PROTECT
PROCURING INNOVATIVE CLIMATE CHANGE SERVICES

D3.3 Report on results of WP3

Bridging the supply and demand for climate services and preparing the PCP

Lead beneficiary: Corvers Procurement Services B.V. (CPS)

Dissemination level: Public

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

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Deliverable abstract

The present report "**D3.3 Report on Results on WP3 Bridging the supply and demand for climate services and preparing the PCP"** provides a summary on the results obtained from the preparation steps of an innovation procurement based on the EAFIP methodology, and includes in the annexes the following relevant documents: State-of-the-art (SOTA) analysis, e-Pitching sessions and OMCs, Business case and value calculations, selected best procurement strategy and tender documents templates.

Keywords

EAFIP, **methodology, , analysis, Open Market Consultation, Business case, procurement strategy, tender documents, pre-commercial procurement, public procurement of innovative solutions**, **exclusion criteria, selection criteria, compliance criteria, award criteria.**

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Table of Acronyms

Acronym	Full name
AI	Artificial Intelligence
AKIS	Agricultural Knowledge and Innovation Systems
COTS	Commercial Off-The-Shelf
CPS	Corvers Procurement Services B.V.
CS	Climate Services
CSA	Coordination and Support Action
EAFIP	European Assistance For Innovation Procurement
EO	Earth Observation
EOOS	European Global Ocean Observing System
ESA	European Space Agency
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FRAND	Fair, Reasonable and Non-Discriminatory
GAC	G.A.C. Group (coordinator)
GEO	Group on Earth Observation
GEOSS	Global Earth Observation System of Systems
GDPR	General Data Protection Regulation
GPA	Agreement on Government Procurement
HAA	City of Haarlem
HE	Horizon Europe
IPRs	Intellectual Property Rights
IoT	Internet of Things
KCEO	Knowledge Centre on Earth Observation
KPI	Key Performance Indicator
NDA	Non-Disclosure Agreement

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Acronym	Full name
OMC	Open Market Consultation
PBG	Public Buyers Group
PC	Project Coordinator
PCP	Pre-Commercial Procurement
PIN	Prior Information Notice
R&D	Research and Development
R&I	Research and Innovation
SMEs	Small and Medium Enterprises
SOTA	State Of The Art
SWVA	
TCO	Total Cost of Ownership
TED	Tenders Electronic Daily
TRL	Technology Readiness Level
WP	Work Package
WTO	World Trade Organization

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Executive summary

This report summarises the outcomes of the Tasks conducted under PROTECT Coordination and Support Action (CSA) WP3 Bridging the supply and demand for climate services and preparing the PCP.

The report is primarily linked to Tasks 3.1, 3.2, 3.3, 3.4, 3.5 and 3.7. It provides a detailed and logical summary and discussion of all the methodological steps carried out under WP3 and explains how they fed into each other.

It recalls the activities conducted during the fine tuning and aggregation of procurers' needs collected and the analysis performed to select the procurement challenges (T3.1) subject to further analysis and that represented the focus of the e-pitching sessions and open market consultations.

In addition, this report details the method and results of the SOTA analysis which also allowed to select the most relevant technologies and services displaying the highest potential for tackling the procurement challenges selected (T3.2).

It further summarises the findings and results of the four e-pitching sessions and open market consultations (T3.3) and the business case and value calculations (T3.4). It also discusses how the key takeaways of these tasks informed the choice for selecting the best procurement strategy and therefore the rationale for conducting the PCP (T3.5). The formal commitment expressed in a signed Letter of Intent foreseen as a result of Task 3.6 and part of D3.4.is also summarised in the report.

Finally, this report contains some template documentation for the tendering documents to be produced for the preparation and launch of the future PCP (T3.7).

Following the identification of four challenges, based on which a preliminary SOTA analysis was performed as well as a market consultation and business case (cost-benefit) analysis, further work and discussions between public buyers led to the selection of one overarching Water challenge.

The methodology, analysis and detailed results of each of the steps based on the European Assistance for Innovation Procurement (EAFIP) methodology to prepare an innovation procurement project are reflected in the reports integrated in D3.3. as part of the Annexes.

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1. Introduction

1.1. Background and context

The EU-funded PROTECT CSA project spans over 24 months and aims to prepare the ground for the future Horizon Europe's Pre-Commercial Procurement (PCP) call HORIZON-CL6-2024-GOVERNANCE-01-5: Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation fully funded by the European Commission through the Horizon Europe programme. This PCP call of a total funding amount of EUR 19 million opened on 17th of October 2023 and closed on the 28th of February 2024.

The awarded PCP project will consist in a joint and possibly cross-border procurement of Research and Development (R&D) services that should help structure and reinforce public demand driven innovation in end-user services based on Earth Observation (EO) in the area of climate change adaptation and mitigation. The procurement of R&D services through the PCP approach has proven to be an effective innovative governance tool and decision-making instrument to close the gap between the supply and demand for innovative solutions.

The future PCP project should deliver successful innovative and fully tested prototype(s) and/or EO end-user service(s) that meet the specific needs of a Public Buyers' Group (PBG) and respond to their common challenge(s). The PBG should be willing and ready to jointly procure innovative marketable solutions, speed up their time-to-market, and ensure best value for money of the procurement. As such, the bidding consortium/ consortia for this call should be a Public Buyers' Group (PBG) led by a designated "Lead buyer" able to implement the PCP process and its various phases, having previously identified a joint challenge with other buyers in the group, that the market cannot currently meet and does not currently provide a satisfying solution.

In this context, Work Package 3 Bridging the supply and demand for Climate Services and preparing the PCP comprises the core activities to prepare the grounds of PCP from the identification and scoping of the problems and challenges with end-users, understanding the technology readiness of potential solutions through a state-of-the-art analysis, engaging with market to obtain the feedback from technology providers on the needs and future plans of the public buyers, developing a business case and a procurement strategy based on one selected challenge, to finally prepare draft tender documents.

For this purpose, PROTECT applied the EAFIP step-by-step methodology and worked together with public buyers and supporting organisations to prepare and present a proposal to the HE PCP call based on one selected Water challenge comprising use cases related to floods, fires and resilient infrastructure.

In short, this report provides an overview of the objectives and outcomes of the tasks performed under WP3 with main conclusions and recommendations. **Section 1.** provides an introduction of the background and context, the purpose of the report and the methodology applied. **Section 2.** provides the summary of results and conclusions of the SOTA analysis. **Section 3.** provides the summary of results and conclusions of the Business case development. **Section 4.** provides the summary of results and conclusions of the Open Market Consultation and e-Pitchings **Section 5.** provides the summary of results of the procurement strategy contained in the Orientation paper and conclusions thereof. **Section 6.** provides the summary of results of the Commitment from procurers and the PCP-WISE public buyers and supporting organisations. **Section 7.** provides an overview of the draft tender documents package.

Finally, the Annexes include the detailed reports of (1) the SOTA analysis; (2) the Open Market Consultation and e-Pitchings; (3) the Business Case development; (4) the Procurement strategy; (6) the Commitment from procurers, and (7) the Tender Documents draft templates.

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1.2. Purpose of this report

This document is developed as part of the PROTECT project, which has received funding from the EU Horizon 2020 Research and Innovation (R&I) programme under the grant agreement number No 101060592. It represents Deliverable 3.3 of Work Package 3 (WP3) – Bridging supply and demand for Climate Services and preparing the PCP.

WP3 aims at identifying the unmet needs of public buyers and steer the market in order to understand if there are existing solutions to tackle the identified challenges and the capabilities of the market to deliver R&D services and/or deploy innovative solutions. As depicted below, WP3 covers the steps to prepare a future innovation procurement project based on the EAFIP methodology.

The steps include: (1) the aggregation of common needs resulting from the work with public procurers throughout different activities (pain point workshops, surveys, thematic discussions, webinars) and the selection of 4 procurement challenges; (2) the state-of-the-art analysis to understand the maturity or technology readiness of solutions relevant to the procurement challenges; (3) the dialogue with the market through an open market consultation process; (4) the development of a business case (value calculations) to understand the costs and benefits of an innovation procurement project and the justification for a PCP; (5) based on the outcomes of these steps, a procurement strategy will define the best procurement approach, either PCP or PPI, the main IPR conditions, the initial set-up for a tender including the PCP timeline, budget, relevant criteria, which are translated in an initial package of tender documents.

These steps correspond to the preparation phase or phase 0 of a potential future PCP.

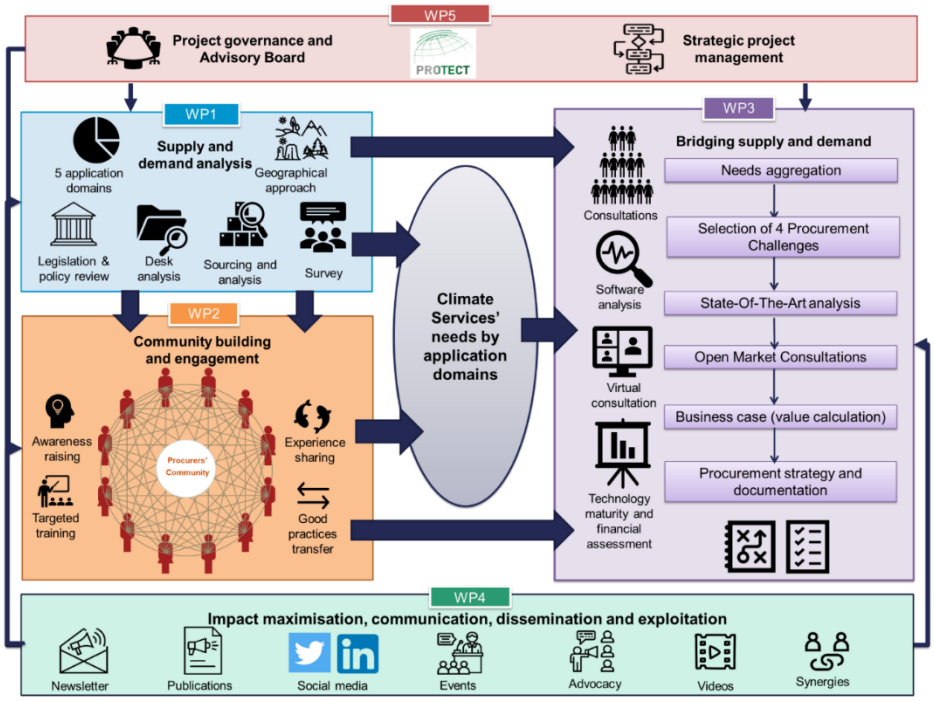

Figure 1: Schematic WPs relation and dependence

The present report summarises the outcomes of each of the preparatory phases and includes the respective report in the annexes. It informs about the results of the tasks conducted under WP3, and provides some conclusions and recommendations.

1.3. Methodology

The EAFIP step-by-step methodology, developed in the context of the European Assistance for Innovation Procurement (EAFIP)[1] initiative of the EC, represents a consistent approach to guide public buyers in the process of designing and implementing an innovation procurement project. It covers the preparation, award and execution of the contract. Particularly importance is given to the preparatory actions in order to ensure the feasibility of the contract, the full satisfaction of the public buyer's needs and an efficient spending of the public funds.

This methodology is based on the PDCA approach (Plan, Do, Check, Act). In the first place, you must understand the problems/needs that you have in your organisation and plan potential solutions to solve them, for instance by purchasing innovative solutions. It is advised to compile your needs in the short and medium term in a demand plan to easily assess which of them should be satisfied first, on the one hand, and inform the technology vendors about your needs so they are aware of them and plan accordingly, on the other.

Once you have a well-defined need that you intend to satisfy through innovation procurement, the next step is to explore whether this approach is suitable and under which conditions by exploring what the market can offer, engaging with technology vendors, and conducting a cost-benefit analysis. If this assessment shows that there are no solutions available in the market to fully cover your needs and the project is economically feasible, then it is possible to conduct an innovation procurement process. The next step is to take action, prepare and publish the tender, followed by the award and execution of the contract(s).

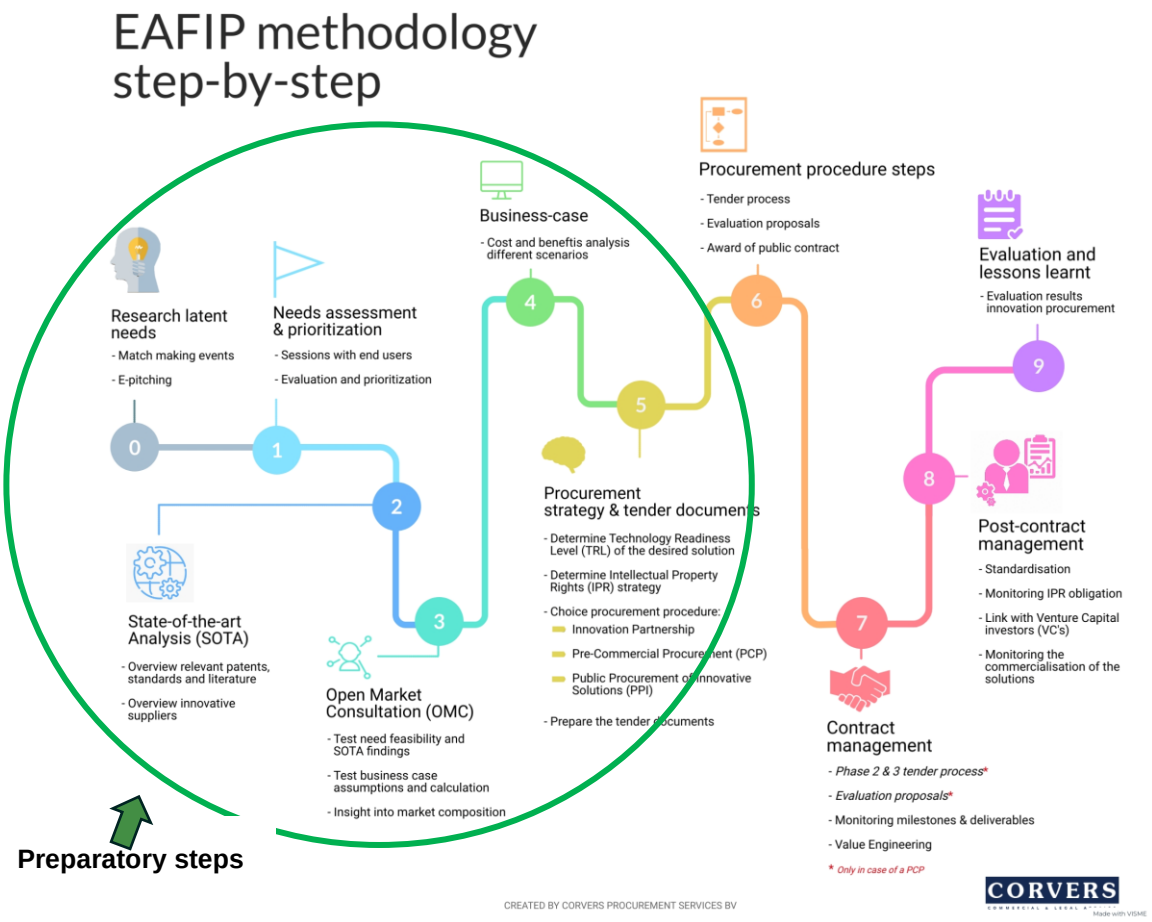

Figure 2: EAFIP step-by-step methodology

[1] www.eafip.eu

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The five (first) preparatory steps – as described below – are fundamental to define the procurement strategy. Once the procurement needs are identified and analysed, the SOTA analysis will reveal information about whether there are (or not) solutions available in the market and the relevant Intellectual Property Rights (IPRs). Then, the findings of the SOTA are validated through an OMC and the economic feasibility of the project through a business case. The results of this preparatory phase will be crucial to designing the tender and finetuning the technical and functional requirements, the selection criteria and the award criteria.

In this process, the Technology Readiness Level (TRL hereinafter) of the solutions, based on the SOTA analysis and the market consultation, is crucial to define the procurement strategy. The following image shows the cycle of innovation up to the commercialisation of a product.

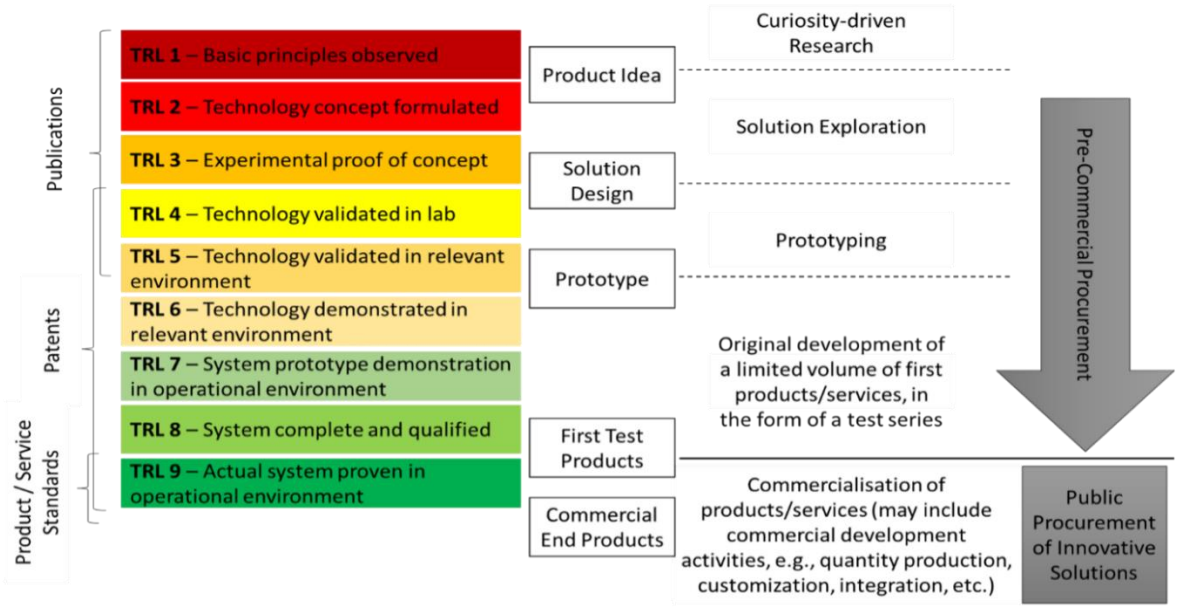

Figure 3:Technology Readiness Level and development maturity. Adapted from EAFIP. (2018). European Assistance for Innovation Procurement (Eafip) Module 2 Toolkit

A lower TRL (3-6) indicates that R&D activities are needed. As described above, if there are no solutions available in the market to tackle the (unmet) needs and R&D actions are required, the choice of procedure may be a PCP. If the TRL is higher (7-9), i.e. the existing solutions are not available on a large-scale commercial basis, it is possible to implement a PPI using the procedures available under the European Public Procurement Directives.

In the abovementioned context, CORVERS following the identification and prioritisation of the end user needs under Task 1.5. and Task 3.1 organised within the project WGs, where workshops were conducted on all the five application domains of PROTECT. These workshops resulted in the narrowing down to the main four challenges: Flood, Fire, Water Resilience, and Sustainable Infrastructure. CORVERS undertook the implementation of the State of the Art Analysis for the 4 selected procurement challenges under Task 3.2 SOTA analysis.

Under Task 1.5 pain point workshops in 5 application domains (Agriculture, forestry and other land uses (including the bioeconomy; Energy and utilities; Marine and coastal environment; Security and civil protection) were conducted to identify challenges and keywords for SOTA research. These keywords were refined to identify patents and standards in addition to the COTS analysis. The results were assessed to estimate the TRL of potential solutions/technologies also considering the TRL definition for software.

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TRL	Definition
1	Preliminary algorithmic stage. Publication of research results.
2	Individual algorithms or functions are prototyped.
3	Prototype of the main functionalities of the integrated system.
4	Alpha version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software development life-cycle; that implements the main functionality of the software and by which preliminary verification and validation activities are archived.
5	Beta version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software life-cycle, that implements the complete functionality of the software and by which preliminary verification and validation activities are archived.
6	Ready for use in an operational or production context, including user support, as a building block or a tool.
7	Demonstrator. Building block and tailored generic software product qualified for a particular purpose.
8	System qualified and ready to be applied in an operational environment.
9	Has been applied in the execution of an operational environment

Table 1: TRL for software

Following the SOTA analysis (section 2), the dialogue with the market provided further insights on the 4 selected challenges (fires, floods, water and sustainable-resilient infrastructure). Based on the results of these steps and the methodology applied to conduct a cost-benefit analysis, a business case was developed for each challenge. Different efforts were employed to work together with public buyers in order to select one challenge to submit a proposal to the HE PCP call. The commitment of public buyers was expressed both by Letters of Intent The outcome of the work performed and the rationale for the selection of the overarching Water challenge has been translated into the procurement strategy contained in D3.2. Orientation paper for procurement strategy.

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2. SOTA analysis

The objective of this task is to detect the existing technologies that may tackle the identified procurement challenges. With this purpose, an analysis of the Intellectual Property Rights (using the IP Intelligent tool IPlytics) was performed featuring the technologies that have been identified in the needs assessment and identification phase. This activity resulted in a stocktaking of existing patents, standards, and certification methods as well as a macro-analysis thereof. The PROTECT partner GECO (GEOsistema) assessed the TRL of the identified technologies, identifying which ones are potential candidates for innovative solutions.

The IPR search conducted delivers two main outcomes:

- A macro-analysis of the results regarding patenting firms, activity, and geography, among others. The complete lists of each search which are attached to this file as annex; and
- A complete list of the relevant documents. The list of patents is presented in a spreadsheet, as annex to the report. A list of standards is also provided in the report in section 4.2. GECO with the help of the partners conducted a thorough technical examination of the IPR search based on the primary findings. With the use of their technical knowledge, they have examined and determined which patents and standards are most useful for each technology within the parameters of this project. They also helped to improve the results drawn by the IPR for each technology.

The output of Task 3.2 is provided in in Annex 1. “Report on the results from the SOTA analysis”.

2.2 Summary of results

2.2.1 Challenge 1 Floods

The analysis revealed research on the :

- Methods for identifying the probability of occurrence of a flood event (risk indicators)
- Flood measuring and trigger system (usually by making grids of the regions)
- After event evaluation of the affected area
- Flood map production
- Systems and methods are provided for processing observation data.

Technologies & tools: Satellite imagery, computer vision, artificial intelligence, multi sensor input (drones etc), image analysis, statistical analysis, and mathematical analysis, kernel algorithm, visible-infrared band images of a region, water based network devices.

Keywords used: Flood/s, earth observation, rapid prediction, coastal, river, detect ,Risk, sea level rise, Satellites, internet of things, drones, AI among others. Also search was contacted with all the COTS that were provided by our partners from Aerospace Valley.

The main keywords “floods’’, ‘’coastal’’ and ‘’river’’ were first paired to side keywords like: “rapid prediction”, “detect” and ‘’earth observation’’ and then also with keywords like “drones”, “satellites” and “AI”, which relate to the specific technology used. Moreover a final search was contacted using the companies from the COTS such us “Copernicus’’ and ‘’European Space Agency’’. Using different combinations of the above keywords we identified more than 2950 patents (some patents are duplicates among the more than 2950 that our research generated), for the purpose of the report we are using only the main keywords and we identified more than 980 patents related to the flood challenge. This number resulted from a steady number of patent applications from 2013 onwards in different domains such technologies for adaptation of climate change.

More specifically, the analysis reveals a rich landscape of cutting-edge research in flood prevention, monitoring, and management technologies. These innovations span a diverse array of areas, showcasing advancements in precision flood prediction, remote sensing technologies, and intelligent

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flood management systems. In an effort to filter these inventions into cohesive groups, we've identified key categories such as Flood Resilience Technologies, EO Advancements, Precision Flood Prediction Systems, and Intelligent Flood Management Systems. Each group encompasses a cluster of inventions and technologies that share common themes and objectives, providing a comprehensive overview of the various efforts to address and mitigate the impact of floods through technological innovation. Moreover there are projects like ECFAS ‘’ A Proof-Of-Concept for the Implementation of a European Copernicus Coastal Flood Awareness System.’’ that are trying to address the floods issue by implementing a European coastal flood awareness system by leveraging Copernicus emergency management system.

2.2.2 Challenge 2 Fires

The analysis revealed research on the :

- Methods for identifying fire risk level
- Early warning- prediction
- Fire management system (status, monitoring & forecast –estimated progression)
- Maps & graphical representation of fire information
- None of the results was related to waste fire specifically but the inventions identified can provide a technological basis for the challenge

Technologies & tools: Satellite imagery, multi sensor input (drones etc), vegetation information, and weather data, statistical analysis, and mathematical analysis, cloud-to-ground lightning distribution characteristics, water based network devices.

Keywords used: Fire ignition, monitoring of fire, prediction, forest fires, Wildfires, satellites, Earth Observation, waste fire, fire prevention, fire risk, fire prediction, Automated notification, Artificial Intelligence, drones, IoT among others. Also search was contacted with all the COTS that were provided by our partners from Aerospace Valley.

The main keywords “waste fire’’, ‘’forest’’ and ‘’earth observation’’ were first paired to side keywords like: “fire prevent”, “fire risks” and ‘’fire prediction’’ and then also with keywords like “drones”, “satellites” and “AI”, which relate to the specific technology used. Moreover, a final search was contacted using the companies from the COTS such us “Sentinel’ ’and ‘’European Space Agency’’. Using different combinations of the above keywords we identified more than 9400 patents (some patents are duplicates among the more than 9400 that our research generated), for the purpose of the report we are using only the main keywords and we identified more than 800 patents related to the fire challenge. This number resulted from a steady increase in number of patent applications from 2013 onwards in different domains such us computer technology. During the review, a significant attempt was put in excluding some sectors which eluded the subject matter of the search such as the telecommunication industry.

More specifically the analysis of innovative fire-related technologies reveals a spectrum of research areas, each contributing to the advancement of fire monitoring, detection, and management systems. In an effort to filter these varied inventions, we have organised them into specific groups, allowing for a more focused understanding of the technological landscape. These groups highlight advancements in areas such as advanced detection systems, automated assessment and prediction methods, geostationary satellite-based detection, integration of IoT and AI for wildfire detection, automatic fire identification, advanced tools for fire management, and mobile fire suppression systems. Each group represents a unique side of the ongoing efforts to enhance our capabilities in combating and mitigating the impact of fires.

2.2.3 Challenge 3 Water

The analysis revealed research on the :

- Methods for identifying the probability of occurrence of a drought
- Systems and methods are provided for processing observation data
- Methods for identifying risk level
- Early warning- prediction
- Water and drought management system (status, monitoring & forecast –estimated progression)
- Maps & graphical representation of water information

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Technologies & tools: Satellite imagery, multi sensor input (drones etc), computer vision, vegetation information, and weather data, statistical analysis and mathematical analysis, water based network devices, ground measuring data, GUI, use of database management systems in handling future data.

Keywords used: Drinking water, Earth observation, drinking water management, water quality, Drought, satellites, fresh water, water detection, AI, water demand, machine learning, In situ among others. Also search was contacted with all the COTS that were provided by the PROTECT partner Aerospace Valley.

Comparably to the previous report, the search in this area had to be refined several times before reaching the correct scope. In fact, the main keywords (e.g., "drinking water", "water management", ''water quality'' and "earth observation") may belong to many different sectors and domains like pharmaceuticals, most of which are out of the scope of this search.

The main keywords were first paired to side keywords like: "water quality", "drought", ''water detection'' which mostly focuses on water; and then also with keywords like "drones", "satellites" and "Iot", which relate to the specific technology used. Moreover a final search was contacted using the companies from the COTS such us "Copernicus' 'and ''European Space Agency''.

Using different combinations of the above keywords we identified more than 3050 patents (some patents are duplicates among the more than 3050 that our research generated), for the purpose of the report we are using only the main keywords and we identified more than 2100 patents related to the water challenge, but if you exclude the patents from industries that are not relevant such as ''pharmaceuticals'', ''medical technology'' and ''computer technology'', and keep only the ones from relevant industries such as ''climate change adaptation' and ''environmental technology'' the outcome of the search is around 1150 patents, the majority of which are associated to technologies within the water challenge domain. The close relation is probably due to the specificity of the industries, especially if compared to previous searches. This number resulted from a steady number of patent applications from 2013 onwards in different domains such technologies for adaptation of climate change.

During the review, a significant attempt was put in excluding some sectors which eluded the subject matter of the search such as the pharmaceutical industry. Nevertheless, although a review of the patents was performed, the list may still include some outliers.

More specifically the analysis of innovative inventions in the realm of environmental monitoring and water resource management has revealed cutting-edge research in distinct areas. In an effort to filter these advancements, we have categorised them into three comprehensive groups, each showcasing a unique focus on technological solutions. These groups are named as follows: Advanced Environmental Monitoring and Management Systems, Advanced Water Resource Management Technologies, and Integrated Water Environment Management Systems. This segmentation allows for a clearer understanding of the diverse technologies contributing to the advancement of environmental sustainability and water resource management.

2.2.4 Challenge 4 Sustainable and resilient infrastructure

The analysis revealed research on the :

- After event evaluation of the affected area
- Creation of a thermal map of a region
- Urban heat island detection method
- Systems and methods are provided for processing observation data.
- Analysis of urban morphology
- Methods for monitoring and managing urban water resources and hydrology through a network of stations
- Early warning-prediction
- Methods for identifying risk level

Technologies & tools: digital aerial and satellite imagery, photography, computer vision, artificial intelligence, multi sensor input (drones etc), image analysis, statistical analysis and mathematical analysis, airborne and spaceborne sensors, deep learning, ground-based data gathering, remote sensing data, data modelling, open source geographical data, image processing, remote sensing image and high-resolution remote sensing image.

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Keywords used: Earth Observation, urban heat islands, urban planning, Infrastructure, satellites, mapping urban areas, Ground sensors, heat island effect, rural areas, neighbourhoods, floods, energy management and fire ignition among others. Also search was contacted with all the COTS that were provided by our partners from Aerospace Valley.

In this application domain we are seeing a lot of overlap in the keywords used with the previous 3 ones seen above. That happens cause the scope of this challenge is very broad and incorporates functionalities that we also saw in the previous challenges. Therefore besides using the main keywords that apply only here such us ‘’infrastructure’’ and ‘’urban heat islands’’, keywords like “drones”, “satellites” and “drones”, which relate to the specific technology used and the companies from the COTS such us “Sentinel’’ and ‘’European Space Agency’’, we also used keywords such as ‘’fire ignition’’ and ‘’floods’’. Using different combinations of the above keywords we identified more than 2350 patents (some patents may be the same among the more than 2350 that our research generated), for the purpose of the report we are using only the main keywords and we identified 56 patents related to the infrastructure challenge. This number resulted from a steady increase in the number of patent applications from 2021 onwards in mainly in the adaptation of climate change domain.

The main keywords were first paired to side keywords like: “urban planning”, “earth observation”, ‘’mapping urban areas’’ which mostly focuses on infrastructure in general; and then also with keywords like “drones”, “satellites” and “AI”, which relate to the specific technology used followed by keywords that address different functionalities in the challenge such us ‘’energy management’’.

More specifically the analysis of recent innovations in research has unveiled a diverse range of advancements in several critical areas. In an effort to filter these advancements into coherent categories, we have identified and summarized them into the following groups. These groups encapsulate groundbreaking research in intelligent transportation and urban mobility, thermal mapping and environmental monitoring, sustainable urban planning and hydrological management, environment simulation and comfort, greenhouse gas monitoring and environmental sensing, as well as water sustainability and infrastructure investment. Each group represents a cluster of technologies and methodologies aimed at addressing specific challenges and contributing to the broader landscape of technological innovation.

2.3 Conclusions

The SOTA analysis report outlines the findings from the IPR search, specifically targeting patents and standards related to the four main challenges identified in the PROTECT CSA project: "Floods", "Fire", "Water resilience", and "Sustainable infrastructure’’.

The patents analysed within the Flood challenge demonstrated the highest average TRLs among the four challenges. The Flood challenge's TRL assessment shows advanced technologies at TRL levels 7 to 9, indicating high readiness for market entry. These patents cover a variety of fields from automated flood risk assessment and real-time flood mapping to dynamic simulation models. They aim to provide user-friendly tools for emergency operations and damage assessment and integration with COTS products such as Copernicus could enhance capabilities further. The Flood challenge emphasises the need for rapid mapping and prediction tools, integrating historical data, cloud services, and real-time mapping algorithms. Challenges include data availability, tool complexity, and user-friendliness. The technologies embedded in these patents address these needs, focusing on digital twin integration, cloud-based solutions, and real-time analysis algorithms.

As far as the Fire challenge is concerned we can see that the TRL assessment focuses on emerging technologies for early fire detection and risk mitigation. These technologies, mainly in development (TRL 4-6), include sensors and simulation models. High-tech companies and research institutions are developing these solutions.

They involve early warning systems, real-time monitoring, and predictive analytics to enhance fire response. The challenge aims to automate fire risk monitoring and response, particularly focusing on waste fires in storage facilities. These technologies complement existing solutions, using data like Copernicus for automated prediction and prevention.

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For the Water Resilience challenge we see patents offering innovative technologies, spanning from conceptual to applied research stages, often using AI. They focus on optimizing water use, enhancing irrigation efficiency, and monitoring water quality. With TRL averages between 5 and 7, they're ready for practical use, and many integrate with products like Sentinel-1 and ESA-Copernicus datasets for better Earth observation data. These technologies aim to improve water monitoring, distribution, and decision-making processes, aligning with the challenge's objectives for sustainable water management.

For the last challenge, Sustainable Infrastructure challenge which aims to improve urban and rural areas' sustainability and climate resilience, patents cover a range of technologies, including AI-driven decision support systems and nature-based solutions for urban planning and risk management. These patents vary in readiness, from conceptual models to near-commercial readiness. They are held by universities, research institutes, and corporations, showcasing innovation from academic and corporate sectors. Integration with existing COTS products could enhance urban planning and resource management. These patents contribute to addressing challenges like flood risk quantification and improving sustainable infrastructure.

Moreover although there are differences in patenting activity and industry domains across the four challenges, a similarity exists in their geographical distribution. The majority of patents come from regions outside of Europe, indicating a significant lag in Europe. This suggests there's room for innovation, with Europe potentially having lower regional TRL compared to other regions.

Additionally, a possible gap and opportunities for innovation are highlighted by the analysis of pertinent standards for the four challenges, with a focus on the lack of standards in particular. The small number of recognised standards points to unrealised potential for creating novel approaches in the field.

In conclusion, the combined analysis of patents and standards shows a dynamic and promising environment for innovation for the four challenges. Although a number of applications and functionalities relevant to the intended solution were found in the previous analysis, a complete solution that fully satisfies all of the requirements was not found.

The research conducted aimed to identify COTS products for the PROTECT project, particularly focusing on EO-based climate services in the EU. Through desk research, surveys, and consultations, the most used COTS products were found to be open data platforms like Copernicus. The survey research formed the basis for identifying COTS, considering parameters such as technology readiness level, type of climate services, technology used, and application domains.

The EU Survey tool was instrumental in disseminating the survey, which underwent multiple iterations and reviews by consortium partners. Based on application domains, taxonomy, data, technology used, and TRLs, solutions were identified. The emphasis on EO-based services led to a focus on space data sources, with providers integrating multiple sources into their services. While various sources were identified, a non-exhaustive inventory was compiled, considering the most frequently utilised ones.

The results of the COTS analysis, describe products, equipment, and technical solutions available on the commercial market. These findings indicate that the identified data sources provide a solid foundation for EO providers to deliver dependable services. However, there's anticipation for advancements in data types, sources, and quality standards, leaving room for innovation through research and development.

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3. Open Market Consultations

The aim of Task 3.3. Open Market Consultations was to ensure that implementing Innovation Procurement is the best way to tackle the four procurement challenges identified. The activities performed under this task helped to communicate procurers' needs to the market well in advance, crosscheck the findings of the desk research and obtain relevant information from suppliers on existing (or to be developed) technologies.

Additionally, GAC organised four e-Pitching sessions (one per selected procurement challenge) - in which the market suppliers (specifically start-ups and SMEs) presented how their existing solutions could tackle the procurement challenges selected. The logistics and organisation of these sessions were done by GAC and moderated by AV.

The e-Pitching sessions served to verify the accuracy of the preliminary SOTA analysis. Following the e-Pitching sessions, four online OMC webinars took place with the purpose to initially measure the degree of innovation, to assess whether the needs of the procurers could be fulfilled via innovation procurement approaches.

The information from the SOTA and the e-Pitching sessions was useful to prepare questions on budget, time, standards, etc. Additionally, a questionnaire was developed and a Prior Information Notice (PIN) for the OMC was published on the TED platform. The PIN assured a wide communication at EU level fostering transparency and ensuring broader competition. The OMC was also widely announced not only in TED via a PIN (to ensure European coverage), but also via other communication channels (LinkedIn and the network of the PROTECT partners).

In particular, AV relied on an extensive and reliable network of partners all across Europe, thanks to its involvements in numerous European and ESA projects (AZO, Skywin, Verhaert, IPN, Gaïa, Madrid Aerospace Cluster, Corallia, Tern, Moravia Aerospace Cluster, Space PL, CESAH, Brimatech). Aerospace Valley is a member of the ESA BIC network and has extended partnerships with the other 19 ESA BICs spreading over 60 cities and 17 European countries. It represents a network of 700 space startups. AV relied on the ESA BIC network operators to promote PROTECT project toward their ecosystems.

In addition, AV is one of the French Copernicus Relays. In close cooperation with the Commission and the Participating States, the Relays act as multipliers and develop initiatives to promote Copernicus as a source of free, full, open and reliable data and information that can help develop business and boost growth. They are identified as one-stop-shop for Copernicus related affairs. Aerospace Valley made use of this network as a multiplier to reach EO startups across the EU. Aerospace Valley mobilised its partner EARSC that represents the EO geo-information services companies, providing geo-spatial data to its customers in Europe and the world. Ultimately, Aerospace Valley relied on the Space Climate Observatory, operated by its long term partner CNES, the national delegate for ESA programmes. .

The goal of the SOTA analysis and OMC was the identification of suppliers that can provide solutions to the challenges. Based on the results of the OMC and the e-Pitching, the concrete 4 procurement challenges were fine-tuned.

Annex 2. "Open Market Consultation Report" provides detailed information on the results of Task 3.3.

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3.1 Summary of results

The Open Market Consultation (OMC) Report of the PROTECT project regarding 4 challenges, namely: Floods, Fire, Water resilience, and Sustainable & resilient Infrastructure, began with its publication in the Tender Electronic Daily (TED).[2] The rules and objectives of the PROTECT OMC, as well as the challenges, the potential public buyers and the PCP approach are described in the OMC Document with Annexes.

Through the OMC, the PBG organised under the PROTECT project informed market operators regarding the upcoming PCP of R&D services for the "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation"[3]. The OMC also aimed to understand the market operators' capabilities to satisfy the PBG's needs and to obtain their input on the viability of the procurement plans and conditions as described in this document and annexes.

The objectives of the OMC were to:

1) Validate the findings of the SOTA analysis and the viability of the set of technical and financial provisions.
2) Raise awareness of the industry and relevant stakeholders (including other users) regarding the upcoming PCP.
3) Collect insights from the industry and relevant stakeholders (including users) to finetune the tender specifications.

The OMC activities consisted of:

- **Four webinars** that took place on 15th and 16th November 2023. The webinars were carried out in English and broadcasted online.
- **A request for information** in the form of an EU Survey questionnaire which was filled out by 18 respondents.
- **Other activities and questionnaires** as deemed necessary within the scope of the project, including a publication of a **Q&A document.**

The OMC was performed under the law of the lead procurer, which is Dutch law.

The target groups of the OMC were users and technology vendors. All interested parties were invited to take part in the OMC. However, it was clarified that the participation in the PCP may be restricted to companies from EU and Associated Countries.

Based on the feedback provided in the EU Survey questionnaire, the majority of respondents belong to start-ups and SMEs.

Participation during the OMC webinars was larger. In each of the four OMC webinars, the number of participants ranged from 25 to 35 persons who followed each of the four complete 90 minutes session. The webinars celebrated within the framework of the OMC were recorded. The video recordings are available on the website of PROTECT.

The timetable of activities and required actions of the OMC is indicated below:

Date	Event
20 September 2023	Publication of the Prior Information Notice (PIN) on TED 574857-2023 - Planning - TED (europa.eu)

[2] See the published PIN on TED: 574857-2023 - Planning - TED (europa.eu)

[3] The upcoming €19 million pre-commercial procurement call is fully funded by the EU. The goal of the "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation" call is for a consortium of public procurers (the "buyers group") to prepare, launch and implement a pre-commercial procurement procedure that responds to a commonly identified challenge in the area of climate adaptation and mitigation. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf#page=555

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Date	Event
25 September 2023	Publication of the OMC documents in the project's website and EU Survey: https://ec.europa.eu/eusurvey/runner/PROTECT-PCP-2023 Open registration for the events and submission of questions
10 November 2023	Deadline to submit questions (17:00h CET)
14 November 2023	Deadline to register for the webinars (17:00h CET)
15-16 November 2023	Celebration of the 4 OMC webinars
17 November 2023	Publication of the Q&A document in the project's website
20 November 2023	Deadline to fill in the EU Survey (17:00h CET)
27 November 2023	Publication of the OMC report
30 November 2023	Closure of the OMCI

Table 2: OMC Timeline

All the relevant information of the OMC, including the results of the e-Pitchings carried out to complement the market analysis is available in the annex "Open Market Consultation Report".

3.2. Conclusions

The OMC revealed that the market is ready to participate in a PCP. Some providers indicated that they could add value to tackling all the four challenges due to the wide range of services they can cover. Other providers can tackle some elements of solutions and contribute to part of the functional requirements of one or more challenges, and they will be interested in cooperation and synergies to address the challenges.

The assumption of PROTECT that there is room for innovation was confirmed by most of the respondents. Several fields for R&D were identified.

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4. Business case development

The business case development and value calculations conducted under Task 3.4. aim to assess the economic impact and viability of starting a PCP. This analysis has the purpose to ensure that PCP solutions will be marketable in the long-run and support the procurers in presenting the case of the project internally to their upper management, in term of value added for their organizations.

In this regard, a parallel analysis on a double track has been performed:

Track 1: Technical analysis (State-of-the-art): consisted of a report about the current market conditions of the COTS products, as well as the analysis of the innovation landscape of the identified technologies through an IPR search. Based on the outcome of this task COTS and the IPR analysis, it was possible to draw some assumptions about the potential cost of development (cost of the PCP) and the cost of purchasing the innovative solution (through a follow-up PPI).

Track 2: Financial analysis: the analysis considers that the motive for innovation is triggered by a specific need identified in the needs assessment in relation to the impact on the organizations. Therefore, the benefits of a PCP to develop innovative solutions, consist in the non-occurrence of a specific scenario and the related impacts. Procurers were asked to measure (1) the occurrence and (2) the impact of each scenario in their organizations. The occurrence considers the frequency of the scenario, while the impact considers the damage in terms of costs and other non-quantitative variables.

The result of the first track provides a rough estimate of the potential cost of the solution, while the outcome of the second track would reveal the benefits for each organization, giving a benchmark to establish the budget of the PCP, the numbers of firms that will be admitted to the challenge, as well as an estimate of the follow-up purchase in a PPI. This information is the basis for building the first version of the Business Cases in relation to the identified procurement challenges.

Annex 3. “Report on the Business case and value calculations” provides the results of the activities conducted to build a Business case.

4.1. Summary of results

The PROTECT Consortium developed a baseline scenario using the expertise knowledge of partners and relevant literature to calculate potential benefits. This assessment considered the current methods and equipment used by the stakeholders for the execution of their daily operations as depicted in the four challenges, as well as related manpower, hours, number of small and large scale extremes, and other associated costs.

The partners estimated the PROTECT solution's performance in terms of cost reductions and revenue increases. Operational and personnel costs related to daily operations were analysed to project how these efficiencies could reduce current losses.

In this regard, the consortium anticipates :

- Flood challenge : The business case appears to be profitable for the implementation of the PROTECT solution. Our analysis indicates significant potential savings and positive impacts, especially when adopted by large regions such as Lombardy, Emilia-Romagna, or Tuscany. Over a 10-year period, the primary benefits include reduced costs for municipalities and local public bodies, enhanced flood protection for civil society and economic sectors, and improved public safety. With multiple regions expected to adopt the service, the collaborative effort will further amplify these benefits, making the investment advantageous for all stakeholders involved.
- Infrastructure Challenge: For this challenge also the business case is profitable for the implementation of the PROTECT solution Based on the sensitivity analysis results, it can be concluded that the monetised benefits have a significant positive impact on the Net Present

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Value (NPV). This is further evidenced by the fact that the NPV is positive across all three scenarios, indicating that the investment is viable for potential buyers. But is important to note that the main component of this challenge which is the heat island effect is also connected with the other 3 challenges that we are trying to address in the context of PROTECT. Therefore, a procurer that is aiming to produce a business case to address the challenge needs to take into account the impact and benefits from the other challenges as well.

- Fire Challenge : Based on the sensitivity analysis results and the fact that the NPV is only slightly negative in the baseline scenario—a figure that is not significant relative to the overall investment—indicates that the investment can be viable for all potential buyers. This can be seen also in the best-case scenario, where an increase in the prediction accuracy of the tool a very positive impact on the investment's viability a scenario which is very likely since the PROTECT solution can built upon actual tested solutions that are on the market which have already achieved 80% accuracy. Nevertheless, we recommend that the developed solutions has at least 85% percent accuracy in order to ensure the viability of the project.

These estimates indicated a positive NPV in all three challenges, suggesting that the investment is profitable for the PROTECT public buyers. A worst-case scenario was also examined, outlining conditions where the investment might not be profitable. Given the number of assumptions made during the preparatory phase, it is recommended that buyers re-evaluate these initial results with more detailed Use Cases before the implementation of the PCP taking into account the value of statistical life.

Lastly, due to the complexities involved, conducting a detailed calculation for the water challenge is considered difficult at this stage of the project. However, we have summarised the effectiveness in terms of savings and impacts associated with implementing a water demand forecasting solution. This summary provides a foundational basis for future cost-benefit analyses. This preliminary analysis highlights the potential for significant operational cost savings, improved resource management, and enhanced preparedness for water-related crises, underscoring the value and importance of continuing to develop and refine water demand forecasting capabilities.

4.2. Conclusions

The Business case report presents the outcomes of the cost benefit analyses conducted in order to justify the R&D investment for the development of a solution that addresses each one of the four identified challenges.

The outcomes of SOTA have been taken into account for evaluating the financial viability of the R&D investment. Based on the above and the market state of play (Section 2) as well as OMC and SOTA results, partners concluded with an approximation of 1 million per user for the initial R&D investment (section 3.1).

The specific impacts, benefits (internal and external / monetary and non-monetary), and costs connected with the development of the innovative solution have been identified in direct consultation with the end users as well as the review of relevant literature. For the development of a cost benefit analysis and in order to evaluate the occurrence of events, a sensitivity analysis based on the assumptions made in the baseline scenario have been performed.

The first version of the cost benefit calculations have been drafted for three out of the four challenges due to limited information on the monetary values for the costs and benefits associated with the water resilience challenge.

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5. Best procurement strategy

The selection of the best procurement strategy of Task 3.5 consists of the assessment – based on the information gathered in the prior steps (needs assessment, state-of-the-art analysis, open market consultation and business case development) following the EAFIP methodology- of whether the implementation of a PCP is justified based on the maturity of the solutions resulting from the TRL assessment, or if the TRL of the solution is higher to select a PPI .

The procurement strategy reflected in the D3.2. Orientation paper (Annex 4), provides the elements to decide for a PCP or PPI approach based on the identified challenges, some preliminary functional specifications, the Intellectual Property Rights (IPR) strategy, and the initial set-up of the PCP.

5.1. Summary of results

D3.1. Orientation delivered at M18 is linked to the results of Task 3.1 – Finetuning and aggregating procurement needs and selecting procurement challenges, Task 3.2 SOTA analysis, and to Task 3.3 Open market consultations with state-of-the-art CS providers to a lesser extent. This deliverable (D3.1) provided a summary of the analysis conducted which allowed to prioritise the recommendations for those procurement challenges displaying a higher climate and procurement impact and that already indicate potential for a PCP as the right approach to address these challenges (T3.1). It also provided a detailed overview of the methodology and tools implemented to conduct the SOTA analysis and the results of the SOTA analysis (T3.2). In addition, this deliverable informed about the specific objectives of Task 3.3 and the methodology and tools to organize and conduct the four e-pitching sessions and the four open marketing consultations later on.

D3.2 Orientation paper to address procurement challenges (final version) delivered at M24 updates D3.1 with further results on the analysis of the procurement challenges in the context of Task 3.3 and Task 3.4 and the discussions leading to the selection of one challenge. It provides a detailed summary of the activities carried out in the context of the four e-pitching sessions and the four open market consultations and the business case and value calculations analysis.

5.2. The Orientation paper

The orientation paper recommends the implementation of PCP and PPI regarding four identified challenges with a higher climate and procurement impact selected in the framework of the PROTECT project. The PCP and/or PPI approach is justified in each case based on the information obtained as a result of the activities carried out during the preparatory phase of innovation procurement projects following the EAFIP methodology.[4]

The identification and selection of procurement challenges and the definition of the procurement approach relates to the outcome of the five main steps in the preparatory phase described in this orientation paper: (1) needs identification and assessment; (2) SOTA analysis; (3) OMC; (4) business case development; and (5) procurement strategy design.

The first orientation paper recommended PCP as the main procurement instrument to tackle the following four procurement challenges, as the functional requirements cannot be achieved by one existing solution and thus R&D is required:

- **FLOODS CHALLENGE:** Rapid-mapping, predicting, preventing different types of floods and improving coordination efforts, relevant to marine and coastal environments, sustainable cities and civil protection and security agencies

[4] See the European Assistance for Innovation Procurement (EAFIP www.eafip.eu).

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- **FIRES CHALLENGE:** Predicting, preventing fires, tracking and tracing causality (causers) in different scenarios (waste, forest/nature, other), relevant to environmental agencies, sustainable cities, agriculture, forestry and land use, as well as for civil protection and security agencies.
- **WATER CHALLENGE:** Climate resilient solutions for predicting, connecting data, planning, supply-demand, relevant to the application domains marine and coastal environments, energy and utilities, sustainable cities, agriculture, forestry and land use, as well as for civil protection and security agencies.
- **INFRASTRUCTURE CHALLENGE:** Sustainable & resilient re-development, buildings restoring & adaptation), relevant to sustainable cities, energy and utilities and civil protection and security agencies.

The scope of the abovementioned four (4) challenges and use cases was reassessed based on the OMC results and the discussions held with public buyers committed to implement a PCP. The result was the selection of **one overarching Water (management) challenge clustering different use cases. The aim is an integral assessment of day-to-day SWVA conditions with space-based value chains based on local/central knowledge (AI, EO-Inversion/hydrological modelling, etc.)** to provide a first basis of local water intelligence for the use case stakeholders. Driven by the functions required by the organisations the data on SWVA conditions can support regular or crisis management processes (e.g. risk indicators) in different application domains. As such, the testing and validation strategy requires the support of technical organisations that will support the PCP implementation. Since the work of these organisations falls outside the scope of PROTECT CSA, the methodology, technical criteria and test planning will be part of the follow up PCP.

Based on the developments mentioned above, this paper details the procurement strategy for a PCP considering the requirements of the relevant Horizon Europe on PCP action.[5] The strategy includes an **updated setup** for the PCP phased approach, the number of suppliers per phase, the budget allocated by supplier per phase, and the duration of each phase.

5.3. Conclusions

As a result of the activities conducted in the framework of the PROTECT project, four procurement challenges have been identified and selected with the purpose of exploring the feasibility and grounds to implement a PCP. The common challenges and functional requirements are considered to have a high climate and procurement impact with cross-border relevance for multiple public buyers and users across the EU.

Based on the preliminary results of the preparatory steps (following the EAFIP methodology), in particular the SOTA analysis and the results of the OMC, it is possible to reach the initial conclusion that the four challenges require R&D efforts in order to tackle the functional requirements identified in the different use cases. Therefore, the recommended approach for the four challenges is the possible implementation of a PCP.

It has been noted that some existing solutions could tackle some functionalities of the floods challenge. In this case, it could be possible to apply the PPI approach, in particular one of the procedures established in the Public Procurement Directives for the only purpose of testing solutions without the possibility of actually purchasing the solution as such. This approach could be also applied by public buyers interested in any of the solutions presented during the e-pitching sessions.

Further analysis of the OMC results and discussions with the public buyers led to scoping one challenge that could cluster different use cases relevant to the other 3 challenges. As a result, the Water

[5] "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation" call is for a consortium of public procurers (the "buyers group") to prepare, launch and implement a pre-commercial procurement procedure that responds to a commonly identified challenge in the area of climate adaptation and mitigation. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf#page=555

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(management) challenge was selected given the importance and impact of water intelligence solutions on use cases related to floods, fires and sustainable and resilient infrastructure across domains. The different use cases would be validated by end users from cities, agricultural agencies, first responders and water management agencies.

The justification of the use cases is the integral assessment of day-to-day SWVA conditions with space-based value chains based on local/central knowledge (AI, EO-Inversion/hydrological modelling, etc.). This will provide a first basis of local water intelligence for the use case stakeholders. Driven by the required functions in their organisations, the translation from the SWVA conditions towards regular or crisis management processes (e.g. risk indicators) can be achieved.

For the preparation of the PCP proposal to respond to the HE PCP call, the orientation paper has set some considerations for the selection of the PCP and/or PPI approach, and possible provisions to strengthen the EU strategic autonomy and resilience, such as the 100% of R&D performance in EU Member States or Associated countries. It is also important to consider allowing a good number of suppliers to participate in phase 1 and phase 2 of the PCP increasing the chances of alternative solutions and incentivising more startups and SMEs to present (joint) bids in the PCP tender.

The paper has also outlined the relevant topics and guidelines to set up the procurement strategy based on the selection of the Water (management) challenge linked to EO data relevant for crises prediction, prevention and mitigation, including updated allocation of the PCP budget, the evaluation of bids, the contract implementation, the testing strategy and the intellectual property rights regime.

In this context, this Orientation Paper reflects the developments in the assessment of needs and the procurement strategy linked to the outcomes of the work performed in cooperation with the committed public buyers who submitted the proposal to the HE PCP call. In the implementation process, the (selected) use cases in Europe will provide a representative spectrum of requirements for the procurement process.

Finally, it is recommended to consider additional preparatory activities and the final selection of use cases once/if the PCP HE grant is awarded to finetune and tailor the PCP tender documents accordingly.

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6. Securing commitment from procurers

The activities conducted under Task 3.6 sought to secure commitment from the procurers' community for the implementation of the potential future PCP. In this task, HAA in charge of managing the community of procurers requested procurers and the relevant decision makers of their organisations to express their formal interest and commitment to undertake an upcoming joint, cross-border or coordinated procurement procedures to tackle one of the selected procurement challenges. The formal commitment was gathered through a signed Letter of Intent. By signing a Letter of Intent, procurers are not bound to conduct the procurement procedure in the event they decide to withdraw.

In total, 11 Letters of Intent were received from various European regions, including The Netherlands, Italy, Belgium, Slovakia, Spain, Finland and Denmark, demonstrating a diverse range of participants committed to addressing climate challenges through innovative procurement approaches.

The Letters of Intent signed by procurement decision-makers of contracting authorities are included in Annex 5.

6.1. Summary of results

Various methods were utilised in order to collect Letters of Intent from procurers. Through collaboration with partners, leveraging social channels, and engaging with the extended PROTECT network, interested buyers were identified and contacted via email with a request to sign the Letter of Intent.

Events played a crucial role in pinpointing interested parties, where networking efforts introduced potential buyers to PROTECT and the PCP-call. Aside of networking, potential buyers were also informed about PROTECT through presentations held during meetings and events. A recent example of such an event is the EU Urban Agenda Partnership on Innovative and Responsible Procurement, organised by PROTECT partner City of Haarlem in April 2024, where a presentation about PROTECT was held. Contact information gathered at events like this facilitated email exchanges, expanding the PROTECT community. Interested contacts were provided with best practices, key recommendations, and other resources relevant for them. Public buyers were also invited to subscribe to the PROTECT newsletter, which helped to keep them informed about the progress of the project and ensured that they remained engaged with the wider PROTECT community.

Additionally, the PROTECT community also organised its own events. In the past year, two series of 'Pain Point Webinars' were organised by the PROTECT Partner Corvers Procurement Services with European buyers and representatives from procurement, innovation and climate adaptation policy departments of regional, local, and national public authorities throughout Europe. Furthermore, two series of training webinars were created on innovation procurement and climate services and three virtual e-pitching sessions were held with providers of climate services. Following these e-pitching sessions, four virtual open market consultations were organised. Each of these sessions focused on one of the four selected climate adaptation & mitigation challenges identified by public buyers of the PROTECT Community. Another way in which engagement with the network was established was through providing on-demand consultations. Interested parties could reach out to the consortium via the PROTECT Community Platform and ask for an on-demand consultation service, which was provided free of charge to them. All these initiatives laid the foundation for future collaborations and encouraged signatories to commit to the Letter of Intent.

D3.4 Report gathering all the signed Letters of Intent details the outcomes achieved. Specifically, it presents the Letters of Intent submitted by procurers to the EU-funded PROTECT project, which aims to support urgent climate adaptation and mitigation through innovation procurement procedures. The Letters of Intent express formal interest and commitment from public authorities across European regions to undertake joint, cross-border, or coordinated procurement procedures to tackle one of the procurement challenges outlined in T.3.1.

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In total, 11 Letters of Intent were signed by the following organisations of 7 European countries:

Organisations that provided a Letter of Intent:

1. Urban Agenda Partnership on Public Procurement
2. Emilia-Romagna Region
3. City of Geel
4. ISEMI
5. Ministry of Interior of Slovakia
6. Institut Cartogràfic i Geològic de Catalunya
7. Municipality of Las Rozas de Madrid
8. Klimatorium
9. Forum Virium Helsinki
10. STOWA
11. Ministry of Business and Labour Catalonia

The results show the collaboration among public buyers and ia shared interest in a joint pre-commercial procurement in Climate Services. Additionally, even in cases where no Letters of Intent were signed, valuable interactions took place which could lead to future collaborations.

The results of Task 3.4 can be found in Annex 5 “D3.4 Report gathering all the signed Letters of Intent'.

6.2. PCP WISE public buyers

In addition to the commitment expressed in the Letters of Intent, twelve (12) public buyers have committed to participate in the PCP as part of the PBG in the context of the proposal submitted to the PCP-WISE HE PCP call. Several technical organisations are also committed to support the development of the testing and validation plans. Other seventeen (17) organisations are interested in joining as supporting organisation and/or the Stakeholders Group (SG).

These organisations are listed below.

Role	Organisation	Country
Lead Procurer	STICHTING TOEGEPAST ONDERZOEK WATERBEHEER	THE NETHERLANDS
Public Buyer	HET WATERSCHAPSHUIS (hWh)	THE NETHERLANDS
Public Buyer	FORUM VIRIUM HELSINKI OY (FVH)	FINLAND
Public Buyer	MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY (MINISTRY OF INTERIOR SLOVAKIA) (MoI)	SLOVAKIA
Public Buyer	GEMEENTE HAARLEM (CITY OF HAARLEM)	THE NETHERLANDS
Public Buyer	BUNDESANSTALT TECHNISCHES HILFSWERK (THW)	GERMANY
Public Buyer	REGION OF CENTRAL MACEDONIA (RCM)	GREECE

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Role	Organisation	Country
Public Buyer	FORENINGEN KLIMATORIUM (KLIMATORIUM)	DENMARK
Public Buyer	BENEGO – GRENSPARK KALMTHOUTSE HEIDE	BELGIUM
Public Buyer	INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA (ICGC)	SPAIN
Public Buyer	CITY OF ROTTERDAM	THE NETHERLANDS
Public Buyer	SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA (SLOVAK ENVIRONMENTAL AGENCY) (SEA)	SLOVAKIA
First Responders	BAYERISCHES ROTES KREUZ (BRK)	GERMANY
First Responders	ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO (ISEMI)	SLOVAKIA
Technical Institution	INSTITUT D'ESTUDIS ESPACIALS DE CATALUNYA FUNDACION (IEEC)	SPAIN
Technical Institution	CLIMATE-KIC HOLDING BV (CLIMATE KIC)	THE NETHERLANDS
Technical Institution	AEROSPACE VALLEY (AV)	FRANCE
Technical Institution	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV (FRAUNHOFER)	GERMANY
Technical Institution	UNIVERSITEIT TWENTE (UT-ITC)	THE NETHERLANDS
Technical Institution	FUNDACIO PRIVADA I2CAT, INTERNET I INNOVACIO DIGITAL A CATALUNYA (I2CAT)	SPAIN

Table 3: Organisations committed to participate in the Water challenge PCP

A brief description of the public buyers is provided below:

1. STOWA works collaboratively with universities, knowledge institutions, and the business community, and supports water boards in meeting short and long-term water management challenges.
2. HET WATERSCHAPSHUIS (HWH) facilitates knowledge sharing and resource optimisation, strengthens the Netherlands' resilience against water-related challenges. Together, these organisations play a vital role in ensuring effective water management practices nationwide, contributing to the country's sustainability and resilience against water-related risks.

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3. FORUM VIRIUM HELSINKI (FVH) is dedicated to advancing Helsinki's smart city initiatives through technology and innovative solutions by engaging diverse stakeholder to contribute to Helsinki's climate goals.
4. THE MINISTRY OF INTERIOR OF THE SLOVAK REPUBLIC (MOI) ensures efficient procurement of goods and services. Through initiatives like the iProcureNet project, MOI promotes innovation in public procurement, addressing security sector needs and fostering cross-border collaboration.
5. THE CITY OF HAARLEM is a recipient of the 2022 Innovation iCapital Award, is a leader in innovation within the Netherlands. With a focus on climate adaptation, sustainability, and fostering innovative SMEs and startups, Haarlem aims to procure 100% circular by 2030, addressing challenges such as urban heat island effects and local flooding.
6. BUNDESANSTALT TECHNISCHES HILFSWERK (THW) is a civil protection agency in Germany, providing technical relief nationally and internationally, and civil protection.
7. THE REGION OF CENTRAL MACEDONIA (RCM) is known for its extensive track record in initiatives such as participation in the INCAREHEART PCP procurement process and its unique mechanism supporting the regional ecosystem's capacity, extroversion, startup support, and project scaling within the framework of RIS3.
8. KLIMATORIUM – INTERNATIONAL CLIMATE CENTER IN DENMARK spearheads collaborative efforts to address climate challenges at local and global levels. Through a living lab approach and circular thinking, Klimatorium develops sustainable solutions and fosters knowledge dissemination to build climate resilience.
9. BENEGO - GRENSPARK KALMTHOUTSE HEIDE (GKH) fosters cooperation in the Dutch and Belgian border in topics including climate change, water management and innovation.
10. THE CARTOGRAPHIC AND GEOLOGICAL INSTITUTE OF CATALONIA (ICGC) provides expertise in geo-information science, security strategies, and spatial data infrastructure.
11. THE CITY OF ROTTERDAM is one of the main cities in the Netherlands characterised for being one step ahead in innovations.
12. SLOVAK ENVIRONMENTAL AGENCY (SEA) specialises in environmental protection and climate change adaptation. Engaged in environmental monitoring and informatics, SEA actively contributes to designing, developing, and implementing environmental information systems, particularly in geoinformatics and remote sensing.

Other organisations are committed to join to provide their expertise :

1. BAYERISCHES ROTES KREUZ (BRK), the Bavarian Red Cross is committed to a more social, better and stronger Bavaria, ready to crises and disasters.
2. ISEMI, a non-profit organization supporting the implementation of security strategies for various international organizations, specializing in areas such as police cooperation, counter-terrorism, and emergency management.
3. THE INSTITUTE OF SPACE STUDIES OF CATALONIA (IEEC) is a distinguished space research and innovation hub with 25 years of expertise, spearheading Catalonia's New Space Strategy for global prominence in space endeavours and the Bavarian Red Cross (BRK) play pivotal roles in environmental stewardship, urban infrastructure development, and disaster relief.
4. CLIMATE-KIC is Europe's premier climate innovation agency, catalysing collective action to bridge the gap between climate commitments and reality.
5. AEROSPACE VALLEY is France's top innovation cluster in aeronautics, space, and unmanned systems, fuels regional growth and job creation through research and development, fostering collaboration between industry and academia to advance aerospace technologies.

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6. FRAUNHOFER AVIATION & SPACE, comprising over 30 institutes, conducts and fosters innovation in climate resilience, aerospace technology, and research advancement.
7. UNIVERSITY OF TWENTE, FACULTY ITC (UT-ITC), ITC collaborates with international organizations to address global challenges through spatial data analysis and research.
8. THE I2CAT FOUNDATION drive transformative solutions using advanced technologies. Together, these diverse partners form a robust consortium committed to addressing complex societal challenges through innovation, collaboration, and knowledge exchange.

The following entities have expressed their support to the PCP proposal and willingness to be part of a Stakeholder Group.

No.	Organisation	Supporting	Stakeholder Group (SG)
1	ARPA Lombardia		X
2	European Association for Remote Sensing Companies (EARSC)		X
3	French National Fire Officers Academy (ENSOSP)		X
4	Hoogheemraadschap De Stichtse Rijnlanden (Regional Water Authority		X
5	Irrigation Community Segarra-Garrides in Catalonia	X	X
6	Ministry of Climate Action, Food and Rural Agenda. Government of Catalonia		X
7	Ministry of Interior of France		X
8	Netherlands Space Office		X
9	Provincie of Limburg		X
10	Région Provence Alpes Côte D'azur (PACA)		X
11	Technology Centre of Catalonia (EURECAT)		X
12	Toulouse Métropole	X	X
13	Waterschap Limburg	X	
14	Zilina Self-Governing Region		X
15	Municipality of Fundão		X
16	Emschergenossenschaft/Lippeverband		X
17	Regional Council of Nouvelle-Aquitaine	X	

Table 4: Supporting organisations and members of the Stakeholder Group

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This preliminary overview of the committed parties shows a diverse array of institutons including research institutions, public agencies, innovation clusters, technical and supporting organisations, that bring a wealth of expertise and resources to implement a PCP for the Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation, to address the Water management challenge.

6.3. Conclusions

The report D3.4. details the steps taken to accomplish Task 3.3: Report gathering all the signed Letters of Intent' and the outcomes achieved. Specifically, it presents the Letters of Intent submitted by procurers to the EU-funded PROTECT project, which aims to support urgent climate adaptation and mitigation through innovation procurement procedures. The Letters of Intent express formal interest and commitment from public authorities across European regions to undertake joint, cross-border, or coordinated procurement procedures to tackle one of the procurement challenges outlined in T.3.1.

The methodology section outlines various approaches used to collect Letters of Intent, including collaboration with partners, leveraging social channels, and engaging with the extended PROTECT network through events, presentations, and webinars. These efforts facilitated the identification and contact of interested buyers, ultimately resulting in the signing of 11 Letters of Intent.

In total, 11 Letters of Intent were received from various European regions, including The Netherlands, Italy, Belgium, Slovakia, Spain, Finland and Denmark, demonstrating a diverse range of participants committed to addressing climate challenges through innovative procurement approaches.

Additionally, for the preparation and submission of the PCP-WISE Water challenge proposal, twelve (12) public buyers, eight (8) technical organisations and other seventeen (17) stakeholders expressed their commitment. The parties who presented the PCP-WISE proposal shows a diverse array of institutions including research institutions, public agencies, innovation clusters, technical and supporting organisations. They bring a wealth of expertise and resources to implement a PCP for the Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation, to address the Water management challenge.

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7. Tender documents

After conducting the previous steps and defining the main guidelines of the procurement, two sets of draft tender documents have been prepared taking into account the HE guidance to prepare PCP tender documents:

1) a PCP neutral template designed in the context of the initial four challenges (floods, fires, water and sustainable and resilient infrastructure) to be filled in with the technical details relevant to one procurement challenge.
2) a PCP template designed based on the selected overarching Water management challenge resulting from the work of the public buyers who presented a PCP-WISE proposal for the HE PCP call on the customization/pre-operationalisation of prototypes end-user services in the area of climate change mitigation and adaptation using EO-data. This second draft tender documents need to be further finetuned and tailored in coordination with the public buyers and the technical institution that will prepare the testing and validation plans. Some of these organisations are not partners of the PROTECT CSA consortium and will only be actively working on the PCP project after the award of the HE PCP Grant.

The template of all the required tender documents include drafts of the Contract Notice, the Contract Award Notice, the Request for Tenders, the Framework Agreement and/or Contracts. The legal documents have been drafted from a European perspective (not including national laws and regulations that need to be addressed at a later stage with the actual public buyers involved in the PCP implementation). The procurers concerned will have to adapt the draft tender documents to their national framework, if needed. Some of the milestones, KPIs and deliverables asked from the selected suppliers, as well as the definition of a monitoring system are included in the draft tender documents.

The two sets of draft tender documents are included in Annex 6.

8. Conclusion

D3.3. Results of WP3 provides the outcomes of each of the preparation steps of an Innovation Procurement project following the EAFIP methodology, namely: (1) needs identification; (2) SOTA analysis; (3) business case development; (4) open market consultation; and (5) procurement strategy. The report summarizes the results and the annexes detail the methodology applied in each step, the respective findings and the conclusions reached towards the preparation of a Pre-Commercial Procurement focusing on one of the four identified challenges (floods, fires, water and resilient infrastructure), namely, the overarching Water challenge. Overall, the challenges identified require the development and combination of technologies signalling the room for innovation through PCP. More specifically the analysis conducted on the SOTA concerning the Water challenge reveals a complex landscape ripe for innovation. Specifically, the analysis of patent applications and industry trends highlights the absence of a dominant technological leader in the water resilience domain, signalling an environment favourable to innovation. The follow up PCP can focus on the development of key technologies that can be developed from TRL5 to TRL8. The results show that there is room for innovation and commitment from public buyers to pursue the Water challenge. Based on the results of these steps, a first package of tender documents has been drafted.

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Annexes

1. SOTA analysis report

See Annex 1. “Report on the results from the SOTA analysis”.

2. Open Market consultation report

See Annex 2. “Open Market Consultation Report”.

3. Business case report

See Annex 3. “Report on the Business case and value calculations”.

4. Procurement strategy paper

See Annex 4. “D3.2.Orientation Paper”.

5. Commitment of procurers report

See Annex 5. “D3.4. Report gathering all the signed Letters of Intent”.

6. Tender documents template

See Annex 6. “Tender Documents (TD1 to TD15)”.

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PROTECT
PROCURING INNOVATIVE CLIMATE CHANGE SERVICES

Report on the results from the SOTA analysis

Lead beneficiary: CPS
Dissemination level: Public

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Project acronym	**PROTECT**
Project title	Preparing a Pre-Commercial Procurement for end-user services based on Environmental Observation to adapt and mitigate climate change
Thematic priority	HORIZON-CL6-2021-GOVERNANCE-01
Type of action	Coordination and Support Action (CSA)
Deliverable number and title	Report of the results from the SOTA analysis part of D3.3.
Work package	WP3
Due date	30/05/2024
Submission date	25/05/2024
Start date of the project	01/06/2022
End date of the project	30/06/2024
Deliverable responsible partner	Corvers Procurement Services B.V,
Version	1.0
Status	Final
Author(s) name(s)	Egli Rrokaj (CORVERS GREECE), Maria Kampa (CORVERS GREECE), Abed El Majid (CORVERS)
Contributing partners	GECO, AV
Reviewer(s)	
Document type	R – Report
Dissemination level	SEN – Sensitive, limited under the conditions of the Grant Agreement

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Version	Date	Modified by	Comments
0.1	10/05/2024	Egli Rrokaj	Draft version
0.2	17/05/2024	Ana Lucia Jaramillo	Draft version
0.3			
1.0			

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Table of Acronyms

COTS	Commercial Off-The-Shelf
EAFIP	European Assistance for Innovation Procurement
EC	European Commission
FRAND	Fair, Reasonable and Non-Discriminatory
IP	Intellectual Property
IPR	Intellectual Property Rights
OMC	Open Market Consultations
PCP	Pre-Commercial Procurement
PPI	Public Procurement of Innovation
R&D	Research and Development
SOTA	State of the Art
TEM	Transmission Electron Microscope
TRL	Technology Readiness Levels
EPO, EP	European Patent Office
WIPO, WO	World Intellectual Property Organisation
ITU	International Telecommunication Union
IETF	Internet Engineering Task Force
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
ETSI	European Telecommunications Standards Institute
TRL	Technology Readiness Level
EO	Earth Observation

1 Background and Context

1.1 Context and scope of the mapping definitions

The European Union (EU) is committed to achieving climate neutrality by 2050 and reducing Greenhouse Gas (GHG) emissions by at least 55% by 2030. The transition to a greener Europe requires the active involvement of all stakeholders capable of bringing about transformative, systemic changes. To succeed, it is essential to leverage a diverse range of technologies and services and gain a comprehensive understanding of both local and global climate change challenges in order to construct a future that is climate-neutral. Earth Observation (EO) is a promising field with significant potential to drive the development of climate services (CS), aiding in the comprehension of climate change, mitigating its risks, and addressing its impacts across various sectors and geographical locations.

Prompted by the urgency of climate issues, the EU is increasingly asserting its leadership position by setting ambitious targets for adaptation and mitigation measures. These measures encompass GHG emissions reduction, renewable energy, energy efficiency, and other parameters outlined in policies like the EU Green Deal. Climate change adaptation and mitigation policies typically have a substantial direct impact on the services market. They often serve as primary drivers of demand in the sector, addressing intricate issues that necessitate long-term solutions at a systemic level. Such initiatives frequently generate the need and funding for the development of customized climate services, including tools,

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products, and information. Even when private actors appear to be steering the growth of the CS market, their actions are often in compliance with public policies, particularly in the domains of environmental, social, and corporate governance.

Within the above-mentioned context, PROTECT aims at levering innovation procurement to unlock the climate services (CS) market's potential to support urgent climate adaptation and mitigation. The work is organised within 5 Work Packages as depicted in the following figure.

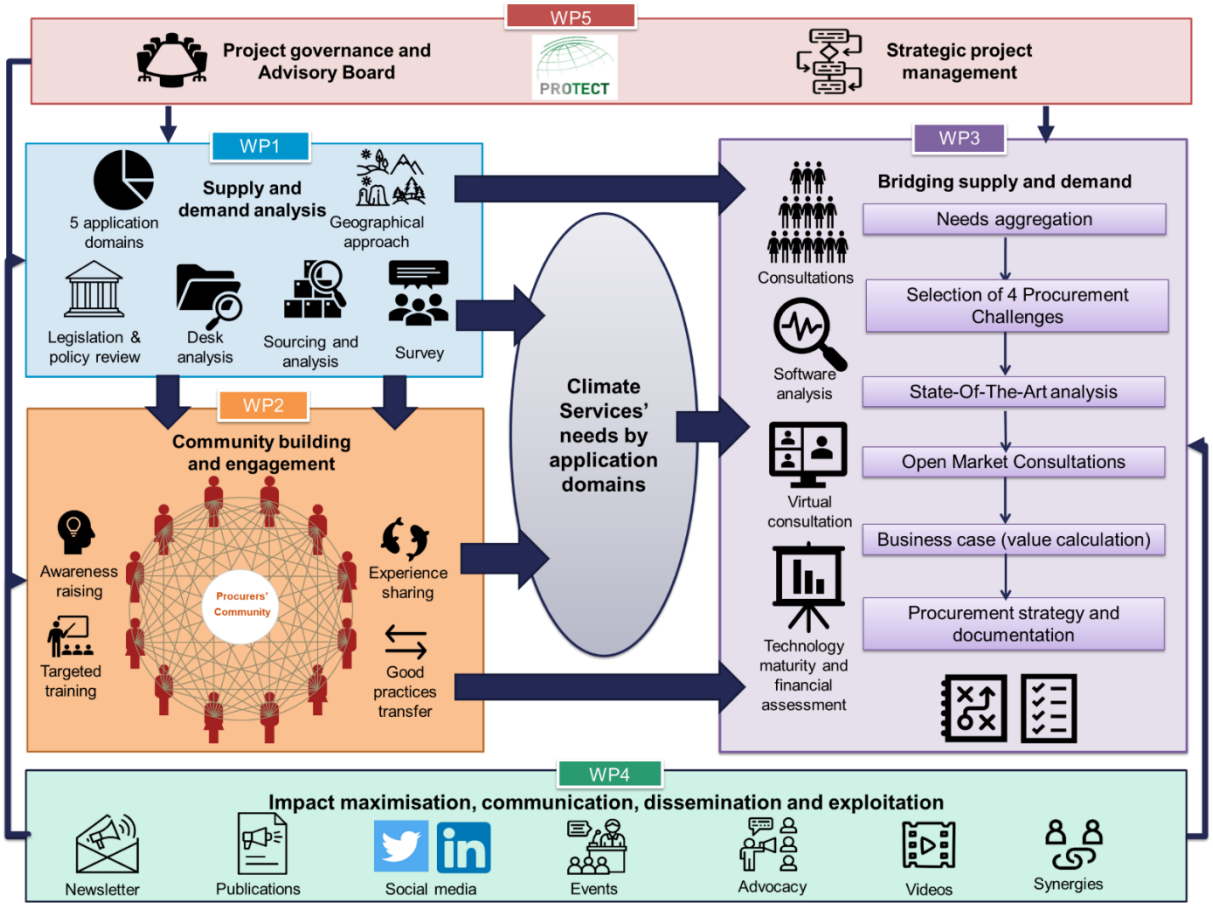

Figure 1: Schematic WPs relation and dependence (source: PROTECT proposal)

In addition, the project was organised to cover horizontally 5 application domains, as described below:

- **Agriculture, forestry and other land uses (including the bioeconomy)** - Agriculture, forestry and other land uses cover a wide range of environments and have great potential for climate services. Unsustainable agricultural and forestry practices (e.g., overexploitation of soils, conversion of forests to agricultural land) generate large amounts of greenhouse gases and disturb the already fragile balance of local ecosystems.

- **Energy and utilities** - Utilities include all activities related to water supply, sewage services, electricity, dams and natural gas.

- **Marine and coastal environment** - Marine environments are aquatic environments with high levels of dissolved salt. They include the open ocean, the deep ocean and coastal marine ecosystems, each with different physical and biological characteristics and therefore representing different ecosystems.

- **Security and civil protection** - Civil security and protection includes the policies, bodies and mechanisms that a country or region has in place to protect itself against new and urgent threats to the safety of people and/or the functioning of critical infrastructure.

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- **Sustainable urban communities** - Green and sustainable urban communities harness their human, natural and financial capital to meet current and future needs in a sustainable manner, with a long-term perspective (ex: heat islands, effects of climate change on the (vulnerable) urban population etc.).

In this context, PROTECT identified common needs and challenges to be tackled by innovation procurement, and for which an analysis of the state-of-the-art of potential solutions was performed following as explained in the following sections.

1.2 Deliverable relation to the project tasks

The EAFIP step-by-step methodology, developed in the context of the European Assistance for Innovation Procurement (EAFIP)[1] initiative of the EC, represents a consistent approach to guide public buyers in the process of designing and implementing an innovation procurement project. It covers the preparation, award and execution of the contract. Particularly importance is given to the preparatory actions in order to ensure the feasibility of the contract, the full satisfaction of the public buyer's needs and an efficient spending of the public funds.

This methodology is based on the PDCA approach (Plan, Do, Check, Act). In the first place, you must understand the problems/needs that you have in your organisation and plan potential solutions to solve them, for instance by purchasing innovative solutions. It is advised to compile your needs in the short and medium term in a demand plan to easily assess which of them should be satisfied first, on the one hand, and inform the technology vendors about your needs so they are aware of them and plan accordingly, on the other.

Once you have a well-defined need that you intend to satisfy through innovation procurement, the next step is to explore whether this approach is suitable and under which conditions by exploring what the market can offer, engaging with technology vendors, and conducting a cost-benefit analysis. If this assessment shows that there are no solutions available in the market to fully cover your needs and the project is economically feasible, then it is possible to conduct an innovation procurement process.

The next step is to take action, prepare and publish the tender, followed by the award and execution of the contract(s).

The five (first) preparatory steps – as described below – are fundamental to define the procurement strategy. Once the procurement needs are identified and analysed, the State-Of-The-Art (SOTA) analysis will reveal information about whether there are (or not) solutions available in the market and the relevant Intellectual Property Rights (IPRs). Then, the findings of the SOTA are validated through an Open Market Consultation (OMC) and the economic feasibility of the project through a business case. The results of this preparatory phase will be crucial to designing the tender and finetuning the technical and functional requirements, the selection criteria and the award criteria.

[1] www.eafip.eu

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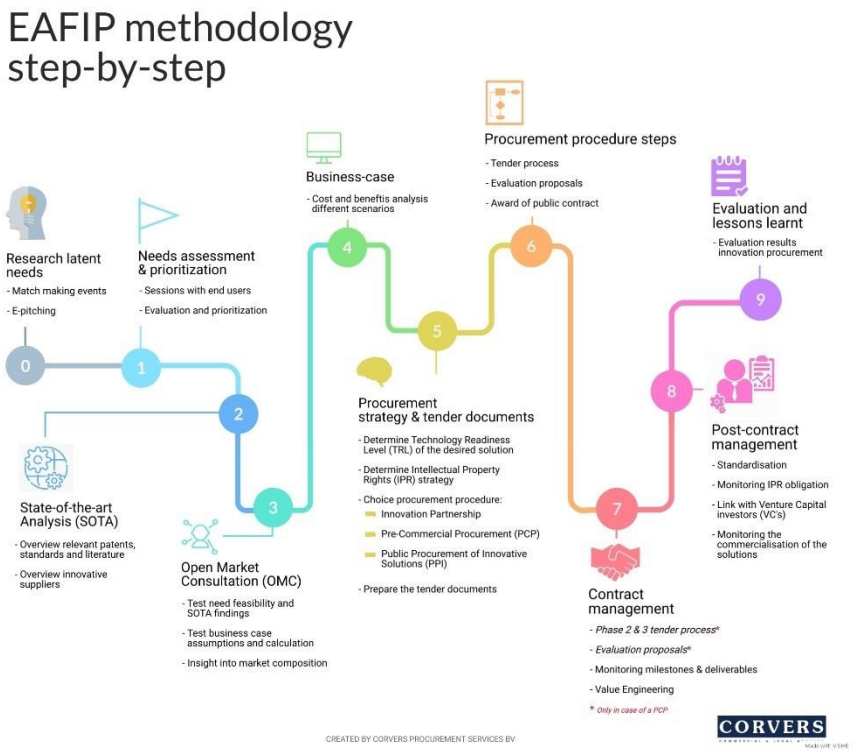

Figure 2:Summary of the EAFIP step-by-step methodology

In this process, the Technology Readiness Level (TRL hereinafter) of the solutions, based on the SOTA analysis and the market consultation, is crucial to define the procurement strategy. The following image shows the cycle of innovation up to the commercialization of a product.

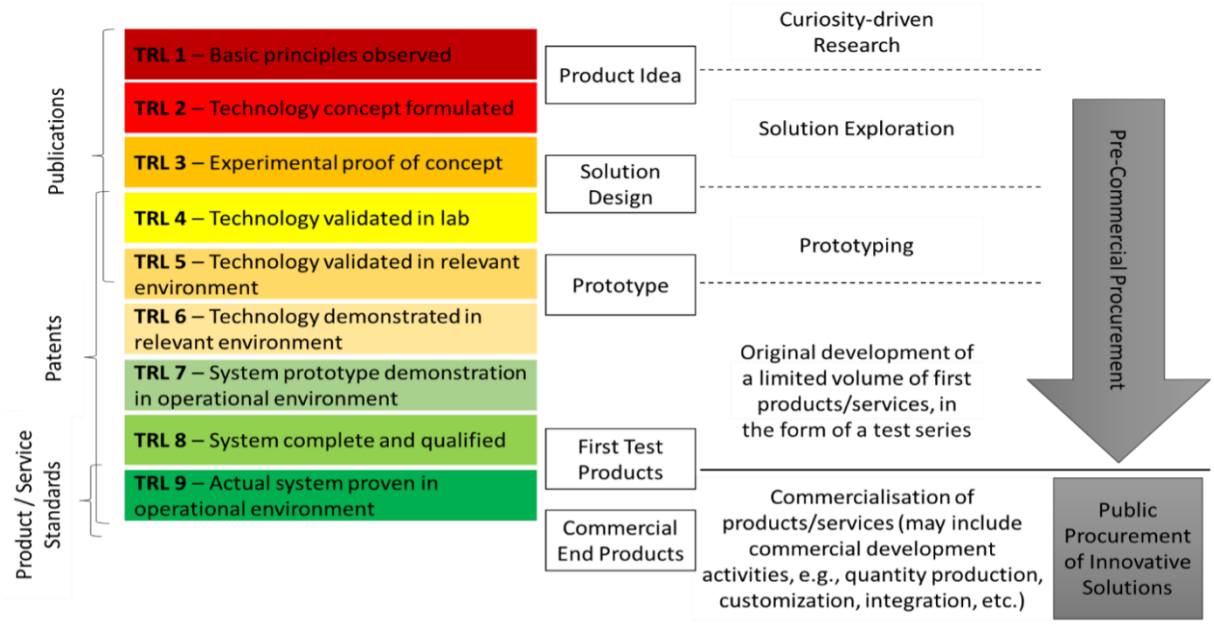

Figure 3:Technology Readiness Level and development maturity. Adapted from EAFIP. (2018). European Assistance for Innovation Procurement (Eafip) Module 2 Toolkit

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A lower TRL (3-6) indicates that R&D activities are needed. As described above, if there are no solutions available in the market to tackle the (unmet) needs and R&D actions are required, the choice of procedure may be a PCP.

If the TRL is higher (7-9), i.e. the existing solutions are not available on a large-scale commercial basis, it is possible to implement a PPI using the procedures available under the European Public Procurement Directives.

In the abovementioned context, CORVERS following the identification and prioritisation of the end user needs under Task 1.5. .& Task 3.1 organised within the project WGs, where workshops were conducted on all the five application domains of PROTECT. These workshops resulted in the narrowing down to the main four challenges: Flood, Fire, Water Resilience, and Sustainable Infrastructure. Corvers undertook the implementation of the State of the Art Analysis for the 4 identified procurement challenges under Task 3.2. : State-Of-The-Art (SOTA) analysis.

In particular, Task 1.5 has implemented pain point workshops in each of the 5 application domains, where, among other objectives, we identified keywords for state-of-the-art (SOTA) research. We began with a base of keywords from the Task 1.5 workshops, which focused on the 5 application domains. Later, we refined these keywords to align with the 4 main challenges. In addition, Task 3.1 spanned until M18 (in parallel with T3.2.) on finetuning and aggregating procurers needs and selecting procurement challenges. In this regard, T3.2 was implemented in parallel with T3.1 receiving input and updating the aforementioned keywords.

2 State of the Art in PROTECT

2.1 Task 3.2 Description

The objective of this task is to detect the existing technologies that may tackle the identified procurement challenges. Building on T1.3 results, CPS, VTREK and Corvers Greece performed an analysis of the Intellectual Property Rights (using the IP Intelligent tool IPlytics) featuring the technologies that have been identified in the needs assessment and identification phase. This activity resulted in a stocktaking of existing patents, standards, and certification methods as well as a macro-analysis thereof. GECO assessed the TRL of the identified technologies, identifying which ones are potential candidates for innovative solutions. The output of Task 3.2, namely the SOTA analysis is provided in this report as part of D3.3 Report on results from SOTA analysis, ePitching sessions and OMCs, Business case and value calculations, selected best procurement strategy and tendering documents.

2.2 Partners' Effort

The involved partners and their required effort in man-months is provided in the table below.

Timeframe: M12-18	GAC	AV	HAA	Corvers Leader	VTREK/Corvers Greece	CKIC	GECO
Partner Effort (MP)	0,25	1,00	0,25	1,00	4,00	0,25	2,00

Table 1: Partners effort allocation

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2.3 Task strategy and distribution of the activities

Task 3.2 is divided in three activities:

- The analysis of the Intellectual Property Rights (using the IP Intelligent tool IPlytics) -> Listing the existing patents, standards -Leader CORVERS/VTREK
- COTS mapping further market analysis & certification methods - Leader AV, CKIC
- Analysis of the material collected, transforming this into a list of technologies and assessment of the TRL level of these technologies. Leader: GECO

The main aim is to identify the room for innovation. In the PROTECT context, a State-of-the-Art analysis has significant goals:

- It reveals whether a specific technology which could meet the needs of the Partners is already available on the market or whether some degree of R&D is needed in order to further develop potential solutions.
- It informs the purchasing strategy toward either a procurement of R&D (i.e., a Pre-Commercial Procurement, PCP), the modification or adaptation of existing solutions (i.e., a public procurement of innovative solutions, PPI), or procurement of an identified Commercial Off-The-Shelf (COTS) solution.

Activity (a)

This step refers to a macro analysis of the total stock of relevant patents, standards, standard essential patents, to obtain information on their type, scope, breadth, content, radicalness and technical relevance, as well as the associated institutions and related suppliers owning intellectual property rights (IPRs). The room for innovation/and or standardisation, the initial maturity level, the result that can be achieved in a given solution space, the associated expected timeline and investment will be determined.

In this step, Corvers/Vtrek/Corver Greece performed an Intellectual Property rights identifying suitable Patents, Standards and Literature to support the partners in the assessment of the TRL of the identified technologies.

As input for this step, Corver/Vtrek/Corver Greece used the keywords obtained as a result of Task 1.5.

After reviewing this analysis, an in-depth technical analysis of the most relevant documents was performed by technical experts from GECO, AV, CKIC. This resulted in the **top 10 patents per application domain.**

This activity provided input to 1) the questions for the OMC, requesting responses from potential firms for how they would incorporate particular IPR or meet certain standards, for example; and 2) the drafting of the tender documentation (technical specifications and award criteria). One defining feature of the IPR search was the provision of information which is independent of industry bias (e.g., identified through research and not self-reported), which reduces the knowledge asymmetry between contracting authorities and the market.

Activity (b)

Using the input provided by the pain point workshops, it was important to identify and evaluate the available Commercial Off- The-Shelf (COTS) products which can satisfy the identified gaps.

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The aim was to identify **at least 5 COTS per application domain** and certication methods if applicable.

Activity (c)

After obtaining the outcomes of the previous tasks, the task was to identify the TRL level of the technologies connected with selected COTS and to conduct a macro analysis of the results.

GECO gathered material and selected the **5 most relevant technologies** per use case that have been selected as critical for the needs of the Partners and which could be eligible for an upcoming PCP.

Under this activity it was also explored the possibility to transversal technologies to be used to more than one application domains.

3 State of the Art Analysis Methodology

3.1 Rationale for an IPR Search

The Intellectual Property Rights (IPR) search conducted by Corvers/Vtrek and Corvers Greece delivers two main outcomes:

- A macro-analysis of the results regarding patenting firms, activity, and geography, among others. The complete lists of each search which are attached to this file as annex.
- A complete list of the relevant documents. The list of patents is presented in a spreadsheet, as annex to this report. The standards list is provided in a table in paragraph 4.2. GECO with the help of the rest of the partners has conducted a thorough technical examination of the IPR search based on the primary findings. With the use of their technical knowledge, they have examined and determined which patents and standards are most useful for each technology within the parameters of this project. They also helped to improve the results drawn by the IPR for each technology.

3.1.1 Rationale for examining intellectual property (patents)

IPR that are granted by a central body and that need to be published as a condition of receiving an intellectual property (IP) grant are referred to as "registered intellectual property." All IPR, however, do not need to be registered in order to be effective, and patent applications may be just as important as patents that have been awarded. Among the forms of intellectual property (IP) that provide protection to the owner of an idea are patents and literature, which are academic publications mainly published in peer-reviewed scholarly journals (as well as agreements and trade secrets).

Patent searches are very important for PCPs because patents are frequently the most pertinent registered intellectual property for technological R&D. A patent is a legal and technical document that gives the owner the authority to forbid third parties from releasing their goods onto the market. It is believed that merely filing for a patent is adequate evidence of a person or organization's (financial) dedication to the subject. A patent demonstrates this commitment. Every country's patent regulations adhere to the "absolute novelty" standard. This means that regardless of the country or chronological order, all inventions in the public domain collectively establish the "State-of-the-Art." Consequently, it is highly recommended to utilize patent databases that encompass data from numerous countries, rather than relying solely on national databases. In essence, patent searches should extend beyond national

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boundaries to encompass all pertinent patents, patent applications, and other relevant published works across countries and throughout history.

In light of this principle, the Intellectual Property Right search was conducted using the IPlytics platform. This tool spans more than 67 patent offices globally, providing access to approximately 120 million patents representing 98 countries, spanning from 1980 to the present day.

In summary, as part of an Intellectual Property Right (IPR) Search, both patent and literature searches are carried out to identify pertinent information within the public domain and assess whether it is already safeguarded by intellectual property rights. The Intellectual Property Right analysis serves the following purposes:

- Confirm the level of advancement in the Research and Development (for PCP) or the innovative solutions (for PPI) intended for acquisition. Additionally, assess the potential for safeguarding any creative initiatives undertaken during the procurement process through Intellectual Property Rights (IPR).
- Determine if there are existing market entities possessing "essential Intellectual Property Rights (IPR)" that are indispensable for addressing the identified needs. Evaluate whether the licensing policies of these entities pose substantial risks or costs, potentially rendering the business case for initiating innovation procurement unfavourable.

3.1.2 Rationale for examining standards

Standardization involves the implicit (for de facto standards) or explicit (for de jure standards) consensus-building process among stakeholders to formalize designs, performance criteria, processes, or information. Technical standardization encompasses the agreement on features across technologies, promoting interoperability among devices, data, or software. Illustrative standards encompass widely used document formats (like .docx or .pdf), communication protocols (such as 4G LTE, WIFI), and image compression formats (e.g., JPG, PNG).

An initial analysis should encompass a search for standards pertinent to the envisioned innovation, as they can facilitate meeting user needs, particularly in addressing interoperability issues. In the technical specifications for PCP/PPI, procurers have the option to request evidence of suppliers' compliance with these existing standards, serving as proof for specific desired solution attributes. Furthermore, standards relevant to defining, measuring, and testing play a crucial role at various stages of the R&D process and can be applied across different phases of PCP.

Regarding innovation procurement, Figure 4 illustrates the characteristic space for innovation with standards, where each node represents an innovation, and each line indicates the set of standards it references. This depiction portrays a well-functioning market scenario, wherein procurers eventually have a broad array of solutions that are interoperable, interchangeable, and competitively priced.

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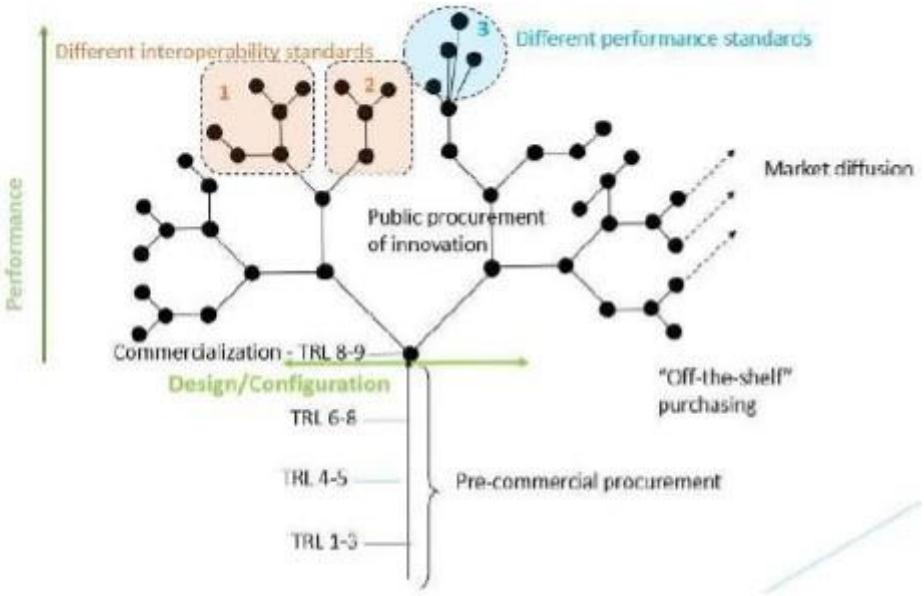

Figure 4: Characteristics space for innovation with standards and standardization. Adapted from Rainville, A., 2017. Standards in green public procurement--A framework to enhance innovation. Journal of Cleaner Production, Volume 167, pp. 1029-1037

Nevertheless, even when relevant standards are available, the public procurer might determine that these standards lack sufficient openness, applicability, or comprehensiveness. In such cases, there might be a need for the creation of new standards or test procedures. This intervention from the demand side ensures that any developed solutions contribute to the production of quality products/services and foster a well-functioning market with diverse options. Situations often arise where numerous redundant and competing standards exist, including proprietary, consortia, or non-harmonized standards. Alternatively, especially in cases of justified radical innovation, such as in PCP, there might be no existing standard, label, or certification applicable to the innovation. PCP can play a role in expediting standardization by initially establishing de facto standards, driven by market forces, which can later be formalized into de jure standards. Alternatively, or at a later stage, suppliers may be mandated to engage with formal standardization bodies to formulate de jure standards through standardization agreements. Examples of such bodies include ETSI, CEN, CENELEC, IETF, and ITU. These activities are crucial for developing a set of complementary standards, forming a robust "trunk" in the depicted tree (Figure 4) upon which the right R&D solution can be successfully commercialized. Importantly, the development of voluntary standards, surpassing regulatory requirements if any, can inform the creation of new regulations or policies, particularly in emerging areas.

1. Introducing groundbreaking innovative solutions within a market that is either non-existent or fragmented—meaning, in a scenario where the "tree" has not yet branched off from its trunk or developed "leaves" (refer to Figure 4). and
2. Mandating, through PCP tender specifications, that vendors guarantee interoperability for crucial components of the solutions and that vendors license Intellectual Property Rights (IPR) related to these components under Fair, Reasonable, and Non-Discriminatory (FRAND) conditions.

3.1.3 Interpretation

This section briefly explores the significance of the outcome of the Intellectual Property Rights (IPR) search at a high level. Depending on the findings of the IPR search, three potential scenarios may emerge:

1. In instances where certain solutions already address specific user requirements (e.g., particular companies have developed components relevant to an interoperable solution, such as low power usage), it is advisable to concentrate the Pre-Commercial Procurement (PCP) on aspects of the

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unmet need for which no solutions currently exist. Additionally, it may be beneficial to consider, based on associated costs of implementing proprietary components, the incorporation of an existing low-power solution into the upcoming innovation.

2. When solutions are available, each patent addressing distinct user needs individually, the procurement can center on retesting suppliers to integrate or combine these solutions. This activity may constitute a Pre-Commercial Procurement (PCP) if it involves substantial modifications or a Public Procurement of Innovation (PPI) if it primarily entails adapting or designing changes to existing solutions.
3. If solutions already exist on the market, each capable of fully meeting the user need, there may be no need for an innovation procurement. Instead, a Commercial Off-The-Shelf (COTS) procurement can be pursued. Alternatively, if the contracting authority is mandated to conduct a Pre-Commercial Procurement (PCP), they may need to consider another project addressing different user needs where no existing solution is available.

Identifying relevant or "overlapping" Intellectual Property Rights (IPR) necessary to meet the procurement need may imply that:

- The need lacks sufficient novelty to justify the PCP or PPI from the outset, as existing patents capable of meeting the needs have already been identified.
- Existing Intellectual Property Rights (IPR) might become "novelty destroying," posing obstacles to subsequent IPR applications/registrations. This implies that contractors involved in PCP or PPI may encounter IPR barriers when delivering solutions to the procurer (in the case of PPI) and attempting to commercialize their solutions to other customers after the PCP/PPI. This challenge could be addressed proactively by:
    - Formulating tender requirements (for both PCP and PPI) and developing solutions during the R&D stage (for PCP) in a manner that circumvents the blocking Intellectual Property Rights (IPR).; or
    - Engaging in negotiations with the Intellectual Property Rights (IPR) holder well in advance, before the commercialization phase, to secure a license.

If the IPR holder proves unwilling to engage in license negotiations, and designing around the blocking Intellectual Property Rights (IPR) is not feasible, the conclusion might be that the IPR risk is too significant to initiate the project.

These points are summarized in table below.

Number of needs met	**Each need is met…**		**Some needs are met**	**No needs are met**
Number of patents meeting the needs	By a single patent	By multiple patents	By some patents	No relevant patents exist
Recommended strategic action	Buy Off-The-Shelf if the patent is embedded in a market-ready solution	Conduct a PPI for a supplier to integrate the IPR into one solution; with desired adaptation/design changes	Conduct a PCP beginning at later TRLs	The need is 'novel'; Conduct a 3 phase PCP beginning at TRL 3 or 4.

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Risk regarding blocking IPR	Low; purchase from a single supplier	High; agreement required between many patent owners plus the solution integrator; IPR may be "novelty destroying" and market is "saturated"	Moderate; IPR must be integrated into a new solution or worked around	Low; there is no IPR to infringe upon; a "white space" enabling innovation.

Table 2: Summary of the relevance of IPR Search findings to an innovation procurement project

3.2 Search Platform & Coverage

Vtrek and Corvers Greece conducted the patent search utilizing the IPlytics platform, a comprehensive online IP- and market analytics tool provided by IPlytics, a company specializing in the development of big data frameworks for data connection and visualization. IPlytics collaborates with four universities worldwide, leveraging academic research to enhance their tools.

IPlytics employs publicly available data sources, ensuring transparency and traceability in their analyses. The company always provides links back to the original document source, enabling users to trace the information back to its foundation. The data is regularly updated to maintain accuracy and reliability. All databases are securely stored within IPlytics' proprietary database framework, and queries exclusively search within IPlytics' data without initiating searches at third-party databases.

3.2.1 Security

The IPlytics Platform, a software tool, is constructed with industry-standard security procedures and adheres to stringent policies to safeguard search queries and client information. Being a German company, IPlytics is bound by national legal requirements pertaining to data security and privacy. Germany's legal standards in these domains are among the most rigorous globally, and IPlytics is obligated to comply with these regulations.

3.2.2 Patents

IPlytics directly sources patent documents from each individual patent office. This ensures an instant integration of the first publication of a patent document anywhere in the world. Some patent data sources such as the World Intellectual Property Organization (WIPO, WO) or the European Patent Office (EPO, EP) provide information for patent filings of multiple countries. In this regard IPlytics Platform has a global patent document coverage of:

- Over 67 worldwide patent offices, resulting in
- About 120 million patent documents and over
- 24 million patent families
- For 98 countries
- Since 1980 until today

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Detailed full text information on:

Full text: Title, abstract, description, claims

- Patent application number and date
- Patent publication number and date
- Patent priority number and date
- INPADOC family information
- INPADOC legal status information (active, lapsed, revoked, expired)
- Patent office / document type
- Reassignment information
- ICP and CPC classifications and description
- Industry Field Cluster
- Applicant / Assignee information
- Inventor information
- Patent citation information
- US litigation

3.2.3 Standards

IPlytics directly sources standards documents from each individual standard setting organization. This ensures an instant integration of the first publication of a standard document anywhere in the world. IPlytics has a global standards document coverage of:

- 96 standard setting organizations, resulting in
- about 4 million standards & contribution documents
- published by over 700 working groups and standards committees
- since 1990 until today

IPlytics guarantees information in standards documents for the following textual and bibliographic. It provides detailed information on:

- Title, Abstract, Keywords
- Standard document number
- Standard issuing date
- Standard ICS classification
- Standard version history
- Document status (active, withdrawn)
- Working Group / Committee
- Referencing Standards Documents
- Referencing Patents Documents
- Declared Standard Essential Patents

3.3 Search Methodology

IPlytics operates in a manner similar to other online search platforms, necessitating input such as keywords to generate specific search outcomes. Therefore, the initial step in an IPR search involves identifying the appropriate keywords to use as input for the search on the platform.

The following steps summarize the search methodology process.

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Step 1: Task 1.5 has implemented the pain point workshops on each one of the 5 application domains where among others the keywords that can be used for the SOTA have been identified.

Step 2: Task 3.1 in parallel with T3.2. worked on finetuning and aggregating procurers needs and selecting procurement challenges. In this regard, T3.2 worked in parallel with T3.1 receiving input and updating the aforementioned keywords.

Step 3: Interaction with Partners (AV, CKIC and GEKO) to discuss the technologies more in detail.

Step 4: Using the information gathered in the previous steps, a list of keywords was created.

Step 5: The list of keywords underwent further refinement throughout the search process to exclude overly specific terms that might overlook potentially relevant entries. Additionally, refinements aimed to eliminate potential outliers, specifically results that may not be relevant and could increase the effort required to review documents while potentially affecting search analytics. Despite these refinements, due to the non-technical nature of the refinement process, there is still a possibility that some non-relevant patents may be present in the overall list.

Please note that:

a. The search encompassed non-granted patents, referring to patents that have been filed but are awaiting formal approval from the relevant patent office. When filing a patent, there is typically a waiting period of several years before receiving approval from the patent office. Despite being in this pending state, these patents still offer a certain degree of protection. They were included in the analysis because they provide insights into the research and development intensity associated with a particular technology.
b. The search also encompassed patents that have lapsed. Patents may lapse for various reasons, including failure to pay the annual fee to the patent office, low technical relevance, or the emergence of new inventions that have supplanted the old ones. Nonetheless, these lapsed patents still serve as a metric for assessing the innovativeness of a specific technological field within a particular timeframe.
c. The same patent may be filed in multiple jurisdictions to secure broader geographical protection. Consequently, this practice can potentially inflate the overall number of patents in the analysis.
d. A patent may belong to the same "patent family," which comprises a set of patent applications addressing the same or similar technical content. Consequently, multiple patents may exist for the same technical content within a patent family. In the spreadsheet containing the list of patents, we extracted only the patent family information to streamline the subsequent technical analysis of the list.

Step 6: The list of patents and standards has been delivered in separate spreadsheets as annexes to this report. It's important to note that the search specifically targeted the timeframe from 2013 to 2023 to ensure a focus on current technologies and research, avoiding the inclusion of obsolete information.

Step 7: An in-depth technical analysis of the IPR search was performed by GEKO, AV, CKIC. Using their technical expertise, they identified top 10 patents per application domain for the scope of this work. In addition, they also supported in refining the IPR's conclusions made per each technology.

It is important to highlight that in conducting an Intellectual Property Rights (IPR) analysis, the focus is on assessing the overall maturity of the market. Consequently, the reader may come across several patents that are not directly related to the primary subject matter, but instead pertain to other fields utilizing the same or similar technologies, particularly in civilian domains. This comprehensive approach in the search enables the analysis on IPlytics to capture a broader perspective on the innovativeness and maturity of each technology.

This expansive scope is beneficial because when the maturity of a technology is low, it becomes essential to explore applications in other domains. This exploration aids in understanding whether the technology can be easily adapted to the preferred domain, potentially from the same suppliers. As an example, a telecom company may be utilizing its technologies in radio frequencies, showcasing the potential for cross-domain applications.

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The Partners responsible for the technical analysis can conveniently navigate through the attached spreadsheets and identify pertinent patents based on the security domain. It is essential to acknowledge that the initial two searches were conducted with a broad scope, encompassing various domains. However, in the subsequent search, the frequency of main keywords appearing in other non-relevant domains necessitated a refinement of the search parameters to narrow down the scope of investigation.

4 Search Results

This section presents the results obtained for each of four main challenges for PROTECT, focusing the analysis on the patents. The analysis of the standards has been performed in a dedicated paragraph (4.2). For each challenge, the number of patents, the top 10 applicants, and the geographical location, have been identified, among other important analytics.

The identification of the most relevant documents was conducted based on their degree of technical relevance, utilizing the indicators provided by the IPlytics platform. These indicators include Technical Relevance (forward citations), Radicalness (backwards citations), and Legal Relevance (determined by the jurisdiction where the patents receive protection, derived from the patent office), along with the Market Coverage indicator. These metrics collectively contribute to the assessment of the significance and impact of the identified documents in the analysis.

4.1 Patents

The patent analysis for the four challenges—Flood, Fire, Water, and Sustainable Infrastructure—is crucial because it tracks the latest technological innovations, assesses their readiness for application identifies gaps in current solutions, and highlights opportunities for collaboration and commercialisation.

This comprehensive overview may inform decision-making, guiding research priorities, policy development, and strategic planning. By analysing the landscape of patented technologies, public entities aiming to acquire innovative Climate Services gain a comprehensive view of the state-of-the-art technologies pertinent to their challenges. This enables them to evaluate more effectively proposed and developed services, ensuring alignment with the latest advancements and the specific needs of their projects. Such an understanding facilitates informed decision-making in selecting cutting-edge solutions that enhance resilience and sustainability in addressing climate-related issues.

4.1.1 Flood challenge

Currently, the mapping of flooded areas (marine, coastal areas and rivers) during severe events can take weeks, resulting in delays in response and prevention. Public organisations lack reliable tools for predicting, preventing and responding to such events in a timely manner.

Some foreseen steps are:

1. Implementing a unified repository for historical data along with a single Application Programming Interface (API)
2. Connecting rapid mapping and climate services to the repository
3. Transforming mapping processes into algorithms for more efficient and automated analysis.
4. Utilising efficient tools and systems to support the mapping and analysis tasks.
5. Ensuring proper utilisation of the tools by a skilled team with the necessary expertise.

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The desired outcome is to establish a system for rapid mapping that enables predictions and projections to identify risks and define benchmarks. This will involve the development and utilisation of software capable of higher resolution and timely acquisition of satellite information.

Patents

The analysis revealed research on the :

- Methods for identifying the probability of occurrence of a flood event (risk indicators)
- Flood measuring and trigger system (usually by making grids of the regions)
- After event evaluation of the affected area
- Flood map production
- Systems and methods are provided for processing observation data.

Technologies & tools: satellite imagery, computer vision, artificial intelligence, multi sensor input (drones etc), image analysis, statistical analysis, and mathematical analysis, kernel algorithm, visible-infrared band images of a region, water based network devices.

Keywords used: flood/s, earth observation, rapid prediction, coastal, river, detect ,Risk, sea level rise, Satellites, internet of things, drones, AI among others. Also search was contacted with all the COTS that were provided by our partners from Aerospace Valley.

The main keywords “floods’’, ‘’coastal’’ and ‘’river’’ were first paired to side keywords like: “rapid prediction”, “detect” and ‘’earth observation’’ and then also with keywords like “drones”, “satellites” and “AI”, which relate to the specific technology used. Moreover a final search was contacted using the companies from the COTS such us “Copernicus’’ and ‘’European Space Agency’’. Using different combinations of the above keywords we identified more than 2950 patents (some patents are duplicates among the more than 2950 that our research generated), for the purpose of the report we are using only the main keywords and we identified more than 980 patents related to the flood challenge. This number resulted from a steady number of patent applications from 2013 onwards in different domains such technologies for adaptation of climate change.

More specifically, the analysis reveals a rich landscape of cutting-edge research in flood prevention, monitoring, and management technologies. These innovations span a diverse array of areas, showcasing advancements in precision flood prediction, remote sensing technologies, and intelligent flood management systems. In an effort to filter these inventions into cohesive groups, we've identified key categories such as Flood Resilience Technologies, Earth Observation Advancements, Precision Flood Prediction Systems, and Intelligent Flood Management Systems. Each group encompasses a cluster of inventions and technologies that share common themes and objectives, providing a comprehensive overview of the various efforts to address and mitigate the impact of floods through technological innovation. Moreover there are projects like ECFAS ‘’ A Proof-Of-Concept for the Implementation of a European Copernicus Coastal Flood Awareness System.’’ that are trying to address the floods issue by implementing a European coastal flood awareness system by leveraging Copernicus emergency management system.

- **Group Name: Precision Flood Prediction Systems**

Description of the Inventions in the Group: This group comprises technologies dedicated to enhancing the precision and accuracy of flood prediction. Inventors have leveraged various approaches, including machine learning, generative adversarial networks (GANs), and radar data analysis. These systems utilize satellite elevation maps, sink-filling algorithms, and spectral analysis to generate deterministic flood hazard maps. With a focus on predicting visible-infrared band images and estimating flood hazard areas, these inventions collectively contribute to the development of advanced tools for more accurate and timely flood prediction.

Number of patents: 12

Technologies Used:

- Machine learning

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- Generative adversarial networks (GANs)
- Radar data analysis
- Satellite elevation maps
- Sink-filling algorithms
- Spectral analysis

- **Group Name: Earth Observation Advancements**

Description of the Inventions in the Group: This group highlights innovations centred around Earth observation technologies, particularly in scenarios where traditional imaging faces challenges, such as cloud cover. The inventions employ radar reflectance/backscatter data and generative adversarial networks (GANs) to predict visible-infrared band images, ensuring consistent monitoring of Earth's surface. Furthermore, this group includes methods for three-dimensional urban flood monitoring, surface water body extraction, and simulation of maximum flooding water depth. These technologies collectively propel advancements in comprehensive Earth observation for flood-related applications.

Number of patents: 15

Technologies Used:

- Radar reflectance/backscatter
- Generative adversarial networks (GANs)
- Three-dimensional urban flood monitoring
- SAR images
- Microwave remote sensing
- High-precision DEM

- **Group Name: Intelligent Flood Management Systems**

Description of the Inventions in the Group: Intelligent Flood Management Systems represent a cluster of inventions designed to enhance flood impact management through automated methods and advanced geospatial database systems. These technologies incorporate flood detection devices, central measuring engines, and adaptive damage-cover structures. Additionally, Google Earth Engine is utilized to create a Flood Preparedness and Emergency Response System (FPERS), offering powerful processing capabilities for rapid response to natural disasters. The inclusion of ledger technology for flood risk analysis further exemplifies the intelligence embedded in these management systems.

Number of patents: 10

Technologies Used:

- Flood detection devices
- Central measuring engine
- Adaptive damage-cover structure
- Google Earth Engine (GEE)
- Geospatial database

- **Group Name: Remote Sensing Technologies for Flood Prediction**

Description of the Inventions in the Group: This group spotlights inventions that harness remote sensing technologies for flood prediction. Leveraging SAR images, microwave remote sensing, and decision-level data fusion, these technologies provide real-time flood detection, hazard assessment, and inundation mapping. Additionally, there are methods for selective flood defence strategy, burst flood submerging range extraction, and near real-time flood inundation map generation. The amalgamation of remote sensing data, decision-making algorithms, and innovative image processing techniques characterizes this group's contributions to advancing flood prediction capabilities.

Number of patents: 14

Technologies Used:

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- SAR images
- Microwave remote sensing
- Decision-level data fusion
- Synthetic Aperture Radar (SAR)
- Multi-source heterogeneous data
- Image processing algorithms

- **Group Name: Flood Resilience Technologies**

Description of the Inventions in the Group: Flood Resilience Technologies encompass a range of inventions aimed at mitigating the impact of floods on physical objects and enhancing resilience. These inventions introduce dynamic parametric flood impact covers, enabling adaptive damage-cover structures based on physical flood event measurements. Furthermore, there are methods for evaluating flooding behaviour, lightweight flood detection with soft fusion, and flood risk assessment with historical intensity fusion. The common thread in this group is the focus on resilient solutions and strategies to minimize the adverse effects of floods on various entities.

Number of patents: 10

Technologies Used:

- Flood detection devices
- Adaptive damage-cover structure
- Machine learning algorithms
- Historical flood observations
- Ledger technology

Current Assignee	Patent Applications Count	Patent Families Count	Share	Market Coverage (MC)	Technical Relevance (TR)
Chinese Academy of Sciences	16	16	0.016	0.480	1.964
Unitary Enterprises Russia	12	12	0.012	0.076	0.668
Strong Force Intellectual Capital	11	1	0.011	19.966	0.000
Nippon Steel	9	8	0.009	0.507	1.099
Swiss Re	9	5	0.009	1.180	0.208
Tianjin University	8	8	0.008	0.393	1.511
Arx Pax Labs	7	2	0.007	5.033	1.204
Hohai University	7	7	0.007	0.355	1.399
Mendel Biotechnology	7	1	0.007	17.514	2.085
Shimizu Corp	7	7	0.007	0.271	2.249

Table 3: Top 10 patent applicants (Flood Challenge)

The table above also shows that the patent applicants in this field are quite dispersed. The first major applicant patented only about 0.016% of the total. This could suggest that in this domain, despite the wide implications and risk that it possess to civilians and organizations alike, the room for innovation could be still potentially high.

This is also confirmed by the next figure, which reveals the industry trends in the selected timeframe. It shows that the number of patent filing in this field, has remained mostly steady in the last 10 years. In fact, only a bit more than half of the patent filed were actually granted. We are also seeing a slight increase in the number of patents in the last couple of years which followed the downward trend we had seen after the 2016 pick, it remains unclear whether the increase of applications in the last couple year will continue also in 2024 since we are seeing a downward trend so far in 2023. If this is the case, this would reinforce the previous argument (that there is room for innovation) concerning the maturity of the technology.

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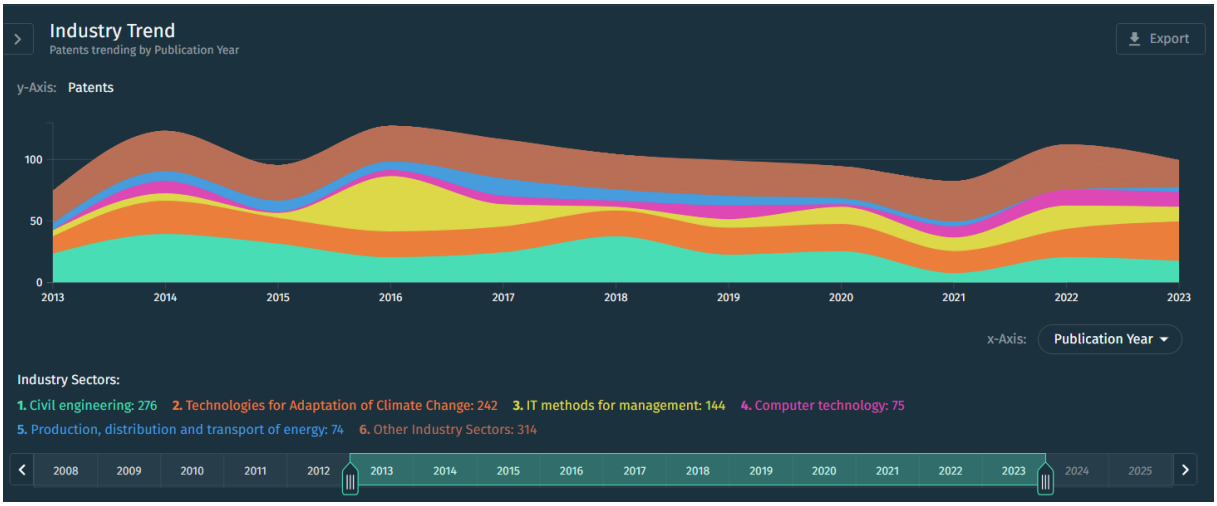

Figure 5: Flood challenge industry trend (2013-2023)

Additionally, it is also worthwhile looking at the geographical distribution of patenting in this field. Where we can observe a significant lead in innovation from Eastern Asian with China having a significant lead and Korea & Japan filling the top 3 spots followed by USA and Russia with EU lagging behind.

Figure 6: Flood challenge patenting geography (2013-2023)

Technologies identified for this challenge include precision flood prediction systems, earth observation advancements, and intelligent flood management systems. These technologies are pivotal in enhancing flood resilience through accurate prediction, efficient monitoring, and automated response systems. They leverage machine learning, radar data analysis, and satellite imagery to facilitate rapid mapping, risk identification, and post-event analysis. Their relevance lies also in their potential to significantly reduce response times to flooding events, enhance predictive capabilities, and streamline risk assessment processes, aligning with the steps outlined in the Flood Challenge document to improve flood resilience.

4.1.2 Fire challenge

Currently, there are several scenarios of fires initiated by different causes and having a harmful effect on the environment.

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One scenario or use case relates to facilities where waste is stored and prone to spontaneous fires, occurring three or more times a year (in one city). These incidents are particularly prevalent during the summer months when temperatures are higher. While data on previous fire events exist (temperature conditions, height of piles, heat waves, composition of garbage, location of storages or disposals) there is no automated solution available to predict fires and make informed decisions for prevention. As a result, environmental agency inspectors bear the responsibility of monitoring these facilities, placing a significant burden on staff resources.

In this waste fire use case, the foreseen steps are:

1. Exploring the technical boundaries to understand the possibilities of providing frequent data updates and establishing the required preparedness frequency.
2. Developing a comprehensive model using both existing and new data to predict waste fires.
3. Aggregating all data from past waste fire incidents can be instrumental in this process.
4. Training the model based on defined conditions and relevant factors, such as the evolving composition of waste over time and temperature variations.
5. Utilizing the gathered data to anticipate fire occurrences, enabling timely preventive actions.
6. Implementing automated notifications to alert environmental; agencies about the risk of fire, empowering them to take necessary measures such as engaging contracted companies or industries experienced in managing waste storage facilities. This proactive approach aims to prevent air pollution and minimize potential damage.

The desired outcome is an automated notification system that promptly identifies the risk of fire in waste storage facilities. This allows environmental agencies to take swift and appropriate measures, such as engaging qualified companies or industries with expertise in waste management. By preventing fires, this solution aims to mitigate air pollution and reduce potential damage associated with such incidents. It is expected to obtain an automated notification system based on the processing data including COPERNICUS data.

Patents

The analysis revealed research on the :

- Methods for identifying fire risk level
- Early warning- prediction
- Fire management system (status, monitoring & forecast –estimated progression)
- Maps & graphical representation of fire information
- None of the results was related to waste fire specifically but the inventions identified can provide a technological basis for the challenge

Technologies & tools: satellite imagery, multi sensor input (drones etc), vegetation information, and weather data, statistical analysis, and mathematical analysis, cloud-to-ground lightning distribution characteristics, water based network devices.

Keywords used: fire ignition, monitoring of fire, prediction, forest fires, Wildfires, satellites, Earth Observation, waste fire, fire prevention, fire risk, fire prediction, Automated notification, Artificial Intelligence, drones, IoT among others. Also search was contacted with all the COTS that were provided by our partners from Aerospace Valley.

The main keywords “waste fire’’, ‘’forest’’ and ‘’earth observation’’ were first paired to side keywords like: “fire prevent”, “fire risks” and ‘’fire prediction’’ and then also with keywords like “drones”, “satellites” and “AI”, which relate to the specific technology used. Moreover, a final search was contacted using the companies from the COTS such us “Sentinel’ ’and ‘’European Space Agency’’. Using different combinations of the above keywords we identified more than 9400 patents (some patents are duplicates among the more than 9400 that our research generated), for the purpose of the report we are using only the main keywords and we identified more than 800 patents related to the fire challenge. This number resulted from a steady increase in number of patent applications from 2013 onwards in different domains

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such us computer technology. During the review, a significant attempt was put in excluding some sectors which eluded the subject matter of the search such as the telecommunication industry.

More specifically the analysis of innovative fire-related technologies reveals a spectrum of research areas, each contributing to the advancement of fire monitoring, detection, and management systems. In an effort to filter these varied inventions, we have organized them into specific groups, allowing for a more focused understanding of the technological landscape. These groups highlight advancements in areas such as advanced detection systems, automated assessment and prediction methods, geostationary satellite-based detection, integration of IoT and AI for wildfire detection, automatic fire identification, advanced tools for fire management, and mobile fire suppression systems. Each group represents a unique side of the ongoing efforts to enhance our capabilities in combating and mitigating the impact of fires.

- **Group Name: Innovative Fire Monitoring and Detection Systems**

Description of the Inventions in the Group:

This group showcases cutting-edge technologies for fire monitoring and detection. From Convolutional Neural Networks (CNN) and semantic neural networking to mobile fire suppression systems and space-time fusion algorithms, these inventions collectively contribute to efficient identification, tracking, and management of forest fires.

Number of patents: 13

Technology used in the group:

- Convolutional Neural Network (CNN)
- GIS data integration
- Artificial Neural Networks (ANN)
- Machine learning models
- Space-time fusion algorithm
- Satellite imagery analysis
- IoT devices
- Remote sensing technologies
- User interface design
- 3S technology (Satellite, GPS, GIS)

- **Group Name: Automated Forest Fire Assessment and Prediction**

Description of the Inventions in the Group:

This group focuses on automated assessment and prediction of forest fires, utilizing technologies such as remote sensing, predictive modeling, and machine learning. These inventions contribute to accurate risk assessment, early detection, and reliable prediction of forest fire spread.

Number of patents: 6

Technology used in the group:

- Remote sensing image data acquisition
- Predictive modelling
- Risk assessment algorithms
- Sensor modules
- Machine learning models
- Spatial analysis
- Meteorological data integration

- **Group Name: Geostationary Satellite-Based Fire Detection**

Description of the Invention in the Group:

This group specifically emphasizes the utilization of geostationary satellites for early forest fire detection. The inventions trace temperature patterns, analyze rising temperatures, and monitor water levels on

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Earth's surface. By sending alerts to communication stations, these systems enable rapid response and enhance early detection capabilities.

Number of patents: 3

Technology used in the group:

- Geostationary satellites
- Temperature sensors
- Communication stations

- ***Group Name: IoT and AI-Integrated Wildfire Detection Systems***

Description of the Inventions in the Group:

This group is dedicated to combining IoT devices with AI technology for early wildfire detection. The systems utilize micro-satellites and drones equipped with high-resolution imaging spectrometers. This integration enhances space-time resolution, providing improved identification and early warnings for effective defence against wildfires.

Number of patents: 5

Technology used in the group:

- IoT devices
- AI algorithms
- Micro-satellites
- Drones with imaging spectrometers

- **Group Name: Automated Fire Identification and Severity Assessment**

Description of the Invention in the Group:

This group introduces an automatic identification method for determining the fire passing range and burning degree of forest fires. It utilizes remote sensing images, calculates normalized vegetation indices, and employs pixel-by-pixel regression for severity assessment, providing valuable insights for firefighting strategies.

Number of patents: 2

Technology used in the group:

- Remote sensing image analysis
- Normalized vegetation index calculation
- Pixel-by-pixel regression
- Forest fire severity index determination

- **Group Name: Tools for Advanced Fire Management**

Description of the Inventions in the Group:

This group provides innovative tools for advanced fire management. Ranging from fire forecasting programs using machine learning to user interfaces for visualizing fire information, these inventions contribute to efficient fire monitoring, prediction, and decision-making.

Number of patents: 4

Technology used in the group:

- Fire forecasting program
- Machine learning models
- User interface design
- Time-based fire information presentation

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- **Group Name: Mobile Fire Suppression Systems**

Description of the Invention in the Group:

Number of patents: 2

This group focuses on mobile fire suppression solutions, featuring the Rain Maker system. This system offers adaptable conduits and nozzles for various applications, operated remotely or manually, and designed for residential, commercial, and industrial settings.

Technology used in the group:

- Remote operation capabilities
- Fire suppressants

Unlike the previous search, it seems that there are technological leaders in this field. The top 4 applicants account for about 34% of the total share of patents but those patents are mostly irrelevant to our application domain. As the annexes with the outcome of the search will later show, this field seems mainly dominated by computer technologies and IT methods for management.

Current Assignee	Patent Applications Count	Patent Families Count	Share	Market Coverage (MC)	Technical Relevance (TR)
Strong Force Intellectual Capital	188	3	0.273	19.297	9.398
BASF	19	9	0.028	2.065	0.705
EVERTREE SAS	16	3	0.023	2.617	3.434
CELLINO BIOTECH INC	13	1	0.019	5.179	0.000
Xyleco	10	3	0.015	2.094	0.058
Shell	9	3	0.013	6.004	0.686
Softbank	9	2	0.013	13.006	1.965
PROTON POWER INC	8	4	0.012	2.102	1.214
CIRCLESX LLC	7	1	0.010	18.396	0.000
Duke University	7	1	0.010	16.606	0.872

Table 4: Top 10 patents' applicants (fire challenge)

The figure below represents the geographical origin of the innovation concerning the fire challenge. The US seems to be the undisputed leader in this field, followed by east Asian countries (China, Korea and Japan) with Australia closing the top 5, here Europe again is lagging significantly behind here would suggest that there is room for innovation.

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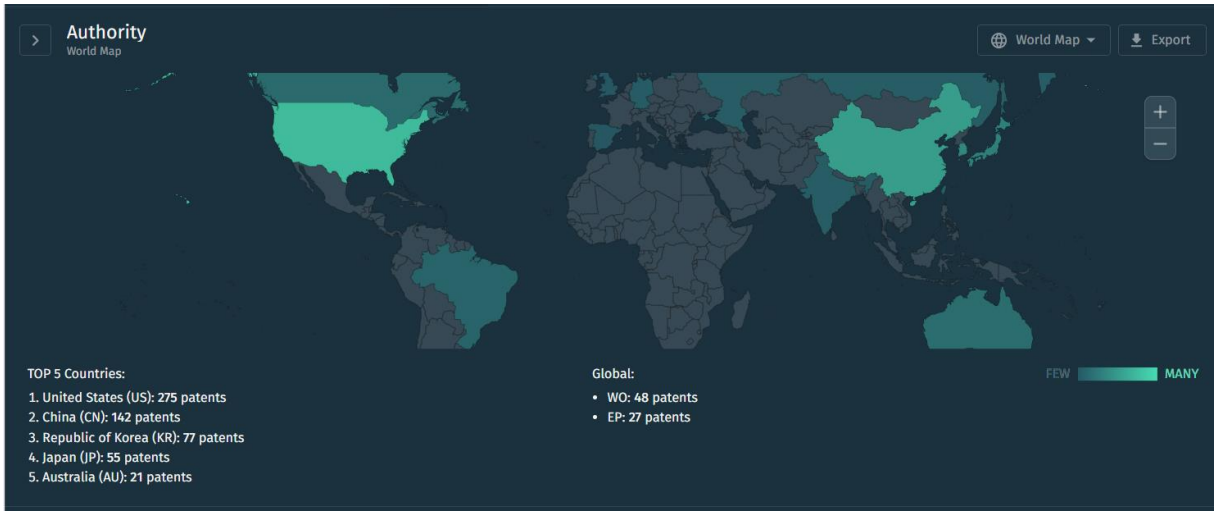

Figure 7: Fire challenge patenting geography (2013-2023)

Finally, looking at the patents' filing activity (diagram below), it is notable that after years of study numbers of patent publications till 2021, nevertheless, from that year the innovation trend has boomed. This picture somehow potentially confirms the previous assumption regarding the existence of a strong R&D effort for this technology, especially in the US and east Asia. However, it would seem dispersed across a number of different actors.

Figure 8: Fire challenge industry trend (2013-2023)

Overall, it is difficult to draw a clear picture from an absolute perspective. However it appears that the R&D intensity in the fire challenge domain is not as high as in the flood challenge domain. The search produced not as many relevant results even though most important applicants have a large number of patented inventions.

Technologies like innovative fire monitoring and detection systems, automated forest fire assessment and prediction, and IoT and AI-integrated wildfire detection systems are crucial for the Fire Challenge as we can also see from pilot projects such us FireAId launch by World Economic Forum. They provide advanced capabilities for early warning, fire risk assessment, and fire progression monitoring. Machine learning algorithms, remote sensing, and predictive modeling used in these technologies can offer significant improvements in detecting fires, assessing their potential impact, and informing management strategies. These align with the Fire Challenge's goals to develop automated solutions for predicting fires, making informed prevention decisions, and implementing efficient fire management practices.

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4.1.3 Water resilience challenge

Currently, there is unpredictability in the demand for fresh water, and there is a lack of connection between the supply and demand of fresh water. Regulations exist in each EU Member State that determine the use of water from various sources, such as channels, treated sewage water, and drinking water, and different purposes such as for agriculture. However, there is a lack of a common language among different stakeholders (users involved such water companies, industry, farmers, etc.) involved in the water cycle chain. Additionally, while data is available in certain regions, there is a lack of connectivity between data hubs and repositories.

In this use case, some foreseen steps are:

1. Gaining a comprehensive understanding of the current situation, including existing mechanisms and policies in place.
2. Exploring how drought-related issues regarding water supply and demand are addressed and determining the type of new services needed to support coping with stress situations based on common language.
3. Identifying the relevant responsible public authorities and their intended uses, while also identifying any existing data gaps.
4. Identifying the different users and purposes for the supply of water like in agriculture.
5. Developing a system that combines EO data and utilizes Artificial Intelligence (AI) for modelling purposes. This system should effectively integrate and analyze relevant data to provide actionable insights.
6. Utilizing database-driven solutions to enhance the distribution of water. This involves identifying factors such as saline concentration, pollution levels, substances, algae presence etc., using EO data, to ensure efficient and informed water distribution.
7. Providing accurate information to water authorities regarding who needs to collect water, when and how to distribute it in a treated manner, to meet specific demands and avoid unnecessary discharge of sweet water.
8. Establishing a resilient system where different stakeholders, including water companies, farmers, and industries, collaborate during drought periods. This collaboration should be based on a comprehensive understanding of the water conditions and quality requirements for different purposes. Guidance and decisions from a policy perspective should be achieved to comprehend the consequences and combine relevant data throughout the entire water cycle chain under a unified taxonomy.

The desired outcome is a predictable demand for fresh water. The regulatory landscape and policies should be clearly defined, providing a cohesive framework for water management. The system should be capable of effectively handling stress situations through data-driven decision making and interventions. The supply and demand for sweet water should be interconnected based on diverse needs of users such as farmers, companies, and industries, while also considering the specific conditions and water quality requirements for different purposes. A comprehensive understanding of the consequences and a combined approach to relevant data within the entire water cycle chain should be achieved and facilitated by effective policy guidance.

Patents

The analysis revealed research on the :

- Methods for identifying the probability of occurrence of a drought
- Systems and methods are provided for processing observation data
- Methods for identifying risk level
- Early warning- prediction
- Water and drought management system (status, monitoring & forecast –estimated progression)
- Maps & graphical representation of water information

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Technologies & tools: satellite imagery, multi sensor input (drones etc), computer vision, vegetation information, and weather data, statistical analysis and mathematical analysis, water based network devices, ground measuring data, GUI, use of database management systems in handling future data.

Keywords used: drinking water, Earth observation, drinking water management, water quality, Drought, satellites, fresh water, water detection, AI, water demand, machine learning, In situ among others. Also search was contacted with all the COTS that were provided by our partners from Aerospace Valley.

Comparably to the previous report, the search in this area had to be refined several times before reaching the correct scope. In fact, the main keywords (e.g., “drinking water”, “water management”, ‘’water quality’’ and “earth observation”) may belong to many different sectors and domains like pharmaceuticals, most of which are out of the scope of this search.

The main keywords were first paired to side keywords like: “water quality”, “drought”, ‘’water detection’’ which mostly focuses on water; and then also with keywords like “drones”, “satellites” and “Iot”, which relate to the specific technology used. Moreover a final search was contacted using the companies from the COTS such us “Copernicus’ ’and ‘’European Space Agency’’.

Using different combinations of the above keywords we identified more than 3050 patents (some patents are duplicates among the more than 3050 that our research generated), for the purpose of the report we are using only the main keywords and we identified more than 2100 patents related to the water challenge, but if you exclude the patents from industries that are not relevant such as ‘’pharmaceuticals’’, ‘’medical technology’’ and ‘’computer technology’’, and keep only the ones from relevant industries such as ‘’climate change adaptation’ and ‘’environmental technology’’ the outcome of the search is around 1150 patents, the majority of which are associated to technologies within the water challenge domain. The close relation is probably due to the specificity of the industries, especially if compared to previous searches. This number resulted from a steady number of patent applications from 2013 onwards in different domains such technologies for adaptation of climate change.

During the review, a significant attempt was put in excluding some sectors which eluded the subject matter of the search such as the pharmaceutical industry. Nevertheless, although a review of the patents was performed, the list may still include some outliers.

More specifically the analysis of innovative inventions in the realm of environmental monitoring and water resource management has revealed cutting-edge research in distinct areas. In an effort to filter these advancements, we have categorized them into three comprehensive groups, each showcasing a unique focus on technological solutions. These groups are named as follows: Advanced Environmental Monitoring and Management Systems, Advanced Water Resource Management Technologies, and Integrated Water Environment Management Systems. This segmentation allows for a clearer understanding of the diverse technologies contributing to the advancement of environmental sustainability and water resource management.

- **Group Name: Advanced Environmental Monitoring and Management Systems**

Description of the Inventions in the Group: This group encompasses a range of inventive solutions for environmental monitoring and management. Innovations include a Wireless Sensor Network for water environments, combining IoT-based monitoring with dynamic GIS databases, and a River Course and Water Land Integrated Three-Dimensional Real Scene Modeling Method utilizing active and passive remote sensing. The Integrated Disaster Information Display leverages satellite images for disaster-related analysis, while the Long-Time-Sequence River and Lake Ridge Culture Area Monitoring Method provides high-precision identification of ridge culture areas. A Water Distribution Monitor Operation Method enhances water quality detection in distribution networks.

Number of patents: 7

Technologies Used:

- Wireless sensor network
- IoT-based monitoring system
- Dynamic GIS databases
- Active and passive remote sensing

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- Satellite images
- Cloud content calculation

- **Group Name: Advanced Water Resource Management Technologies**

Description of the Inventions in the Group: This group focuses on advancements in water resource management technologies. Inventions include methods for improving underground water reserve estimation precision by integrating GRACE satellite gravity data and global water statistics. A Monthly-Scale Water Resource Drought Estimation Method utilizes gravity satellite data and Budyko frame coupling for theoretical water resource management. A Reservoir Drought-Resistant Emergency Scheduling Method, based on NSGA-II algorithm, calculates soil water content and irrigation water demand for small-medium river basins. A Quantitative Estimation Method of Monthly-Scale Evapotranspiration integrates hydrological meteorological data and GRACE gravity satellite data for spatial downscaling.

Number of patents: *4*

Technologies Used:

GRACE satellite gravity data

- Global water statistics
- NSGA-II algorithm
- Hydrological meteorological data

- **Group Name: Integrated Water Environment Management Systems**

Description of the Inventions in the Group**:** This group emphasizes the integration of technologies for comprehensive water environment management. A Water Environment Information Integration and Sharing System employs wireless sensor networks and an IoT-based monitoring system connected to dynamic GIS databases. The SAR Remote Sensing Fine Identification Method for Fresh Water Resources uses time sequence SAR images and a decision tree recognition algorithm for water resource type identification. The Reservoir Management System for Water Quality Control utilizes eductors, a recirculating pump, and sample lines for chemical control. The Farmland Plot Irrigation Water Quantity Calculation Method combines remote sensing and calculation algorithms for precise irrigation water management.

Number of patents: 4

Technologies Used:

- Wireless sensor network
- IoT-based monitoring system
- Dynamic GIS databases
- SAR images
- Decision tree recognition algorithm
- Remote sensing
- Calculation algorithms

The table below also shows that the patent applicants in this field are quite dispersed and no technological leader has emerged. The first major applicant patented only about 3% of the total. This could suggest that in this domain, despite the wide implications and risk that it possess to civilians and organizations alike, the room for innovation could be still potentially high.

Current Assignee	Patent Applications Count	Patent Families Count	Share	Market Coverage (MC)	Technical Relevance (TR)
DSM-Firmenich	33	6	0.029	1.723	0.487

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Corbion	26	2	0.022	18.833	3.586
Digimarc	26	2	0.022	14.600	2.172
Foro Energy	25	2	0.022	18.560	2.531
Alphabet	19	2	0.016	13.238	1.114
Johnson & Johnson	19	3	0.016	1.913	2.687
Thermo Fisher	19	5	0.016	3.524	1.333
PELLFICURE PHARMACEUTICALS	17	2	0.015	1.236	0.429
Omni Medsci	16	1	0.014	15.195	4.358
LIVELEAF HOLDINGS US	14	1	0.012	1.786	0.859

Table 5: Top 10 Applicants (Water challenge)

From the analytics about the industry trend (see diagram below), it steady number of patent applications from 2013 onwards in different domains, something that could mean that there is no significant breakthrough in the domain and would reinforce the argument that there is room for innovation.

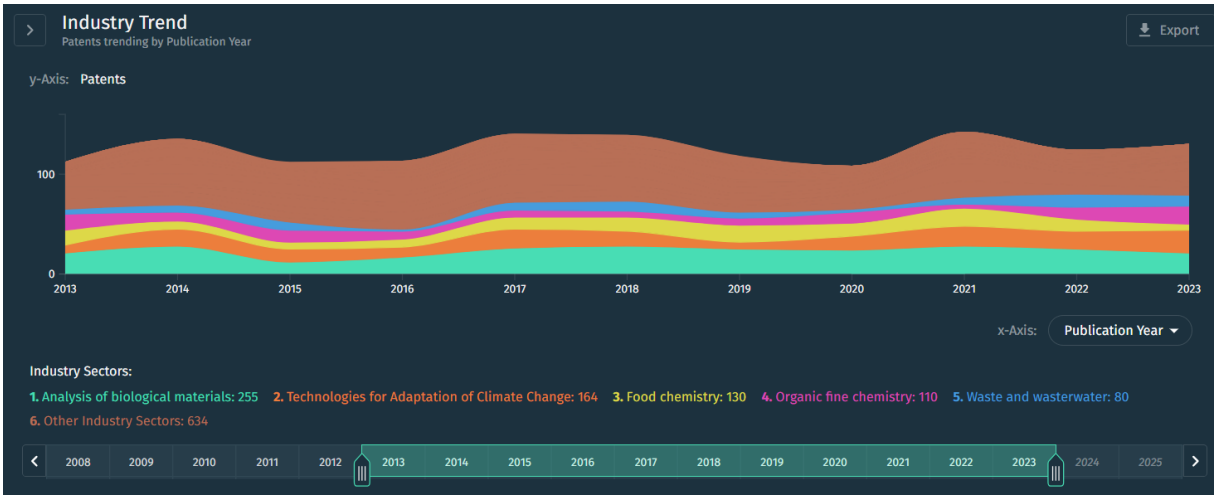

Figure 9: Water challenge industry trend (2013-2023)

Despite this stable trend, the lack of clear technological leaders despite the fairly large but dispersed in different domains number of patents found would suggest that room for innovation could be consistent.

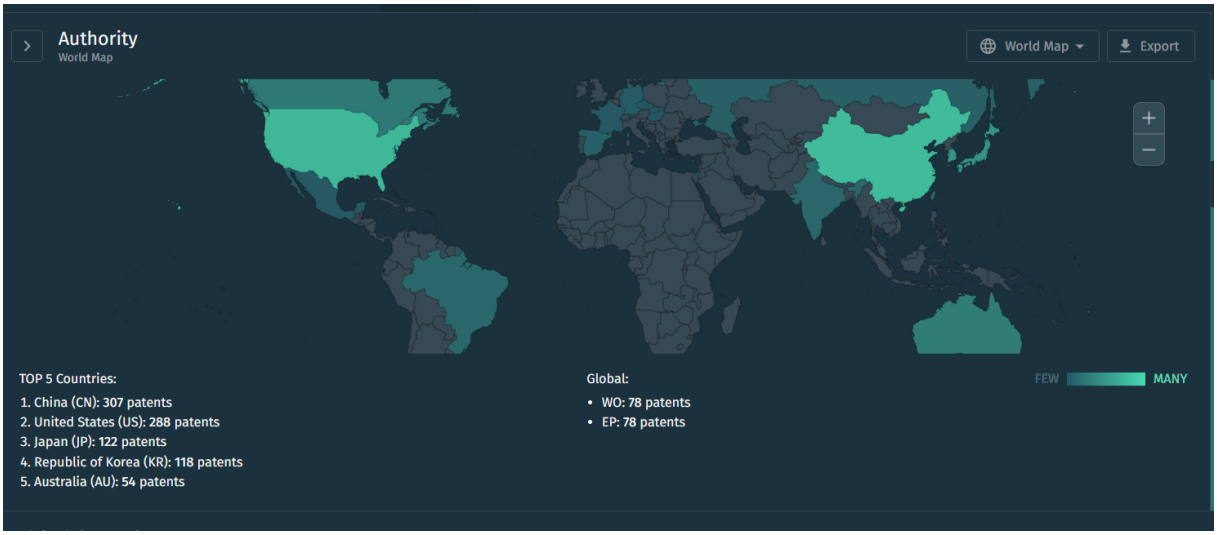

Figure 10: Water challenge patenting geography (2013-2023)

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The figure above represents the geographical origin of the innovation concerning the water challenge. China and US seem to be the leader in this field, followed by Japan, Korea and Australia closing the top 5. Europe lagging significantly behind here would suggest that there is room for innovation and that the regional TRL might be relatively lower in Europe compared to the other aforementioned regions.

The technologies identified for addressing water resilience focus on drought prediction, water and drought management systems, and advanced environmental monitoring. By integrating satellite imagery, AI, and multisensory inputs, these technologies aim to enhance the predictability of water demand, improve water distribution efficiency, and support drought resilience. Relevance to the Water Challenge lies in their potential to address the unpredictability of fresh water demand and supply, facilitate data-driven water management, and improve connectivity between data hubs, as highlighted in the Water Challenge document.

4.1.4 Sustainable infrastructure challenge

Currently, there is a need for integrated sustainable re-development, restoring & climate adaptation of existing neighbourhoods both in urban and rural areas.

In this use case, some foreseen actions are:

- Developing an integrated solution (using EO data) with regard to the re-development, restoration and climate adaptation of existing neighbourhoods to address/prevent:
    a. heat island effects
    b. flooding
    c. droughts
    d. water scarcity
    e. in neighbourhoods & rural areas
- Measuring the effectiveness of climate adaptation measures and applied adaptations.
- Developing an integrated climate service that combines possible adaptation measures such as heat island and water scarcity prevention, measures that address flooding and droughts in neighbourhoods & rural areas for modelling purposes and possible scenarios with existing limitations (e.g., narrow streets, protected historical monumental buildings, bridges, water scarcity faced by farmers, etc.) and given other priorities such as green, energy transition, parking.
- Exploring most common limitations, barriers and impossibilities that stand in the way of implementing climate adaptation of the existing infrastructure. Using the outcomes to find an innovative solution given these limitations.

The challenge is to find a solution to climate adaptation for this complex situation (vulnerable urban &/ rural areas with a combination of heat, flooding, water scarcity and droughts) using integrated climate services.

Patents

The analysis revealed research on the :

- After event evaluation of the affected area
- Creation of a thermal map of a region
- Urban heat island detection method
- Systems and methods are provided for processing observation data.
- Analysis of urban morphology
- Methods for monitoring and managing urban water resources and hydrology through a network of stations
- Early warning-prediction
- Methods for identifying risk level

Technologies & tools: digital aerial and satellite imagery, photography, computer vision, artificial intelligence, multi sensor input (drones etc), image analysis, statistical analysis and mathematical

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analysis, airborne and spaceborne sensors, deep learning, ground-based data gathering, remote sensing data, data modelling, open source geographical data, image processing, remote sensing image and high-resolution remote sensing image.

Keywords used: Earth Observation, urban heat islands, urban planning, Infrastructure, satellites, mapping urban areas, Ground sensors, heat island effect, rural areas, neighbourhoods, floods, energy mangement and fire ignition among others. Also search was contacted with all the COTS that were provided by our partners from Aerospace Valley.

In this application domain we are seeing a lot of overlap in the keywords used with the previous 3 ones seen above. That happens cause the scope of this challenge is very broad and incorporates functionalities that we also saw in the previous challenges. Therefore besides using the main keywords that apply only here such us ‘’infrastructure’’ and ‘’urban heat islands’’, keywords like “drones”, “satellites” and “drones”, which relate to the specific technology used and the companies from the COTS such us “Sentinel’’ and ‘’European Space Agency’’, we also used keywords such as ‘’fire ignition’’ and ‘’floods’’. Using different combinations of the above keywords we identified more than 2350 patents (some patents may be the same among the more than 2350 that our research generated), for the purpose of the report we are using only the main keywords and we identified 56 patents related to the infrastructure challenge. This number resulted from a steady increase in the number of patent applications from 2021 onwards in mainly in the adaptation of climate change domain.

The main keywords were first paired to side keywords like: “urban planning”, “earth observation”, ‘’mapping urban areas’’ which mostly focuses on infrastructure in general; and then also with keywords like “drones”, “satellites” and “AI”, which relate to the specific technology used followed by keywords that address different functionalities in the challenge such us ‘’energy management’’.

More specifically the analysis of recent innovations in research has unveiled a diverse range of advancements in several critical areas. In an effort to filter these advancements into coherent categories, we have identified and summarized them into the following groups. These groups encapsulate groundbreaking research in intelligent transportation and urban mobility, thermal mapping and environmental monitoring, sustainable urban planning and hydrological management, environment simulation and comfort, greenhouse gas monitoring and environmental sensing, as well as water sustainability and infrastructure investment. Each group represents a cluster of technologies and methodologies aimed at addressing specific challenges and contributing to the broader landscape of technological innovation.

- **Group Name: Thermal Mapping and Environmental Monitoring**

Description of the Inventions in the Group**:** This specialized group focuses on inventions related to thermal mapping and environmental monitoring. Utilizing satellite imagery and thermal mapping technologies, these innovations create precise heat maps, analyze temperature variations, and provide insights into environmental changes.

Number of patents: 3

Technologies Used:

- Satellite imagery
- Thermal imaging
- Environmental monitoring
- Data analysis
- Mathematical modelling

- **Group Name: Smart Urban Systems**

Description of the Inventions in the Group**:** This comprehensive group encompasses inventions aimed at enhancing various aspects of urban systems through intelligent technologies. It includes innovations in smart transportation, real-time data analytics, and vehicle-to-everything communication, contributing to improved road safety and traffic efficiency.

Number of patents: 5

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Technologies Used**:**

- Internet of Things (IoT)
- Real-time data analytics
- Satellite imaging
- Thermal imaging
- Geographic Information Systems (GIS)

- **Group Name: Sustainable Urban Development**

Description of the Inventions in the Group**:** This group encompasses inventions providing sustainable solutions for urban challenges. It includes innovations in hydrological station network optimization, environmental monitoring with Nano satellites, and climate-responsive urban design, contributing to sustainable infrastructure and resource management.

Number of patents: 2

Technologies Used:

- 3S technology (GIS, GPS, Remote Sensing)
- Hydrological modelling
- Nano satellites
- Wireless Sensor Networks (WSN)

- **Group Name: Human-Centric Environmental Design**

Description of the Inventions in the Group**:** Inventions in this group revolve around creating human-centric environments and enhancing well-being. This includes innovations in simulating natural settings, considering human brain core activation, and implementing sensory information to reduce stress and enhance the overall quality of life.

Number of patents: 2

Technologies Used:

- Environmental data processing
- Simulation of sensory information

The table below also shows that the patent applicants in this field are quite dispersed and no technological leader has emerged. The 3 top applicants patented account only about 2% of the total. This could suggest that in this domain the room for innovation could be still potentially high.

Current Assignee	Patent Applications Count	Patent Families Count	Share	Market Coverage (MC)	Technical Relevance (TR)
ACO AHLMANN SE	4	1	0.071	2.932	0.000
GEOCORAIL	4	1	0.071	3.118	0.216
Thermogas Dynamics	4	1	0.071	1.091	3.982
CNRS	3	1	0.054	1.427	0.000
DIRTSAT	3	1	0.054	0.909	0.000

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NAUTILUS VENTURES IPCO	3	1	0.054	3.322	0.615
University of Limoges	3	1	0.054	1.427	0.000
University of Stuttgart	3	1	0.054	2.649	0.000
CMI LIMITED	2	1	0.036	4.205	1.846
NEPTUNETECH	2	1	0.036	5.875	0.297

Table 6: Top 10 Applicants (Infrastructure challenge)

From the analytics about the industry trend (see diagram below), we can see that overall there is a volatility in the number of patent applications from 2013 onwards with few spikes along the way with the most important one being in 2015 which coincides with the rise of application in the environmental technology domain. The last couple of years we are noticing a steady increase in patent application that are driven mainly through the rise in the adaptation for climate change domain.

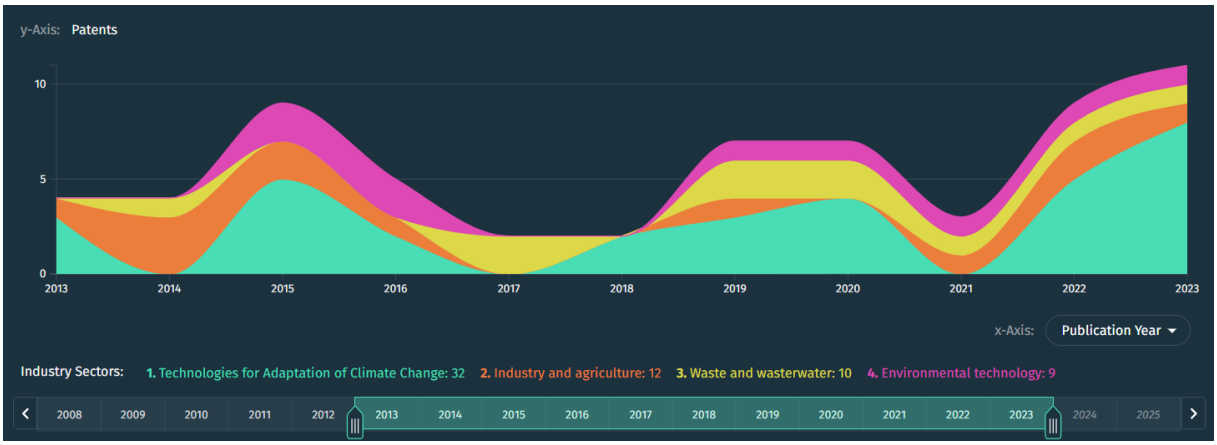

Figure 11: Infrastructure challenge industry trend (2013-2023)

Despite this unstable trend, the lack of clear technological leaders and the not that large number of patents found would suggest that room for innovation could be consistent.

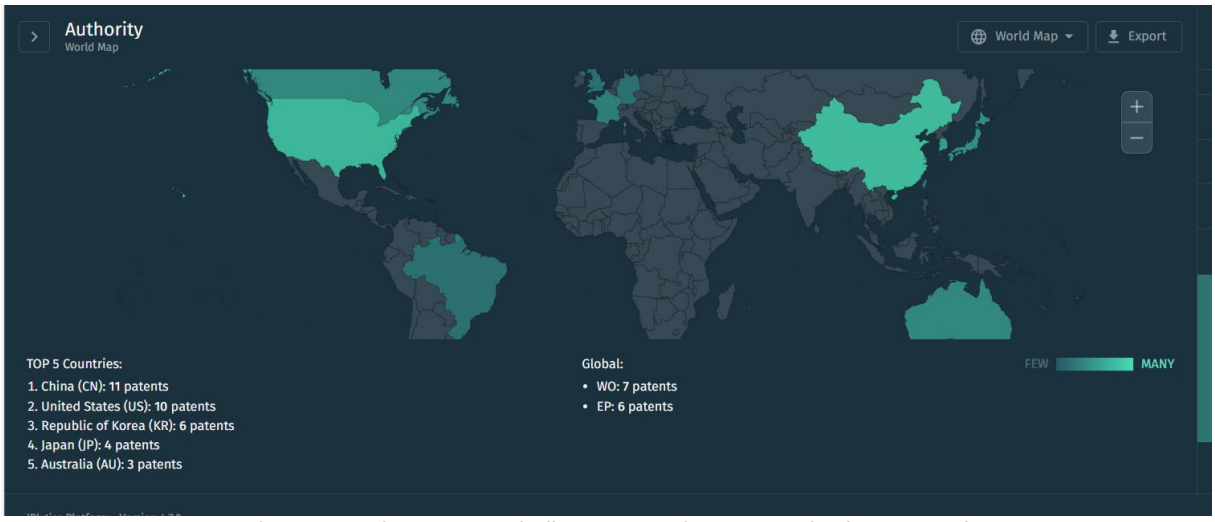

Figure 12: Infrastructure challenge patenting geography (2013-2023)

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The figure above represents the geographical origin of the innovation concerning the infrastructure challenge. The US and seem to be the leader in the field, followed by closely by Japan, Korea and Australia closing the top 5 as we also saw in the water challenge with the number of patents though being significantly smaller here. In this challenge also Europe is lagging behind which again can suggest Technologies of the identified patents, dealing with topic such as urban heat island detection, thermal mapping, and managing urban water resources directly support the Sustainable Infrastructure Challenge's objectives. These technologies, utilizing digital aerial imagery, computer vision, and AI, can help mitigate heat island effects, address water scarcity, and support sustainable redevelopment. Their application in urban planning and climate adaptation measures aligns with the need for integrated solutions to prevent flooding, droughts, and enhance neighbourhood resilience, in line with the Sustainable Infrastructure Challenge.

4.2 Standards (All challenges)

In the PROTECT SOTA search, few relevant standards were found for the four selected challenges mainly for the floods and water, those results came after performing research using similar keywords as the ones employed in the patents search. Most relevant standards that we found and listed below are in relation to earth observation technologies.

Title	Standard Document Id	Publication Date	Abstract
Web Map Service	WMS 1.3/ ISO 19128	2006-03	The OpenGIS® Web Map Service Interface Standard (WMS) provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application. The interface also supports the ability to specify whether the returned images should be transparent so that layers from multiple servers can be combined or not.
OGC® Sensor Observation Service Interface Standard	IS/12-006/2.0	2012-04	The SOS standard is applicable to use cases in which sensor data needs to be managed in an interoperable way. This standard defines a Web service interface which allows querying observations, sensor metadata, as well as representations of observed features. Further, this standard defines means to register new sensors and to remove existing ones. Also, it defines operations to insert new sensor observations. This standard defines this functionality in a binding independent way; two bindings are specified in this document: a KVP binding and a SOAP binding.
Web Feature Service	IS/wfs/2.0.2	2014-07	The Web Feature Service (WFS) represents a change in the way geographic information is created, modified and exchanged on the Internet. Rather than sharing geographic information at the file level using File

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			Transfer Protocol (FTP), for example, the WFS offers direct fine-grained access to geographic information at the feature and feature property level. This International Standard specifies discovery operations, query operations, locking operations, transaction operations and operations to manage stored, parameterized query expressions. Discovery operations allow the service to be interrogated to determine its capabilities and to retrieve the application schema that defines the feature types that the service offers. Query operations allow features or values of feature properties to be retrieved from the underlying data store based upon constraints, defined by the client, on feature properties. Locking operations allow exclusive access to features for the purpose of modifying or deleting features. Transaction operations allow features to be created, changed, replaced and deleted from the underlying data store. Stored query operations allow clients to create, drop, list and described parameterized query expressions that are stored by the server and can be repeatedly invoked using different parameter values. This International Standard defines eleven operations: GetCapabilities (discovery operation) DescribeFeatureType (discovery operation) GetPropertyValue (query operation) GetFeature (query operation) GetFeatureWithLock (query & locking operation) LockFeature (locking operation) Transaction (transaction operation) CreateStoredQuery (stored query operation) DropStoredQuery (stored query operation)

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			ListStoredQueries (stored query operation) DescribeStoredQueries (stored query operation)
Sensor Model Language (SensorML)	IS/SensorML/2.1	2020-08	The primary focus of the Sensor Model Language (SensorML) is to provide a robust and semantically-tied means of defining processes and processing components associated with the measurement and post-measurement transformation of observations. This includes sensors and actuators as well as computational processes applied pre- and postmeasurement. The main objective is to enable interoperability, first at the syntactic level and later at the semantic level (by using ontologies and semantic mediation), so that sensors and processes can be better understood by machines, utilized automatically in complex workflows, and easily shared between intelligent sensor web nodes. This standard is one of several implementation standards produced under OGC's Sensor Web Enablement (SWE) activity. This standard is a revision of content that was previously integrated in the SensorML version 1.0 standard (OGC 07-000).
IEEE Draft Standard for the Unmanned Aerial Vehicle (UAV) Polarimetric Remote Sensing Method for Earth Observation Applications	P1937.7/D2	Active Draft	Polarimetric remote sensing is a new remote sensing observation method and a supplement to conventional remote sensing. It is effective at the ultraviolet, visible and infrared spectral regions for better monitoring of the earth. Different objects have different polarized characteristics, even different parts of the same objects show different polarized characteristics. As a result, at every band range (ultraviolet, visible and infrared) the UAV polarimetric remote sensing needs different sensors, different band setting, different data pre-processing procedures, even needs different recognition models for different earth object. Multiple parameters and diverse metrics create interoperability and data utilization problems unless standards are established in various aspects of polarimetric remote sensing for Earth observation systems. This standard specifies the basic definitions of terms in the UAV Earth observation polarimetric remote sensing task, and also specifies the basic process and method from three aspects: data acquisition preparation, data acquisition and correction, data processing and application. It also puts forward instructive suggestions in many specific dimensions, such as equipment status, parameter indicators, data calibration, data processing methods, etc. This standard will enable vendors to supply various components for Drone-based polarimetric remote sensing systems and to help ensure interoperability in operations and data utilization of polarimetric remote sensing deployed in earth observation systems.

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Space. Earth observation. Image processing levels	BS EN 17030:2018	2018-05	This standard BS EN 17030:2018 Space. Earth observation. Image processing levels is classified in these ICS categories: 35.040.30 Coding of graphical and photographical information 35.240.70 IT applications in science 35.040.30 Coding of graphical and photographical information 35.240.70 IT applications in science This European Standard specifies the definition of the different processing steps (levels) of images coming from Earth observation systems observing the surface of the Earth regarding the different sensor sources of the origin data. It applies at least to image products generated from the following types of sensors: - electro-optical (including infrared and hyper-spectral); - SAR (Synthetic Aperture Radar). The standard allows to identify the information depth and the used auxiliary data/information. Furthermore it allows the comprehension of image data from different sources and gives hints about the information compatibility.
Space - Earth observation - Image processing levels	CSN EN 17030	2018-11	CSN EN 17030 This European Standard specifies the definition of the different processing steps (levels) of images coming from Earth observation systems observing the surface of the Earth regarding the different sensor sources of the origin data. It applies at least to image products generated from the following types of sensors: - electro-optical (including infrared and hyper-spectral); - SAR (Synthetic Aperture Radar). The standard allows to identify the information depth and the used auxiliary data/information. Furthermore it allows the comprehension of image data from different sources and gives hints about the information compatibility. Original English text of CSN EN Standard. The price of the Standard included all amendments and correcturs.
pace - Earth observation - Image processing levels (Endorsed by Asociación Española de Normalización	UNE EN 17030:2018	2018-06	This standard UNE EN 17030:2018 Space - Earth observation - Image processing levels (Endorsed by Asociación Española de Normalización in June of 2018.) is classified in these ICS categories: 35.240.70 35.040.30 35.040

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in June of 2018.)			
Geographic information. Preservation of digital data and metadata Content specifications for Earth observation data and derived digital products	BS ISO 19165-2:2020	2020-07	This standard BS ISO 19165-2:2020 Geographic information. Preservation of digital data and metadata is classified in these ICS categories: 35.240.70 IT applications in science This document aims to extend the long-term preservation of digital geospatial data to provide details about content describing the provenance and context specific to data from missions that observe the Earth using spaceborne, airborne or in situ instruments.
ISO 19165-2:2020- Geographic information- Preservation of digital data and metadata-Part 2: Content specifications for Earth observation data and derived digital products	ISO 19165-2:2020	2020	This document aims to extend the long-term preservation of digital geospatial data to provide details about content describing the provenance and context specific to data from missions that observe the Earth using spaceborne, airborne or in situ instruments.
ISO 21962:2003- Space data and information transfer systems-Data entity dictionary specification language (DEDSL)-PVL syntax	ISO 21962:2003	2003	ISO 21962:2003 specifies the requirements for establishing a parameter value language (PVL) to be used in the creation of a data entity dictionary (DED). ISO 21962:2003 is intended to be used by implementers of data entity dictionaries, and for example, by data producers to construct dictionaries that describe, in a more formal manner, data entities within their data products; by data users to understand data received from data producers who have used ISO 21962:2003 to construct their dictionaries; by an organization that mandates the attributes used to define each entity description in dictionaries used within that organization; by a particular community, such as Earth observation, space physics, archives, etc., to establish a degree of standardization for the contents of any data dictionary associated with a data product (this would be done by using ISO 21962:2003 to define a community-wide data dictionary); by organizations and communities to exchange the contents of a data dictionary in a standardized manner, i.e. to facilitate interoperability.
ISO 18674-5:2019-	ISO 18674-5:2019	2019	This document specifies the measurement of stress changes by means of total pressure cells (TPC).

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Geotechnical investigation and testing-Geotechnical monitoring by field instrumentation-Part 5: Stress change measurements by total pressure cells (TPC)			General rules of performance monitoring of the ground, of structures interacting with the ground, of geotechnical fills and of geotechnical works are presented in ISO 18674-1. If applied in conjunction with ISO 18674-4, this document allows the determination of effective stress acting in the ground. This document is applicable to: — monitoring changes of the state of stress in the ground and in geo-engineered structures (e.g. in earth fill dams or tunnel lining); — monitoring contact pressures at the interface between two media (e.g. earth pressure on retaining wall; contact pressure at the base of a foundation); — checking geotechnical designs and adjustment of construction in connection with the Observational Design procedure; — evaluating stability during or after construction. Guidelines for the application of TPC in geotechnical engineering are presented in Annex B. NOTE This document fulfils the requirements for the performance monitoring of the ground, of structures interacting with the ground and of geotechnical works by the means of total pressure cells as part of the geotechnical investigation and testing according to EN 1997-1[1] and EN 1997-2[2].
ISO/TS 19124-1:2023-Geographic information-Calibration and validation of remote sensing data and derived products-Part 1: Fundamentals	ISO/TS 19124-1:2023	2023	The ISO 19124 series is focused on calibration and validation (Cal/Val) of remote sensing data, which are collected by a sensor on-board a platform in a mission, and products derived in part or whole from the data. The ISO 19124 series defines the metadata related to the calibration and validation process that has not been defined in other ISO/TC 211 International Standards. The metadata allows the data providers to provide a standardized description of the Cal/Val process they have applied to the data. It allows the data users to get the same forms of metadata from different data providers. This document addresses the overall framework and common calibration and validation processes related to Earth observation data and derived products from different types of remote sensors. Subsequent parts in the ISO 19124 series will target data from specific sensors, for example, infrared, ultraviolet/visible/near-infrared, microwave, or broadband, products derived from those data, and calibration and validation sites. Calibration addresses a geometric, radiometric, or spectral correction of the data. Validation addresses an evaluation of the quality and the accuracy of the data and the derived products.
Tracked Changes. Assessing and managing flood risk in development. Code of practice	BS 8533:2017 - TC	2020-02	This standard BS 8533:2017 - TC Tracked Changes. Assessing and managing flood risk in development. Code of practice is classified in these ICS categories: 91.120.30 Waterproofing

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ISO 14002-2:2023- Environmental management systems- Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area-Part 2: Water	ISO 14002-2:2023	2023	This document gives general guidelines for organizations seeking to address water-related environmental aspects, environmental impacts, environmental conditions, and the associated risks and opportunities within an environmental management system in accordance with ISO 14001. The document addresses issues for environmental management related to water quantity and quality, such as water withdrawal, efficient use of water, and water discharge, as well as approaches to cope with water-related events such as flooding and droughts. The document considers the interconnections of water with other environmental media and takes a holistic approach to the management of water due to its impacts on ecosystems, ecosystem services, related biodiversity, as well as human life and well-being. This document is applicable to organizations irrespective of their size, type, financial resources, location and sector. It is applicable to all types of water and considers a life cycle perspective.
Environmental management systems - Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area - Part 2: Water	CSN EN ISO 14002-2	2023-11	CSN EN ISO 14002-2 This document gives general guidelines for organizations seeking to address water-related environmental aspects, environmental impacts, environmental conditions, and the associated risks and opportunities within an environmental management system in accordance with ISO 14001. The document addresses issues for environmental management related to water quantity and quality, such as water withdrawal, efficient use of water, and water discharge, as well as approaches to cope with water-related events such as flooding and droughts. The document considers the interconnections of water with other environmental media and takes a holistic approach to the management of water due to its impacts on ecosystems, ecosystem services, related biodiversity, as well as human life and well-being. This document is applicable to organizations irrespective of their size, type, financial resources, location and sector. It is applicable to all types of water and considers a life cycle perspective.
Standard Guide for Stakeholder Engagement on Environmental Risk Management and Climate	E3356-22	2022-10	1.1 This guide provides a series of steps to develop and execute an effective stakeholder engagement process for a broad spectrum of environmental projects including, but not limited to, site remediation and brownfields development, as well as local and regional climate resiliency and climate vulnerability initiatives. This guide does not apply to broad programmatic initiatives. 1.2 Effective stakeholder engagement in site remediation, brownfields redevelopment, habitat restoration, climate resiliency, climate vulnerability, and flood prevention and control projects requires a process

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			that is based on mutual education, effective communication about the project and its impacts, identification of the interests that will be affected, and open discussion about how to address those interests to the extent that is possible. The General Accountability Office suggests that core principles and strategic approaches enhance stakeholder participation (GAO 2006)(1)2. The National Oceanic and Atmospheric Administration (NOAA) reported that stakeholders developed more robust mitigation measures that addressed multiple hazards when they integrated climate variability into vulnerability and risk assessments associated with flooding and other natural disasters in the East Bay area of California's San Francisco Bay. (NOAA, 2021)(2). 1.3 An effective stakeholder engagement process (see Fig. 1) can create benefits for large projects, including:3 FIG. 1 Stakeholder Engagement Process Stakeholder Engagement Process Stakeholder Engagement Process Source: Eurofleets https://www.eurofleets.eu/stakeholders/ 1.3.1 Improved, sustainable outcomes, because the final project plan builds on local capacity and knowledge and considers local and regional issues that may require resolution in order to move forward. 1.3.2 Shared understanding of perspectives, issues, challenges, alternatives, and how these influence the desired or necessary outcomes 1.3.3 Credibility of and predictability for the project plan that comes from transparency 1.3.4 Stakeholder support for the planning process through shared data, ideas, funding, and political support 1.3.5 Strengthened relationships among affected parties for moving forward on the project.

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			1.3.6 Satisfying any legally-required public notice and participation requirements. 1.3.6.1 Stakeholder engagement should not be confused with the public participation requirements of the National Environmental Policy Act codified in 40 CFR §6.203. because NEPA potentially does not involve stakeholders until later in the project development process. In addition, NEPA's public participation process is not as flexible as that described in this guide. 1.3.7 Welp and Stoll-Kleeman (2006)(3) reported additional benefits of engaging stakeholders and affected parties in decisions regarding natural resources management. These benefits include: 1.3.7.1 Enhanced understanding, 1.3.7.2 Developing new options, 1.3.7.3 Decreasing hostility among participants through improved dialog and discussion, 1.3.7.4 Enlightening legal policy makers, 1.3.7.5 Producing competent, fair, and optimized solutions, 1.3.7.6 Accelerating the decision-making process. 1.4 In order to identify prospective stakeholders, ISO 26000 clause 5.3.2 suggests that an organization should ask the following questions: 1.4.1 To whom does the organization have legal obligations? 1.4.2 Who might be positively or negatively affected by the organization’s decisions, activities, or anticipated outcomes?

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			1.4.2.1 Mediators and facilitators are expected to be neutral parties. 1.4.3 Who is likely to express opinions and concerns about the decisions and activities of the organization? 1.4.4 Who has been involved in the past when similar concerns needed to be addressed? 1.4.5 Who can help the organization address specific impacts? 1.4.6 Who can affect the organization's ability to meet its responsibilities? 1.4.7 Who are the affected parties that would be disadvantaged if excluded from the engagement? 1.5 Stakeholder prioritization criteria 1.5.1 Identification of criteria to prioritize stakeholder engagement may be useful for some projects (Sharpe, 2021)(4). These criteria include, but are not limited to: 1.5.1.1 Level of interest, 1.5.1.2 Proximity, including nearby property owners,, 1.5.1.3 Fairness, 1.5.1.4 Magnitude of impact, 1.5.1.5 Underrepresented and underserved populations, 1.5.1.6 Probability of impact, 1.5.1.7 Level of community influence,

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			1.5.1.8 Cost, and 1.5.1.9 Time to implement a proposed project plan. 1.6 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Table 7: Relevant standards (all challenges)

Among above identified standards those related to Web Map Service, Sensor Observation Service Interface, Web Feature Service, Sensor Model Language (SensorML), and the t Standard for Remote Sensing are likely more relevant as they facilitate the management, analysis, and visualization of geospatial and environmental data at different resolution, inherently od interest for addressing the challenges. They enable effective mapping, monitoring, and data interoperability, which are key to flood risk management, fire detection and response, water resource management, and planning sustainable infrastructure.

On the other hand, while pinpointing the direct connection with the challenges requires a more in-depth analysis, standards focused on specific technical protocols or formats—without direct application to geospatial data management, earth observation, or environmental monitoring—might be deemed less relevant to the challenges at hand. However, it's important to note that detailed standards, such as those related to instruments and measurements, should be evaluated in the discussion with climate service providers once identified, for determining the compliance and applicability of their services in addressing the 4 challenges.

Guidance documents, though not strictly technical standards as those related to protocols or measurements, can significantly influence the practical application of climate services in addressing 4 the challenges. While these documents may not mandate specific technical protocols, they offer valuable insights, best practices, and methodological guidance that can enhance the effectiveness usage of climate services (shaping how climate services are deployed and utilized across these challenges). Furthermore they can provide frameworks for integrating geospatial data, recommend approaches for analysing and visualizing environmental conditions, and suggest strategies for leveraging earth observation technologies, proving instrumental in developing more resilient and adaptive strategies.

4.3 State-of-the-Art of identified technologies-TRL assessment

4.3.1 Assessing the Technology readiness level of technologies.

In addressing the multifaceted challenge of analysing hundreds of patents related to various technologies, as introduced in chapter 4.1, for the four challenges, a nuanced methodological approach was crafted to effectively manage and decipher the substantial volume of information.

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The preliminary assessment of patents for each challenge involved a comprehensive methodology that integrated advanced Natural Language Processing (NLP) techniques with expert judgment. This approach was essential for efficiently navigating through large datasets—up to 100 patents per challenge—and distilling relevant insights. Here's a description of the process:

Contextualization of Challenges: Initially, the process began by defining the scope of each challenge. This involved leveraging summaries from the Open Market Consultation Documents to accurately frame the investigation. Such contextualization was crucial for ensuring that the examination of patents was directly aligned with the specific objectives and needs of each challenge.

NLP-Supported Analysis: Utilizing Large NLP capabilities, the methodology involved an automated yet sophisticated analysis of the patent datasets. This step was designed to support expert judgment by identifying potential connections between the patents and the challenges, highlighting the necessity for powerful analytical tools in handling expansive datasets.

Extraction and Iterative Scoring: For each identified challenge, the analysis process extracted key insights regarding each patent's relevance to the challenge. Given the variability in relevance from one patent to another, the methodology involved an iterative scoring process conducted three times. This allowed for a cumulative judgment of each patent's pertinence, filtering out the top 20 most promising patents through a dynamic and refined evaluation process.

Expert Judgment and Parallel Verification: Following the NLP-supported analysis, expert judgment was applied to assess the top 20 patents more deeply, including both the abstract and full patent descriptions available online. This phase also included parallel verification against online evidence, such as news sites and patent owners' websites, to identify potential operational applications. This step was pivotal in assessing the Technology Readiness Levels (TRLs) and practical utility of the patents, moving beyond the information provided in the abstracts and descriptions alone.

Exclusion of Irrelevant Patents: Patents that lacked online evidence of the owner's activities or were deemed irrelevant to the challenge upon this manual investigation phase were excluded.

TRL Assessment: The TRL assessment, rather than providing a definitive judgment on each patent's readiness level, offered a range indicative of the patent's developmental stage. Given the synthetic nature of the information available for each patent and the large number of patents analysed, a precise TRL assessment was beyond the scope of this preliminary analysis. The methodology acknowledged the need for a detailed evaluation, including development stage, testing results, and integration details, which was not feasible within this initial assessment framework.

This methodology, blending NLP capabilities with expert insights, enabled a thorough and nuanced preliminary assessment of patents related to the challenges, setting the stage for further detailed investigations and potential applications of these technologies.

In the process of assessing patents for the four challenges, a focused subset of approximately 10 patents from the initially shortlisted 20 was thus evaluated for their Technology Readiness Levels (TRLs, see description in chapter 1.2). This phase enriched the original patent database from IPlytics by integrating additional insights in separate fields, including the suggested TRL range from our investigation, the rationale behind each TRL assessment, and references to online evidence that supported these evaluations.

Given the detailed nature of the information collected and the complexity of the analysis, the table summarizing the selected patents for all four challenges has been relegated to an annex. This decision was made to streamline the main document while still providing interested readers the opportunity to explore the intricate details of the assessment at their leisure.

In the following paragraph a synthetic description of the findings for each challenge is reported.

4.3.2 Results of technologies relevant for the challenges

The TRL assessment for the **Flood challenge** showcased advanced technologies with a strong leaning towards high readiness levels. The patents analysed within this challenge demonstrated the highest average TRLs among the four challenges, with most technologies likely falling within a TRL range of 7 to 9. This suggests that the flood management technologies are not only advanced but are also nearing

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or reached already market readiness, with several patents showing evidence of deployment in operational environments.

The Flood challenge patents are assigned to a mix of entities, including multinational technology corporations, global reinsurance companies, startups specializing in disaster risk assessment, property analytics and data services firms, academic institutions, and specialized research organizations. This assortment highlights a collaborative and multidisciplinary approach among various sectors in tackling flood management challenges.

The technologies encompass various approaches, including automated methods for flood risk assessment, systems for real-time flood mapping, methods for flood water analysis, and dynamic simulation models for flood inundation ranges. These technologies leverage data analysis, computer Modeling, and satellite information to enhance flood management capabilities. Such technologies include software solutions for flood risk scoring, computer programs for simulating flood scenarios, and systems that integrate satellite data for high-resolution flood mapping. These innovations aim to provide user-friendly tools for emergency operations, support early warning systems, and facilitate post-event analysis for damage assessment. There is potential for improving the efficiency of flood management processes, from risk assessment to mitigation measures implementation, using advanced algorithms, cloud-based solutions, and digital twin integration for climate and geospatial data.

Evidence of real-world application was found for all the analysed patents, underscoring the relatively mature and operational nature of these solutions. The presence of online evidence for each patent provided another indication that these technologies have been actively utilized by municipalities and other stakeholders, like insurers, reflecting a significant degree of adoption and integration into existing flood risk management practices.

The TRL assessments are based on the maturity of the technology, with several patents indicating a high readiness level due to successful demonstrations of the technology in operational environments. For example, some patents by big companies focus on efficient flood water analysis with a TRL of 7 to 9, justified by evidence of application in real-world scenarios. Another patent outlines a dynamic simulation method for flood inundation ranges with a TRL range of 6 to 9, highlighting the method's systematic approach and its validation through practical applications.

The technologies described in these patents include software solutions for flood risk scoring, computer programs for simulating flood scenarios, and systems that integrate satellite data for high-resolution flood mapping. These innovations aim to provide user-friendly tools for emergency operations, support early warning systems, and facilitate post-event analysis for damage assessment. The focus is on improving the efficiency of flood management processes, from risk assessment to mitigation measures implementation, using advanced algorithms, cloud-based solutions, and digital twin integration for climate and geospatial data.

When comparing these patents to the Commercial Off-The-Shelf products (COTS, see next chapter) there is a clear opportunity for synergy, integration or even extend the capabilities of COTS products like Copernicus data and Sentinel Hub. These integrations could lead to enriched data analytics platforms, more accurate predictive Modeling for flood events, and improved dynamic systems for flood impact coverage.

Furthermore, the Floods challenge outlines urgent need for rapid mapping and prediction tools to manage and respond to flood events more efficiently. It emphasizes the importance of integrating historical data, cloud services, and real-time mapping algorithms to develop a system capable of predicting floods, supporting emergency operations, and facilitating post-event analysis and climate adaptation planning. Overcoming gaps such as high-resolution data availability, the complexity of existing tools, and the need for solutions that are user-friendly and cater to non-experts. The relevance of the technologies such as the ones embedded in the patents for the Flood challenge lies in addressing some of these needs through innovative technologies that can enhance flood management capabilities, including digital twin integration, cloud-based solutions, and algorithms for real-time analysis.

In summary, the Flood challenge's TRL assessment underscores a suite of mature technologies poised for market entry or expansion. These patents reflect the ongoing efforts to enhance flood resilience

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through technology, with a strong emphasis on data-driven decision-making and automated analysis to support rapid and effective flood management responses, with the potential to work in concert with established services like the COTS products to deliver comprehensive flood management solutions. This alignment not only validates the technologies' current state but also positions them as valuable assets in the ongoing effort to bolster climate resilience and adaptive strategies.

The Technology Readiness Level (TRL) assessment for the **Fire challenge** has highlighted a suite of emerging technologies predominantly in the domains of early detection, predictive analytics, and risk mitigation for fire management. These technologies, which range from sensor-based systems to advanced simulation models, are likely, in absence of more robust evidence or in dept analysis, in the development phases with TRLs averaging between 4 and 6. There is thus room for innovation here, indicating of a field that is actively evolving, with a focus on enhancing the accuracy and timeliness of fire detection and the effectiveness of firefighting strategies. The TRL assessments reflect the such stage, with patents in the lower TRL range (2-4) often describing conceptual models or early-stage prototypes that require further validation (like technologies describing wildfire, forest fire and detection system) and patents outlining system for very early detection and suppression of fires with a TRL range of 3 to 6, showing progress towards practical application but still (likely) requiring demonstration in operational environments.

The assignees responsible for these patents are a mix of high-tech companies, research institutions, and universities, each bringing a unique perspective to the challenge of fire management. The presence of high-tech firms suggests a drive towards commercialising of fire management solutions, to be further investigated, while academic and research institutions contribute cutting-edge research and novel approaches to this pressing global issue.

The technologies described relate to various systems and methods, including computer programs for early warning systems, real-time monitoring, and predictive analytics to enhance fire response capabilities. Innovations include global monitoring systems for tracking fire events, apparatus for identifying forest fire susceptible areas, and methods for extracting fire information from satellite imagery. The emphasis is on leveraging technology to provide actionable insights, support emergency response teams, and mitigate the impact of fires through timely and accurate detection.

The **Fire challenge** indeed focuses on addressing fires initiated by various causes, particularly highlighting the scenario of waste fires in storage facilities. These incidents, recurring multiple times a year and exacerbated by higher temperatures, lack automated predictive solutions for prevention. The challenge aims to develop a model utilizing existing and new data, including COPERNICUS, to predict and prevent such fires through automated notifications for environmental agencies.

The available technologies like the one showcased in the patents related to the Fire challenge emphasize innovative approaches to fire detection, prediction, and management, potentially incorporating remote sensing, historical, and weather data for AI-based waste fire prediction, aligning with the challenge's objectives to automate fire risk monitoring and response, suggesting a complementary relationship with COTS products in enhancing fire management solutions.

The **Water resilience challenge** patents exhibits innovative technologies aimed at fortifying water resilience, with a spectrum of Technology Readiness Levels (TRLs) from conceptual frameworks to applied research and developmental stages, also harnessing artificial intelligence (AI) to address water-related concerns. Furthermore, drought management and remote sensing emerge as pivotal themes, underscoring a commitment to optimizing water resource evaluation and environmental monitoring crucial for water resilience.

These patents showcase technologies that leverage data analytics, remote sensing, and computational models to optimize water use, enhance irrigation efficiency, and monitor water quality in real-time. The focus is on sustainable water management, with solutions aimed at conserving water resources, improving agricultural productivity, and ensuring water quality and safety. The innovations reflect a blend of hardware systems, software applications, and analytical frameworks designed to address various challenges in water resource management, from supply optimization to environmental monitoring.

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The patents feature a range of assignees, including academic institutions focused on research and development, government research institutes with mandates for public welfare and scientific advancement, and private sector companies and consultancies offering technology solutions and services.

Interestingly, the patents reviewed for the Water Resilience Challenge had intermediate TRL averages of 5 (minimum) and 7 (maximum), showcasing a readiness for practical application. most patents featured indeed online evidence application documentation. Moreover, the Water Resilience Challenge demonstrates a breadth of considerations like those in the Fire challenge, albeit with slightly less diversity. The TRL assessments reflect the development stage and application potential of each technology. Patents with lower TRLs (3-5) typically describe systems and methods that are in the conceptual or prototyping phase, requiring further validation, and testing. Higher TRLs (6-9) are assigned to technologies with demonstrated efficacy in operational environments, such as advanced root zone water quality monitoring systems and comprehensive water management platforms.

The patented technologies for the Water challenge may also integrate well with COTS provided knowledge like Sentinel-1 and ESA-Copernicus Earth observation datasets, as the services offered by the Copernicus Data Space Ecosystem. The integration with COTS products, if not in place already, could enhance the patented technologies by providing access to a continuous stream of high-quality Earth observation data, supporting a range of activities, from monitoring water resources to managing irrigation systems, and could be instrumental in improving the accuracy and efficiency of water-related technologies. The APIs and data access services provided by these COTS products would allow patented technologies to access and process the data as needed, thereby expanding their capabilities and applications in the field of water management and resilience.

The emphasis on innovative drought management and remote sensing solutions resonates with the objectives delineated in the Water Resilience Challenge document. With the capability to furnish actionable insights for water distribution, enhance the interconnectivity between data repositories and develop database-driven solutions for better water distribution. Existing technologies show the potential to substantially mitigate the challenges associated with water resilience, thereby augmenting water monitoring, distribution efficacy, and decision-making processes through the strategic integration of AI and remote sensing technologies.

The **Sustainable infrastructure challenge** is dedicated to fostering integrated sustainable redevelopment and climate adaptation in both urban and rural neighbourhoods. This initiative aims at developing solutions to counteract heat island effects, manage flooding, droughts, and water scarcity, and evaluate the effectiveness of climate adaptation measures. It underscores the importance of exploring nature-based solutions, boosting local energy production, and utilizing Earth Observation (EO) data to pinpoint critical sites for intervention. The challenge's scope extends to mitigating climate-related risks and enhancing overall sustainability through strategic, innovative approaches.

In analysing patents related to this challenge, it seems that there is a spectrum of technologies that can directly support the challenge's multifaceted goals. The patents showcase technologies primarily in the fields of IT methods for management, civil engineering, and electrical engineering, with applications in urban planning, economic development decision-making, and ecological sustainability. Such technologies span from advancements in urban hydrology and flood risk quantification to climate adaptation methodologies. These include decision support systems powered by artificial intelligence (AI) and machine learning (ML) for economic and infrastructure planning, innovative ecological city designs emphasizing sustainability and efficiency, and platforms analysing economic indicators to guide investments. Technologies also encompass sustainable urban planning solutions addressing the heat island effect, water scarcity, and flood risks through nature-based solutions and smart planning. Additionally, infrastructure monitoring and management technologies leverage satellite imagery, digital twins, and cloud solutions for real-time risk assessment and resource management.

The technologies covered by the selected patents typically span a Technology Readiness Level (TRL) range from early-stage conceptual models (TRL 4-6) to advanced development and near-commercial readiness (TRL 7-9). This range indicates a spectrum from technologies still under validation or in

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prototyping phases to those that are well-developed, implemented, and ready for integration into real-world applications. The presence of technologies across this TRL spectrum reflects ongoing innovation in sustainable infrastructure, from early research and development to mature solutions poised for deployment and scaling in urban and ecological systems.

The rationale provided for TRL assessments often references the development stage of the technology, its demonstration in relevant environments, or the existence of operational prototypes. For instance, patents with higher TRLs (7-9) typically have more developed systems and methods, potentially incorporating advanced data processing, computer systems for economic development decisions, and risk quantification methods. Lower TRLs (4-6) are associated with technologies still in the validation or prototyping phases.

The patents are held by a variety of assignees, including universities (e.g., Saint Louis University, Universidad De São Paulo - USP), research institutes (e.g., Nanjing Automation Institute of Water Conservancy and Hydrology), and corporations (e.g., CoreLogic Solutions, LLC). This diversity indicates that innovation in sustainable infrastructure comes from both academic research and corporate R&D.

The patents cover, as anticipated, a broad spectrum of technologies, ranging from urban hydrological station network layout methods based on 3S technology, computer systems for economic development decisions, to systems and methods for quantifying flood risk. These technologies span various industry fields and sectors, including computer technology, IT methods for management, and mechanical engineering.

While the not explicitly connected to Commercial Off-The-Shelf (COTS) products, the integration of advanced technologies (TRL 7-9) with existing COTS solutions, particularly those providing Earth Observation and Climate Services layers, could enhance urban planning, risk assessment, and resource management. The relevance of these patents to sustainable infrastructure challenges lies in their potential to enhance urban planning, risk assessment, and resource management through innovative technological solutions. For example, patents related to quantifying flood risk directly contribute to understanding and mitigating one of the key challenges in sustainable infrastructure - managing water-related disasters.

4.3.3 Looking Beyond Patents an example of confirm of Technological maturity through the OMC

While patent analysis is instrumental in mapping out the technological landscape and maturity for various challenges, it's still necessary to recognize that many applications are yet untethered to patents and that, on the other way round, patented technology may not be necessary available for integration in customized Climate Services. This necessitates a broader view, incorporating market offer evaluations alongside technological research. This perspective is crystallized through the PROTECT project's open market consultation (OMC), which has been pivotal in unveiling mature, challenge-relevant technologies. Illustrative examples from the OMC for the FLOOD and WATER challenge reveal services employing technologies parallel to those found in patent analyses, underscoring the maturity of technological offerings across the four challenges, even beyond direct patent connections and leveraging on EOBS data from the COTS.

Box 1 – Aiding Flood Response in Emilia Romagna, May 2023, with the SaferPlaces Platform

From May 16th to 18th, 2023, Emilia-Romagna experienced extreme rainfall, causing significant floods and landslides across the region. This event, resulted in unprecedent water accumulation and damage as explained in this video from University of Bologna, with 23 rivers overflowing or breaching at the same time , thousands of landslides hundreds of municipalities roads and infrastructures damaged and affected. The SaferPlaces platform was instrumental in aiding ER Civil Protection with rapid flood mapping and early warnings, actively monitoring over 20 critical areas in real-time. Subsequently, the platform's digital twin technology validated flood hazard maps against

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actual events, demonstrating high predictive accuracy. Further, SaferPlaces was used to estimate economic losses, utilizing satellite data for comprehensive damage assessments. Full report on carried on activity can be found HERE

Figure 13: application of SaferPlaces to simulation of high probability flooding areas and comparison with real flooded areas in the "Borgo Durbecco" neighborhood, of city of Faenza (bottom right) and the city of Cesena (upper left)

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OWASIS improved water availability information – Anticipating drought/waterexcess'

Water managers all over the world are confronted with new challenges related to climate change. Floods and droughts resulting from increasingly severe weather conditions cause worldwide economic damage, degradation of nature, increased political and societal tensions and ultimately the loss of lives.

The lack of proper information on water availability is one of the most challenging obstacles in water management. In many cases data is not available, incomplete or inaccessible. This leads to ineffective or erroneous decision making and may cause subsequent water problems. Adequate water availability information is key to solving current and future water challenges. Two innovative services are provided in OWASIS to improve water resource management. These applications are the soil water storage capacity service and the water-auditing service.Water managers have a wide range of technological measures at their disposal to prevent and mitigate the effects of floods and drought. With limited time and financial resources, it is crucial to facilitate the decision-making process with proper, undisputed and timely information. Earth observation based smart hydrological modeling provides daily information on the soil-water availability evolution during the season and over the years.

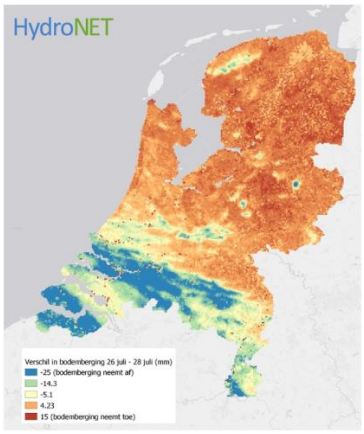

Figure 14: Daily Wateravailability (filling degree of water in soil profile) in the Netherlands (example of summer 2019), where areas develop a decrease (yellow/green towards blue) or an increase (orange towards red) in soil water in 2 days in mm. @courtesy Hydr

4.4 The COTS (Commercial off-the-shelf) products

The aim of the performed research – under this section 6 – is to identify the Commercial Off-The-Shelf (COTS) for the PROTECT project.

The COTS analysis was made taking into account the products/technologies available on market.

During the mapping of the EO-based climate services at EU level performed in the frame of the WP1, the providers were able to provide more details regarding the technology used to be able to provide their services. These information in combination with a desk research, concluded that the most used Commercial-Off-The-Shelf (COTS) products by the providers are in fact open data platforms such as Copernicus. More details can be found below.

The mapping of the EO-based providers has been conducted through three different methods have been applied for sourcing and analysis of CS, technologies, and providers on the market in the five selected application domains, as described below:

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- Desk Research is a type of research that is based on the material published in reports and similar documents that are available in public libraries, websites, data obtained from surveys already carried out, etc.
- Survey Reseach is the collection of information from a sample of individuals through their responses to questions.
- Consultation is a one-to-one meeting between two parties with the scope of getting more accurate information.

Among all three above-mentioned methods, the Survey Research represents the base for the identification of the COTS. This step has been based on the main 4 parameters mentioned below:

- TRL level :
    - Operational technologies and solutions (>TRL7).
    - Solutions at a low technology maturity level (TRL5 and 6) with high prospects of being commercialised in the medium term (4 years).
    - Solutions at a very low maturity level (<TRL 4) presenting important technological barriers that could be lifted in the medium term with R&D investments.
- Type of CS (taxonomy).
- Technology used.
- Application domains they apply to.

EU Survey is the tool which has been selected to use for displaying the survey in the dissemination process. The survey went through multiple iterations and has been reviewed by all the consortium partners and especially CKIC, before being open to the public. Solutions have been identified based on the application domains, type of CS (taxonomy), data and technology used, TRLs. The Survey Template can be seen in the attached Annex 6.

As a result of the emphasis on identifying EO-based services, the sources from which space data is collected have been the focal point of the effort to identify the COTS as it can be seen in the following figure:

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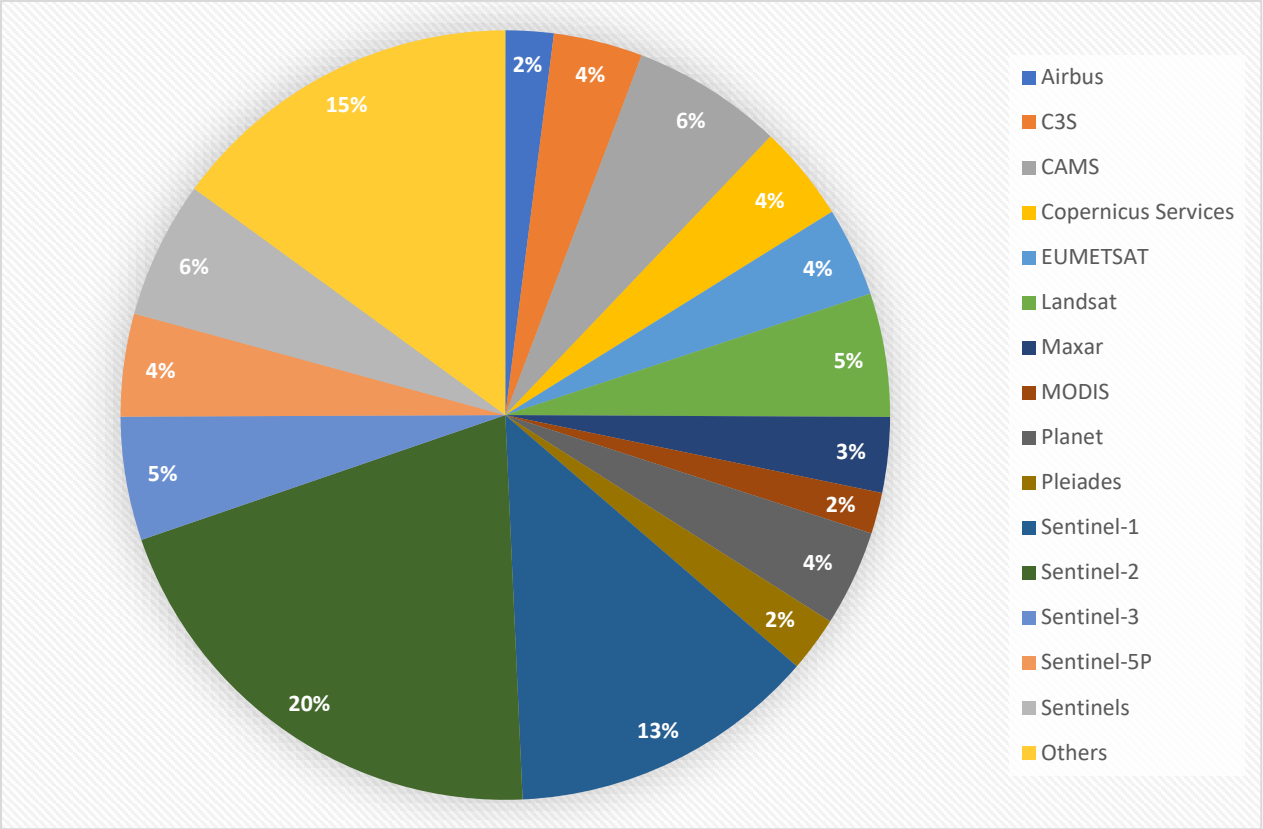

Figure 15. The EO-based services data source distribution

It is noteworthy to mention that the prevailing strategy employed by EO-based providers is the integration of numerous data sources into their services. Although "Others" appears to comprise a significant proportion of the distribution (15%), it is actually composed of a collection of sources with notably low usage percentages (0.29%, 0.58%, and 0.86%). The data sources from which "Others" originates are Aqua, CDS, CLMS, CMEMS, CMS, ECMWF, EnMAP, Galileo, GEDI, GOES, GRACE, Hyperion, Kineis, Landsat-8, Landsat-9, LiDAR, MSG, MTG, NOAA, NPP-VIIRS, OCO-3, OCO-2, Planetscope, Self-made, Sentinel-5, Sentinel-6, SMAP, SMOS, SPOT, SPOT-6, SPOT-7, Terra, VHR satellite data, ECOSTRESS, SMOS, PRISMA, ONDA-DIAS. Hence, for the purpose of the COTS analysis, a non-exhaustive inventory comprising only the most frequently utilized ones has been compiled as it can be seen in the table below.

The results of the Commercial Off-The-Shelf (COTS) analysis are summarized below in the form of a Table describing products, equipment and technical solutions available on the commercial market. The following products have been identified as essential parts of the future solution.

Below you can see the solutions available on the market which connect the 4 challenges:

No.	Product name	Manufacturer	Graphic presentation of the technology or symbol	Description of the solution	Source
1	Copernicus Data	Copernicus Data Copernicus		At the core of our service is providing access to data and tools related to atmospheric monitoring. We also support our users by providing quality assurance information, and advice on how to use and interpret data.	Link

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2	SENTINEL-1 Data	CREODIAS		Sentinel-1 is a key component of the European Space Agency's (ESA) Copernicus programme, designed to provide valuable and reliable radar imagery for Earth observation. This radar satellite constellation consists of two identical satellites, Sentinel-1A and Sentinel-1B, working together to enable continuous and all-weather imaging of the Earth's surface. Sentinel-1's primary mission is to acquire synthetic aperture radar (SAR) data, offering a unique perspective for monitoring various aspects of the Earth. SAR technology enables imaging of the Earth's surface regardless of weather conditions, daylight, or cloud cover, ensuring the acquisition of critical data under any circumstances.	Link
3	Pleiades-1A Satellite Sensor (0.5m)	Pleiades-1A		AIRBUS Defence & Space Pleiades-1A satellite sensor was successfully launched on December 16, 2011, and provides 0.5m high resolution satellite image data. Watch video of Pleiades-1A satellite launch. The Pleiades-1A satellite is capable of providing orthorectified color data at 0.5-meter resolution (roughly comparable to GeoEye-1) and revisiting any point on Earth as it covers a total of 1 million square kilometers (approximately 386,102 square miles) daily. Perhaps most importantly, Pleiades-1A is capable of acquiring high-resolution stereo imagery in just one pass and can accommodate large areas (up to 1,000 km x 1,000 km).	Link
4	Sentinel Hub	Sentinel Hub		We make satellite data (Sentinels, Landsat and other providers) easily accessible for you to be browsed or analyzed, within our cloud GIS or within your own environment. Get satellite imagery on your table without worrying about synchronization issues, storage,	Link

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				processing, de-compression algorithms, meta-data or sensor bands. Take a look at our Sentinel Hub brochure for more information.	
5	OpenEO Platform	European Space Agency	esa European Space Agency	openEO platform provides intuitive programming libraries to process a wide variety of earth observation datasets. This large-scale data access and processing is performed on multiple infrastructures, which all support the openEO API. This allows use cases from explorative research to large-scale production of EO-derived maps and information.	Link

Table 8: COTS available in the market

As far as EO providers are concerned, the aforementioned data sources do in fact provide a solid foundation upon which to build their ability to deliver dependable services to end-users. Nevertheless, in light of the heightened demands of end-users and the responses obtained from our survey, the EO providers are anticipating additional advancements concerning the data types, sources, and quality standards from which they can obtain information. This leaves scope automatically for innovation via R&D.

5 Conclusions

5.1 Conclusion on the IPR search

This report outlines the findings from the Intellectual Property Rights (IPR) search, specifically targeting patents and standards related to the four main challenges identified in the PROTECT CSA project: "Floods", "Fire", "Water resilience", and "Sustainable infrastructure''.

The patents analysed within the Flood challenge demonstrated the highest average TRLs among the four challenges. The Flood challenge's Technology Readiness Level (TRL) assessment shows advanced technologies at TRL levels 7 to 9, indicating high readiness for market entry. These patents cover a variety of fields from automated flood risk assessment and real-time flood mapping to dynamic simulation models. They aim to provide user-friendly tools for emergency operations and damage assessment and integration with Commercial Off-The-Shelf (COTS) products such as Copernicus could enhance capabilities further. The Flood challenge emphasizes the need for rapid mapping and prediction tools, integrating historical data, cloud services, and real-time mapping algorithms. Challenges include data availability, tool complexity, and user-friendliness. The technologies embedded in these patents address these needs, focusing on digital twin integration, cloud-based solutions, and real-time analysis algorithms.

As far as the Fire challenge is concrned we can see that the Technology Readiness Level (TRL) assessment focuses on emerging technologies for early fire detection and risk mitigation. These technologies, mainly in development (TRL 4-6), include sensors and simulation models. High-tech companies and research institutions are developing these solutions.

They involve early warning systems, real-time monitoring, and predictive analytics to enhance fire response. The challenge aims to automate fire risk monitoring and response, particularly focusing on

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waste fires in storage facilities. These technologies complement existing solutions, utilizing data like COPERNICUS for automated prediction and prevention.

For the Water Resilience challenge we see patents offering innovative technologies, spanning from conceptual to applied research stages, often using AI. They focus on optimizing water use, enhancing irrigation efficiency, and monitoring water quality. With TRL averages between 5 and 7, they're ready for practical use, and many integrate with products like Sentinel-1 and ESA-Copernicus datasets for better Earth observation data. These technologies aim to improve water monitoring, distribution, and decision-making processes, aligning with the challenge's objectives for sustainable water management.

For the last challenge, Sustainable Infrastructure challenge which aims to improve urban and rural areas' sustainability and climate resilience, patents cover a range of technologies, including AI-driven decision support systems and nature-based solutions for urban planning and risk management. These patents vary in readiness, from conceptual models to near-commercial readiness. They are held by universities, research institutes, and corporations, showcasing innovation from academic and corporate sectors. Integration with existing COTS products could enhance urban planning and resource management. These patents contribute to addressing challenges like flood risk quantification and improving sustainable infrastructure.

Moreover although there are differences in patenting activity and industry domains across the four challenges, a similarity exists in their geographical distribution. The majority of patents come from regions outside of Europe, indicating a significant lag in Europe. This suggests there's room for innovation, with Europe potentially having lower regional TRL compared to other regions.

Additionally, a possible gap and opportunities for innovation are highlighted by the analysis of pertinent standards for the four challenges, with a focus on the lack of standards in particular. The small number of recognised standards points to unrealized potential for creating novel approaches in the field.

In conclusion, the combined analysis of patents and standards shows a dynamic and promising environment for innovation for the four challenges. Although a number of applications and functionalities relevant to the intended solution were found in the previous analysis, a complete solution that fully satisfies all of the requirements was not found.

5.2 Conclusion on the COTS

In conclusion, the research conducted aimed to identify Commercial Off-The-Shelf (COTS) products for the PROTECT project, particularly focusing on Earth Observation (EO)-based climate services in the European Union (EU). Through desk research, surveys, and consultations, the most used COTS products were found to be open data platforms like Copernicus. The survey research formed the basis for identifying COTS, considering parameters such as technology readiness level, type of climate services, technology used, and application domains.

The EU Survey tool was instrumental in disseminating the survey, which underwent multiple iterations and reviews by consortium partners. Based on application domains, taxonomy, data, technology used, and TRLs, solutions were identified. The emphasis on EO-based services led to a focus on space data sources, with providers integrating multiple sources into their services. While various sources were identified, a non-exhaustive inventory was compiled, considering the most frequently utilized ones.

The results of the COTS analysis, describe products, equipment, and technical solutions available on the commercial market. These findings indicate that the identified data sources provide a solid foundation for EO providers to deliver dependable services. However, there's anticipation for advancements in data types, sources, and quality standards, leaving room for innovation through research and development

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Annexes

Due to the big size of the patent search tables, the annexes related to them have been included as separate excel files.

Annex 1 – Floods challenge list of patents

Annex 2 – Fire challenge list of patents

Annex 3 – Water resilience chalenge list of patents

Annex 4 – Sustainable infastracture list of patents

Annex 5 - Shortlisted patents with TRL assessment

Annex 6 - Survey Template for mapping the EO-based climate services

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ANNEX 6. PROTECT - Survey - Mapping of European EO climate services providers

Are you a European company providing innovative EO services for climate adaptation or mitigation?

Fill in our EU Survey!

Background and objectives of this questionnaire

The European Union funded PROTECT project aims to support urgent action for climate adaptation, mitigation and resilience. The project aims to enable public authorities to use state-of-the-art public procurement approaches in order to identify solutions – climate services based on Earth observation - that best fit the specific and systemic needs of public demand. The initial focus is on five encompassing application domains: Energy and Utilities, Sustainable Urban Communities, Marine and Coastal Environment and Agriculture, Forestry and Other Land Use (including bioeconomy) and Civil Security and Protection.

This project aims to prepare a future European funded Pre-Commercial Procurement initiative (2024). It has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592.

*Learn more about Innovation procurement and its two modalities - Pre-Commercial procurement (PCP) and Public procurement of Innovative solutions (PPI) – **in the attached document below**.*

Download

What is innovation procurement.pdf

Context

The project partners are looking for innovative services using Earth Observation data addressing the needs of public authorities regarding climate adaptation and mitigation.

The objectives of this survey are :

1. To map European climate services that use Earth Observation (EO) data.
2. To give public authorities a snapshot of the state of the art of the market and on-going developments

Your interest in filling in this questionnaire
Each pre-identified provider will have the chance to be referenced by the PROTECT project and might have the opportunity to present their services in front of participating public buyers in the frame of an Open Market Consultation (online pitching sessions) and some of our project activities.

We are looking forward to working with you!

Instructions to fill in this questionnaire

* It is recommended to fill in this form together with the business representative of the your entity.

* If more than one of the company's services are fitting to the scope, the questionnaire should be filled in separately for each service by selecting Service 1 first, filling in all the details for the respective service and after selecting Add another service option, filling in all the information for Service 2 etc.
* The information provided will only be used in the context of the PROTECT project. Processing of personal information is fully compliant with data protection regulations in place (learn more about GDPR here).

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Do you give your consent for PROTECT project to procees your information?

- I agree - Please fill in the questions below
- I don't agree - **Thank you for your time ! Unfortunqtely, you won't be able to continue this survey ! Have a wonderful day !**

Personal and Organisation Information

*** 1. Name and surname**

*** 2. Name of the organization**

*** 3. Do you give your consent for PROTECT project to procees your information?**

- I agree
- I don't agree

*** 4. Email**

*** 5. Phone number**

*** 6. Website**

7. Logo

*** 8. Headquarter's country**

- AT - Austria
- BE - Belgium
- BG - Bulgaria
- HR - Croatia
- CY - Cyprus
- CZ - Czechia
- DK - Denmark

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- EE - Estonia
- FI - Finland
- FR - France
- DE - Germany
- EL - Greece
- HU - Hungary
- IE - Ireland
- IT - Italy
- LV - Latvia
- LT - Lithuania
- LU - Luxembourg
- MT - Malta
- NL - Netherlands
- PL - Poland
- PT - Portugal
- RO - Romania
- SK - Slovak Republic
- SI - Slovenia
- ES - Spain
- SE – Sweden

*** 9. City**

*** 10. Type of enterprise**

- Micro Enterprises (<10 employees)
- Small Enterprises (10-49 employees)

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- ○ Medium-sized Enterprises (50-249 employees)
- ○ Large Enterprises (>250 employees)
- ○ Public Organization
- ○ Others

*** 11. Company's description (Max. 10 lines)**

Description of your service

According to European Union Agency for the Space Programme (EUSPA): "Earth Observation refers to the use of remote sensing technologies to monitor land, marine (seas, rivers, lakes) and atmosphere. Satellite-based EO relies on the use of satellite-mounted payloads to gather imaging data about the Earth's characteristics. The images are then processed and analysed in order to extract different types of information that can serve a very wide range of applications and industries."

The European Union definition as outlined in the 2015 European Union research and innovation roadmap for climate services reads as follows: "we attribute to the term a broad meaning, which covers the transformation of climate-related data − together with other relevant information − into customised products such as projections, forecasts, information, trends, economic analysis, assessments (including technology assessment), counselling on best practices, development and evaluation of solutions and any other service in relation to climate that may be of use for the society at large. As such, these services include data, information and knowledge that support adaptation, mitigation an disaster risk management (DRM)."

Service 1

*** A. Please select option:**

- ☐ Service 1 (S1)

*** S1.1. In which of the following five applications domains is the service delivered?**

- ○ **Agriculture, forestry and other land uses (including the bioeconomy)** *Ex : Agriculture, forestry and other land uses cover a wide range of environments and have great potential for climate services. Unsustainable agricultural and forestry practices (e.g. overexploitation of soils, conversion of forests to agricultural land) generate large amounts of greenhouse gases and disturb the already fragile balance of local ecosystems.*

  a) Environmental monitoring

- ○ Carbon capture & content assessment
- ○ Environmental impact monitoring
- ○ Biomass monitoring
- ○ Deforestation/degradation monitoring
- ○ Others

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*** If Others, write which one :**

b) Natural resources monitoring

- Biomass monitoring
- Crop yield forecasting
- Soil condition monitoring
- Vegetation monitoring
- Forest Inventory monitoring
- Forest vegetation health monitoring
- Others

*** If Others, write which one :**

c) Operations management

- Asset monitoring
- CAP monitoring
- Farm management systems
- Pastureland management
- Precision irrigation
- Variable rate application
- Forest asset management
- Forest exploitation certification
- Others

*** If Others, write which one :**

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d) Weather services for agriculture

- Snow and ice
- Climate services for agriculture
- Weather forecasting for agriculture
- Others

*** If Others, write which one :**

- **Energy and utilities**
  Ex : Utilities include all activities related to water supply, sewage services, electricity, dams and natural gas.

a) Renewable energy:

- Site selection, planning and monitoring for renewable energy
- Renewable energy assessment potential and forecast
- Others

*** If Others, write which one :**

b) Other

- Energy network conditions monitoring
- Power plant design optimisation
- Environmental impact assessment of energy and mineral resources plants
- Pipeline monitoring
- Others

*** If Others, write which one :**

c) Waste

- Climate data and modelling for waste monitoring and management
- Others

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*** If Others, write which one :**

- **Marine and coastal environment**
  Ex : Marine environments are aquatic environments with high levels of dissolved salt. They include the open ocean, the deep ocean and coastal marine ecosystems, each with different physical and biological characteristics and therefore representing different ecosystems.

a) Environmental monitoring

- Marine pollution monitoring
- Others

*** If Others, write which one :**

b) Maritime engineering

- Marine surveying and mapping
- Dredging
- Others

*** If Others, write which one :**

c) Navigation

- Climate data and modelling for navigation
- Others

*** If Others, write which one :**

d) Ocean services

- Metocean
- Others

*** If Others, write which one :**

e) Ports

- Climate data and modelling for ports

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- Others

*** If Others, write which one :**

f) Vessel tracking

- Dark vessel monitoring
- Others

*** If Others, write which one :**

g) Aquaculture

- Climate data and modelling for aquaculture
- Others

*** If Others, write which one :**

h) Fisheries

- Illegal, unreported and unregulated fishing (IUU) control
- Catch optimisation
- Fish stock detection
- Others

*** If Others, write which one :**

- **Security and civil protection**
  Ex : Civil security and protection includes the policies, bodies and mechanisms that a country or region has in place to protect itself against new and urgent threats to the safety of people and/or the functioning of critical infrastructure.

a) Early warning

- Forecast
- Monitoring and warning services
- Others

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*** If Others, write which one :**

b) Migration and settlement

- Monitoring and forecasting the climate impact of migration
- Forecasting of climate drivers for migration
- Others

*** If Others, write which one :**

c) Post-event analysis

- Post-event analysis
- Others

*** If Others, write which one :**

d) Preparedness

- Preparedness
- Others

*** If Others, write which one :**

e) Rapid mapping

- Rapid mapping
- Others

*** If Others, write which one :**

f) Search and Rescue

- Beacons for Aviation
- Beacons for Land
- Situational awareness supporting search and rescue
- Others

*** If Others, write which one :**

g) Infrastructure Planning

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- Permitting
- Vulnerability Analysis
- Others

*** If Others, write which one :**

h) Insurance for natural disasters

- Risk modelling
- Others

*** If Others, write which one :**

i) Critical infrastructure

- Construction Operations
- Monitoring of impact of human activities on infrastructure
- Infrastructure monitoring
- Predictive maintenance
- Emergency assistance
- Design of infrastructure
- Others

*** If Others, write which one :**

- **Sustainable urban communities**

Ex : Green and sustainable urban communities harness their human, natural and financial capital to meet current and future needs in a sustainable manner, with a long-term perspective (ex: heat islands, effects of climate change on the (vulnerable) urban population etc.).

a) Environmental monitoring

- [ ] Air quality monitoring in urban environments
- [ ] Thermal auditing
- [ ] Urban greening

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- [ ] Urban heat islands
- [ ] Others

*** If Others, write which one :**

b) Smart cities operations

- [ ] Smart waste management
- [ ] Others

*** If Others, write which one :**

c) Urban planning and monitoring

- [ ] Cultural heritage monitoring
- [ ] Surveying and mapping of urban areas
- [ ] Urban modelling, 3D modelling, Digital Twins
- [ ] Urban planning
- [ ] Others

*** If Others, write which one :**

d) Urban mobility

- ○ Climate data and modelling for urban mobility monitoring and forecasting
- ○ Others

*** If Others, write which one :**

*** S1.2. Service acronym or project name (Horizon 2020 projects and similar are being taken into consideration as well) :**

*** S1.3. Which technologies are used for the service? (multiple choices)**

- [ ] Satellites

*** S1.3.1. Describe the typology of EO data you use (Ex: Sentinel 5P, Pléiades, Copernicus atmosphere services etc.) :**

- [ ] Drones

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- [ ] Aircrafts
- [ ] Ground sensors
- [ ] IoT
- [ ] Artificial Intelligence/Machine Learning
- [ ] Others

*** If Others, write which one :**

Download

ECSS-E-HB-11A_1March2017_.pdf

*** S1.4. Which is the Technological Readiness Level of the solution? The TRL levels for software are described according to the Annex A from ECSS-E-HB-11A which can be find above.**

- ○ TRL 1
  Ex : Preliminary algorithmic stage. Publication of research results.

  *** S1.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

- ○ TRL 2
  Ex : Individual algorithms or functions are prototyped.

  *** S1.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

- ○ TRL 3
  Ex : Prototype of the main functionalities of the integrated system.

  *** S1.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

- ○ TRL 4
  Ex : Alpha version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software development life-cycle; that implements the main functionality of the software and by which preliminary verification and validation activities are archieved.

  *** S1.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

- ○ TRL 5
  Ex : Beta version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software life-cycle, that implements the complete functionality of the software and by which preliminary verification and validation activities are archived.

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*** S1.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

○ TRL 6
Ex : Ready for use in an operational or production context, including user support, as a building block or a tool.

*** S1.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

○ TRL 7
Ex : Demonstrator. Building block and tailored generic software product qualified for a particular purpose.

*** S1.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

S1.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

○ TRL 8
Ex : System qualified and ready to be applied in an operational environment.

*** S1.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

S1.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

○ TRL 9
Ex : Has been applied in the execution of an operational environment.

*** S1.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

S1.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

*** S1.5. Explain how your service assists public authorities in climate adaptation or mitigation actions :**

*** S1.6. What kind of data do you lack of to improve your service?**

*** S1.7. What future missions or emerging technologies would help improve your service and make it fit better with market needs?**

*** S1.8. Do you have or do you plan to implement partnerships with other climate services providers to complement you service offer?**

S1.9. Comments

☐ Add another service – see below

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Service 2

*** B. If Add another service selected, please select option:**

☐ Service 2 (S2)

*** S2.1. In which of the following five applications domains is the service delivered?**

○ **Agriculture, forestry and other land uses (including the bioeconomy)**
Ex : Agriculture, forestry and other land uses cover a wide range of environments and have great potential for climate services. Unsustainable agricultural and forestry practices (e.g. overexploitation of soils, conversion of forests to agricultural land) generate large amounts of greenhouse gases and disturb the already fragile balance of local ecosystems.

a) Environmental monitoring

○ Carbon capture & content assessment

○ Environmental impact monitoring

○ Biomass monitoring

○ Deforestation/degradation monitoring

○ Others

*** If Others, write which one :**

b) Natural resources monitoring

○ Biomass monitoring

○ Crop yield forecasting

○ Soil condition monitoring

○ Vegetation monitoring

○ Forest Inventory monitoring

○ Forest vegetation health monitoring

○ Others

*** If Others, write which one :**

c) Operations management

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- Asset monitoring
- CAP monitoring
- Farm management systems
- Pastureland management
- Precision irrigation
- Variable rate application
- Forest asset management
- Forest exploitation certification
- Others

*** If Others, write which one :**

d) Weather services for agriculture

- Snow and ice
- Climate services for agriculture
- Weather forecasting for agriculture
- Others

*** If Others, write which one :**

- **Energy and utilities**
  Ex : Utilities include all activities related to water supply, sewage services, electricity, dams and natural gas.

  a) Renewable energy:

- Site selection, planning and monitoring for renewable energy
- Renewable energy assessment potential and forecast

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

- Others

*** If Others, write which one :**

b) Other

- Energy network conditions monitoring
- Power plant design optimisation
- Environmental impact assessment of energy and mineral resources plants
- Pipeline monitoring
- Others

*** If Others, write which one :**

c) Waste

- Climate data and modelling for waste monitoring and management
- Others

*** If Others, write which one :**

- **Marine and coastal environment**
  Ex : Marine environments are aquatic environments with high levels of dissolved salt. They include the open ocean, the deep ocean and coastal marine ecosystems, each with different physical and biological characteristics and therefore representing different ecosystems.

a) Environmental monitoring

- Marine pollution monitoring
- Others

*** If Others, write which one :**

b) Maritime engineering

- Marine surveying and mapping

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

- Dredging
- Others

*** If Others, write which one :**

c) Navigation

- Climate data and modelling for navigation
- Others

*** If Others, write which one :**

d) Ocean services

- Metocean
- Others

*** If Others, write which one :**

e) Ports

- Climate data and modelling for ports
- Others

*** If Others, write which one :**

f) Vessel tracking

- Dark vessel monitoring
- Others

*** If Others, write which one :**

g) Aquaculture

- Climate data and modelling for aquaculture
- Others

*** If Others, write which one :**

h) Fisheries

- Illegal, unreported and unregulated fishing (IUU) control

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

- Catch optimisation
- Fish stock detection
- Others

*** If Others, write which one :**

- **Security and civil protection**
  Ex : Civil security and protection includes the policies, bodies and mechanisms that a country or region has in place to protect itself against new and urgent threats to the safety of people and/or the functioning of critical infrastructure.

a) Early warning

- Forecast
- Monitoring and warning services
- Others

*** If Others, write which one :**

b) Migration and settlement

- Monitoring and forecasting the climate impact of migration
- Forecasting of climate drivers for migration
- Others

*** If Others, write which one :**

c) Post-event analysis

- Post-event analysis
- Others

*** If Others, write which one :**

d) Preparedness

- Preparedness
- Others

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

*** If Others, write which one :**

e) Rapid mapping

- ○ Rapid mapping
- ○ Others

*** If Others, write which one :**

f) Search and Rescue

- ○ Beacons for Aviation
- ○ Beacons for Land
- ○ Situational awareness supporting search and rescue
- ○ Others

*** If Others, write which one :**

g) Infrastructure Planning

- ○ Permitting
- ○ Vulnerability Analysis
- ○ Others

*** If Others, write which one :**

h) Insurance for natural disasters

- ○ Risk modelling
- ○ Others

*** If Others, write which one :**

i) Critical infrastructure

- ◉ Construction Operations
- ○ Monitoring of impact of human activities on infrastructure
- ○ Infrastructure monitoring

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

- Predictive maintenance
- Emergency assistance
- Design of infrastructure
- Others

*** If Others, write which one :**

- **Sustainable urban communities**
  Ex : Green and sustainable urban communities harness their human, natural and financial capital to meet current and future needs in a sustainable manner, with a long-term perspective (ex: heat islands, effects of climate change on the (vulnerable) urban population etc.).

a) Environmental monitoring

- [ ] Air quality monitoring in urban environments
- [ ] Thermal auditing
- [ ] Urban greening
- [ ] Urban heat islands
- [ ] Others

*** If Others, write which one :**

b) Smart cities operations

- [ ] Smart waste management
- [ ] Others

*** If Others, write which one :**

c) Urban planning and monitoring

- [ ] Cultural heritage monitoring
- [ ] Surveying and mapping of urban areas
- [ ] Urban modelling, 3D modelling, Digital Twins
- [ ] Urban planning

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

☐ Others

*** If Others, write which one :**

d) Urban mobility

○ Climate data and modelling for urban mobility monitoring and forecasting

○ Others

*** If Others, write which one :**

*** S2.2. Service acronym or project name (Horizon 2020 projects and similar are being taken into consideration as well) :**

*** S2.3. Which technologies are used for the service? (multiple choices)**

☐ Satellites

*** S2.3.1. Describe the typology of EO data you use (Ex: Sentinel 5P, Pléiades, Copernicus atmosphere services etc.) :**

☐ Drones

☐ Aircrafts

☐ Ground sensors

☐ IoT

☐ Artificial Intelligence/Machine Learning

☐ Others

*** If Others, write which one :**

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*** S2.4. Which is the Technological Readiness Level of the solution? The TRL levels for software are described according to the Annex A from ECSS-E-HB-11A which can be find above.**

○ TRL 1
Ex : Preliminary algorithmic stage. Publication of research results.

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*** S2.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

TRL 2

Ex : Individual algorithms or functions are prototyped.

*** S2.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

TRL 3

Ex : Prototype of the main functionalities of the integrated system.

*** S2.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

TRL 4

Ex : Alpha version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software development life-cycle; that implements the main functionality of the software and by which preliminary verification and validation activities are archieved.

*** S2.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

TRL 5

Ex : Beta version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software life-cycle, that implements the complete functionality of the software and by which preliminary verification and validation activities are archived.

*** S2.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

TRL 6

Ex : Ready for use in an operational or production context, including user support, as a building block or a tool.

*** S2.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

TRL 7

Ex : Demonstrator. Building block and tailored generic software product qualified for a particular purpose.

*** S2.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

S2.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

TRL 8

Ex : System qualified and ready to be applied in an operational environment.

*** S2.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

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S2.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

○ TRL 9
Ex : Has been applied in the execution of an operational environment.

*** S2.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

S2.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

*** S2.5. Explain how your service assists public authorities in climate adaptation or mitigation actions :**

*** S2.6. What kind of data do you lack of to improve your service?**

*** S2.7. What future missions or emerging technologies would help improve your service and make it fit better with market needs?**

*** S2.8. Do you have or do you plan to implement partnerships with other climate services providers to complement you service offer?**

S2.9. Comments

☐ Add another service - see below

Service 3

*** C. If Add another service selected, please select option:**

☐ Service 3 (S3)

*** S3.1. In which of the following five applications domains is the service delivered?**

○ **Agriculture, forestry and other land uses (including the bioeconomy)**
Ex : Agriculture, forestry and other land uses cover a wide range of environments and have great potential for climate services. Unsustainable agricultural and forestry practices (e.g. overexploitation of soils, conversion of forests to agricultural land) generate large amounts of greenhouse gases and disturb the already fragile balance of local ecosystems.

a) Environmental monitoring

○ Carbon capture & content assessment

○ Environmental impact monitoring

○ Biomass monitoring

○ Deforestation/degradation monitoring

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- Others

*** If Others, write which one :**

b) Natural resources monitoring

- Biomass monitoring
- Crop yield forecasting
- Soil condition monitoring
- Vegetation monitoring
- Forest Inventory monitoring
- Forest vegetation health monitoring
- Others

*** If Others, write which one :**

c) Operations management

- Asset monitoring
- CAP monitoring
- Farm management systems
- Pastureland management
- Precision irrigation
- Variable rate application
- Forest asset management
- Forest exploitation certification
- Others

*** If Others, write which one :**

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d) Weather services for agriculture

- Snow and ice
- Climate services for agriculture
- Weather forecasting for agriculture
- Others

*** If Others, write which one :**

- **Energy and utilities**
  Ex : Utilities include all activities related to water supply, sewage services, electricity, dams and natural gas.

a) Renewable energy:

- Site selection, planning and monitoring for renewable energy
- Renewable energy assessment potential and forecast
- Others

*** If Others, write which one :**

b) Other

- Energy network conditions monitoring
- Power plant design optimisation
- Environmental impact assessment of energy and mineral resources plants
- Pipeline monitoring
- Others

*** If Others, write which one :**

c) Waste

- Climate data and modelling for waste monitoring and management

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- Others

*** If Others, write which one :**

- **Marine and coastal environment**
  Ex : Marine environments are aquatic environments with high levels of dissolved salt. They include the open ocean, the deep ocean and coastal marine ecosystems, each with different physical and biological characteristics and therefore representing different ecosystems.

a) Environmental monitoring

- Marine pollution monitoring
- Others

*** If Others, write which one :**

b) Maritime engineering

- Marine surveying and mapping
- Dredging
- Others

*** If Others, write which one :**

c) Navigation

- Climate data and modelling for navigation
- Others

*** If Others, write which one :**

d) Ocean services

- Metocean
- Others

*** If Others, write which one :**

e) Ports

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

- Climate data and modelling for ports
- Others

*** If Others, write which one :**

f) Vessel tracking

- Dark vessel monitoring
- Others

*** If Others, write which one :**

g) Aquaculture

- Climate data and modelling for aquaculture
- Others

*** If Others, write which one :**

h) Fisheries

- Illegal, unreported and unregulated fishing (IUU) control
- Catch optimisation
- Fish stock detection
- Others

*** If Others, write which one :**

- **Security and civil protection**
  Ex : Civil security and protection includes the policies, bodies and mechanisms that a country or region has in place to protect itself against new and urgent threats to the safety of people and/or the functioning of critical infrastructure.

  a) Early warning

  - Forecast
  - Monitoring and warning services
  - Others

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*** If Others, write which one :**

b) Migration and settlement

- Monitoring and forecasting the climate impact of migration
- Forecasting of climate drivers for migration
- Others

*** If Others, write which one :**

c) Post-event analysis

- Post-event analysis
- Others

*** If Others, write which one :**

d) Preparedness

- Preparedness
- Others

*** If Others, write which one :**

e) Rapid mapping

- Rapid mapping
- Others

*** If Others, write which one :**

f) Search and Rescue

- Beacons for Aviation
- Beacons for Land
- Situational awareness supporting search and rescue
- Others

*** If Others, write which one :**

g) Infrastructure Planning

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- Permitting
- Vulnerability Analysis
- Others

*** If Others, write which one :**

h) Insurance for natural disasters

- Risk modelling
- Others

*** If Others, write which one :**

i) Critical infrastructure

- Construction Operations
- Monitoring of impact of human activities on infrastructure
- Infrastructure monitoring
- Predictive maintenance
- Emergency assistance
- Design of infrastructure
- Others

*** If Others, write which one :**

- **Sustainable urban communities**
  Ex : Green and sustainable urban communities harness their human, natural and financial capital to meet current and future needs in a sustainable manner, with a long-term perspective (ex: heat islands, effects of climate change on the (vulnerable) urban population etc.).

a) Environmental monitoring

- [ ] Air quality monitoring in urban environments
- [ ] Thermal auditing
- [ ] Urban greening

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- [ ] Urban heat islands
- [ ] Others

*** If Others, write which one :**

b) Smart cities operations

- [ ] Smart waste management
- [ ] Others

*** If Others, write which one :**

c) Urban planning and monitoring

- [ ] Cultural heritage monitoring
- [ ] Surveying and mapping of urban areas
- [ ] Urban modelling, 3D modelling, Digital Twins
- [ ] Urban planning
- [ ] Others

*** If Others, write which one :**

d) Urban mobility

- ○ Climate data and modelling for urban mobility monitoring and forecasting
- ○ Others

*** If Others, write which one :**

*** S3.2. Service acronym or project name (Horizon 2020 projects and similar are being taken into consideration as well) :**

*** S3.3. Which technologies are used for the service? (multiple choices)**

- [ ] Satellites

*** S3.3.1. Describe the typology of EO data you use (Ex: Sentinel 5P, Pléiades, Copernicus atmosphere services etc.) :**

- [ ] Drones

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- [ ] Aircrafts
- [ ] Ground sensors
- [ ] IoT
- [ ] Artificial Intelligence/Machine Learning
- [ ] Others

*** If Others, write which one :**

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*** S3.4. Which is the Technological Readiness Level of the solution? The TRL levels for software are described according to the Annex A from ECSS-E-HB-11A which can be find above.**

- ○ TRL 1
  Ex : Preliminary algorithmic stage. Publication of research results.

  *** S3.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

- ○ TRL 2
  Ex : Individual algorithms or functions are prototyped.

  *** S3.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

- ○ TRL 3
  Ex : Prototype of the main functionalities of the integrated system.

  *** S3.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

- ○ TRL 4
  Ex : Alpha version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software development life-cycle; that implements the main functionality of the software and by which preliminary verification and validation activities are archieved.

  *** S3.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

- ○ TRL 5
  Ex : Beta version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software life-cycle, that implements the complete

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functionality of the software and by which preliminary verification and validation activities are archived.

*** S3.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

TRL 6

Ex : Ready for use in an operational or production context, including user support, as a building block or a tool.

*** S3.4.1. Describe your project in 15 lines (Challenges addressed, Technological barriers to raise, Innovative aspect of your project etc.) :**

TRL 7

Ex : Demonstrator. Building block and tailored generic software product qualified for a particular purpose.

*** S3.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

S3.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

TRL 8

Ex : System qualified and ready to be applied in an operational environment.

*** S3.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

S3.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

TRL 9

Ex : Has been applied in the execution of an operational environment.

*** S3.4.1. Description of your service in 15 lines (Ex: Challenges addressed, value proposition, uniqueness of the solution, collaborations with other providers if it is a project, clients targeted etc.) :**

S3.4.2. Provide an example of use case with a client or an end-user (Max. 15 lines) :

*** S3.5. Explain how your service assists public authorities in climate adaptation or mitigation actions :**

*** S3.6. What kind of data do you lack of to improve your service?**

*** S3.7. What future missions or emerging technologies would help improve your service and make it fit better with market needs?**

*** S3.8. Do you have or do you plan to implement partnerships with other climate services providers to complement you service offer?**

S3.9. Comments

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☐ I have more than 3 services - Please fill in the questionnaire again. Thank you !

Presentation of the results of the survey

The consortium would like to display the results of the mapping on the PROTECT online platform to provide an actionable and readable catalogue of climate services that will be consulted by our community of public procurers.

*** 1. Do you authorise the PROTECT consortium to use your answers to feed into the catalogue of climate services that will be displayed on PROTECT's online platform? (Multiple choices)**

☐ Yes, I agree for all services.

☐ Yes, I agree for Service 1.

☐ Yes, I agree for Service 2.

☐ Yes, I agree for Service 3.

☐ No, I disagree and I wish that PROTECT keeps the results confidential.

*** 2. Do you accept to be contacted by PROTECT team to have additional information after you filled the questionnaire?**

○ Yes, I agree.

○ No, I disagree.

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PROCURING INNOVATIVE CLIMATE CHANGE SERVICES

Annex 2. Open Market consultation report

Results of the

Open Market Consultation for the future Pre-Commercial Procurement of R&D services of innovative Climate Services based on Earth Observation in four challenges:

FLOODS, FIRE, WATER &

SUSTAINABLE INFRASTRUCTURE

November 2023

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Table of Contents

Abbreviations and Acronyms

COTS	Commercial Off-The-Shelf
CS	Climate Services
EAFIP	European Assistance for Innovation Procurement
EO	Earth Observation
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FRAND	Fair, Reasonable and Non-Discriminatory
GEOSS	Global Earth Observation System of Systems
GDPR	General Data Protection Regulation
HE	Horizon Europe
IPRs	Intellectual Property Rights
OMC	Open Market Consultation
PBG	Public Buyers Group
PCP	Pre-Commercial Procurement
PIN	Prior Information Notice
R&D	Research and Development
SMEs	Small and Medium Enterprises
SOTA	State of the Art
TED	Tenders Electronic Daily
TRL	Technology Readiness Level

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

1. Introduction

Disclaimer and Copyright

It should be noted that this document is based upon the information publicly available to the PROTECT project (including but not limited to information on the upcoming pre-commercial procurement call of the European Commission on the "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation") and the feedback provided during the market consultation. As such, the PROTECT project and any of its partners cannot guarantee the accuracy and/or completeness of this information and the actions and measures based upon this information. It is recommended to access the relevant EU platforms to receive the actual relevant information and updates thereof.

This document has been drafted with the utmost care, but no guarantees are given regarding its soundness and/or completeness. Any errors or inaccuracies can be reported via email to (info-PROTECT@group-gac.com)

The PROTECT-PCP Consortium is not responsible for the correct operation of any URL mentioned in this document, nor for the proper functioning of any used electronic platform (for example the EU survey system). Any problems encountered when using a URL and / or an electronic platform must be reported to the organisation that makes the URL or the electronic platform available. Problems with downloading and uploading (of documents) must also be reported via email to (info-PROTECT@group-gac.com)

Economic operators and other stakeholders are being informed that any information regarding the setup and execution of both the procurement process and the execution of any contract/framework agreement as a result of the procurement process as well as public summaries of the results of the PCP project, including information about key R&D results attained and lessons learnt by the procurers during the PCP, can be shared after consultation with the respective R&D provider by the PROTECT-PCP Group with(in) the context of the contract and consequently can be analysed, (re-)used and published by the PROTECT project. Details should not be disclosed that would hinder application of the law, would be contrary to the public interest, would harm the legitimate business interests of the R&D providers involved in the PCP or could distort fair competition between the participating R&D providers or others on the market.

[1] The Horizon Europe PCP call HORIZON-CL6-2021-GOVERNANCE-01-15 will on 17 October 2023. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf The implementation of the PCP depends on the obtention of this funding by the potential public buyers. https://www.protect-pcp.eu/pcp-call/

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PROTECT project receives funding under the European Union's Horizon Europe framework program for research and innovation under the grant agreement grant agreement No 101060592. The EU is however not participating as a contracting authority in the procurement.

A Prior Information Notice (PIN) has been published in Tenders Electronic Daily (TED) to announce the Open Market Consultation on potential future procurement activity: https://ted.europa.eu/udl?uri=TED:NOTICE:574857-2023:TEXT:EN:HTML&src=0

2. Purpose of the Open Market Consultation

2.1. Scope and main objectives

This document describes the results of the Open Market Consultation (OMC) of the PROTECT project regarding 4 challenges, namely: Floods, Fire, Water resilience, and Sustainable & resilient Infrastructure, as described in the OMC Document with Annexes.

The OMC began on the date of its publication in the Tender Electronic Daily (TED), and ends on the date indicated as such in this document. The rules and objectives of the PROTECT OMC, as well as the challenges, the potential public buyers and the PCP approach are described in the OMC Document with Annexes.

Through the OMC, the Public Buyers Group (PBG) organized under the PROTECT project informed market operators regarding the upcoming Pre-Commercial Procurement (PCP) of Research and Development (R&D) services for the "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation"[2]. The PCP responds to commonly identified challenges in the area of climate adaptation and mitigation that can be better addressed jointly or that a single procurer could not otherwise have addressed alone.

The OMC also aimed to understand the market operators' capabilities to satisfy the PBG's needs and to obtain their input on the viability of the procurement plans and conditions as described in this document and annexes.

In sum, the objectives of this OMC were to:

1) Validate the findings of the State-Of-The-Art (SOTA) analysis and the viability of the set of technical and financial provisions.
2) Raise awareness of the industry and relevant stakeholders (including other users) regarding the upcoming PCP.
3) Collect insights from the industry and relevant stakeholders (including users) to finetune the tender specifications.

This OMC was performed under the law of the lead procurer, which is Dutch law.

The Public Buyers involved in the PROTECT project are not legally bound in any way by the outcome of the OMC.

Starting an OMC does not mean that the PBG in the PROTECT project is obliged to start a tendering or purchasing procedure. If this OMC is followed by a tendering procedure and/or purchasing procedure, the PBG reserves the right to adjust and/or supplement the solution described in this document on every

[2] The upcoming €19 million pre-commercial procurement call is fully funded by the EU. The goal of the "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation" call is for a consortium of public procurers (the "buyers group") to prepare, launch and implement a pre-commercial procurement procedure that responds to a commonly identified challenge in the area of climate adaptation and mitigation. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf#page=555

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element. No rights can be derived from statements and/or communications during this OMC in any future tendering procedure and/or purchasing procedure.

The OMC is not part of any pre-qualification or selection process. No advantage or disadvantage will be given to any supplier / group of suppliers to the detriment of others during the OMC and the sub-sequent competitive procedure for the award of contracts.

All information provided during the OMC and other background information is published online in English. Where appropriate, parts of the information received from market parties can be shared with the European Commission.

2.2. Participation in the OMC

The target groups of this OMC were users and technology vendors. All interested parties were invited to take part in the OMC. However, it was clarified that the participation in the PCP may be restricted to companies from EU and Associated Countries.

Participation in the OMC was voluntary and non-binding and was at the own expense and risk of market operators. A market operator could not charge any costs to the PBG for participation in the OMC or for (re) use of its information in the context of a future procurement procedure.

Participation in the OMC is not a condition for submitting a tender in the subsequent procurement, does not lead to any rights or privileges for the participants, and is not part of any pre-qualification or selection process. The provided input in this OMC will not be used to evaluate future proposals.

Based on the feedback provided in the EU Survey questionnaire, the majority of respondents belong to start-ups and SMEs, as indicated in the figure below.

Type of organization:

		Answers	Ratio
Startup		8	44.44 %
SME		7	38.89 %
Public organization		1	5.56 %
Private organization		1	5.56 %
Other:		2	11.11 %
No Answer		0	0.00 %

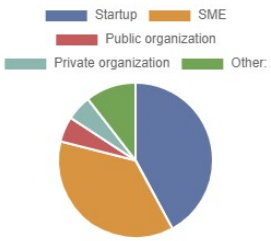

Figure 1.- Type of organisations who replied to the Request for Information using the EU Survey tool

The participants who replied to the EU Survey questionnaire are from organisations in France, Germany, Greece, Luxembourg, Italy, Spain, the Netherlands and United Kingdom.

Participation during the OMC webinars was larger. In each of the four OMC webinars, the number of participants ranged from 25 to 35 persons who followed each of the four complete 90 minutes session. The webinars celebrated within the framework of the OMC were recorded. The video recordings are available on the website of PROTECT.

The data collected, processed, stored and used by the PROTECT Consortium has the only purpose of implementing the PROTECT project and is handled according to the General Data Protection Regulation (Regulation 2016/679 of the European Parliament and of the Council - GDPR). Participants may

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exercise your right to access your personal data and the right to rectify such data by contacting: (info-PROTECT@group-gac.com)

2.3. Timeline and activities

The timetable of activities and required actions of the OMC is indicated below:

Date	Event
20 September 2023	Publication of the Prior Information Notice (PIN) on TED
25 September 2023	Publication of the OMC documents in the project's website and EU Survey: https://ec.europa.eu/eusurvey/runner/PROTECT-PCP-2023 Open registration for the events and submission of questions
10 November 2023	Deadline to submit questions (17:00h CET)
14 November 2023	Deadline to register for the webinars (17:00h CET)
15-16 November 2023	Celebration of the 4 OMC webinars
17 November 2023	Publication of the Q&A document in the project's website
20 November 2023	Deadline to fill in the EU Survey (17:00h CET)
27 November 2023	Publication of the OMC report
30 November 2023	Closure of the OMC

The PROTECT Consortium was entitled to adjust the timetable above and to terminate the OMC for its own reasons at any time, and to publish such modifications or termination on TED and the project's website (https://www.protect-pcp.eu/).

The OMC activities consisted of:

- **Four webinars** that took place on 15th and 16th November 2023. The webinars were carried out in English and broadcasted online.
- **A request for information** in the form of an EU Survey questionnaire which was filled out by 18 respondents.
- **Other activities and questionnaires** as deemed necessary within the scope of the project, including a publication of a **Q&A document**.

The PROTECT Consortium was entitled to adjust the planned activities or to include new activities at any time according to the needs and responses of the market.

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3. The OMC results

3.1. The OMC procedure and reporting

The OMC started on the date of its publication in the EU's Supplement to the Official Journal (TED) and ended on the date set in the timetable above.

Interested parties were requested to register in order to participate in the events and receive additional information of the project. Additional written contribution in the form of a Request For Information (RFI) questionnaire was requested through the EU Survey questionnaire. The responses to the questionnaire could not contain any confidential information. The questionnaire was intended to explore the market 'as is', there are no wrong or right answers. The answers provided will be used as input for the procurement strategy and contract conditions.

The PROTECT Consortium supported interested parties throughout the whole OMC during the webinars, and by answering questions through a Q&A document which was published in the project's website.

Market operators who wished to provide additional confidential information during the OMC could send this to the email: info-PROTECT@group-gac.com. The information had to be clearly marked as confidential. Confidential information is not included in the OMC report.

The language of this market consultation is English.

3.2. Open Market Consultation report

After processing and analysing the answers, the PROTECT Consortium aims to disseminate the results to the widest possible audience through this OMC Report. Nevertheless, all answers provided by market parties are anonymized. The PROTECT Consortium will therefore provide only the general findings and a summary of the answers obtained in the EU Survey questionnaire. The OMC Report is published on the website of PROTECT.

3.3. Summary of the results

This section summarises the feedback provided to each of the 24 questions of the EU Survey under 5 topics: (1) The PCP challenge requirements and planning; (2) The State-Of-The-Art analysis and TRL; (3) The testing strategy; (4) Miscellaneous; and (5) Questions for users.

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3.3.1. PCP challenge requirements and planning

1. **Do you have questions about the PCP requirements? If yes, please explain.**

		Answers	Ratio
Yes		4	22.22 %
No		14	77.78 %
No Answer		0	0.00 %

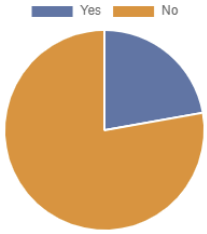

Figure 2.- Questions about the PCP requirements

Respondents wanted to know how they can be a part of the PCP and what the criteria will be. They would like to know if the requirements of economic standing would allow a start-up to participate. They asked which associated countries are able to participate in the PCP. If, for example, UK is included in the HE associated countries.

Finally, respondents asked if there will be a list of the PCP requirements to make it easier to recognize them and address them.

The PCP tender documents will clarify the criteria, requirements and specifications. In principle, PCP will foster the participation of start-ups and SMEs; therefore, the requirements will allow their participation encouraging synergies.

The HE Programme indicates the list of associated countries, where UK is included.

2. **Which challenges can you tackle? Please explain.**

		Answers	Ratio
Floods		7	38.89 %
Fire		6	33.33 %
Water resilience		10	55.56 %
Sustainable infrastructure		10	55.56 %
No Answer		0	0.00 %

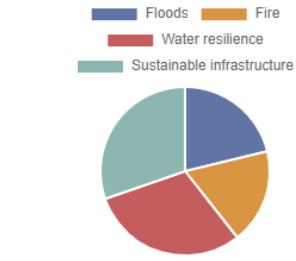

Figure 3.- Challenges that can be tackled

According to the respondents, some challenges can be tackled as follows:

- Irrigation control and weather forecast services.
- A methodology to assess flood risk based on past events, satellite radar data and digital elevation models (DEMs).

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- A range of services for water management in a platform combining 3 services: (1) monitoring irrigated and non-irrigated plots and characterizing irrigation practices; (2) mapping water bodies and monitoring water availability, and (3) monitoring water quality (turbidity, chlorophyll-a concentration, etc.).

- Measuring atmosphere gases (GHG), both measure the carbon release in case of fire, and provide inputs during the fire about the atmosphere and thus evolution of the fire (providing data and analysis about atmosphere gases during and after the fire).

- Cybernetic data collecting devices that are for hours in the state of levitation.

- Measures to fight against environmental and public health damages and climate change using remote sensing spans from visible to microwave electromagnetic spectrum.

- For the **FIRE challenge** specific expertise can be useful to detect littering and illegal dumping and to assess the environmental risk and the climatic conditions that increase the likelihood of fire outbreaks.

- For the **Water resilience challenge** the combination of different observations will be key to developing advanced KPIs that attempt to correlate information on drought, weather, water consumption, water pollution, crop type and cycles etc.

- Services for resilient cities (wildfire, extreme heat, flooding, droughts) and Blue-Green Infrastructure (location, health, risk) and overlay these to help mitigate risks (especially related to climate risks).

- Use of hyperspectral data with high spectral resolution allowing to locate water sources (classification) and study the water composition. This type of data are openly or privately accessible via several providers.

- Because climate change will pose a challenge for the water supply and management, there are currently different initiatives, methods and approaches used to plan and manage the activities in this area, but there is a lack of connection between them. The tools, methods, norms, etc. of application in areas such as basin management, distribution networks, water infrastructure (dams, reservoirs, etc.), agriculture, etc. are completely different and it is not possible to implement an overarching management system. Despite the fact that nexus between water, agriculture and other sectors are of high relevance in the scientific literature, it is proposed to develop: (1) Methods for identifying the probability of occurrence (both in the current and future climate) of drought, episodes of high water flow and other situations that may pose a risk for water management; (2) Systems and methods for processing observation data from local stations, gauges, earth observation, etc.; (3) Methods for identifying risk level considering climate trends and projections in conjunction with socioeconomic trends (land use changes, demands, etc.); (4) Early warning- detection and prediction systems; (5) Basin and water management systems (considering status, monitoring & forecast –estimated progression) allowing to manage water resources in the face of droughts, high river flow events, scarcity, etc.; (6) Maps & graphical representation of water information derived from observational data and integrated digital twins (simulating hydro-climatology, basin, network, infrastructure and all components of the water cycle).

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- Meso modelling of Urban Heat Island and Micro Modelling of Thermal Comfort. For policy makers and urban designer to make decision for more adapted cities and public places and to assess the effectiveness of climate adaptation measures and applied adaptations.

- Micro modelling of flooding to assess effectiveness of climate adaptation measures and applied adaptations. Combination of both variables to facilitate decision making process mainstreaming.

- There are solutions developed to track coastline resilience, and other blue-economy related challenges.

- Use of satellite imagery, raster maps, and servers to facilitate structured management and analysis of Big Geo Data. Tapping into existing data services on public data, without compromising data.

- Monitoring GHG emissions from energy infrastructure (power plants, gas pipelines).,

- Customization/development of existing platforms for Flood Mapping at high resolution and mitigation measures assessment.

3. Can you contribute on the outcomes related to EO? Yes/no. Please explain.

		Answers	Ratio
Yes		17	94.44 %
No		1	5.56 %
No Answer		0	0.00 %

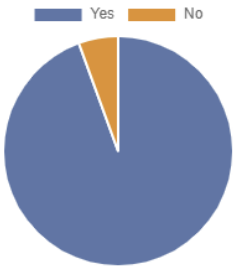

Figure 4.- Can you contribute to EO related outcomes

The contribution to EO outcomes can include:

- Irrigation control and weather forecast.

- Services based on satellite imagery and Earth observation technologies.

- Earth observation capabilities and AI to solve environmental problems. Earth Observation, and in particular satellite imagery, is the only means to regularly classify events of interest at scale, with high accuracy and cost-effectively. AI is key to automating classification at scale in very large volumes of data acquired during observation. Over the past decade, both fields have benefited from synergetic effects and their combined use is triggering the environment moment, a moment when we have the necessary tools to measure anthropogenic environmental impacts and inform decision making and policy. Our expertise is threefold: Remote sensing processing, advanced AI technologies and environment.

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- Deploying a solution for water resilience (water pollution and water management) which are applications related to EO.

- A predictable demand for fresh water. This will be allowed through tools and systems that will take in consideration the regulatory landscape and policies (flood, biodiversity, water quality, etc.) providing a cohesive framework for water management. The system will be capable of effectively handling stress situations (both in the long-term/planning and in the short term/operational timescales) through data-driven decision making and interventions, allowing to simulate activities such as changes in the reservoir management policies, new infrastructure for water storage, supply and consumption, water saving measures, etc. connecting the supply and demand sides for sweet water**.**

- Water quality requirements for different purposes (industrial, biodiversity, bath, etc.). A comprehensive understanding of the consequences and a combined approach to relevant data within the entire water cycle chain will be achieved and facilitated by policy guidance, user engagement, surveys, etc.

- Assessment of the evolution of the LST (in cities) using images to evaluate the effectiveness of climate adaptation measures.

- Access and analytics in space and time, through a huge spectrum of 3rd party clients, without programming.

- Focus on mitigation of GHG emissions using EO data.

- A platform aligned with the expected outcomes of the call by leveraging Earth Observation data (including Copernicus program), to enhance flood preparedness and response. With a worldwide the service, at high-resolution, exploiting satellite and geospatial data with AI, to provide accurate flood risk intelligence and scenario analysis, fostering mitigation and climate adaptation strategies adoption. This can contribute to reducing demand fragmentation as it addresses common needs across regions. Furthermore, the platform has scalability, capability to ingest local user data when available, and flexible business model (Software As a Service or Data As a Service) to foster market uptake of climate solutions, encouraging investments in mitigation/adaptation measures, economic growth and climate resilience.

4. **Are you able to enhance the development of new environmental information? Yes/no. Please explain.**

		Answers	Ratio
Yes		16	88.89 %
No		2	11.11 %
No Answer		0	0.00 %

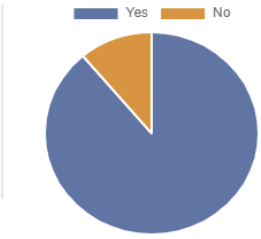

Figure 5.- Are you able to enhance the development of new environmental information

Respondents provided the following feedback regarding the development of environmental information:

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- Some have at the core business Earth Observation working with ESA.
- Some are developing an own constellation, and are able to work with other data (Sentinel 5P)
- Some have new patented technology dedicated to circular economy.
- For the **FIRE challenge,** some can come up with new type of classification leveraging different observations combining optical, swir & radar (for instance to discriminate between the type of waste).
- Some can enhance the resolution of satellite imagery and therefore get detailed insights that were not previously available in its raw form. Meaning they can apply technology on open satellite imagery and thus drastically reduce the costs without compromising on detail and providing regular and consistent information.
- Other have an R&D team, specialized in data and image processing (all bands) with expertise in AI, computer vision with a thorough history in developing new solution based on satellite images for earth observation, especially for urban planning (demography and population density history and prediction) such as land classification, urban vs. natural zones evolution forecast, climate change impacts and inundation. The expertise could be applied to developing models for new environmental information and further selling operational SaaS services to public & private clients and end-users.
- Some proposed systems and tools can deliver measures, forecasts, and projections of river flow, water availability, demand, etc allowing to optimize the water cycle management and planning.
- Some would like to explore developing adaptation indexes (Thermal and Flood) through the combination of surface information and thermal and climate indicators for spatial explicit data at micro and meso to assess the combined effectiveness of solutions or NbS.
- Other focus on developing tools and products for private and public stakeholders using space-based technologies, mainly Earth Observation ones (Copernicus) ad-hoc real time derivation of new visualizations and insights.
- Some indicate a platform which enhances environmental information development through Earth Observation by integrating satellite data with AI algorithms to create actionable flood risk intelligence. Its capacity to process extensive EO datasets (and integrate them with local knowledge and data when available) facilitates the creation of detailed digital twins for urban areas, improving predictive environmental modelling and supporting the implementation of effective, data-driven, climate resilience strategies.
- One demonstration video was provided.[3]

[3] https://youtu.be/ZBoVvX1XTik

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5. **Are you ready to explore pre-operational European services through the exploitation of new Earth Observation (EO), digital infrastructures and modelling capabilities? Yes/no. Please explain.**

		Answers	Ratio
Yes		16	88.89 %
No		2	11.11 %
No Answer		0	0.00 %

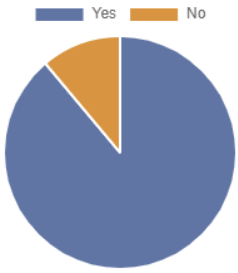

Figure 6.- Are you ready to explore EU services through the exploitation of EO

Respondents indicate that they are ready to explore EU services through the exploitation of new EO, digital infrastructures and modelling capabilities:

- Some could integrate already the data they collect into the ESA Copernicus Open Hub to allow users 1cm resolution instead of 10m resolution.
- Some teams have a strong background in leveraging advanced EO technologies and data. They have invested in developing and maintaining state-of-the-art digital infrastructure that enables the processing and analysing of large datasets efficiently. This is crucial for handling the complex and voluminous data in EO projects.
- The core business of some is modelling. Including measuring methane emissions from Earth observation, calculating biomass in agroforestry projects and assessing the environmental risks of illegal landfills.
- Some emphasised to be committed to working collaboratively and believe in the power of shared knowledge and resources. They believe a PCP project is an excellent opportunity to engage with other European institutions, share expertise, and learn from others.
- Other emphasised on the readiness to explore pre-operational EU services through the exploitation of new EO data, infrastructures and modelling capabilities such as ESA Hub, new Copernicus Digital Access Service - DAS, Copernicus Contributing Missions - CCM, DestinationEarth - DESP (incl. digital twin Hydrology and computing), Copernicus CAMS.
- Several respondents indicated having extensive expertise and a solid track record in exploring pre-operational European services, and can transform climate and earth observation data into products and applications.
- Other indicated having a solution to explore pre-operational European services by utilizing new Earth Observation (EO) data as it natively combines digital infrastructure to deploy the service to final user, and advanced modelling capabilities to provide n flood risk assessments and **predictions.** Its integration of EO datasets with innovative AI-driven models adds value to EO data translating them into actionable intelligence.

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6. **Do you see problems or contradictions between the PCP requirements and planning? Yes/no. Please explain.**

		Answers	Ratio
Yes		1	5.56 %
No		17	94.44 %
No Answer		0	0.00 %

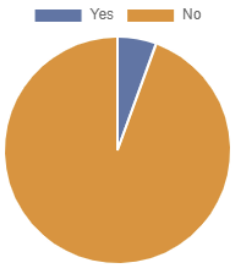

Figure 7.- Do you see problems or contradictions

Most participants indicate that they find no problems at this stage. One respondent mentions possible restriction to work with ESA.

7. **Do you have questions/suggestions about the use cases? Yes/no. Please explain.**

		Answers	Ratio
Yes		4	22.22 %
No		14	77.78 %
No Answer		0	0.00 %

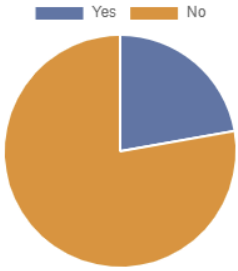

Figure 8.- Do you have suggestions about use cases

The suggestions mainly relate to the FIRE challenge pointing out the possibility that the use cases benefit from leveraging the data that are supposed to be filled and obtained before any entry of waste in a waste facility. The combination of earth observation data and in-situ data could help to develop anomaly detection models. Most of the time the “official” data should fit to observed data, and it could be possible to develop a stronger model to correlate observation with AI predictions, and raise alarm on anomaly.

For the Sustainable and Resilient Infrastructure challenge, the suggestion is measuring the effectiveness of climate adaptation measures and applied adaptations.

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3.3.2. State-of-the Art (SOTA) Analysis and TRL

8. Do you think there is room for development beyond the state of the art? Yes/no. In which specific area?

		Answers	Ratio
Yes		16	88.89 %
No		2	11.11 %
No Answer		0	0.00 %

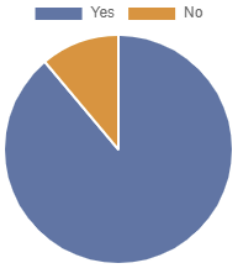

Figure 9.- Is there room for development beyond the state of the art

The room for innovation has been pointed out in the following specific areas:

- Exploring the relationship between floods and ecosystems.
- The state of the art algorithms. Earth observation algorithms are not yet able to distinguish between different types of waste. And to the best of our knowledge there is no model that combines external data and satellite imagery to detect anomalies in waste facilities that could trigger fire.
- The combination of all the data that is currently available and developing solutions in this way so that the information is made accessible.
- Despite the availability of various software and infrastructure tools to study drought probability, risk level, water management, etc., no application is proposed to study the level of water pollution and the impact of human activities (industry, agriculture, etc.) near water sources.
- Some topics for development beyond the state of the art are: (1) Common methodologies, terminologies, metadata, etc. for all the agents and activities involved in water cycle; (2) Overarching systems that integrate the monitoring and modelling of all the subsystems of the water cycle (climatology, hydrology, water storage and distribution, water consumption, sanitation, etc.); (3) Inclusion of different timescales: most of the tools already existing operate in the short-term scale, but the inclusion of forecast and projections in the seasonal, annual, decadal and multidecadal scales can bring benefits for planning and managing; and (4) Consideration of the water-soil-other activities nexus.
- The potential inferences of LST to Air Temperature. Developing monitoring and effectiveness assessment model though the analysis of evolution of the LST (in cities) using the Landsat 8 and 9 images.
- Safe AI integration, location-transparent federation, automatic data fusion across data archives, and more are needed to maximize EO exploitation.
- It was emphasised that while the current market offers a mix of commercial and free solutions for medium-resolution flood mapping and weather forecasting, a specific solution sets itself apart by delivering a unified global coverage and cloud-based platform that not only meets already part of the FLOODS CHALLENGE needs but goes above and beyond. It provides high-detail flood maps, interoperable with every GIS software, leverages on fast flood algorithms, enable interaction for mitigation measures effects testing (""what if"") and does not require highly

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skilled professionals to be run. Acknowledging the gaps the solution can undergo further development to fulfil all the requested innovation needs.

9. What developments would you propose?

Among the developments proposed are:

- Prescription maps.
- Merging flood analysis with agricultural and forestry monitoring applications.
- Other tools to complete a range of long-term water management solutions.
- Models of gas dispersion, inverse modelling to define the original source LTA UAVs.
- A model that integrates multiple observations from multiple instruments. One of the difficulties is the spatial and temporal registration. The others concern the constitution of dataset sufficient to make the model learn. Self-supervised learning and semi supervised learning methods will be leveraged to reduce the need of label.
- Combining different data sources together, looking further into the use of AI.
- Tools for analysing the composition of water sources & rivers and studying areas of activity near water sources (agricultural zones using chemicals (pesticides, herbicides, etc.); industries, air pollution (impacting rainfall) will add value for the water resilience plan.
- Some actions including: (1) The analysis of the legal framework, responsible public authorities and other relevant agents, tools, methodologies, etc. in each of the subcomponents of the water cycle; (2) The development of new observational methods for water cycle management; (3) The generation of overarching digital twins, simulating weather/climate, hydrology, water infrastructure, distribution and sanitation networks, demand (e.g. agriculture, tourism, etc.); (4) The development of simulation framework (including both physical and data-driven methodologies such as artificial intelligence) for evaluating the effectiveness of actions and measures to optimize the water cycle components, allowing to make actionable decisions in the short, medium and long term; (5) Guidance, training and visualization tools, including tailored dashboards for different decision-makers.
- Potential inferences of LST to Air Temperature. Developing monitoring and effectiveness assessment model though the analysis of evolution of the LST (in cities) using the Landsat 8 and 9 images.
- Meso modelling of Urban Heat Island and Micro Modelling of Thermal Comfort. For policy makers and urban designer to make decision for more adapted cities and public places and to assess the effectiveness of climate adaptation measures and applied adaptations.
- Micro modelling of flooding to assess effectiveness of climate adaptation measures and applied adaptations.
- Combination of both variables to facilitate decision making process mainstreaming NBS.
- The modelling of thermal comfort and the impact of the climate change on it, and the modelling of the impact of the new urban planning project on the thermal comfort.
- Multi-stakeholder participations to benefit from mutual collaboration for win-wins.
- Focus on the creation of scalable products that can be quickly accessed and used by any organization, not creating boundaries.

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- Allow anybody to have access to information, so anybody (not just specialized technical departments) can benefit from it, accessing the webpages/information at will.
- Enhance datacubes, European-based rasdaman, enhance and integrate further sources and developments.
- Operational and daily monitoring of GHG emissions from infrastructure and facilities worldwide.
- API for access to flood risk intelligence, Climate scenarios for all types of FLOODS, 3D Digital Twin , link to ground stations for AI -based flood river stage forecasting

10. Do you know the TRL of those solutions/developments?

		Answers	Ratio
Yes		11	61.11 %
No		7	38.89 %
No Answer		0	0.00 %

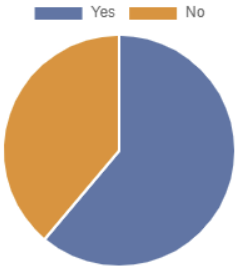

Figure 10.- Do you know the TRL

The feedback from participants pointed out solutions at different TRL. Several respondents indicated lower TRL 2, 3, 4, while others indicated to have solutions at TRL 5-6. Other solutions are moving up from TRL 6 to 7 and 8. Some indicated to be aligned with the PCP expectations between TRL 3-8.

It is emphasised that developments could be achieved by bringing together advances in imaging systems such as hyperspectral imaging, which provides information on water and soil composition based on spectral reflectance at several wavelengths, and the Copernicus Sentinel-5P to study air quality and pollution in regions where water sources & rivers are located, as well as advances in AI and computer vision methods, and big data analysis.

In some cases, it was mentioned that the overarching system is in a conceptual state. Prototypes have been developed internally with TRL 4 – 5. However, very mature technologies are implemented in different sectors of the water cycle. They see as the goal of a proposal to connect all of them to maximize their benefits.

Finally, some pointed out data solutions already at TRL 9.

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11. **Do you know any certifications and/or standards that are relevant to the PCP project? If yes, please explain.**

		Answers	Ratio
Yes		6	33.33 %
No		12	66.67 %
No Answer		0	0.00 %

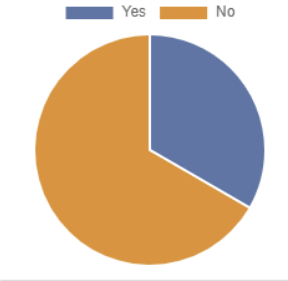

Figure 11.- Do you know relevant certifications and standards

Among the certifications and standards indicated as relevant to the PCP project are:

- EASA Rules
- ISO14064 related to GHG procedures, quantification, measurement etc.
- A very diverse set of certifications applicable to the different components of the water cycle. The harmonization of data for the whole water cycle is planned to be done under the STAC Specification.
- ESA BIC incubation, FrenchTech labelling.
- INSPIRE, ISO, OGC coverage standards for spatio-temporal data & services: Coverage Implementation Schema, WCS, WCPS.

Some participants pointed out that there are a lot of certifications and standards. However, certification and standard procedures are intensive processes. This should be investigated during the solution design phase.

3.3.3. Testing strategy

12. **In your opinion, are the timelines and testing for phases 2 and 3 feasible? Yes/no. Please explain.**

		Answers	Ratio
Yes		15	83.33 %
No		3	16.67 %
No Answer		0	0.00 %

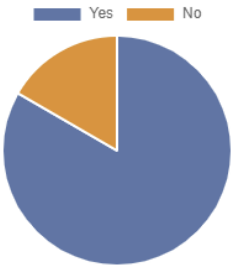

Figure 12.- Are timelines and testing for the PCP phases feasible

In general, participants indicated that the 18 months planning for the PCP phases is acceptable and feasible considering the provided budgets.

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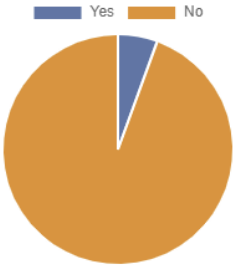
It was indicated that if a new iterative development process is set in place, the timing provided could be enough (although it is still optimistic that in 6 months a European-wide solution can be tested, and consequently corrected).

A smaller number of the respondents considered that the PCP phases might require more time.

13. Do you have any comments on the budget assigned per supplier and per phase? Do you prefer option 1, 2, 3 or 4? Yes/no. Please explain.

Figure 13.- Do you have any comments on the budget

		Answers	Ratio
Yes		1	5.56 %
No		17	94.44 %
No Answer		0	0.00 %



		Answers	Ratio
Budget option 1		7	38.89 %
Budget option 2		1	5.56 %
Budget option 3		3	16.67 %
Budget option 4		2	11.11 %
No Answer		5	27.78 %

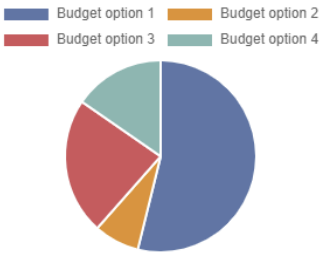


Figure 14.- Which budget option is preferred (see OMC document)

Most respondents had no comments about the budget. Other stressed that the four challenges are key to meeting Europe's future needs in terms of climate change resilience and public health security, thus funding at least two challenges could be a good option.

Other indicated that the successive reduction of the budget available for the suppliers should be limited, especially for the Phase 3, therefore option 2 is a good compromise.

It should be noted that small companies can be sensible to payment plans based on milestones Therefore, a payment scheme should consider enabling small companies to participate.

The budget details will be further defined in the tender documents, however, it should be noted that more than 50% of the budget should be allocated to R&D activities as defined in the Frascati manual.

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3.3.4. Miscellaneous

14. What information do you still need in order to make a good plan of action?

Some respondents indicated that the information is clear for now. Other needed more precise information on the project's deadlines and objectives, which will be clarified when the PCP tender is launched.

Some asked about the possibility to make consortia. This is indeed possible when presenting a bid to the PCP tender.

Other participants referred to the need of more information on available historical data. More data on the economic, public health and environmental impacts, specifically regarding fires. More details on preferred data sources, target users (non-expert, casual, expert), etc. are also welcome.

More details of the end-user detailed requirements, decision-making context and timeline were also required. This includes the exact needs of future customers and their needs over time. It was suggested to have a clear calendar with deliverables expected in order to join the PROTECT PCP. The description of technical requirements for the challenges, validation and testing are requested. Other suggested the possibility to provide a step by step guide.

These aspects will be clarified when the PCP tender is launched.

Finally, some highlighted that they would like to have interviews with the buyers to identify specific customer problems.

15. Do you have any suggestions on the open-source data/information requirement of open access?

		Answers	Ratio
Yes		6	33.33 %
No		12	66.67 %
No Answer		0	0.00 %

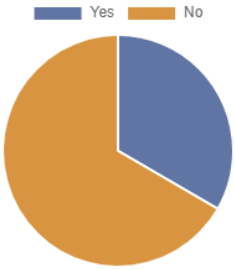

Figure 15.- Do you have any suggestions of open-source and open access

Regarding the suggestions on the open-source data/information and open access requirement, some comments are:

- That what is done in Europe a dozen times only needs to be done for IT solutions just once. Sometimes the same solution is funded several times, while missing systems do not get funds, as the evaluators do not understand what they decide about. Decision makers need to have the ability to program otherwise they are simply "analphabets" in terms of digital transformation. They simply do not speak the language (programming language) they have to decide about.

- One of the key factors to achieve the expected outcomes of the (FIRE) challenge will be the ability to create a continuous integration of the data collected in situ.

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- The developments could be integrated in already existing platforms which are evolving and a tailored strategy should be adjusted.

- The wish to learn more about open-sourcing. In previous projects open-sourcing has been a goal, but it is not always as straightforward (e.g. usage capabilities of customers, for instance through software packaging, which requires training and maintenance).

- Open-source is a business model, not a software quality criterion, and no guarantee for vendor independence (despite this is often said). Actually, some open-source tools enforce a lock-in. Hence, a criterion should be to select the best of breed, with a best-fit.

- OGC standard compliancy

16. What are the risks associated to the proposed cooperation between stakeholders and EU programmes?

Regarding the risks identified, respondents indicated the following:

- Political and Economic Instability
- Property rights management
- Lack of data protection, especially when sharing skills
- Delay in the planning linked to public agenda
- The protectionism of Airbus, OBS, Thales, the Helmholtz Society, ESA and many others who are afraid to lose their relevance as there are by far better performing groups outside of these organisations.
- Long sales cycles
- The proposed activities can be partially funded by programmes such as DestinE, Copernicus, Horizon Europe, but they are competitive and funds cannot be assured. Stakeholders can contribute providing a basal funding and demonstrating the value of the solutions, so the lack of end-user involvement, low absorption capacity, etc. is the main risk.
- Misalignment of objectives
- Bureaucratic complexity
- Financial risks
- Regulatory compliance
- Cultural and communication barriers
- Data security and privacy concerns
- Dependency risks
- Project management and coordination challenges
- Impact assessment and evaluation difficulties
- Timings: the European public sector is known of their slowness in response and analysis of any kind of feedback/documentation/deliverable shared from private companies to them. With the tight schedule, it would be wise to set up methods of communication that could enable the agile development from us, the private companies.
- Lack of outreach of SMEs, they might be too invisible

Some respondents did not identify any risk. They suggested a cooperation agreement between the stakeholders (partners, beneficiaries) to clarify IPR, access to data, etc.

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17. **Are there any omissions in these questions? Yes/No. Please explain.**

		Answers	Ratio
Yes		2	11.11 %
No		16	88.89 %
No Answer		0	0.00 %

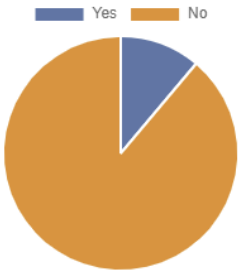

Figure 16.- Are there any omissions in these questions

According to some respondents, the relevant parts related to education and sharing of knowledge are missing.

It was also asked to indicate the risks foreseen with regard to the ability to achieve the objectives of the Challenges and how it is proposed to mitigate them.

18. **Do you have any suggestions?**

Some suggestions relate to answering the following:

- How to take care of a sustainable, fair and valid education in terms of sustainability.
- How sustainable processes need to be profitable, while they can be compared to the process of garbage collection.
- How to teach that the value of sustainability gets visible, even when no one pays for it.
- How to make EU sustainability and education profitable.

19. **You may provide suggestions applicable to any of the use cases: FLOODS, FIRE, WATER RESILIENCE & SUSTAINABLE INFRASTRUCTURE**

Some specific suggestions have been made with regard to the challenges:

- **FLOODS:** LTA UAV pre Warning. Stress the capability to have a scalable and sustainable service.
- **FIRE:** Aerial Imagery. The Fire Challenge should not be limited to official waste landfills and must also include risks from illegal landfills and littering. These problems are prone to trigger forest fires with the climate change, which is weakening forests all over Europe, not only in southern countries.
- **WATER RESILIENCE:** PRobes with drones to lab to App.
- **SUSTAINABLE & RESILIENT INFRASTRUCTURE:** needs education.

It is also mentioned that the documentation does not indicate if critical infrastructure is related to the European coastline (most of population in Europe lives in communities next to the sea/ocean). Or if this a point considered in the "Floods" challenge.
Critical infrastructure could be relevant to all challenges.

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3.3.5. Questions for users

20. Do you have specific remarks on the functionalities of a specific challenge that should be take into account? Yes/no. Please explain.

		Answers	Ratio
No		10	55.56 %
Yes		8	44.44 %
No Answer		0	0.00 %

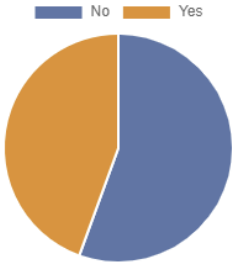

Figure 17.- Do you have specific remarks on the functionalities

Regarding the remarks on the functionalities of specific challenges, respondents indicated that:

- Soon no fossil fuels will be used, and the regenerative power train does not stand yet. The question is if the delta is known, and how much we have left and how much an equivalent powertrain will cost?
- Overall, the challenges of the cities of Haarlem, Barcelona and Helsinki are similar to the challenges faced in Greece, namely in relation to floods, fires, infrastructure and water solutions. For example, the Municipality of Keratsini-Drapetsona is a highly dense urbanized area, dealing with floods and the urban heat island might be a priority.

21. Can you indicate any use cases that you will be interested in, which are not indicated by PROTECT? Yes/no. Please explain.

		Answers	Ratio
Yes		6	33.33 %
No		12	66.67 %
No Answer		0	0.00 %

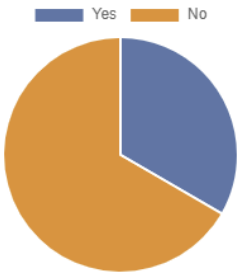

Figure 18.- Can you indicate any use cases of interest

Participants highlight some possible use cases related to:

- Education
- Study of water pollution and the impact of nearby human activities and air pollution on the quality of water sources.
- Hydropower and other energy facilities: the management of hydropower production, associated to dams and reservoirs, is a key aspect of the water cycle management. In dry areas, multipurpose reservoirs define the overall water availability and offer, and most of them are also connected to the requisites, regulations, etc. of the energy system. So, the connections between the energy and water systems are obvious in this regard, but also in terms of the water used for refrigeration of thermal plants, and other energy uses. The monitoring, simulation and modelling

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of the energy system linked to the water system can allow to create a digital twin that will meet the requirements of the users and the call more effectively.

- Soil health: Carbon farming, targeted fertiliser application, land restoration monitoring. Compliance with EU Soil Health Law, the Farm to Fork Strategy, CSRD policy recommendations by public bodies. And the overarching EU Green Deal.
- Coastline Resilience, as it is a critical infrastructure affecting the livelihood and economies of most of the European countries, and it is one of the most direct effects of climate changes that can be tracked down using satellite based information (sea level rise, warmer currents, degradation of the beaches, effects of storms on harbours and other critical infrastructure).
- Newspace

22. Do you know any developments that PROTECT needs to take into account? Yes/no. Please explain.

		Answers	Ratio
Yes		4	22.22 %
No		14	77.78 %
No Answer		0	0.00 %

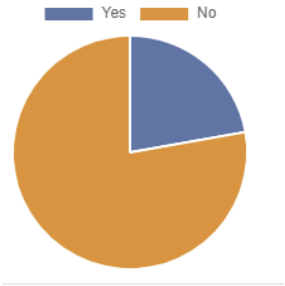

Figure 19.- Do you know any relevant developments for PROTECT

Respondents indicated to take into account the following developments:

- Global Protectionism
- Earth observation (Copernicus, etc.) and digital infrastructure (DestinE, DIAS, etc.) are critical for the development of the actions proposed
- HEATWAVES Service. Routine that calculates and characterises the frequency, intensity and duration of heatwaves at different regional scales (NUTS2, NUTS3 and Local Administration Units) globally according to different hazard levels (warning, alert and alarm) that are defined according to the severity of the potential impacts. The routine characterises past and future heatwaves based on observed or reanalysis and projected daily maximum and minimum temperature data considering free and open source data sources available at Copernicus Climate Change Service (E-OBS, ERA5-Land and EURO-CORDEX). More information on the source data used can be found in the e-OBS dataset (daily observed data for the whole of Europe), ERA5-Land reanalysis (daily global reanalysis data), and the CORDEX dataset (future regional climate conditions for different emission scenarios - RCP2.5, RCP4.5 and RCP 8.5 - providing different trajectories of future climate forcing from 2006 to 2100. TX 9-271-314
- CLIMTHON. Library for managing climate data from different official sources. It contains routines for performing bias corrections, model ensembles as well as calculation of climate indicators. It also includes functions to calculate extreme events (heat waves, return periods etc.). TX 9-271-292
- THERMAL ASSESSMENT TOOL TX 9-271-606"
- Datacubes and analysis-ready data

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23. How could you contribute to PROTECT?

		Answers	Ratio
Share in-house developments		8	44.44 %
Suggestions for further developments		10	55.56 %
Knowledge		12	66.67 %
Other		7	38.89 %
No Answer		0	0.00 %

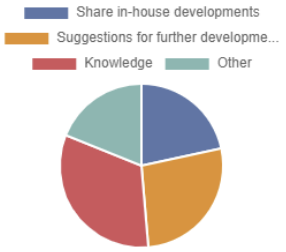

Figure 20.- How could you contribute to PROTECT

In general, participants are highly motivated to contribute to PROTECT PCP and open to explore possibilities. One respondent emphasised on having an existence dedicated to next generations.

Other pointed out at the importance of co-construction with the end-users (the beneficiaries); co-develop the operational solution/ pilot (practicing design thinking, with agile and lean startup methodology with sprints, UX design...).

One respondent mentioned the access to the multi-Petabyte datacube federation, EarthServer, for custom analytics with zero-coding.

24. Do you have any suggestions?

The suggestion made is that companies would really like to see that two challenges are selected, not only one, as this would facilitate startup companies like ours to find entry points more easily.

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4. The follow up PCP

PROTECT is preparing the operational ground for a Pre-Commercial Procurement (PCP) proposal in response to the Horizon Europe pre-commercial procurement call "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation" fully funded by the EU with to €19 million. The goal of the call is for a consortium of public procurers (Public Buyers Group) to prepare, launch and implement a PCP procedure that responds to commonly identified challenges in the area of climate adaptation and mitigation.[4]

The envisaged future PCP – i.e. a joint procurement of R&D services – is intended to be launched to reinforce public demand driven innovation in end-user services in the area of climate adaptation and mitigation. PCP has the potential to be an effective demand-side innovation action and a useful tool to close the gap between supply and demand for innovative solutions. **Solutions are expected to achieve TRL 7-8.**

The future PCP should deliver successful innovative and fully tested product(s) and/or service(s) that meet the common needs of the PBG to procure research, develop innovative marketable solutions, speed up the time-to-market and provide best value for money.

The future PCP on the customization/pre-operationalisation of prototypes of end-user services in the area of Climate Change Adaptation and Mitigation will be contributing to the European Green Deal related domains benefiting from further deployment, uptake and exploitation of Environmental Observation data and products. Furthermore, it will be contributing to fit-for-purpose Environmental Observation Systems and a strengthened Global Earth Observation System of Systems (GEOSS).[5]

GEOSS is a set of coordinated, independent Earth observation, information and processing systems that interact and provide access to diverse information for a broad range of users in both public and private sectors. GEOSS links these systems to strengthen the monitoring of the state of the Earth. It facilitates the sharing of environmental data and information collected from the large array of observing systems contributed by countries and organizations within GEO. Furthermore, GEOSS ensures that these data are accessible, of identified quality and provenance, and interoperable to support the development of tools and the delivery of information services. Thus, GEOSS increases the understanding of Earth processes and enhances predictive capabilities that underpin sound decision-making: *it provides access to data, information and knowledge to a wide variety of users*.

If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, they must make use of Copernicus and/or Galileo/EGNOS (although other data and services may additionally be used).

The future PCP proposal will build on the outcomes coming from the PROTECT project funded under HORIZON-CL6-2021-GOVERNANCE-01-15: Preparing for pre-commercial procurement (PCP) for end-user services based on environmental observation in the area of climate change adaptation and mitigation (the PROTECT project), the work done previously under Horizon 2020 and Horizon Europe (e.g., from e-shape, climate service projects and downstream services projects), and GEOSS initiatives.

The future solutions should take advantage of the use, uptake, and deployment of environmental observations as well as digital and data-based green solutions, assessed through the European Green

[4] HORIZON-CL6-2024-GOVERNANCE-01-5: Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf#page=555

[5] The mission of the Group on Earth Observations is to build the Global Earth Observation System of Systems (GEOSS) GEOSS (earthobservations.org) https://www.earthobservations.org/geoss.php.

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Deal's 'do no harm' principle, **to contribute to innovative governance models and for designing, implementing and monitoring science-based policy.**

The project to be carried out under the HE-funded PCP should contribute to Innovative governance supporting the European Green Deal objectives recognizing, coping with and promoting resilience and inclusiveness in the face of on-going shocks and disruptions across Europe and the world, whether these be climatic, ecological, economic, social, geopolitical or related to agricultural inputs and resources, food, health, bio-based sectors or the wider bioeconomy. The creation of networks with the public (citizen engagement) and researchers, including also through digital technologies, can step up transformation and enhance resilience in different areas, such as food.[6]

PCP proposals should set out a credible pathway contributing to innovative governance and sound decision-making on policies for the green transition and more specifically to one or more of the following impacts:

- innovative governance models enabling sustainability and resilience notably to achieve better informed decision-making processes, societal engagement and innovation;
- areas related to the European Green Deal benefit from further deployment and exploitation of environmental observation data, products and "green" solutions;
- a strengthened Global Earth Observation System of Systems (GEOSS)[7]
- sustainability performance and competitiveness improved through further deployment of digital and data technologies as key enablers;
- stakeholders and end users including primary producers and consumers are better informed and engaged thanks to effective platforms such as AKIS;
- strengthened EU and international science-policy interfaces to achieve the Sustainable Development Goals.

When considering their impact, proposals also need to assess their compliance with the "Do No Significant Harm" principle according to which the project's R&I activities should not support or carry out activities that cause a significant harm to any of the six environmental objectives of the EU Taxonomy Regulation.[8]

Solutions should have impacts in the following areas:

- "Climate change mitigation and adaptation";
- "Clean and healthy air, water and soil";
- "Enhancing ecosystems and biodiversity on land and in water";
- "High quality digital services for all";
- "A Competitive and secure data-economy".

Social innovation is also relevant when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake. It is envisaged the coordination with

[6] The new partnership 'Agriculture of Data' will help improve the sustainability performance of agricultural production and strengthen policy monitoring and evaluation capacities through using the full potential of Earth and environmental observation and data technologies. It will address public and private sector interests in a synergetic way. This will be done through responsible R&I delivering data-based green solutions and through establishing governance structures which allow for systemic approaches to capitalizing and using data. The partnership for a 'Climate-neutral, sustainable and productive Blue Economy' will enable a just and inclusive transition to a climate-neutral, sustainable and productive blue economy providing for a healthy ocean, people's wellbeing, and a blue economy that is in harmony with nature and whose benefits are distributed fairly.

[7] The European Commission is a member and co-chair of the Group on Earth Observations (GEO), as such the European Commission adopted the GEO Canberra Declaration and Commission Decision C(2019)7337/F1, and committed to contribute to the GEO objectives, including to the Global Earth Observation System of Systems (GEOSS).

[8] As per Article 17 of Regulation (EU) No 2020/852 on the establishment of a framework to facilitate sustainable investment (EU Taxonomy Regulation).

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European Space Agency (ESA) actions so that ESA space data and science can be proactively integrated into the relevant research actions.

The PROTECT public buyers will submit a proposal to obtain the 19M HE grant by February 2024. Following the award of the HE grant, the public buyers aim to launch a PCP tender in Q4 2024 or Q1 2025. The PCP would have a duration of approximately 18 months.

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5. Conclusions

The OMC revealed that the market is ready to participate in a PCP. Some providers indicated that they could add value to tackling all the four challenges due to the wide range of services they can cover. Other providers can tackle some elements of solutions and contribute to part of the functional requirements of one or more challenges, and they will be interested in cooperation and synergies to address the challenges.

The assumption of PROTECT that there is room for innovation was confirmed by most of the respondents. Several fields for R&D were identified.

Several companies indicated specific interest in the Fires and Water resilience challenge, while others are interested in the Sustainable and Resilient Infrastructure challenge. Others indicated that they have already tools to tackle most of the functions of the floods challenge.

Some indicated the capacity to tackle challenges related to Water or Infrastructure of coastline municipalities/regions. Some mention having expertise in remote sensing processing, advanced AI technologies and environment.

Some assured that have demonstrated products and are ready to go with needed references and also the EIC Seal of Excellence and the solar Impulse efficient Solution Label.

Some providers would like that two challenges are selected, not only one, as this would facilitate start-up companies to find entry points more easily. It could be that the challenge has sub challenges encouraging the participation of more providers.

The PCP tender is expected to be launched following the award of the HE PCP 19M grant to which the public buyers will apply in February 2024. The award of the grant may take place in fall 2024, and the PCP tender would be launched in Q4 2024 or Q1 2025.

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PROTECT
PROCURING INNOVATIVE CLIMATE CHANGE SERVICES

Annex 3. Business case report

Lead beneficiary: CPS
Dissemination level: Public

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Project acronym	**PROTECT**
Project title	Preparing a Pre-Commercial Procurement for end-user services based on Environmental Observation to adapt and mitigate climate change
Thematic priority	HORIZON-CL6-2021-GOVERNANCE-01
Type of action	Coordination and Support Action (CSA)
Deliverable number and title	Report of the results from the SOTA analysis part of D3.3.
Work package	WP3
Due date	30/05/2024
Submission date	25/05/2024
Start date of the project	01/06/2022
End date of the project	30/07/2024
Deliverable responsible partner	Corvers Procurement Services B.V.
Version	1.0
Status	Final
Author(s) name(s)	Maria Kampa (CORVERS GREECE), Egli Rrokaj (CORVERS GREECE), Abed El Majid (CORVERS)
Contributing partners	
Reviewer(s)	
Document type	R – Report
Dissemination level	SEN – Sensitive, limited under the conditions of the Grant Agreement

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Version	Date	Modified by	Comments
0.1	15/05/2024	Maria Kampa, Egli Rrokaj	Draft version
0.2	17/05/2024	Ana Lucia Jaramillo	Draft version review
0.3			
1.0			

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Table of Acronyms

COTS	Commercial Off-The-Shelf
EAFIP	European Assistance for Innovation Procurement
EC	European Commission
FRAND	Fair, Reasonable and Non-Discriminatory
IP	Intellectual Property
IPR	Intellectual Property Rights
OMC	Open Market Consultations
PCP	Pre-Commercial Procurement
PPI	Public Procurement of Innovation
R&D	Research and Development
SOTA	State of the Art
TEM	Transmission Electron Microscope
TRL	Technology Readiness Levels
EPO, EP	European Patent Office
WIPO, WO	World Intellectual Property Organisation
ITU	International Telecommunication Union
IETF	Internet Engineering Task Force
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
ETSI	European Telecommunications Standards Institute
TRL	Technology Readiness Level
EO	Earth Observation

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1 Introduction

1.1 Adherence to Task 3.4

Task description	Deliverable reference
The business case and cost analysis aim to assess the economic impact and viability of starting a PCP. This is an important document to ensure that PCP solutions will be marketable in the long-run and to support the procurers in presenting the case of the project internally to their upper management, in term of value added for their organizations.	Section 4 presents the outcomes of the cost benefit analyses conducted in order to justify the R&D investment for the development of a solution that addresses each one of the four identified challenges.
In this regard, a parallel analysis on a double track shall be performed. Track 1: Technical analysis (State-of-the-art, Task 3.1): As part of task 3.2, CPS and VTREK will – based on T1.3. - build a report about the current market conditions of the commercial off the-shelf (COTS) products, as well as the analysis of the innovation landscape of the identified technologies through an Intellectual Property Right (IPR) search. The outcome of this task can be used for the purpose of this Business Case. In fact, based on both the COTS and the IPR analysis, the partners can already draw some assumptions about the potential cost of development (cost of the PCP) and the cost of purchasing the innovative solution (through a follow-up PPI).	The outcomes of SOTA have been taken into account for evaluating the financial viability of the R&D investment. Based on the above and the market state of play (Section 2) as well as OMC and SOTA results, partners concluded with an approximation of 1 million per user for the initial R&D investment (section 3.1).
Track 2: Financial analysis: The motive for innovation is necessary triggered by a specific need. The need consists in specific issues that procurers have identified in the needs assessment part, and the related impact on the organizations. Therefore, the benefits of this project, namely, the existence of a PCP solution, consist in the non-occurrence of each specific scenario and the related impacts. Then, the procurers will be asked to measure (1) the occurrence and (2) the impact of each scenario in their organizations. The occurrence considers the frequency of the scenario, while the impact considers the damage in terms of costs and other non-quantitative variables. The result of the first track would give a rough estimate of the potential cost of the solution, while the outcome of the second track would reveal the benefits for each organization, giving a benchmark to establish the budget of the PCP, the numbers of firms that will be admitted to the challenge, as well as an estimate of the follow-up purchase in a PPI. This information will support CPS and VTREK in building the first version of the four Business Cases (one per procurement challenges)	In section 3.1, the specific impacts, benefits (internal and external / monetary and non-monetary), and costs connected with the development of the innovative solution have been identified in direct consultation with the end users as well as the review of relevant literature. For the development of a cost benefit analysis and in order to evaluate the occurrence of events, a sensitivity analysis based on the assumptions made in the baseline scenario have been performed. The first version of the cost benefit calculations have been drafted in section 3.2. for three out of the four challenges due to limited information on the monetary values for the costs and benefits associated with the water resilience challenge.

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1.2 Task methodology and distribution of the activities

The initial phase of the business case development methodology involves clearly outlining the objectives and scope of the proposed project. Within the framework of an innovation procurement initiative, this process aligns with identifying and analyzing needs. It primarily entails grasping the problem or opportunity the project aims to tackle, identifying relevant stakeholders, and setting measurable objectives. A well-defined scope lays the groundwork for a comprehensive cost-benefit analysis.

A. Identification of Costs and Benefits: Once the four challenges have been identified, the initial stage involved identifying and categorizing the costs and benefits associated with the proposed endeavor. Costs may be direct (such as equipment and labor) or indirect (including training and maintenance). Conversely, benefits can range from quantifiable outcomes like increased revenue or cost savings to qualitative improvements like enhanced enviromental or social impact.

B. Quantification and Assessment: Quantifying costs and benefits is pivotal in conducting a thorough cost-benefit analysis (CBA). While tangible elements can be easily quantified, intangible factors require a more nuanced approach. Techniques such as discounted cash flow analysis and Net Present Value (NPV) calculations aid in assigning a monetary value to future costs and benefits, considering the time value of money.

C. Risk Evaluation: A comprehensive risk assessment is essential to fortify the reliability of the cost-benefit analysis. Identifying potential risks associated with the project, whether internal or external, enables decision-makers to address uncertainties and make well-informed decisions. Strategies for mitigating risks can be integrated into the business case to tackle potential challenges and uncertainties.

D. Sensitivity Analysis: In addition to risk analysis, sensitivity analysis is conducted to gauge the impact of variations in key variables on the project's outcomes. This step allows decision-makers to understand the project's sensitivity to changes in factors such as cost estimates, revenue projections, or market conditions. By exploring different scenarios, organizations can enhance their preparedness for potential fluctuations in the project's performance.

2 The Earth Observation Market

Earth observation, or EO, is the term for the remote sensing and in-situ technologies that are used to monitor land, water (lakes, rivers, and oceans), and the atmosphere in order to record the physical, chemical, and biological systems of the planet. Satellite-based EO uses payloads mounted on satellites to collect information about Earth's features. Because of this, satellite-based platforms can be used worldwide for a variety of physical, commercial, and environmental applications to track and identify trends and changes. After being processed, EO data can be integrated into intricate models to generate information and intelligence (such as forecasts, behavioural analyses, and climate projections), and it is frequently used in complementarity with in-situ measurements. The field of Earth observation has grown significantly in the last few years due to advancements in satellite technology, data processing skills, and the increasing demand for practical insights. Satellites from numerous nations and private businesses are gathering a vast amount of data, which is opening our eyes to new perspectives on the world.

Global sales of value-added services and EO data reached €3.4 billion in 2023. The top three segments—Climate, Environment and Biodiversity, Agriculture, and Urban Development and Cultural Heritage—account for nearly half of this total. The Insurance and Finance segment is expected to grow significantly, though, from an estimated €340 million in 2023 to nearly €900 million in 2033, when it is

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expected to become the largest contributor to global EO revenues. The global market for EO data and value-added services is expected to generate almost €6 billion in total revenue by 2033.

There are several factors in several market categories that are expected to contribute to the growth of EO data and service revenues. As the effects of climate change become more pronounced every year, EO services become increasingly important to these sectors. In addition, EO observation adds value to the Climate, Environmental, and Biodiversity sector by providing continuous and comprehensive data that is difficult to obtain through other systems. When assessing risk in insurance and finance, EO data is used to provide information that would not be available otherwise or that would be available but would not be as accurate or updated as frequently. Furthermore, EO offers vital information for urban planning, promoting sustainable development.

The two regions with the highest revenue from EO data and value-added services are the US and Europe. Together, US and European businesses hold a market share of over 85%, with each party contributing more than 40%. China's share of the market is 6%, and the share of global revenues generated by Canadian and Japanese companies is 3% and 2%, respectively. Three divisions exist within the downstream EO industry: insights & decision support, data processing & analysis, and data distribution and acquisition. Notably, leading businesses frequently differ throughout the value chain, despite the fact that big players like Maxar, Airbus, and Amazon are present in multiple categories.

Companies that acquire and distribute data, offering raw, unprocessed, or pre-processed data from EO constellations, are the first link in the EO value chain. North America commands the largest market share, approximately 50%, followed by Europe, which holds approximately 40% of the market. The systematic review of data is then carried out by data processing companies in an effort to extract any potentially valuable knowledge. In the EO data market, companies operating at this stage of the value chain use EO data to power digital services or online platforms that give users access to tools and resources for analysing EO data, creating algorithms, and creating applications. With about 55% of the market in 2021, North American businesses were in the lead. The existence of very large companies like AWS, Alphabet (Google), and Maxar is the reason for this significant share. Europe held substantial market shares in the aviation, climate, environment, and biodiversity, insurance, and finance sectors, accounting for about 35% of the global data processing market. More than twice as many European companies as North American companies engaged in EO data processing related activities across all market segments.

Analysis, insights, and decision support is the next category in the EO value chain after data processing; over 50% of the global market is held by Europe, and nearly 25% by North America. European service providers, primarily SMEs, have effectively specialised in meeting their clients' needs for customised solutions at this point in the value chain.

In Europe the EO services sector comprised of 772 Companies (an increase of 3.5% compared to the 2022 survey) across 34 countries (comprising EU and ESA member states). Companies offering services or supplying (selling) data or information using satellite data generated a total of €1.7 bn revenues (driven by Copernicus data and information) in 2022 (an increase of +10.9% compared to the previous year). Considering around 14 000 employees estimated in the sector, the European EO industry results to still be largely dominated by micro and small companies.

3 Business Case Results

3.1 Analysis

Between 1980 and 2022, climate-related extremes resulted in approximately EUR 650 billion in losses in the EU (at 2022 prices). Floods accounted for nearly 43%, while storms (including lightning, hail, and mass movements) contributed to about 29% of the total. Heat waves caused around 20% of the losses

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attributed to climatological hazards, with droughts, forest fires, and cold waves making up the remaining approximately 8%[1].

The table presents economic losses and fatalities resulting from weather- and climate-related extreme events between 1980 and 2022, categorized by country[2].

Country	Total losses (Million EURO)	Losses per sq.km (EURO)	Losses per capita (EURO)	Insured losses (Million EURO)	Insured losses (%)	Fatalities
Austria	13216	157566	1626	2333	18	755
Belgium	16208	528524	1543	6310	39	4690
Bulgaria	4741	42715	594	86	2	256
Croatia	3667	64802	830	92	3	906
Cyprus	423	45701	597	7	2	67
Czechia	16274	206334	1567	1896	12	715
Denmark	8881	206896	1646	5459	61	532
Estonia	306	6750	217	44	14	5
Finland	2286	6755	440	70	3	7
France	120613	188907	1947	41727	35	45260
Germany	167299	467879	2065	50391	30	101334
Greece	11934	90622	1129	401	3	4643
Hungary	8919	95894	875	479	5	874
Ireland	3537	50568	869	519	15	68
Italy	111110	367817	1918	5081	5	21758
Latvia	1182	18295	513	64	5	87
Lithuania	1695	25968	511	9	1	102
Luxembourg	1252	482413	2700	622	50	170
Malta	47	148848	118			5
Netherlands	9996	267420	629	3865	39	4315
Poland	18166	58237	480	1214	7	2551
Portugal	15042	163099	1470	535	4	10339
Romania	17525	73513	816	178	1	1438
Slovakia	1773	36159	333	73	4	119
Slovenia	6934	342051	3452	276	4	315
Spain	83782	165582	1977	3990	5	18954
Sweden	3658	8175	402	969	26	43
Iceland	25	248	88			3
Liechtenstein	21	129169	631	10	48	0
Norway	4965	12912	1073	3551	72	41
Switzerland	18743	453957	2542	6690	36	2281
Türkiye	6012	7705	92	402	7	1788
Total EU-27	650467			126690		220308

Despite ongoing efforts in mitigation and adaptation, the European Union has faced significant economic losses due to weather and climate-related extremes between 1980 and 2022. This alarming statistic underscores the pressing necessity to expedite the implementation of adaptation measures to mitigate further financial repercussions.

Studies indicate that efficient adaptation actions are characterized by a benefit-cost ratio surpassing 1.5. However, measures yielding a lower ratio demand meticulous scrutiny due to the uncertainty surrounding their economic costs and benefits. Evaluating the benefits of adaptation measures entails considering not only the diminished impact of natural hazards but also their contribution to overall economic advancement. Additionally, assessments must account for ancillary benefits such as improvements in biodiversity, air quality, water management, greenhouse gas emission reductions, and public health.

In this context, the flowing sections present the outcomes of the analyses conducted by the PROTECT Consortium to identify the costs and the benefits associated with the introduction of the PCP solution. These analyses are the culmination of a thorough review of pertinent studies in the literature, coupled with invaluable input from end-users and partners addressing the four challenges identified during the PROTECT initiative as the most viable and promising.

Lastly, it is important to note that the estimated investment required for each of the four challenges, as part of the cost-benefit analysis, is approximately 1 million euros. This one-time cost estimation is based

[1] https://www.eea.europa.eu/en/analysis/indicators/economic-losses-from-climate-related
[2] https://www.eea.europa.eu/data-and-maps/daviz/impacts-of-extreme-weather-and-5#tab-chart_1

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on data from the follow-up PCP call released by the European Commission and has been corroborated by the Open Market Consultation results and the e-pitching sessions.

3.1.1 Flood Challenge

Floods stand out as significant weather-related occurrences in Europe where according to European Environment Agency one in eight people reside in locations susceptible to floods, and these places also include vital infrastructure, exerting substantial economic ramifications, as evidenced by recent severe flooding incidents. With climate change expected to heighten the hydrological cycle, an escalation is anticipated in both the scale and frequency of intense precipitation events. These occurrences result in tangible direct consequences like structural damage to buildings, alongside intangible direct impacts affecting non-market sectors, such as public health. Moreover, floods induce indirect repercussions on the economy, including disruptions to transportation and electricity supply. Major flood events possess the potential to trigger macro-economic disturbances, underscoring the multifaceted impacts of such natural disasters on European societies and economies.

Based on reports[3], floods are considered as having the highest anticipated losses. This conclusion is drawn from thorough analyses of historical data, vulnerability in different areas, and predictions about climate change. Floods often cause significant damage to buildings, roads, and people's lives, making them a major concern in risk assessments.

Based on analyses conducted on European level, the most costly events for the past 40 years include the 2021 floods in Germany and Belgium (EUR 44 billion), the 2022 combined drought and heatwave across the continent (EUR 40 billion), the 2002 floods in central Europe (EUR 34 billion), the 1999 storm Lothar in Western Europe (EUR 17 billion), the 2003 drought and heatwave in the EU (EUR 17 billion), and the 2000 floods in France and Italy (EUR 14 billion), all adjusted to 2022 prices.

More specifically on EU level, economic losses resulting from flooding events amounted to 3.21 billion euros in 2022. Just one year earlier, figures had reached a new record high, with costs adding up to more than 45 billion euros. Prior to that, the highest annual loss was recorded in 2002, at some 37 billion euros. Since 1980, economic losses from this type of event have amounted to nearly 280 billion euros composing a considerable amount of losses.

In addition to the economic losses incurred, flood-related fatalities on the European Union level remain a raising concern. While the region has made significant strides in flood risk management and disaster preparedness, fatalities resulting from flooding events continue to pose a substantial threat to public safety. The toll of lives lost to floods underscores the urgent need for comprehensive mitigation and adaptation strategies to address the multifaceted challenges posed by these natural disasters.

More specifically, studies indicate that the risk of river flooding in Europe may reach unprecedented levels. In 2023, approximately one-third of Europe's river network experienced river flows surpassing the 'high' flood threshold, with 16% exceeding the 'severe' flood threshold. Major river basins such as the Loire, Rhine, and Danube witnessed record or near-record high river flows, attributed to a succession of storms occurring between October and December. According to initial assessments by the International Disaster Database (EM-DAT), the floods in 2023 impacted around 1.6 million individuals in Europe and accounted for approximately 81% of the continent's economic losses attributed to climate impacts that year[4]. Similar studies estimate that, river flooding causes average annual damage of €7.6 (5.6–11.2) billion per year and exposes around 166,000 (124,000–276,000) people per year to inundation[5].

While there is extensive literature addressing flood risk reduction, only a limited number of studies have actually quantified the costs and benefits associated with various measures, often focusing on local contexts. Some studies have examined the potential for reducing flood risk in Europe through different adaptation strategies in future scenarios, but they have not provided detailed estimates of implementation costs. Others, conducted at continental or global scales, have primarily focused on

[3] https://environment.ec.europa.eu/news/new-analysis-indicates-european-cities-and-countries-highest-expected-losses-future-flooding-2023-06-21_en
[4] https://climate.copernicus.eu/europe-experiences-widespread-flooding-and-severe-heatwaves-2023
[5] https://www.nature.com/articles/s41558-022-01540-0

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raising dyke heights or assessing residual flood damage, typically overlooking the effectiveness of nature-based solutions. The current section aims to conduct large-scale analysis to evaluate the economic efficacy of solutions in flood risk reduction.

Innovation Drivers

Taking the above into consideration, the consortium identified the below drawbacks in their current low level operations and led to the need for a new solution are the following:

- Delayed Response: Without efficient tools and systems in place, response efforts to flood events may be delayed, leading to increased damage to property and infrastructure, as well as potential loss of life.
- Inaccurate Predictions: Without access to comprehensive flood data and advanced prediction models, authorities may struggle to accurately forecast the timing, extent, and severity of future flood events, reducing their ability to adequately prepare and respond.
- Increased Vulnerability: Without automated mapping processes and real-time data analysis, communities remain vulnerable to the impacts of floods, including displacement, economic losses, and disruption of essential services such as transportation and utilities.
- Ineffective Risk Management: Without skilled teams equipped with the necessary expertise and tools, authorities may struggle to effectively manage flood risks, leading to subpar decision-making and potentially exacerbating the consequences of flood events.
- Lack of Preparedness: Failure to develop a comprehensive flood mapping and response system may leave communities ill-prepared to mitigate the impacts of future flood events, increasing their susceptibility to long-term damage and recovery challenges.
- Higher Collective Recovery costs : Failure to develop a high resolution flood mapping system may leave communities unaware of the real potential impacts of flood events, preventing them from equipping with adequate insurance coverage in advance and leading to increased collective costs after the event.

Buyers Group Benefits

The next logical step in the analysis was to identify the impacts and associated savings connected with the introduction of the PROTECT solution for the buyers, addressing the previously identified drawbacks. To formulate these benefits, we examined a scenario where the solution is adopted by a large region, such as Lombardy, Emilia-Romagna, or Tuscany (20,000-25,000 km²), over a 5-year period. In this scenario, the regional government acts as the primary procurer ("internal"), while external beneficiaries include a portion of municipalities and local public bodies receiving advice from the regional government via the service, as well as the civil society and economic sectors affected by floods.

The main benefits are external, as such a service is likely to be acquired with public interest as the primary goal. Given the substantial collaborative effort in the ongoing PCP process, we assumed that at least three (3) regions with similar size and issues will adopt the service nationally, amplifying the positive impacts and associated savings in our study.

In this regard, these savings can be divided into internal and external ones and are summarized to the following tables:

Benefit	Impact	Rationale for the estimates	Estimation
Unified repository for historical data	Accurate description of the flood history in a region	Support long term planning by reproducing past scenarios instead of archive research and manual reconstruction for evidences , see for example restricted usage Copernicus EMS rapid mapping catalogue; saving estimate : 20 days /year of archive work saved @ cost of 300 euro/person	18.000,00 €

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Fastening the FLOOD Risk assessment	More efficient and automated analysis	Having scenarios and map in minutes instead of making complex models running fostering real time decisions; cost saving estimate : 1 Local Flood event/year to assess with 4 persons at the office and on the field an average of 15 days of work @ cost of 300 euro/person	54.000,00 €
Higher detail FLOOD maps	Ability to better analyse the situation in the ground during emergency and for scenarios (long term planning)	Getting high resolution flood maps from the platform scenarios instead of outsourcing complex hydraulic studies. Basing on recent public tender for hydraulic models for part of the region (10% savings annual, 1 tender very 10 years)	45.000,00 €
Cutting direct costs for government	Supporting institutional goals (like revision of masterplans) directly with the service instead of outsourcing	1 study saved /year inside a Region @ 25'000 € lump sum	75.000,00 €
User friendly solutions (Qualitative)	Ability for non-experts to use the solution	Saved: 1PMs of external consultants @ cost of 600 euro/day/person	36.000,00 €
Efficient Risk Assessment Tools	Quick assess of event flood risks done internally instead of outsourcing post event studies	1 study on risk assessment, medium spatial detail, Across one catchment river/year @ 25'000 € lump sum	75.000,00 €
Data Sharing and Interoperability (Qualitative)	inter-agency, better-coordinated efforts and resource allocation.	Data and model interoperability for FLOOD protection is a recognized necessity by the regional level	Qualitative
Cost Efficiency in Monitoring	lower operational costs for flood monitoring through real-time data analysis and flood mapping	Field survey during emergency saved, 1 Local Flood event/year to monitor with 5 persons on the field an average of 15 days of work @ cost of 300 euro/person	67.500,00 €

Table 1 Internal Savings

Benefit	Impact	Rationale for the estimates	Estimation
Health and Safety Improvements	Reduced public health impact from floods due to better prediction and mitigation efforts.	Huge part of the population in affected municipalities displaced in emergency for sanitary and safety reasons	Qualitative
Economic Stability	Effective flood management reduces the economic burden on affected communities, businesses, and governments by minimizing property damage, disruption to economic activities, and associated recovery costs. This stability can foster economic growth and resilience.	Stability effect account on avoiding just a 1% of the damages of an exceptional event by the use of the service (consider it is an extreme event, very rare> 100 years Return time , more frequent FLOODS are much smaller but likely impact of the service on them will be higher) . A prudential estimate may be referred to a more frequent but less severe event in them of damages like the one event that caused in	600.000,00 €

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		Greece 2,5 billion[6]. Considering a mere 10% of it as a reasonable annual saving leads to an estimate range 200-400k/year	
Creation of new job opportunities		On the provider side at least 1 IT plus 1 technical - commercial FTE for O&M; and 1 customer service	Qualitative
Insurance and Risk Management:	More accurate risk assessment for insurance purposes, potentially leading to lower insurance premiums for residential, agriculture industry etc.	Insurance data on paid premiums are not public to make a comparison, however risk profiling clearly benefit from higher resolution accurate flood maps VS large scale ones	Qualitative
Cutting direct costs for government and local municipalities	lowering necessity of dedicates on demand studies to support planning and engineering decisions.	One dedicated local hydraulic study saved for few municipalities in the Region (e.g. 5) per year at an average cost of 15'000 euro each.	225.000,00€
Community Engagement	Enhanced tools for community education and engagement in flood preparedness.	Based on Italian example of Climathon initiative.	Qualitative
Infrastructure Planning	Improved infrastructure resilience through informed urban development and land use planning	FLOOD barriers in Rimini and Cesenatico sized thanks to the new service , expected annual benefit in the paper are related to the presence of the barrier, part of this annual benefit related to the use of the service of resilient design estimated to a mere 5% of the benefit in the next 30 years (up to 2050)	300.000,00 €

The above benefits amount up to 1.495.500,00 euros in total on an annual basis.

Buyers Group Costs

The estimated costs are presented in the table below including the funds for the development phase as well as the implementation phase (Totoal Cost of Ownership) of the solution. The costs included in each phase are the sum of:

- Provision and O&M orientative costs of a Software As A Service platform
- Substantial savings for large areas (joint PCP scale factor)
- Initial costs distributed over 5 years to calculate yearly cost

For the humanresources related calculation, the PM costs are estimated with an average of 6000 €/month.

[6] https://www.euractiv.com/section/politics/news/greece-eyes-eu-money-after-deadly-floods-damages-reach-e2-5-billion/

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Type of cost	Description	Estimated cost (annual)	One off cost during the first year of the project
Manufacturing costs (Procurement Cost)	In our case this cost is the estimated PCP cost		1.000.000,00 €
After PCP costs (LCC)	Salaries for new team members- 2 new person months are expected with the introcuction of the new solution (annual)	36.000,00 €	
	Training Costs for the new solution (annual)	15.000,00 €	
	Operating costs (annual)	45.000,00 €	
	Licenses (annual)	45.000,00 €	
	Transition costs (from old to new)- 1 Person month is expected to guide the transition	36.000,00 €	108.000,00€
	Equipment (Hardware/Cloud for the new solution, software)	30.000,00 €	
	Setup costs	90.000,00 €	
	Total Costs (first year) composed by the annual costs (without the annual transition cost) and first year's costs.	1.369.000,00 €	
	Total Cost (next years) composed by all annual costs.	261.000,00€	

Costs for human and technological resources were based on input from partners who work with the technology and who know which types of functions are needed.

3.1.2 Infrastructure challenge

More heat is absorbed and reemitted by man-made structures like buildings, roads, and other infrastructure than by naturally occurring environments like woods and bodies of water. Urban areas create "islands" of greater temperatures compared to surrounding areas because of the high concentration of these structures and the scarcity of greenery. "Heat islands" are the term used to describe these hot spots. A number of factors, such as day or night, small or large cities, suburban regions, northern or southern climates, and any season, can lead to the formation of heat islands.

There are several reason that facilitate in the creations of heat islands:

- Urban areas' decreased natural landscapes
- Urban material characteristics
- Urban geometry
- Heat produced by human activity
- Climate and topography

The quality of life and community environment are greatly impacted by heat islands. High temperatures cause more people to use air conditioning, which raises electricity consumption. This increases electricity costs and causes peak demand in the summer, which may result in rolling brownouts or blackouts. A rise in energy consumption also results in a rise in the usage of fossil fuels, which in turn causes emissions of greenhouse gases and air pollutants, smog, particulate matter, and acid rain to impair air quality, and a direct increase in the creation of ground-level ozone. In addition to aggravating heat waves and raising the dangers for vulnerable groups, heat islands can contribute to heat-related illnesses and discomfort. Furthermore, hot surfaces increase the temperature of stormwater runoff,

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endangering aquatic life and raising the temperature of urban streams relative to those in forests. Moreover heat islands increase the temperature of stormwater runoff, which enters bodies of water and disturbs aquatic life by changing metabolism and reproduction. Compared to streams in forests, urban streams grow noticeably hotter, which stresses or even kills aquatic life. Rain gardens and permeable pavements are examples of green infrastructure that can reduce runoff and enhance water quality. The heat island effect also raises the risk of floods and fires because it modifies weather patterns and raises temperatures.

As also described in the SOTA (Annex 1 of D3.3) below is a description of the fire challenge in the context of PROTECT.

Currently, there is a need for integrated sustainable re-development, restoring & climate adaptation of existing neighbourhoods both in urban and rural areas.

In this use case, some foreseen actions are:

- Developing an integrated solution (using EO data) with regard to the re-development, restoration and climate adaptation of existing neighbourhoods to address/prevent:
    a. heat island effects
    b. flooding
    c. droughts
    d. water scarcity
    e. in neighbourhoods & rural areas
- Measuring the effectiveness of climate adaptation measures and applied adaptations.
- Developing an integrated climate service that combines possible adaptation measures such as heat island and water scarcity prevention, measures that address flooding and droughts in neighbourhoods & rural areas for modelling purposes and possible scenarios with existing limitations (e.g., narrow streets, protected historical monumental buildings, bridges, water scarcity faced by farmers, etc.) and given other priorities such as green, energy transition, parking.
- Exploring most common limitations, barriers and impossibilities that stand in the way of implementing climate adaptation of the existing infrastructure. Using the outcomes to find an innovative solution given these limitations.

The challenge is to find a solution to climate adaptation for this complex situation (vulnerable urban &/ rural areas with a combination of heat, flooding, water scarcity and droughts) using integrated climate services.

Innovation Drivers

The drawbacks identified by the procurers in the current operations and led to the need for a new solution are the following:

- Unreliable models to predict, respond and prevent severe events.
- Current tools provide resolution that is not sufficient.
- Lack of data and risk maps.
- Data is not compatible and not possible to combine.

Buyers Group Benefits

The next logical step in our investigation was to identify the effects and associated benefits associated with the purchasers' adoption of the PROTECT solution, which are related to the previously mentioned shortcomings and are summarized below:

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Benefit	Impact	Estimation
Unified repository for historical data	Accurate description of the wind, sun, heat, greening, drought, floods history in a region will result in an estimated benefit 2PM x 2 persons	24.000 euros
Transforming mapping processes into algorithms	Efficient and automated prediction and warning wind, sun, heat, greening, drought, floods will save personnel cost 1PM x 2 persons	12.000 euros
Transforming mapping processes into algorithms	Efficient and automated calculation of scenarios wind, sun, heat, greening, drought, floods will save personnel cost 1PM x 2 persons	12.000 euros
Transforming mapping processes into algorithms	More efficient and automated analysis wind, sun, heat, greening, drought, floods will require less calculation and analyses 1PM x 2 persons	12.000 euros
Transforming mapping processes into algorithms	More efficient and automated monitoring wind, sun, heat, greening, drought, floods will require less calculation and monitoring 1PM x 2 persons	12.000 euros
Better decision-making regarding Climate ADAPTATION OF existing infrastructure	Quality of decision-making using data, analysis and calculated scenario's regarding climate adaptation of infrastructure. We expect better decision-making can lead to savings equivalent 3 PM x 2 persons	36.000 euros
Improvement in the quality of life of the citizens	Locate the heat islands and make infrastructure more climate adaptive, greener, create shadows. We expect this localisation can lead to savings equivalent 2 PM x 2 persons	24.000 euros
Impact of cost	Less costs thanks to ability to maintain only if it is necessary instead of ones in a fixed period will lead expected savings of 3PM x 2 persons compared to the current situation	36.000 euros
Reduction in material decay due to weathering	Greening building surfaces reduce material decay due to weathering as a supporting ecosystem service.	3,334,801.44 euros

Table 2 Internal benefits (infrastructure)

The above benefits amount up to 3,502,801.44 euros in total on an annual basis.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Buyers Group Costs

The following table provides a summary of the various costs that are related to the introduction of the PROTECT solution for buyers:

Type of cost	Description	Estimated cost (annual)	One off cost
Manufacturing costs (Procurement Cost)	In our case this cost is the estimated PCP cost		1.000.000,00 €
After PCP costs (LCC)	Personnel costs (PCP preparation, contract management etc, travel costs, equipment) -In our case these costs are covered.		
	Training Costs for the new solution	20.000,00 €	
	Operating costs	240.000,00 €	
	Licenses	20.000,00 €	
	Transition costs (from old to new)	144.000,00 €	
	Equipment (Hardware for the new solution, software)	10.000,00 €	
Total Costs		1.524.000,00 €	

Table 3 Costs (infrastructure)

3.1.3 Fire challenge

Europe is now more vulnerable to forest fires due to climate change. Nevertheless, since 1980, the Mediterranean region's burned area has marginally shrunk, suggesting that firefighting efforts have been successful. However, in recent years, areas of central and northern Europe that are normally not prone to fires have been devastated by forest fires that coincide with record droughts and heatwaves. More adaptation measures are required because most European regions are anticipated to experience longer fire seasons and an expansion of fire-prone areas, especially under high emissions scenarios.

Many ecosystems depend on forest fires, including forest rejuvenation, disease and insect management, and the reduction of fuel accumulation and subsequent fire intensity. Large-scale, frequent fires, however, have a detrimental effect on biodiversity, soil quality, water and air quality, and the beauty of landscapes. Due to their high greenhouse gas emissions, potential for economic loss and human casualties in populated areas, and other factors, forest fires pose a threat to efforts to mitigate climate change. Climate is one of several variables that affects fire risk. The EU's policy for adapting to climate change acknowledges that there would likely be a significant influence of climate change on the risk of forest fires in Europe.

Large-scale forest fires occurred in more nations than at any other time in recent years, including in areas of central and northern Europe that had never before seen a fire. For example, 2018 was one of the worst fire seasons ever recorded in Sweden, necessitating international firefighting aid. Severe meteorological conditions have contributed to many of the recent intense fire occurrences and disastrous fire seasons in Europe; record droughts and heatwaves,

Based on meteorological conditions, the Canadian Fire Weather Index (FWI) is used to evaluate the risk of fire. The FWI grew for all of Europe between 1980 and 2012, especially for southern and eastern Europe. The fact that the Mediterranean burned less during the same time period implies that attempts to control and suppress fires in this area were not entirely ineffective.

With the exception of some areas of northern and eastern Europe, most regions are expected to see further increases in the risk of wildfires caused by weather. Portugal, Spain, and Turkey will continue to have the highest absolute fire danger, but this increase is predicted to cause moderate fire danger zones in western and central Europe to expand northward. According to modelling studies, the amount of burned land in the EUMED5 countries might treble under a 3 °C global warming scenario. However, this rise could be significantly curbed by implementing extra measures like fire breaks, prescribed burning, and improved fire suppression.

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As also described in the SOTA (Annex 1 of D3.3) below is a description of the fire challenge in the context of PROTECT.

Currently, there are several scenarios of fires initiated by different causes and having a harmful effect on the environment.

One scenario or use case relates to facilities where waste is stored and prone to spontaneous fires, occurring three or more times a year (in one city). These incidents are particularly prevalent during the summer months when temperatures are higher. While data on previous fire events exist (temperature conditions, height of piles, heat waves, composition of garbage, location of storages or disposals) there is no automated solution available to predict fires and make informed decisions for prevention. As a result, environmental agency inspectors bear the responsibility of monitoring these facilities, placing a significant burden on staff resources.

In this waste fire use case, the foreseen steps are:

- Exploring the technical boundaries to understand the possibilities of providing frequent data updates and establishing the required preparedness frequency.
- Developing a comprehensive model using both existing and new data to predict waste fires.
- Aggregating all data from past waste fire incidents can be instrumental in this process.
- Training the model based on defined conditions and relevant factors, such as the evolving composition of waste over time and temperature variations.
- Utilizing the gathered data to anticipate fire occurrences, enabling timely preventive actions.
- Implementing automated notifications to alert environmental; agencies about the risk of fire, empowering them to take necessary measures such as engaging contracted companies or industries experienced in managing waste storage facilities. This proactive approach aims to prevent air pollution and minimize potential damage.

The desired outcome is an automated notification system that promptly identifies the risk of fire in waste storage facilities. This allows environmental agencies to take swift and appropriate measures, such as engaging qualified companies or industries with expertise in waste management. By preventing fires, this solution aims to mitigate air pollution and reduce potential damage associated with such incidents. It is expected to obtain an automated notification system based on the processing data including COPERNICUS data.

Innovation Drivers

The drawbacks identified by the procurers in the current operations and led to the need for a new solution are the following:

- Risk of higher damage to the property and nature.
- Unreliable models to predict, respond and prevent severe events.
- Current tools provide low resolution.
- Lack of fire data and risk maps.
- Risk to the health of general population.
- Increase of CO2 footprint.
- High risk of chemicals to the air and ground water.
- Currently, the mapping of fire areas during severe events can take weeks, resulting in delays in response and prevention.
- Same fire models.
- Lack of coordination among the different 1st responders.
- Lack of ability to trace the causes and the responsible person of the fire events.
- Precise estimation and comparison of actual amount of waste vs officially reported in evidence.

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Buyers Group Benefits

The identification of the effects and related benefits linked with the adoption of the PROTECT solution for the purchasers, which are tied to the aforementioned shortcomings, was the next logical step in our investigation and they are listed below:

Benefit	Impact
Prediction on the resources you need to mobilize (how many fire trucks, troops, recourse allocation in general), by the predicting the event in advance you can save/properly allocate your resources.	Improves readiness for firefighting operations and reduces expenses by avoiding the needless use of resources.
Impact of cost to facility of waste dump.	Minimises damage costs, downtime, and potential environmental hazards by lowering the likelihood of fires in waste dump facilities.
Measuring the probability for fire occurrence.	Targets preventive measures where they are most needed, reducing the frequency and severity of fires and minimising losses and damage.
Reduce the response time (of firefighters and the region in general).	Quicker reaction times lead to less property damage, less costly firefighting expenses, and more safety for the impacted areas.
Reduce the decision-making process (for the allocation of forces etc).	Decision-making that happens more quickly ensures that resources are deployed efficiently and promptly to mitigate fire incidents.

Table 4 Internal benefits (fire)

Detailed Cost Calculation for Firefighters Intervention – Use Case of Waste Fires

Part A: Financial Costs of the Intervention

Surcharges

(a) Fixed - consistent for each officer and for each intervention, like risk or hardship allowances

- Intervention supplement: 8.375 €/hour/person
- Supplement for using breathing apparatus or protective clothing: 20.9375 €/hour/person

(b) Variable - varies for each officer as they're based on hourly wages and mainly occur during night raids or long and large-scale incidents. These include overtime and time spent on duty during an emergency call-out. Both allowances are roughly estimated using an average officer's pay of EUR 12/hour. This leads to:

- Overtime: 15.6 €/hour/person
- On-call at the workplace: 6 €/hour/person
-

Fuel

We'll consider only tankers for intervention, possibly some working machinery for dredging the soil and backfilling the fire. For a tanker, we estimate diesel consumption during the "offensive" run and pump work (whether for firefighting or pumping water out of the lake):

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- Consumption during driving: 50 litres/100 km
- Consumption during pump operation: 15 litres/hour
- Diesel price: 1.70 €/litre

The costs for preparing PPE and equipment

These costs usually aren't quantified anywhere, so this will be my estimate. It includes cleaning each member's PPE, washing it, and getting the equipment back into action – particularly, filling pressure vessels with air using a compressor. For prolonged engagements, we also account for damage to some PPE (commonly response gloves), destruction of in-kind equipment (hoses), and equipment wear and tear.

For small and short interventions, we'll only account for cleaning intervention clothing, estimated at 10 €/officer, and the electricity cost for filling pressure vessels at the intervention, which is about 0.50 €/pressure vessel. Other costs (damage to PPE and equipment, equipment wear and tear) are almost zero for small interventions and we can estimate them as a lump sum at 100 €/intervention.

For long interventions, it's common to damage intervention gloves and some clothing items. In this case, we estimate the cost per officer at 100 €/officer. The price for filling the pressure vessel remains the same. But there's frequent damage to assets and vehicle wear and tear, which we estimate at 500 €/tanker. There are also other costs, such as the need for drinking water and food for officers and costs associated with the activities of the commanding officers or the command staff. We estimate this at EUR 1,000/intervention.

| Cost of: | Small Intervention | Large Intervention | | --- | --- | --- | | Officer | 10 | 100 | | Pressure Vessel | 0.5 | 0.5 | | Tanker | - | 500 | | Total Intervention | 100 | 1000 |

Part B: Cost Estimation for Small Preventive Intervention

Consider a preventive intervention or an event reported early and therefore still in the development stage with a small magnitude.

Assumptions:

- Intervention with 2 tankers
- 5 intervening officers
- Total intervention time: 2 hours
- 3 officers intervene in breathing apparatus for 1 hour (2 cylinders each)
- No need for on-call and overtime
- Fuel consumption is based on 1.5 hours of pump operation on both tankers, with each tanker travelling 50 km (driving to the intervention, movement on the fireground, water shuttle, driving to the base)

Type of intervention	Assumption	Cost
Surcharge for Intervention	5 x 2 hr x 8.375 €	83.75 €
Extra Charge for Breathing Apparatus	3 x 1 hr x 20.9375 €	62.8125 €
"Cleansing" of the Officer	5 x 10 €	50 €
Pressure Vessels	6 x 0.50 €	3 €
Fuel Costs for Ride	25 L x 2 x 1.70 €	85 €
Fuel Costs for Work	15 L x 1.5 hr x 2 x 1.70 €	76.50 €
Lump Sum for Intervention	-	100 €
Total Costs	-	461.06 € (rounded to 460 €)

Part C: Estimating the Costs of a Large-Scale Intervention

Consider a large-scale landfill fire where, in addition to tankers, working machinery (excavators and a roller) must be used to contain the fire. The fuel costs of these working machines are similar to those of

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a tanker, so we'll only count the tankers in the rough estimate. These fires last for several days, but for comparison, we'll only quantify the cost for 1 day (24 hours) of the intervention.

There will be a rotation of officers as they won't intervene for 24 hours nonstop. However, the cost will be the same for one officer and the other, so it's as if 1 single officer were to intervene continuously for 24 hours and also use breathing apparatus without a break. However, there are increased costs during the rotation of officers because they're intervening for a period of time with two officers at the same time. We'll account for this by calculating 10 hours of overtime for each officer instead of the night overtime (which is 8 hours).

Due to the size of the officers' deployment, it'll be necessary to conduct a call-out of officers from home to on-call at the worksite. With forty responders, we anticipate the need for 15 officers called to the convocation to ensure the fire stations are operational for the next response.

Assumptions:

- Intervention with 10 tankers and 5 working machines, i.e. 15 tankers
- 40 intervening officers
- Intervention duration: 24 hours
- 25 officers will intervene in breathing apparatus for about half of the intervention time, i.e. 12 hours (24 cylinders per officer)
- Overtime for each officer at night: 8 hours + 2 hours due to rotation
- 15 officers called to standby
- 15 tankers to be divided into: 2 work machines, 4 static tankers and 9 water/soil transport vehicles
- Working machines and static tankers will have a pump work of approx. 20 hours and a distance of 30 km - water and soil transport vehicles will have a pump work of 2 hours and a distance of 300 km each

Type of intervention	Assumption	Cost
Surcharge for Intervention	40 x 24 hr x 8.375 €	8040 €
Extra Charge for Breathing Apparatus	20 x 12 hr x 20.9375 €	6281.25 €
Overtime Costs	40 x 10 hr x 15.60 €	6240 €
Emergency Surcharge	15 x 24 hr x 6 €	2160 €
"Cleansing" of the Officer	40 x 100 €	4000 €
Maintenance of Firetruck	15 x 500 €	7500 €
Pressure Vessels	25 x 24 x 0.50 €	300 €
Fuel Costs for Ride	15 L x 6 x 1.70 €	153 €
	150 L x 9 x 1.70 €	2295 €
Fuel Costs for Work	15 L x 20 hr x 6 x 1.70 €	3060
	15 L x 2 hr x 9 x 1.70 €	459
Lump Sum for Intervention	-	1000 €
Total Costs	-	41,488.25 € (rounded to 41,500 €)

Overall, there are a number of advantages to using the PROTECT solution, such as improved enforcement and education efforts, early warning and preparedness for individuals and municipalities, optimised resource allocation for firefighters, improved planning and preparedness for fire management, real-time decision support during waste fires and fires in general, optimised response efforts, and ease of evaluating the efficacy of fire management practices. By enabling proactive measures like vegetation clearance, firebreak construction, and focused education campaigns, these predictive models lower the probability and intensity of waste fires. They also help firefighters make well-informed decisions about containment tactics and resource deployment, which ultimately reduces property damage, casualties, and environmental impact. By continuously refining approaches based on past data and outcomes,

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predictive models contribute to more effective fire management and preparedness for future events.

Buyers Group Costs

The following table provides a summary of the various costs that are related to the introduction of the PROTECT solution for buyers:

Type of cost	Description	Estimated cost (annual)	One off cost
Manufacturing costs (Procurement Cost)	In our case this cost is the estimated PCP cost		1.000.000,00 €
After PCP costs (LCC)	Personnel costs (PCP preparation, contract management etc, travel costs, equipment) -In our case these costs are covered.		
	Salaries for new team members	60.000,00 €	
	Training Costs for the new solution	10.000,00 €	
	Operating costs	5.000,00 €	
	Data repository	100.000,00 €	
Total Costs		1.175.000,00 €	

Table 5 Costs (fire)

3.1.4 Water challenge

Water supply and wastewater services face susceptibility to the effects of climate change. In addition to threats to water resources, including potential shortages in supply, there are also vulnerabilities concerning water infrastructure and its quality, as well as activities reliant on water, such as hydro-power generation, river transportation, and power station cooling. Nevertheless, variations exist in the projected precipitation patterns for wet and dry regions, as well as disparities between wet and dry seasons. The considerable uncertainty surrounding these projections poses significant challenges in conducting economic cost analyses.

The intricate nature of water demand, which varies greatly across different locations, presents a challenge when attempting to analyse water-related economic impacts on a European scale. While there have been pan-European assessments of the impact of climate change on stream-flow drought, soil moisture drought, and water scarcity, these assessments did not include monetary evaluations. Some studies have focused on evaluating the costs of adaptation in the water sector, serving as a proxy for potential damages. For instance, Hughes et al. estimated the cumulative adaptation costs for various water services in Western and Eastern Europe over the period 2010–2050. Additionally, the European Commission has reported potential annual costs for desalination and water transport by 2030. Another study by Mima et al. projected the additional expenses related to increased electricity demand for water supply and treatment due to climate-induced water demand growth[7].

Moreover, economic analyses have been conducted at the national or catchment level. For example, the Bank of Greece estimated the cumulative costs of climate change on the water supply sector as a percentage of GDP for various timeframes and scenarios. Having the above limitations, the Consortium at the time of the delivery of the current report could not monetarise the direct benefits and costs associated with the water resilience challenge. However, an attempt to highlight the benefits from water demand forecasting has been made in the following paragraphs.

[7] https://www.ecologic.eu/sites/default/files/publication/2018/2811-coacch-review-synthesis-updated-june-2018.pdf

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Buyers Group Benefits

Considering climate change and prospects for increased water scarcity, one might expect that increasing numbers of utilities will have to invest in forecasting activities in the near future. In other areas characterised by declining per capita water use, improved forecasting capacity is needed to avoid costly investment decision errors. In this regard, water demand forecasting offers significant monetary benefits for EU member states by enabling cost savings and efficient budgeting. Accurate predictions help avoid over-investment in infrastructure and reduce operational costs, leading to financial savings:

- Energy Costs: reduce the energy required for pumping and treatment processes.
- Maintenance Costs: reduce the frequency and cost of repairs and maintenance.
- Chemical Costs: optimize chemical use for water treatment, reducing expenditure on treatment chemicals.
- Labor Costs: Streamlined operations and reduced emergency interventions lower the need for additional labour, resulting in labour cost savings.
- Storage Costs: reduce the need for excessive storage facilities and associated costs.
- Transportation Costs: minimize the need for costly water transportation from distant sources.

Another issue arising from the inefficient water management that needs to be considered is related to drought. Drought can lead to degradation of water quality, and thus make it more difficult for drinking water utilities to treat water to meet required standards.

The benefits of drought management practices often revolve around the concept of avoided costs, which essentially refer to the savings realized by not having to produce additional units of water to meet demand. These avoided costs encompass both short-term factors, such as variable operating costs, and long-term considerations, like expanding water utility capacity. Utilizing avoided costs as a proxy for benefits in cost-benefit analyses allows stakeholders to compare the savings from drought management practices with the incremental costs of implementing such measures. For instance, if the cost of public outreach to conserve water is lower than the cost of producing additional units of water, then public outreach is deemed beneficial. Moreover, avoided costs contribute to the a three way analysis by encompassing direct costs (borne by the stakeholder), indirect costs (impacting customers, industries, and the environment), and opportunity costs (savings that can be redirected elsewhere by the utility and society).

The benefits deriving from addressing the drought impacts are organized into the following categories:
.

- Water Infrastructure Cost Savings: optimizing existing infrastructure to withstand drought conditions, reducing the need for costly repairs or upgrades during periods of water scarcity.
- Water Quality Cost Savings: mitigate challenges arising from drought more effectively, resulting in cost savings associated with water treatment and quality management.
- Water Reliability Cost Savings: minimize the need for emergency measures, reducing associated costs and ensuring reliable water supply for consumers.

Last but not least, the introduction of a solution addressing the water demand and drought challenge will yield significant non-monetary benefits, particularly concerning the health of citizens. Access to clean and reliable water sources is fundamental for maintaining public health and preventing waterborne diseases. By implementing a robust water demand forecasting system, communities can better manage water resources, ensuring consistent access to safe drinking water even during periods of drought or scarcity. This not only promotes hydration and sanitation but also reduces the risk of water-related illnesses, which can have far-reaching impacts on public health, particularly in vulnerable populations such as children and the elderly. Additionally, improved water management practices contribute to environmental sustainability, preserving ecosystems and safeguarding biodiversity, which in turn supports overall health and well-being.

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3.2 Business Case and Cost Analysis

The information gathered by the PROTECT partners through workshops, the SOTA of PROTECT, and the inputs from the market during the Open Market Consultation will all be included in the preliminary calculations to determine the benefits that the PROTECT solution will provide.

In this context, the benefits to be examined for the development of the business case are the internal ones presented in the previous section that come in the form of cost reduction from the implementation of the PROTECT solution assuming that the tool developed will have the ability of 80% accuracy in predicting wastefires. At the same times all the costs associated with the implementation of the solution will be as described above.

By considering the above, the introduction of the PROTECT solution, is expected to have a considerable impact in the daily operations of the procurer in the case of the waste fire use case, leading to monetary and non-monetary benefits.

The preliminary calculations to estimate the benefits brought by the PROTECT solutions were based on the data collected by the PROTECT partners and external stakeholders through dedicated discussions and templates, the SOTA of PROTECT and the inputs provided by the market during the Open Market Consultation.

Serving the identification of the monetary benefits, the consortium attempted to calculate the Net Present Value (NPV) for estimating the difference between the present value and the present value over a period of time for the new solution for all four challenges.

The calculations of the NPV of PROTECT allow to:

- Assess the initial investment and its profitability.
- Define the connected savings compared to an annual operational basis.

In this framework, the PROTECT Consortium calculated the net present value (NPV) of waste fire use case for a period of five (5) years. The five years that were used to calculate the net present value (NPV) were predicated on the idea that this is a reasonable amount of time for the Total Cost of Ownership (TCO) and the transaction time needed for the solution to be fully functional and a fully functional commercial product, as specified in the Terms of Reference document. It should be mentioned that each instrument's estimated depreciation cost is three to five years.

3.2.1 Flood Challenge

To conclude with the savings for year 1 to 5 , we just simply deducted the annual costs (261.000,00 €) as described in section 3.1.1. from the calculated benefits (1.495.500,00 €) leading to net annual savings of 1.234.500,00 €.

On the first year of the project, we do not foresee any benefits, only the total first year costs (1.369.000,00 €).

Based on the abovementioned information and an assumption for a discount rate around 4,5 %, the following table present the calculation of the NPV over a period of 5 years.

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Initial Investment	1.369.000,00 €
Discount Rate	4,50%
Savings (net of annual costs)	1.234.500,00 €

Net Present Value						
Year	0	1	2	3	4	5
Undiscounted Cash Flow	(1.369.000)	1.234.500,00 €	1.234.500,00 €	1.234.500,00 €	1.234.500,00 €	1.234.500,00 €
Present Value	(1.369.000)	1.181.339,71 €	1.130.468,62 €	1.081.788,16 €	1.035.203,98 €	990.625,82 €

Net Present Value	€ 4.050.426

3.2.1.1 Sensitivity Analysis

We conducted a sensitivity analysis considering the adoption of the solution by either 1 or 5 regions. Taking all factors into account, the sensitivity analysis yielded the following results, as detailed in the table below:

Impact	Baseline	Min	Max
	3 regions	1 region	5 regions
Revenue			
Internal Benefits			
Unified repository for historical data	€ 18.000	€ 6.000	€ 30.000
Fastening the FLODD Risk assessment	€ 54.000	€ 18.000	€ 90.000
Higher detail FLOOD maps	€ 45.000	€ 15.000	€ 75.000
Cutting direct costs for government	€ 75.000	€ 25.000	€ 125.000
User friendly solutions	€ 36.000	€ 12.000	€ 60.000
Efficient Risk Assessment Tools:	€ 75.000	€ 25.000	€ 125.000
Cost Efficiency in Monitoring	€ 67.500	€ 22.500	€ 112.500
External Benefits			
Economic Stability	€ 600.000	€ 200.000	€ 1.000.000
Cutting direct costs for government and local municipalities	€ 225.000	€ 75.000	€ 375.000
Infrastructure Planning	€ 300.000	€ 100.000	€ 500.000
Total	€ 1.495.500	€ 498.500	€ 2.492.500
Costs			
Personnel Total Cost			
Salaries for new team members	€ 36.000	12.000,00 €	€ 60.000
Training Costs for the new solution	€ 15.000	5.000,00 €	€ 25.000
Operating costs	€ 45.000	15.000,00 €	€ 75.000
Licenses	€ 45.000	15.000,00 €	€ 75.000
Transition costs (from old to new)	€ 108.000	36.000,00 €	€ 180.000
Equipment (Hardware/Cloud for the new solution, software)	€ 30.000	10.000,00 €	€ 50.000
Setup costs	€ 90.000	30.000,00 €	€ 150.000

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Procurement Cost (PCP WISE estimation)	€ 1.000.000	€ 1.000.000	€ 1.000.000
Total Costs (first year)	**€ 1.369.000**	**€ 1.123.000**	**€ 1.615.000**
Total Costs (next years)	**€ 261.000**	**€ 87.000**	**€ 435.000**
NPV	**€ 4.050.426**	**€ 683.475**	**€ 7.417.377**

3.2.2Infrastructure challenge

For our baseline scenario, the total cost of implementing the PROTECT solution are estimated to be 524.000 euros.

Moreover in order to calculate the benefits for implementing the PROTECT solution we consider them as the yearly savings and they amount to 3,502,801.44 euros.

The baseline case examined for the infrastructure challenge was based on the following:

1) Benefits provided by the municipality of Haarlem and shown above in Table 2.
2) Costs provided by the municipality of Haarlem and shown above in Table 3.
3) Procurement costs from the PCP which amounts to 1,000,000 euros.
4) Calculation of reduction in material decay due to weathering for the city of Haarlem which amounts to 3,334,801.44 euro per year and was calculated based on the following data:
   - The data and information's to calculate the above was taken from ''Johnson, D., See, L., Oswald, S. M., Prokop, G., & Krisztin, T. (n.d.). A cost–benefit analysis of implementing urban heat island adaptation measures in small- and medium-sized cities in Austria.''
   - We used the green city scenario which includes the addition of green roofs, trees, low vegetation, and the unsealing of impervious surfaces. There are many advantages to using green practices, such as unsealing, trees, low vegetation, and green roofs. The advantages were measured in terms of urban ecosystem services.
   - We used the city of Salzburg mentioned in the report as reference since the population is similar to the one of Haarlem
     - To determine the area that would be affected by the adoption of adaptation scenarios in Haarlem, one must consider the relative sizes of the two cities. Given that Haarlem is just about 32 square kilometres and Salzburg is approximately 65 square kilometres, we may determine the damaged area in Haarlem by dividing the two regions by their ratio. Therefore, the estimated size of areas affected by the implementation of green roofs in Haarlem would be approximately **1,344,678** square meters.
   - **Average lifespan of conventional roofs** which is 25 years and was taken from the paper.
   - **Average lifespan of green roofs** which is 50 years and was taken from the paper.
   - **Cost saving for major replacement and sealing repairs at the 25th year** which us 62 euro and was taken from the paper.
   - **Cost saving per square meter per year** which is calculated as:
     Cost saving for major replacement and sealing repairs at the 25th year /Average lifespan of conventional roofs =2.48 euros
   - **And finally the total saving per year for the reduction in material decay is calculated as:**
     Cost saving per square meter per year x area of green roofs=
     2.48 euros x 1,344,678=**3,334,801.44 euro**
5) Total benefits are 3,502,801.44 euros (benefits provided by Haarlem + saving from the reduction in material decay)
6) Total costs are 1,524,00 euros (costs provided by Haarlem + procurement costs)

Based on the abovementioned information, the following table present the calculation of the NPV over a period of 5 years.

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Costs (Procurement costs + Costs from PROTECT)	€ 1,524,000.00				
Discount Rate	4.50%				
Savings	€ 3,502,801.44				
Net Present Value					
Year	**1**	**2**	**3**	**4**	**5**
Discount Factor	0.956937799	0.915729951	0.876296604	0.838561344	0.802451047
Undiscounted Cash Flow	€ 3,502,801.44	€ 3,502,801.44	€ 3,502,801.44	€ 3,502,801.44	€ 3,502,801.44
Present Value	€ 3,351,963.10	€ 3,207,620.19	€ 3,069,493.01	€ 2,937,313.88	€ 2,810,826.68
Net Present Value	€ 13,853,216.86				

3.2.2.1 Sensitivity Analysis

We have run a sensitivity analysis to try and account for the effects of the different variables and assumptions in our calculation taking into account the following:

- The range -20% to 20% percentage in benefits due to reduction of personnel cost and material decay.
- The range of -30% to 30% percentage for the decrease in connected costs.

By considering all the above parameters, the sensitivity analysis concluded to the following results as are presented in the following table:

Scenario	Percentage change/Costs	Total costs	Percentage change/Benefits	Total benefits	NPV
Baseline scenario	0%	1,524,000.00 €	0%	3,502,801.44 €	13,853,216.86 €
Worst case	30%	1,681,000.00 €	-30%	2,451,961.01€	9,083,051.80 €
Best case	-20%	1,419,000.00 €	20%	4,203,361.00 €	17,033,051.80 €

3.2.3 Fire challenge

The baseline case examined for the waste fires was based on the following assumptions:

1) Total number of waste fires per year: 64 waste fires
    - ISEMI expert qualifiedly established that the waste fires per year were 64.
2) Based on the total data of the fires of Slovakia provided 89% of waste fires are small and 11% are large.
    - Based on data from the partners which came by "expert estimation" on the basis of the exact number of fires divided according to the number of deployed personnel:
        - small (up to 8 personnel, i.e. one technical car and one tanker) 6947.
        - large 859
    - Based on the above numbers we can see that approximately that 89% of the fires in Slovakia are small and 11% are large. Therefore, is safe to assume that the same numbers apply also for the waste fires in Slovakia.
3) The tool developed from the PROTECT solution will provide 80% accuracy in predicting wildfires, based on the pilot of the FireAId initiative from the World Economic Forum. This tool

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includes an interactive AI-powered map, which is enhancing wildfire prediction and prevention in Türkiye.

4) Cost of intervention based on numbers provided by partners
   - Cost of a Small intervention: 460€
   - Cost of a Large intervention: 41.500€

For our baseline scenario, the total cost of waste fire is estimated to be 316.720 euros This amount corresponds to the sum of the costs for a large and small intervention:

- Total cost for small intervention: 26.220€
- Total cost for large intervention: 290.500€

Moreover, to calculate the benefits for implementing the PROTECT solution we multiplied the total cost of waste fire with the 80% prediction ability that the tool will provide and we get 253.376 euros as total benefits, this number represent the total savings from the implementation of the PROTECT solution.

Based on the abovementioned information, the following table present the calculation of the NPV over a period of 5 years.

Costs (Procurement costs + Costs from PROTECT)	€ 1,175,000.00				
Discount Rate	4.5%				
Savings	€ 253,376.00				
Net Present Value					
Year	**1**	**2**	**3**	**4**	**5**
Discount Factor	0.956937799	0.915729951	0.876296604	0.838561344	0.802451047
Undiscounted Cash Flow	€ 253,376.00	€ 253,376.00	€ 253,376.00	€ 253,376.00	€ 253,376.00
Present Value	€ 242,465.07	€ 232,023.99	€ 222,032.53	€ 212,471.32	€ 203,321.84
Net Present Value	-€ 62,685.25				

Table 6 NPV (fire)

3.2.3.1 Sensitivity Analysis

We have run a sensitivity analysis to try and account for the effects of the different variables assumptions in our calculation taking into account the following:

The tool developed from the PROTECT solution will provide 65%-95% range accuracy in predicting wastefires with 65% being for the worst case and 95% for the best case scenario.

By considering all the above parameters, the sensitivity analysis concluded to the following results as are presented in the following table:

Scenario	Total cost of wastefire	Accuracy in predicting wild fires	Savings due to Protect	NPV
Baseline scenario	**316,720.00 €**	**80%**	**253,376.00 €**	**- 62,685.25 €**
Worst case	**316,720.00 €**	**65%**	**205,868.00 €**	**- 271,244.27 €**
Best case	**316,720.00 €**	**95%**	**300,884.00 €**	**145,873.76 €**

Table 7 Sensitivity analysis (fire)

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3.3 Risks

It's exciting to take on a new project or investment opportunity. It is imperative to acknowledge that all projects inherently carry risks that may present substantial obstacles during the project's duration. If these investment risks are not recognised and taken proactive measures to manage them, they could cause schedule delays, budget overruns, and jeopardise the project's overall success. For a project to be executed more smoothly and robustly, it is essential to recognise and address these risks early on. Within the framework of the business case development and the evaluation of investment opportunities, a comprehensive risk assessment has been conducted in this instance.

The risks that are anticipated, along with their likelihood and impact, are compiled in the table below.

Foreseen risks	Impact	Likelihood of occurance
The solution not being user friendly- End user do not adopt the solution	High	Medium
Delays will conclude on the end solution not to be relevant	Medium	Medium
Contractors not able to deliver the technical solution	High	Medium
Solution system difficult to combine with existing system(s)	High	Medium
Solution for scenario calculation is not user-friendly	High	Medium
Impossibility to manufacturing the solution due to IPR barriers.	Medium	Low
Resistance to change	High	Medium
Overestimation of Solution Capabilities.	Medium	Medium
Resource constraints, e.g. staffing shortages	Low	Medium
Impossibility to manufacturing the solution due to IPR barriers.	Medium	Low
Resistance to change	Medium to High	High
Underutilization of the Solution	Medium to High	Medium

4 Conclusions

The PROTECT Consortium developed a baseline scenario using the expertise knowledge of partners and relevant literature to calculate potential benefits. This assessment considered the current methods and equipment used by the stakeholders for the execution of their daily operations as depicted in the four challenges, as well as related manpower, hours, number of small and large scale extremes, and other associated costs.

The partners estimated the PROTECT solution's performance in terms of cost reductions and revenue increases. Operational and personnel costs related to daily operations were analysed to project how these efficiencies could reduce current losses.

In this regard, the consortium anticipates :

- Flood challenge : The business case appears to be profitable for the implementation of the PROTECT solution. Our analysis indicates significant potential savings and positive impacts,

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especially when adopted by large regions such as Lombardy, Emilia-Romagna, or Tuscany. Over a 10-year period, the primary benefits include reduced costs for municipalities and local public bodies, enhanced flood protection for civil society and economic sectors, and improved public safety. With multiple regions expected to adopt the service, the collaborative effort will further amplify these benefits, making the investment advantageous for all stakeholders involved.

- Infrastructure Challenge: For this challenge also the business case is profitable for the implementation of the PROTECT solution Based on the sensitivity analysis results, it can be concluded that the monetized benefits have a significant positive impact on the NPV. This is further evidenced by the fact that the NPV is positive across all three scenarios, indicating that the investment is viable for potential buyers. But is important to note that the main component of this challenge which is the heat island effect is also connected with the other 3 challenges that we are trying to address in the context of PROTECT. Therefore, a procurer that is aiming to produce a business case to address the challenge needs to take into account the impact and benefits from the other challenges as well.
- Fire Challenge : Based on the sensitivity analysis results and the fact that the NPV is only slightly negative in the baseline scenario—a figure that is not significant relative to the overall investment—indicates that the investment can be viable for all potential buyers. This can be seen also in the best-case scenario, where an increase in the prediction accuracy of the tool a very positive impact on the investment's viability a scenario which is very likely since the PROTECT solution can built upon actual tested solutions that are on the market which have already achieved 80% accuracy. Nevertheless, we recommend that the developed solutions has at least 85% percent accuracy in order to ensure the viability of the project.

These estimates indicated a positive Net Present Value (NPV) in all three challenges, suggesting that the investment is profitable for the PROTECT public buyers. A worst-case scenario was also examined, outlining conditions where the investment might not be profitable. Given the number of assumptions made during the preparatory phase, it is recommended that buyers re-evaluate these initial results with more detailed Use Cases before the implementaiton of the PCP taking into accoun the value of statistical life.

Lastly, due to the complexities involved, conducting a detailed calculation for the water challenge is considered difficult at this stage of the project. However, we have summarized the effectiveness in terms of savings and impacts associated with implementing a water demand forecasting solution. This summary provides a foundational basis for future cost-benefit analyses. This preliminary analysis highlights the potential for significant operational cost savings, improved resource management, and enhanced preparedness for water-related crises, underscoring the value and importance of continuing to develop and refine water demand forecasting capabilities.

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D3.2 Orientation paper

Procurement strategy to implement Pre-Commercial Procurement and Public Procurement of Innovative solutions

Lead beneficiary: CPS

Dissemination level: Public

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Project acronym	PROTECT
Project title	Preparing a Pre-Commercial Procurement for end-user services based on Environmental Observation to adapt and mitigate climate change
Thematic priority	HORIZON-CL6-2021-GOVERNANCE-01
Type of action	PU - Public
Deliverable number and title	D3.2
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Deliverable responsible partner	Corvers Procurement Services B.V. (CPS)
Version	V1
Status	Final
Author(s) name(s)	Analucia Jaramillo (CORVERS), Beatriz Gómez Fariñas (CORVERS), Katerina Nikolaidou (CORVERS); Maria Kampa (CORVERS GREECE), Maria Niatsudi (CORVERS GREECE)
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Reviewer(s)	Valentina Schippers-Opejko (HAA)
Document type	R – Report
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Disclaimer

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0.2	29-02-2024	Ana Lucia Jaramillo (CORVERS)	Draft version update
0.3	25-04-2024	Ana Lucia Jaramillo (CORVERS)	Pre-final version for review
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0.6	28-05-2024	Valentina Schippers-Opejko (HAA)	Peer review
1.0	29-05-2024	Melissa Campagno (GAC)	Final quality review

Project abstract

PROTECT aims at levering innovation procurement to unlock the climate service (CS) market's potential to support urgent climate adaptation and mitigation. The project will allow public and private organisations to build up and integrate their knowledge and skills about climate change, environmental observation (EO) and innovation procurement, notably enabling public authorities to shift to a proactive governance model, using innovative public procurement approaches to increase value and climate impact for money. It shall increase access of CS SME providers across Europe to public procurement markets and shape solutions that best address public demand, both specific and systemic. The initial focus will be on five encompassing application domains (Utilities, Green cities, Health, Land use & Marine environment, Security) and their contributions to the areas of sustainability in Horizon Europe's Cluster 6. The project will source and assess existing and high-potential CS solutions and technologies that use EO data. It will engage with an extensive and varied community of procurers, inform the definition and aggregation of their needs and functional requirements for CS, explaining, fostering and supporting a 'buying with impact' approach. Clearer, less fragmented demand shall guide and support R&D for future CS. PROTECT will prepare the operational ground for one or more joint, cross-border or coordinated pre-commercial procurement (PCP) processes and identify short-term actions so that Public Procurement of Innovative Solutions (PPI) can be activated towards or right after the project's end. At policy level, it will provide decision-makers for procurement, climate and policy, at EU, national, regional and local levels, with practical recommendations and guidelines to boost the use of innovation procurement for climate action.

Keywords

State-of-the-art (SOTA) analysis, Technology Readiness Levels (TRL), procurement strategy

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Abbreviations and Acronyms

AI	Artificial Intelligence
AKIS	Agricultural Knowledge and Innovation Systems
API	Application Programming Interface
CAN	Contract Award Notice
CN	Contract Notice
COTS	Commercial Off-The-Shelf
CS	Climate Services
EAFIP	European Assistance For Innovation Procurement
EO	Earth Observation
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FRAND	Fair, Reasonable and Non-Discriminatory
GEOSS	Global Earth Observation System of Systems
GDPR	General Data Protection Regulation
GHG	Greenhouse Gas
GPA	Agreement on Government Procurement
GUI	Graphical User Interface
HAA	City of Haarlem
HE	Horizon Europe
IPRs	Intellectual Property Rights
IWRM	Integrated water resource management
NBS	Nature Based Solutions
NDA	Non-Disclosure Agreement
OMC	Open Market Consultation
PBG	Public Buyers Group
PC	Project Coordinator

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PCP	Pre-Commercial Procurement
PIN	Prior Information Notice
R&D	Research and Development
SMEs	Small and Medium Enterprises
SOTA	State Of The Art
TCO	Total Cost of Ownership
TED	Tenders Electronic Daily
TRL	Technology Readiness Level
SWVA	Soil Water Vegetation Atmosphere System
WTO	World Trade Organization

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Executive Summary

This orientation paper recommends the implementation of Pre-Commercial Procurement (PCP) and Public Procurement of Innovative Solutions (PPI) regarding four identified challenges with a higher climate and procurement impact selected in the framework of the PROTECT project. The PCP and/or PPI approach is justified in each case based on the information obtained as a result of the activities carried out during the preparatory phase of innovation procurement projects following the European Assistance For Innovation Procurement initiative's methodology.[1]

The identification and selection of procurement challenges and the definition of the procurement approach relates to the outcome of the five main steps in the preparatory phase described in this orientation paper: (1) needs identification and assessment; (2) state-of-the-art (SOTA) analysis; (3) open market consultation (OMC); (4) business case development; and (5) procurement strategy design.

The first orientation paper recommended PCP as the main procurement instrument to tackle the following four procurement challenges, as the functional requirements cannot be achieved by one existing solution and thus R&D is required:

- **FLOODS CHALLENGE:** Rapid-mapping, predicting, preventing different types of floods and improving coordination efforts, relevant to marine and coastal environments, sustainable cities and civil protection and security agencies
- **FIRES CHALLENGE:** Predicting, preventing fires, tracking and tracing causality (causers) in different scenarios (waste, forest/nature, other), relevant to environmental agencies, sustainable cities, agriculture, forestry and land use, as well as for civil protection and security agencies.
- **WATER CHALLENGE:** Climate resilient solutions for predicting, connecting data, planning, supply-demand, relevant to the application domains marine and coastal environments, energy and utilities, sustainable cities, agriculture, forestry and land use, as well as for civil protection and security agencies.
- **INFRASTRUCTURE CHALLENGE:** Sustainable & resilient re-development, buildings restoring & adaptation), relevant to sustainable cities, energy and utilities and civil protection and security agencies.

The scope of the abovementioned four (4) challenges and use cases was reassessed based on the OMCs' results and the discussions held with public buyers committed to implement a PCP. The result was the selection of **one overarching Water (management) challenge clustering different use cases. The aim is an integral assessment of day-to-day Soil Water Vegetation Atmosphere System (SWVA) conditions with space-based value chains based on local/central knowledge (Artificial Intelligence, Earth Observation-Inversion/hydrological modelling, etc.)** to provide a first basis of local water intelligence for the use case stakeholders. Driven by the functions required by the organisations the data on SWVA conditions can support regular or crisis management processes (e.g. risk indicators) in different application domains. As such, the testing and validation strategy requires the support of technical organisations that will support the PCP implementation. Since the work of these organisations falls outside the scope of PROTECT CSA, the methodology, technical criteria and test planning will be part of the follow up PCP.

Based on the developments mentioned above, this paper details the procurement strategy for a PCP considering the requirements of the relevant Horizon Europe on PCP action.[2] The strategy includes an

[1] See the European Assistance for Innovation Procurement (EAFIP www.eafip.eu).

[2] "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation" call is for a consortium of public procurers (the "buyers group") to prepare, launch and implement a pre-commercial procurement procedure that responds to a commonly identified challenge in the area of climate adaptation and mitigation. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf#page=555

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updated setup for the PCP phased approach, the number of suppliers per phase, the budget allocated by supplier per phase, and the duration of each phase.

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1. Introduction

The orientation paper prioritises recommendations for the procurement challenges with a higher climate and procurement impact and indicates whether a PCP or a PPI is the best procurement approach to address the four identified procurement challenges based on the TRLs assessed in Task 1.3 - Sourcing CS technologies and providers, and finetuned in Task 3.2 -.SOTA analysis. PROTECT aims to prepare a PCP, but the possibility of a PPI approach has also been considered.

In this orientation paper, the possible use of PCP and/or PPI approaches are justified based on the information obtained as a result of the activities carried out during the preparatory phase of an innovation procurement project following the EAFIP methodology.[3] There are five main steps in the preparatory phase, namely: (1) needs identification and assessment; (2) state-of-the-art (SOTA) analysis; (3) open market consultation; (4) business case development; (5) procurement strategy design.

For this purpose, the orientation paper presents in section 2 the methodology applied for the identification and selection of four procurement challenges and the outcomes of the abovementioned preparatory steps.

Section 3 provides a description of use cases in each of the four challenges, stating the current situation and the desired future functionalities, as well as the general findings of a preliminary patents and standards search.

Section 4 describes the Water (management) challenge as result of further scoping the needs with public buyers. The scope and methodology to select use cases is explained.

Section 5 provides the main considerations for the selection of a PCP and/or PPI approach.

Section 6 focuses on the requirements of the PCP approach and updated procurement strategy of a future PCP of Water management innovations considering the specific requirements of the HE PCP call on the “Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation”.[4]

Finally, section 7 provides main conclusions and recommendations.

Additionally, the annexes include a diagram of the Water (management) challenge, previous information on the four challenges related to Floods, Fires, Water and Sustainable and resilient infrastructure, the summary of the results of the e-pitching sessions, the summary of the Commercial Off The Shelf (COTS) search, and an overview of the procedures that could be used under the PPI approach.

This orientation paper has been updated with information obtained at the completion of the tasks related to the SOTA analysis, the Business case development and the fine-tuning of the procurement strategy based on the work performed with the commitment public buyers in preparation of the PCP-WISE proposal based on the outcomes of the PROTECT project.

[3] See the European Assistance for Innovation Procurement (EAFIP www.eafip.eu).
[4] The €19 million pre-commercial procurement call is fully funded by the EU. The goal of the “Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation” call is for a consortium of public procurers (the “buyers group”) to prepare, launch and implement a pre-commercial procurement procedure that responds to a commonly identified challenge in the area of climate adaptation and mitigation. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf#page=555

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2. Methodology

One of the objectives of the PROTECT project is to identify public buyers' common pressing challenges and unmet needs, and to define if the functional requirements can be tackled by existing solutions, by innovative solutions closer to the market, or whether R&D is needed to develop and test prototypes.

If the solutions are available in the market, a traditional procurement procedure may be conducted. In case the challenge requires a solution which is near to the market or already on the market in small quantity but does not meet public sector requirements for large scale deployment yet, the PPI approach may be applied by using one of the procurement procedures established in the EU public procurement directives.[5] When there are no solutions in the market to satisfy the unmet need and there is a significant gap which requires that the public buyer steers the development of solutions to satisfy its needs and gathers knowledge about pros/cons of alternative solutions from different providers, the PCP approach can be applied to create a competitive supply base.

To identify the common pressing challenges and unmet needs, the methodology applied in the context of the PROTECT project consisted of a value engineering approach, consultations and workshops with public buyers, and the selection of 4 procurement challenges based on six criteria (Table 1). To recommend the most suitable procurement strategy (traditional procurement, PCP or PPI) based on the technology readiness of potential solutions to address each challenge, the preparatory steps of the EAFIP methodology have been followed, as explained in the following sections.

The value engineering approach consists of 3 stages: (i) Pre-study (including surveys and desk research); (ii) Workshops (pain point workshops and consultations); and (iii) Post-study (analysis and recommendations for the implementation of innovation procurement approaches). Value techniques[6] where used to describe the scope of problems, use cases, functional requirements, the present state and the desired (wished) future situation during the first five pain point workshops, one per application domain: (1) Marine and Coastal environment, (2) Sustainable Urban Communities, (3) Civil Security and Protection, (4) Energy and Utilities, and (5) Agriculture, Forestry and other Land Use.

Further analysis was conducted to select those challenges with high impact in more than one application domain and with cross-border relevance, which revealed after the preliminary analysis on the patents and standards that there is room for innovation beyond the state state-of-the- art given the specific functional requirements. The analysis led to the selection of 4 procurement challenges across application domains and relevant to different public buyers from different EU Member States, which were communicated through the Open Market Consultation (OMC) to receive feedback from the market. The results of the OMC and the following steps are also described in the sections below.

After the submission of D3.1 Orientation Paper, the work with public buyers was resumed with the purpose to scoping the R&D needs and use cases based on the insights obtained from the previous steps and the commitment to prepare a proposal for the HE PCP call. Based on the work of public buyers, it was deemed necessary to define one overarching challenge that could cluster several use cases relevant to crises management. In this sense, the Water (management) challenge was selected based on the rationale that water intelligent solutions and related EO data are crucial to provide climate services linked to the challenges of floods, fires and sustainable and resilient infrastructure as explained in section 4.

[5] Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC and Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC.

[6] See report ANNEX VIII Common needs in five domains using value methodologies (T1.5) in D2.1 Cross-cutting analysis of drivers of the demand for climate services and barriers.

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2.1. Needs assessment and prioritisation

With the purpose of identifying, assessing, and prioritising needs in the context of the PROTECT project, two sets of pain point workshops were carried out in March and September 2023. First, five workshops (one per application domain) took place on 28th and 29th of March of 2023. The second set of four workshops took place on 18th and 19th of September and focused on four challenges selected out of the seven challenges initially identified (five from the workshops, one per each application domain, and two additional proposed from consultations with public buyers). During the more in-depth workshops tackling each of the four challenges, relevant information was provided regarding the SOTA analysis and the OMC.

As a result of the first five workshops, five challenges and related keywords for the IPR search were identified. The outcome consisted of a description of the problem and functional requirements, a use case stating the 'as is' present situation and the 'wish' optimal future situation that could be achieved with innovative solutions. In addition, a value pilot and keywords were preliminarily defined. The identified challenges in the five application domains expressed as functional requirements were:

- **Marine and Coastal environment**: Rapid and reliable mapping of flooded areas for planning, preventing, predicting and post-event intervention and cooperation.
- **Sustainable Urban Communities:** Thermal monitoring and predicting waste fire to avoid spontaneous ignition in waste storages and air pollution, using automated notification of risk of fire based on the modelling of certain conditions (like the level of humidity, air temperature, height of the pile of waste, etc.).
- **Civil Security and Protection:** Identifying illegal dumping of waste in water and sending automated alerts to law enforcement agencies to prevent the flow of waste causing cross-border damages, and producing standardised reports that can serve as proof of responsibility in (criminal) judicial proceedings.
- **Energy and Utilities:** Predicting the demand for sweet water from different users aimed at connecting the supply and demand of water for diverse uses (such as farming) in the water value chain to tackle periods of drought.
- **Agriculture, Forestry and other Land Use:** Detecting climate vulnerability in the face of challenges like salinity affecting reproductivity of vegetation, through automated analysis that supports the decision of experts in preparing resilience plans.

Following the first set of pain point workshops, a series of consultations with public buyers took place, identifying two additional challenges: (1) Building and restoring resilient cities infrastructure, and (2) Predicting peak traffic times & CO2 emissions by types of transportation. These two challenges and the five challenges identified in the pain point workshops were defined as seven challenges with potential impact across application domains.

From the seven challenges, four were selected for the in-depth second set of pain point workshops. The methodology to determine the four challenges was based on 6 criteria: (1) commitment to lead a buyers group; (2) interest of public buyers; (3) genuine need to solve a problem as part of the strategic plan of an organisation; (4) expected impact of EO and CS on several sectors; (5) technology readiness level (TRL) (if COTS are available or there is enough room for innovation to conduct a PCP); and (6) EU wide network, interregional cooperation and cross-border interest.

The assessment of criteria (1), (2), (3) and (6) was based on the feedback from interested public buyers (through EU Survey questionnaires and consultations). For the assessment of the impact criterion (4), several elements were taken into account, such as the European level impact, expected replicability of the solution for other public buyers/regions, impact on sustainability and climate linked to primary needs (air, water, food, shelter), safety and security, the prevention of risks, and the impact on several users and sectors. The TRL of potential solutions criterion (5) was based on the preliminary results of the

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SOTA analysis consisting of the patents and standards search using keywords on the intelligent IPlytics platform[7], the e-pitching results and the assessment of COTS.[8]

The four selected challenges and the related functional requirements were analysed more in depth during the second set of four pain point workshops, one per challenge:

- **FLOODS CHALLENGE:** Rapid-mapping, predicting, preventing different types of floods and improving coordination efforts, relevant to marine and coastal environments, sustainable cities and civil protection and security agencies
- **FIRES CHALLENGE:** Predicting, preventing fires, tracking and tracing causality (causers) in different scenarios (waste, forest/nature, other), relevant to environmental agencies, sustainable cities, agriculture, forestry and land use, as well as for civil protection and security agencies.
- **WATER CHALLENGE:** Climate resilient solutions for predicting, connecting data, planning, supply-demand, relevant to the application domains marine and coastal environments, energy and utilities, sustainable cities, agriculture, forestry and land use, as well as for civil protection and security agencies.
- **INFRASTRUCTURE CHALLENGE:** Sustainable & resilient re-development, restoring & adaptation of existing neighbourhood's, including buildings, bridges, roads etc, relevant to sustainable cities, energy and utilities and civil protection and security agencies.

These challenges were reassessed by public buyers and user stakeholders to define the concrete R&D scope of a future PCP. The Water challenge was selected and further scoped as the need of water intelligence for the **integral assessment of day-to-day SWVA conditions with space-based value chains based on local/central knowledge (AI, EO-Inversion/hydrological modelling, etc.)**. The data on SWVA conditions can support regular or crisis management processes (e.g. risk indicators) related to floods, fires and resilient infrastructure in different application domains

The definition of the challenges was the first step of the preparatory phase in the application of the EAFIP methodology (Figure 1), followed by the SOTA analysis, the OMC, the business case development and the design of the procurement strategy choosing for a PCP or PPI approach based on the TRL of the potential solutions.

[7] https://platform.iplytics.com
[8] See the OMC Report. http://www.protect-pcp.eu/wp-content/uploads/2023/11/PROTECT-OMC_Report_2023_FINAL2_27-11-2023.pdf

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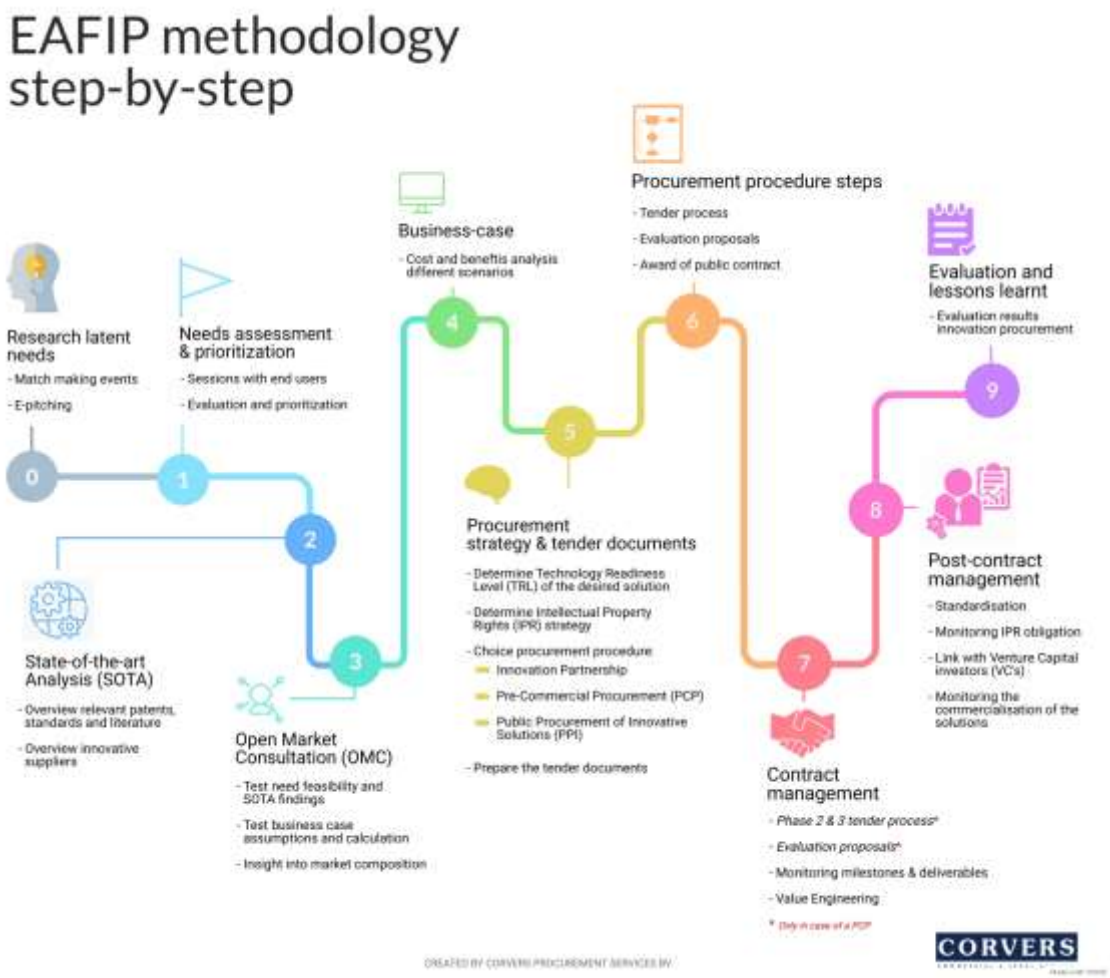

Figure 1: The steps of an Innovation Procurement project based on the EAFIP methodology

For the actual implementation of the PCP based on the concrete R&D scope of water intelligence, additional preparatory work will be required in cooperation with the committed public buyers, users stakeholder group and supporting technical organisations. Together, they will select the final use cases and design the testing and validation plan as explained in section 6.

2.2. SOTA analysis

The main goal of the SOTA analysis is to identify if there is enough room for innovation to set the grounds for a future PCP. The SOTA analysis consists of three activities:

(i) Analysing the Intellectual Property Rights (IPR), listing the existing patents and standards;

(ii) Mapping of the Commercial-Off-The-Shelf (COTS) products; and

(iii) Assessing the material collected, translating this into a list of technologies and assessing the TRL level of these technologies.

The preliminary results of the SOTA analysis are based on the IPR and standards search using selected keywords on the IPlytics intelligent platform (https://www.iplytics.com/), the e-Pitching sessions conducted on 18th and 19th September (see Annex 2) and the COTS mapping (see Annex 3).

During the mapping of the EO-based climate services at EU level performed in the frame of PROTECT, suppliers were able to provide more details regarding the technology used to provide their services. This

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information, combined with a desk research, concluded that the providers' most used COTS products are open data platforms such as Copernicus.

In addition, the initial results showed that there is research going on in fields related to the 4 challenges and solutions tackling some but not all of the functionalities defined under each of the challenges.

The analysis of the standards and COTS has not revealed any relevant standards for the four challenges. Regarding the COTS, the initial search indicated that a number of products are available in the market but they can only partially address the gaps and needs of the procurers. Therefore, the preliminary conclusion is that there are grounds for a PCP in any of the 4 challenges (Floods, Fire, Water and Infrastructure).

In the context of PROTECT, an analysis of mapped climate services used the following TRLs.

TRL	Definition
1	Preliminary algorithmic stage. Publication of research results.
2	Individual algorithms or functions are prototyped.
3	Prototype of the main functionalities of the integrated system.
4	Alpha version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software development life-cycle; that implements the main functionality of the software and by which preliminary verification and validation activities are archived.
5	Beta version. Preliminary release of non-mature software version; distributed to a community at an early stage of the software life-cycle, that implements the complete functionality of the software and by which preliminary verification and validation activities are archived.
6	Ready for use in an operational or production context, including user support, as a building block or a tool.
7	Demonstrator. Building block and tailored generic software product qualified for a particular purpose.
8	System qualified and ready to be applied in an operational environment.
9	Has been applied in the execution of an operational environment

Table 1: Technology readiness levels (TRLs) applied to the assessment of mapped Climate Services

2.3. Open Market Consultation results

A Prior Information Notice (PIN)[9] published in Tenders Electronic Daily (TED) announced the OMC on potential future procurement activity. The rules and objectives of the PROTECT OMC, as well as the challenges, the potential public buyers and the PCP approach, were described in the OMC Document and its annexes. The OMC was performed under the law of one of the potential lead procurers, City of Haarlem, which is Dutch law.

Through the OMC, the Public Buyers Group (PBG) organized under the PROTECT project communicated the needs related to the four challenges and informed market operators about the

[9] https://ted.europa.eu/udl?uri=TED:NOTICE:574857-2023:TEXT:EN:HTML&src=0

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upcoming PCP of R&D services for the "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation".[10] During the OMC, it was explained that the preparation of a PCP proposal would respond to commonly identified challenges (by a group of 20 potential public buyers) in the area of climate adaptation and mitigation that can be better addressed jointly.

The OMC also aimed to understand the market operators' capabilities to satisfy the PBG's needs and to obtain their input on the viability of the procurement plans and conditions described in OMC document and annexes.

In sum, the objectives of the OMC were to:

1. Validate the findings of the SOTA analysis and the viability of the set of technical and financial provisions.
2. Raise awareness of the industry and relevant stakeholders (including other users) regarding the upcoming PCP.
3. Collect insights from the industry and relevant stakeholders (including users) to finetune the tender specifications.

The target groups of the OMC were users (including other public buyers with similar unmet needs) and technology vendors. All interested parties were invited to take part in the OMC. However, it was clarified that the participation in the future PCP may be restricted to companies from EU and Associated Countries and that the 100% of R&D services would be required to be performed in the EU or Associated Countries.

The participation in the OMC was voluntary and non-binding and was at the own expense and risk of market operators. A market operator could not charge the PBG any costs for participation in the OMC or for (re) use of its information in the context of a future procurement procedure. It was also clarified that the participation in the OMC is not a condition for submitting a tender in the subsequent procurement, does not lead to any rights or privileges for the participants, and is not part of any pre-qualification or selection process. Neither the provided input in the OMC could be used to evaluate future proposals.

The OMC activities consisted of:

- **Four webinars** that took place on 15th and 16th November 2023. The webinars were carried out in English and broadcasted online. The recordings of the webinars are published on the PROTECT website, with the aim to enlarge the audience.
- **A request for information** in the form of an EU Survey questionnaire which was filled out by 18 respondents.
- **Other activities and questionnaires** as deemed necessary within the scope of the project, including a publication of a **Q&A document**.

Based on the feedback provided in the EU Survey questionnaire, the majority of respondents belonged to start-ups and SMEs, as indicated in the figure below.

[10] "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation".https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf#page=555

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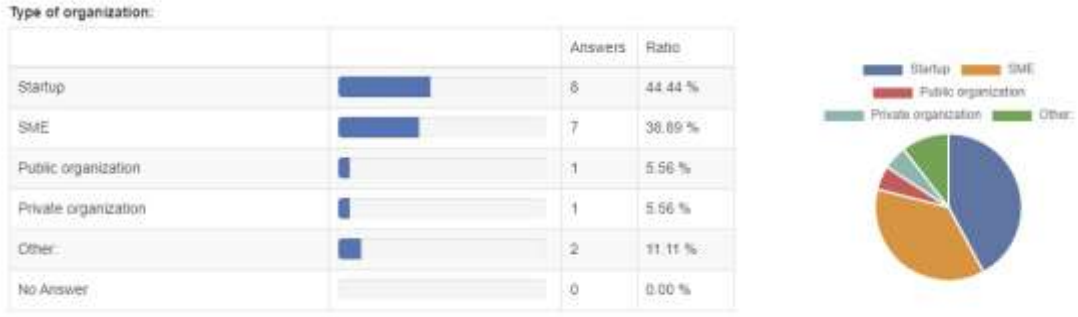

Type of organization:

		Answers	Ratio
Startup		8	44.44 %
SME		7	38.89 %
Public organization		1	5.56 %
Private organization		1	5.56 %
Other:		2	11.11 %
No Answer		0	0.00 %

Figure 2: Type of organisations who replied to the Request for Information using the EU Survey tool

The participants who replied to the EU Survey questionnaire were from organisations in France, Germany, Greece, Luxembourg, Italy, Spain, the Netherlands and United Kingdom.

According to the respondents of the Request for Information, the four challenges can be tackled including:

- Irrigation control and weather forecast services.
- A methodology to assess flood risk based on past events, satellite radar data and digital elevation models (DEMs).
- A range of services for water management in a platform combining 3 services: (1) monitoring irrigated and non-irrigated plots and characterizing irrigation practices; (2) mapping water bodies and monitoring water availability, and (3) monitoring water quality (turbidity, chlorophyll-a concentration, etc.).
- Measuring atmosphere gases (GHG), both measure the carbon release in case of fire, and provide inputs during the fire about the atmosphere and, thus evolution of the fire (providing data and analysis about atmosphere gases during and after the fire).
- Cybernetic data collecting devices are in the state of levitation for hours.
- Measures to fight against environmental and public health damages and climate change using remote sensing span from visible to microwave electromagnetic spectrum.
- For the **FIRE challenge,** specific expertise can be useful to detect littering and illegal dumping and to assess the environmental risk and the climatic conditions that increase the likelihood of fire outbreaks.
- For the **Water resilience challenge,** the combination of different observations will be key to developing advanced KPIs that attempt to correlate information on drought, weather, water consumption, water pollution, crop type and cycles etc.
- Services for resilient cities (wildfire, extreme heat, flooding, droughts) and Blue-Green Infrastructure (location, health, risk) and overlay these to help mitigate risks (especially related to climate risks).
- Use of hyperspectral data with high spectral resolution allowing to locate water sources (classification) and study the water composition. This type of data is openly or privately accessible via several providers.
- Because climate change will pose a challenge for the water supply and management, there are currently different initiatives, methods and approaches used to plan and manage the activities in this area, but there is a lack of connection between them. The tools, methods, norms, etc. of application in areas such as basin management, distribution networks, water infrastructure (dams, reservoirs, etc.), agriculture, etc. are completely different and it is not possible to

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implement an overarching management system. Despite the fact that nexus between water, agriculture and other sectors are of high relevance in the scientific literature, it is proposed to develop: (1) Methods for identifying the probability of occurrence (both in the current and future climate) of drought, episodes of high water flow and other situations that may pose a risk for water management; (2) Systems and methods for processing observation data from local stations, gauges, earth observation, etc.; (3) Methods for identifying risk level considering climate trends and projections in conjunction with socioeconomic trends (land use changes, demands, etc.); (4) Early warning- detection and prediction systems; (5) Basin and water management systems (considering status, monitoring & forecast –estimated progression) allowing to manage water resources in the face of droughts, high river flow events, scarcity, etc.; (6) Maps & graphical representation of water information derived from observational data and integrated digital twins (simulating hydro-climatology, basin, network, infrastructure and all components of the water cycle).

- Meso modelling of Urban Heat Island and Micro Modelling of Thermal Comfort. For policy makers and urban designer to make decision for more adapted cities and public places and to assess the effectiveness of climate adaptation measures and applied adaptations.
- Micro modelling of flooding to assess effectiveness of climate adaptation measures and applied adaptations. Combination of both variables to facilitate decision making process mainstreaming.
- There are solutions developed to track coastline resilience, and other blue-economy related challenges.
- Use of satellite imagery, raster maps, and servers to facilitate structured management and analysis of Big Geo Data. Tapping into existing data services on public data, without compromising data.
- Monitoring GHG emissions from energy infrastructure (power plants, gas pipelines).,
- Customisation/development of existing platforms for Flood Mapping at high resolution and mitigation measures assessment.

Providers indicated as possible contribution to EO outcomes the following:

- Irrigation control and weather forecast.
- Services based on satellite imagery and Earth observation technologies.
- Earth observation capabilities and AI to solve environmental problems. Earth Observation, and in particular satellite imagery, is the only means to regularly classify events of interest at scale, with high accuracy and cost-effectively. AI is key to automating classification at scale in very large volumes of data acquired during observation. Over the past decade, both fields have benefited from synergetic effects and their combined use is triggering the environment moment, a moment when we have the necessary tools to measure anthropogenic environmental impacts and inform decision making and policy. Our expertise is threefold: Remote sensing processing, advanced AI technologies and environment.
- Deploying a solution for water resilience (water pollution and water management) which are applications related to EO.
- A predictable demand for fresh water. This will be allowed through tools and systems that will take in consideration the regulatory landscape and policies (flood, biodiversity, water quality, etc.) providing a cohesive framework for water management. The system will be capable of effectively handling stress situations (both in the long-term/planning and in the short-term/operational timescales) through data-driven decision-making and interventions, allowing simulation of activities such as changes in the reservoir management policies, new infrastructure for water storage, supply and consumption, water saving measures, etc. connecting the supply and demand sides for sweet water**.**

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- Water quality requirements for different purposes (industrial, biodiversity, bath, etc.). A comprehensive understanding of the consequences and a combined approach to relevant data within the entire water cycle chain will be achieved and facilitated by policy guidance, user engagement, surveys, etc.
- Assessment of the evolution of the LST (in cities) using images to evaluate the effectiveness of climate adaptation measures.
- Access and analytics in space and time, through a huge spectrum of 3rd party clients, without programming.
- Focus on mitigation of GHG emissions using EO data.
- Platform aligned with the expected outcomes of the call by leveraging Earth Observation data (including Copernicus program), to enhance flood preparedness and response. With a worldwide the service, at high-resolution, exploiting satellite and geospatial data with AI, to provide accurate flood risk intelligence and scenario analysis, fostering mitigation and climate adaptation strategies adoption. This can contribute to reducing demand fragmentation as it addresses common needs across regions. Furthermore, the platform has scalability, capability to ingest local user data when available, and a flexible business model (Software As a Service or Data As a Service) to foster market uptake of climate solutions, encouraging investments in mitigation/adaptation measures, economic growth and climate resilience.

Providers pointed out the room for innovation in the following specific areas:

- Exploring the relationship between floods and ecosystems.
- The state-of-the-art algorithms. Earth observation algorithms are not yet able to distinguish between different types of waste. And to the best of our knowledge there is no model that combines external data and satellite imagery to detect anomalies in waste facilities that could trigger fire.
- The combination of all the data that is currently available and developing solutions in this way so that the information is made accessible.
- Despite the availability of various software and infrastructure tools to study drought probability, risk level, water management, etc., no application is proposed to study the level of water pollution and the impact of human activities (industry, agriculture, etc.) near water sources.
- Some topics for development beyond state of the art are (1) Common methodologies, terminologies, metadata, etc. for all the agents and activities involved in water cycle; (2) Overarching systems that integrate the monitoring and modelling of all the subsystems of the water cycle (climatology, hydrology, water storage and distribution, water consumption, sanitation, etc.); (3) Inclusion of different timescales: most of the tools already existing operate in the short-term scale, but the inclusion of forecast and projections in the seasonal, annual, decadal and multidecadal scales can bring benefits for planning and managing; and (4) Consideration of the water-soil-other activities nexus.
- The potential inferences of LST to Air Temperature. Developing monitoring and effectiveness assessment model though the analysis of evolution of the LST (in cities) using the Landsat 8 and 9 images.
- Safe AI integration, location-transparent federation, automatic data fusion across data archives, and more are needed to maximise EO exploitation.
- It was emphasised that while the current market offers a mix of commercial and free solutions for medium-resolution flood mapping and weather forecasting, a specific solution sets itself apart by delivering a unified global coverage and cloud-based platform that not only meets already part of the FLOODS CHALLENGE needs but goes above and beyond. It provides high-detail flood maps, interoperable with every GIS software, leverages on fast flood algorithms, enable interaction for mitigation measures effects testing (“”what if””) and does not require highly

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skilled professionals to be run. Acknowledging the gaps, the solution can undergo further development to fulfil all the requested innovation needs.

Providers proposed the following developments:

- Prescription maps.
- Merging flood analysis with agricultural and forestry monitoring applications.
- Other tools to complete a range of long-term water management solutions.
- Models of gas dispersion, inverse modelling to define the original source LTA UAVs.
- A model that integrates multiple observations from multiple instruments. One of the difficulties is the spatial and temporal registration. The others concern the constitution of dataset sufficient to make the model learn. Self-supervised learning and semi-supervised learning methods will be leveraged to reduce the need of label.
- Combining different data sources together, looking further into the use of AI.
- Tools for analysing the composition of water sources & rivers and studying areas of activity near water sources (agricultural zones using chemicals (pesticides, herbicides, etc.); industries, air pollution (impacting rainfall) will add value for the water resilience plan.
- Some actions including: (1) The analysis of the legal framework, responsible public authorities and other relevant agents, tools, methodologies, etc. in each of the subcomponents of the water cycle; (2) The development of new observational methods for water cycle management; (3) The generation of overarching digital twins, simulating weather/climate, hydrology, water infrastructure, distribution and sanitation networks, demand (e.g. agriculture, tourism, etc.); (4) The development of simulation framework (including both physical and data-driven methodologies such as artificial intelligence) for evaluating the effectiveness of actions and measures to optimize the water cycle components, allowing to make actionable decisions in the short, medium and long term; (5) Guidance, training and visualization tools, including tailored dashboards for different decision-makers.
- Potential inferences of LST to Air Temperature. Developing monitoring and effectiveness assessment model though the analysis of evolution of the LST (in cities) using the Landsat 8 and 9 images.
- Meso modelling of Urban Heat Island and Micro Modelling of Thermal Comfort. For policy makers and urban designer to make decision for more adapted cities and public places and to assess the effectiveness of climate adaptation measures and applied adaptations.
- Micro modelling of flooding to assess effectiveness of climate adaptation measures and applied adaptations.
- Combination of both variables to facilitate decision making process mainstreaming NBS.
- The modelling of thermal comfort and the impact of the climate change on it, and the modelling of the impact of the new urban planning project on the thermal comfort.
- Multi-stakeholder participations to benefit from mutual collaboration for win-wins.
- Focus on the creation of scalable products that can be quickly accessed and used by any organisation, not creating boundaries.
- Allow anybody to have access to information, so anybody (not just specialised technical departments) can benefit from it, accessing the webpages/information at will.
- Enhance datacubes, European-based rasdaman, enhance and integrate further sources and developments.
- Operational and daily monitoring of GHG emissions from infrastructure and facilities worldwide.

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- API for access to flood risk intelligence, Climate scenarios for all types of FLOODS, 3D Digital Twin, link to ground stations for AI -based flood river stage forecasting

It has been emphasised during the OMC that developments could be achieved by bringing together advances in imaging systems such as hyperspectral imaging, which provides information on water and soil composition based on spectral reflectance at several wavelengths, and the Copernicus Sentinel-5P to study air quality and pollution in regions where water sources & rivers are located, as well as advances in AI and computer vision methods, and big data analysis.

Among the certifications and standards indicated as relevant to the PCP project are:

- EASA Rules.
- ISO14064 related to GHG procedures, quantification, measurement etc.
- A very diverse set of certifications applicable to the different components of the water cycle. The harmonization of data for the whole water cycle is planned to be done under the STAC Specification.
- ESA BIC incubation, FrenchTech labelling.
- INSPIRE, ISO, OGC coverage standards for spatio-temporal data & services: Coverage Implementation Schema, WCS, WCPS.

Some participants pointed out that there are a lot of certifications and standards. However, certification and standard procedures are intensive processes. This should be investigated during the solution design phase.

In conclusion, the OMC confirmed the initial assumptions that the functional requirements of the four challenges cannot be tackled by one solution and that R&D efforts are required to address existing technology gaps.

2.4. Business case development

With the information gathered in the previous steps, the preliminary business case was based on the public buyers' prioritised unmet needs (and specific technology gaps) to organise the pre-commercial procurement and achieve the underlying objectives while keeping the costs and risks to an acceptable level. The baseline has been drawn on a layered approach and common taxonomy to collect water related data, develop comparative alternatives based on desired functionalities and outcomes and Total Cost of Ownership (TCO) calculations. Section 6 provides the updated foreseen procurement strategy, including the PCP budget.

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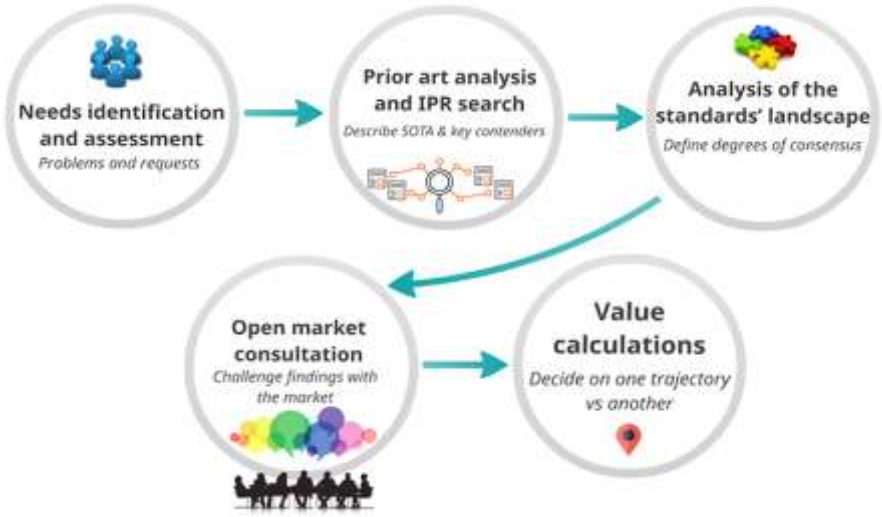

Figure 3: The five steps summarising the Business Case – EAFIP methodology

2.5. Procurement strategy

The PCP or PPI approach depends on the maturity of potential solutions corresponding to the TRL framework (Figure 4). The selected challenges for a PCP approach are those where potential solutions are between TRL 3-5. Those challenges for which solutions available are at higher TRL 7-9 may be addressed by a PPI approach. The following figure illustrates the relationship between the TRL (or maturity of the solutions) and the procurement approach/strategy.

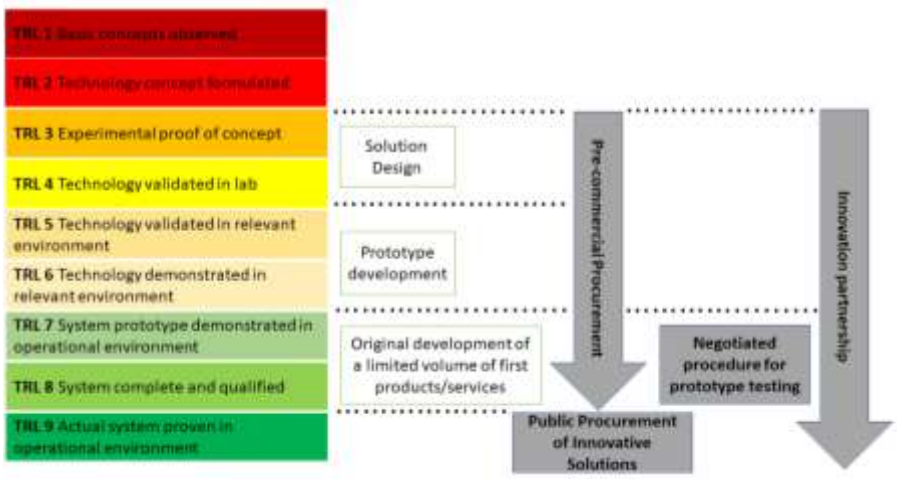

Figure 4: Relationship between the technology readiness levels (TRLs) and the procurement approaches

In addition, from the mapping of legal frameworks regarding the regulation of PCP, subcontracting, market consultations and joint cross-border procurement, the legislation in the Netherlands, Finland and Greece has shown to be more innovation friendly than other countries.

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3. Procurement Challenges

In the following sections, the four selected challenges are described based on use cases that present the current situation and the desired outcome from potential innovative solutions. A reference to the type of contracting authorities/entities for each challenge has been made. The preliminary findings of the patent and standards search and related technologies are outlined for each challenge.

3.1. Flood challenge

Use case: Rapid mapping of floods

Currently, the mapping of flooded areas (marine, coastal areas and rivers) during severe events can take weeks, resulting in delays in response and prevention. Public organisations lack reliable tools for predicting, preventing and responding to such events in a timely manner.

The desired outcome is to establish a system for rapid mapping that enables predictions and projections to identify risks and define benchmarks. This will involve the development and utilization of software capable of higher resolution and timely acquisition of satellite information.

Contracting authorities/entities: Cities.

The preliminary patent and standards analysis revealed research on the following aspects:

- Methods for identifying the probability of occurrence of a flood event (risk indicators).
- Flood measuring and trigger system (usually by making grids of the regions).
- After event evaluation of the affected area.
- Flood map production.
- Systems and methods are provided for processing observation data.

It also revealed several technologies & tools: satellite imagery, computer vision, artificial intelligence, multi sensor input (drones etc), image analysis, statistical analysis, and mathematical analysis, kernel algorithm, visible-infrared band images of a region, water based network devices.

3.2. Fires challenge

Use case 1: Fire in storage waste facilities

This use case relates to facilities where waste is stored and prone to spontaneous fires, occurring three or more times a year (in one city). These incidents are particularly prevalent during the summer months when temperatures are higher. While data on previous fire events exist (temperature conditions, height of piles, heat waves, composition of garbage, location of storages or disposals) there is no automated solution available to predict fires and make informed decisions for prevention. As a result, environmental agency inspectors bear the responsibility of monitoring these facilities, placing a significant burden on staff resources.

The desired outcome is an automated notification system that promptly identifies the risk of fire in waste storage facilities. This allows public bodies to take swift and appropriate measures, such as engaging qualified companies or industries with expertise in waste management. By preventing fires, this solution aims to mitigate air pollution and reduce potential damage associated with such incidents. It is expected to obtain an automated notification system based on the processing data including COPERNICUS data.

Contracting authorities/entities: Environmental agencies.

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Use case 2: Wildfire

This use case relates to wildfires starting in forests/fields with crops or grasslands with low vegetation which could start due to a combination of lack of water/drought and certain conditions which create a first spark.

Intelligence can be developed to understand the patterns and develop risk maps. Focus on high-risk areas, measure these areas. Provide water information to provide risk maps. Develop local databases (local datahubs) with the same standards. A local system should provide more frequent information than what is available on larger scale. Rebuild water intelligence to understand water levels and when the thresholds are approached in terms of risk mapping.

The desired outcome is an automated notification system that promptly identifies the risk of fire. This allows public bodies to take swift and appropriate measures. By preventing fires, this solution aims to mitigate air pollution and reduce potential damage associated with such incidents. An automated notification system is expected to be obtained based on the processing data, including COPERNICUS data.

Contracting authorities/entities: Environmental agencies, LEA's, fire brigades

Use case 3: Fire cause tracing/tacking

This use case relates to identifying, tracing, and tracking the cause (and the culprit) of the fire. It is challenging for law enforcement agencies to trace the individuals responsible for criminal behavior (e.g., setting fire or dumping substances that cause fire to official waste dumping sites/facilities). In the event that a fire consumes part of a waste dumping site, it is vital to be able to compare the site's condition before and after the fire. This comparison would enable us to determine the amount of waste that was burnt and, consequently, evaluate the environmental damage caused. Additionally, the same technology could be used to establish whether the amount of waste entities dumped into the site matches the amount they report officially. Furthermore, there is a lack of effective measures to inform and prevent the cross-border effects. Additionally, the absence of usable data hinders the ability to gather evidence for criminal proceedings.

The desired outcome is the implementation of an alert system that sends notifications to competent authorities, aiming to prevent the illegal dumping of waste/ illegal activities that could lead to fires in dumping sites and mitigate the risks of cross-border damage. The system would enable us to compare the state of the waste dumping site before and after the fire, determine the amount of burnt waste, and define the extent of environmental damage. Additionally, the system would be able to verify if the amount of waste entities dumped into the dumping site is consistent with their official reports. Furthermore, standardized reports and information should be readily available and admissible in civil and criminal proceedings. This will facilitate the establishment of responsibilities in accordance with the applicable laws and regulations within the specific judiciary system.

Contracting authorities/entities: LEA's, fire brigades.

The preliminary patent and standards analysis revealed research on the following aspects:

- Methods for identifying fire risk level.
- Early warning- prediction.
- Fire management system (status, monitoring & forecast –estimated progression).
- Maps & graphical representation of fire information.

➔ None of the results was related to waste fire specifically but the inventions identified can provide a technological basis for the challenge.

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It also revealed several technologies & tools: satellite imagery, multi sensor input (drones etc), vegetation information, and weather data, statistical analysis, and mathematical analysis, cloud-to-ground lightning distribution characteristics, water based network devices.

3.3. Water challenge

Use case: Demand for fresh water

Currently, there is unpredictability in the demand for fresh water, and there is a lack of connection between the supply and demand of fresh water. Regulations exist in each EU Member State that determine the use of water from various sources, such as channels, treated sewage water, and drinking water, and different purposes such as for agriculture. However, there is a lack of a common language among different stakeholders (users involved such water companies, industry, farmers, etc.) involved in the water cycle chain. Additionally, while data is available in certain regions, there is a lack of connectivity between data hubs and repositories.

The desired outcome Is a predictable demand for fresh water. The regulatory landscape and policies should be clearly defined, providing a cohesive framework for water management. The system should be capable of effectively handling stressful situations through data-driven decision making and interventions. The supply and demand for sweet water should be interconnected based on diverse needs of users such as farmers, companies, and industries, while also considering the specific conditions and water quality requirements for different purposes. A comprehensive understanding of the consequences and a combined approach to relevant data within the entire water cycle chain should be achieved and facilitated by effective policy guidance.

Contracting authorities/entities: Water authorities/companies, water sanitation authorities

The preliminary patent and standards analysis revealed research on the following aspects:

- Methods for identifying the probability of occurrence of a drought.
- Systems and methods are provided for processing observation data.
- Methods for identifying risk level.
- Early warning- prediction.
- Water and drought management system (status, monitoring & forecast –estimated progression).
- Maps & graphical representation of water information.

It also revealed several technologies & tools:: satellite imagery, multi sensor input (drones etc), computer vision, vegetation information, and weather data, statistical analysis and mathematical analysis, water based network devices, ground measuring data, GUI, use of database management systems in handling future data.

3.4. Sustainable and resilient infrastructures challenge

Use case: Integrated sustainable climate adaptation of existing neighbourhood's

Currently, there is a need for integrated sustainable re-development, restoring & climate adaptation of existing neighbourhoods both in urban and rural areas.

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The desired outcome is to find a solution to climate adaptation for this complex situation (vulnerable urban &/ rural areas with a combination of heat, flooding, water scarcity, storms and droughts) using integrated climate services.

Contracting authorities/entities: Cities.

The preliminary patent and standards analysis revealed research on the following aspects:

- After event evaluation of the affected area.
- Calculation of different scenarios using combination of possible climate effects (e.g. temperature, flooding, storm, drought).
- Creation of a thermal map of a region.
- Urban heat island detection method.
- Systems and methods are provided for processing observation data.
- Analysis of urban morphology.
- Methods for monitoring and managing urban water resources and hydrology through a network of stations.
- Early warning-prediction.
- Methods for identifying risk level .

It also revealed several technologies & tools: digital aerial and satellite imagery, photography, computer vision, artificial intelligence, multi sensor input (drones etc), image analysis, statistical analysis and mathematical analysis, airborne and spaceborne sensors, deep learning, ground-based data gathering, remote sensing data, data modelling, open source geographical data, image processing, remote sensing image and high-resolution remote sensing image with possibility to combine this data with other important data layers, for example demographical map in order to see if some vulnerable groups (old/dement/less valid people/young children) live in potential risk area, where evacuation or transportation could provide additional difficulties compared to other, not vulnerable groups

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4. Further scoping needs and use cases

Further discussions followed the analysis of the market consultation results in the process of obtaining the commitment of public buyers around the 4 identified challenges described in section 3. Since the challenges covered broadly the desired end-to-end climate change solutions, where several technologies would need developments to tackle all the functional requirements, it was deemed necessary to work on defining the scope of the R&D based on the technical analysis of the needs and use cases by the end-users of the potential solutions in specific operational environments.

In this context, the public buyers committed to lead and procure jointly a PCP of research and development services, agreed on selecting one overarching Water (management) challenge covering different use cases in connection with floods, fires and resilient infrastructure (because of too little or too much water). The Water (management) challenge requires Earth Observation (regional) data in a layered approach that identifies which data is available and what data needs to be obtained to understand the climate patterns. EO-data will be crucial for the provision of climate services that help improve operations in different application domains.

4.1. The overarching Water challenge

Based on the prior art analysis and preliminary patent search, which showed that no solution was already available on the market or close to the market to fully tackle the desired outcome and functionalities of the four challenges, the public buyers decided to focus on one challenge that could be further scoped to integrate use cases relevant to the other challenges and several end-users in different application domains. In this process, an overarching Water challenge was selected given that water management has an impact in crises related scenarios concerning floods, fires and resilient infrastructure. The Water (management) challenge aims to solve the problem of water intelligence needs and data requiring the development of original solutions, which will ideally reach TRL 8 through the PCP approach.

In particular, the analysis conducted on the SOTA concerning the Water challenge reveals a complex landscape ripe for innovation. Specifically, the analysis of patent applications and industry trends highlights the absence of a dominant technological leader in the water resilience domain, signalling an environment favourable to innovation.

The convergence of advanced technologies such as Artificial Intelligence (AI) and remote sensing, with a focus on addressing drought prediction and water management, highlights a promising trajectory toward enhancing water resilience. Furthermore, an examination of patents submitted for the Water challenge indicates intermediate TRLs averaging between 5 (minimum) and 7 (maximum), suggesting readiness for practical application and a commitment to addressing water-related concerns offering a solid foundation for further development and adaptation to specific needs within the PCP framework.

Leveraging COTS products like Sentinel-1 and ESA-Copernicus EO datasets presents additional opportunities to enhance the capabilities of patented technologies, facilitating continuous access to high-quality data for improved water resource management. These innovative solutions have the potential to significantly mitigate challenges related to water distribution and decision-making processes, which will advance water resilience both locally and globally. These technologies have the potential to significantly contribute to the ensuring a resilient and sustainable water future through continued development and strategic integration.

The PCP would focus on using satellite data for smart management of freshwater distribution across various sectors like urban, rural (agriculture/nature), drinking water (industries, food/cooling), and recreation. Ensuring a balanced supply and demand of freshwater is crucial for both city and rural areas, especially as extreme climate conditions like droughts and floods become more common. In this sense,

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the PCP project would emphasise on leveraging Earth observation data to monitor water quantity and quality, starting with a focus on quantity.

To mitigate extreme climate/water situations, water managers need to anticipate with day-to-day operational information in their management area (dashboards) and build up their local intelligence as a prerequisite to anticipate on related crises (caused by too little or too much water). Additional layers to the system such as wind, sun, heat, drought, subsidence, greening would be considered in relation to climate change consequences affecting water adding value. An additional benefit of adding the extra layers to the system is that this system could be used for multiple approaches by European public authorities.

In this context, through the PCP, public buyers aim to steer the European market to make synergies for the development of solutions based on the functional needs identified from the demand side. Through the PCP, several contractors will be able to compete in the creation of innovative solutions, opening the possibility for researchers and companies to work on future technologies and services that will contribute to more sustainable processes, while fostering new business opportunities to the commercialisation of products and services.

The functional specifications and technical requirements should be aligned with the destination topics on innovative governance, environmental observations and digital solutions in support of the Green Deal, and deploying and adding value to environmental observations, as well as contributing to the Agricultural Knowledge and Innovation Systems (AKIS) by having relevant use cases.

In sum, the Water (management) challenge aims to develop and test water intelligence innovative solutions beyond the state-of-the-art for climate adaptation using space and EO-based information to prevent and mitigate 3 water related crisis challenges (floods, fires and infrastructure impact). The general objective is to be more climate resilient through a better EO-based information position and alignment between regional water management, cities, communities and crisis organisations across EU Member States borders and in common river basin systems.

For this purpose, twenty one (21) use cases have been identified (see Annex 2) and it is deemed necessary to apply a methodology to select a smaller number of representative use cases (e.g. five (5) use cases) to be tackled in the PCP. The solutions developed should be tested and validated against the criteria, functional and performance requirements defined in the use cases.

4.2. Methodology and selection of use cases

The customisation/pre-operationalisation of Water (management) innovations through PCP aims to obtain R&D services up to TRL (Technology Readiness Level) 8, where phase 1 will produce solution designs, phase 2 will test prototypes/technologies in a lab environment, and phase 3 will perform field validation by end-users testing services (based on specific use cases) in different operational environments.

The methodology proposed to select use cases for the implementation of the PCP project includes a layers approach, a common water taxonomy and the overview of the EO-based value chain for water intelligence to understand the requirements of the identified use cases. In this sense, the identified use cases should be further analysed, scoped and clustered (in comparable problems) in order to select five representative use cases within the activities conducted in the framework of the envisaged PCP.

LAYERS APPROACH

This approach consists of 4 layers of information: (1) Base layer 1: For users; (2) Base layer 2: Water (Taxonomy); (3) Layer 3: Water Dynamics (Thresholds/scenarios); and (4) Layer 4: (Water related) risks.

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Base layer 1 For the user: A standard description of our (static) world provides us with base information (information carrier layer for harmonization of information and exchange) such as location, elevation, weather, land use maps, soil maps, administrative boundaries, infrastructure. Many existing European data sets and standards (Copernicus, INSPIRE, High Value Datasets, etc.) are already available and will be evaluated and considered in the context of this project. These common information carriers (The Copernicus Land Service, High-Res Layer Imperviousness) provide a basis for our dynamic changing world.

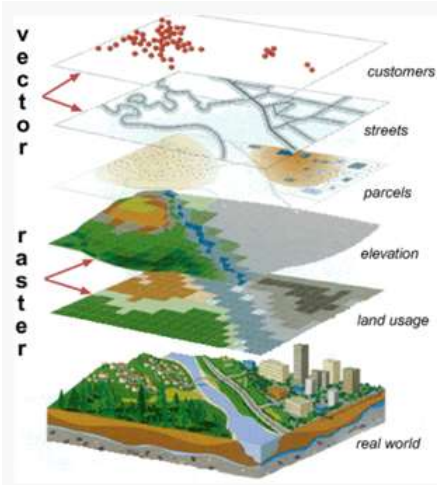

Figure 5. Base layer 1

Base layer 2 Water (Taxonomy): The regular water cycle processes can be described/modelled with key variables which can be partly measured/observation by EO and partly modelled and mostly in combination with each other. Local knowledge and ground measurements are essential to understand the quality of these exercises. Harmonizing the monitoring of the local SWVA (Soil Water Vegetation Atmosphere System)-system conditions, provide a common understanding in order to support and solve water distribution issues within common river basin areas (cross border and between management areas) Observed by EO: evapotranspiration, soil moisture, temperature, rain, etc. Modelled: see hydrological cycle on the left, either common applied centralised standard model instrumentarium or local modelling/knowledge/tailored instrumentarium, resulting notably into the amount of water in the soil profile and indicator for groundwater levels.

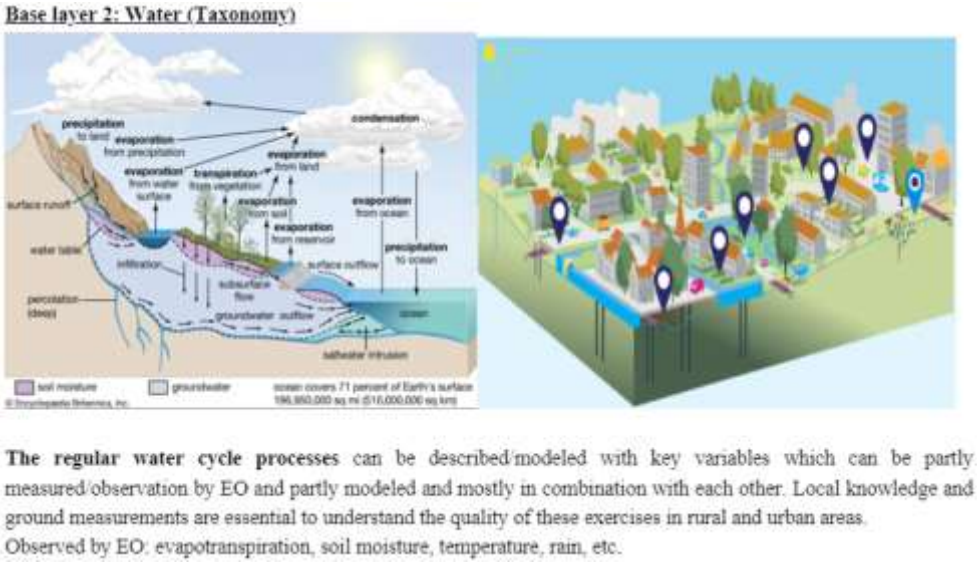

Figure 6. Base layer 2 Water Taxonomy

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Layer 3 Water dynamics: Due to extreme climate events amplified by longer-term, often nonlinear evolutions of the climate, the regular water cycle transforms into different categories of crises/hazards:

- Extreme changes to the water cycle cause drought, flooding and with consequences on the short and long term for our soil-water-atmosphere system of our living world (water dynamics layer).
- Critical (sector specific) thresholds are passed, e.g., saturation of topsoil causing runoff, critical combustion factor of biomass/nature vegetation or critical groundwater level for irreversible subsidence of infrastructure.
- Impact on sectors: agriculture, nature, city infrastructure, economy, living conditions.
- Using climate scenarios, one can simulate and improve these threshold criteria in cases of too much or too little water in the soil-water-vegetation system.

Layer 4: (Water related) risks.

The risk of too dry or too wet conditions is partly determined by the potential impact (physical damage) to various sectors combined with equally important, if not more, alpha factors such as increased pressure on key resources from economic development, communities' strategies to build resilience while protecting all sectors of society, ideological fault lines around conflicting uses and priorities, and more.

Risk can be seen as the product of chance by impact, the result of the vulnerability of a sector or a human community to a certain degree of exposure to the occurring hazard category. EO can play a role for both factors in the product. It also powerfully contributes to creating data for learning processes (AI e.g. for vulnerability assessment) and developing a better, more uniform Risk Language.

USER DRIVEN EO-BASED VALUE CHAIN FOR WATER INTELLIGENCE

In the implementation process the (selected) use cases in Europe will provide a representative spectrum of requirements for the procurement process. The basis is the integral assessment of day-to-day SWVA conditions with space-based value chains based on local/central knowledge (AI, EO-Inversion/hydrological modelling, etc.). This will provide a first basis of local water intelligence for the use case stakeholders. Driven by their required functions in their organisations, translation from the SWVA conditions towards regular or crisis management processes (e.g. risk indicators) can be achieved.

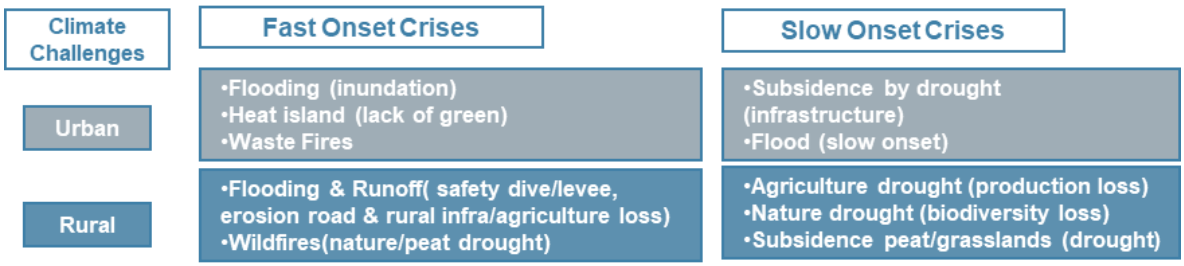

Figure 7: Use case categories driving the value chain

COMMON TAXONOMY MATRIXES

Based on the four information layers, the common taxonomy matrixes can be used to identify available and missing elements to understand the conditions of water and soil in regular conditions and in extreme conditions, also in urban areas.

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Service Matrix Regular Conditions (Soil-Water-Vegetation-Atmosphere system)

Service Layer in EU Usecase	A1. Information carrier & standard raster X,Y,Z, & vector actualisation/mutation of (admin) borders	A2. DTM (detailed)	A3. Rainfall ao weather parameters	B1. Evapotranspiration (soil-veg-atm system)	B2. Soil Moisture Top & soil profile	B3. Groundwater level
1. Base (start of EO valuechain)	Lufo, High Res Satellite (yearly update), mutations AI based	LIDAR, LuFo	International Radar Composite Ground Radar, Sat based, weathermodels (ECWMF)			
2.Water Regular	Update (EO/AI based) changes in water management infrastr. channels,areas, dikes,etc	Improve 3D (hydro)logical spatial (sub) river basin model (EO/AI)	Input to EO-based waterbalance modeling/AI based	> Innov. fieldobservation > (MW,Opt) Sat soil-veg evapotransipiration & > A3/B1 Input to EO-based waterbalance model/AI based	> Innov. fieldobservation > MW Sat TopSoil system > A3/B1 input to EO-based soil;-water-atm modeling (wateravailability)	> Innov. fieldobservation > Groundwater level (A3/B1 input toEO/AI based modeling
3.Water(+ or -) Dynamics conditions/limits (Sector inputs)	Update/actualise/map per sector management admin/area/delineation (AI-based)	Update DTM/basin model due to (erosion or subsidence)	Weather / climate scenarios (short and long term)	Per sector Threshold determination of soil-water system (scenario modeling)	Per sector Threshold determination of soil-water system (scenario modeling)	Per sector Threshold determination of soil-water system (scenario modeling)
4. Risk see crises matrix D1 to D5						

Service Matrix Regular Conditions in Urban Areas (Soil-Water-ATM system)

Service Layer in EU Usecase	A1. Information carrier & standard raster X,Y,Z, & vector actualisation/mutation of (admin) borders	A2. height model (detailed)	A3. Rainfall ao weather parameters	B1. Evapotranspiration (soil-veg-atm system)	B2. Soil Moisture Top & soil profile	B3. Groundwater level
1. Base (start of EO valuechain)	Lufo, High Res Satellite (yearly update), mutations AI based	3D-city modelling (height streetlevel/building (LIDAR, cm-dm in Z)	city temperature, sunshine, wind,rain weathermodels (ECWMF)		Maps of Stoniness of city (street) for infiltration	
2.Water Regular	Update (EO/AI based) changes in water management infrastr. channels,areas, dikes,etc	Improve 3D (hydro)logical spatial (sub) surfacewater model (EO/AI)	Input to EO-based waterbalance modeling/AI based	> Innov. fieldobservation > (MW,Opt) Sat soil-veg evapotransipiration & > A3/B1 Input to EO-based waterbalance model/AI based	> Innov. fieldobservation > MW Sat TopSoil system > A3/B1 input to EO-based soil;-water-atm modeling (wateravailability)	> Innov. fieldobservation > Groundwater level (A3/B1 input toEO/AI based modeling
3.Water(+ or -) Dynamics conditions/limits (Sector inputs)	Update/actualise/map per sector management admin/area/delineation (AI-based)	Subsidence (mm/yr) by satelite INSAR	Weather / climate scenarios (short and long term)	Per sector Threshold determination of soil-water system (scenario modeling)	Per sector Threshold determination of soil-water system (scenario modeling)	Per sector Threshold determination of soil-water system (scenario modeling)
4. Risk see crises matrix D1 to D5		Risk subsidence street, building, sewerage				

Service Matrix Extreme Conditions (too dry, too wet)

Service Layer in EU Usecase	C1. Drought	C2 Wild Fires	C3. Water Quality	C4. Subsidence (urban/rural)	C5. Water excess
1. Base	Input from A services	Input from A services	Input from A services	Input from A services	Input from A services
2.Water Regular	Input from A/B services	Input from A/B services	Input from A/B services	Input from A/B services	Input from A/B services
3.Water crises (+ or -) Dynamics process modeling (Sector inputs)	> Input to improving/cal/val drought model (agro, city, ecosystem dependent) > Realtime & scenario modeling	> Input to improving/cal/val fire distribution & fire figting process model (ecosystem dependent) > Realtime & scenario modeling	> Input to improving/cal/val ground/surface water quality model (agro, city, ecosystem dependent) > hind-, now, & forecast & climate scenario modeling (decadal trends-analysis)	> Input to improving/cal/val subsidence process model (agro, city, ecosystem dependent) > hind-, now, & forecast & climate scenario modeling (decadal trends-analysis)	> EO-Saturation Top soil > EO-surface/flood extent >Input to waterbalance & Runoff model (agro-, city-, ecosystem dependent) >Input to waterbalance & Inundation model (agro-, city-, ecosystem dependent
4. Impact/Risk Indicator (Sector inputs)	D1. Sector dependent **Impact/Risk drought** indicator modeling (evolution)	D2. Sector dependent **Impact/Risk wild fire** indicator modeling (evolution)	D3. Sector (agro, city, ecosystem, drinking water) dependent **Impact/Risk water quality** indicator modeling (evolution)	D4. Sector dependent **Impact/Risk subsidence** indicator modeling (evolution)	D5. Sector dependent **Impact/Risk waterexcess** indicator modeling (evolution)

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Service Matrix Extreme Conditions in Urban Areas

Service Layer in EU Usecase	C1. Energy transition (wind, sun)	C2 Quality of living (Heat island, greening)	C3. Water scarcity (green, gr water)	C4. Subsidence grey infra (urban)	C5. Water excess in the city (floods, inundation)	C6 Maintenance & climate adaptation of city infra
1. Base	Input from A services	Input from A services	Input from A services	Input from A1,2 services	Input from A services	Input from A services
2 City management Regular	Input from A/B services	Input from A/B services	Input from A/B services	Input from A/B services	Input from A/B services	Input from A/B/C services
3 City crises (+ or -) Dynamics process modeling (Sector inputs)	> Input to improving/cal/val wind and sun models (city, ecosystem dependent) > Realtime & scenario modeling	> Input to improving/cal/val heat island and greening models (ecosystem dependent) > Realtime & scenario modeling	> Input to improving/cal/val ground/surface water quality model (city, ecosystem dependent) > hind-, now, & forecast & climate scenario modeling (decadal trends-analysis)	> Input to improving/cal/val subsidence process model (city, ecosystem) > hind-, now, & forecast & climate scenario modeling (decadal trends-analysis)	> EO-Saturation Top soil > EO-surface/flood extent >Input to waterbalance & Runoff model (city-, ecosystem dependent) >Input to waterbalance & Inundation model (city-, ecosystem dependent	Thresholding critical maintenance levels wrt lifecycle of infra), climate adaptation of existing infrastructure, city process models
4 Impact/Risk Indicator (Sector inputs)	D1. Sector dependent **Impact/Risk wind(storm)** indicator modeling (evolution)	D2. Sector dependent **Impact/Risk heat island and greening** indicator modeling (evolution)	D3. Sector (city, ecosystem, drinking water) dependent **Impact/Risk water quality and scarcity** indicator modeling (evolution)	D4. Sector dependent **Impact/Risk subsidence** indicator modeling (evolution), grey infra, ecosystem biodiversity, foundation (assets) risk map	D5. Sector dependent **Impact/Risk waterexcess** indicator modeling in urban areas (evolution)	Risk Critical infrastructure (energy, water, etc.) Impact on regular infrastucture, modeling (evolution)

Figure 8: Service matrixes

USE CASES

Climate change of the past decades has already had a major impact on our SWVA. This impact is expected to increase further in the future, in accelerating and highly nonlinear ways resulting from physical climate processes combined with consequences of increasing anthropic pressure, including the effects of maladaptation. As this system forms the basis for many functions of our society, the need to integrate and monitor the anticipated and potential impacts of climate change in a structural and consequent manner seems imperative, as has been done in meteorology with weather parameters for more than a century. Of course, the disbalance in our SWVA-system results in serious impacts for each sector in the short and the long term.

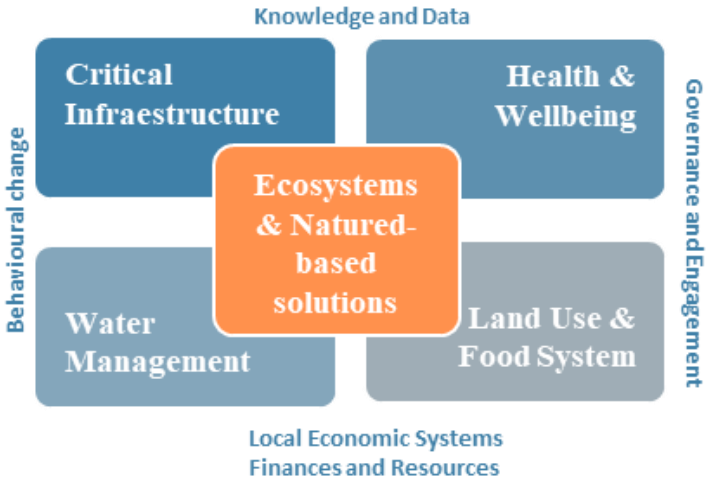

Figure 9: Key community systems and enabling conditions

In this context, demonstrations of potential solutions would take place across important sectors such as agriculture, nature, urban livelihoods, (drinking, surface, ground) water and safety in general, with information from integrated EO-based service development in space and time.

In the preparation of the PCP, the selected use cases should represent a range of European regions with a serious climate-induced disbalance in the SWVA-system. While those use cases generally start

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from short term issues encountered by the concerned stakeholders, climate change tends to increase their frequency, intensity and coupling with other issues it aggravates, resulting in long-term systemic crises.

Examples of chain effects due to serious shortage on water availability in the SWVA-system are:

1) Agriculture: drought, suboptimal production and harvest losses, deterioration of soils.
2) Urban: heat island effects, stress on green areas and livelihoods, waste dump fires, subsidence and damage to infrastructure.
3) Nature: groundwater/wildfires, subsidence peat lands.

The long-term effects of disbalance in the SWVA-system are degraded conditions induced or aggravated by climate change. Persistent drought in certain regions poses significant risks such as infrastructure subsidence, agricultural challenges, biodiversity degradation, and increased wildfires. These issues align with the Key Community Systems outlined in the Horizon Europe Mission Adaptation. Through the related use cases, the intention is to tackle these challenges beyond water management, contributing to broader community resilience. The efforts aim to enhance enabling conditions, going beyond mere knowledge and data, to foster sustainable solutions for communities facing climate-related threats.

The aforementioned process will ensure that the selected challenge is shared among the end users at EU level.

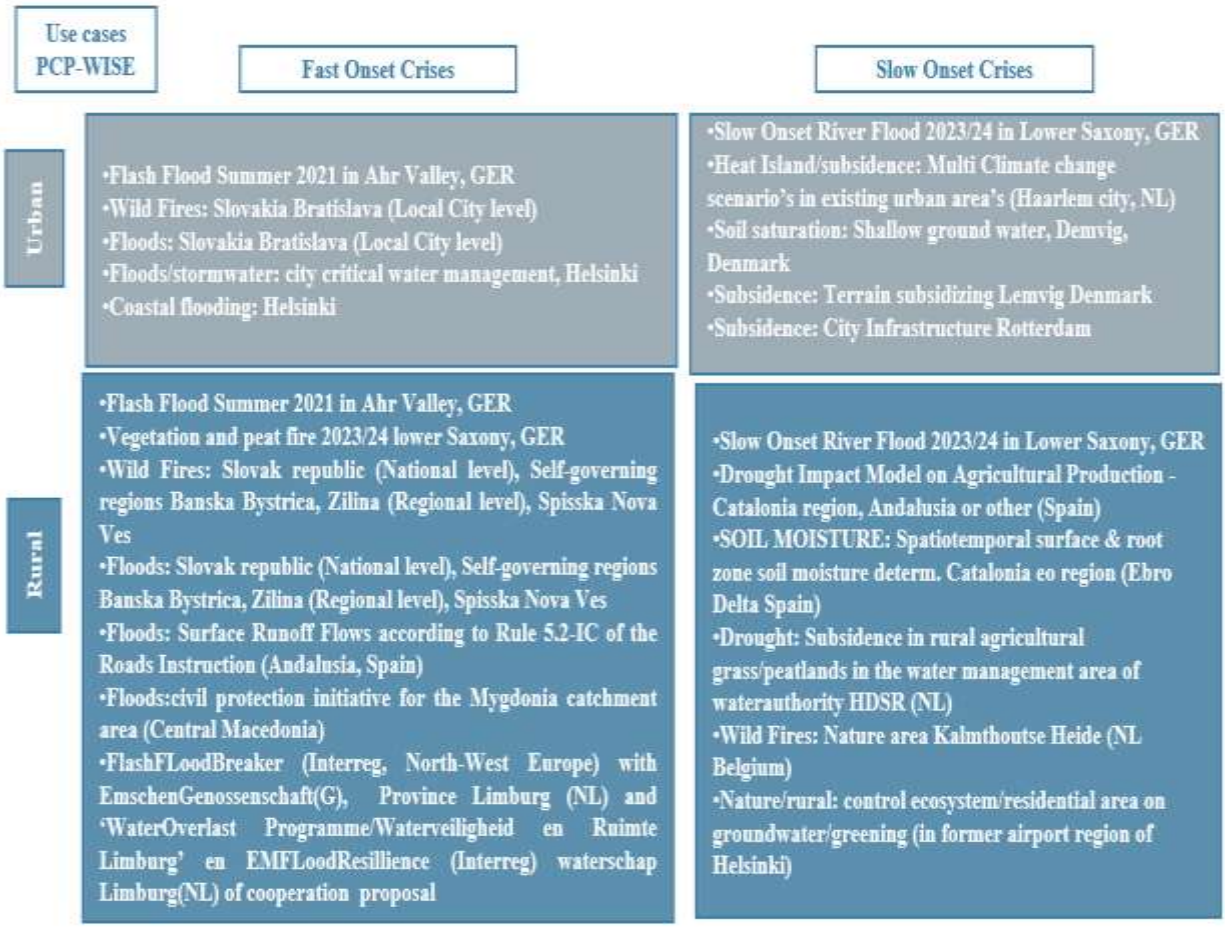

Figure 10: Initial identified use cases

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5. Considerations to select a PCP or PPI

The procurement strategy aims to provide guidance on how public organisations across Europe can make strategic use of public procurement instruments to obtain innovative and sustainable goals for the green and digital transformation considering the selected procurement challenges. As indicated above, there are two main modalities or trajectories that an innovation procurement project could follow: the PCP and the PPI. The type of procurement and related IPR conditions will depend on the maturity of the solutions which could potentially tackle the functional requirements.

The main differences between PCP ”and P’I are described in Table 2:[11]

	PCP	PPI
When?	The identified challenge requires R&D to get new solutions developed and tested**.** No commitment to deploy (PPI) yet.	Challenge requires a solution which is near to the market or already on the market in small quantity but does not meet public sector requirements for large scale deployment yet. No R&D involved (R&D already done, or no R&D needed to solve challenge).
What?	Public procurer buys R&D to steer development of solutions to its needs, gather knowledge about pros/cons of alternative solutions, avoid supplier lock-in later (create competitive supply base).	Public procurer acts as launching customer/early adopter/first buyer for innovative products and services that are newly arriving on the market (not widely commercially available yet).
How?	Public procurer buys R&D from several suppliers in parallel (comparing alternative solution approaches), in form of competition evaluating progress after critical milestones (design, prototyping, testing). IPR related risks and benefits of R&D are shared between procurer and suppliers to maximize incentives for wide commercialization.	Public procurer announces the intention to buy a critical mass of innovative solutions to trigger industry to bring products on the market with desired quality / price ratio within a specific time. After verification if the market was able to deliver the desired quality/price – e.g. via a test and/or certification – the public procurer buys a significant volume of innovative solutions.

Table 2: Main differences of the PCP and PPI approaches (EAFIP Toolkit)

In principle, the four challenges identified in the context of the PROTECT project are suitable for a PCP approach followed by a PPI for the deployment of the solutions developed in the PCP. However, it is important to: (i) obtain a more detailed assessment of the specific technology gaps to be addressed by

[11] EAFIP Toolkit www.eafip.eu/toolkit

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the R&D efforts, which will be provided by the final results of the SOTA analysis, and (ii) to have a clear cost/benefit analysis of addressing those gaps regarding the value that the functionalities would provide to the public buyers in terms of the impact of the (to be developed) climate services and EO applications, which will be based on the business case.

Additionally, it could be the case that some public buyers are interested in available prototypes and solutions (e.g. those presented in the e-pitching) which are at higher TRL and respond to a specific functionality, which could be tested (under the PPI approach) following the negotiated procedure without prior publication purely for the purpose of research, experimentation, without the possibility of purchasing the solution as such.

In the following sections, the specific characteristics of the PCP and PPI approach are explained.

5.1. Pre-Commercial Procurement (PCP)

PCP is an approach to procure R&D services that involves competitive development in phases, risk-benefit sharing under market conditions and that aims to create growth and jobs in Europe. It challenges innovative players on the market, via an open, transparent and competitive process, to develop new solutions for a technologically demanding mid- to long-term challenge that is in the public interest and requires new research and development. In this context, PCP enables the co-creation of innovative solutions by R&D suppliers (e.g. technology providers, research institutes) and public buyers.

This instrument is explained in the Communication from the EC “Pre-commercial Procurement: driving innovation to ensure sustainable high quality public services in Europe”. [12]

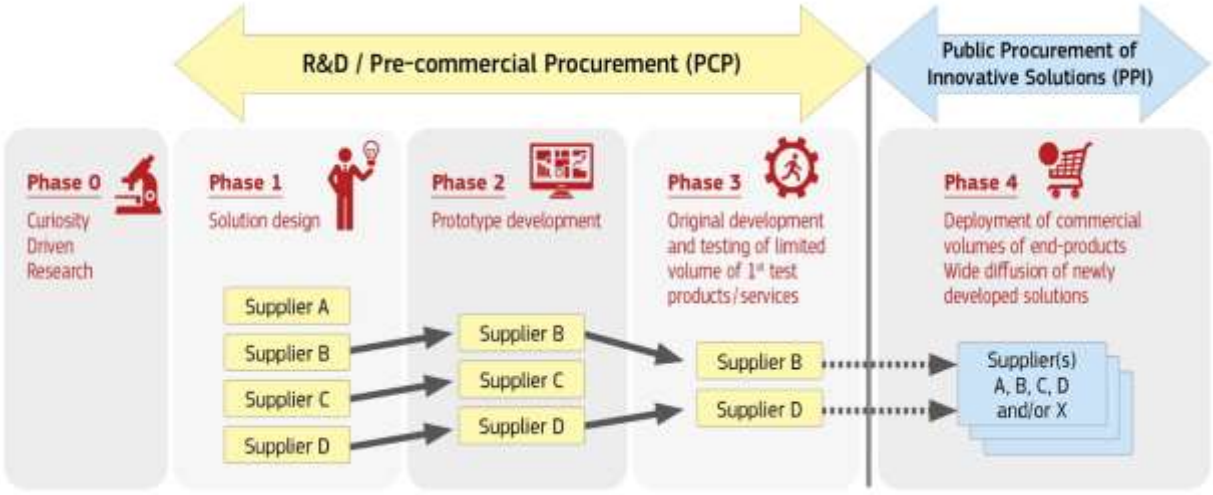

Figure 11: PCP/PPI scheme, European Commission COM(2007)799 final Based on “Pre-commercial procurement: driving innovation to ensure sustainable high quality public services in Europe”, COM(2007) 799 final

PCP identifies the best possible solutions the market can develop, by comparing alternative solution approaches from different technology vendors in parallel. By steering the development of innovative solutions towards concrete public sector needs, PCP may trigger industry to initiate R&D that was previously unthought-of. In PCP, procurers are thus demanding customers, who are articulating advanced solution requirements as potential future early adopters of the developed solutions (which will be selected in a separate PPI procurement that follows the completion of the PCP).

Procurers also share the IPR related risks and benefits of undertaking new developments with the R&D providers participating in PCP. IPR ownership rights remain vested in the participating R&D providers, while the public procurers keep license free rights to use the developed solutions, the possibility to

[12] “Pre-commercial procurement: driving innovation to ensure sustainable high quality public services in Europe”, COM(2007) 799 final, 14.12.2007 (PCP Communication). See also the Commission Staff Working Document SEC(2007) 1668.

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require participating R&D providers to license IPRs to third party providers at reasonable market conditions, and an option that enables procurers to call back the IPR ownership rights in case the participating R&D providers fail to commercialise solutions within a specific timeline after the PCP. This approach maximises the incentives to commercialise the developed solutions to other markets.

PCP was defined in 2007 in the PCP Communication in full compliance with the legal framework.[13] The 2014 public procurement directives clarify that PCP is exempted from its remit and the 2014 and 2022 State aid framework for Research and Development and Innovation[14] clarifies the conditions under which PCP is done according to market conditions and therefore does not constitute State aid.

Due to its characteristics, PCP is exempted from the GPA of the WTO and consequently of the EU Public Procurement Directives. This is of particular interest to foster European strategic autonomy and resilience, since contracting authorities may require the performance of the R&D services to take place in Europe, which in turn strengthens Europe's technological potential and increases the resilience of Members States to potential supply chain disruption in emerging technologies. It also supports the goal of having an autonomous Europe when it comes to key enabling technologies.

The use of multiple sourcing in PCP also strengthens EU strategic autonomy and resilience. By triggering in a forward-looking way a range of suppliers to develop new innovative solutions that can address upcoming mid-to-long term procurement needs, public procurers can bring in competition from new innovative companies into a supply chain that was previously plagued by supplier lock-in, or build up a totally competitive pool of European suppliers that can address its strategic needs in the future with solutions that are 'made in Europe'.

The IPR and commercialisation conditions that can be used in PCP also contribute to fostering EU strategic autonomy. It is a key characteristic of PCP to leave the IPR ownership rights with the participating contractors so that they can commercialise their solutions more widely, which increase the range of European suppliers able to deliver solutions to the public sector, thus enhancing resilience and strategic autonomy. This comes with a condition to commercialise the solutions within a specified time. This condition can be extended with the requirement to perform the majority of the commercialisation activities in Europe (e.g. production, marketing, service delivery facilities) also after the PCP contracts ends. In addition, the procurer can restrict exclusive transfer and licensing of the results/IPR from the PCP to non-EU suppliers. An IPR call back clause ensures that the public procurer can require IPR ownership rights to be transferred back to the procurer in case a supplier does not respect the PCP's place performance conditions, establishment and control from Europe obligations, IPR obligations or commercialisation obligations or in case other EU strategic autonomy or essential security interests are compromised (e.g. in case of a merger or acquisition of a PCP supplier by a non-EU entity).

In conclusion, PCP is justified on the grounds that R&D is needed (between TRL 3-8) to achieve the functional requirements. This is the case of the four challenges where potential solutions still need substantial R&D. Thus, an active demand side is needed to steer the developments to ensure that solutions will meet all the functional and technical requirements (e.g. regarding cross-border interoperability and standardisation) where suppliers are not likely to invest in developing in such solutions on their own.

5.2. Public Procurement of Innovative solutions (PPI)

PPI approach refers to the procurement where contracting authorities act as a launch customer of innovative goods or services which are not yet available on a large-scale commercial basis and may include conformance testing. Market readiness prior to deployment can be verified through e.g.

[13] PCP is exempted from the application of the European public procurement directives, but remains subject to the applicable provisions of the Treaty on the Functioning of the European Union and the EU competition rules.
[14] "Framework for state aid for R&D&I", COM(2014) 3282 (2014 EU State Aid Framework) and "Framework for State aid for research and development and innovation. C(2022) 7388 final of 19.10.2022.

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conformance testing, certification or quality labelling of solutions. In PPI, procurers act as launch customers, also called early adopters or first buyers of the innovative solutions.

PPI focuses on innovative solutions which are not yet available on a large-scale commercial basis. This also includes solutions based on existing technologies that are used in a new, innovative way. The solutions may have been (partially) demonstrated with success on a small scale (e.g. field testing of a first batch of products) and may be nearly or already available in small quantities on the market. However, due to residual risk or market uncertainty, the innovations are not being produced at large scale yet and do not meet market price/quality requirements of procurers for wide deployment yet.

While PCP focuses on the R&D phase prior to commercialization, PPI concentrates on the commercialization/diffusion of solutions. In other words, PCP only covers the procurement of R&D services, in a way that is clearly separated from any potential subsequent purchase of commercial volumes of end-products.

A PPI approach targeting solutions at higher TRL (7-8) can be applied using any of the different types of contracting procedures as established in the EU Public Procurement directives based upon a procurement strategy designed on a business case. PPI may include compliance testing, certification and labelling, but it can also refer to the testing of prototypes in a lab or an operational environment. PPI can also entail the combination of the R&D and deployment of commercial solutions through an Innovation Partnership procedure.

The PPI can establish IPR conditions to stimulate, for example an open source and open hardware approach. The PPI can implement criteria and contract performance clauses to foster innovative solutions, interoperable standards, as well as social and environment considerations such as those established in the soft law of the International Labour Organisation (ILO). The PPI can also implement value engineering clauses in framework agreements to stimulate the possibility to add value along the contract term through the systematic analysis of the functions and the possibility of reducing costs while enhancing the efficiency of solutions. A PPI can take place as a joint cross-border procurement bringing together several public organisations across Europe. For this purpose, they may use of the funding schemes of the Horizon Europe Programme.

For a PPI approach, depending on the scope and the object of the procurement, open, restricted, and negotiated procedures are available under Directive 2014/24/EU (Annex 4).

Among these procedures, the negotiated procedure without prior publication may be used for public supply contracts: (a) where the products involved are manufactured purely for the purpose of research, experimentation, study or development; however, contracts awarded pursuant to this point shall not include quantity production to establish commercial viability or to recover research and development costs. This procedure, which can be used for prototype testing, is regulated in the Public Procurement Directives. [15]

[15] See Recital 50 Directive 2014/24/EU, Art. 32(3)(a) Directive 2014/24/EU, and art. 50(b) Directive 2014/25/EU.

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6. The PROTECT follow up PCP's procurement strategy

PROTECT supports urgent action for climate adaptation, mitigation and resilience and brings together public buyers to use the PCP approach in order to foster and speed up the development of innovative solutions for Climate Services based on Earth Observation that best fit the specific and systemic needs of the public demand. In this context, PROTECT is preparing the operational ground for a PCP proposal in response to the Horizon Europe pre-commercial procurement call "Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation" fully funded by the EU with to €19 million.[16]

The initial focus for the follow up PCP is on the four common challenges identified across five application domains (Energy & Utilities, Sustainable Urban Communities, Agriculture, Forestry and other Land use, Marine and Coastal Environments and Civil Security and Protection) which fit into the mid-to-long-term innovation plans of the public buyers. The findings of the analysis conducted, as explained in the sections above, show that there is room for innovation in all the four challenges, with some more specific solutions addressing the floods challenge which may require less R&D efforts. However, the analysis (including the completion of the SOTA analysis and business case) and discussions with public buyers may lead to the choice of one overarching challenge (which could be the water challenge as deemed essential to other challenges to anticipate on climate risks of floods, fires and subsidence).

The envisaged future PCP will be a joint procurement of research and development services launched to reinforce public demand driven innovation in end-user services in the area of climate adaptation and mitigation. Public buyers from different EU Member States and different types of users (e.g. water agencies, environmental agencies, first responders, firefighters, LEAs and cities) aim to use the PCP approach as an effective demand-side innovation action and a useful tool to close the gap between supply and demand for innovative solutions. In principle, the solutions developed and tested in the future PCP are expected to achieve TRL 7-8 to deliver successful innovative and fully tested product(s) and/or service(s) that meet the common needs of the public buyers speeding up the time-to-market and providing best value for money.

The future PCP on the customization/pre-operationalisation of prototypes of end-user services in the area of Climate Change Adaptation and Mitigation will contribute to the European Green Deal related domains benefiting from further deployment, uptake and exploitation of Environmental Observation data and products. Furthermore, it will contribute to fit-for-purpose Environmental Observation Systems and a strengthened Global Earth Observation System of Systems (GEOSS).[17]

The PCP proposal will take into consideration the following topics:

- **Innovative governance, environmental observations and digital solutions in support of the Green Deal (2023/24):** To take advantage of the use, uptake, and deployment of environmental observations as well as digital and data-based green solutions, assessed through the European Green Deal's 'do no harm' principle, is key for innovative governance models and for designing, implementing and monitoring science-based policy. To maximise impacts of R&I on the ground and spark behavioural and socio-economic change, the knowledge and innovation produced throughout the whole cluster should be widely disseminated to and exchanged between the key stakeholders and end users. In particular, the

[16] HORIZON-CL6-2024-GOVERNANCE-01-5: Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation.

[17] The mission of the Group on Earth Observations is to build the Global Earth Observation System of Systems (GEOSS) GEOSS (earthobservations.org) https://www.earthobservations.org/geoss.php. If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, they must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

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Agricultural Knowledge and Innovation Systems (AKIS) need to be strengthened in line with the 2023-2027 CAP to accelerate the required transformative changes.

- **Innovating with governance models and supporting policies:** Considering that transformative changes such as those required within the European Green Deal are dynamic processes and require appropriate governance. To ensure coordination and collaborative and informed decision-making, governance of multiple channels and networks that provide readily available and robust data and information from different sources is required. The activities will consider new ways to govern the transition process and strengthen the governance, in particular by ensuring i) appropriate and inclusive engagement with stakeholders, e.g. civil society and regional and local actors, ii) environmental observations coverage, and iii) that information and knowledge is made available and accessible. R&I for governance to support the European Green Deal should provide insights into the opportunities to overcome potential institutional barriers such as lock-ins, path dependency, political and cultural inertia, power imbalances and the ways to strengthen the effectiveness and efficiency of regulatory pathways. It should also help create synergies and linkages between different policy instruments and funding opportunities. Innovative governance supporting the European Green Deal objectives needs to recognise, cope with and promote resilience and inclusiveness in the face of on-going shocks and disruptions across Europe and the world, whether these be climatic, ecological, economic, social, geopolitical or related to agricultural inputs and resources, food, health, bio-based sectors or the wider bioeconomy. The creation of networks with the public (citizen engagement) and researchers, including also through digital technologies, can step up transformation and enhance resilience in different areas, such as food. Critical risk assessment and reduction strategies need to be incorporated, including the diversification of infrastructures, resources and knowledge through more self-sufficiency and autonomy. Innovative governance will: i) support social innovation in the bioeconomy and bio-based systems (e.g. revitalisation of local communities with innovative bio-based business models and social innovation, or with co-creation and trust-building measures for biotechnology and bio-based innovation systems); ii) assess existing and emerging trade-offs of land and biomass; and iii) strengthen the national bioeconomy networks in countries taking part in the Central-Eastern European Initiative for Knowledge-Based Agriculture, Aquaculture and Forestry in the Bioeconomy (BIOEAST Initiative).[18]
- **Deploying and adding value to environmental observations**: Data and information obtained through environmental observation is of great value when assessing the state of the planet and is crucial to supporting the European Green Deal and the climate and ecological transitions. Integrating this information from different sources (space-based, airborne including drones, in-situ and citizens observations) with other relevant data and knowledge while ensuring (better) accessible, interoperable or deployable information, provides the information necessary for shaping the direction of policy development in the broad context of Cluster 6A strong link to Copernicus, the European Earth observation and monitoring part of the EU Space programme (in Cluster 4 - Digital, Industry and Space) and the European Space Agency's (ESA) Earth observation programme, as well as support to the Group on Earth Observation (GEO), its European regional initiative (EuroGEO), the Global Earth Observation System of Systems (GEOSS) and the European Commission initiative *DestinationEarth*[19] is foreseen for topics on environmental observations. R&I activities relevant to the ocean, seas and coastal waters will complement and support the UN Decade of Ocean Science for Sustainable Development and

[18] https://bioeast.eu/. The new partnership 'Agriculture of Data' will help improve the sustainability performance of agricultural production and strengthen policy monitoring and evaluation capacities through using the full potential of Earth and environmental observation and data technologies. It will address public and private sector interests in a synergetic way. This will be done through responsible R&I delivering data-based green solutions and through establishing governance structures which allow for systemic approaches to capitalising and using data. The partnership for a 'Climate-neutral, sustainable and productive Blue Economy' will enable a just and inclusive transition to a climate-neutral, sustainable and productive blue economy providing for a healthy ocean, people's wellbeing, and a blue economy that is in harmony with nature and whose benefits are distributed fairly.

[19] https://digital-strategy.ec.europa.eu/en/policies/destination-earth.

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the UN Decade on Ecosystem Restoration, the G7 Future of the Seas and Oceans Initiative, the European Global Ocean Observing System (EOOS) and the GOOS 2030 strategy.

- **Digital and data technologies as key enablers:** Digital and data-based innovation, in complementarity with activities supported by Cluster 4 and the Digital Europe Programme, should bring benefits for citizens, businesses, researchers, the environment, society at large and policymakers. The potential of the ongoing digital transformation, and its wider impacts – both positive and negative – need to be better understood and monitored in view of future policy design and implementation, governance, and solution development. The potential for digital and data technologies, including AI-, IoT-, and augmented reality-based solutions, to increase the sustainability and resilience of production and consumption systems, as well as industry and services, in sectors covered by this Cluster will be exploited. This destination will contribute to the development, support and take up of innovative digital and data-based solutions to support communities, economic sectors relevant for this cluster and society at large to achieve sustainability objectives. The focus is on overall sustainable solutions tailored to the needs of end-users and/or the systems. More specifically, R&I activities will contribute to economic circularity by promoting reuse of materials and waste reduction, adding value to existing knowledge and increasing cost-effectiveness, safety and trustworthiness of innovative environmentally friendly technologies in and across primary production sectors, food systems, bio-based sectors, bioeconomy, and sectors related to the oceans and biodiversity. It will also increase attention given to precision and collaborative technologies and contribute to the human-centric twin green and digital transitions. This is a key policy objective that is also supported by the cross-cutting objective pursued by the CAP, the EU digital strategy, the European industrial strategy, the circular economy action plan, the SME strategy and the European data strategy.
- **Strengthening agricultural knowledge and innovation systems (AKIS):** It refers to the organisation and knowledge flows between persons, organisations and institutions who use and produce knowledge for agriculture and interrelated fields. Knowledge and advice to all actors relevant are key to improving sustainability.
- **Social innovation**: It has the potential to strengthen the resilience of communities, increases the relevance, acceptance and uptake of innovation, and helps bring about lasting changes in social practices, therefore acting as a system changer. Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake. If required, the topics will be coordinated with European Space Agency (ESA) actions so that ESA space data and science can be proactively integrated into the relevant research actions.

In this context, the PCP proposal should set out a credible pathway contributing to innovative governance and sound decision-making on policies for the green transition and more specifically to one or more of the following impacts:

- Innovative governance models enabling sustainability and resilience notably to achieve better informed decision-making processes, societal engagement and innovation.
- Areas related to the European Green Deal benefit from further deployment and exploitation of environmental observation data, products and “green” solutions.
- A strengthened Global Earth Observation System of Systems (GEOSS).[20]
- Sustainability performance and competitiveness in the areas covered by Cluster 6 are improved through further deployment of digital and data technologies as key enablers.

[20] The European Commission is a member and co-chair of the Group on Earth Observations (GEO), as such the European Commission adopted the GEO Canberra Declaration and Commission Decision C(2019)7337/F1, and committed to contribute to the GEO objectives, including to the Global Earth Observation System of Systems (GEOSS). Where appropriate, proposals are encouraged to cooperate with the European Commission Knowledge Centre on Earth Observation (KCEO) https://knowledge4policy.ec.europa.eu/earthobservation_en, in order to e.g. disseminate and exploit results.

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- Stakeholders and end users including primary producers and consumers are better informed and engaged thanks to effective platforms such as AKIS.
- Strengthened EU and international science-policy interfaces to achieve the Sustainable Development Goals.

The PCP proposal will also assess the compliance with the "Do No Significant Harm" principle according to which the project's activities should not support or carry out activities that cause a significant harm to any of the six environmental objectives of the EU Taxonomy Regulation.[21]

6.1. The Public Buyers

Twelve (12) public buyers have committed to participate in the PCP as part of the PBG in the context of the proposal submitted to the HE PCP call. Several technical organisations are also committed to support the development of the testing and validation plans. Other seventeen (17) organisations are interested in joining as supporting organisation and/or the Stakeholders Group (SG). In addition, eleven (11) organisations provided letters of intent as part of Task 3.6. to participate in the further development of use cases and benefit from the activities and lessons learned from the project.

Role	Organisation	Country
Lead Procurer	STICHTING TOEGEPAST ONDERZOEK WATERBEHEER	THE NETHERLANDS
Public Buyer	HET WATERSCHAPSHUIS (hWh)	THE NETHERLANDS
Public Buyer	FORUM VIRIUM HELSINKI OY (FVH)	FINLAND
Public Buyer	MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY (MINISTRY OF INTERIOR SLOVAKIA) (MoI)	SLOVAKIA
Public Buyer	GEMEENTE HAARLEM (CITY OF HAARLEM)	THE NETHERLANDS
Public Buyer	BUNDESANSTALT TECHNISCHES HILFSWERK (THW)	GERMANY
Public Buyer	REGION OF CENTRAL MACEDONIA (RCM)	GREECE
Public Buyer	FORENINGEN KLIMATORIUM (KLIMATORIUM)	DENMARK
Public Buyer	BENEGO – GRENSPARK KALMTHOUTSE HEIDE	BELGIUM
Public Buyer	INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA (ICGC)	SPAIN
Public Buyer	CITY OF ROTTERDAM	THE NETHERLANDS
Public Buyer	SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA (SLOVAK ENVIRONMENTAL AGENCY) (SEA)	SLOVAKIA

[21] As per Article 17 of Regulation (EU) No 2020/852 on the establishment of a framework to facilitate sustainable investment (EU Taxonomy Regulation).

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First Responders	BAYERISCHES ROTES KREUZ (BRK)	GERMANY
First Responders	ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO (ISEMI)	SLOVAKIA
Technical Institution	INSTITUT D'ESTUDIS ESPACIALS DE CATALUNYA FUNDACION (IEEC)	SPAIN
Technical Institution	CLIMATE-KIC HOLDING BV (CLIMATE KIC)	THE NETHERLANDS
Technical Institution	AEROSPACE VALLEY (AV)	FRANCE
Technical Institution	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV (FRAUNHOFER)	GERMANY
Technical Institution	UNIVERSITEIT TWENTE (UT-ITC)	THE NETHERLANDS
Technical Institution	FUNDACIO PRIVADA I2CAT, INTERNET I INNOVACIO DIGITAL A CATALUNYA (I2CAT)	SPAIN

Table 3: Organisations committed to participate in the Water challenge PCP

A brief description of the public buyers is provided below:

1. STOWA works collaboratively with universities, knowledge institutions, and the business community, and supports water boards in meeting short and long-term water management challenges.
2. HET WATERSCHAPSHUIS (HWH) facilitates knowledge sharing and resource optimisation, strengthens the Netherlands' resilience against water-related challenges. Together, these organisations play a vital role in ensuring effective water management practices nationwide, contributing to the country's sustainability and resilience against water-related risks.
3. FORUM VIRIUM HELSINKI (FVH) is dedicated to advancing Helsinki's smart city initiatives through technology and innovative solutions by engaging diverse stakeholder to contribute to Helsinki’s climate goals.
4. THE MINISTRY OF INTERIOR OF THE SLOVAK REPUBLIC (MOI) ensures efficient procurement of goods and services. Through initiatives like the iProcureNet project, MOI promotes innovation in public procurement, addressing security sector needs and fostering cross-border collaboration.
5. THE CITY OF HAARLEM is a recipient of the 2022 Innovation iCapital Award, is a leader in innovation within the Netherlands. With a focus on climate adaptation, sustainability, and fostering innovative SMEs and startups, Haarlem aims to procure 100% circular by 2030, addressing challenges such as urban heat island effects and local flooding.
6. BUNDESANSTALT TECHNISCHES HILFSWERK (THW) is a civil protection agency in Germany, providing technical relief nationally and internationally, and civil protection.
7. THE REGION OF CENTRAL MACEDONIA (RCM) is known for its extensive track record in initiatives such as participation in the INCAREHEART PCP procurement process and its unique mechanism supporting the regional ecosystem's capacity, extroversion, startup support, and project scaling within the framework of RIS3.

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8. KLIMATORIUM – INTERNATIONAL CLIMATE CENTER IN DENMARK spearheads collaborative efforts to address climate challenges at local and global levels. Through a living lab approach and circular thinking, Klimatorium develops sustainable solutions and fosters knowledge dissemination to build climate resilience.
9. BENEGO - GRENSPARK KALMTHOUTSE HEIDE (GKH) fosters cooperation in the Dutch and Belgian border in topics including climate change, water management and innovation.
10. THE CARTOGRAPHIC AND GEOLOGICAL INSTITUTE OF CATALONIA (ICGC) provides expertise in geo-information science, security strategies, and spatial data infrastructure.
11. THE CITY OF ROTTERDAM is one of the main cities in the Netherlands characterised for being one step ahead in innovations.
12. SLOVAK ENVIRONMENTAL AGENCY (SEA) specialises in environmental protection and climate change adaptation. Engaged in environmental monitoring and informatics, SEA actively contributes to designing, developing, and implementing environmental information systems, particularly in geoinformatics and remote sensing.

Other organisations are committed to join to provide their expertise :

1. BAYERISCHES ROTES KREUZ (BRK), the Bavarian Red Cross is committed to a more social, better and stronger Bavaria, ready to crises and disasters.
2. ISEMI, a non-profit organization supporting the implementation of security strategies for various international organizations, specializing in areas such as police cooperation, counter-terrorism, and emergency management.
3. THE INSTITUTE OF SPACE STUDIES OF CATALONIA (IEEC) is a distinguished space research and innovation hub with 25 years of expertise, spearheading Catalonia's New Space Strategy for global prominence in space endeavours and the Bavarian Red Cross (BRK) play pivotal roles in environmental stewardship, urban infrastructure development, and disaster relief.
4. CLIMATE-KIC is Europe's premier climate innovation agency, catalysing collective action to bridge the gap between climate commitments and reality.
5. AEROSPACE VALLEY is France's top innovation cluster in aeronautics, space, and unmanned systems, fuels regional growth and job creation through research and development, fostering collaboration between industry and academia to advance aerospace technologies.
6. FRAUNHOFER AVIATION & SPACE, comprising over 30 institutes, conducts and fosters innovation in climate resilience, aerospace technology, and research advancement.
7. UNIVERSITY OF TWENTE, FACULTY ITC (UT-ITC), ITC collaborates with international organizations to address global challenges through spatial data analysis and research.
8. THE I2CAT FOUNDATION drive transformative solutions using advanced technologies. Together, these diverse partners form a robust consortium committed to addressing complex societal challenges through innovation, collaboration, and knowledge exchange.

In addition, the following entities have expressed their support to the PCP proposal and willingness to be part of a Stakeholder Group.

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No.	Organisation	Supporting	Stakeholder Group (SG)
1	ARPA Lombardia		X
2	European Association for Remote Sensing Companies (EARSC)		X
3	French National Fire Officers Academy (ENSOSP)		X
4	Hoogheemraadschap De Stichtse Rijnlanden (Regional Water Authority		X
5	Irrigation Community Segarra-Garrides in Catalonia	X	X
6	Ministry of Climate Action, Food and Rural Agenda. Government of Catalonia		X
7	Ministry of Interior of France		X
8	Netherlands Space Office		X
9	Provincie of Limburg		X
10	Région Provence Alpes Côte D'azur (PACA)		X
11	Technology Centre of Catalonia (EURECAT)		X
12	Toulouse Métropole	X	X
13	Waterschap Limburg	X	
14	Zilina Self-Governing Region		X
15	Municipality of Fundão		X
16	Emschergenossenschaft/Lippeverband		X
17	Regional Council of Nouvelle-Aquitaine	X	

Table 4: Supporting organisations and members of the Stakeholder Group

This preliminary overview of the committed parties shows a diverse array of institutions including research institutions, public agencies, innovation clusters, technical and supporting organisations, that bring a wealth of expertise and resources to implement a PCP for the Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation, to address the Water management challenge.

6.2. The PCP setup and planning

As discussed above, PCP is an approach that allows public procurers to buy R&D from several competing suppliers in parallel, to compare alternative solution approaches, and to identify the best value-for-money solutions that the market can deliver to address their needs. In PCP, there is a risk-

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benefit sharing under market conditions between the public procurer and the suppliers, and a clear separation between the PCP and the deployment of commercial volumes of end-products. The value of the total amount of products covered by the contract must be **less than 50 % of the total value of the PCP contract.**

The PCP tender will start with the publication of the contract notice along with the request for tenders, the framework agreement, and the phase contracts. After evaluating the offers submitted by the market operators according to the rules established in the tender documents, the contracts will be awarded and a contract award notice will be published. The process will be monitored to ensure sound deployment, integration, and validation of the PCP.

The PCP procedure will comprise three phases of solution design, prototype implementation, and validation and demonstration of the solutions:

- **PCP Phase 1 – Solution design [4 months**]: During this phase, the contractors will be asked to describe the solution providing the complete architecture and design thereof and verifying the technical, economic and organisational feasibility of their solution to address the PCP challenge.
- **PCP Phase 2 – Prototype development (and testing of technologies) [9 months]:** This phase concerns the development of the first prototypes of the solutions, which will be tested. Contractors will develop a first prototype based on the design documents delivered in the previous phase and test their solutions in lab conditions. Prototypes will be tested and verified to provide a measure of the technical performance of each solution in a controlled environment. During and at the end of phase 2, the Public Buyers (PB) will request from the contractors a series of deliverables in order to evaluate their progress and the performed activities and obtained results.
- **PCP Phase 3 – Validation and demonstration of the solutions (end-users piloting services in operational environment) [6 months]:** This phase will validate the final solutions in diverse conditions, using the detailed scenarios and processes developed in the verification and validation strategy. During phase 3, a feedback mechanism will be established between the PB Group and the selected contractors in order for the latter to receive requests for improvements directly from the end users. The PBG will request from the contractors an Integration Report. Finally, a Field Acceptance Report related to the accomplishment that the two final solutions which have been deployed and that the validation tests have been successfully performed in a real operational environment will be requested.

Evaluations after each phase will progressively identify the solutions that offer the best value for money and meet the customers' needs. This phased approach allows successful contractors to improve their offers for the next phase, based on lessons learnt and feedback from procurers in the previous phase. Using the phased approach with gradually growing contract sizes per phase will also make it easier for smaller companies to participate in the PCP and enable SMEs to grow their business step-by-step with each phase. The initial estimation of the PCP budget is shown in Section 6.3. Table 7. The reasoning for the PCP budget allocation with emphasis in Phase 2 is based on the complexity of the technology and the development required given the multiple layers and use cases that will be clustered and tackled in Phase 2.

After each phase, intermediate evaluations will be carried out to progressively select the best solutions. Contractors that are evaluated as successful after phase 1 will be invited to bid for phase 2 contracts. Likewise, contractors that are evaluated positively after phase 2 will be invited to bid for phase 3 contracts. During phases 2 and 3, contractors will be invited to communicate with the PCP Consortium about any specific requirements to ensure the developments made within the project.

In principle, one overarching challenge (with several selected use cases) will be tackled possibly in one PCP without lots. In phase 3, up to two selected solutions may be validated.

The law applicable to the potential future PCP will be the law of the lead procurer, which may be Dutch law.

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6.3. Budget per phase

The initial description of the PCP budget per phase presented in the OMC document was based on the HE PCP 19M grant and the options of having a PCP comprising two challenges and possible sub-challenges, to allow a larger number of providers to participate, in particular in the phase 1 and phase 2 of the PCP. This approach, however, needs to be further analysed and defined in consideration of the results of the business case.

In this regard, the tables below should be taken as mere examples including the expected number of suppliers, the budget per supplier and the duration of each phase. In case of less suppliers admitted to each phase based on the evaluation (award) criteria, the remaining budget may be shifted to increase the budget for the successful suppliers in the next phase.

In D3.1 Orientation Paper (first version), four (4) options were presented which included two challenges and a higher number of suppliers per phase. However, based on the discussions held with the public buyers who expressed their commitment to be involved in the PCP, a new budget allocation for the overarching Water challenge is justified by the strategy to incentivise the market cooperation and synergies of consortia built up on specific complementarities of technology providers, as explained below.

Budget and contractors per PCP phase

The following table summarizes the selected procurement approach for the overarching Water challenge on the number of contractors, budget per contractor, total budget per phase, duration per phase and total PCP budget.

PCP Phase	No. Contractors	Budget per contractor	Total budget	Phase duration
Phase 1 solution design	5	300000	1500000	4 months
Phase 2 prototype development	3	2400000	7200000	8 months
Phase 3 testing and validation	2	1554544	3109088	6 months
		TOTAL	**11809088**	**18 months**

Table 5: PCP phases, number of suppliers, budget and phase duration

The overarching Water challenge and the market rationale

Given the complexity of the overarching Water challenge that aims to comprise several use cases in different domains, the procurement strategy seeks to encourage the technology providers to make synergies and combine their skills, work field and technologies to tackle all the use cases. As such, the PCP strategy, specifically the number of contractors per phase and the budget allocated per phase will steer the market to build up consortia to submit a bid.

In the context of PCP, a contractor would represent a consortium/group of large and small companies expected to consist of:

1. At least 1 big (mostly civil) engineering company with a capable hydrological/hydraulic division (they mostly work on road-/channel construction/tunnels/groundwater management in cities and rural areas. They deliver professional services for clients, based on sound contracts with deliverables mostly with government or industries (capable liabilities/financial, legal, contractual division needed). Besides their operational experience they also have a professional workaround dealing with projects, subcontractors, and milestones/deliverables and capable of TRL8 (even to TRL9/10 when having good client divisions), They provide/host also mostly the IT facilities in combination with below subcontractors.
2. A group of small specialised companies:

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a) hydrological modelling/service companies (in subcontract of the above large company) with a track record of hydrological (pre-commercial not scientific) projects executed for operational request of water management authorities (regional, national). They have to focus on the mandatory SWVA system development towards TRL8. The space component can be input to this from the category 2b and 2c

b) satellite value-added companies who deliver specific operational spatial/temporal information products related to the specific requirements for the use cases selected (proven portfolio to clients, not research projects only) as input to the hydrological value chain, they have their internal IT-data chain facilities for processing, but need to link up with the hydrological modelling chain. Mostly 1 or 2 specialistic satellite value chains are in 1 company. So, it is expected to have more SMEs in this category in the consortium

c) Sometimes a and b are combined in 1 specialised company but requires critical mass and capacity to have a TRL8 operational (processing/data/information/delivery) environment.

3. Knowledge partner (institute or applied R&D organization or applied research company) who can address specific research issues and have enough networks to find the best solution direction.
4. Solution architect (IT) company who can combine/integrate all the various aspects of the total solution and also facilitate the links between all IT aspects in the consortium and client environment, but also is aware of the AI, OGC, INSPIRE, privacy directives and EC regulations.
5. A specific professional communication/organisational/sector company: The functional translation to link up with client environment is often a separate company who can speak the right (water/functional/management) language (and have the trust) of the client.
6. (Optional) A legal and IPR specialised company could help the consortium in developing patents (and mutual internal partner/owner rights of the) long-term services for TRL8 services.

In addition to the contractor strategy, the PCP setup should guarantee some crucial aspects (procurement essentials):

- Avoid creating preferred selling (locked in) mechanisms in the European market. Thus, it is necessary to develop a competitive strategy during the project and for the project afterlife. In this manner, it would be possible for other new consortia to still have a chance to provide services in the future. As developments are fast in this specialised field, it is important to ensure flexibility to improve/update the service portfolio. Therefore, this requirement needs to be communicated in the outreach to the market.
- Doing a 3 years project, the organisations can learn on procurement (in this specific sector), learn on gaps/missing components for further future development, so during and after the project it is important to build up an awareness for a future R&D programme with priorities (recommendation for other programmes in EU for applied research in water/climate domain).
- It is important to be adaptive to ongoing (national/EU climate policy and water management) developments during the project and with that a fit future vision and strategy building as a team.
- Define other topics that need to be discussed with the public buyers, support organisations and stakeholders.

Phase 2 is the most challenging phase as all of the above aspects need to be addressed in the prototyping and professionally further to be elaborated in the phase 3.

The strategy will evolve during the project in discussion with the installed governance/advisory teams in place.

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6.4. Evaluation of bids in the PCP

The tender documents will include specific provisions and related evaluation criteria. An initial indication on the evaluation committees involved and the steps to be followed are provided in this section. These aspects will be further defined and modified if needed at a later stage during the preparation of the actual PCP process.

In the PCP tender, after receiving the bids from interested technology providers, these will be evaluated according to the rules established in the tender documents, and the contracts will be awarded. The award of the contracts will be published in TED via a Contract Award Notice (CAN).

For the purpose of the evaluation of the bids, the following different bodies can be appointed:

- **The Administrative Procurement Committee (APC)** will be composed by at least three members of the Lead Procurer and will have a dedicated role with the view to support and spend up the tender procedures during the procurement execution. In this regard, the APC members will support the Lead Procurer on the tender's evaluation (evaluating the tenders against the exclusion and selection criteria, contact excluded bidders).
- **The Financial Evaluation Committee (FEC)** will be constituted by a group of experts, representatives from the Buyers Group, specialising in economic and business aspects of the procurement process. Chaired by the Lead Procurer's representative, the FEC receives supplementary assistance from economic advisors as necessary. The FEC conducts comprehensive reviews to assess the project's financial and business viability. Throughout all phases of the PCP process, the FEC supports the evaluation of the end-of-phase reports submitted by contractors. Its primary objective is to ensure alignment with economic and business-related requirements as drafted in the tender as well as to provide feedback on their commercialisation plans. Decisions within the FEC are reached through consensus and are then presented to the Procurement Evaluation Board (PEB) for final decision-making. This collaborative approach ensures that financial considerations are carefully integrated into the broader project framework, ultimately enhancing the project's overall success.
- **The Technical Evaluation Committee (TEC)** will be comprised of technical and domain-specific experts, a representative from the Buyers Group, and chaired by the Lead Procurer's representative. It will receive support (without voting rights) from expert advisors as needed. The primary responsibility of the TEC is to ensure the project progresses in a timely manner and the delivery of high-quality results. Throughout all phases of the PCP process, the TEC will review the end of phase reports and the proposals submitted by contractors, ensuring compliance with technical requirements. The committee proposes acceptance or rejection of deliverables and the proposals to the PEB. The TEC addresses complaints submitted by economic operators during the tendering process, providing recommendations to the PEB for final decision. Decisions within the TEC are reached through consensus, reflecting a collaborative approach to project oversight and decision-making.
- **The Procurement Evaluation Board (PEB),** chaired by the Lead Procurer representative and integrated of at least one representative from each end user, will serve as the decision-making body overseeing the tendering process and subsequent contract execution**.**

Bids will be evaluated in a non-discriminatory and transparent manner.

At the end of the evaluation procedure, a ranking will be drawn up, in which the technology providers will be inserted based on the overall score achieved, in descending order.

In case the bids of two or more technology providers obtain the same overall score, but with different partial scores for the price and for all the other different evaluation elements, the technology provider who obtained the best score on the technical offer will be placed first in the ranking.

The evaluation process and initial contract award will follow steps:

- Step 1: Checking the exclusion criteria per technology provider. Performed by the APC.

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- Step 2: For technology providers passing step 1, checking the selection criteria per technology provider. Performed by the APC.
- Step 3: For technology providers passing step 2, checking the pass/fail award criteria per technology provider. Performed by the APC.

Formal Approval by PEB of the outcome of the three prior steps.

- Step 4: For technology providers passing step 3, evaluating the Bids based on the weighted award criteria. Performed by TEC.
- Step 5: Opening of the financial offers. Performed by APC.
- Step 6: Evaluation of the financial offers. Performed by FEC.

Formal Approval by PEB of the outcome of the two prior steps.

- Step 7: Final ranking by PEB.
- Step 8: Provisional award decision by PEB & communication thereof.
- Step 9: Final award decision after the standstill period (ten days) & signing of framework agreement and phase 1 contract.

This approach should be further fine-tuned based on the detailed design of the procurement strategy and the evaluation scheme**.**

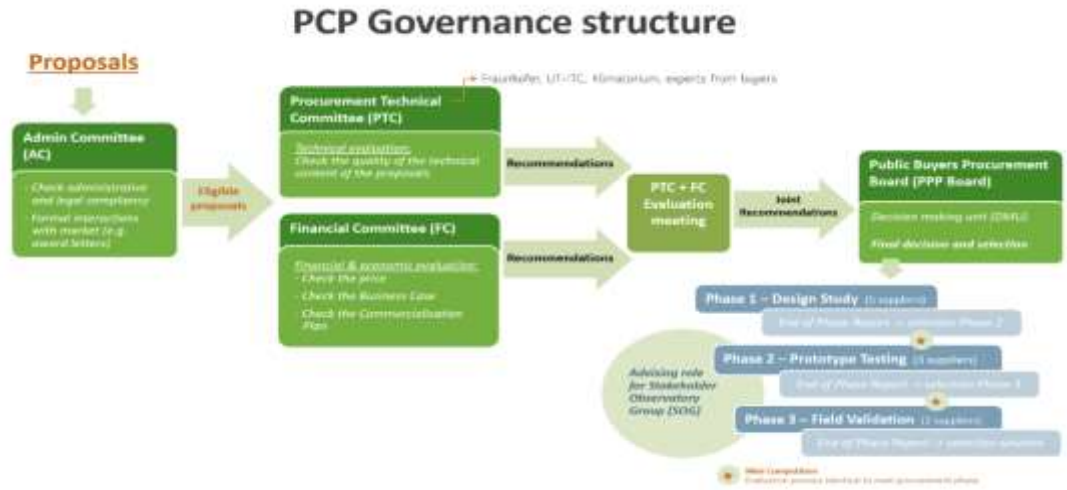

Figure 12: Possible PCP Governance structure

6.5. Contract's implementation

During the implementation of the potential future PCP, it is recommended to have effective tools to monitor performance of the R&D suppliers and provide regular feedback during each phase. For example, each contractor could be assigned a main contact person (their supervisor) appointed by the procurers as the main point of contact.

Other relevant activities to be considered are :

Pre-monitoring: A kick-off meeting per contractor can be scheduled at the beginning of each PCP Phase and the selected contractors will be requested to present their implementation schedule for the PCP Phase that they are entering. During the same meeting, the supervisor will present the framework for the review. The objective is to establish a close and fruitful communication channel with the

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contractors, in order to ensure from the early beginning of the action that the project is implemented according to the needs of the buyers.

Monitoring: Contract implementation can be monitored and reviewed against the expected outcomes for each phase. The intensity of monitoring and communication between the Public Buyers Group and the contractors will increase from Phase 1 to Phase 3. For instance, regular meetings with the contractors by videocall or face-to-face, on-site visits to the contractors' locations to check and discuss the status of the work and progress, or any other suitable way. Ad-hoc meetings and on-site inspections are also possible in the event that the R&D development has halted or slowed down.

Post-monitoring: At the conclusion of the monitoring activities, the supervisor will provide written feedback for each contractor at each PCP Phase. This feedback will generally consist of overall comments and remarks about the contractor's outcomes under review. Monitoring activities will be continued after the PCP is completed. Specifically, it will be checked whether the contractors are successfully commercializing the R&D results within the call-back period defined in the PCP framework agreement. If that is not the case, the PCP Consortium will ask the R&D suppliers to give licenses under Fair, Reasonable And Non-Discriminatory (FRAND) terms to other third parties, or will ask to transfer back the ownership of results to the Public Buyers Group. Other contractual obligations of the contractors that go beyond the end of the PCP are, for instance, providing information or support to the Public Buyers' Group in connection with the PCP solution, contributing to standardization, obligations regarding publication of information about the contract, auditing/keeping data obligations, etc.

The intensity of monitoring and communication will increase from Phase 1 to Phase 3 through regular contacts with each R&D provider by teleconference means, face-to-face meetings or any other way that is suitable.

Data management: The data collected and generated during PCP-WISE will be managed in line with the FAIR principles (Findable, Accessible, Interoperable, Reusable) according to the needs of the project. Types of data/research outputs (e.g. experimental, observational, images, text, numerical) and their estimated size; if applicable, combination with, and provenance of, existing data: (1) Persistent identifiers like digital object identifiers (DOIs) and trusted repositories ensure data findability. (2) Open access timelines and provisions for restricted data access are outlined, considering intellectual property rights (IPR) and verification needs. (3) Interoperability standards, formats, and vocabularies for data and metadata enhance data exchange. (4) Data reusability is facilitated through licensing agreements (e.g., Creative Commons), and tools/models for data generation and interpretation are provided. (5) Curation, storage, and preservation costs are managed by dedicated teams responsible for data management and quality assurance. These practices not only enhance open science rigor, but also contribute to addressing gender disparities by promoting transparency and inclusivity in research processes. This effort will also tie into the Data Management Plan (DMP) for the project, which stipulates the data management principles that the consortium partners will adhere to in their work.

6.6. Testing strategy

The testing strategy will consider the challenge requirements, outcomes and impact of the PCP. The testing strategy will be developed by defining the selection, compliance and award criteria, performance conditions and IPR strategy. A verification and validation strategy will be in place in order to summarise the technical verification and operational validation processes that will be followed for evaluating the companies. This takes into account external systems, applications, protocols and data formats for the development of the interoperability and integration strategy of the PCP solutions, as well as IPR clauses attached to the proposed solutions.

Verification and validation activities should be planned, notably at the end of each PCP phase. While verification is often understood as a technical evaluation or testing targeting compliance with requirements or non-functional conditions, validation is a broader concept and also covers assurance that nontechnical phase outcomes (as interoperability, replaceability, re-usability, (cost) efficiency,

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timeliness, etc) are in line with PCP Buyers group needs and expectations, and fully integrate climate change implications as well as short term requirements.

Further work is required in PCP Phase 0, including the definition of the verification and validation strategy targeting comprehensive and systematic approach to the activities from curiosity driven research concept to the actual acceptance testing. In this sense, the verification and validation strategy will not only deal with specific procedures for the evaluation of the performance, or assurance parameters, but also the link between various levels of abstractions, from scenarios, requirements, specifications and others to the final technical solution or cost assumption validations. It includes the following steps:

- Step 1: definition of the overall verification and validation strategy that describes the approach including procedures and processes regarding the verification and the validation activities after each phase.
- Step 2: definition of the technical verification strategy that analyses how the PCP Consortium will verify that the prototypes being built at PCP Phase 2 meet system requirements. Evaluation or testing activities related to this step should be performed with the support of the technical advisors.
- Step 3: definition of the operational validation strategy that describes the methods, measures and procedures needed to assure that PCP users are satisfied with outcomes of each phase, and that these outcomes are in line with their needs and expectations, including requirements, specifications, planning, cost assumptions, internal feasibility and other issues. For the validation in each phase, KPAs (Key Performance Areas), KPIs (Key Performance Indicators) and (Project Management Owners) MOEs should be defined. The core of the operational validation strategy should be the definition of a benchmark methodology for the developed solution. In order to compare the final solutions validated in Operational environment in PCP Phase 3, the results generated by the PCP prototypes should be assessed using the use cases developed.

6.7. Intellectual Property Rights

Intellectual Property Rights (IPRs) are the rights that adhere to creations and grant the holder(s) thereof a monopoly on the use of that creation for a specified period and subject to certain exceptions. The underlying aim of granting such (temporary) monopoly is to incentivise creators to share their creation with the public, and to achieve the social benefits of increased creative activity.

Traditional IPRs – such as patent, copyright and trademark – are generally fully disclosed to the public domain, meaning that the essential qualities of the protected subject matter are made available for public inspection. Public and third party use of IPRs is however curtailed by the requirement of needing a ‘license’ to use the IPR productively.

In the context of the PCP, the IPR will be distinguish between “background IPR”, “sideground IPR” and “foreground IPR” depending on when they are generated.

“Background IPR” refers to the pre-existing intellectual property and trade secrets produced before the project and which the parties (public buyers and contractors) bring to the PCP, and which may be built-upon, modified or improved during the procurement. As a general rule, the background IPR remains the property of the party who generated it. Given this, access rights may need to be granted to the public buyers to ensure that they are able to conduct the activities they are involved in during the PCP (e.g., analysing and testing of solutions) and to use the PCP results that incorporate background IPR.

“Sideground IPR” refers to intellectual property produced during the period of the PCP but not in the activities covered by the PCP contract itself. In the vast majority of cases, the sideground IPR remains the property of the party who generated it. Given this, access rights may need to be granted to public procurers to ensure they are able to conduct the activities they are involved in during the PCP project

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(e.g., analysing and testing of solutions) and to use the PCP results, which incorporate the sideground IPR.

"Foreground IPR" refers to the intellectual property and trade secrets produced in and during the PCP.

In the potential future PCP, the contractors will retain ownership of the IPRs that they will generate during the PCP and will be able to use them to exploit the full market potential of the developed solutions. Contractors will be in a position to commercialise the innovations derived from a public procurement, to secure the appropriate protection of the intellectual property and to defend – if necessary – the intellectual property rights in court. In exchange, the public buyers will receive an irrevocable, indefinite, worldwide, royalty-free, non-exclusive license to use all project's results at no additional cost. Moreover, it might have the right to require the companies that participate in the PCP to license the results to other third parties, under FRAND conditions.

In case of non-exploitation of the results or abuse of the results against public interests or failure to commercialize the results, the Public Buyers Group will have the right to require the transfer of the IPRs generated by the company during the PCP (call back clause).

The results will be disseminated according to open access rules and obligations, whilst safeguarding at the same time the IPRs of the members of the PROTECT and the contractors (both background and foregrounds rights).

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7. Conclusions and recommendations

As a result of the activities conducted in the framework of the PROTECT project**, four procurement challenges have been identified and selected with the purpose of exploring the feasibility and grounds to implement a PCP**. The common challenges and functional requirements are considered to have a high climate and procurement impact with cross-border relevance for multiple public buyers and users across Europe.

Based on the preliminary results of the preparatory steps (following the EAFIP methodology), in particular the SOTA analysis and the results of the Open Market Consultation, it is possible to reach the conclusion that **the four challenges require R&D efforts in order to tackle the functional requirements identified in the different use cases**. Therefore, the recommended approach for the four challenges is the possible implementation of a PCP.

Nevertheless, it has been noted that **some existing solutions could tackle some functionalities of the floods challenge**. In this case, it could be possible to apply the PPI approach, in particular one of the procedures established in the Public Procurement Directives for the only purpose of testing solutions without the possibility of actually purchasing the solution as such. This approach could be also applied by public buyers interested in any of the solutions presented during the e-pitching sessions.

Further analysis of the OMC results and discussions with the public buyers led to **scoping one challenge that could cluster different use cases** relevant to the other 3 challenges. As a result of the agreement of committed public buyers, the Water (management) challenge was selected given the importance and impact of water intelligence solutions on use cases related to floods, fires and sustainable and resilient infrastructure across domains, to be validated by end users from cities, agricultural agencies, first responders and water management agencies.

The justification of the selected use cases is the integral assessment of day-to-day SWVA conditions with space-based value chains based on local/central knowledge (AI, EO-Inversion/hydrological modelling, etc.). This will provide a first basis of local water intelligence for the use case stakeholders. Driven by the required functions in their organisations, the translation from the SWVA conditions towards regular or crisis management processes (e.g. risk indicators) can be achieved.

For the preparation of the PCP proposal to respond to the HE PCP call, **this orientation paper has set some considerations for the selection of the PCP and/or PPI approach**, and possible provisions to strengthen the EU strategic autonomy and resilience, such as the 100% of R&D performance in EU Member States or Associated countries. It may also be **important to consider allowing a good number of suppliers to participate in phase 1 and phase 2 of the PCP** increasing the chances of alternative solutions and incentivising more startups and SMEs to present (joint) bids in the PCP tender.

The paper has also outlined the relevant topics and guidelines to set up the procurement strategy based on the selection of **the Water (management) challenge linked to EO data relevant for crises** prediction, prevention and mitigation, including updated allocation of the PCP budget, the evaluation of bids, the contract implementation, the testing strategy and the intellectual property rights regime.

In this context, this **Orientation Paper was updated to reflect the developments in the assessment of needs and the procurement strategy** linked to the outcomes of the work performed in cooperation with the committed public buyers who submitted the proposal to the HE PCP call. In the implementation process the (selected) use cases in Europe will provide a representative spectrum of requirements for the procurement process.

Finally, it is recommended to consider additional preparatory activities and the final selection of use cases once/if the PCP HE grant is awarded to finetune and tailor the PCP tender documents accordingly.

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ANNEXES

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ANNEX 1 – CHALLENGES & USE CASES

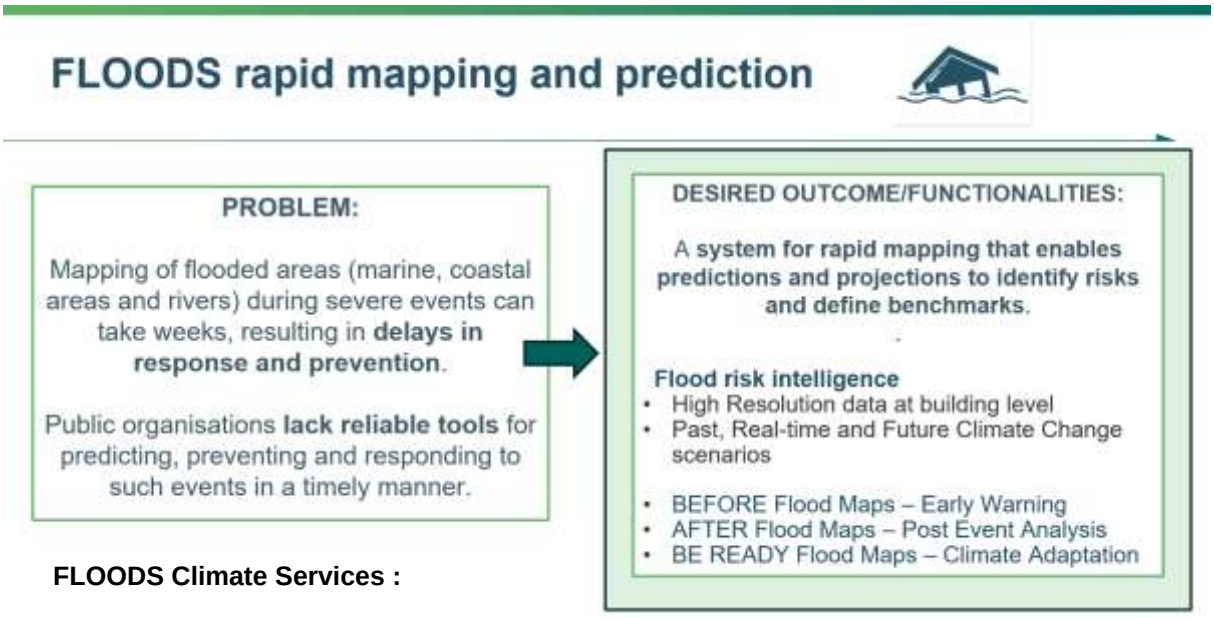
1. Floods challenge

Currently, the mapping of flooded areas (marine, coastal areas and rivers) during severe events can take weeks, resulting in delays in response and prevention. Public organisations lack reliable tools for predicting, preventing and responding to such events in a timely manner.

Some foreseen steps are:

1. Implementing a unified repository for historical data along with a single Application Programming Interface (API)
2. Connecting rapid mapping and climate services to the repository
3. Transforming mapping processes into algorithms for more efficient and automated analysis.
4. Utilising efficient tools and systems to support the mapping and analysis tasks.
5. Ensuring proper utilisation of the tools by a skilled team with the necessary expertise.

The desired outcome is to establish a system for rapid mapping that enables predictions and projections to identify risks and define benchmarks. This will involve the development and utilisation of software capable of higher resolution and timely acquisition of satellite information.



FLOODS Climate Services :

- Digital Twin and EO, climate and geospatial data integration
- Cloud and API based solution
- Fast algorithms for real time mapping
- Specific routine for what if scenarios
- Changing Climate
- Resilient Cities

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- User friendly and tailored for non-expert in hydrodynamic model

BEFORE Flood Maps – Early Warning

- Support Emergency Operations
- Support Early Warning
- Displacement of people at high risk
- Put in place rapid mitigation measures for reducing the damages
- Rapid Mapping tools
- What if scenarios
- River Breaching or overtopping
- Extreme Sea Level
- High Resolution Data
- LIDAR Data'

AFTER Flood Maps – Post Event Analysis

- Flood Mapping from Satellite images
- Copernicus Sentinel
- Cosmo Sky Med
- From Flood Mask to Flood Depth
- Damage Assessment building by building

BE READY Flood Maps – Climate Adaptation

- Support Land Use Planning and Adaptation Strategies in Cities
- Identification of hot spot Risk
- Support in localizing and designing mitigation measures
- Physical Barriers
- Nature based Solution

Currents Gaps and Innovation Needs

High resolution data gaps

- Lack of flood data and risk maps
- Uneven coverage at global level
- Parametric Insurance Not Possible

Complex tools for selected experts

- Cost, Time and CPU-intensive Solutions
- Targeted highly skilled professionals

Static View of Flood Risk

- Not Possible to simulate a changing Resilient City with Adaptation and Mitigation infrastructures
- Multiple hazards/damages and climate scenarios

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Floods in regional adaptation

- **Flood risks figure prominently in major risk assessments and adaptation strategies in regions across Europe:**
  - a) Marine & coastal: Flooding risks in almost all coastal regions: sea level rise [Med FR,ES,northern IT,northern DE,PL], marine submersion [North and Baltic seas,ES-n,IT-n,FR-se], extreme rainfall, thunderstorms and gales [PL,ES-n], combinations of those factors [DE-n,ES-n,NL,LT,FR-w]
  - b) Sustainable urban communities: Risk of flooding in urban areas (heavy rainfall, river overflow, marine submersion, sea level rise), aggravated by soil degradation, itself amplified by droughts [BE,NL, IT,PL,FR]
  - c) Energy & utilities: multiplication of flooding (extreme rainfall, sea level rise) to disrupt energy production [DE,LT,PL]; risk of landfill flooding [LT]
  - d) Agriculture, forestry and other land use: Negative impact on land use from floodings combined with droughts, heavy rains, storms [IT-n,ES-n,LT,PL]; increasing flooding risk in agricultural areas [FI,DE-e,IT-w/n,FR]

Legal texts relevant to the Floods challenge (EU level)

The EU Floods Directive

- Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (publ. 6 November, 2007)
- Each EU country is required to assess all areas under risk of significant floods, to create Flood Hazard Maps and Flood Risk Maps for such areas in terms of possible flood extent and assets & humans at risk, and to take adequate and coordinated measures to reduce flood risk
- The general public must have access to this information and a say in the planning process
- The Floods Directive is closely coordinated with the Water Framework Directive

Legal texts relevant to the Floods challenge (nat'l level)

Transposing the EU Floods Directive

- The Directive was transposed into national laws mostly between 2008 and 2010
- In most cases, this appeared either within new Water Laws, Water Acts, or updates / amendments of the current ones
- In complement: national flood risk management plans; plans at the level of regions / river basins / sub-regions
- Working Group set up within CIRCABC to support implementation of both the Floods Directive and the Water Framework Directive
- 6-year cycles to reduce the risk of flood damage: 1st cycle 2010-2015, 2nd cycle 2016-2021, 3rd cycle 2022-2027; results from 2nd cycle reported for 19 countries, public consultation concluded in 5 more, 3 ongoing or delayed

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2. Fire challenge

Currently, there are several scenarios of fires initiated by different causes and having a harmful effect on the environment.

One scenario or use case relates to facilities where waste is stored and prone to spontaneous fires, occurring three or more times a year (in one city). These incidents are particularly prevalent during the summer months when temperatures are higher. While data on previous fire events exist (temperature conditions, height of piles, heat waves, composition of garbage, location of storages or disposals) there is no automated solution available to predict fires and make informed decisions for prevention. As a result, environmental agency inspectors bear the responsibility of monitoring these facilities, placing a significant burden on staff resources.

In this waste fire use case, the foreseen steps are:

1. Exploring the technical boundaries to understand the possibilities of providing frequent data updates and establishing the required preparedness frequency.
2. Developing a comprehensive model using both existing and new data to predict waste fires.
3. Aggregating all data from past waste fire incidents can be instrumental in this process.
4. Training the model based on defined conditions and relevant factors, such as the evolving composition of waste over time and temperature variations.
5. Utilizing the gathered data to anticipate fire occurrences, enabling timely preventive actions.
6. Implementing automated notifications to alert environmental; agencies about the risk of fire, empowering them to take necessary measures such as engaging contracted companies or industries experienced in managing waste storage facilities. This proactive approach aims to prevent air pollution and minimize potential damage.

The desired outcome is an automated notification system that promptly identifies the risk of fire in waste storage facilities. This allows environmental agencies to take swift and appropriate measures, such as engaging qualified companies or industries with expertise in waste management. By preventing fires, this solution aims to mitigate air pollution and reduce potential damage associated with such incidents. It is expected to obtain an automated notification system based on the processing data including COPERNICUS data.

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FIRE prediction, prevention, tracing

PROBLEM:
There are **several scenarios of fires initiated by different causes** and having a harmful effect on the environment.

- One use case relates to **facilities where waste is stored and prone to spontaneous fires.** While data on previous fire events exist **there is no automated solution available to predict fires and make informed decisions for prevention.**
- Another use case relates to tracking and tracing fire resulting from illegal dumping of waste or fire. intentionally caused based on the possibility to compare fields or waste piles before and after.

DESIRED OUTCOME/FUNCTIONALITIES:

Automated notification system based on the processing data including COPERNICUS data that promptly identifies the risk of fire.

To allow environmental agencies to take swift and appropriate measures, such as engaging qualified companies or industries with expertise in waste management.

Comparing, tracking and tracing to identify criminal activity.

WASTE FIRES

Definition:
An uncontrolled fire in a waste storage site

+/- 77 waste fires/year in the Netherlands

+/- 60 waste fires/year in Sweden

+/- 25 waste fires/year in Austria

CONTRIBUTING FACTORS

Type of waste / contamination

Amount of waste

Ambient temperature (variation and level)

Ambient moisture content / rainfall

Wind

On-site remediating factors

USE CASE

Prediction of waste fires with AI by combining remote sensing, historical and weather data.

FORESEEN STEPS

EXPLORING BOUNDARIES

AGGREGATING DATA

MODEL DEVELOPMENT

TRAINING THE MODEL / ON-SITE VALIDATION

UTILISATION OF PREDICTIONS

IMPLEMENTING NOTIFICATIONS

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Another use case or fire scenario (also for wild/forest fire) relates to identifying, tracing, and tracking the cause (and the culprit) of the fire. It is challenging for law enforcement agencies to trace the individuals responsible for criminal behaviour (e.g., setting fire or dumping substances that cause fire to official waste dumping sites/facilities). In the event that a fire consumes part of a waste dumping site, it is vital to be able to compare the site's condition before and after the fire. This comparison would enable us to determine the amount of waste that was burnt and, consequently, evaluate the environmental damage caused. Additionally, the same technology could be used to establish whether the amount of waste entities dump into the site matches the amount they report officially. Furthermore, there is a lack of effective measures to inform and prevent the cross-border effects. Additionally, the absence of usable data hinders the ability to gather evidence for criminal proceedings.

In this identification, trace and track use case, some foreseen steps are:

1. Conducting a comprehensive assessment of existing monitoring capabilities to identify gaps and potential improvements.
2. Defining the types of substances that are commonly illegally dumped, drawing from previous experiences and specific case studies.
3. Develop a model that uses both existing and new data to compare the amount of waste before and after an incident occurs.
4. Aggregate all data from past waste fire incidents or incidents involving the dumping of more waste than officially reported.
5. Developing appropriate measures to address these incidents.
6. Establishing timely communication channels between environmental agencies, firefighters, and other relevant law enforcement entities to promptly notify them of potential risks and share investigation outcomes.
7. Defining and implementing possible interventions to tackle wild fires and/or at dumping sites to prevent further illegal activities and mitigate damage.
8. Standardizing the reporting and data collection processes, ensuring the admissibility of the gathered information in both civil and criminal courts. This will enable the establishment of responsibilities in accordance with the applicable laws within specific judiciary systems.

The desired outcome is the implementation of an alert system that sends notifications to competent authorities, aiming to prevent the illegal dumping of waste/ illegal activities that could lead to fires in dumping sites and mitigate the risks of cross-border damage. The system would enable us to compare the state of the waste dumping site before and after the fire, determine the amount of burnt waste, and define the extent of environmental damage. Additionally, the system would be able to verify if the amount of waste entities dump into the dumping site is consistent with their official reports. Furthermore, standardized reports and information should be readily available and admissible in civil and criminal proceedings. This will facilitate the establishment of responsibilities in accordance with the applicable laws and regulations within the specific judiciary system.

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Fires in regional adaptation

- **Fire risks figure prominently in major risk assessments and adaptation strategies in regions across Europe:**
  a) Sustainable urban communities: sharply increasing fire and wildfire risks in virtually every country, strongly amplified by heatwaves and urban heat islands
  b) Energy & utilities: increased risk of landfill fires [e.g. LT]
  c) Agriculture, forestry and other land use: fast-increasing risk of fires [BE,FI-s,IT-n/c,FR,DE,ES,,,]

Legal texts relevant to the Fire challenge (EU level)

The EU Waste Framework Directive

- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste
- Basic principles include waste management to avoid endangering human health, harming the environment, creating risks for water, air, soil, plants, animals, causing a nuisance through noise or odours
- It is built on a 5-step waste hierarchy: prevention > preparing for re-use > recycling > recovery > disposal
- It sets targets to every EU country
- There is a strong emphasis on circular economy objectives, which is prominently reflected in several national laws
- However, very limited reference is made to fire risks and illegal dumping, and generally to climate dimensions

Legal texts relevant to the Fire challenge (nat'l level)

Waste related texts

- Almost all EU countries have a Law on Waste or on Waste Management
- In a few cases, waste regulations are part of a broader environmental conservation law (France, Greece, the Netherlands)
- In Belgium and in Italy for instance, the waste sector is regulated by a set of more specific texts; in some cases, most of the regulations are at regional level (e.g. Austria)
- General waste regulations tend to be explicit on the categories of waste, specific risks, technical requirements, prevention of pollution; in contrast, they say little or nothing explicit about fire risks, only a few mention illegal dumping, and the link with climate change issues is not mentioned

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3. Water resilience challenge

Currently, there is unpredictability in the demand for fresh water, and there is a lack of connection between the supply and demand of fresh water. Regulations exist in each EU Member State that determine the use of water from various sources, such as channels, treated sewage water, and drinking water, and different purposes such as for agriculture. However, there is a lack of a common language among different stakeholders (users involved such water companies, industry, farmers, etc.) involved in the water cycle chain. Additionally, while data is available in certain regions, there is a lack of connectivity between data hubs and repositories.

In this use case, some foreseen steps are:

1. Gaining a comprehensive understanding of the current situation, including existing mechanisms and policies in place.
2. Exploring how drought-related issues regarding water supply and demand are addressed and determining the type of new services needed to support coping with stress situations based on common language.
3. Identifying the relevant responsible public authorities and their intended uses, while also identifying any existing data gaps.
4. Identifying the different users and purposes for the supply of water like in agriculture.
5. Developing a system that combines EO data and utilizes Artificial Intelligence (AI) for modelling purposes. This system should effectively integrate and analyze relevant data to provide actionable insights.
6. Utilizing database-driven solutions to enhance the distribution of water. This involves identifying factors such as saline concentration, pollution levels, substances, algae presence etc., using EO data, to ensure efficient and informed water distribution.
7. Providing accurate information to water authorities regarding who needs to collect water, when and how to distribute it in a treated manner, to meet specific demands and avoid unnecessary discharge of sweet water.
8. Establishing a resilient system where different stakeholders, including water companies, farmers, and industries, collaborate during drought periods. This collaboration should be based on a comprehensive understanding of the water conditions and quality requirements for different purposes. Guidance and decisions from a policy perspective should be achieved to comprehend the consequences and combine relevant data throughout the entire water cycle chain under a unified taxonomy.

The desired outcome is a predictable demand for fresh water. The regulatory landscape and policies should be clearly defined, providing a cohesive framework for water management. The system should be capable of effectively handling stress situations through data-driven decision making and interventions. The supply and demand for sweet water should be interconnected based on diverse needs of users such as farmers, companies, and industries, while also considering the specific

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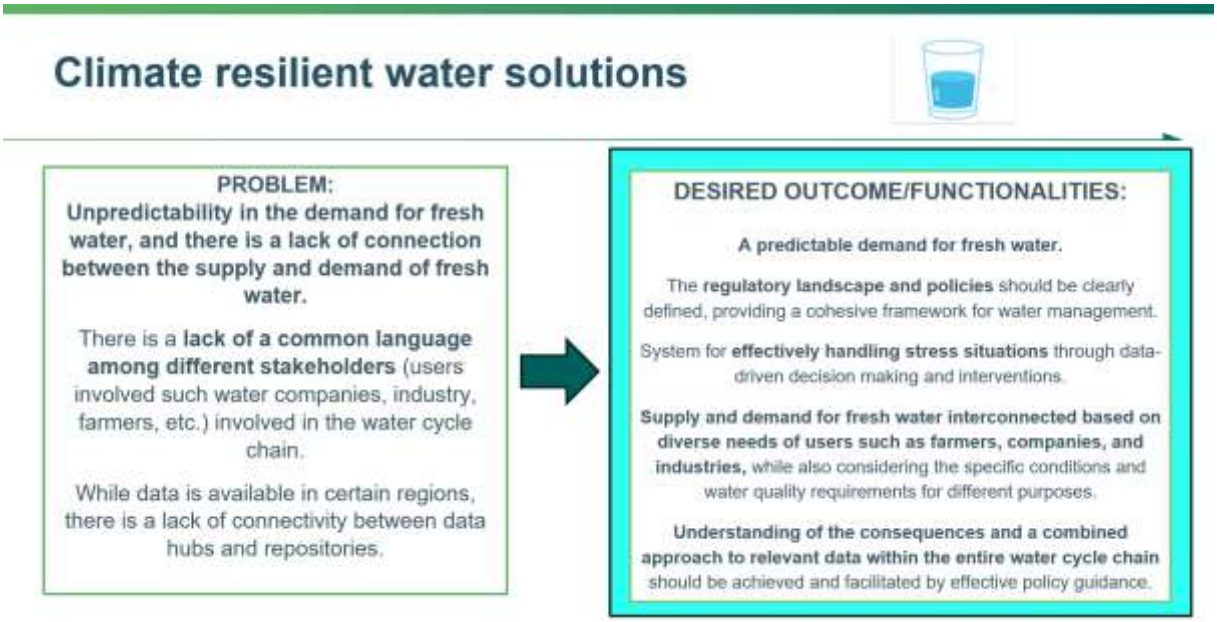
conditions and water quality requirements for different purposes. A comprehensive understanding of the consequences and a combined approach to relevant data within the entire water cycle chain should be achieved and facilitated by effective policy guidance.



Examples of use for Climate Adaptation

- Greenhouse gas emission indicators (water management):
- In case of droughts: CO2 emission by peat oxidation (subsidence)
- In case of water excess: CH4 en N2O emission in anaerobic soil conditions
- Salinization risks (due to increase of drought and seepage pressure by sea level rise)
- Insight in the available sweet water storage in large Lakes like Ijsselmeer (relevant for the Dutch National LCW commission decision support)
- Insight in the amount of local water storage (saturation level) in soils in times extreme climate conditions in management areas (to anticipate timely for local flooding (e.g. Limburg 2021)
- Insight in drought conditions (agriculture & nature), irrigation limitations/ban, etc
- Transition/monitoring of the rural area functions in future (distribution of blue, green grey infrastructure).

The Dutch Waterschapshuis and STOWA national water management information production hub (through its SAT-WATER programme)

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European/national water monitoring resources

- Monitoring Water Quantity and Quality (regular): https://www.rijkswaterstaat.nl/en/water/water-management
- Monitoring extreme high water & Early warning (crisis): https://www.rijkswaterstaat.nl/en/water/water-management/monitoring/efas
- Main waterway network & maintenance, construction & traffic management (European level): for economic drivers like Transport, Storage, recreation cooperation Netherlands, Germany (Rhine), Belgium (Scheldt): https://www.eurisportal.eu/

European/national/regional watermanagement resources (https://www.efas.eu/en/monitoring)

- EFAS collects near real-time water level and river discharge observations to display national/regional threshold exceedances
- European wide, observation-based flood monitoring:
- EU-EO & insitu/model based instrument https://emergency.copernicus.eu/mapping/ems/rapid-mapping-portfolio
- National data on hydrology & meteo & satellite based information: https://www.efas.eu/en/share-your-data-efas
- Dutch examples on national operational EO based information products: e.g. OWASIS (hydrology), WIWB (meteo)
- Gridded meteorological maps (CEMS
- National data on hydrology & meteo & satellite based information: https://www.efas.eu/en/share-your-data-efas
- Dutch examples on national operational information products: e.g. KNMI, WIWB (meteo)
- EFAS provides a number of hydrological monitoring products based on LISFLOOD simulations driven by observed meteorological input
- Soil moisture and snow water equivalent (mostly model based, maps on national initial conditions),
- Dutch examples on national operational EO based information products: e.g. LIBV, soil moisture & OWASIS)

The water challenge needs to be tackle from a regional, national and European perspective, due to the cross-border impact on climate and socio-economics.

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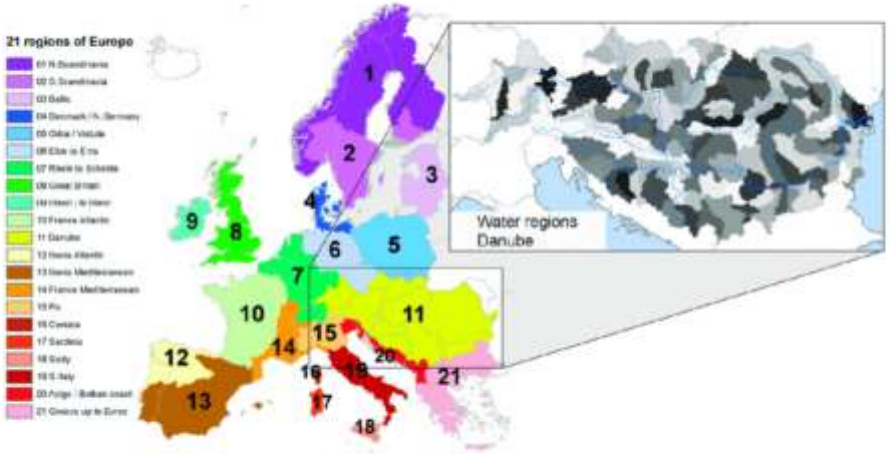
Watermanagement regional/national/European infrastructure



The 21 regions of Europe, as defined by river basins, climate and socio-economics. Right insert: the smaller "water regions" for the Danube river basin. The 21 regions of Europe, as defined by river basins, climate and socio-economics. Right insert: the smaller "water regions" for the Danube river basin.

Figure credit: Hans van Leeuwen, Het Waterschapshuis/Stowa, presentation on 13th September 2023

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Water issues in regional adaptation

- **Water quality and availability risks figure prominently in major risk assessments and adaptation strategies in regions across Europe:**
  a) Marine & coastal: Quality degradation of coastal waters [FR], increased saltwater intrusions, salinization, freshwater shortages [FR-w,IT-c,ES,NL], decreased water quality [LT,IT-c], eutrophication of water bodies, damaged ecosystem services (ES-n,IT-c,DE-n]
  b) Sustainable urban communities: Water quality and quantity affecting a.o. energy and utilities [southern Europe, now also concerning BE,NL,DE-s]
  c) Energy & utilities: Increased frequency of droughts and of heatwaves [LT,PL,BE,DE,ES,FR,IT] with consequences on water quality and quantity;
  d) Agriculture, forestry and other land use: More frequent and longer droughts [DE,IT-n,NL,ES], often coupled with water quality and quantity concerns [BE,IT,ES-n,FR,LT], competition for water between urban and agricultural use; threats of lower water recharge and decrease in aquifer levels [FR-se,IT-s,ES,NL], risks on pastures and fodder [PL]; reduced river flows, higher transpiration and water stress [ES,FR]; impacts aggravated as more frequent or abundant irrigation required in agriculture [DE-w,IT-n,ES]

Legal texts relevant to the Water challenge (EU level)

The EU Water Framework Directive

- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy
- Latest version published in 2014; adaptation to climate change not included in the Directive itself but agreement from Member States in 2009 to integrate it in the 6-year River Basin Management Plans (RBMPs) elaborated under the WFD – *cf.* "River basin management in a changing climate - a Guidance document"
- Each EU Member State is required to use their RBMPs and Programmes of Measures to protect and, where necessary, restore water bodies in order to reach good status (chemical and ecological), and to prevent deterioration
- The Floods Directive is closely coordinated with the Water Framework Directive
- Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change refers to water (and particularly freshwater) availability and sustainability notably in its section 2.3.4

Legal texts relevant to the Water challenge (nat'l level)

Transposing the EU Water Framework Directive

- The Directive is implemented primarily through the RBMPs
- Some of the RBMPs are transnational (e.g. Danube, Elbe, Oder, Rhine, Sava) and are closely articulated with water policies in the different countries involved
- Each EU Member State is covered by between 1 and 14 RBMPs, managed at national or regional levels; some of the RBMPs ae not literally centred on one river and cover a hydrographic unit or region
- RBMP process includes identification of "significant water management issues" and broad public consultations
- Working Group set up within CIRCABC to support implementation of both the Floods Directive and the Water Framework Directive
- 6-year cycles: 1st cycle 2010-2015, 2nd cycle 2016-2021, 3rd cycle 2021/22-2027

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4. Sustainable Infrastructure challenge

Currently, there is a need for integrated sustainable re-development, restoring & climate adaptation of existing neighbourhoods both in urban and rural areas.

In this use case, some foreseen actions are:
- Developing an integrated solution (using EO data) with regard to the re-development, restoration and climate adaptation of existing neighbourhoods (including buildings, bridges, roads, etc) to address/prevent/monitor:
    - heat island effects
    - flooding
    - droughts
    - water scarcity
    - Heavy wind/ storm
    - in neighbourhoods & rural areas

- Measuring the effectiveness of climate adaptation measures and applied adaptations and monitoring.
- Calculation of scenarios and risks using different climate effects (such as heat, flooding, drought, storm etc).
- Prediction of risks.
- Developing an integrated climate service that combines possible adaptation measures such as heat island and water scarcity prevention, measures that address flooding and droughts in neighbourhoods & rural areas for modelling purposes and possible scenarios with existing limitations (e.g., narrow streets, protected historical monumental buildings, bridges, water scarcity faced by farmers, etc.) and given other priorities such as green, energy transition, parking.
- Exploring most common limitations, barriers and impossibilities that stand in the way of implementing climate adaptation of the existing infrastructure. Using the outcomes to find an innovative solution given these limitations.

The challenge is to find a solution to climate adaptation for this complex situation (vulnerable urban &/ rural areas with a combination of heat, flooding, water scarcity and droughts) using integrated climate services.

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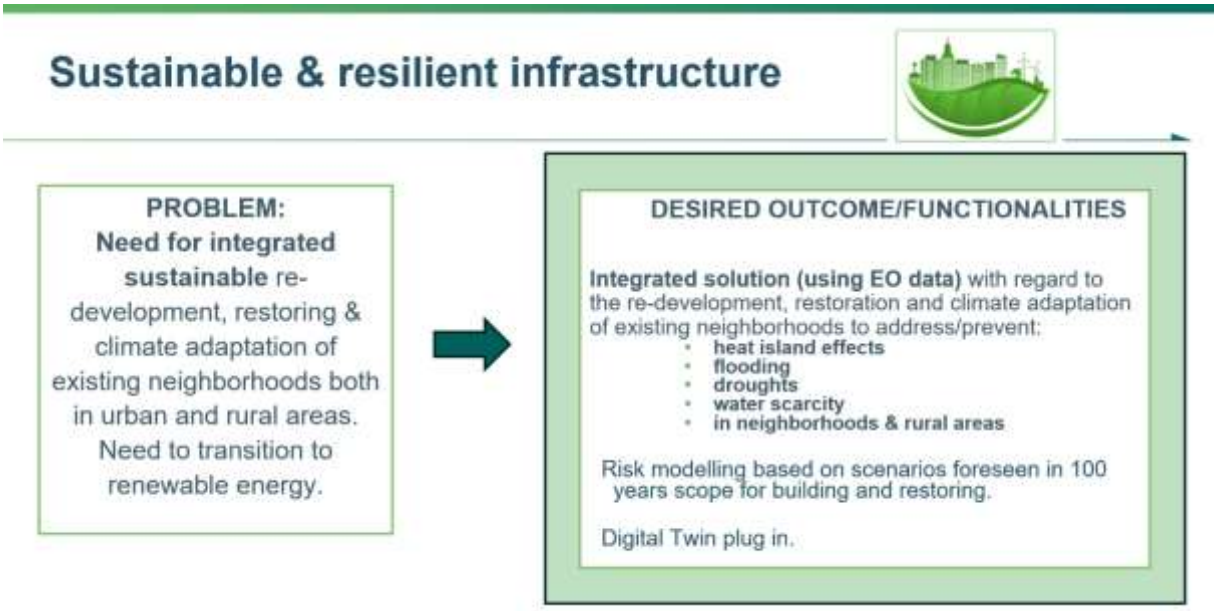

Some use cases are:

- Nature-based solutions (NBS) to tackle flood risks in case of heavy rains, especially surrounding critical infrastructure (e.g. railways, hospitals, energy network etc.).
- Specifically: Finnish buildings largely wooden, massive insulation etc. cannot survive flooding.
- Snow (amount, moisture level) growing challenge
- Heat mitigation with NBS
- Local energy production/energy renovations
- EO for identifying the most critical sites (e.g. urban heat island, areas losing greenery/impervious surfaces) and potential sites for solar etc.
- Urban hydrology after storms/heavy rain
- Early warning/alert systems for authorities/public
- Existing NBS and implementation strategies
- Tools for evaluating impact of NBS/climate change/future urban development/construction to urban heat (effectiveness of adaptation measures)
- Impact/cost evaluation tools for energy renovations (https://helsinginilmastoteot.fi/en/energy/energy-renovation-what-why-and-how/)z
- Advise on how to do a climate adaptation of existing neighborhoods to address water scarcity, heat islands, floods as an integral solution.
- Monitoring of water scarcity, heat islands, floods for existing neighbourhoods.
- Information on renovations to different building stocks (e.g. heritage buildings, old industrial sites etc.).
- How can heat, heavy rainfall and other extreme weather expressions could be used to produce energy.
- Cities need solutions for climate adaptation of existing neighbourhoods and energy transition to renewable sources at the same time.

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Sustainable infrastructure in regional adaptation

- **Risks to sustainable infrastructure figure prominently in major risk assessments and adaptation strategies in regions across Europe:**
  a) Marine & coastal: Flooding risks in almost all coastal regions: sea level rise [Med FR,ES,northern IT,northern DE,PL], marine submersion [North and Baltic seas,ES-n,IT-n,FR-se], extreme rainfall, thunderstorms and gales [PL,ES-n], combinations of those factors [DE-n,ES-n,NL,LT,FR-w]
  b) Sustainable urban communities: Swelling and shrinking soils resulting from hydrogeological instability [IT,FR-s], creating vulnerability for building foundations in urban areas, landslide risks
  c) Energy & utilities: Increased frequency of droughts and of heatwaves [LT,PL,BE,DE,ES,FR,IT] with indirect impacts of water scarcity or hotter waters on e.g. energy production; consequences of ocean acidification on infrastructures [FR-w]; extreme events and longer term processes threatening railways and roads [FR]; coupled issues on water availability / quality and energy production [large cities]

Elements from EU's Climate Adaptation Strategy relevant to the Sustainable Infrastructure challenge

- Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change (publ. 24 February, 2021)
- Systemic approach to support the further development and implementation of adaptation strategies and plans at all levels of governance; cross-cutting priorities: integrating adaptation into macro-fiscal policy, nature-based solutions for adaptation, and local adaptation action
- Support implementing nature-based solutions (NBS) on a larger scale, notably blue-green infrastructures, and the development of financial approaches and products that also cover nature-based adaptation
- Support the development of rapid response decision support tools to enrich the toolbox for adaptation practitioners
- Support the integration of climate resilience considerations into the criteria applicable to construction and renovation of buildings and critical infrastructure

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Sustainable infrastructure – a space for multiple systemic interactions

❶ Building ❷ Street ❸ Trees ❹ Solar water heating ❺ "Multi-functional" green wall
❻ "Multi-functional" roof garden ❼ Storm water harvesting and recycling ❽ Food production
❾ Ground water aquifer ❿ Constructed wetland ⓫ Pocket park ⓬ Urban streams and ponds

Credits: Blue Green Solutions / Imperial College London, EIT Climate-KIC

Legal texts of reference at EU and national levels

- **EU foundational documents:**
  a) EU Floods directive (2007)
  b) EU Waste Framework Directive (2008)
  c) EU Water Framework Directive (2000)
  d) EU Strategy on Adaptation to Climate Change (2021)
- **At national levels:**
  a) Water laws/acts or amendments thereof; flood risk management plans
  b) Laws/acts on waste, waste management
  c) River basin management plans (RBMPs)
  d) National and regional climate adaptation strategies and action plans

This is also a dynamic process with cycles and multiple iterations

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ANNEX 2 – SELECTED WATER CHALLENGE

The Water (management) challenge is underpinned by the fact that climate change has more and more consequences on our water availability and distribution and with that an increasing impact to our daily European life. The European River basins are a result of melting snowpacks of the European mountainous areas (upstream) and local rainwater (along the river basin). Both sources of water are under constant change due to dynamics in (extreme) weather patterns and regressing/decreasing snow areas and glaciers in the mountains. As the main European rivers are sharing their basins/tributaries amongst the various European country borders (Rhine, Danube, Meuse, etc.), it is important to cooperate with each other in terms of managing the sparse fresh water along the whole extent of the basin. A joint European water intelligence is required within the basin area, between the countries (cross border) and between the water management areas/administrations.

The distribution of water along the river basin and the dynamic weather patterns (rain/temperatures/wind) requires a joint water management strategy based on an overall local monitoring of the soil-water-vegetation-atmosphere system. The core is the water balance of this system, which can be actualised locally and spatially by using a day-to-day regular frequent EO-based hydrological modelling validated by local inspections and knowledge of water management authorities. The Copernicus River Basin monitoring system (EFAS) on (supra) national level is a first good guess for the primary river systems in Europe and can provide the boundary conditions and prior general indication for the local situation in local river systems.

For the envisaged development of an integral Water intelligence system (using EO data) as a prerequisite to anticipating extreme climate conditions and their potential impacts on society, the organisation and governance of the future climate change PCP project foresees different groups of users, notably: (a) water management agencies; (b) environmental agencies; (c) first responders; (d) sustainable and resilient cities; (e) agricultural agencies.

In the abovementioned context, the intention is that the PCP project focuses especially on the local regions and their soil-water-vegetation conditions and their local dynamics in water availability for the aforementioned sectors. When local weather conditions lead to extreme (long) drought spells (lack of rain) or high temperature the pressure on the soil-water system will increase with all kinds of consequences and ultimately crises situations. And when weather conditions lead to extreme local (high intensity and/or long lasting) rains the soil-water system cannot cope with and store the abundance of water with impacts to rural and urban infrastructure from runoff, erosion, and inundation. Factors with no physical origin also apply - due to land use, urban sprawling, territorial development patterns, but also usage and behaviors, all factors that do not originate directly in climate change but have a much more critical impact due to climate change and to the partial or downright insufficient awareness of the consequences of such choices in a context of climate change with accelerating consequences.

Across Europe, recent water system imbalances have led to extreme events and localised crises, underscoring the need for proactive crisis anticipation. Water managers in both rural and urban areas must employ common water intelligence garnered from regular monitoring across various scales. By being the first responders equipped with water intelligence, they can develop current spatial risk maps, aiding in crisis prioritization and refining risk reduction strategies.

A unified water taxonomy is essential for monitoring local water balance, crucial in anticipating climate change-induced crises. Leveraging Earth observation-based water balance modelling holds significant potential for managing and mitigating water dynamics' societal impacts. Integration of knowledge and capacity into matured operations, reaching Technology Readiness Level (TRL) 8, stands to benefit water, nature, agriculture, and urban managers alike. Therefore, the PCP procurement strategy mandates comprehensive research and development of solutions, ranging from TRL5 to TRL8, necessitating collaboration among larger and smaller SME consortia. Furthermore, the selection of

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representative use cases and stakeholders across Europe should guide the procurement process, ensuring harmonization in water intelligence standards

The Water (management) challenge wil be addressed on the basis of three main pillars:

- Production/organisation of common operational information products on the local/regional water/soil/climate systems and new needs (R&D developments).
- Interoperability mechanisms between Member State organisations through common procurement mechanisms.
- An active user network for exchange, validation, improvement, update, experience (guided by established European technical partners).

1. Impact of the Water challenge

The expected impact of the Water intelligence PCP is linked to the importance of water which is essential for life on Earth. Water is the critical natural resource which underpins all social and economic activity. In the last century, water use grew twice as fast as the world's population, and today water scarcity affects more than 40 percent of the global population (ESA). The dedicated goal on water in UN's 2030 Agenda for Sustainable Development has put the spotlight on water policy at global level and in national planning to avoid an accelerating 'water crisis' towards 2030. A 'water crisis' is ultimately a management crisis that can be solved through the application of sound water management policies and integrated water resource management (IWRM) initiatives. The successful implementation of water polices and IWRM requires access to reliable data and information on key water related challenges. EO data can powerfully contribute to addressing these data needs. This is especially relevant where policies and management decisions should be based on reliable information.

Furthermore, the Taxonomy Regulation, a classification system established by the EU to identify whether or not a given economic activity should be considered "environmentally sustainable", identifies six environmental objectives: (1) climate change mitigation, (2) climate change adaptation, (3) sustainable use and protection of water and marine resources, (4) transition to a circular economy, (5) pollution prevention and control, and (6) protection and restoration of biodiversity and ecosystems. The PCP on Water intelligence has the potential to contribute to the majority of these objectives particularly to climate adaptation and sustainable use and protection of water resources. Climate information can help end-users make climate smart decisions. The climate information can range from seasonal forecasts to long-term projections. It can be combined with other sectoral information (e.g., population distribution, crop distribution, coastal protection) that is relevant for assessing exposure and vulnerability to climate hazard, and may include weather services, which focus on short-term forecasts (e.g., hazardous weather conditions).

According to the Taxonomy Regulation, an economic activity that pursues the environmental objective of climate change adaptation should contribute substantially to reducing or preventing the adverse impact of the current or expected future climate, or the risks of such adverse impact, whether on that activity itself or on people, nature or assets. This environmental objective should be interpreted in accordance with relevant Union law and the Sendai Framework for Disaster Risk Reduction 2015–2030. In this context, the PCP on Water intelligence should include use cases related to risk prevention and management related to floods, fires and impact on infrastructure, taking into account the relevant legal framework..

Moreover, the environmental objective of the sustainable use and protection of water and marine resources, according to the Taxonomy Regulation, should be interpreted in accordance with relevant Union law, including Regulation (EU) No 1380/2013 of the European Parliament and of the Council and Directives 2000/60/EC, 2006/7/EC, 2006/118/EC, 2008/56/EC and 2008/105/EC of the European Parliament and of the Council, Council Directives 91/271/EEC , 91/676/EEC and 98/83/EC and Commission Decision (EU) 2017/848, and with the communications of the Commission of 18 July 2007 on 'Addressing the challenge of water scarcity and droughts in the European Union', of 14 November 2012 on 'A Blueprint to Safeguard Europe's Water Resources' and of 11 March 2019 on 'European

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Union Strategic Approach to Pharmaceuticals in the Environment'. In addition, the Water Framework Directive and the Proposal for a Directive on Soil Monitoring and Resilience (Soil Monitoring Law) will be considered. In this sense, PCP-WISE will consider EU policy and regulations where relevant.

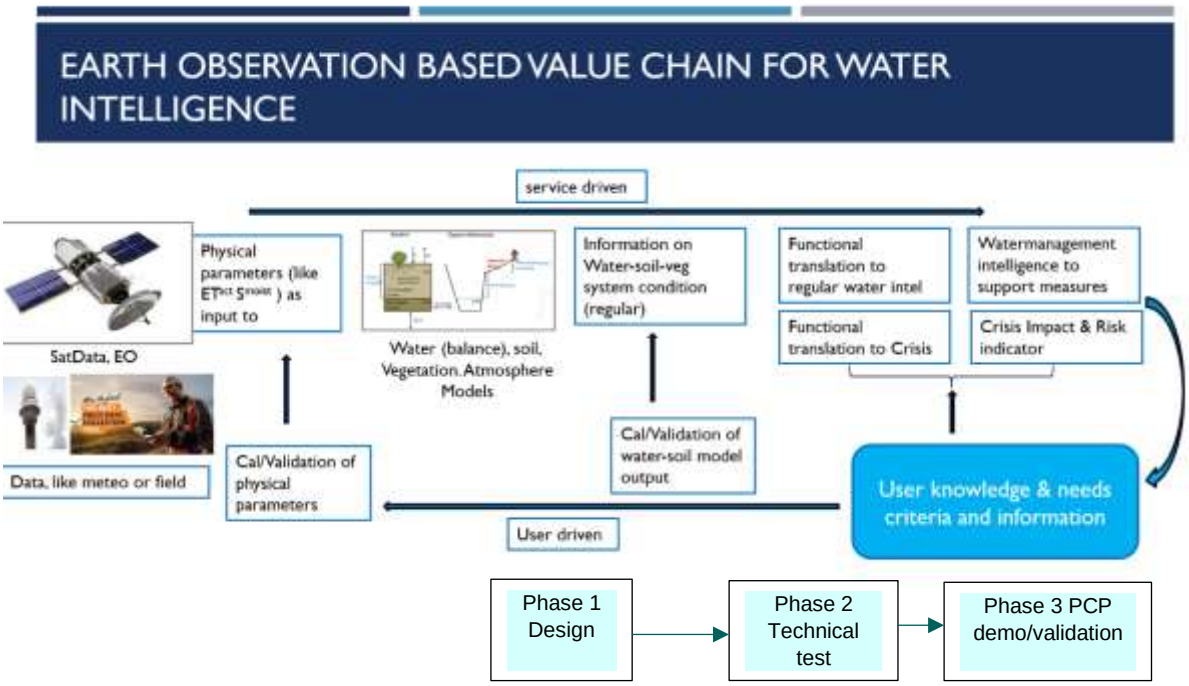

Figure 13: Value chain for water intelligence and PCP phases

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2. Identified use cases

	Fast Onset Crises	Slow Onset Crises
Urban	Flash Flood Summer 2021 in Ahr Valley, GER	Slow Onset River Flood 2023/24 in Lower Saxony, GER
	Wild Fires: Slovakia Bratislava (Local city level	Heat Island/subsidence: Multi Climate change scenarios in existing urban areas (Haarlem city, NL)
	Floods: Slovakia Bratislava (Local city level)	Soil saturation: Shallow ground water, Demvig, Denmark
	Floods/stormwater: city critical water management, Helsinki	Subsidence: Terrain subsidizing Lemvig Denmark
	Coastal flooding: Helsinki	Subsidence: City Infrastructure Rotterdam
Rural	Flash Flood Summer 2021 in Ahr Valley, GER	Slow Onset River Flood 2023/24 in Lower Saxony, GER
	Vegetation and peat fire 2023/24 lower Saxony, GER	Drought Impact Model on Agricultural Production – Catalonia region, Andalusia or other (Spain)
	Wild Fires: Slovak Republic (National level), Self-governing regions Banska Bystrica, Zilina (Regional level), Spisska Nova Ves	Drought: Subsidence in rural agricultural grass/peatlands in the water management area of waterauthority HDSR (NL)
	Floods: Surface Runoff Flows according to Rule 5.2-IC of the Roads Instruction (Andalusia, Spain)	Wild Fires: Nature area Kalmthoutse Heide (N, Belgium)
	FloodsL civil protection initiative for the Mygdonia catchment area (Central Macedonia)	Nature/rural: control ecosystem/residential area on groundwater/greening (in former airport region of Helsinki)
	FlashFloodBreaker (Interreg, North-West Europe) with EmschenGenossenschaft(G), Province Limburg (NL) and 'WaterOverlast Programme/Waterveiligheid en Ruimte Limburg' and EMFLoofResilience (Interreg) waterschap Limburg (NL) of cooperation proposal.	

Table 6: Identified use cases

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ANNEX 3 – SUMMARY OF E-PITCHING

As part of the market analysis, PROTECT carried out e-Pitching sessions on 18 and 19 September 2023. Participants (26 in total) from 8 different countries (France, Lithuania, Germany, Italy, Luxembourg, Finland, Morocco, The Netherlands) presented their solutions and R&D roadmaps. While some of the presented solutions (at TRL 7-9) tackle aspects related to the PROTECT challenges, none of them seem to cover all the functionalities related to a specific challenge. However, the potential of further developments and combination of technologies seem promising for the future PCP challenge, considering the maturity of solutions (at TRL 4-6) and the expected R&D plans.

A summary of the Climate Services presented are as follows:

Climate Services based on Earth Observation:

- Measure the environmental benefits provided by nature-based projects
- Added-value products based on Sentinel-1 SAR data
- IoT systems in the state of suspension for sustainable near real-time EO
- Autonomous flying UAV solution for flood prevention
- Measurement of emissions
- Satellite measurement of greenhouse gases
- Urban Data Analytics for urban climate risk and mitigation action - simulation of impact
- Cloud-based precision solar radiation service for clean energy in European cities
- Wild Fire Risk Monitor
- Satellite and Drone Technology for Rapid Observation and Notification of Environmental Threats
- Thermal comfort modelling for more liveable and sustainable cities of tomorrow
- Making Agritech sustainable
- Local early warning system for flooding
- Urban Resiliency Monitor
- Geo Big Data Technology For Diverse Climate Service Product Development
- Safer Places: Global Platform
  AI-based Digital Twin Solution for Flood Risk Intelligence
- Assuring food security by mitigating risk for aquaculture farms using Earth Observation technologies
- Democratisation of Local Climate Awareness
- Measuring temperature to manage water, ecosphere and climate resilience
- Air Pollution & Urban Heat Island mitigation by Urban vegetation
- High-resolution weather data operator and certifier
- Services for flood and coastal risk management
- Ensuring food production through irrigation monitoring

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- Soil Organic Carbon Monitor

Type of entity (multiple answers are possible)

		Answers	Ratio
Natural person, individual expert, professional		0	0 %
Micro/SME, startup enterprise		26	100 %
R&D institution (public or private)		3	11.54 %
Technology transfer centre (public or private)		0	0 %
Government body or agency		0	0 %
Civil society organisation		0	0 %
University or training centre		0	0 %
Large enterprise		0	0 %
Standardisation body		0	0 %
Other (please specify)		0	0 %
No Answer		0	0 %

Current status of solutions proposed

		Answers	Ratio
Idea (TRL 1-3)		2	7.69 %
Prototype (TRL 4-6)		11	42.31 %
Tested product/service (TRL 7-9)		14	53.85 %
No Answer		0	0 %

Ownership

		Answers	Ratio
100% of the proposer/presenter		21	80.77 %
Shared with third parties		3	11.54 %
IPR held by third parties		2	7.69 %
No Answer		0	0 %

Table 7: Summary of e-Pitching results

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ANNEX 3 – SUMMARY OF COTS

Product Name	Company	Description	Relevance with the use case	TRL (estimated)
Copernicus Data	Copernicus	At the core of our service is providing access to data and tools related to atmospheric monitoring. We also support our users by providing quality assurance information, and advice on how to use and interpret data.	Is being used by many companies to provide services	9
SENTINEL-1 Data	CREODIAS	Sentinel-1 is a key component of the European Space Agency's (ESA) Copernicus programme, designed to provide valuable and reliable radar imagery for Earth observation. This radar satellite constellation consists of two identical satellites, Sentinel-1A and Sentinel-1B, working together to enable continuous and all-weather imaging of the Earth's surface. Sentinel-1's primary mission is to acquire synthetic aperture radar (SAR) data, offering a unique perspective for monitoring various aspects of the Earth. SAR technology enables imaging of the Earth's surface regardless of weather conditions, daylight, or cloud cover, ensuring the acquisition of critical data under any circumstances.	Is being used by many companies to provide services	9

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Pleiades-1A Satellite Sensor (0.5m)	Pleiades-1A	AIRBUS Defence & Space Pleiades-1A satellite sensor was successfully launched on December 16, 2011, and provides 0.5m high resolution satellite image data. Watch video of Pleiades-1A satellite launch. The Pleiades-1A satellite is capable of providing orthorectified color data at 0.5-meter resolution (roughly comparable to GeoEye-1) and revisiting any point on Earth as it covers a total of 1 million square kilometers (approximately 386,102 square miles) daily. Perhaps most importantly, Pleiades-1A is capable of acquiring high-resolution stereo imagery in just one pass and can accommodate large areas (up to 1,000 km x 1,000 km).	Is being used by many companies to provide services	9
Sentinel Hub	Sentinel Hub	We make satellite data (Sentinels, Landsat and other providers) easily accessible for you to be browsed or analyzed, within our cloud GIS or within your own environment. Get satellite imagery on your table without worrying about synchronization issues, storage, processing, de-compression algorithms, meta-data or sensor bands. Take a look at our Sentinel Hub brochure for more information.	Is being used by many companies to provide services	9
OpenEO Platform	European Space Agency	openEO platform provides intuitive programming libraries to process a wide variety of earth observation datasets. This large-scale data access and processing is performed on multiple infrastructures, which all support the openEO API. This allows use cases from explorative research to large-scale production of EO-derived maps and information.	Is being used by many companies to provide services	9

Table 8: Commercial Off-The-Shelf Products

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ANNEX 4 – OVERVIEW OF PPI PROCEDURES

The table below shows an overview of the main characteristics of each procedure in the PPI approach.

Directive 2014/24/EU **General overview of the procedures** **Article 26**		
Preferred procedures	**Open procedure - Article 27**	Any interested economic operator may submit a tender in response to a call for competition (no "preselection" as in restricted procedure)
	Restricted procedure - Article 28	**Two staged procedure:** 1. Any economic operator may submit a request to participate in response to a call for competition. 2. Only those economic operators invited to do so by the Contracting Authority following its assessment of the information provided may submit a tender.
"Exceptional" procedures	**Competitive procedure with negotiation (negotiated procedure)** **Article 29**	**Two staged procedure:** 1. Any economic operator may submit a request to participate in response to a call for competition. 2. Only those economic operators invited to do so by the Contracting Authority following its assessment of the information provided may submit a tender. The Contracting Authority will identify the subject-matter of the procurement by providing a description of the needs and the characteristics required and indicate which elements are the minimum requirements. Unless indicated in tendering document, the Contracting Authority will **negotiate** the initial and all subsequent tenders. • The minimum requirements and award criteria are not subject to negotiations. In the negotiations, equal treatment of all tenderers has to be guaranteed. Negotiations can take place in successive stages in order to reduce the number of tenders.
	Competitive dialogue - Article 30	**Two staged procedure:** 1. Any economic operator may submit a request to participate in response to a call for competition. 2. Only those economic operators invited to do so by the Contracting Authority following its assessment of the information provided may participate in the dialogue.

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		Best price-quality ratio as only award criteria. The Contracting Authority will define its needs and requirements, as well as the award criteria and an indicative timeframe. The Contracting Authority will open a dialogue to identify and define the means to satisfy the defined needs. • **It is possible to discuss all aspects of the procurement with the chosen participants.** During the dialogue, equal treatment of all tenderers has to be guaranteed. The dialogue can take place in successive stages in order to reduce the number of tenders.
	Innovation Partnerships Article 31	Two staged procedure: 1. Any economic operator may submit a request to participate in response to a call for competition. 2. Only those economic operators invited by the Contracting Authority following its assessment of the requested information may submit research and innovation projects aimed at meeting the needs identified by the contracting authority that cannot be met by existing solutions. The goal is to develop an innovative product, service or works and purchase the results. The Contracting Authority will identify the need for an innovative product, service or works **that cannot be met by purchasing products, services or works already available on the market**. • Indicate which elements are minimum requirements. • Include Intellectual Property Rights provisions. Innovation partnership can be with one or with several partners and be structured in successive phases following the sequence of steps in the research and innovation process. The Contracting Authority will **negotiate** the initial and all subsequent tenders. • The minimum requirements and award criteria are not subject to negotiations.

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		In the negotiations, equal treatment of all tenderers has to be guaranteed. Negotiations can take place in successive stages in order to reduce the number of tenders.
	Negotiated procedure without prior publication **Article 32**	There is an exhaustive list of cases that must be duly justified by the Contracting Authority which wants to follow the procedure.

Table 9: Procurement Procedures for Public Procurement of Innovative solutions

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Annex 6.1. Tender documents template

PCP Tender Documents Package (TD1 to TD15)

Lead beneficiary: CPS

Dissemination level: Public

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Project acronym	PROTECT
Project title	Preparing a Pre-Commercial Procurement for end-user services based on Environmental Observation to adapt and mitigate climate change
Thematic priority	HORIZON-CL6-2021-GOVERNANCE-01
Type of action	PU - Public
Deliverable number and title	D3.3 Report of Results of WP3 – Tender documents
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Author(s) name(s)	Analucia Jaramillo (CORVERS), Beatriz Gómez Fariñas (CORVERS), Stephan Covers (CORVERS); Abed El Maijd Nasser (CORVERS); Azra Atalan (CORVERS); Dionysios Pelekis (CORVERS); Katerina Nikolaidou (CORVERS GREECE); Maria Niniatsoudi (CORVERS GREECE), Spyrangelos Georgatos (CORVERS GREECE); Maria Kampa (CORVERS GREECE), Egli Rrokaj (CORVERS GREECE).
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Reviewer(s)	Melissa Campagno (GAC)
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Disclaimer

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Version	Date	Modified by	Comments
0.1	14-08-2023	Ana Lucia Jaramillo (CORVERS)	Draft version
0.2	25-02-2024	Ana Lucia Jaramillo (CORVERS)	Draft version update
0.3	17-02-2024	Ana Lucia Jaramillo (CORVERS)	Draft version update
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0.5	18-04-2024	Katerina Nikolaidou (CORVERS); Maria Niniatsoudi (CORVERS).	Draft version review
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1.0	17-05-2024	Ana Lucia Jaramillo (CORVERS), Melissa Campagno (GAC)	Final version and quality check

Project abstract

PROTECT aims at levering innovation procurement to unlock the climate service (CS) market's potential to support urgent climate adaptation and mitigation. The project will allow public and private organisations to build up and integrate their knowledge and skills about climate change, environmental observation (EO) and innovation procurement, notably enabling public authorities to shift to a proactive governance model, using innovative public procurement approaches to increase value and climate impact for money. It shall increase access of CS SME providers across Europe to public procurement markets and shape solutions that best address public demand, both specific and systemic. The initial focus will be on five encompassing application domains (Utilities, Green cities, Health, Land use & Marine environment, and Security) and their contributions to the areas of sustainability in Horizon Europe's Cluster 6. The project will source and assess existing and high-potential CS solutions and technologies that use EO data. It will engage with an extensive and varied community of procurers, inform the definition and aggregation of their needs and functional requirements for CS, explaining, fostering and supporting a 'buying with impact' approach. Clearer, less fragmented demand shall guide and support R&D for future CS. PROTECT will prepare the operational ground for one or more joint, cross-border or coordinated pre-commercial procurement (PCP) processes and identify short-term actions so that Public Procurement of Innovative Solutions (PPI) can be activated towards or right after the project's end. At policy level, it will provide decision-makers for procurement, climate and policy, at EU, national, regional and local levels, with practical recommendations and guidelines to boost the use of innovation procurement for climate action.

Keywords

Pre-Commercial Procurement (PCP), Request For Tenders (RFT), Framework Agreement (FA), Specific Phase Contract, Exclusion, Selection, Award and Compliance Criteria, Evaluation, Intellectual Property Rights (IPR).

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Abbreviations and Acronyms

AI	Artificial Intelligence
AKIS	Agricultural Knowledge and Innovation Systems
COTS	Commercial Off-The-Shelf
CS	Climate Services
EAFIP	European Assistance For Innovation Procurement
EO	Earth Observation
EOOS	European Global Ocean Observing System
ESA	European Space Agency
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FRAND	Fair, Reasonable and Non-Discriminatory
GEO	Group on Earth Observation
GEOSS	Global Earth Observation System of Systems
GDPR	General Data Protection Regulation
GPA	Agreement on Government Procurement
HAA	City of Haarlem
HE	Horizon Europe
IPRs	Intellectual Property Rights
IoT	Internet of Things
KCEO	Knowledge Centre on Earth Observation
KPI	Key Performance Indicator
NDA	Non-Disclosure Agreement
OMC	Open Market Consultation
PBG	Public Buyers Group
PC	Project Coordinator
PCP	Pre-Commercial Procurement

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PIN	Prior Information Notice
R&D	Research and Development
SMEs	Small and Medium Enterprises
SOTA	State Of The Art
TCO	Total Cost of Ownership
TED	Tenders Electronic Daily
TRL	Technology Readiness Level
WTO	World Trade Organization

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PREFACE

This PCP Request for Tenders (RFT) invites all interested parties to present their offers to customize/pre-operationalize water intelligence innovations from space for European climate resilience.

The project, spanning phases from solution design to field validation targeting TRL 8, aims to address an R&D challenge from those identified as FLOODS, FIRES, WATER RESILIENCE and SUSTAINABLE AND RESILIENT INFRASTRUCTURE using space and Earth Observation data.

This PCP is a research & development (R&D) services procurement which is conducted through a Pre-Commercial-Procurement (PCP).

The Request for Tenders (RFT) in Tender Document 1 (TD) contains the following sections:

Section 1. General Context and Background: provides the underlying rationale of PCP and explains the PCP approach and how it differs from traditional procurement.

Section 2. Tender Profile: introduces the tender profile, including the description of the services to be procured, overall Water intelligence challenge this PCP must address and the motivation behind it. It explains the different phases of the PCP and the expected outcome of each phase. In addition, a general introduction to the procurers involved (also referred to as 'Buyers Group') is provided. This Section also provides with an overview of the timeline, budget, and procurement approach. Finally, Intellectual Property Right (IPR) considerations are addressed.

Section 3. Evaluation of Tenders: explains the preconditions for submitting a Tender, and an overview of the criteria to be used in the evaluation of the Tenders. The processes for the evaluation is also explained in this section.

Section 4. Content and Format of Tenders: describes how the bids should be presented in the administrative, technical and financial sections. It also explains the conditions of the contracts between the winning Tenderers and the Buyers Group, including the monitoring process, results evaluation, payment conditions and communication with the Buyers Group.

Section 5. Miscellaneous: addresses issues such as language, bidding offer, communication, confidentiality, cancellation of the tender and the procedures for appeal.

This PCP procurement is part of a project that is funded by Horizon Europe Research and Innovation Programme, under Grant Agreement *[number] (project website)]*

The contracts are therefore subject to additional rules based on the EU GA No [ ]

Attention: The EU (and/or any of its services) is not participating as a Contracting Authority in this procurement.

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PCP TENDER DOCUMENT 1
REQUEST FOR TENDERS (TD1)

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This Request for Tenders, designated as Tender Document 1 (TD1), should be read in conjunction with other Tender Documents related to this PCP, listed hereunder:

Tender Document 2 (TD 2): Framework Agreement
Tender Document 3 (TD 3): PCP Specific Contract for Phase 1
Tender Document 4 (TD 4): PCP Specific Contract for Phase 2
Tender Document 5 (TD 5): PCP Specific Contract for Phase 3
Tender Document 6 (TD 6): PCP End of Phase (1, 2, 3) report
Tender Document 7 (TD 7): Contractor details and Project abstracts
Tender Document 8 (TD 8): Technical Offer
Tender Document 9 (TD 9): Financial Offer & Cost Breakdown
Tender Document 10 (TD 10): Declaration of Honour
Tender Document 11 (TD 11): Declaration of Honour Russia
Tender Document 12 (TD 12): Consortia Statement
Tender Document 13 (TD 13): Subcontracting Statement
Tender Document 14 (TD 14): Legal Capacity of the Technology Provider Statement
Tender Document 15 (TD 15): Declaration of pre-existing rights

And Annexes:
Annex 2. Use cases
Annex 3. Checklist of documents and actions
Annex 4. Information about the Public Buyers Group
Annex 5. Preexisting rights of the Public Buyers Group
Annex 6. List of environmental, social and labour law obligations established by EU law, national legislation, collective agreements or the international environmental, social and labour conventions which Bids must comply with.

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PCP REQUEST FOR TENDERS (TD1)

1. GENERAL CONTEXT AND BACKGROUND

This Pre-Commercial Procurement (PCP) is a cross-border joint procurement of R&D services to reinforce public demand driven innovation in end-user services in the area of Climate Change Adaptation and Mitigation. Solutions are expected to achieve TRL 7-8. The PCP should deliver successful innovative and fully tested product(s) and/or service(s) that meet the common needs of the Public Buyers Group (PBG) to procure research, develop innovative marketable solutions, speed up the time-to-market and provide best value for money.

In the context of the PROTECT project the 4 challenges described below have been identified by public organisations:

1. FLOODS CHALLENGE: Rapid-mapping, predicting, preventing different types of floods and improving coordination efforts, relevant to marine and coastal environments, sustainable cities and civil protection and security agencies.
2. FIRES CHALLENGE: Predicting, preventing fires, tracking and tracing causality (causers) in different scenarios (waste, forest/nature, other), relevant to environmental agencies, sustainable cities, agriculture, forestry and land use, as well as for civil protection and security agencies.
3. WATER CHALLENGE: Climate resilient solutions for predicting, connecting data, planning, supply-demand, relevant to the application domains marine and coastal environments, energy and utilities, sustainable cities, agriculture, forestry and land use, as well as for civil protection and security agencies.
4. INFRASTRUCTURE CHALLENGE: Sustainable and resilient re-development, buildings restoring & adaptation), relevant to sustainable cities, energy and utilities and civil protection and security agencies.

This PCP focuses on [Challenge x] for the customization/pre-operationalisation of prototypes of end-user services in the area of Climate Change Adaptation and Mitigation contributing to the European Green Deal related domains and benefiting from further deployment, uptake and exploitation of Environmental Observation data and products. Furthermore, it will be contributing to fit-for-purpose Environmental Observation Systems and a strengthened Global Earth Observation System of Systems (GEOSS).

GEOSS is a set of coordinated, independent Earth observation, information and processing systems that interact and provide access to diverse information for a broad range of users in both public and private sectors. GEOSS links these systems to strengthen the monitoring of the state of the Earth. It facilitates the sharing of environmental data and information collected from the large array of observing systems contributed by countries and organizations within GEO. Furthermore, GEOSS ensures that these data are accessible, of identified quality and provenance, and interoperable to support the development of tools and the delivery of information services. Thus, GEOSS increases the understanding of Earth processes and enhances predictive capabilities that underpin sound decision-making: it provides access to data, information and knowledge to a wide variety of users.

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The project must use satellite-based earth observation, positioning, navigation and/or related timing data and services of Copernicus and/or Galileo/EGNOS (although other data and services may additionally be used).

The PCP is expected to contribute to all of the following outcomes:

- Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation, building on the Copernicus Services that respond to the common needs and beyond state-of-the-art performance targets of the PBG.
- Reduction of fragmentation of demand for innovative solutions by enabling public procurers to collectively implement this PCP in the area of climate adaptation and mitigation, which, due to their nature, are better addressed jointly, or which they would not have been able to tackle independently.
- New opportunities for wide market uptake and economies of scale for the supply side through the use of joint specifications, wide publication of results and – where relevant – contribution to standardization, regulation or certification to remove barriers for introduction of innovations into the market and creation of new products, processes and/or services ready for market uptake, leading to viable new businesses, jobs and sustainable economic growth.

The joint PCP procurement will include activities for awareness raising, networking, training, evaluation, validation and dissemination of results, to which providers are expected to cooperate.

The PCP builds on the outcomes coming from the PROTECT project funded under HORIZON-CL6-2021-GOVERNANCE-01-15: Preparing for pre-commercial procurement (PCP) for end-user services based on environmental observation in the area of climate change adaptation and mitigation (the PROTECT project), the work done previously under Horizon 2020 and Horizon Europe (e.g., from e-shape, climate service projects and downstream services projects), and GEOSS initiatives.

Moreover, the jointly identified challenges fit into the mid-to-long-term innovation plans of the PBG. The Open Market Consultation carried out in the context of PROTECT confirmed that solutions currently available on the market or under development are not meeting their needs of the end-to-end solutions as expressed in the challenges above, to tackle concrete targets for the desired functionality/performance improvement in the quality and efficiency of their public services.

The future solutions should take advantage of the use, uptake, and deployment of environmental observations as well as digital and data-based green solutions, assessed through the European Green Deal's 'do no harm' principle, to contribute to innovative governance models and for designing, implementing and monitoring science-based policy.

Innovative governance

The project to be carried out under the HE-funded PCP should contribute to innovative governance supporting the European Green Deal objectives recognizing, coping with and promoting resilience and inclusiveness in the face of on-going shocks and disruptions across Europe and the world, whether these be climatic, ecological, economic, social, geopolitical or related to agricultural inputs and resources, food, health, bio-based sectors or the wider bioeconomy. The creation of networks with the public (citizen engagement) and researchers, including also through digital technologies, can step up transformation and enhance resilience in different areas.

Critical risk assessment and reduction strategies need to be incorporated, including the diversification of infrastructures, resources and knowledge through more self-sufficiency and autonomy.

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Environmental observation

The results of the PCP should deploy and add value to environmental observations. Data and information obtained through environmental observation is of great value when assessing the state of the planet and is crucial to supporting the European Green Deal and the climate and ecological transitions.

It is foreseen the integration of information from different sources (space-based, airborne including drones, in-situ and citizens observations) with other relevant data and knowledge while ensuring (better) accessible, interoperable or deployable information for shaping the direction of policy development with a link to Copernicus, the European Earth observation and monitoring part of the EU Space programme and the European Space Agency's (ESA) Earth observation programme, as well as support to the Group on Earth Observation (GEO), its European regional initiative (EuroGEO), the Global Earth Observation System of Systems (GEOSS) and the European Commission initiative Destination Earth.

R&D activities relevant to the ocean, seas and coastal waters will complement and support the UN Decade of Ocean Science for Sustainable Development and the UN Decade on Ecosystem Restoration, the G7 Future of the Seas and Oceans Initiative, the European Global Ocean Observing System (EOOS) and the GOOS 2030 strategy.

Digital and data-based innovation

Digital and data-based innovation, in complementarity with the Digital Europe Programme, should bring benefits for citizens, businesses, researchers, the environment, society at large and policymakers. The potential of the ongoing digital transformation, and its wider impacts – both positive and negative – need to be better understood and monitored in view of future policy design and implementation, governance, and solution development.

The potential for digital and data technologies, including AI, IoT, and augmented reality-based solutions, should be applied to increase the sustainability and resilience of production and consumption systems, as well as industry and services.

Solutions should contribute to the development, support and take up of innovative digital and data-based solutions to support communities, economic sectors and society at large to achieve sustainability objectives. The focus is on overall sustainable solutions tailored to the needs of end-users and/or the systems. More specifically, R&D activities will contribute to economic circularity by promoting reuse of materials and waste reduction, adding value to existing knowledge and increasing cost-effectiveness, safety and trustworthiness of innovative environmentally friendly technologies in and across primary production sectors, food systems, bio-based sectors, bioeconomy, and sectors related to the oceans and biodiversity.

Particular attention should be given to precision and collaborative technologies and contribute to the human-centric twin green and digital transitions. This is a key policy objective that is also supported by the cross-cutting objective of the EU digital strategy, the European industrial strategy, the circular economy action plan, the SME strategy and the European data strategy.

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Strengthening Agricultural Knowledge and Innovation Systems (AKIS) is also relevant.

Knowledge and advice to all relevant actors are key to improving sustainability. For instance, primary producers have a particular need for impartial and tailored advice on sustainable management choices. AKIS go beyond agriculture, farming and rural activities and cover environment, climate, biodiversity, landscape, bioeconomy, consumers and citizens, i.e. all food and bio-based systems including value chains up to the consumer. Effective AKIS is a key driver to bridge the gap between science and practice and to enhance co-creation. This will speed up innovation and the take-up of results needed to achieve the European Green Deal objectives and targets.

This includes promoting interactive innovation and co-ownership of results by users as well as strengthening synergies with other EU funds, especially boosting the multi-actor approach and setting up structural networking within national/regional/local AKIS. In addition, social innovation also has the potential to achieve the objectives set in this destination, as it strengthens the resilience of communities, increases the relevance, acceptance and uptake of innovation, and helps bring about lasting changes in social practices, therefore acting as a system changer.

Where appropriate, proposals are encouraged to cooperate with the European Commission Knowledge Centre on Earth Observation (KCEO)).

Expected impact of the PCP

PCP proposals should set out a credible pathway contributing to innovative governance and sound decision-making on policies for the green transition and more specifically to one or more of the following impacts:

- innovative governance models enabling sustainability and resilience notably to achieve better informed decision-making processes, societal engagement and innovation;
- areas related to the European Green Deal benefit from further deployment and exploitation of environmental observation data, products and “green” solutions;
- a strengthened Global Earth Observation System of Systems (GEOSS)
- sustainability performance and competitiveness improved through further deployment of digital and data technologies as key enablers;
- stakeholders and end users including primary producers and consumers are better informed and engaged thanks to effective platforms such as AKIS;
- strengthened EU and international science-policy interfaces to achieve the Sustainable Development Goals.

When considering their impact, proposals also need to assess their compliance with the “Do No Significant Harm” principle according to which the project’s R&I activities should not support or carry out activities that cause a significant harm to any of the six environmental objectives of the EU Taxonomy Regulation.

Social innovation is also relevant when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake. It is envisaged the coordination with European Space Agency (ESA) actions so that ESA space data and science can be proactively integrated into the relevant research actions.

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In this context, the common challenge will be tackled through this **Pre-Commercial Procurement procedure** to develop innovative solutions in the area of Climate Change using Earth Observation (EO) data.

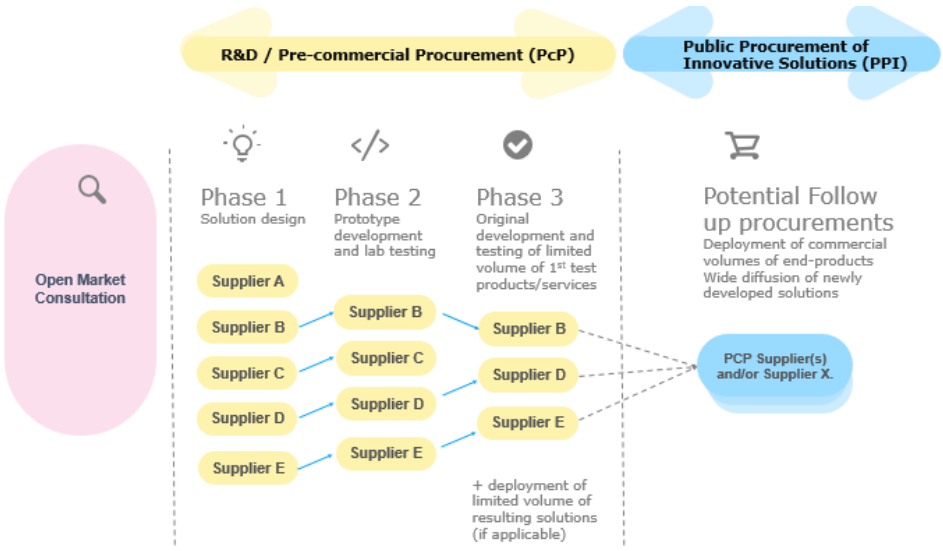

Figure 1. PCP phased process and a follow up PPI

PCP is characterised by the following five **features**:

1. Competitive development in phases to identify the solutions offering the best value for money

PCP targets situations that require radical innovation or R&D and for which there are typically no solutions on or close to the market yet. Different competing providers may have different ideas for solutions to the problem. As R&D is yet to take place, there is not yet any proof as to which of these potential alternative solutions would best meet customers' needs.

PCP therefore awards R&D contracts to a number of competing contractors at the same time, in order to compare different approaches to solving the problem. It thus offers innovators an opportunity to show how well their solution compares with others. It also allows a first customer test reference to be obtained from countries of the procurers that will test the solutions.

The R&D for this PCP is split into 3 phases (Phase 1: solution design, Phase 2: prototyping and lab testing, Phase 3: original development, installation, wider field testing and validation of a limited set of 'first' products or services).

Evaluations after each phase will progressively identify the solutions that offer the best value for money and meet the customers' needs. This phased approach allows successful contractors to improve their offers for the next phase, based on lessons learnt and feedback from procurers in the previous phase. Using the phased approach with gradually growing contract sizes per phase will also make it easier for smaller companies to participate in the PCP and enable SMEs to grow their business step-by-step with each phase.

Depending on the outcome of the PCP (will it result in innovative solutions that meet the tender requirements and offer good value for money?), procurers may or may not decide to follow-up the PCP with a public procurement to deploy the innovative solutions (PPI).

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2. Public procurement of R&D services

PCP addresses mid- to long-term public procurement needs for which either no commercially stable solutions yet exist on the market, or existing solutions exhibit structural shortcomings which require further R&D to resolve. PCP is a way for procurers to trigger the market to develop new solutions that address these shortcomings. PCP focuses on specific identified needs and provides customer feedback to businesses from the early stages of R&D. This improves the likelihood of commercial exploitation of the newly developed solutions.

PCP is explained in the PCP communication COM/2007/799 and the associated staff working document SEC/2007/1668. The R&D services can cover research and development activities ranging from solution exploration and design, to prototyping, right through to the original development of a limited set of 'first' products or services in the form of a test series. Original development of a first product/service may include limited production/supply in order to incorporate the results of field-testing and demonstrate that the product/service is suitable for production/supply in quantity to acceptable quality standards. R&D does not include quantity production or supply to establish the commercial viability or to recover R&D costs.[1] It also excludes commercial development activities such as incremental adaptations or routine/periodic changes to existing products, services, production lines, processes or other operations in progress, even if such changes may constitute improvements.

3. Open, transparent, non-discriminatory approach — No large-scale deployments

Unless there are specific participation and/or control restrictions *(see section 3.1)*, PCP procurements are normally open at least to all operators in EU Member States or HE associated countries, on equal terms, regardless of the size, geographical location or governance structure.

Access is extended to operators from WTO GPA signatory countries and other third countries if there are not sufficient operators in EU Member States or associated countries that can perform the R&D work (*see section 3.1*).

In all cases, there is, however, a place of performance requirement that a predefined minimum percentage of the contracted R&D services must be performed in EU Member States or Horizon Europe associated countries (or a more restricted list of countries; *see section 3.1*).

All communication (before, during and after the procurement) will normally be carried out in English (and other languages, if mentioned in section 5).

Any subsequent public procurement of innovative solutions (PPI), for the supply of commercial volumes of the solutions developed in the PCP, will be carried out under a separate procurement procedure. Participation in the PCP is thus not a prerequisite for the provisioning of a solution on a commercial scale.

4. Sharing of IPR-related risks and benefits under market conditions

PCP procures R&D services at market price, thus providing contractors with a transparent, competitive and reliable source of financing for the early stages of their research and development.

[1] See also Article XV(1)(e) WTO GPA 1994 and the Article XIII(1)(f) of the revised WTO GPA 2014.

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Giving each contractor the ownership of the IPRs attached to the results (foreground) they generate during the PCP means that they can widely exploit the newly developed solutions commercially. In return, the tendered price must contain a financial compensation for keeping the IPR ownership — compared to the case where the IPRs would be transferred to the procurers (the tendered price must be the 'non-exclusive development price'). Moreover, the procurers must receive license-free rights to use the R&D results for internal use, and licensing rights subject to certain conditions.

The contractors also retain ownership of their background rights (albeit subject to certain rights of use by the procurers, see section 2.7).

For more information, *see PCP on the Europa website*.

5. Exemption from EU Public Procurement Directives, WTO Government Procurement Agreement (GPA) and EU state aid rules

PCP procurements are exempted from the EU Public Procurement Directives because the procurers do not retain all the benefits of the R&D (the IPR ownership stays with the contractors).[2]

They are also exempted from the WTO Government Procurement Agreement (GPA) because this Agreement does not cover R&D services[3] (— the PCP being limited to such services and any subsequent PPI procurements relating to commercial-scale supply of such solutions not being part of the PCP procurement).

PCP procurements do not constitute state aid under the EU state aid rules[4] if they are implemented as defined in the PCP communication[5], namely by following an open, transparent, competitive procedure with risk- and benefit-sharing at market price. The division of all rights and obligations (including IPRs) and the selection and award criteria for all phases must be published at the outset; the PCP must be limited to R&D services and clearly separated from any potential follow-up PPI procurements; PCP contractors may not be given any preferential treatment in a subsequent procurement for provision of the final products or services on a commercial scale.

Other things to know

The start of this PCP procurement was proceeded by an open market consultation *(see summary and Q&A on [https://www.protect-pcp.eu/relevant-resources/]* .

This procurement is part of a project that is funded by the European Union's Horizon Europe Research and Innovation Programme, under grant agreement No [insert number] — [insert project acronym] *(see [insert project website])*.

The procurement receives also funding from the European Union's [insert name of EU programme] and/or [insert name of national programme] co-financed by the European Union: [insert beneficiary name and grant agreement number and acronym].

2 See Article 16(f) of Directive 2004/18/EC (Article 14 of Directive 2014/24/EU), Article 24(e) of Directive 2004/17/EC (Article 32 of Directive 2014/25/EU) and Article 13(f)(j) of Directive 2009/81/EC.

3 See the EU's Annex IV of Appendix I to the WTO GPA.

4 See Point 33 of the Commission Communication on a framework for state aid for research and development and innovation (C(2014) 3282).

5 Commission Communication: Pre-Commercial Procurement: driving innovation to ensure sustainable, high quality public services (COM(2007) 799) and PCP staff working document (SEC(2007)1668).

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- ⚠ **Note that is not allowed for one and the same procurer to receive funding for his part of the PCP budget from different EU programmes (e.g. Horizon Europe and ERDF). But it is possible for different procurers in the buyers group to receive funding from different EU sources.**
- ⚠ **The EU has given a grant for this procurement, but is not participating as a contracting authority in the procurement.**

ℹ **For more information, *see 'Innovation procurement' and 'Links to regional policy' in the Commission notice on synergies between ERDF funds and Horizon Europe*.**

2. TENDER PROFILE

2.1 Description of services to be procured

PCP challenge

The challenge [of PCP name] consists of the development and testing of innovative solutions beyond the state of-the-art for climate adaptation using space and EO (Earth Observation)-based information to prevent and mitigate [floods, fires, water scarcity, infrastructure impact]. The general objective is to be more climate resilient through a better EO-based information position and alignment.

Following the results of PROTECT CSA, it became apparent that the [challenge] aligns with the long-term innovation goals of public organisations and supporting stakeholders. In this sense, [PCP name] will address the development of new technologies to improve the functions of mapping, predicting, preventing, restoring and adapting.

In this context, the PCP aims to achieve the:

a) customization/pre-operationalisation of prototypes of services in the area of Climate Change Adaptation and Mitigation contributing to the European Green Deal related domains validated by end-users.
b) exploitation of Environmental Observation data and products.
c) contribution to fit-for-purpose Environmental Observation Systems and a strengthened Global Earth Observation System of Systems (GEOSS).
d) potentialization of digital and data technologies, including AI, IoT, and augmented reality-based solutions to increase the sustainability and resilience of production and consumption systems, as well as industry and services.
e) development, support and take up of innovative digital and data-based solutions to support communities, economic sectors and society at large to achieve sustainability objectives.
f) sustainable solutions tailored to the needs of end-users and/or the systems.
g) solutions that contribute to economic circularity adding value to existing knowledge and increasing cost-effectiveness, safety and trustworthiness of innovative environmentally friendly technologies.
h) solutions that contribute to the human-centric twin green and digital transitions.
i) Solutions that contribute to strengthening the Agricultural Knowledge and Innovation Systems (AKIS).

Scope of the R&D services to be procured

This procurement is for R&D services to develop solutions to tackle one of the following challenges: FLOODS, FIRES, WATER RESILIENCE or SUSTAINABLE AND RESILIENC INFRASTRUCTURE. The specific functional and performance requirements are explained in the use cases of Annex 1.

[PCP name] focuses especially on the [local regions and…] When weather conditions lead to extreme local conditions [explain].

Leveraging Earth observation-based modelling holds significant potential for managing and mitigating water dynamics' societal impacts. [explain]

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The challenge comprises a selection of representative use cases and stakeholders across Europe to guide the procurement process and ensure harmonization in [insert] standards.

The main quality/efficiency improvements sought for are: [indicate the target quality/efficiency and/or functionality/performance improvements, compared to the current best available solutions, *e.g. 30 % energy efficiency improvement, interoperability*].

- To use satellite data for [explain]
- To mitigate extreme climate situations [explain]

In this context, [PCP name] aims to steer the European market to make synergies for the development of solutions based on the functional needs identified from the demand side. Through the Pre-commercial Procurement process, several contractors will be able to compete in the creation of innovative solutions, opening the possibility for researchers and companies to work on future technologies and services that will contribute to more sustainable processes, while fostering new business opportunities to the commercialisation of products and services. The functional specifications and technical requirements will be aligned with the destination topics on innovative governance, environmental observations and digital solutions in support of the Green Deal, and deploying and adding value to environmental observations, as well as contributing to the Agricultural Knowledge and Innovation Systems (AKIS) by having relevant use cases.

The PCP phases

The R&D for this PCP will be split into 3 phases (Phase 1: solution design, Phase 2: prototyping and lab testing, Phase 3: original development, installation, wider field testing and validation of a limited set of 'first' products or services).

PCP PHASE 1 – SOLUTION DESIGN [4 months]: During this phase, the contractors will be asked to describe the solution providing the complete architecture and design thereof and verifying the technical, economic and organisational feasibility of their solution to address the PCP challenge.

PCP PHASE 2 – PROTOTYPE DEVELOPMENT (and testing of technologies) [9 months]: This phase concerns the development of the first prototypes of the solutions, which will be tested. Contractors will develop a first prototype based on the design documents delivered in the previous phase and test their solutions in lab conditions. Prototypes will be tested and verified to provide a measure of the technical performance of each solution in a controlled environment. During and at the end of phase 2, the PBG will request from the contractors a series of deliverables in order to evaluate their progress and the performed activities and obtained results, as well as an end of phase report.

PCP PHASE 3 – VALIDATION AND DEMONSTRATION OF THE SOLUTIONS (end-users piloting services in operational environment) [6 months]: This phase will validate the final solutions in diverse conditions, using the detailed scenarios and processes developed in the verification and validation strategy. During phase 3, a feedback mechanism will be established between the PBG and the selected contractors in order for the latter to receive requests for improvements directly from the end users. The PBG will request from the contractors an Integration Report. Finally, a Field Acceptance Report related to the accomplishment that the two final solutions which have been deployed and that the validation tests have been successfully performed in a real operational environment will be requested.

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Evaluations by the relevant committee after each phase will progressively identify the solutions that offer the best value for money and meet the customers' needs. This phased approach allows successful contractors to improve their offers for the next phase, based on lessons learnt and feedback from procurers in the previous phase.

The PCP budget, with the maximum per phase and contractor, is shown in the Table below. The reasoning for the PCP budget allocation with emphasis in Phase 2 is based on the complexity of the technology and the development required given the multiple layers and use cases that will be clustered and tackled in Phase 2.

Drivers behind the PCP to improve the quality and efficiency of the public services

[e.g. to meet regulatory requirements and/or to meet a need for standardisation or certification Explain also why current solutions don't meet the need].

Climate change of the past decades has already had a major impact on [ ]. This impact is expected to increase further in the future. Therefore, the need to integrate and monitor the anticipated and potential impacts of climate change in a structural and consequent manner seems imperative, as has been done in meteorology with weather parameters for more than a century. In this project, demonstrations of potential solutions will take place across important sectors such as [agriculture, nature, urban livelihoods, and safety in general, with information from integrated EO based service development in space and time.

In the preparation of [PCP name], use cases have been selected representing a [range of European regions]. While those use cases generally start from short term issues encountered by the concerned stakeholders, climate change tends to increase their frequency, intensity and coupling with other issues it aggravates, resulting in long-term systemic crises.

For the implementation of [PCP name], the strategy and tools will include the following approach: [explain]

The gender dimension should be taken into account in the content of the plan research, development and testing activities of the PCP.

The PCP may include the purchase of a limited set of *[*prototype(s)*][*and*][*or*][*first products or services*]* resulting from the R&D. The limited set of prototype(s)/first test products/services are needed for R&D purposes (*e.g. if the existing solution used by the procurers has to be destroyed in order to test the new solutions developed during the PCP and/or the procurers need to carry out further testing of the newly developed solutions after the PCP is finished)*. [Explain clearly who is procuring which/how many prototypes/first products or services and where and when and to who they need to be delivered].

⚠ **The PCP will award the tender on best value for money solutions, not to the lowest price only solutions, thus. NOT ONLY requirements regarding the price are considered, but also regarding quality improvements of the innovative solutions.**

The targets for the quality/efficiency improvements are set [see Annex specifications] so that they clearly enable to make a step-change beyond what currently available solutions are able to deliver. Annex x includes functional or performance-based specifications that include technical minimum requirements that innovative solutions must meet. The analysis on the shortcomings of solutions available on the

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market, the analysis of the needs of the procurers and the outcome of the open market consultation can be found [here].

The specific requirements of the subsequent phases *(e.g. for phase 2: local technical and safety conditions where prototype testing is planned to take place at one of the procurers' labs; for phase 3: local technical, environmental, ethics and safety/security requirements for field-testing] are provided in Annex x.* The metrics or indicators that the procurers will use to evaluate and validate, at the end of each PCP phase, to what extent each competing solution has made progress towards reaching the targets are included in each use case (Annex x).

The targets for the quality/efficiency improvements of the required solutions are set to enable a step-change beyond what currently available solutions are able to deliver. The functional or performance-based specifications (see Annex x) include technical minimum requirements that innovative solutions must meet. Based on specific use cases defined (see Annex x), it is possible to establish the shortcomings of solutions available on the market. The analysis of the needs of the procurers has set the grounds for the selected use cases, and the outcome of the open market consultation revealed the room for innovation and the technological gaps that can be tackle through R&D activities (see Annex x).

Tenderers should take into account the specific requirements of each of the PCP phases. For phase 2, the local technical and safety conditions of the place where the prototype testing is planned to take place at procurers' labs should be taken into account. For phase 3, the local technical, environmental, ethics and safety/security requirements for field-testing should be taken into account. The procurers will use metrics and indicators to evaluate and validate, at the end of each PCP phase, to what extent each competing solution has made progress towards reaching the targets (see Annex x).

Expected outcomes (per phase)

The following tables describe the objectives, the associated output, results and the tasks to be carried out (milestones and deliverables) for each of the PCP phases (solution design, prototyping, original development and testing of a limited set of 'first' products or services):

Expected outcomes (table for 3 phases)				
Phase 1: Solution design				
	Objective:	Perform research to: 1. elaborate the solution design and determine the approach to be taken to develop the new solutions and 2. demonstrate the technical, financial and commercial feasibility of the proposed concepts and approach to meet the procurement need		
	Output and results:	Solution design (Proof of Concept)		
	Milestones and deliverables	**By when?**	**How?**	**Output and results**

	Milestones:	M1.1) Kick off meeting	[dd.mm.yyyy] Start of the phase 1	[*e.g.sent by email to lead procurer, on-site visit*] Online meeting with procurer	Initial plan and project abstracts (in the format required by the EU for publication)
		M1.2) Follow up meeting	Mid of phase 1	Online meeting with procurer	Follow up on work performed
		M1.3) End of phase report	End of phase 1	Online meeting with procurer and report sent via email.	Solution design
	Deliverables:	D1.1) Plan for phase 1	First week of the start of phase 1	Send planning via email to contact person of procurer	Phase 1 plan and project abstracts (in the format required by the EU for publication)
		D1.1a) Presentation on activities	Week 4 of phase 1	Online meeting with procurer	Update on progress
		D1.1b) Report on activities	Week 6 of phase 1	Online meeting with procurer	Deliverable report on progress
		D1.2) Solution design draft	Week 8 of phase 1	Present draft in online meeting with procurer	Progress draft of solution design
		D1.3) Update on activities	Week 12 of phase 1	Online meeting with procurer	Progress report of activities
		D1.3a) Update on activities	Week 14 of phase 1	Online meeting with procurer	Progress report on solution design
		D1.4) End of phase report and abstract	Week 16 of phase 1	Send end of phase report to procurer	End of phase report with the Solution Design and a section that explains the

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					IPR measures taken by the contractors to protect the results and lists the names and location of personnel that carried out the R&D activities
		D1.5) End of phase report and abstract	End of phase 1	Send summary in the EU format for publication	A summary of the main results achieved by each contractor and conclusions from phase 1 (in the format required by the EU for publication)
Phase 2: Prototyping					
	Objective:	Develop, demonstrate and validate prototypes in lab conditions			
	Output and results:	Solutions tested in lab of procurers based on use cases			
	Milestones and deliverables		**By when?**	**How?**	**Output and results**
	Milestones:	M2.1) Kick off meeting	[dd.mm.yyyy] Start of phase 2	[*e.g. sent by email to lead procurer, on-site visit*] Online/site meeting with procurer	Phase 2 planning and project abstracts (in the format required by the EU for publication)
		M2.2) Progress update	Week 2 of phase 2	Online meeting with procurer	Progress on plan
		M2.3) Progress update	Week 4 of phase 2	Online meeting with procurer	Progress on plan

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		M2.4) Progress update	Week 6 of phase 2	Online meeting with procurer	Progress on plan
		M2.5) Progress update	Week 8 of phase 2	Online meeting with procurer	Progress on plan
		M2.6) Progress update	Week 10 of phase 2	Online meeting with procurer	Progress on plan
		M2.7) Progress update	Week 12 of phase 2	Online meeting with procurer	Progress on plan
		M2.8) Progress update	Week 14 of phase 2	Online meeting with procurer	Progress on plan
		M2.9) Start of testing	Week 16 of phase 2	Preparation of testing plan sent to contact person	Testing plan
		M2.10) Testing update	Week 18 of phase 2	Lab testing report	Test results
		M2.11) Testing update	Week 20 of phase 2	Lab testing report	Test results
		M2.12) Testing update	Week 22 of phase 2	Lab testing report	Test results
		M2.13) Testing update	Week 24 of phase 2	Lab testing report	Test results
		M2.14) Testing update	Week 26 of phase 2	Lab testing report	Test results
		M2.15) Testing update	Week 28 of phase 2	Lab testing report	Test results
		M2.16) Testing update	Week 30 of phase 2	Lab testing report	Test results
		M2.17) End of phase	Week 32 of phase 2	End of phase online meeting	Report with and phase 3 planning
		M2.18) End of phase	Week 32 of phase 2	End of phase report sent to contact person	Testing report and phase 3 planning
		M2.19) Prptotype demonstration	End of phase 2	Prototype demonstration to the EU	A demonstration to the EU of the

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					prototypes developed during phase 2
	Deliverables:	D2.1) Prototype and testing plan	Week 1 of phase 2	Online/site meeting on testing plan	Testing plan finetuned and project abstracts (in the format required by the EU for publication)
		D2.1a) Prototype and testing presentation	Week 1of phase 2	Online/site presentation	Testing plan finetuned
		D2.1b) Prototype and testing plan report	Week 2 of phase 2	Prototype and testing plan	Testing plan finetuned
		D2.2) Prototype testing report	Week 16 of phase 2	Online/site meeting on prototype testing results	Progress on prototype testing results
		D2.3) Prototype testing finetuning	Week 22 of phase 2	Online/site meeting of testing	Progress on prototype testing finetuning
		D2.3a) Interim report on testing results	Week 30 of phase 2	Online/site meeting of testing and document sent to contact person	Report on testing results
		D2.4) End of phase report	Week 32 of phase 2	End of phase report sent to contact person	End of phase report with recommendation and a section that explains the IPR measures taken by the contractors to protect the results and lists the names and location of personnel that carried

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					out the R&D activities
		D2.5) End of phase report and abstract	Week 32 of phase 2	Send summary in the EU format for publication	A summary of the main results achieved by each contractor and conclusions from phase 2 (in the format required by the EU for publication)
		D2.6) Demonstration	End of phase 2	Prototype demonstration to the EU	A demonstration to the EU of the prototypes developed during phase 2
	Points to be addressed in report:	Prototype design and testing plan. Finetuning of the plan based on recommendations. Results of the lab testing based on use cases and KPIs. Abstract and end-of phase report on the required template. A summary of the main results achieved by each contractor and conclusions from phase 2 (in the format required by the EU for publication)			
Phase *[3]*: Development & testing					
	Objective:	Original development and field-testing of a limited set of first services in 5 testing sites located in 5 EU Member States *[*products*]* *[*services*]* (the test series)			
	Output and results:	Solutions tested in operational environments based on use cases in 5 sites			
	Milestones and deliverables		**By when?**	**How?**	**Output and results**
	Milestones:	M3.1) Kick off meeting	[dd.mm.yyyy] Start of phase 3	[*e.g. sent by email to lead procurer, on-site visit*] Online/site meeting with procurer	Phase 3 planning testing in operational environment and project abstracts (in the format required by

					the EU for publication)
		M3.2) Testing setup in operational site 1	Week 2 of phase 3	Online/site meeting with procurer	Finetuned plan for site 1
		M3.3) Testing progress in operational site 1	Week 3 of phase 3	Online/site meeting with procurer	Progress and test results in site 1
		M3.4) Testing progress in operational site 1	Week 4 of phase 3	Online/site meeting with procurer	Progress and test results in site 1
		M3.5) Testing progress in operational site 1	Week 5 of phase 3	Online/site meeting with procurer	Progress and test results in site 1
		M3.6) Testing setup in operational site 2	Week 6 of phase 3	Online/site meeting with procurer	Finetuned plan for site 2
		M3.7) Testing progress in operational site 2	Week 7 of phase 3	Online/site meeting with procurer	Progress and test results in site 2
		M3.8) Testing progress in operational site 2	Week 8 of phase 3	Online/site meeting with procurer	Progress and test results in site 2
		M3.9) Testing progress in operational site 2	Week 9 of phase 3	Online/site meeting with procurer	Progress and test results in site 2
		M3.10) Testing setup in operational site 3	Week 10 of phase 3	Online/site meeting with procurer	Finetuned plan for site 3
		M3.11) Testing progress in operational site 3	Week 11 of phase 3	Online/site meeting with procurer	Progress and test results in site 3

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		M3.12) Testing progress in operational site 3	Week 12 of phase 3	Online/site meeting with procurer	Progress and test results in site 3
		M3.13) Testing progress in operational site 3	Week 13 of phase 3	Online/site meeting with procurer	Progress and test results in site 3
		M3.14) Testing setup in operational site 4	Week 14 of phase 3	Online/site meeting with procurer	Finetuned plan for site 4
		M3.15) Testing progress in operational site 4	Week 15 of phase 3	Online/site meeting with procurer	Progress and test results in site 4
		M3.16) Testing progress in operational site 4	Week 16 of phase 3	Online/site meeting with procurer	Progress and test results in site 4
		M3.17) Testing progress in operational site 4	Week 17 of phase 3	Online/site meeting with procurer	Progress and test results in site 4
		M3.18) Testing setup in operational site 5	Week 18 of phase 3	Online/site meeting with procurer	Finetuned plan for site 5
		M3.19) Testing progress in operational site 5	Week 19 of phase 3	Online/site meeting with procurer	Progress and test results in site 5
		M3.20) Testing progress in operational site 5	Week 20 of phase 3	Online/site meeting with procurer	Progress and test results in site 5
		M3.21) Testing progress in operational site 5	Week 21 of phase 3	Online/site meeting with procurer	Progress and test results in site 5
		M3.22) Testing results in 5 sites	Week 22 of phase 3	Online/site meeting with procurer	Progress and test results of 5 sites

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		M3.23) End of phase report	Week 23 of phase 3	End of phase online/site meeting	End of phase report with recommendations
		M3.24) Final report	Week 24 of phase 3	End of phase report sent to contact person	End of PCP report with recommendations
		M3.25) Summary of results	End of phase 3	End of phase report sent to contact person	A summary of the main results achieved by each contractor and conclusions from the PCP in the format required by the EU for publication.
	Deliverables:	D3.1) Plan to test solutions in operational environments in 5 sites	Week 1 of phase 3	Online/site meeting and testing plan sent to contact person	Testing plan finetuned and project abstracts (in the format required by the EU for publication)
		D3.1a) Interim report on finetuned plan for 5 sites	Week 2 of phase 3	Online/site presentation	Testing plan finetuned
		D3.1b) Progress report of testing in site 1	Week 3 of phase 3	Progress report	Site 1 testing results
		D3.2) Progress report of testing in site 1 and 2	Week 10 of phase 3	Online/site meeting on service testing results	Progress on service testing results in site 1 and 2

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		D3.3) Progress report of testing in site 3, 4 and 5	Week 22 of phase 3	Online/site meeting of testing	Progress on prototype testing finetuning
		D3.3a) Interim report on results of testing in 5 sites	Week 23 of phase 3	Online/site meeting of testing and document sent to contact person	Report on testing results
		D3.4) End of phase report	Week 24 of phase 3	End of phase report sent to contact person	End of phase report with recommendation and a section that explains the IPR measures taken by the contractors to protect the results and lists the names and location of personnel that carried out the R&D activities
		D3.5) Summary of results	End of phase 3	End of phase report sent to contact person	A summary of the main results achieved by each contractor and conclusions from the PCP in the format required by the EU for publication.
		D3.6) Deadline for lessons learned	End of phase 3	Online meeting and deadline agreement	A deadline by which the contractors must agree on the text for the summary of overall lessons learnt and

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					results achieved from the PCP, for publication
		D3.6) Demonstration of services	End of phase 3	Demonstration to the EU	A final demonstration to the EU of the final products or services developed during the 3 phases.
	Points to be addressed in report:	Results of services testing in operational environments in 5 sites. End-user evaluation of solutions based on use cases and KPIs. A summary of the main results achieved by each contractor and conclusions from the PCP in the format required by the EU for publication, recommendations.			

The tasks and expected outcomes of each milestone and deliverable are detailed below:

- for each end-of phase deliverable, a section that explains the IPR measures taken by the contractors to protect the results and lists the names and location of personnel that carried out the R&D activities
- at the start of phase 1, phase 1 project abstracts (in the format required by the EU for publication)
- at the end of phase 1, a summary of the main results achieved by each contractor and conclusions from phase 1 (in the format required by the EU for publication)
- at the start of phase 2, phase 2 project abstracts (in the format required by the EU for publication)
- at the end of phase 2, a summary of the main results achieved by each contractor and conclusions from phase 2 (in the format required by the EU for publication)
- at the end of phase 2, a demonstration to the EU of the prototypes developed during phase 2
- at the start of phase 3, phase 3 project abstracts (in the format required by the EU for publication)
- at the end of phase 3, a summary of the main results achieved by each contractor and conclusions from the PCP in the format required by the EU for publication)]
- a deadline by which the contractors must agree on the text for the summary of overall lessons learnt and results achieved from the PCP, for publication
- at the end of the PCP, a final demonstration to the EU of the final products or services developed during the 3 phases.

For phase 2 the prototype validation is expected to be done at the premisses of the procurer(s)/contractors in [ ]. The different use cases should all be tackled by each contractor/consortia.

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For phase 3, the testing of services in operational environment will take place in [ ] according to the finetuned plan from week 2 until week 22 of phase 3. Each contractor/consortium is expected to develop (1) solution for the limited test series.

For phase [3], provide information on the timing and the site(s) where the procurers will carry out the testing and validation of the test series. State clearly how many solutions each contractor is expected to develop for the limited test series. Specify whether contractors need to set aside resources for testing the solutions on the premises of all or only some procurers. Indicate whether they need to plan to have resources available to carry out testing sequentially or in parallel at the different sites. For PCPs with lots, clarify if there is a need for field testing of products/services developed by contractors in different lots together (to test dependencies between lots and to ensure that building blocks developed in different lots ultimately work together as expected).

The contractors/consortia need to set aside resources for testing the solutions on the premises of (5) procurers. Contractors/consortia need to plan having resources available to carry out testing sequentially (or in parallel) at the different sites covering the different use cases.

2.2 Tender closing time

Tender closing time will be: [**date and hour, e.g. 5 September 2025, 17.00h**]

2.3 Procurer(s) and other parties involved in the PCP

This procurement relates to a joint PCP that will be carried out by the following lead procurer: [name and country of the lead procurer]

The lead procurer is appointed to coordinate and lead the joint PCP, and to sign and award the framework agreement and the specific contracts for all phases of the PCP, in the name and on behalf of the following buyers group:

- [name and country of the member 1 of the PBG]
- [name and country of the member 2 of the PBG]
- …

The lead procurer is *[not]* part of the PBG.

The procurers in the PBG have the following background/profile/responsibilities for:

- [name 1]: [insert responsibilities]
- [name 2]: [insert responsibilities]
- ……

The responsibilities which the procurers in the PBG have in their respective countries with regard to setting the acquisition and/or regulatory strategy for the innovative solutions are as follows:[…}.

The following entities are not in the PBG but participate as third parties giving in-kind contributions to the procurers for the purpose of carrying out the PCP:

- [name, country]
- [name, country]
- …

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The following entities are participating as preferred partners with an interest in the PCP, but without being part of the PBG or giving in-kind contributions for carrying out the PCP:

- [name, country]
- [name, country]
- [name, country]

The preferred partners will be kept informed about the PCP [indicate what type of information concerning the PCP they will have access to and whether they will attend certain parts of the PCP implementation such as product demonstrations and testing. Explain that they will not have rights to results or IPRs].

The main roles and responsibilities are as follows:

Lead procurer — Appointed by the PBG to organise and lead the joint procurement; also part of the PBG, if he contributes to the procurement budget.

Public Buyers Group — The group of procurers that contribute to the procurement budget. For procurers that participate in the EU grant as sole participants *(i.e. entities representing several members, e.g. a central purchasing body, a European research infrastructure consortium or a European regional cooperation group)*, indicate which of the members contribute to the PCP procurement budget.

Third parties that provide in-kind contributions to the PCP — Entities that are neither lead procurer nor part of the PBG, but that give in-kind contributions to the PCP.

Preferred partners — Entities that are neither lead procurer nor part of the PBG nor third parties providing in-kind contributions, but that have a special interest in closely following the PCP *(entities involved in the Horizon Europe grant 'related additional networking activities'; other potential buyers for the solutions that have expressed a special interest in the PCP)*.

2.4 Contracting approach

The PCP will be implemented by means of a **framework agreement** with call-offs for **specific contracts** for each of the PCP R&D phases (altogether 'contracts').

Following the tendering stage, a framework agreement and a specific contract for phase 1 will be awarded to a minimum of [indicate number: minimum 3 (2 is only allowed if the market consultation has shown that there are fewer than 3 eligible tenderers capable of performing the R&D services)] contractors. If less that the minimum contractors present a bid the PBG shall motivate a decision to stop or continue the PCP.

A call-off will be organised for phase 2, with the aim of awarding a minimum of [indicate number] phase 2 contracts. Only offers from contractors that successfully completed phase 1 will be eligible for phase 2. The procurers will validate the phase 2 prototypes [identify the site: in the procurer's labs or the contractors' lab].

A second call-off will be organised for phase 3, with the aim of awarding a minimum of [indicate number: minimum 2] phase 3 contracts. Only offers from contractors that successfully completed phase 2 will be eligible for phase 3.*]*

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Field-testing of the first products/services is expected to take place [insert where *(e.g. at all the sites where procurers of the PBG are based)*.

The framework agreement will set all the framework conditions for the duration of the PCP (covering all the three phases). There will be no renegotiation. The framework agreement will remain binding for the duration of all phases for which contractors remain in the PCP. Tenderers that are awarded a framework agreement will also be awarded a specific contract for phase 1 (evaluation of tenders for the framework agreement and phase 1 are combined). Tenderers are therefore asked not only to submit their detailed offer for phase 1, but also to state their goals, and to outline their plans (including price conditions) for phase 2 *[*and 3*]* — thus giving specific details of the steps that would lead to commercial exploitation of the R&D results.

The brief overview of the overall timing of the PCP (including the expected start and finish dates) and of the individual phases is as follows: […]

The PCP will start on (M1) and finish on (M19). The duration of phase 1 will be 4 months. The duration of phase 2 will be 9 months and the duration of phase 3 will be 6 months.

The offers for the next phase will be requested only *after* the end-of phase deliverables of the previous phase and after the contractors have been informed of successful completion of the previous phase — in this case only the contractors that successfully completed the previous phase will be invited to make offers for the next phase.

2.5 Total budget and budget distribution (per phase)

The total budget for the PCP, the maximum budget per phase and the maximum budget per tender per phase, as well as the minimum number of contractors and the duration of each is expressed in the table below.

PCP Phase	Duration	No. Contractors	Budget per contractor	Total budget
Phase 1	4 months	5		
Phase 2	9 months	3		
Phase 3	6 months	2		
			TOTAL	

Flexibility will be provided to transfer leftover budget from one phase to the next phase in case offers with lower price than expected are received. For all phases, contracts will be financed until the remaining budget is insufficient to fund the next best tender. The exact number of contracts finally awarded will thus depend on the prices offered and the number of tenders passing the evaluation. As leftover budget from the previous phase will be transferred to the next phase, the total budget available for phase 2 *[*and 3*]* may eventually be higher than stated here (but the maximum budget per contractor for phase 2 *[*and 3*]* will remain the same). The lower the average price of tenders, the more contracts can be awarded.

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However, the total value of the contracts awarded can also be lower than initially expected if there are fewer tenders than expected that meet the minimum evaluation criteria.

The number of expected contractors may increase to allow more contracts than initially expected to be awarded if there are more high quality tenders at cheaper prices than expected.

2.6 Time schedule

The time schedule is the following:

Planned time schedule (table for 3 phases)	
Date	**Activity**
	First tender procedure (framework agreement and phase 1 contracts)
[dd.mm.yyyy]	Publication of contract notice in TED
…	Deadline for requesting the tender documents
	Deadline for submitting questions about the tender documents
	Deadline for the lead procurer to publish replies to questions (Q&A document)
	Deadline for submission of tenders for the framework agreement and phase 1
	Opening of tenders
	Tenderers are notified about the decision on awarding contracts
	Signature of framework agreements and phase 1 specific contracts
	Publication of the contract award notice in TED
	Implementation of phase 1
	Start of phase 1
	Names of winning phase 1 contractors and their project abstracts to be sent to EU (template*) and published on [insert acronym] PCP project website
	Visit of phase 1 contractors to the premises(s) of the procurer(s) to learn about the operational boundary conditions governing the design of targeted solutions
	Deadline for phase 1 interim milestone(s)/interim deliverable(s)
	Visit(s) of the phase 1 supervisor/monitoring team to the contractors' premises to check completion of milestone(s)/interim deliverable(s)
	Feedback from phase 1 supervisor/monitoring team on phase 1 interim milestone(s)/interim deliverable(s)

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	Interim payments (if applicable)
	Deadline for phase 1 final milestone(s)/final report/deliverable(s)
	Assessment of phase 1 final milestone(s)/final report/deliverable(s)
	Phase 1 contractors notified as to whether they have completed this phase satisfactorily and successfully
	End of phase 1
	Summary of the results and conclusions achieved by each contractor during the phase sent to EU (template*)
	Payment of balance for phase 1 to contractors that completed this phase satisfactorily
	Second tender procedure (call-off for phase 2)
	Launch call-off for phase 2 (only offers from contractors that successfully completed phase 1 are eligible)
	Deadline for submitting questions on phase 2 call-off documents
	Deadline for the lead procurer to circulate replies to questions to phase 2 tenderers
	Deadline for submitting phase 2 offers
	Opening of phase 2 offers
	Contractors are notified about the decision on awarding phase 2 contracts
	Signature of phase 2 specific contracts
	Implementation phase 2
	Start of phase 2
	Names of winning phase 2 contractors and their project abstracts to be sent to EU (template*) and published on [insert acronym] PCP project website
	Visit of phase 2 contractors to the premises(s) of the procurer(s), where applicable
	Deadline for phase 2 interim milestone(s)/deliverable(s)
	Visit(s) of the phase 2 supervisor/monitoring team to the contractors' premises to check completion of interim milestone(s)/deliverable(s)
	Feedback from phase 2 supervisor/monitoring team on phase 2 interim milestone(s)/deliverable(s)

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	Interim payments (if applicable)
	Lab testing of the prototype developed during phase 2
	Feedback from phase 2 supervisor/monitoring team on lab testing of the prototype
	Deadline for submission of phase 2 final milestone(s)/final report /deliverable(s)
	Demonstration of prototype for the EU technical review of phase 2
	Assessment of phase 2 final milestone(s)/final report/deliverable(s)
	Phase 2 contractors notified as to whether they have completed this phase satisfactorily and successfully
	End of phase 2
	Summary of the results and conclusions achieved by each contractor during the phase sent to EU (template*)
	Payment of balance for phase 2 to contractors that completed this phase satisfactorily
	/Third tender procedure (call-off for phase 3)
	Launch call-off for phase 3 (only offers from contractors that successfully completed phase 2 are eligible)
	Deadline for submitting questions about phase 3 call-off documents
	Deadline for the lead procurer to circulate replies to questions to phase 3 tenderers
	Deadline for submitting phase 3 offers
	Opening of phase 3 offers
	Contractors are notified about decision to award phase 3 contracts
	Signature of phase 3 specific contracts
	Implementation phase 3
	Start of phase 3
	Names of winning phase 3 contractors and their project abstracts to be sent to EU (template*) and published on [insert acronym] PCP project website
	Visit of phase 3 contractors to premises(s) of procurer(s), where applicable

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	Deadline for phase 3 interim milestone(s)/deliverable(s)
	Visit(s) of the phase 3 /monitoring team to the contractors' premises to check completion of phase 3 interim milestone(s)/deliverable(s)
	Feedback from phase 3 monitoring supervisor/monitoring team on phase 3 interim milestone(s)/deliverable(s)
	Interim payments (if applicable)
	Field-testing of products/services developed during phase 3
	Feedback from phase 3 supervisor/monitoring team on field-testing of the products/services
	Deadline for submission of phase 3 final milestone(s)/final report/ deliverable(s)
	Final demonstration of products/services developed during phase 3 (including to EU representatives)
	Assessment of phase 3 final milestone(s)/final report/deliverable(s)
	Phase 3 contractors notified as to whether they have completed this phase satisfactorily and successfully
	End of phase 3*]*
	Summary of the results and conclusions achieved by each contractor during the PCP sent to EU for publication purposes (template*).
	Payment of balance for phase 3 to contractors that completed this phase satisfactorily

2.7 Intellectual Property Rights (IPR)

Ownership of results (foreground)

Each contractor will keep the ownership of the IPRs attached to the results they generate during the PCP implementation. The price offered in the tender is expected to take this into account.

The ownership of the IPRs will be subject to the following conditions:

- The PBG has the right to:
  - access the results, on a royalty-free basis, for their own use.
  - grant (or require the contractors to grant) non-exclusive licences to third parties to exploit the results under fair and reasonable conditions (without the right to sub-license).

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- The PBG has the right to require the contractors to transfer ownership of the IPRs if the contractors fail to comply with their obligations, notably concerning the protection or exploitation of the results or to protect public interests (including security interests).

The contractors must ensure that the results are not subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries set out in section 3.1 of this request for tenders — unless otherwise agreed with the granting authority.*]*

Commercial exploitation of results

The market potential of the results is estimated at [insert available figures for the expected size and type of the potential total market size, *i.e. beyond the PCP procurers*].*]*

The contractors are expected to start commercial exploitation of the results at the latest [insert number of years (minimum of four years after the end of the Horizon Europe grant)] years after the end of the framework agreement.

Contractors are required to undertake specific activities beyond product development to commercially exploit the results, e.g. certification of solutions or contribution to standardisation

The PBG will undertake actions to help remove barriers to the introduction onto the market of the solutions to be developed during the PCP (e.g. promotion of R&D results among other public procurers, contribution made by the demand side to regulation, standardisation, and certification).

The PCP is subject to exploitation restrictions/additional exploitation obligations under the HE call conditions [ ].:

The feasibility of the business plan to commercially exploit the R&D results will be assessed as part of the award criteria.

The contractors may not transfer ownership of their results or grant licences to third parties which are established in countries which are not [include the list of eligible countries set out in the HE call conditions] (or, if applicable, are controlled by such countries or entities from such countries) — unless they have requested and received prior approval by the contracting authority who will request prior approval from the granting authority that is co-financing the PCP.*]*

The contractors must promote the dissemination of their results, in particular through [publications and] contribution to standardisation. The contractors and the contracting authority will establish at the start of the framework agreement a list of [planned publications about the results and] appropriate standards to contribute to, and will keep this list updated throughout the framework agreement. The contractors must — up to four years after the end of the PCP — inform the contracting authority, who will inform in its turn the granting authority that is co-financing the PCP, if the results could reasonably be expected to contribute to European or international standards.*]*

In case of a public emergency, the contractors must (if requested by the granting authority) grant for a limited period of time specified in the request, non-exclusive licences — under fair and reasonable conditions — to their results to legal entities that need the results to address the public emergency and

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commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions.*]*

In addition the HE call conditions impose additional exploitation obligations, as follows [add them here].

The contractors may not transfer ownership or the results or give exclusive licenses, if this would conflict with the right of first refusal for the PBG to buy the results. [explain further the exact procedure that the PBG should follow to invoke the right of first refusal, unless already explained in the framework agreement].*]*

For more information, see section 5.5 in the framework agreement that describes in more detail the rights and obligations regarding exploitation of results.

Declaration of pre-existing rights (background and sideground)

The ownership of pre-existing rights will remain unchanged.

In order to be able to distinguish clearly between results and pre-existing rights (and to establish which pre-existing rights are held by whom):

- Tenderers are requested to elaborate the proposed list of pre-existing rights that they wish to use for their proposed solution in their offers.
- Procurers and contractors will establish an agreed list of pre-existing rights to be used, before the start of the Framework Agreement and this list will be updated at the start of each specific contract.

The procurers *[*and third parties providing in-kind contributions to the PCP*]* do not hold any pre-existing rights relevant to the PCP contracts. The procurers *[*and third parties providing in-kind contributions to the PCP*]* hold the following pre-existing rights relevant to the PCP contracts: [list all pre-existing rights that tenderers should be aware about to prepare their offer — and specify those that are available for use and those that must be used to build upon for carrying out the R&D for the PCP].*]*

Specific conditions may apply:

[OPTION 1 if there is NO relevant background held by lead procurer, buyers group and third parties providing in-kind contributions:

The contractors must ensure that background that is subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries set out in section 3.1 and that impact the exploitation of the results (i.e. would make the exploitation of the results subject to control or restrictions) must not be used and must be explicitly excluded from the list of pre-existing rights agreed between the contractors and the contracting authority that will be used for the PCP — unless otherwise agreed with the contracting authority.*]*

For PCPs with control restrictions due to strategic interests in the HE call conditions (e.g. specific control restrictions on background), the call conditions shall prevail and must be applied. [If no, the conditions

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on background should only use similar restrictions if the buyers group has justified reasons to do so and in agreement with the granting authority.]

Note that impact the exploitation of results should be understood as making the exploitation of the results subject to control or restrictions, for example if exploitation would require the agreement of the entity owning the background. If such background needs to be used this must be agreed with the granting authority.

The members of the PBG will receive rights to use the background IPR related to the developed solution for free during and for the purpose of the PCP. They are not buying developed prototypes or first products/services as part of this PCP. However, they will receive rights to use the background rights related to the developed solution after the PCP at fair and reasonable conditions, the price for which will be established if and when the procurers conduct after the PCP a follow-up procurement to buy developed solutions or first prototypes.

Or

The members of the PBG receive rights to use the background rights related to the developed solution for free during and for the purpose of the PCP. They will be buying [specify whether it is 'developed prototypes' or 'first products'] as part of this PCP and, therefore, also receive rights to use the background rights related to the developed solution for a duration of [specify the duration for which the procurer want to keep using the PCP solution and the associated background rights after the PCP] after the PCP. This to be taken into account in your financial offer for the PCP.*]*

Rights to use the background related to the developed solution must be granted under the same conditions as above also to entities that are under the direct or indirect control of procurers of the PBG, or under the same direct or indirect control as procurers of the PBG, or directly or indirectly controlling procurers of the PBG, subject to applicable control restrictions.

The framework agreement will contain a provision that describes in more detail the rights and obligations of the different parties regarding the pre-existing rights and results.

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3. EVALUATION OF TENDERS

3.1 Eligible tenderers, joint tenders and subcontracting

Eligibility of tenderers

Participation in the tendering procedure is open on equal terms to all types of operators that are established in EU Member States or Horizon Europe associated countries[6]

Explain whether the call for tenders is open to all types of operators (companies or other type of legal entities) or whether there are any eligibility restrictions:

[OPTION for PCPs for which the open market consultation has shown that there are NOT sufficient potential interested bidders in the EU Member States and HE associated countries: that are established in [add WTO GPA signatory countries and other third countries if needed to obtain sufficient amount of offers]] on equal terms, regardless of the size, geographic location or governance structure].]

[OPTION 2 if there are participation and/or control restrictions in the HE call conditions: Participation in this call for tenders is open only to interested operators established in [and controlled from] [add the list of countries to which participation and/or control is restricted].

Participation in this call for tenders is open only to interested operators established in *[*and controlled from*]* [add the list of countries to which participation and/or control is restricted].

'Control' is defined as the possibility to exercise decisive influence on the operator, directly or indirectly, through one or more intermediate entities, 'de jure' or 'de facto'. Each tenderer must complete Annex [xxx] Declaration of ownership and control to indicate its country of establishment and its country/ies of control and must present the supporting evidence normally acceptable under the law of that/those country/ies as requested in Annex [xxx]. In addition, such a declaration (and supporting evidence) must be submitted for each subcontractor, expert and other entities on whose capacity the tender relies). Additional evidence may be requested by the contracting authority after the submission deadline.

Please note that in case of participation and/or control restrictions, the contractors will have to ensure that the participation and/or control requirements are extended to their subcontractors, affiliated entities and other third parties (including suppliers of components used for the innovative solution) and that any cooperation with nationals of third countries that are not eligible countries or that are controlled by such a country and/or by a national of such a country does not affect the strategic assets, interests, autonomy or security of the EU and its Member States and avoids potential negative effects over security of supply of inputs that are critical to the procurement.*]*

6 List of Horizon Europe participating countries.

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Please also note that participation in the PCP contract is not open to entities that are subject to EU restrictive measures under Article 29 of the Treaty on the European Union (TEU) and Article 215 of the Treaty on the Functioning of the EU (TFEU)[7] — in any capacity (not as main contractor, member of a grouping/consortium, subcontractors, experts or any other type of entity on whose capacity the tender relies or other third parties that are cooperated with).In addition, the contractors must ensure that none of the contracted services are performed in countries nor by entities that are subject to EU restrictive measures (sanctions). They must ensure that none of the goods procured or used for the procurement were developed, produced or supplied in countries or by entities that are subject to such EU restrictive measures. In order to ensure that the EU restrictive measures are respected throughout the supply chain that will be involved in delivering the contract results, the contractors must ensure that these obligations also apply to their subcontractors, affiliated entities and other third parties (including suppliers of components used for the innovative solution) they cooperate with in the research, development, testing and subsequent commercialisation of the results, as well as to any entities succeeding them in their ownership or development of the results.

Tenders submitted in collaboration with others

Tenders may be submitted by a single entity or in collaboration with others. The latter can involve either submitting a joint tender or subcontracting, or a combination of the 2 approaches.

For joint tenders:

- the group of tenderers must assume joint and several liability for the performance of the contract.
- the group of tenderers must mandate one of them with the power to sign the framework agreement and specific contracts provide in their name and on their behalf ('lead contractor')

For subcontracting:

- [specify if there are restrictions on the allowed amount(s) that can be subcontracted]
- [indicate the provisions of national law that apply to subcontracting]
- [explain that the tender must mention which parts of the contract will be subcontracted]
- specify that the contractors remain fully liable to the procurers for the performance of the contract (and that this is the reason why also the subcontracts must reflect the rules of the Horizon Europe grant, including as relates to the place of performance, the definition of R&D services, confidentiality, results and IPRs, the visibility of EU funding, conflicts of interest, language, obligation to provide information and keep records, audits and checks by the EU, the processing of personal data, liability for damages as well as environmental, ethics and security requirements).

Other

Prior participation in the open market consultation is not a pre-condition for submitting a tender.

However, for phase 2 *[*and 3*]*, participation is limited to tenderers that successfully completed the preceding phase.

3.2 Exclusion criteria

The exclusion criteria are as follows:

[7] Please note that the EU Official Journal contains the official list and, in case of conflict, its content prevails over that of the EU Sanctions Map.

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Exclusion criteria	Evidence
A) Conflict of interest	Declaration of Honour (TD10)
B) Breach of obligations relating to the payment of taxes or social security contributions	Declaration of Honour (TD10)
C) Bankruptcy or professional misconduct	Declaration of Honour (TD10)
D) Criminal offences	Declaration of Honour (TD10)
E) Proposed solution already available in the market	Declaration of Honour (TD10)
F) Compliance with GDPR	Declaration of Honour (TD10)
G) Compliance with Minimum Documentation requirements	Declaration of Honour (TD10)

⚠ **Tenderers that do not comply with these criteria will be excluded.**

Each exclusion criterion is explained in more detail below.

B) Conflict of interest

Tenderers that are subject to a conflict of interest may be excluded when the situation cannot be effectively remedied by other less intrusive measures. If there is a potential conflict of interest, tenderers must immediately notify the lead procurer in writing

A conflict of interest covers both personal and professional conflicts. Personal conflicts are any situation where the impartial and objective evaluation of tenders and/or implementation of the contract is compromised for reasons relating to economic interests, political or national affinity, family, personal life *(e.g. family of emotional ties)* or any other shared interest. Professional conflicts are any situation in which the contractor's (previous or ongoing) professional activities affect **the** impartial and objective evaluation of tenders and/or implementation of the contract.

Provided the above, in the context of PROTECT Tender will be excluded if they fall within one of the following categories, relating to the structure of groups of operators:

- Where a single economic operator or affiliated entity is participating within more than one group of operators or both as single tenderer and as a member of a group of operators.
- Where a single economic operator or affiliated entity has already participated as a subcontractor or partner in PROTECT project.

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- Where a single economic operator or affiliated entity participated in PROTECT CSA (GA 101060592) project.

Affiliated Entity means any legal entity directly or indirectly controlling, controlled by, or under common control with that economic operator or its subsidiary, for so long as such control lasts.

⚠ **If an actual or potential conflict of interest arises at a later stage *(i.e. during the implementation of the contract)*, the contractor concerned must contact the lead procurer, who is required to notify the EU and to take steps to rectify the situation. The EU may verify the measures taken and require additional information to be provided and/or further measures to be taken.**

C) Breach of obligations relating to the payment of taxes or social security contributions

A Tenderer or Contractor, a member of the Consortium, a subcontractor and/or a Third Party on whose resources it relies upon (if applicable) can be excluded from further participation in the PCP if it is in breach of its obligations relating to the payment of taxes or social security contributions and where this has been established by a judicial or administrative decision having final and binding effect.

D) Bankruptcy or professional misconduct

A Tenderer or Contractor, a member of the Consortium, a subcontractor and/or a Third Party on whose resources it relies upon (if applicable) can be excluded from further participation in the PCP in any of the following situations:

- Where the Contracting Authority can demonstrate by any appropriate means a violation of applicable obligations referred to in Article 18(2) of the Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014.
- Where the Tenderer is bankrupt or is the subject of insolvency or winding-up proceedings, where its assets are being administered by a liquidator or by the court, where it is in an arrangement with creditors, where its business activities are suspended or it is in any analogous situation arising from a similar procedure under national laws and regulations.
- Where the Lead Procurer can demonstrate by appropriate means that the Tenderer is guilty of grave professional misconduct, which renders its integrity questionable.
- Where the Lead Procurer has sufficiently plausible indications to conclude that the Tenderer has entered into agreements with other economic operators with the intention of distorting competition.
- Where the Tenderer has shown significant or persistent deficiencies in the performance of a substantive requirement under a prior public contract, a prior contract with a contracting entity or a prior concession contract which led to early termination of that prior contract, damages or other comparable sanctions.
- Where the Tenderer has been guilty of serious misrepresentation in supplying the information required for the verification of the absence of grounds for exclusion or the fulfilment of the selection criteria.
- Where the Tenderer has undertaken to unduly influence the decision-making process of the Lead Procurer, to obtain confidential information that may confer upon it undue advantages in the procurement procedure, or to negligently provide misleading information that may have a material influence on decisions concerning exclusion, selection or award.

Where the Tenderer has failed to maintain relevant licensing or membership of an appropriate trading or professional organisation where required by law.

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E) Criminal offences

The Tenderer, or a representative of the Tenderer, a member of the Consortium, a subcontractor and/or a Third Party on whose resources it relies upon (if applicable) will be excluded from the PCP it has been convicted by final judgment for a criminal offence listed below:

- Participation in a criminal organisation, as defined in Article 2 of Council Framework Decision 2008/841/JHA.
- Corruption, as defined in Article 3 of the Convention on the fight against corruption involving officials of the European Communities or officials of Member States of the European Union (2) and Article 2(1) of Council Framework Decision 2003/568/JHA as well as corruption as defined in the national law of the contracting authority or the economic operator.
- Fraud within the meaning of Article 1 of the Convention on the protection of the European Communities' financial interests.
- Terrorist offences or offences linked to terrorist activities, as defined in Articles 1 and 3 of Council Framework Decision 2002/475/JHA, respectively, or inciting or aiding or abetting or attempting to commit an offence, as referred to in Article 4 of that Framework Decision.
- Money laundering or terrorist financing, as defined in Article 1 of Directive 2005/60/EC of the European Parliament and of the Council.
- Child labour and other forms of trafficking in human beings as defined in Article 2 of Directive 2011/36/EU of the European Parliament and of the Council.

F) Proposed solution already available in the market

Tenderers whose proposed solution is already available in the market will be excluded.

G) Compliance with GDPR

The Tenderers shall comply with the legislation and regulations applicable to the processing of personal data in Europe. In particular and if applicable, the Tenderer, members of a Consortium, subcontractors and Third Parties if applicable will have to ensure compliance with Article 28(7) of Regulation (EU) 2016/679 of the European Parliament and of the Council and Article 29(7) of Regulation (EU) 2018/1725 of the European Parliament and of the Council (on standard contractual clauses between controllers and processors).

H) Compliance with Minimum Documentation requirements

The Tenderer has the capability to provide with the Minimum Documentation listed in Annex 4.

3.3 Selection criteria

The selection criteria are as follows:

Selection criteria	Evidence
A) Ability to perform R&D up to original development of the first products or services	Proof of previous R&D projects of similar nature and scale.

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and to commercially exploit the results of the PCP, including intangible results in particular IPRs	The Tenderer shall indicate the level of technical resources to perform R&D. The Tenderer will provide a description (free text) of the capabilities of the organization to commercially exploit the Results of the PCP.
B) Suitability to pursue the professional activity	Legal Capacity of the Tenderer Statement
C) Demonstration of expertise and working experience required to undertake an innovative R&D project that entails relevant technology.	CVs of the Team, including minimum…employed by…capable of...having experience in… The quality of the CVs will be evaluated as part of the weighted award criteria.
D) At least one reference case per relevant domain (to tackle in the use cases) in a scientific research environment.	Description of (a) case(s), not older than 3 years (template provided). The quality of the reference case(s) will be evaluated as part of the weighted award criteria.

⚠ **Tenderers that do not comply with these criteria will be excluded.**

A) Ability to perform R&D up to original development of the first products or services and to commercially exploit the results of the PCP, including intangible results in particular IPRs

Tenderers must have:

- The capacity, tools, material and equipment to:
  - carry out research and lab prototyping.
  - produce and supply a limited set of first products or services and demonstrate that these products or services are suitable for production or supply in quantity and to quality standards defined by the procurers.
- The financial and organisational structures to:
  - manage, exploit and transfer or sell the results of the PCP (including tangible and intangible results, such as new product designs and IPRs).
  - generate revenue by marketing commercial applications of the results (directly or through subcontractors or licensees).

B) Suitability to pursue the professional activity

Tenderers must be legally and technically able to deliver the R&D services necessary to tackle the PCP challenge.

C) Demonstration of expertise and working experience required to undertake an innovative R&D project that entails relevant technology.

Tenderers must have the expertise and working experience required to undertake an innovative R&D project that entails relevant technology. ***Please note that this is a performance clause.***

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D) At least one reference case per relevant domain (to tackle in the use cases) in a scientific research environment.

Tenderers must have been involved in (a) relevant case(s) per domain, not older than 3 years before the deadline to submit the Bids.

Should there be any doubt as to any of these criteria, tenderers may be requested to provide additional information.

3.4 Award criteria

There are 2 types of award criteria (on/off criteria and weighted criteria).

On/off award criteria

Tenders must comply with the following on/off award criteria:

Pass/fail award criteria	Evidence
A) Compliance with the definition of R&D services[10]	Declaration of Honour Additionally: - The offers for all 3 Phases may include only items needed to address the challenge in question and to deliver the R&D services described in this Request for Tenders. - The total value of products offered in Phase 1 and in Phase 2 must be less than 50% of the value of the Phase 1 and Phase 2 Contracts' value. - The value of the total amount of products covered by the contract must be less than 50 % of the total value of the PCP Framework Agreement. Tenders that go beyond the provision of R&D services will be excluded.
B) Compatibility with other public financing	Declaration of Honour for absence of other incompatible public financing.
C) Compliance with the requirements regarding the place of performance of the contract	Declaration of Honour Additionally: - A list of staff working on the specific contract *(including for subcontractors)*, indicating clearly their role in performing the contract *(i.e., whether they are principal R&D staff or not)* and the location *(country)*

	where they will carry out their tasks under the contract. - A list of geographical locations where the data is hosted (and backup sites).
D) Compliance with ethics requirements	Declaration of Honour If the Tender involves activities that raise ethical issues, the Tenderer must submit an ethics self-assessment that: - Describes how the tender meets the legal and ethical requirements of the country or countries where the tasks raising ethical issues are to be carried out. - Explains in detail how the tenderer intends to address the ethical issues identified, in particular as regards objectives *(e.g., dual-use goods[16]);* methodology *(e.g., involvement of children and related consent procedure and protection of data collected)* and the potential impact *(e.g., issues relating to the dual use of goods, stigmatisation of particular social groups).* Before starting the particular task that raises ethical issues, Contractors must provide a copy of any ethics committee opinion required under national law; and any notification or authorisation for activities raising ethical issues required under national law.
E) Security	Declaration of Honor
F) Other…	

⚠ **Tenders that do not comply with these criteria will be excluded. The contracting authority reserves the right to ask for proof of compliance with the exclusion/selection/award criteria at any moment throughout the procedure. The tenderer shall provide all the necessary evidence within 5 days**

Each criterion is explained in more detail below.

A) Compliance with the definition of R&D services

Tenders that go beyond the provision of R&D services will be excluded.

R&D covers fundamental research, industrial research and experimental development, as per the definition given in the EU R&D&I state aid framework[8]. It may include exploration and design of solutions and prototyping up to the original development of a limited volume of first products or services in the form of a test series. Original development of a first product or service may include limited production or supply in order to incorporate the results of field-testing and to demonstrate that the product or service

[8] See Point 15 of the Commission Communication on a framework for state aid for research and development and innovation (C(2014) 3282).

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is suitable for production or supply in quantity to acceptable quality standards.[9] R&D does not include quantity production or supply to establish commercial viability or to recover R&D costs. It also excludes commercial development activities such as incremental adaptations or routine or periodic changes to existing products, services, production lines, processes or other operations in progress, even if such changes may constitute improvements. The purchase of commercial volumes of products or services is not permitted.

The definition of services means that the value of the total amount of products covered by the contract must be less than 50 % of the total value of the PCP framework agreement.

The following evidence is required:

- The financial part of the offer for the framework agreement must provide binding unit prices for all foreseeable items for the duration of the whole framework agreement.
- The financial part of the offer for each phase must give a breakdown of the price for that phase in terms of units and unit prices for every type of item in the contract, distinguishing clearly the units and unit prices for items that concern products.
- The offers for all PCP phases may include only items needed to address the challenge in question and to deliver the R&D services described in the request for tenders.
- The offers for all PCP phases must offer services matching the R&D definition above.
- The total value of products offered in phase 1/*[/*phase 2*]* must be less than 50 % of the value of the phase 1*[/*phase 2*]* contract and the total value of products offered in the last phase must be so that the total value of products offered in all phases is less than 50% of the total value of the PCP framework agreement.
- …

⚠ **Both percentages for the product value inside phase 1 and phase 2 must be set at less than 50% to ensure that tenders that do not go through to phase 2 or phase 3 still satisfy the definition of an R&D services contract.**

B) Compatibility with other public financing

Tenders that receive public funding from other sources will be excluded, if this leads to double public financing or an accumulation of different types of public financing that is not permitted by EU legislation, including EU state aid rules.

The evidence require is a declaration of honour for absence of other incompatible public financing.

C) Compliance with requirements relating to the place of performance of the contract

Tenders will be excluded if they do not meet the following requirements relating to the place of performance of the contract:

- At least 50% of the total value of activities covered by each specific contract for PCP phase 1 *[*and 2*]* must be performed in the EU Member States or in Horizon Europe associated countries[10]. The principal R&D staff working on each specific contract must be located in the EU Member States or Horizon Europe associated countries.

9 See Article XV(1)(e) WTO GPA 1994 and the Article XIII(1)(f) of the revised WTO GPA 2014.
10 List of Horizon Europe participating countries.

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- At least 50% of the total value of activities covered by the framework agreement (i.e. the total value of the activities covered by all phases) must be performed in the EU Member States or Horizon Europe associated countries. The principal R&D staff working on the PCP must be located in the EU Member States or Horizon Europe associated countries.

All activities covered by the contract are included in the calculation (i.e. all R&D and operational activities that are needed to perform the R&D services, *e.g. research, development, testing and certifying solutions*). This includes all activities performed under the contract by contractors and, if applicable, their subcontractors.

The principal R&D staff are the main researchers, developers and testers responsible for leading the R&D activities covered by the contract.

Moreover, at least 100% of the contracted R&D services on security components of the solution must be performed in [add the list of countries to which participation and/or control is restricted] or [add 'EU Member States or Horizon Europe associated countries'*]].]*

The contractors must in addition ensure that the performance of the contract takes place in [add the list of countries to which participation and/or control is restricted] — unless otherwise approved by the granting authority.*]*

The following evidence is required:

- The financial part of the offer must provide binding unit prices for all foreseeable items for the duration of the whole framework agreement and give a breakdown of the price for the current phase in terms of units and unit prices (hours and unit price per hour), for every type of item in the contract *(e.g. junior and senior researchers).*
- A list of staff working on the specific contract (including for subcontractors), indicating clearly their role in performing the contract (i.e. their personnel profile, whether they are principal R&D staff or not, whether they are working on security components or not*]*) and the location (country) where they will carry out their tasks under the contract.
- A confirmation or declaration of honour that, where certain activities forming part of the contract are subcontracted, subcontractors will be required to comply with the place of performance obligation to ensure that the minimum percentage of the total amount of activities that has to be performed in the EU Member States or HE associated countries is respected.
- …

⚠ **Both percentages for phase 1 *[*and phase 2*]* must be set at the minimum percentage to ensure that tenders that do not go through to phase 2 *[*or phase 3*]* still satisfy the place of performance requirement.**

D) Ethics and research integrity

Tenders will be excluded if they:

- Do not comply with the following rules:

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    - Ethical principles (including the highest standards of research integrity, notably as set out in the European Code of Conduct for Research Integrity[11], and, in particular, avoiding fabrication, falsification, plagiarism and other research misconduct).
    - Applicable international, EU and national law.
- Include plans to carry out activities in a country outside the EU if they are prohibited in all Member States or plans to destroy human embryos.
- Include activities whose aim is to:
    - Carry out human cloning for reproductive purposes.
    - Modify the genetic heritage of human beings in such a way as could make such changes heritable (with the exception of research relating to cancer treatment of the gonads).
    - Create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.
- Include activities that do not focus exclusively on civil applications.
- Do not comply with the following ethics requirements:
    - [insert the ethics deliverables from Annex 1 to the EU grant agreement]*]*.

If the tender involves activities that raise ethical issues, the tenderer must submit an ethics self-assessment that:

- Describes how the tender meets the legal and ethical requirements of the country or countries where the tasks raising ethical issues are to be carried out.
- Explains in detail how the tenderer intends to address the ethical issues identified, in particular as regards:
    - Objectives *(e.g. dealing with vulnerable populations and dual-use goods[12], ensuring* that *development, deployment and/or use of AI is ethical, robust, safe and lawful).*
    - Methodology *(e.g. involvement of children and related consent procedure and* protection *of data collected, ensuring human oversight and transparency of AI).*
    - The potential impact *(e.g. issues relating to the dual use of goods, environmental damage, stigmatisation of particular social groups, political or financial retaliation, benefit-sharing and malevolent use of results, trustworthy AI systems)*.

If the tender involves development, deployment and/or use of artificial intelligence (AI)-based techniques, the self-assessment must address the ethics issues related to the involvement of AI in order to ensure that this is done in a way that is ethical, robust, safe and lawful.

⚠ **For information on ethics issues, *see the guidance for EU grant beneficiaries How to complete your ethics self-assessment*.**

Call-offs for phases 2 *[*and 3*]* may request that this information be updated in the offers submitted for these phases.

11 The European Code of Conduct for Research Integrity of ALLEA (All European Academies).
12 See Article 2(1) EU Export Control Regulation No 428/2009.

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Before starting the particular task that raises ethical issues, contractors must provide a copy of:

- Any ethics committee opinion required under national law; and
- Any notification or authorisation for activities raising ethical issues required under national law.

The framework agreement will contain a provision on ethics.

E) Security

Tenders will be excluded if they do not:

- Comply with:
  - EU, national and international law on dual-use goods or dangerous materials and substances.
  - The security aspect letter (SAL) annexed to the Horizon Europe grant agreement and Decision No 2015/444[13], in case the HE grant agreement provides for a security classification that affects the PCP contracts.
  - The following security recommendations:
    - [insert the security recommendations from Annex 1 to the Horizon Europe grant agreement].*]*

Tenders themselves must not contain any classified information.

If the output of activities or results proposed in the tender raise security issues or uses EU-classified information, the tenderer must show that these issues are being handled correctly. In such a case, tenderers are required to ensure and to provide evidence of the adequate clearance of all relevant facilities. They must examine any issues (*such as those relating to access to classified information or export or transfer control*) with the national authorities before submitting their offer. Tenders must include a draft security classification guide (SCG), indicating the expected levels of security classification. If necessary for the tender procedure or for performing the contract itself, contractors will be requested to ensure appropriate security clearance for third parties *(e.g. for personnel)*.

i For information on security, *see the guidance for EU grant beneficiaries: Guidelines on the classification of information in Horizon Europe projects* and *Guidance on how to handle security-sensitive projects.*

Call-offs for phases 2 *[*and 3*]* may request that this security information be updated in the offers submitted for that phase.

Before starting the particular task that raises security issues, contractors must provide a copy of any export or transfer licences required under EU, national or international law.

The framework agreement and/or the specific contracts will contain a provision on security.

F) Other…

Should there be any doubt as to any of these criteria, tenderers may be requested to provide additional information.

[13] Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information.

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Weighted award criteria

The award criteria (and sub-criteria, where applicable), weightings and thresholds for each of the PCP phases are provided in the following table.

Weighted award criteria (table for 3 phases)	**Maximum points**	**Thresholds**	**Weighting**
Phase 1: Solution design			
Technical quality criteria			
A) [insert technical quality criterion 1]			
B) [insert technical quality criterion 2]			
X) [insert technical quality criterion x = environmental impact of the proposed project activities and the subsequent solution commercialisation]			
Y) [insert technical quality criterion y = digitalisation]			
…			
Total technical quality criteria			
Price			
Phase 2: Prototype development and lab testing			
Technical quality criteria			
A) [insert technical quality criterion 1]			
B) [insert technical quality criterion 2]			
X) [insert technical quality criterion x = environmental impact of the proposed project activities and the subsequent solution commercialisation]			

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Y) [insert technical quality criterion y = digitalisation]			
…			
Total technical quality criteria			
Price			
Phase *[3]*: First product/service development & field testing			
Technical quality criteria			
A) [insert technical quality criterion 1]			
B) [insert technical quality criterion 2]			
X) [insert technical quality criterion x = environmental impact of the proposed project activities and the subsequent solution commercialisation]			
Y) [insert technical quality criterion y = digitalisation]			
…			
Total technical quality criteria			
Price			

Each weighted award criterion is explained in more detail below:

A) …

B)…

X) Environmental impact of the proposed PCP project activities and subsequent solution commercialisation

Do no significant harm principle

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Explain how your tender ensures compliance with the 'do no significant harm' principle as per Article 17 of the EU Taxonomy Regulation (EU) No 2020/852[14], i.e. is designed in a way that it is not significantly harming any of the six following environmental objectives of the EU Taxonomy Regulation:

- Climate change mitigation.
- Climate change adaptation.
- The sustainable use and protection of water and marine resources.
- The transition to a circular economy.
- Pollution prevention and control.
- The protection and restoration of biodiversity and ecosystems.

Compliance means that the proposed activities must not support or carry out activities that do significant harm to any of the six above objectives. This needs to be assessed both for the activities that are proposed to be carried out during the course of the PCP contract (for the R&D activities and for complementary activities such as project management, travel, etc) as well as for the expected lifecycle impact of the innovative solution at a subsequent commercialization stage.

Compliance of the tender's project methodology with this principle has several benefits. Not only will it allow to ensure that the newly developed innovative solution contributes to protecting the environment. It will also help to improve your position on the financial market, increasing your chances to obtain financial investments for your business, including in particular for further development and commercialisation of the innovative solution developed during the PCP. The EU Taxonomy Regulation provides uniform criteria that enable financial investors to determine the degree of environmental sustainability of different economic activities and shift their financial investments towards environmentally sustainable economic activities.

Additional environmental standards

The following additional environmental requirements go beyond the 'do no significant harm principle' and create positive environmental impacts, in order to contribute to reverse current disastrous trends and/or restore the environment *(e.g. decrease GHG emissions and combat climate change, move to a cleaner mix of energy and resource usage, reduce waste, increase circularity, restore precious ecosystems and their biodiversity, improve the air and water quality etc.)*.

Tenderers should demonstrate how their approach for both the proposed PCP project activities and the subsequent solution commercialisation will result in a positive environmental impact.

A smart use of Green Public Procurement principles should be made, such as the EU GPP and/or ecodesign criteria, life-cycle costing etc.

The PCP aims to be future proof and the resulting solutions will be well-positioned to meet both future legislative trends and growing environmental customer demands by the time they will be commercialised on the market.

The relevant call conditions of the HE grant containing additional environmental requirements shall apply under this criterion.

Broader environmental legislation in the specific field(s) addressed by the PCP (e.g. climate change, environment, etc). For instance, the European Green Deal created a wave of new legislative initiatives

[14] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (OJ L 198, 22.6.2020, p. 13).

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that have either already or will still come into force over the coming years. In addition, the national environmental requirements (e.g. several EU countries have already implemented stricter Green Public Procurement action plans, targets and rules than the European ones) shall be taken into account. The PCP procurement should comply with those.

The PCP will create positive environmental impacts, in order to contribute to reverse current disastrous trends and/or restore the environment (e.g. decrease GHG emissions and combat climate change, move to a cleaner mix of energy and resource usage, reduce waste, increase circularity, restore precious ecosystems and their biodiversity, improve the air and water quality etc).

The relevant environmental requirements for the PCP (see Annex) and request tenderers to demonstrate how their approach for both the proposed PCP project activities and the subsequent solution commercialisation will result in a positive environmental impact. Make smart use of Green Public Procurement principles, such as the EU GPP and/or eco-design criteria, life-cycle costing etc.

Such additional criteria will help to ensure that the PCP is future proof and the resulting solutions will be well-positioned to meet both future legislative trends and growing environmental customer demands by the time they will be commercialised on the market.

Y) Digitalisation

This Horizon Europe funded PCPs should embrace and take into account the digital transition. The European Digital Decade policy[15] has set targets for all Member States to reach 100% digitalisation of public services by 2030 and to boost investments in innovative digital solutions to make this happen *(e.g. robotics, AI/big data, blockchain, digital twins, virtual/augmented reality and the metaverse, quantum computing, advanced semiconductor solutions, digital design and manufacturing)*. Modernising both manufacturing processes and resulting products with digital technologies can enable the public sector as early adopter of digitally enabled solutions to provide faster, cheaper and higher quality public services to European citizens.

The first report on the status of the Digital Decade calls on Member States to develop action plans in support of innovation procurement and step up efforts to more than double public procurement investments in developing, testing and deploying innovative digital solutions in order to reach full speed adoption of innovative digital solutions in public services[16]. There is a need for significantly higher investment in all fields of public sector activity, such as health, public administration, transport, security, education and culture, construction, energy, water, and environment. Moreover, a Commission recommendation[17] has identified 10 technology areas as 'critical' for the EU's economic security, meaning areas that require substantial increased investments in Europe: artificial intelligence, robotics and autonomous systems, advanced semiconductors, advanced connectivity and advanced digital technologies, quantum, advanced sensing, space, and energy and biotechnologies, advanced materials, manufacturing and recycling technologies. Clearly, ICT technologies prominently appear as critical for Europe's economic security. Therefore, the technical requirements and the award criteria are set to encourage tenderers to make best use of existing digital technologies and/or to develop and test new digital innovations, in order to deliver the PBG higher quality and/or lower cost solutions.

The Horizon Europe requirements for certain digital technologies and/or other relevant EU legislation/EU initiatives shall be taken into account in the specification of your technical requirements.

15 https://digital-strategy.ec.europa.eu/en/policies/europes-digital-decade
16 https://digital-strategy.ec.europa.eu/en/library/2023-report-state-digital-decade
17 Recommendation and Annex respectively: https://defence-industry-space.ec.europa.eu/system/files/2023-10/C_2023_6689_1_EN_ACT_part1_v8.pdf and https://defence-industry-space.ec.europa.eu/system/files/2023-10/C_2023_6689_1_EN_annexe_acte_autonome_part1_v9.pdf

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Artificial intelligence

Artificial Intelligence can bring enormous benefits to improve the efficiency and effectiveness of public sector processes with intelligent data analysis. Where the procurement involves artificial intelligence, it should follow the Guidance on Ethics by design and Ethics of use approaches for AI[32] to ensure that the AI is trustworthy, i.e. lawful, ethical and technically robust.

Due diligence is required regarding the trustworthiness of all artificial intelligence-based systems or techniques. AI-based systems or techniques must be developed in a safe, secure and responsible manner, with a clear identification of and preventative approach to risks. To a degree matching the type of risk that the AI application presents[18], AI-based systems or techniques should be, or be developed to become (implicitly or explicitly contributing to one or several of the following objectives):

- Technically robust, accurate and reproducible, and able to deal with and inform about possible failures, inaccuracies and errors, proportionate to the assessed risk posed by the AI-based system or technique
- Socially robust, in that they duly consider the context and environment in which they operate
- Reliable and to function as intended, minimising unintentional and unexpected harm, preventing unacceptable harm and safeguarding the physical and mental integrity of humans
- Able to provide a suitable explanation of its decision-making process, whenever an AI-based system can have a significant impact on people's lives.

Data handling

The PCP procurement should be in line with the EU open data strategy[19].

Using publicly available data in procurements and making more data resulting from procurements publicly available is essential to enable new services and applications across Europe. Therefore, it will be ensured to follow the requirements on open data resulting from Horizon Europe and from the EU directives on open data.

For procurements that involve physical products that include software, it should be ensured compliance with the EU Data Act[20] and the right to repair that open possibilities for products to be repaired by third parties.

Where relevant the new European data spaces should be taken into account. The nine initial Common European data spaces are the following:

- An industrial data space — to support the competitiveness and performance of the EU's industry.
- A Green Deal data space — to use the major potential of data in support of the Green Deal priority actions on issues such as climate change, circular economy, pollution, biodiversity, and deforestation.
- A mobility data space — to position Europe at the forefront of the development of an intelligent transport system.

18 See the European AI act for the different risk levels and the corresponding requirements for each level: https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence

19 https://digital-strategy.ec.europa.eu/en/policies/strategy-data

20 Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (COM (2022)68 final).

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- A health data space — essential for advances in preventing, detecting and treating diseases as well as for informed, evidence-based decisions to improve the healthcare systems.
- A financial data space — to stimulate innovation, market transparency, sustainable finance, as well as access to finance for European businesses and a more integrated market.
- An energy data space — to promote a stronger availability and cross-sector sharing of data, in a customer-centric, secure and trustworthy manner.
- An agriculture data space — to enhance the sustainability performance and competitiveness of the agricultural sector through the processing and analysis of data.
- Data spaces for public administrations — to improve transparency and accountability of public spending and spending quality, fighting corruption, both at EU and national level.
- A skills data space — to reduce the skills mismatches between the education and training systems and the labour market needs.

The tender requirements are in line with the EU GDPR Regulation[21] to ensure correct handling of privacy issues and processing of personal data. Where required by the Regulation, the handling of personal data requires consent from the owner of the data and must be restricted in scope and time duration. In particular, in relation to [the text of the detailed in the contractual provisions for personal data in the contract(s) *(see Framework Agreement, Article 11– Processing of personal data)*.

If needed, also other security sensitive project data should be restricted geographically, to trusted geographical locations *(e.g. restriction of locating the servers handling the data in EU countries only)*. In particular, in relation to [the text here detailed in the contractual provisions for security related data in the contract(s) *(see Framework Agreement, Article 10 – Security related obligations).*

Cybersecurity

With the digitalisation of public services and an increasing dependence on networks, another key concern is to consider security requirements in the procurement of ICT-based solutions, in order to protect essential services and critical infrastructures. Therefore, the tender requirements are compliant with the EU Network Information Security Directive (NIS), where needed. The new NIS directive (NIS II) extends the digital security obligations to a wider group of entities, i.e. in addition to entities that were already covered by NIS I (healthcare, energy, water supply, transport, banking and financial market infrastructure, digital infrastructures and digital services) the following new sectors are targeted under NIS II: public administrations, waste management, food, space, postal/courier services, manufacturing of certain critical products such as pharmaceuticals, chemicals.

In order to better protect Europe against cyber-attacks, the EU Cyber Resilience Act[22] is defining minimum cybersecurity requirements for digital products and the EU has mandated the ENISA Agency to prepare European cybersecurity certification schemes[23] for ICT products, ICT services and ICT processes — with the goal of establishing (and harmonizing) the cybersecurity compliance of these products, services and processes. Currently, ENISA is developing certification schemes for ICT products, cloud services and mobile networks (in particular, 5G). The resulting certificates will be recognised in all EU Member States.

Blockchain

21 https://eur-lex.europa.eu/eli/reg/2016/679/oj
22 https://digital-strategy.ec.europa.eu/en/library/cyber-resilience-act
23 https://www.enisa.europa.eu/topics/certification

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In case the procurement uses blockchain technology, it should be considered if it can make use of the European Blockchain Services Infrastructure (EBSI)[24]. EBSI is a European wide infrastructure (covering all EU Member States, Norway and Liechtenstein) that enables public administrations, and eventually also companies, to provide cross-border blockchain based services across Europe.

Green digital solutions

In case the procurement has a digital element, the tender requirements should align with the green initiatives in the digital sector in Europe.

For example, in the context of the EU Green Deal the EU has announced the introduction of Digital Product Passports that will help buyers to verify and follow up the circularity and green claims of the products they buy on the EU market.

The EU has set also objectives to green datacenters, telecommunications and blockchain networks and is strengthening the eco-design criteria and energy labels to reduce the environmental impact of ICT solutions (reducing CO2 emissions, improving energy efficiency, repairability, circularity etc).

The EU is also working together with European Green Digital Coalition to develop methods that can be used by public procurers to measure the net environmental impact of green digital solutions (that can consist of a combination of hardware and software)[25]. This effort is expected to feed into the European Commission's planned activities to define additional green public procurement criteria for the ICT sector.

Should there be any doubt as to any of these criteria, tenderers may be requested to provide additional information.

Additional sub-criteria may be added for the call-offs for phase 2 *[*and 3*]*, as a way of making the award criteria more precise, provided that they do not substantially change the existing criteria.

⚠ **The weighted award criteria shall ensure that the procurers get the best value for money. Therefore, the lowest price as the sole criterion is not used, without taking quality into account, neither the highest quality is used as the sole criterion, without taking price into account.**

The technical quality and price award criteria, weightings and thresholds are set so as to favour the most economically advantageous tenders. The thresholds per criterion and the total threshold are defined above.

3.5 Evaluation procedure

Opening of tenders

This section describes the composition of the opening committee, i.e. the number and type of members, without giving their names.

[24] https://digital-strategy.ec.europa.eu/en/policies/european-blockchain-services-infrastructure
[25] https://www.greendigitalcoalition.eu/

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It is specified which points will be checked during the opening of tenders, in particular in relation to compliance with the conditions on the content and format of the offer *(see above)*.

Tenders not complying with the formal requirements will be excluded from the tender evaluation.

The date for the opening of the tenders and how tenderers can participate is explained below..

For phases 2 *[*and 3*]*, there may be differences in the composition of the opening committee or in the procedure, as explained below.

Evaluation

For the purpose of the evaluation of the bids, the following different Committees are appointed:

1. Procurement Evaluation Committee (PEC):

The PEC analyses, makes proposals and sets guidelines for the whole PCP tendering process. It monitors the elaboration and approves the tender specifications, the evaluation criteria and award criteria prepared by the Procurement Technical Committee along with all tender documents and the IPR management. This Committee will make the final decision concerning the ranking of bids and award of the contracts during the different phases of the PCP. At the end of phase 1 and phase 2, it will decide about the unsatisfactory, satisfactory, or successful completion of the phase by each contractor.

2. Procurement Technical Committee (PTC):

The PTC assists in their activities the PEC based on the tender specifications, the evaluation and award criteria. The Procurement Technical Committee will carry out all technical evaluation tasks, including – without limitation – the evaluation of bids for the different PCP phases; the end of phase reports; the early prototypes of phase 2 and their adequacy; and the outcomes and prototypes of phase 3.

The PTC will be chaired by a representative of the lead procurer.

3. A procurement team:

The procurement team will deal with administrative aspects of the procurement. The team will assess the bids regarding their compliance with the administrative requirements. The bids that comply with such requirements will be made available to the PEC and PTC for the following evaluation. Two additional members from the procurement, who are not involved in the project, will perform the official opening of the bids and record the results.

Bids will be evaluated in a non-discriminatory and transparent manner.

At the end of the evaluation procedure, a ranking will be drawn up, in which the technology providers will be inserted based on the overall score achieved, in descending order.

In case the bids of two or more technology providers obtain the same overall score, but with different partial scores for the price and for all the other different evaluation elements, the technology provider who obtained the best score on the technical offer will be placed first in the ranking.

The evaluation process and initial contract award can be composed of the following steps:

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- Step 1: Checking the exclusion criteria per technology provider. Performed by the procurement team.
- Step 2: For technology providers passing step 1, checking the selection criteria per technology provider. Performed by the procurement team.
- Step 3: For technology providers passing step 2, checking the pass/fail award criteria per technology provider. Performed by the procurement team.

Formal Approval by PEC of the outcome of the three prior steps.

- Step 4: For technology providers passing step 3, evaluating the Bids based on the weighted award criteria. Performed by PTC.
- Step 5: Opening of the financial offers. Performed by the procurement team.

Formal Approval by PEC of the outcome of the two prior steps.

- Step 6: Final ranking by PEC.
- Step 7: Provisional award decision by PEC & communication thereof.
- Step 8: Final award decision after the standstill period (ten days) & signing of framework agreement and phase 1 contract.

This approach should be further fine-tuned based on the detailed design of the procurement strategy and the evaluation scheme.

Scoring

The system for scoring, qualitative appraisal and ranking consist of [ ] *(e.g. starting from a first round of individual evaluations and concluding with a final agreed qualitative appraisal; the scoring for each tender and the final ranking list of all tenders agreed by the lead procurer and the PBG)*.

The table below contains the Scoring Model that will be used by the TMC and the PEC to assess and score the extent to which a Tender/Offer is meeting the Award Criteria.

Score	Description
0	The description fails to address the Objective or cannot be assessed due to missing or incomplete information.
0,2	Poor – Objective is inadequately addressed or there are serious inherent weaknesses.
0,4	Fair – The description broadly addresses the Objective, but there are significant weaknesses.
0,6	Good – The description addresses the Objective well, but a number of shortcomings are present.
0,8	Very good – The description addresses the Objective very well, but a small number of shortcomings are present.
1	Excellent – The description successfully addresses all relevant aspects of the Objective. Any shortcomings are minor.

Every score per quality criterion (all, will be multiplied with the weight for the criterion). For example, if a tender scores 0,8 points (Very good) for sub criterion X, this means this tender receives 0,8 points * 5 = 4 points in total for this criterion out of a maximum of 5 points. Per criterion, this same methodology

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will be used. If a tender would score the maximum number of points for every criterion, it will receive the total maximum technical score of 80 points.

Awarded points for each criterion will be multiplied by weighting percentage for particular criteria leading to a final score per criteria. The final score for Tenderer is a sum of all final criteria scores.

The maximum scoring obtained after the proposal evaluation shall be 100 points, where:

- 20 percentage of the points correspond to the **Financial Offer**, and
- 80 percentage of the points correspond to the **Technical Offer**

Following the Scoring Model:

Li = 80 * (Ti /Tmax) + 20 * [(Fmin for Phase 1/Fi for Phase 1) + (Fmin Phase 2/Fi for Phase 2) + (Fmin for Phase 3/Fi for Phase 3)]

Where

- Tmax Technical Score of the Best Technical Tender for the Phase
- Ti Technical Score of the Tender i
- Fmin Lowest Price of all Tenders for each Phase
- Fi Price of the Tender i for each Phase
- Li Total Score of the Offer i rounded to two decimals places.

This formula will be used for all the Phases of the PCP.

The type of feedback tenderers will receive from the evaluation of their tender consists of [ ].

For phases 2 *[*and 3*]*, the differences in the composition of the evaluation committee or in the procedure will be the following [ ]. In particular, it is highlighted that the evaluation of offers for phase 2 *[*and 3*]* has only 2 steps: evaluating the offers based on the on/off and weighted award criteria.

⚠ **Under the HE grant, the PBG and lead procurer are obliged to evaluate the tenders and offers for the call-offs for phase 2 *[*and 3*] jointly* and must make a *joint* award decision.**

Any potential conflicts of interest shall be avoided.

For each phase and each tender received, the evaluation documents must be submitted as deliverable under the HE grant agreement — at the end of the tender evaluation. These deliverables should include: the final scores awarded, a qualitative appraisal per evaluation criterion, minutes of the evaluation meeting and the final ranking list.

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4. CONTENT AND FORMAT OF TENDERS

4.1 Format

The tenders must meet the formal requirements (including the address for submission of the tender and requirements relating to the presentation of the offer and its packaging).

The tenders must:

- Contain administrative, technical and financial sections.
- Indicate their minimum validity period (from submission).
- Be signed by an authorised representative.

Tenders that do not comply with the formal requirements will automatically be rejected.

More detailed information about the final layout requirements for the phase 2 *[*and 3*]* offers will be provided in the call-off.

4.2 Administrative section

Tenders must include the following information (the documentary evidence necessary to identify the tenderer and to evaluate the tender against the exclusion, selection and on/off award criterion B and — for joint tenders — the mandate for the lead contractor).

For PCPs that impose control restrictions based on the HE call conditions, it is necessary to include the Annex [xxx] Declaration of ownership and control.

The lead procurer may request clarification or additional evidence where there is any doubt.

More detailed information for the phase 2 *[*and 3*]* offers will be provided in the call-offs.

4.3 Technical section

Tenders must include a technical offer containing:

- A technical plan that outlines: 1) the tenderer's idea for addressing all the requirements given in the PCP challenge description, relating both to functionality and performance; and 2) technical details of how this would be implemented, including also the proposed approach for complying with the do no significant harm principle *[*and with the gender dimension (if relevant)*.*
- A draft business plan that explains the proposed approach to commercially exploit the results of the PCP and to bring a viable product or service onto the market.
- A list of the pre-existing rights (background) relevant to the tenderer's proposed solution, in order to allow IPR dependencies to be assessed.
- A risk assessment and risk mitigation strategy.
- A reply to the question "Does this tender involve ethical issues? (YES/NO)" and if YES, an ethics self-assessment, with explanations how the ethical issues will be addressed.

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- A reply to the question "Does this tender involve: activities or results that may raise security issues and/or EU-classified information[26] as background or results? (YES/NO)" and if YES information on how these issues will be addressed.
- …

Tenders failing to meet these requirements will be excluded.

The technical part must provide a *detailed* technical offer for phase 1 (including an explanation of the methodology, a work plan and details of deliverables and milestones) and must specify the plans for and objectives of the subsequent phases 2 *[*and 3*]* and beyond (including a plan for commercial exploitation of the results).

The technical section of the tender should be drafted according to **the template provided (*possibly by providing a template).***

The information provided in the technical section of the tender will be used to evaluate the tenders, on the basis of the technical award criteria and the on/off award criteria A, D and E. Information regarding on/off award criteria B and C is verified through the financial section of the tender.

More detailed information for the phase 2 *[*and 3*]* offers (in particular on the technical implementation plan, updated business plan and list of IPRs) will be provided in the call-offs.

4.4 Financial section

The tender must include a detailed financial offer specifying:

- Binding unit prices for all items needed for carrying out phase 1 and for items that are expected to be needed for phase 2 *[*and phase 3*]* (given in euros, excluding VAT but including any other taxes and duties)
- A fixed total price for phase 1 and an estimated total price for phase 2 *[*and 3*]*, broken down to show unit prices and the number of each unit needed to carry out phase 1 (given in euros, excluding VAT but including any other taxes and duties).

In addition, the financial section must include:

- A price breakdown that shows the price for R&D services and the price for supplies of products (to demonstrate compliance with the definition of R&D in on/off award criterion A).
- A price breakdown that shows the location or country in which the different categories of activities are to be carried out *(e.g. x hours of senior researchers in country L at y euro/hour; a hours of junior developers in country M at b euro/hour),* which personnel profile corresponds to principle R&D personnel. *PCPs that involve security related R&D should indicate* which personnel profile is working on security components*]* (to demonstrate compliance with the requirement relating to place of performance in on/off award criterion C).
- The financial compensation valuing the benefits and risks of the allocation of ownership of the IPRs to the contractors (i.e. IPRs generated by the contractors during the PCP), either:

[26] See Decision 2015/444/EC, Euratom on the provisions on security of EU-classified information.

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- *[OPTION 1 if the procurers choose 'ex ante' valuation of the IPRs:* by giving an absolute value for the price reduction between the price offered in the tender compared to the exclusive development price (i.e. the price that would have been quoted were IPR ownership to be transferred to the procurers)*]*
- *[OPTION 2 if the procurers choose 'ex post' valuation of the IPRs:* by confirming the tenderers' agreement with the chosen royalty scheme specified by the procurers, including the percentage of royalties that contractors will have to pay on sales/profits made from commercial exploitation of the IPRs*]*

in order to ensure compliance with the EU R&D&I state aid framework.

⚠ **The unit prices quoted for each category of items *(e.g. hourly rates for junior and senior researchers, developers and testers)* remain binding for all phases (i.e. for the duration of the framework agreement).**

The financial section of the tender should be written following the template provided.

The following formula will be used for unit prices that can be indexed for phase 2 *[*and 3*]*.

The financial compensation for allocating IPR ownership to the contractors must reflect the market value of the benefits received *(i.e. the opportunity that the IPRs offer for commercial exploitation)* and the risks assumed by the contractors *(e.g. the cost of maintaining IPRs and bringing the products onto the market)*. Note that when the value of the risks equals or exceeds the value of the benefits, the financial compensation offered by vendors may be zero.

The information provided in the financial section of the tender will be used to evaluate the tenders on the basis of the price award criteria and the on/off award criteria A, B and C. For on/off criterion B, the financial section can contain a self-declaration asking the tenderer to declare compliance of his offer with other public financing sources.

More detailed information for the phase 2 *[*and 3*]* offer will be provided in the call-off. The price for phase 2 *[*and 3*]* offers must be based on the binding unit prices in the tender and the price conditions set out in the framework agreement. Where new units/unit prices *(e.g. for new tasks or equipment)* are subsequently added to the offers for phase 2 *[*or phase 3*]*, they will become binding for the remaining phases.

Similar price breakdowns will be requested for the call-offs for phase 2 *[*and 3*]*.

The VAT regime(s) that apply are as follows [ ]. If all contractors will be paid by the lead procurer *(centralised payments)*, it will be the VAT regime of the lead procurer. If the contractors will be paid by each procurer in the PBG individually (pro rata to its contribution to the PCP procurement budget; decentralised payments), it will be the VAT regime for each procurer for its share of the payment.

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5. MISCELLANEOUS

5.1 Language

All communication (relating to either the tender procedure or the implementation of the contract) must be carried out in English *[*or [add additional language(s), if any]*]*.

Tenders as well as offers for phase 2 *[*and 3*]* call-offs must be submitted in English *[*and [insert additional language(s), if any]*]*.

Deliverables must be submitted in English *[*and [insert additional language(s), if any]*].*

Indicate specific language requirements, if necessary (for example, if certain tasks need to be carried out in cooperation with third parties locally, e.g. for field-testing with end-users who may speak only the local language).

5.2 Tender constitutes binding offer

A signed tender will be considered to constitute a firm, irrevocable, unchangeable and binding offer from the tenderer.

The signature of an authorised representative will be considered as the signature of the tender (and will be binding on the tenderer or, for joint tenders, the group of tenderers).

5.3 Unauthorized communication — Questions

The Q&A from the open market consultation can be found on [indicate the website where the Q&A from the open market consultation phase can be found].

For further questions, you may contact [the lead procurer via email and/or by other means] in English [and any additional languages chosen by the lead procurer and the PBG] until [insert date].

The summary of all questions and answers will be presented in an anonymised Q&A document that will be published on [indicate the website where the Q&A will be uploaded] in English [and any additional languages chosen by the lead procurer and the PBG] (final version planned for [insert date]). For phase 2 and *[3]*, the answers will not be published, but distributed to all contractors that successfully completed the previous phase.

⚠ **All other contacts (or attempted contacts) will be considered unauthorised and may lead to the exclusion of your tender.**

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5.4 Confidentiality

Tenderers must keep confidential any information obtained in the context of the tender procedure (including EU-classified information[27]).

5.5 Contract implementation

Successful tenderers will be requested to sign both a framework agreement for the entire duration of the PCP and specific contracts for each phase *(see the models given in Annexes 1 and 2)*.

Monitoring

During each phase, contract implementation will be monitored periodically and reviewed against the expected outcomes (milestones, deliverables and output or results) for the phase.

Each contractor will be assigned a main contact person (their supervisor) from the monitoring team appointed by the procurers.

There will be regular monitoring meetings between contractors and the supervisor/monitoring team.

[Explain how often they will take place, how they will be conducted (physical meetings or remote/online meetings), and what they will involve. The contractors could be asked to discuss the results achieved in the preceding period and present their updated work plan; the monitoring team or supervisor could visit the contractors' premises to periodically monitor progress; the contractors could visit the procurer's premises (in particular at the start of a phase to get to know better the operational environment that solutions need to be designed for). Clarify that the contractors must cover their own costs and thus foresee personnel and travel budgets in their offer. In case of PCPs with lots, clarify if and when there will be meetings that involve contractors from the different lots to sort out dependencies between lots and to ensure that building blocks under development in different lots will ultimately work together as expected.]

The monitoring team [or supervisor] will provide regular feedback to contractors after meetings or visits.

[Explain how and when this will take place and how this will allow contractors to continuously improve the way in which their solutions address the problem set out in the PCP description.]

Payments based on satisfactory completion of milestones and deliverables of the phase

Payments corresponding to each PCP phase will be subject to the satisfactory completion of the deliverables and milestones for that phase.

Satisfactory completion will be assessed by an assessment committee composed of [describe the composition of the assessment committee, without mentioning their names].

Satisfactory completion will be assessed according to the following requirements:

- If the work corresponding to that milestone/deliverable has been carried out.

[27] Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU-classified information.

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- If a reasonable minimum quality has been delivered.
- If the reports have been submitted on time.
- If the monies have been allocated to the planned objectives.
- If the monies have been allocated and the work has been carried out according to the on/off award criteria (place of performance, public funding and R&D definition criteria).
- If the work has been carried out in compliance with the provisions of the contract (including in particular verification if the contractors have duly protected and managed IPRs generated in the respective phase).

'Reasonable minimum quality' of a report means that:

- The report can be read by somebody who is familiar with the topic, but not an expert.
- The report gives insight in the tasks performed in and the results.
- The report is made using the end of phase report form or (if applicable) the milestone report form and the requirements of this form have been met.
- …

'Reasonable minimum quality' of a demonstration (for phase 2 *[*or 3*]*) means:

- The demonstration can be understood by somebody who is familiar with the topic, but not an expert (for instance, somebody with operational but not technical knowledge).
- The demonstration shows how the innovation works, how it can be used and (if applicable) how it is operated and maintained.
- The demonstration is accessible to parties appointed by the procurers, unless these are direct competitors of the contractors.
- ...

Satisfactory completion in each of the phases does not mean successful completion. *(A PCP could, for instance, be satisfactorily completed even if it concludes that the innovation is not feasible.)*

The assessment will consider the efforts made by contractors to take into account the feedback from the supervisor or the monitoring team.

[Specify the terms of approval for deliverables (for reports and demonstrations respectively), in particular how many days the contractors have to approve/request modifications/reject deliverables, how many days the contractors have to resubmit deliverables.]

Where the assessment committee judges the completion of deliverables or milestones to be unsatisfactory, [explain what happens, in particular the possible consequences in terms of reducing or withdrawing payments for that deliverable and/or terminating the contract].

Invoices must be submitted *[*to the contracting authority*] [*pro-rata to each member of the PBG*]*.

In case pro-rata payments are used*:* For every payment, the contractors must create [insert a number equal to the number of procurers in the PBG] invoices which divide the amount according to the following distribution:

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- [insert percentage that equals the ratio between the financial contribution of procurer X to the total PCP costs (including the applicable VAT in country X) and the total PCP costs (including VAT)] percent of the payment to be invoiced to [insert name of procurer X]]
- […] percent of the payment to be invoiced to [insert name of procurer Y]]
- …

Contractors' invoices must provide:

- A price breakdown showing the price for R&D services and the price for supplies of products (in order to demonstrate compliance with the definition of R&D in on/off award criterion A).
- A price breakdown showing the location or country in which the different categories of activities were performed *(e.g. x hours of senior researchers in country L at y euro/hour, a hours of junior developers in country M at b euro/hour),* which personnel profile corresponds to principle R&D personnel *[OPTION for PCPs that involve security related R&D:* and which personnel profile is working on security components*]* (to demonstrate compliance with the requirement relating to the place of performance in on/off award criterion C).

The payments will be made according to the following scheme [explain]. The amounts of the pre-instalments and interim payments (where applicable) and the payment of the balance will be as follows [explain].

Eligibility for the next phase based on successful completion of the phase

Eligibility for participation in the next phase will be subject to successful completion of the preceding phase.

Successful completion of a phase will be assessed by the assessment committee against the following requirements:

- If all milestones have been successfully completed.
- If the R&D results meet the minimum functionality/performance requirements of the challenge description *(i.e. the minimum quality/efficiency improvements which the procurers set forward for the innovative solutions to achieve).*
- If the results of the R&D are considered to be promising.
- …

'Promising' means:

- For phase 1, that the feasibility is convincing.
- *[for standard PCPs with 3 phases*: for phase 2, that the feasibility, the applicability in an operational setting and the potential impact of the product is convincing*].*

⚠ **Note that there is a difference between satisfactory completion (requirement for payment) and successful completion (prerequisite for passing from one phase to the next).**

Finalisation of phase 3: Possible follow-up PPI procurements

Follow-up PPI procurements for a *limited* set of prototypes and/or test products developed during this PCP procurement ('limited follow-up PPIs') may be awarded by negotiated procedure (with invitation to minimum 3 potential providers, including those that successfully completed this PCP).

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Follow-up PPI procurements for a *commercial volume* of the innovative solutions developed in this PCP procurement will be subject to a new call for tenders.

[If possible, please provide an indicative schedule for the procurement process that the PBG would organise for deploying commercial volumes of the solutions, were the PCP to be completed successfully.]

5.6 Cancellation of the tender procedure

The procurers may, at any moment, cease to proceed with the tender procedure and cancel it.

The procurers reserve the right not to award any contracts at the end of the tender procedure.

The procurers are not liable for any expense or loss the tenderers may have incurred in preparing their offer *[*except for [insert if mandatory limits under national law]*].*

5.7 Procedures for appeal

[Specify the names of the appeal and mediation bodies foreseen under the national law applicable to the lead procurer and the time periods for filing a complaint and the different stages of dispute settlement.]

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PCP TENDER DOCUMENT 2 FRAMEWORK AGREEMENT (TD2)

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PCP FRAMEWORK AGREEMENT (TD2)

PREAMBLE

This is a framework agreement ("Agreement" or "Framework Agreement") between the following parties:

on the one part,

the "lead procurer" (contracting authority), [insert details of the lead procurer],

acting in the name and on behalf of the *[*other*]* members of the Public Buyers Group (PBG) (together with the lead procurer: "procurers"):

1. [insert the details of the procurers in the buyers group (NOT of preferred partners or third giving in-kind contributions to the PCP!)]
2.

and on the other hand, the "contractor", [insert details of the contractor],

[*OPTION for joint tenders:* acting in the name and on behalf of the other members of group of tenderers:

1. [insert the details of the members of the group of tenderers]
2.

The members of the group of tenderers are hereafter collectively referred to as "the contractor" and will be jointly and severally liable vis-à-vis the lead procurer for the performance of this Framework Agreement and the Specific Contracts.***]***

The lead procurer, the PBG and the contractor(s) shall be referred to together as "parties", unless otherwise specified.

By signing this Agreement, the parties agree to implement the Pre-Commercial Procurement (PCP) in accordance with the Agreement and all the obligations it sets out.

The Agreement is composed of:

Preamble

Terms and Conditions

Annex 1 Request for tenders

Annex 2 Contractor's tender

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TERMS AND CONDITIONS

Article 1 — Subject of the agreement

This Framework Agreement defines the general terms and conditions for the implementation of the PCP procurement of R&D services set out in Article XX and for the Specific Contracts that will be awarded for each of the PCP phases.

Article 2 — Duration

Define the duration for the framework agreement and starting and end date for the implementation of the tasks.

Specify that the period of execution of the tasks may be extended only with the express written agreement of the parties before the expiration of the period for execution of the tasks.

Article 3 — R&D services to be provided

The contractor shall provide the R&D services (tasks, deliverables and milestones) to develop solutions to tackle the challenge set out in the tender and the Specific Contracts.

Article 4 — Pricing, payment and accounting

The price for the R&D services to be implemented for each PCP phase will be set out in the Specific Contracts.

The prices shall be based on the binding unit prices in the tender and the following price conditions:

- If new units/unit prices are added to offer for phase 2 *[*or 3*]*, they shall become binding for the remaining phases.
- *[Specify the other price conditions]*

Specify the payment and invoicing conditions that will apply. Ensure consistency with the request for tenders/tender (if needed via cross-references).

Article 5 — Rights and obligations regarding results (foreground), pre-existing rights (background and sideground) and the related rights (including intellectual and industrial property rights)

Include provisions that clarify the rights and obligations related to pre-existing rights (background, sideground) and *results (foreground) for:*

- *the procurers (contracting authority and the PBG),*
- *the contractor, and*
- *its subcontractors (if any).*

Do not forget to include the special IPR provisions from the HE grant agreement into the PCP contracts (e.g. EU right to object to transfers or licencing of results; additional exploitation or dissemination obligations, additional control restrictions, access to research data, etc).

In addition to what is listed in this section, you may specify additional intellectual property provisions, provided they:

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- *do not conflict with the obligations under the Horizon Europe grant agreement, and*
- *help the procurers or the contractor to implement the PCP as well as disseminate and exploit the results.*

5.1 IPR definitions

The follow definitions apply to this Framework Agreement:

- 'Results (i.e. foreground)' means any tangible or intangible output that is generated in the PCP, whatever its form or nature, whether or not it can be protected. This includes any material, document, technology, solution, data, knowledge or information (foreground material) as well as any rights attached to it, including intellectual property rights ('rights on results' or 'IPRs attached to the results').
- 'Rights on results': any rights, including industrial or intellectual property rights on the results. They may consist of rights on newly created materials and rights on pre-existing materials (background rights and sideground rights) that are included in the results. They may consist in a right of ownership, a licence right and/or right of use belonging to the contractor, the creator, the contracting authority, the PBG or to any other third parties, including subcontractors.
- 'Background' means any material, document, technology, solution, data, know-how or information (background material) — whatever its form or nature (tangible or intangible), regardless of whether or not it can be protected, including any attached rights such as intellectual property rights ('background IPRs') — that (1) is held prior to the signing of the Framework Agreement or a Specific Contract, (2) identified by the parties involved in the PCP as background and (3) needed to implement the PCP or exploit the results of the PCP.
- 'Background rights': any rights, including industrial and intellectual property rights on background. They may consist in a right of ownership, a licence right and/or right of use belonging to the contractor, the creator, the contracting authority, the PBG or to any other third parties, including subcontractors.
- 'Sideground' means any material, document, technology, solution, data, know-how or information (sideground material) — whatever its form or nature (tangible or intangible), regardless of whether or not it can be protected, including any attached rights such as intellectual property rights ('sideground IPRs') — that is (1) generated during the timespan of the PCP but not in the PCP and (2) needed to implement the PCP or to exploit the results of the PCP.
- 'Sideground rights': any rights, including industrial and intellectual property rights on sideground material. They may consist in a right of ownership, a licence right and/or right of use belonging to the contractor, the creator, the contracting authority, the PBG or to any other third parties, including subcontractors.
- 'Pre-existing material': any material, document, technology, solution, information, data or know-how, whatever its form or nature, tangible or intangible, regardless of whether or not it can be protected, which exists prior to the contractor using it for the production of a result in the implementation of the Framework Agreement or a Specific Contract. It includes both the background material and the sideground material.
- 'Pre-existing rights': any rights, including industrial and intellectual property rights on pre-existing material. It may consist in a right of ownership, a licence right and/or right of use belonging to the contractor, the creator, the contracting authority as well as to any other third parties, including subcontractors. It includes both background rights and sideground rights.
- 'Fair and reasonable conditions' means appropriate conditions, including financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access *(for example, the actual or potential value of the results, background or sideground to which*

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access is requested and/or the scope, duration or other characteristics of the exploitation envisaged).

- 'Generated in the PCP' means in the implementation of activities described in the PCP Framework Agreement or Specific Contracts.
- 'Not generated in the PCP' means not generated in the implementation of activities described in the PCP Framework Agreement or Specific Contracts.
-

⚠ ***If you use other definitions (allowed), make sure that they are compatible with your obligations under the Horizon Europe grant agreement.***

The contractor is responsible for ensuring that all third parties that it collaborates with during and after the Framework Agreement and the Specific Contracts respect all intellectual and industrial property-related obligations towards the contracting authority and the PBG and must pass on its obligations to those entities.

The contractor must ensure that the rights of the contracting authority and the PBG under the Framework Agreement and the Specific Contracts are upheld under all circumstances, including in case of merger, split, takeover or other corporate restructuring.

Provide for some introductory general provisions that ensure that the contractor is responsible that all IPR provisions are respected in any situation, even in case of changes to the contractor/consortium that may occur during/after the PCP (e.g. in case of subcontracting, in case of mergers/acquisitions):

5.2 Ownership of results

The rights and obligations in relation to ownership of results shall ensure:

- That each contractor that generates results owns the attached IPRs.
- *[Indicate who will own results that are not IPRs (e.g. prototypes and first products resulting from the R&D, design, prototype and first product/service specifications, simulations, data models, drawings, source code)]*

5.2.1 Ownership of the results

Subject to the conditions set out in Articles XX.2, XX.3, XX.4, XX.5 and XX.6, the contractor retains the ownership of all the rights on the results that it generates. This includes the rights on newly created material generated by it and the rights on background and sideground material that may be included in the results or that is essential for the functioning of the use of the results *(see Articles XX.8 and XX.9 on pre-existing rights)*.

***[**additional OPTION when the PBG wants to buy own foreground material and own it after the end of the PCP:* Notwithstanding this, the members of the PBG will each become owners of [enter number of copies required: e.g. at least one] exemplar of each foreground material, together with all the necessary documentation to use the foreground material as foreseen by the Framework Agreement and Specific Contracts. This applies both where foreground material is software, physical/hardware prototypes or first solution implementations (products or services), simulations, designs, data models, etc. In order to enable them to use and adapt these results *(see Article XX.4)*, they also have the right to obtain a copy of the source code and of the design specifications and any other relevant technical documentation concerning the creation, construction and functioning of the results.

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The contractor will retain the ownership of all the other exemplars of the foreground material, generated for which the members of the PBG do not obtain ownership.

5.2.2 Buyers group ownership in case of breach of contract to preserve public interests or to protect or commercialise the results

Conditions

The members of the PBG may exceptionally require transfer of the ownership of results generated under the PCP procurement to them, if the contractor:

- Does not (or no longer) comply with one of the following obligations:
  - 'Compliance with definition of R&D services' obligation in section [XXX] of the request for tenders.
  - 'Place of performance obligation' obligation in section [XXX] of the request for tenders.
  - 'Place of establishment and control' obligation in section [XXX] of the request for tenders.
- Decides not to protect the results that it generated or does not seek timely or sufficient protection to enable the buyers group to use the results as provided for in the Framework Agreement or a Specific Contract *(see Article XX.3).*
- Fails to commercially exploit the results within the four years time period and the circumstances of the case show that it has not used its best efforts to do so *(see Article XX.5.1).*
- Uses the results to the detriment of the public interest *[OPTION when EU security and/or strategic autonomy interests need safeguarding*, including EU strategic autonomy or security interests*] (see Article XX.5.2).*
- Is subject to a merger or acquisition and the impact analysis concludes that the merger or acquisition negatively impacts the access to or the commercial exploitation of the results, including the EU security interests and EU strategic autonomy objectives set out in Art XX.5 *(see Article XX.5.3)*.

Procedure

The members of the PBG will notify the contractor of their intention to require the transfer of ownership of results through the contracting authority.

Before exercising their rights, the contracting authority will first contact the contractor to verify any measures that the contractor has taken to achieve successful commercial exploitation of the results, to safeguard EU strategic autonomy and security interests and rules, to prevent use of the results to the detriment of the public interest and to comply with its contractual obligations.

Following the transfer of the ownership of the results to the members of the PBG, the members of the PBG may grant licenses to third parties to ensure further protection, usage and exploitation of the results *(see Article XX.4.3).*

The contractor shall ensure that the commercial exploitation of the results by the members of the PBG will not infringe any of its other obligations under this Framework Agreement or a Specific Contract, such as its obligations regarding security, confidentiality and the protection of intellectual property or its obligations under data protection legislation.

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5.3 Protection of the results

The rights and obligations in relation to protection of results are explained below:

- Each contractor is responsible for the management *(including protection)* of its IPRs and bears the costs associated with this.
- Procurers have the right to monitor the management of the IPRs.
- The contractor must inform the PBG (via the lead procurer) of results that can be exploited, regardless of whether they can be protected or not, within [insert number] days from when they are generated. The information submitted to the lead procurer must include information about the contents of the results, the confirmation by the contractor to protect them and the planned timing for protection.
- If a contractor does not seek protection for results that should be protected, the PBG has the right to itself protect the results.
- If the HE call conditions impose control restrictions due to strategic interests, make sure that the results of the PCP will be protected in such a way that they will be free from such restrictions.
- Whether the contractor is required to deposit copies of results *(e.g. the source code and design specifications)*, *for example, under an ESCROW agreement designed to guarantee the buyers group continued access to results in the case of financial bankruptcy of the contractor (or any of its subcontractors)*.

⚠ *If the lead procurer (the contracting authority of the PCP) is also financially investing in the PCP and therefore also wants to receive the same IPR-related rights as the buyers group (e.g. ownership of some copies of the foreground material, and access and licensing rights to the attached IPR rights), then the buyers group needs to be defined in such a way that the contracting authority is part of the buyers group.*

The contractor shall be responsible for the management of all the rights on the results that it holds and shall bear the associated costs, including for the protection, examination, grant, maintenance, defence and litigation of the rights on the results.

The contracting authority and members of the PBG shall be entitled to monitor the management of all rights on the results held by the contractor. The contractor shall submit periodical reports, when requested by the contracting authority and the PBG, no more frequently than [enter a reasonable period, e.g. annually] on the exploitation of the results, including the rights on the results, by the contractor, its licensees or assignees. The contractor shall respond at any time to requests for information from the contracting authority and the PBG about the handling of the rights on the results.

A specific procedure that can be followed by the procurers for the monitoring, protection and transfer of IPR.

The contractor shall ensure that the results are identified, recorded and carefully distinguished from the outputs of other research and development activities that are not covered by the Framework Agreement or a Specific Contract.

The contractor shall inform the contracting authority of any results it generates that can be exploited, regardless of whether they can be protected or not, at the latest [enter a reasonable time, e.g. two months] from the generation of the result. The notification shall include information about the contents of the results, the confirmation by the contractor of its decision to protect said results, the type of

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protection that will be pursued and, for registered IPRs such as patents and design rights, the planned timing and geographical scope of such protection/ jurisdictions for which the contractor will seek to obtain protection.

If the contractor decides to protect its results, it shall ensure that an application for protection is filed to the relevant authority (national, European Patent Office (for patents) or European Union Intellectual Property Office (for trademarks and designs)) within [enter a reasonable time, e.g. one year] after notifying the contracting authority, and in any case prior to any publication on them.

Where possible, the applications for protection shall include the following statement: 'These results were achieved with EU support. The European Union has certain rights in these results'.

In case of any decision not to continue an application for protection, not to pay maintenance fees, or not to defend in a re-examination or opposition proceeding, the contractor shall notify the contracting authority not less than [enter a reasonable time, e.g. 60 days] before the deadline for responding to the procedure for protection, maintenance or litigation.

If the contractor decides not to protect the results that it generated or does not seek timely or sufficient protection to enable the buyers group to use the results as provided for in the Framework Agreement or a Specific Contract, for example in terms of jurisdictions for registered IPRs, the members of the buyers group retain the right to require that the contractor transfers the ownership of the result to them so that the buyers group can ensure that the results are protected.

[*additional OPTION when depositing of results under escrow is required:* The contractor shall put a copy of the results it generates (e.g. source codes of software and all related documentation, design specifications of prototypes, documentation about the foreground IP etc) under escrow with a reputable escrow agent. If requested by the contracting authority, a tri-party agreement shall be signed between the escrow agent, the contractor and the contracting authority (on behalf of the members of the buyers group), duly protecting the interests of the contracting authority and the buyers group in case of bankruptcy or liquidation of the contractor and ensuring that in such cases the members of the buyers group shall obtain a copy of the results.***]***

If the contractor becomes aware of any product or activity of any third party that involves or may involve infringement or other violation of the rights on the results, the contractor shall promptly notify the contracting authority of the infringement or violation.

If the HE call conditions impose control restrictions due to strategic interests, add the following option: [OPTION for PCPs with control restrictions due to strategic interests in the HE call conditions: The contractor must ensure that the results are not subject to control or other restrictions by a country (or entity from a country) which is not [specify the list of countries in line with the list of eligible countries defined in section 3.1 of the request for tenders] — unless otherwise agreed with the contracting authority.*]*

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

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5.4 Access rights to the results

5.4.1 Access rights to the results for the contracting authority and the buyers group

The rights and obligations in relation to access to the results are the following:

- The contractor grants to the PBG irrevocable, royalty-free, non-exclusive, world-wide access rights to use the results, for their own purposes (for IPRs: until their expiry date).
- For results that are an implementation of design specifications into simulations, prototypes, demonstrators or first products /services, those access rights are limited to a duration of [insert duration] years and to the following purposes for fulfilling the R&D objectives of the PCP: [specify those purposes for your PCP].
- The PBG has *[*the right to grant*]* *[*the right to require the contractor to grant — within a reasonable time period specified in the request —*]* non-exclusive licences to third parties to commercially or non-commercially exploit the results under fair and reasonable conditions, without the right to sub-license.

The contractor must ensure that it complies with its obligations under the framework agreement and specific contracts if it uses subcontractors; that it must obtain all necessary rights (transfer, licences or other) from the subcontractors, as if they were generated by itself; that it should refrain from using subcontractors if obtaining those rights is impossible).

Don't forget to also foresee rules on subcontractor rights and obligations with respect to the above points

The contractor grants the members of the PBG, including their affiliated entities, a royalty-free, non-exclusive, worldwide, irrevocable and non-sub-licensable (except as explicitly authorised under this Framework Agreement) license to use its results for their own purposes, during and after the Framework Agreement and Specific Contracts. The contractor also grants a royalty-free, non-exclusive, worldwide, irrevocable and non-sub-licensable license to contractors and subcontractors of the PBG to practice the results for their own purposes, during and after the Framework Agreement and Specific Contracts.

- For those results that are design specifications (including the rights on such type of results), the access rights are unlimited in duration, or at least until expiration of the attached rights if any. For the avoidance of any doubt, use for its own purposes also allows the buyers group (and any contracting authority appointed by the buyers group to implement a procurement on their behalf) to use the design specifications in tender specifications of future public procurements related to the results.
- For those results that are an implementation of the design specifications into simulations, prototypes, demonstrators or first products /services, the access rights are ***[****OPTION 1 when the buyers group intends to continue to use the results indefinitely:* unlimited in duration***]*** ***[****OPTION 2 when the buyers group intends to continue to use the results for a limited time:* limited to a duration of [enter the envisaged usage period, e.g. 4] years after the end of the Framework Agreement and Specific Contracts***]***, with the aim to [define the purpose, e.g. 'enable wider validation of the results in production (e.g. across a larger set of future use cases, datasets and users)'], and the license is limited to use of the results for the buyers group own non-commercial purposes. Except in exceptional conditions and subject to the conditions in Article XX.3 (decision of the contractor not to protect/exploit certain results), XX.4.3 (failure of the contractor to license results to third parties) and XX.5 (failure of the contractor to commercially exploit the results or abuse of the results against the public interest), the contracting authority and members of the buyers group do not aim to commercially exploit/sell itself the contractor's

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results. Commercial exploitation of the contractor's results is in the first place the responsibility of the contractor, as specified in Article XX.5 (commercialisation of results).

Without prejudice to above rights to access the results for various purposes, the members of the PBG, their (sub)contractors, any contracting authority appointed by the PBG to implement a procurement in their name and/or on their behalf, enjoy in particular:

- The right to make the results available to their staff and to persons and entities working for them or cooperating with them, including contractors, subcontractors.
- The right to integrate the results into the PBG's infrastructure and to use the results as part of this infrastructure (including the right to load, display, transmit and run the results on the infrastructure) at least for [enter the same envisaged usage period as above, e.g. 4 years] years after the end of the Framework Agreement and Specific Contracts.
- The right to make the necessary copies of the results for internal distribution, archiving, back-up, correcting errors, studying or testing of the functioning of the results.
- The right to make compilations, translations, adaptations or other types of arrangements or alterations to the results as is necessary for their intended use, for example to ensure interoperability with other systems implemented by the PBG.
- The right to publish summaries of the results, after consultation with the contractor to ensure that no confidential information is thereby disclosed or that the publication would not interfere with the protection of intellectual or industrial property rights. These rights are in addition to the rights provided for by law, such as the unwaivable rights of, and exceptions for the benefit of lawful users of software or of databases, as foreseen under the applicable EU or national laws.

These rights do not allow, unless expressly permitted by the contractor, the right for the contracting authority and the buyers group to make the results available to the market, neither for free or under open licence terms (open source, open data) nor under market commercial conditions, neither to the general public nor to sectors of the economy. However, the members of the buyers group reserve the right to make available to the public, even for free, any public service provided by them that makes use of the new functionalities enabled by the results that have been integrated in the PBG's infrastructure.

The contractor retains the right to commercial exploitation of the results, as specified in Article XX.5 (commercial exploitation of results), for any purposes of using the results beyond the scope of the current PCP. The members of the PBG reserve the right to require the contractor (see Article XX.4.3 access to results for third parties) to give access under fair and reasonable conditions to the results to third parties, for example to third parties interested in developing and commercialising their own use cases on top of the PBG's infrastructure.

In case of commercial exploitation of products, services or processes arising or developed from the results by the contractor (or by entities affiliated to it or succeeding it in the ownership or development of the results), the contractor shall ensure that the members of the PBG (or any contracting authority appointed by the PBG to implement a procurement in their name and/or on their behalf) are offered the commercial products or services at the best price offered by the contractor (or the entities affiliated or succeeding it) in similar situations to any other third party (in particular without charging for licenses or other rights which the PBG already have under other provisions of this Framework Agreement or a Specific Contract).

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⚠ **The limitation of the scope and/or duration of the access rights (to 'what is needed by the PBG to fulfil the R&D objectives of the PCP') is needed for the PCP to remain an 'R&D procurement' where the 'procurers do not retain all the benefits' and thus be exempted from the WTO rules and the EU public procurement directives.**

5.4.2 Access rights to the results for the EU

The EU has the right to use non-sensitive information relating to the PCP and materials and documents received from the contracting authority and the PBG for policy, information, communication, dissemination and publicity purposes — during the EU grant or afterwards. This concerns notably summaries for publication, as well as any other material, such as pictures or audio-visual material, and other deliverables submitted by the contracting authority and the PBG to the EU, in paper or electronic form.

The right for the EU to use these materials, documents and information is granted in the form of a royalty-free, non-exclusive and irrevocable licence, which includes the following rights:

(a) Use for its own purposes (in particular, making them available to persons working for the EU granting authority or any other EU service (including institutions, bodies, offices, agencies, etc.) or EU Member State institution or body; copying or reproducing them in whole or in part, in unlimited numbers; and communication through press information services).

(b) Distribution to the public (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes).

(c) Editing or redrafting (including shortening, summarising, inserting other elements (e.g. meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation).

(d) Translation.

(e) Storage in paper, electronic or other form.

(f) Archiving, in line with applicable document-management rules.

(g) The right to authorise third parties to act on its behalf or sub-license to third parties the modes of use set out in Points (b), (c), (d) and (f), if needed for the information, communication and publicity activity of the granting authority.

(h) Processing, analysing, aggregating the materials, documents and information received and producing derivative works.

The rights of use are granted for the whole duration of the industrial or intellectual property rights concerned.

If materials or documents are subject to moral rights or third party rights (including intellectual property rights or rights of natural persons on their image and voice), the contractor must ensure that they comply with their obligations under this Framework Agreement and Specific Contracts (Articles XX.8 and XX.9 on pre-existing rights) in particular, by obtaining the necessary licences and authorisations from the rights holders concerned.

Where applicable, the EU granting authority will insert the following information: "© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the EU under conditions."

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5.4.3 Access rights to the results for third parties

If requested by the contracting authority or the PBG, the contractor shall, within a reasonable time period specified in the request, grant to the third parties specified in the request a non-exclusive and non-sub-licensable license to use and exploit the results, and any background or sideground which may be necessary for the use or exploitation of the results, under fair and reasonable conditions.

If the contractor fails or refuses to grant the requested licenses, the contracting authority and members of the buyers group retain the right to grant themselves a non-exclusive and non-sub-licensable license to the third parties to use and exploit the results (or to appoint an independent third party to do so).

5.5 Commercial exploitation of results

Provide for the rights and obligations in relation to commercial exploitation of the results:

5.5.1 Responsibility of the contractor to commercially exploit results

The contractor shall take prompt action to ensure that its results are exploited commercially (directly or indirectly through another entity, through transfer or licensing), even if they cannot be protected, in order to ensure swift availability of the developed solutions on the wider market and to generate revenue by marketing commercial applications of the results.

It is important that the period of time allowed for commercial exploitation of results is set in such a way as to give the contractor a fair and reasonable amount of time to exploit the results in the relevant sector. This will ensure that the potential for marketing the product or service is valued correctly (Horizon Europe uses as an appropriate length of time 4 years). The period should take account of the fact that: 1) the contractor needs to start producing the good or service in quantity and to invest in large scale promotion activities and 2) the potential first customers, public procurers, generally take time to prepare and launch a PPI after the PCP has been completed.

⚠ *If the duration of the Horizon Europe grant is finally longer than initially foreseen (i.e. if the HE action duration is extended), you must also extend duration of the framework agreement and the specific contracts (via an amendment). The formulation above ensures that if this happens, the duration for the obligation on the commercial exploitation in the framework agreement will also be automatically extended (as it will start counting from the new end date specified in the amendment).*

In particular, the contractor must use its best efforts to exploit its results up to [four] years after the end of the Framework Agreement and Specific Contracts, including where they are capable of commercial exploitation, to exploit them commercially (i.e. marketing a commercial application of the results, directly or indirectly, through a subcontractor or licensee).

If, despite a contractor's best efforts, the results are not exploited within one year after the end of the Framework Agreement and Specific Contracts, the contractor must (unless otherwise agreed in writing with the contracting authority and the PBG) use the Horizon Europe Results Platform[28] to find interested parties to exploit the results.

[28] Horizon Europe Results Platform

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If the contractor fails to commercially exploit the results within the four years time period and the circumstances of the case show that it has not used its best efforts to do so, the members of the PBG retain the right to require that the contractor transfers the ownership of the results to them so that the PBG can ensure that the results are commercially exploited.

5.5.2 Additional obligations/limitations for the exploitation of results due to public interests

Security or strategic autonomy

[OPTION when safeguarding of EU security interests is important, in particular when the PCP involves security related R&D and/or when the HE call conditions impose specific additional security obligations: In order to [explain the reason, e.g. safeguard the delivery of public services through the PBG's infrastructure against potential physical and cyber threats and to protect the exchange of security sensitive information], the contractor shall ensure to safeguard EU security interests in the commercial exploitation of the results.***]***

[*OPTION when safeguarding of EU strategic autonomy is important, in particular when the PCP involves critical technologies or critical assets, and/or when the HE call conditions impose specific additional EU strategic autonomy obligations:* In order to safeguard security of supply of inputs critical to the functioning of the buyers group's infrastructure and fair competition in the supply chain compliant with EU rules and interests, the contractor shall ensure to safeguard EU strategic autonomy in the commercial exploitation of the results. For this purpose, the contractor shall ensure that a significant amount of the commercial exploitation of the results takes place in the EU Member States and/or countries associated to Horizon Europe[29]. In particular, the contractor must produce minimum [enter a reasonable percentage, e.g. 50%] of the products, services or processes that incorporate results or that are produced through the use of results in [add the list of countries in line with the list of eligible countries defined in section 3.1 of the request for tenders].

[additional OPTION for PCPs that involve security-related R&D: Moreover, for results that are security components, the contractor must moreover produce [enter a reasonable percentage (typically more demanding than the one in the previous paragraph), e.g. 100%] in *[OPTION if there are participation and/or control restrictions in the HE call conditions*: [add the list of countries to which participation and/or control is restricted]*][OPTION if there are no participation and/or control restrictions in the HE call conditions*: [add 'EU Member States or Horizon Europe associated countries']*].]*

[additional OPTION when EU security and/or strategic autonomy interests need safeguarding, in particular when imposed by the HE call conditions: The contractor must ensure that, in the commercial exploitation of results, any cooperation with entities established in other countries, or controlled by such countries or entities from such countries, does not affect the EU security or strategic autonomy interests and avoids potential negative effects over security of supply of inputs critical to the functioning of the buyers group's infrastructure.*]*

Standardisation

[*OPTION if there are additional obligations related to standardisation in the HE call conditions:* The contractors must promote the dissemination of their results, in particular through [publications and] contribution to standardisation. The contractors and the contracting authority will establish at the start of the Framework Agreement a list of [planned publications about the results and] appropriate standards to contribute to, and will keep this list updated throughout the Framework Agreement and for each

[29] List of Horizon Europe participating countries.

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Specific Contract. The contractors must — up to four years after the end of the Framework Contract and Specific Contracts — inform the contracting authority, who will inform in its turn the granting authority that is co-financing the PPI, if the results could reasonably be expected to contribute to European or international standards.***]***

Public emergency

[*OPTION if there are additional exploitation obligations in case of a public emergency in the HE call conditions:* In case of a public emergency the contractor must, if requested by the contracting authority on behalf of the buyers group or the EU, commit to rapidly and broadly exploit the products and/or services resulting from the PCP at fair and reasonable conditions to address the public emergency. This provision applies up to four years after the end of the PCP.***]***

Other

[Where the HE call conditions impose other additional exploitation obligations, add them here.]

If the contractor uses the results to the detriment of the public interest *[OPTION when EU security and/or strategic autonomy interests need safeguarding, in particular when imposed by the HE call conditions:*, including EU strategic autonomy or security interests*]*, the members of the PBG are entitled to require that the contractor transfers the ownership of the results to them, in order to stop use of the results against the public interest and ensure commercial exploitation of the results by another party in line with the exploitation conditions.

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. specific exploitation obligations or control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

The contractor must ensure that these obligations also apply to its subcontractors, affiliated entities and other third parties it cooperates with in the commercialisation of the results, as well as to any entities succeeding them in their ownership or development of the results.

5.5.3 Obligation to notify a planned merger or acquisition

In case of a merger or acquisition by an entity from a country (or controlled by a country) that is not an EU Member State or Horizon Europe associated country, the contractor must notify the contracting authority at least [enter a reasonable period, e.g. three (3) months] in advance of the decision to implement the merger or acquisition and:

- Describe in detail the identity, ownership and control structure of the potential new merged entity or the potential new owner(s)
- Include a reasoned assessment of the likely impact of the possible merger/acquisition on:
  - The access to the results and to the background and sideground that is essential for accessing the results, as foreseen by the Framework Agreement and Specific Contracts for the contracting authority and for third parties.
  - The commercialisation exploitation of the results, including the EU security interests and EU strategic autonomy objectives above.

The contracting authority and the PBG may request the contractor for additional information to verify the potential impact, upon which the contractor must promptly provide the requested information.

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In case the impact analysis concludes that the merger or acquisition negatively impacts the access to or the commercial exploitation of the results, including the EU security interests and EU strategic autonomy objectives set out in Article XX.5, the members of the PBG are entitled to require that the contractor (both the contractor before or after the merger or acquisition) transfers the ownership of the results to them so that the buyers group can ensure that the interests are preserved and protected.

5.6 Transfer and licensing of results

The rights and obligations in relation to transfer and licensing of results are the following:

- The contractor may grant non-exclusive licences to third parties allowing them to exploit the results (or otherwise give the right to exploit them) — unless this impedes the access rights of the buyers group or unless the HE call conditions impose restrictions to a specific list of eligible countries.
- The contractor may transfer ownership or give exclusive licenses to its results — unless this is prohibited (or restricted) by the HE call conditions or the ethics, security or EU strategic autonomy obligations and provided that it ensures that its obligations (in respect of the results) apply to the new owner and that this new owner is obliged to pass them on in any subsequent transfer *(e.g. by including a requirement to do so in their arrangements with the new owner).*

A right of first refusal for the PBG to buy the results is foreseen.

The procedure for transfers when there are procurers in the buyers group that still have (or may still request) access rights to the results is [ ] *(e.g. that the contractor must give them at least 45 days advance notice of its intention to transfer ownership of the results and that this notification must include sufficient information on the new owner to enable the procurers to assess the effects on their access rights. A procurer can object within 30 days of receiving notification, if it can show that the transfer would adversely affect its access rights. Should an objection be raised, the transfer may not take place until agreement has been reached between the parties concerned).*

5.6.1 Non-exclusive licensing of results

[*OPTION 1 by default (no restrictions):* The contractor may on its own initiative without prior authorisation from the contracting authority, give non-exclusive licenses to third parties to exploit the results that it owns to the extent that:

- such licenses do not affect the rights — including the access rights — of the contracting authority, the PBG or the EU related to the results, and
- such licenses do not affect the obligations — including the security and ethical obligations — of the contracting authority and the PBG related to the results, and
- such licenses are not granted to entities which are subject to EU restrictive measures under Article 29 of the Treaty on the European Union (TEU) and Article 215 of the Treaty on the Functioning of the EU (TFEU)[30] (sanctions).

The contractor must ensure in the licensing agreement that all its obligations under the Framework Agreement and Specific Contracts are passed on to the third party and that the third party has the obligation to pass on these obligations in any potential subsequent licensing.***]***

[*OPTION 2 if there are participation and/or control restrictions in the HE call conditions:* Non-exclusive licensing is subject to the same restrictions as exclusively licensing of results, as specified in Article XX.6.2.***]***

[30] Please note that the EU Official Journal contains the official list and, in case of conflict, its content prevails over that of the EU Sanctions Map.

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Check carefully if the call conditions for your HE grant impose specific requirements (e.g. control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

5.6.2 Exclusive licensing and transfer of ownership of results

Conditions

Exclusive licensing and transfers of ownership of the results are restricted as follows:

- The contractor may not transfer or give exclusive licenses if this would affect the rights — including the access rights — of the contracting authority, the PBG or the EU related to the results.
- The contractor may not transfer or give exclusive licenses if this would affect the obligations — including the security and ethical obligations — of the contracting authority and the PBG related to the results.
- The contractor may not transfer or give exclusive licenses to entities that are subject to EU restrictive measures under Article 29 of the Treaty on the European Union (TEU) and Article 215 of the Treaty on the Functioning of the EU (TFEU)[31] (sanctions)
- *[OPTION if the HE call conditions include a right for the EU to object to transfers or licensing:* the contractor may not transfer ownership of its results or give licences to third parties which are established in a non-EU country not associated with Horizon Europe if the EU granting authority objects to the transfer; the notification procedure below must be followed*]*
- *[OPTION if there are participation and/or control restrictions in the HE call conditions:* the contractor may not transfer ownership of its results or give licences to third parties which are established in countries which are not [include the list of eligible countries set out in section 3.1 of the request for tenders] (or, if applicable, are controlled by such countries or entities from such countries) — unless they have requested and received prior approval by the contracting authority who will request prior approval from the granting authority that is co-financing the PCP. The notification procedure below must be followed.*]*
- *[OPTION if there is a right of first refusal for the PBG:* the contractor may not transfer ownership or the results or give exclusive licenses, if this would conflict with the right of first refusal for the buyers group to buy the results. [explain further what is the exact procedure for the buyers group to invoke the right of first refusal].*]*

The contractor must ensure in the transfer/licensing agreement that all its obligations under the Framework Agreement and Specific Contracts are passed on to the new owner/licensee and that this new owner/licensee has the obligation to pass them on in any subsequent transfer/licensing.

Notification procedure

If the contractor intends to transfer or grant a licence to a third party in one of the notification cases listed above, they must notify the contracting authority who will request prior authorisation to the EU granting authority. The notification must be done at least [specify an appropriate period, e.g. three months] in advance and:

- Identify the specific results concerned.

[31] Please note that the EU Official Journal contains the official list and, in case of conflict, its content prevails over that of the EU Sanctions Map.

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- Describe in detail the intended new owner or licensee and the planned or potential exploitation of the results.
- Include a reasoned assessment of the likely impact of the intended transfer or exclusive license on:
  - The access rights to the results and on the background and sideground that is essential for accessing the results as foreseen by the Framework Agreement and Specific Contracts for the contracting authority, the members of the PBG or for third parties.
  - The commercialisation exploitation of the results in line with public interests and EU interests, in particular regarding competitiveness *[OPTION when safeguarding of EU strategic autonomy interests is important for the PBG, in particular when the PCP involves security-related R&D and/or when the HE call conditions impose specific additional security obligations:* and EU strategic autonomy objectives as specified in Article XX.5*]* as well as consistency with ethical principles and security considerations on EU interests.

The contracting authority may on behalf of the EU granting authority request the contractor for additional information to verify the potential impact, upon which the contractor must promptly provide the requested information.

Before granting the authorisation, the EU granting authority will verify the potential impact of the intended transfer or exclusive licensing.

The EU granting authority may object to the transfer or exclusive licensing or may condition its authorisation to measures ensuring that the transfer or exclusive licensing will not have unintended or undesirable consequences.

Before the EU granting authority gives its written authorisation, the transfer may not take place and any transfer or exclusive licensing agreement concluded before or without a written authorisation will be null and void.

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. specific control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

5.7 Pre-existing materials and pre-existing rights (background and sideground)

The rights and obligations concerning pre-existing materials and rights (background and sideground) are the following:

- Rules regarding ownership of pre-existing rights (remains unchanged).
- The parties must inform each other about the generation of/changes in pre-existing rights within [insert number] days from the generation /change.
- The contractor introducing background must within [define period] of the signing of the PCP framework agreement provide the lead procurer with a list of the pre-existing rights it holds and/or has access to *(e.g. via its subcontractors)* at the date of the agreement and a list of the software necessary for the operation of the prototype and first products/services that will be developed during the PCP, specifying which software is closed source software. An updated list (to the extent necessary) must be provided with each bid for the next phase.

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- The access that the parties must grant each other to each other's pre-existing rights and sideground for carrying out the tasks assigned to them in the PCP, for exploitation of results generated in the PCP and for using the results for their own purposes (normally at least to the PBG).
- The conditions for access should be fair and reasonable to all parties, e.g. — as appropriate for your PCP:
  - On a royalty-free, non-exclusive basis, access to each other's background, for carrying out the tasks assigned to them in/during the PCP.
  - Under fair and reasonable conditions and on non-exclusive basis, access to each other's background, for exploitation of results generated in the PCP and for using the results for their own purposes in particular also after the PCP.
  - Under fair and reasonable conditions and on non-exclusive basis, access to each other's sideground, for carrying out the tasks assigned to them in the PCP, for exploitation of results generated in the PCP and for using the results for their own purposes in particular also after the PCP.
  -

5.8 Ownership of and access to pre-existing materials and rights

Background and sideground remain the property of the party providing it, or as the case may be, its licensor(s) and nothing contained in this Framework Agreement or a Specific Contract shall affect the rights of each party in their background or sideground.

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. specific control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

Subject to pre-existing obligations that may apply to background or sideground, the members of the PBG grant the contractor a royalty-free, non-exclusive, irrevocable and non sub-licensable license to use their background and sideground for the performance of the Framework Agreement and Specific Contracts, during the period of the Framework Agreement or Specific Contract.

[*OPTION 1 in case the procurers have background that is relevant to the PCP:* The PBG hold the following background that is relevant to the PCP: [specify relevant background].***]*** ***[****OPTION 2 in case the procurers do NOT have background that is relevant to the PCP:* The PBG do not hold any background that is relevant to the PCP.***]***

Subject to pre-existing obligations that may apply to background or sideground, the contractor grants the PBG and (sub)contractors that assist them in executing the Framework Agreement and Specific Contracts (including in particular in evaluation or testing of solutions) a royalty-free, non-exclusive, irrevocable and non-sub-licensable (except as explicitly authorised under this Framework Agreement) license to use its background and sideground for the execution of the Framework Agreement and Specific Contracts and during the period of the Framework Agreement and Specific Contracts.

Regarding the rights to use for the background rights, choose option 1 or 2 below, as applicable: ***[****OPTION 1 for PCPs in which procurers do not buy resulting prototypes/first products/services:* The members of the PBG are not purchasing developed prototypes or first products/services as part of this PCP. However, subject to pre-existing obligations that may apply to background or sideground, the

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contractor grants to the members of the PBG — and also to (sub)contractors that practice the results for the PBG's own non-commercial use — a license to use its background and sideground under fair and reasonable conditions to the extent needed to use the results for the the PBG's own non-commercial purposes, beyond the execution of the Framework Agreement and Specific Contracts and after the Framework Agreement and Specific Contracts.***]*** ***[****OPTION 2 for PCPs in which procurers buy resulting prototypes or first products/services:* The members of the PBG are purchasing [specify whether it is 'developed prototypes' or 'first products'] as part of this PCP. Subject to pre-existing obligations that may apply to background or sideground, the contractor grants to the members of the PBG — and also to (sub)contractors that practice the results for the PBG's own non-commercial use — a royalty-free, non-exclusive, irrevocable and non-sub-licensable (except as explicitly authorised under this Framework Agreement) license to use its background and sideground to the extent needed to use the results for the PBG's own non-commercial purposes, beyond the execution of the Framework Agreement and Specific Contracts and after the Framework Agreement and Specific Contracts for [specify the duration for which the procurers want to keep using the PCP solution and the associated background rights after the PCP. This period must be the same as in request for tenders and must be aligned with the period for usage rights that is defined for access of the PBG to the results in Article XX.4.1].***]***

These licenses are in addition to rights provided for by law, such as the unwaivable rights of, and exceptions for the benefit of lawful users of software or of databases, as foreseen under the applicable EU or national laws.

Subject to pre-existing obligations that may apply to background or sideground, the contractor also grants rights to use its background and sideground — under the same conditions as above — to entities that are under the direct or indirect control of members of the PBG, or under the same direct or indirect control as members of the PBG, or directly or indirectly controlling members of the PBG ***[****OPTION for PCPs with control restrictions in the HE call conditions:,* subject to applicable control restrictions***]***.

5.9 List/evidence of pre-existing materials and pre-existing rights (background and sideground)

5.9.1 List of pre-existing materials and pre-existing rights

In order to be able to distinguish clearly between rights on newly created materials, and newly created rights on the one hand and pre-existing materials and pre-existing rights on the other hand, and to establish which pre-existing materials and rights are held by whom, the parties must establish an agreed list of all their pre-existing materials and pre-existing rights (background and sideground) that may be used for the performance of this Framework Agreement and Specific Contracts, including identification of the rights' owners.

The contractor must provide the declaration listing pre-existing materials and pre-existing rights in its offer for the Framework Agreement and must provide an updated version of it to the contracting authority within the bid for each Specific Contract in order to have the updated list approved by the contracting authority at the *latest [specify a reasonable time, e.g. 30 days]* after the start of each Specific Contract. If there are no pre-existing materials nor pre-existing rights, the contractor must provide a declaration to that effect.

The list of pre-existing material and pre-existing rights shall identify, for each pre-existing material and right, the tasks, deliverables or other aspects related to the performance of the Framework Agreement and Specific Contracts contract that may be affected by pre-existing material/right, the pre-existing material/right concerned, the rights to the pre-existing material, the rights holder and any prior obligations on the pre-existing rights that may apply to the results. Such list will include, but is not limited to, a list of the software necessary for the performance of the Framework Agreement and Specific Contracts (including but not limited to software necessary for the operation of the prototypes and

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products or services that will be developed during the Framework Agreement or Specific Contract), specifying which software is closed source software.

The contractor shall inform the contracting authority about any evolutions in any of its pre-existing material and pre-existing rights that affect the performance of the Framework Agreement or a Specific Contract. This includes any changes to the background (including the rights on the background) and about the generation of new sideground (including new rights on the sideground) within [specify a reasonable time, e.g. 30 days] from the change or generation and at the latest by the end of the corresponding phase and with each bid for the next phase.

[OPTION for PCPs with control restrictions due to strategic interests in the HE call conditions: The contractor must ensure that background that is subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries set out in section 3.1 of the request for tenders and that impact the exploitation of the results (i.e. would make the exploitation of the results subject to control or restrictions) must not be used and must be explicitly excluded from the list of pre-existing rights agreed between the contractor and the contracting authority that will be used for the PCP — unless otherwise agreed with the contracting authority.*]*

Note that background that impacts the exploitation of results should be understood as making the exploitation of those results subject to control or restrictions, for example if exploitation would require the agreement of the entity owning the background. If such background needs to be used this must be agreed with the granting authority.

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. specific control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

5.9.2 Evidence of pre-existing rights

If requested by the contracting authority, the contractor must, in addition to the list mentioned under Article XX.9.1, provide evidence that it has the ownership or the right to use all the listed pre-existing materials and rights, except for the rights owned or licensed by the contracting authority and the PBG.

The contracting authority may request this evidence even after the end of this Framework Agreement and Specific Contracts.

This evidence may refer, for example, to rights to: parts of other documents, images, graphs, sounds, music, tables, data, software, technical inventions, know-how, IT development tools, routines, subroutines or other programs ('background technology'), concepts, designs, installations or pieces of art, data, source or background materials or any other parts of external origin.

This evidence must include, as appropriate:

- The name and version number of the work.
- The full identification of the work and its author, developer, creator, translator, data entry person, graphic designer, publisher, editor, photographer, producer.
- A copy of the licence to use the product or of the agreement granting the relevant rights to the contractor or a reference to this licence.
- A copy of the agreement or extract from the employment contract granting the relevant rights to the contractor where parts of the results were created by its personnel.
- The text of the disclaimer notice if any.

Provision of evidence does not release the contractor from its responsibilities if it is found that it does not hold the necessary rights, regardless of when and by whom this fact is revealed.

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Article 6 — Confidentiality

The parties shall keep confidential any data, documents or other material (in any form) that is identified as confidential at the time it is disclosed. This applies during the implementation of the Framework Agreement and Specific Contracts and up to [insert number of years (minimum 4 years after the end of the Horizon Europe grant)] years after their end.

If information has been identified as confidential only orally, it shall be considered to be confidential only if this is confirmed in writing within 15 days of the oral disclosure.

Unless otherwise agreed between the parties, they may use confidential information only to implement the Framework Agreement and Specific Contracts.

The parties may disclose confidential information to their staff or to third parties involved in the PCP implementation only if:

(a) They need to be aware of this information in order to implement the PCP activities under the Framework Agreement and Specific Contracts, and

(b) They are bound by an obligation of confidentiality.

The contracting authority and members of the PBG may disclose confidential information to the EU granting authority if required under their Horizon Europe grant agreement.

The confidentiality obligations cease to apply if:

(a) The disclosing party agrees to release the other party from the obligation,

(b) The information becomes generally and publicly available, without breaching any confidentiality obligation, or

(c) The disclosure of the information is required by EU or national law.

This does not change the security obligations, which still apply. Stricter confidentiality obligations apply for information that is EU-classified or subject to a security recommendation.

⚠ If the duration of the Horizon Europe grant agreement is longer than foreseen (i.e. if the action duration is extended), you must also extend the confidentiality obligation for the framework agreement (via an amendment).

Article 7 — Promotion, publicity and communication

7.1 Dissemination obligations

The contractor shall undertake communication activities to create publicity about its participation to the procurement, and to promote the objectives and the results of the R&D carried out under the PCP (in particular, to other potential customers with the objective to achieve commercial exploitation of the results; see Article XX on commercial exploitation of results).

When undertaking these activities, the contractor shall ensure that they do not infringe any of its other obligations under this Framework Agreement or a Specific Contract, such as its obligations regarding protection of intellectual property, confidentiality, security restrictions or its obligations under data protection legislation.

Where the PBG or HE call conditions impose additional dissemination obligations (e.g. open access obligations) on the PCP contractors for the results of the PCP, add them here.

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7.2 Obligation of prior notification of the contracting authority

During the implementation of the Framework Agreement and Specific Contracts and for a period of [insert number] *[*years*][*months*]* after the end of the Framework Agreement and Specific Contracts, the contractor shall inform the contracting authority [indicate number] days in advance of any (written or oral) publication or any other type of communication (in any media or form) relating to the services or results. Information on communication activities expected to have a major media impact shall be provided sufficiently in advance to allow the lead procurer to inform the EU.

The contractor must, in particular, submit a draft copy of any publications:

- For written publications — at the same time as the submission to the editor for publication or at least one month before the date intended for publication, whichever is earlier.
- For oral communications or other types of disclosure — twenty calendar days before the forecasted date of submission to the organiser of a scientific meeting or of said other type of disclosure.

If requested by the contracting authority, the contractor shall remove any confidential or security sensitive information before the disclosure.

Both parties agree that they will balance any of their requests to remove confidentiality, security or intellectual property-sensitive aspects from a publication proposed by the other party against the other party's objective to maintain sufficient information related to the performance of the Framework Agreement and Specific Contracts or the results that is necessary for the appropriate presentation or understanding of the publication.

7.3 Recognition of EU funding

All communication activities about the PCP and/or its results (including in electronic form and via social media), as well as infrastructure, equipment and major results financed by the PCP shall display the EU emblem and include the following text:

- For communication activities: 'This [publication][communication] is part of the [acronym of the HE grant] project that has received funding from the European Union's Horizon Europe Research and Innovation Programme'.
- For infrastructure, equipment and major results: 'This [infrastructure][equipment][insert type of result] is part of the [acronym of HE grant] project that has received funding from the European Union's Horizon Europe Research and Innovation Programme'.

If results are incorporated in a standard, the contractor must — unless the contracting authority requests or agrees otherwise in writing or unless it is impossible — ask the standardisation body to include the following statement in (information related to) the standard: 'Funded by the European Union'.

If results are protected through registered IPR, the contractor must — wherever possible under the applicable rules — include in its applications for protection the following statement: 'These results were achieved with EU support. The European Union has certain rights in these results'.

When displayed together with another logo, the EU emblem shall have appropriate prominence. The contractor may use the EU emblem without first obtaining approval from the EU. This does not, however, give the contractor the right to exclusive use. Moreover, the contractor may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

All communication activities shall indicate that the opinions expressed reflect only the author's views and do not represent the contracting authority's or the EU's official position. The contracting authority,

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in agreement with the EU granting authority, may waive this obligation in writing or provide the text of the disclaimer.

XX.4 Communication/publication rights for the contracting authority and the buyers group

The contracting authority and members of the PBG may use, for the purposes of communication and publicity, all information relating to the PCP, documents (notably summaries) and deliverables, and any other material (such as pictures or audio-visual material) from the contractor (including in electronic form).

The contracting authority and members of the PBG may, in particular, publish the name of the contractor and its project abstracts, the summaries of the main results from the R&D and the lessons learnt during the PCP *(e.g. relating to the feasibility of the different approaches to meeting the procurers' requirements that were explored, and the lessons learnt for potential future use of the solutions proposed)*.

This does not change the confidentiality obligations under Article XX.

Moreover, before publishing this information, the contracting authority shall consult the contractor, in order to avoid harm to legitimate business interests *(e.g. regarding aspects of the solutions that could be IPR-protected)* or distortion of competition.

XX.5 Communication/publication rights for the EU

The EU may use, for the purposes of communication and publicity, information relating to the PCP, documents (notably summaries) and deliverables, and any other material (such as pictures or audiovisual material) from the contractor (including in electronic form).

If the EU's use of these materials, documents or information would risk compromising legitimate interests, the contractor may, however, ask the contracting authority to request the EU granting authority not to use it.

The right to use the contractor's materials, documents and information includes:

(a) Use for its own purposes (in particular, making them available to persons working for the EU granting authority or any other EU service (including institutions, bodies, offices, agencies, etc.) or EU Member State institution or body; copying or reproducing them in whole or in part, in unlimited numbers; and communication through press information services).

(b) Distribution to the public (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes).

(c) Editing or redrafting (including shortening, summarising, inserting other elements (e.g. meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation).

(d) Translation.

(e) Storage in paper, electronic or other form.

(f) Archiving, in line with applicable document-management rules.

(g) The right to authorise third parties to act on its behalf or sub-license to third parties the modes of use set out in Points (b), (c), (d) and (f), if needed for the information, communication and publicity activity of the granting authority.

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(h) Processing, analysing, aggregating the materials, documents and information received and producing derivative works.

If the right of use is subject to rights of a third party (including the contractor's staff), the contractor shall ensure that it obtains the necessary approval from the third parties concerned.

Article 8 — Conflicts of interest

8.1 The contractor shall take all measures necessary to prevent a situation arising where the impartial and objective implementation of the Framework Agreement or a Specific Contract is compromised for reasons involving economic interests, political or national affinity, family, personal life or any other shared interest.

The contractor shall also take all measures necessary to prevent a situation in which its (previous or ongoing) professional activities affect the impartial and objective implementation of the Framework Agreement or a Specific Contract.

8.2 The contractor shall notify the contracting authority without delay of any situation constituting or likely to lead to a conflict of interest (including changes of ownership) and shall immediately take all steps necessary to rectify this situation.

The contracting authority may instruct the contractor to take specific measures to remedy the situation.

Article 9 — Ethics and research integrity

9.1 The contractor shall carry out the tasks assigned to it in the Framework Agreement and Specific Contracts in compliance with:

(a) Ethical principles (including the highest standards of research integrity).

(b) Applicable international, EU and national law.

The contractor must commit to and ensure the respect of basic EU values (such as respect for human dignity, freedom, democracy, equality, the rule of law and human rights, including the rights of minorities). The contractor must pay particular attention to the principle of proportionality, the right to privacy, the right to the protection of personal data, the right to the physical and mental integrity of persons, the right to non-discrimination, the need to ensure protection of the environment and high levels of human health protection.

In case the development, deployment and/or use of the PCP solution involves artificial intelligence (AI), the contractor must ensure that the artificial intelligence is trustworthy, i.e. lawful, ethical and technically robust. The artificial intelligence system must preserve and protect the following six general ethical principles based on fundamental rights as enshrined in the Charter of Fundamental Rights of the European Union (EU Charter), and in relevant international human rights law[32]:

– Respect for human agency: human beings must be respected to make their own decisions and carry out their own actions. Respect for human agency encapsulates three more specific principles, which define fundamental human rights: autonomy, dignity and freedom.

[32] For more information, *see Horizon Europe guidance on ethics by design and ethics of use approaches for AI*.

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- Privacy and data governance: people have the right to privacy and data protection and these should be respected at all times.
- Fairness: people should be given equal rights and opportunities and should not be advantaged or disadvantaged undeservedly.
- Individual, social and environmental well-being: artificial intelligence systems should contribute to, and not harm, individual, social and environmental wellbeing.
- Transparency: the purpose, inputs and operations of artificial intelligence programs should be knowable and understandable to its stakeholders.
- Accountability and oversight: humans should be able to understand, supervise and control the design and operation of artificial intelligence-based systems, and the actors involved in their development or operation should take responsibility for the way that these applications function and for the resulting consequences.

The contractor may not:

- Carry out activities in a Member State for an activity which is forbidden in that Member State.
- Carry out activities in a country inside or outside the EU, if they are prohibited in all EU Member States.

The contractor may not carry out activities which:

(a) Aim at human cloning for reproductive purposes.

(b) Intend to modify the genetic heritage of human beings in a way which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads).

(c) Intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

(d) Lead to the destruction of human embryos (for example, for obtaining stem cells).

The contractor may not carry out activities that do not focus exclusively on civil applications.

The contractor shall respect the fundamental principle of research integrity — as set out in the European Code of Conduct for Research Integrity[33].

This implies compliance with the following essential principles:

- Reliability in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources.
- Honesty in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way.
- Respect for colleagues, research participants, society, ecosystems, cultural heritage and the environment.
- Accountability for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts.

and means that the contractor must ensure that persons carrying out research tasks follow the good research practices and refrain from the research integrity violations described in this Code.

[33] European Code of Conduct for Research Integrity of ALLEA (All European Academies).

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XX.2 Before starting any activity that raises an ethical issue, the contractor shall submit to the lead procurer a copy of:

(a) Any ethics committee opinion required under national law.

(b) Any notification or authorisation for activities raising ethical issues required under national law.

[*OPTION if the HE grant agreement contains ethics requirements that concern the PCP contracts:*

XX.3 In addition, the contractor shall comply with the following additional ethics requirements:

– [insert the ethics deliverables from Annex 1 to the HE grant agreement].***]***

Article 10 — Security-related obligations

[*OPTION if the PCP involves dual-use goods or dangerous materials or substances:*

XX.X Activities involving dual-use goods or dangerous materials and substances shall comply with applicable EU, national and international law.

Before starting the activity, the contractor shall provide the contracting authority with a copy of any export or transfer licences required.***]***

[*OPTION if the HE grant agreement provides for a security classification that affects the PCP contracts:*

XX.X Classified information shall be treated in accordance with the security aspect letter (SAL) annexed to the Horizon Europe grant agreement and EU Decision No 2015/544[34] until it is declassified.

Tasks involving classified information may not be subcontracted without prior written approval from the contracting authority.

The contractor shall inform the contracting authority of any changes relating to security and, if necessary, request an amendment.***]***

[*OPTION if the HE grant agreement contains security recommendations restricting disclosure or dissemination that affect the PCP contracts:*

XX.X The following results may be disclosed or disseminated only if the contractor has first obtained written approval from the contracting authority:

– [insert the results subject to a security recommendation restricting disclosure or dissemination from Annex 1 to the HE grant agreement].***]***

[*OPTION if the HE grant agreement contains other security recommendations that affect the PCP contracts:*

XX.X In addition, the contractor shall comply with the following additional security recommendations:

– [insert the security recommendations from Annex 1 to the HE grant agreement].***]***

Define the applicable rules regarding location, access and processing of security related data. In case the HE call conditions impose other geographic restrictions (e.g. restrictions on the participation and/or control of contractors to the procurement, place of performance

[34] Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU-classified information.

requirements, etc), agree in cooperation with the granting authority how to best ensure consistency of the rules on handling of security related data with those other restrictions.

The localisation of and access to [all security related data handled under the contract] [all data related to contract activities that are performed on the security components of the solution] […] processed by the contractor shall comply with the following:

- The data shall only be processed within the territory of [the European Union and the Horizon Europe associated countries[35]] [the European Union][…] and will not leave that territory
- The data shall only be held in data centres located with the territory of [the European Union and the Horizon Europe associated countries] [the European Union][…]
- [No access shall be given to such data outside of [the European Union and the Horizon Europe associated countries] [the European Union][…] or [access to data may be given on a need to know basis only to authorised persons established in a country which has been recognised by the European Commission as providing adequate protection to security related data [as defined in EU Decision No 2015/544] […]]
- The contractor may not change the location of data processing without the prior written authorisation of the contracting authority.

Article 11 — Processing of personal data

The contractor shall process personal data in compliance with the applicable EU and national law on data protection, in particular Regulation 2016/679 [36] (including as relates to authorisations and notification requirements).

Contractors must ensure that personal data is:

- Processed lawfully, fairly and in a transparent manner in relation to the data subjects.
- Collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes.
- Adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed.
- Accurate and, where necessary, kept up to date.
- Kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the data is processed.
- Processed in a manner that ensures appropriate security of the data.

Define the conditions to be respected regarding location, access and processing of personal data. In case the HE call conditions impose other geographic restrictions (e.g. restrictions on the participation and/or control of contractors to the procurement, place of performance requirements, etc), agree in cooperation with the granting authority how to best ensure consistency of the rules on handling of personal data with those other restrictions.

The localisation of and access to the personal data processed by the contractor shall comply with the following:

35 List of Horizon Europe participating countries.

36 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC ('GDPR') (OJ L 119, 4.5.2016, p. 1).

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- The personal data shall only be processed within the territory of [the European Union and the Horizon Europe associated countries[37]] [the European Union][…] and will not leave that territory.
- The data shall only be held in data centres located with the territory of [the European Union and the Horizon Europe associated countries] [the European Union][…].
- [No access shall be given to such data outside of [the European Union and the Horizon Europe associated countries] [the European Union][…] or [access to data may be given on a need to know basis only to authorised persons established in a country which has been recognised by the European Commission as providing adequate protection to personal data].
- The contractor may not change the location of data processing without the prior written authorisation of the contracting authority.
- Any transfer of personal data under the Framework Agreement or a Specific Contract to third countries or international organisations shall fully comply with the requirements laid down in Chapter V of Regulation (EU) 2016/679.

The contractor may grant its staff access to data only in so far as is strictly necessary for implementing, managing and monitoring the Framework Agreement and Specific Contracts.

The contractor must inform the staff whose personal data are collected and processed by the procurers and/or the EU. For this purpose, the contractor must provide them with the privacy statements of the procurers and the EU, before transmitting their data. If explicit prior consent from the data subjects is needed, the contractor must obtain such consent.

Article 12 — Obligation to provide information and keep records

XX.1 The contractor must, at any time during the implementation of the Framework Agreement and Specific Contracts or afterwards, provide any information requested by the procurers in relation to the Agreement or Contracts.

XX.2 The contractor must keep, for a period of up to [insert number of years (minimum 5 years after the end of the HE grant agreement)] years after the end of the Framework Agreement and Specific Contracts, records and other supporting documentation relating to their implementation.

This obligation includes records and other supporting documentation on scientific and technical implementation (in line with the accepted standards in the field) and on the price charged and the costs incurred by the contractor.

The contractor must keep the original documents. Digital and digitalised documents are considered originals if they are authorised under national law.

Should there be ongoing checks, reviews, audits, investigations, litigation or other pursuits of claims (including claims by a third party against the procurers), the contractor must keep all records and other supporting documentation until the end of these procedures.

37 List of Horizon Europe participating countries.

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Article 13 — EU checks, reviews, audits and investigations

Should the EU (including the European Court of Auditors, the European Public Prosecutor's Office (EPPO) or the European Anti-Fraud Office (OLAF)) decide to carry out a check, review, audit or investigation, the contractor must make available all information, records and other supporting documents relating to the implementation of the Framework Agreement and Specific Contracts.

Should there be an on-the-spot visit, the contractor must allow access to its premises and must ensure that the information requested is readily available.

Article 14 — EU impact evaluation

Should the EU carry out an impact evaluation (of its grant to the procurers), the contractor must make available all information, records and other supporting documents relating to the implementation of the Framework Agreement and Specific Contracts.

Article 15 — Breach of contract

Set out the consequences in case of breach of contract (in line with the law applicable to the contract).

Don't forget provisions on partial/improper implementation of tasks and breach of other obligations.

Include a section on liability for damages:

XX.1 The contractor must compensate the contracting authority and members of the PBG if they are held liable by the EU for damage sustained as a result of the implementation of the Framework Agreement or a Specific Contract (or because it was not implemented properly).

XX.2 The EU cannot be held liable for any damage caused to the contractor or caused by the contractor in connection with the implementation of the Framework Agreement or a Specific Contract.

Set out clear rules for termination of the Framework Agreement and Specific Contracts, reduction or recovery of payments and liquidated damages. Think of including not only such rules for typical breach of contract situations that may occur in any type of procurement, but think also of how to use them for breaches of PCP specific provisions (e.g. breaches of compliance with the place of performance requirements, with the R&D definition, with the place of establishment and control requirements (if any), with IPR and commercialisation requirements).

[OPTION in case there are preferred partners and third parties providing in-kind contributions to the PCP: **Article XX — Participation of preferred partners and third parties providing in-kind contributions to the PCP)**

Complete as applicable to the specificities of the PCP. Name the preferred partners and third parties providing in-kind contributions to the PCP and explain the boundary conditions for their participation, i.e. the rights and responsibilities under the agreement and specific contracts.

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Pay particular attention to clearly set out the rules for participating in testing/monitoring/evaluation of results, confidentiality, processing of personal data and communication.

Specify also clearly the IPR-related rights (e.g. access rights to results needed to follow the implementation of the PCP) and obligations of preferred partners and third parties providing in-kind contributions to the PCP (e.g. access rights to pre-existing rights, sideground or results (foreground) needed by contractors to implement the PCP or exploit its results).]

Article 16 — Amendments

Include a provision on amendments. Specify that they must be made in writing.

Include a clause that the amendment may not have the purpose or the effect of making changes to the contracts which might call into question the decision awarding the contracts or result in unequal treatment of tenderers.

Article 17 — Interpretation

Include a provision specifying that the terms set out in the framework agreement have precedence over those in annexes and that the terms set out in Annex 1 (request for tenders) have precedence over those set out in Annex 2 (contractor's tender).

Specify that the same applies to the specific contracts.

Article 18 — Applicable law and dispute settlement

Choose:

- ***the law applicable to the framework agreement and to the specific contracts***
- ***the dispute settlement mechanisms, in particular the competent court or other dispute settlement mechanisms (e.g. arbitration or mediation, if allowed under national law) and the deadlines to respect.***
-

Article 19 — Entry into force

Define the entry into force (e.g. upon signature of the last party).

SIGNATURES

The lead procurer signs for the PBG and — in case of joint tenders — the lead contractor for the group of contractors.

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PCP TENDER DOCUMENT 3
SPECIFIC PHASE CONTRACT (TD3)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP SPECIFIC CONTRACT FOR PHASE 1 (TD3)

PREAMBLE

Similar set-up as the framework agreement: Lead procurer concludes and signs in in the name and on behalf of the PBG.

Annex the contractor's offer.

Specific contracts must contain at least the following elements/provisions:

TERMS AND CONDITIONS

Article 1 — Subject of the contract

This Specific Contract defines the specific terms and conditions for the implementation of the PCP procurement of R&D services set out in Article XX — for the *[*1st*][*2rd*][*3rd*]* PCP phase.

Article 2 — Duration

The duration of the specific contract is [ ] and starting date is [ ] and end date for the implementation of the tasks is [ ].

The period of execution of the tasks may be extended only with the express written agreement of the parties before the expiration of the period for execution of the tasks.

Article 3 — R&D services to be provided

The contractor shall provide the R&D services (tasks, deliverables and milestones) set out in the offer for this phase.

Specify the scope of the specific contract (i.e. which phase and which lot, if any).

Specify the individuals in charge of carrying out the R&D activities for the specific contract and their location (country where they carry out the R&D activities).

Article 4 — Price and payment arrangements

The price to be paid by *[*the lead procurer*][*the procurers in the PBG*]* for the R&D services set out in Article XX shall be *[*EUR*][*other currency*]* [amount in figures and in words].

Specify the amounts of pre-instalments and interim payments (if applicable) and final payment in figures and words. In case of pro rata payments by the procurers in the PBG, split the amount pro rata per procurer according to their contribution to the total PCP costs (with and without VAT).

Specify which invoice for which payment x the contractor has to send to whom (lead procurer or PBG) after approval of deliverable x. Specify how many days after receipt of the invoice payment(s) have to be made to the contractor.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Specify the contractor's bank account details and the currency in which payments will be made.

Article 5 — Security related obligations

Add a provision on security if specifically needed for the phase and not already covered by the provision in the framework agreement.

Article 6 — Entry into force

Specify the entry into force date.

SIGNATURES

Same as for framework agreement: The lead procurer signs for the PBG and — in case of joint tenders — the lead contractor for the group of contractors.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP TENDER DOCUMENT 4

SPECIFIC CONTRACT FOR PCP PHASE 2 (TD4)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP SPECIFIC CONTRACT FOR PHASE 2 (TD4)

PREAMBLE

Similar set-up as the framework agreement: Lead procurer concludes and signs in in the name and on behalf of the PBG.

Annex the contractor's offer.

Specific contracts must contain at least the following elements/provisions:

TERMS AND CONDITIONS

Article 1 — Subject of the contract

This Specific Contract defines the specific terms and conditions for the implementation of the PCP procurement of R&D services set out in Article XX — for the *[*1st*][*2rd*][*3rd*]* PCP phase.

Article 2 — Duration

The duration of the specific contract is [ ] and starting date is [ ] and end date for the implementation of the tasks is [ ].

The period of execution of the tasks may be extended only with the express written agreement of the parties before the expiration of the period for execution of the tasks.

Article 3 — R&D services to be provided

The contractor shall provide the R&D services (tasks, deliverables and milestones) set out in the offer for this phase.

Specify the scope of the specific contract (i.e. which phase and which lot, if any).

Specify the individuals in charge of carrying out the R&D activities for the specific contract and their location (country where they carry out the R&D activities).

Article 4 — Price and payment arrangements

The price to be paid by *[*the lead procurer*][*the procurers in the PBG*]* for the R&D services set out in Article XX shall be *[*EUR*][*other currency*]* [amount in figures and in words].

Specify the amounts of pre-instalments and interim payments (if applicable) and final payment in figures and words. In case of pro rata payments by the procurers in the PBG, split the amount pro rata per procurer according to their contribution to the total PCP costs (with and without VAT).

Specify which invoice for which payment x the contractor has to send to whom (lead procurer or PBG) after approval of deliverable x. Specify how many days after receipt of the invoice payment(s) have to be made to the contractor.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Specify the contractor's bank account details and the currency in which payments will be made.

Article 5 — Security related obligations

Add a provision on security if specifically needed for the phase and not already covered by the provision in the framework agreement.

Article 6 — Entry into force

Specify the entry into force date.

SIGNATURES

Same as for framework agreement: The lead procurer signs for the PBG and — in case of joint tenders — the lead contractor for the group of contractors.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP TENDER DOCUMENT 5

SPECIFIC CONTRACT FOR PCP PHASE 3 (TD5)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP SPECIFIC CONTRACT FOR PHASE 3 (TD5)

PREAMBLE

Similar set-up as the framework agreement: Lead procurer concludes and signs in in the name and on behalf of the PBG.

Annex the contractor's offer.

Specific contracts must contain at least the following elements/provisions:

TERMS AND CONDITIONS

Article 1 — Subject of the contract

This Specific Contract defines the specific terms and conditions for the implementation of the PCP procurement of R&D services set out in Article XX — for the *[*1st*][*2rd*][*3rd*]* PCP phase.

Article 2 — Duration

The duration of the specific contract is [ ] and starting date is [ ] and end date for the implementation of the tasks is [ ].

The period of execution of the tasks may be extended only with the express written agreement of the parties before the expiration of the period for execution of the tasks.

Article 3 — R&D services to be provided

The contractor shall provide the R&D services (tasks, deliverables and milestones) set out in the offer for this phase.

Specify the scope of the specific contract (i.e. which phase and which lot, if any).

Specify the individuals in charge of carrying out the R&D activities for the specific contract and their location (country where they carry out the R&D activities).

Article 4 — Price and payment arrangements

The price to be paid by *[*the lead procurer*][*the procurers in the PBG*]* for the R&D services set out in Article XX shall be *[*EUR*][*other currency*]* [amount in figures and in words].

Specify the amounts of pre-instalments and interim payments (if applicable) and final payment in figures and words. In case of pro rata payments by the procurers in the PBG, split the amount pro rata per procurer according to their contribution to the total PCP costs (with and without VAT).

Specify which invoice for which payment x the contractor has to send to whom (lead procurer or PBG) after approval of deliverable x. Specify how many days after receipt of the invoice payment(s) have to be made to the contractor.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Specify the contractor's bank account details and the currency in which payments will be made.

Article 5 — Security related obligations

Add a provision on security if specifically needed for the phase and not already covered by the provision in the framework agreement.

Article 6 — Entry into force

Specify the entry into force date.

SIGNATURES

Same as for framework agreement: The lead procurer signs for the PBG and — in case of joint tenders — the lead contractor for the group of contractors.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP TENDER DOCUMENT 6
END OF PHASE (1, 2, 3) REPORT
(TD6)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP END OF PHASE REPORT (TD6)

Results & conclusions

Contractors
1. The innovative solution *Provide a short description (that is suitable for publication purposes) of:* **The innovative solution** (in its current form) **Where exactly lies the innovation in the solution**: In which ways and to which extent does the solution go beyond what existing solutions can achieve? **The degree of innovation**: indicate if your innovative solution is (a) a totally new product / service / process / method; (b) an improvement to an existing product / service / process / method; (c) a new combination of existing products / services / processes / methods and (d) a new use for existing products / services / processes / methods).
2. Commercialisation success *Provide a short description (mark parts that are not suitable for publication purposes) of:* **How mature is the innovative solution in terms of its readiness to commercialise widely**: Which steps towards wide scale commercialisation have been completed so far? *(do not forget: IPR protection, certification, CE marking, attracting additional investors to grow the business, setting up sales / distribution channels / marketing activities to expand sales to other countries etc.)* **What is the current commercialisation success of the solution**: *e.g. awards / other forms of recognitions obtained, sales / increase in market share already achieved, licensing agreements already concluded, collaboration agreements with other partners (e.g. retailers) to commercialise the solutions already signed, additional investments attracted to further commercialise the solution.*
3. Other benefits obtained *Provide a short description (mark parts that are not suitable for publication purposes) of any other benefits that you obtained from participating in the procurement, e.g.* **Getting easier access to (a new segment of) the public procurement market** (e.g. did the procurement enable you to work with procurers/end-users that you were not working with beforehand?) **Growing your business across borders and/or to other markets** *(e.g. private markets)* due to the first customer references provided by the procurement **Shortening the time-to-market for your innovation** due to early customer/end-user feedback **Other benefits / lessons learnt:** complete if applicable

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4. Business growth

Provide a short description (mark parts that are not suitable for publication purposes) of:

How much has your business already grown during the procurement?

In terms of (a) personnel growth; (b) turnover growth; (c) growth in market share etc.

What are the prospects to grow your business via wider commercialisation of the solution:

1. How large is the potential market for your solution? is it a growing / steady / declining market?
2. By when can commercialisation start (now / in 1 / in 3 / in 5 / in more than 5 years)?
3. Is competition patchy (no major players) / established (but no comparable offering) / fierce?

Which future steps do you plan to take to further grow your business? *(e.g. attracting additional investors to grow your business, mergers / acquisitions / joint ventures / spin-offs / IPO, setting up sales / distribution channels / marketing activities, expanding to other countries etc.)*

5. Final remarks *(not for publication purposes, to assess how further EU support could best help you)*

What are the remaining bottlenecks to commercialise your solution? (e.g. certification, legislation etc.)

What type(s) of assistance do you need to address those bottlenecks and grow your business / commercialise your solution more widely? (e.g. EU regulation on x, finding investors, IPR help etc.)

How important was the procurement for your business? (Would/could you have done it on your own?)

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TENDER DOCUMENT 7

CONTRACTOR DETAILS AND PROJECT ABSTRACTS

(TD 7)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

CONTRACTOR DETAILS AND PROJECT ABSTRACTS (TD7)

Document type	Deliverable
Document version	Final
Document Preparation Date	[complete]
Classification	Public
Author(s)	All project partners
File Name	[Project Name] *[*PCP Phase 1*]* *[*PCP Phase 2*]* *[*PCP Phase 3*]* — Contractor details and project abstracts

For PCPs: complete this table for each contractor that was awarded a PCP Phase 1, 2 or 3 contract.

Contactor Details	Type/ size of legal entity	Place of performance of contract activities	Logo
Main contractor Name legal entity Address legal entity Name contact person Phone nr contact person E-mail address contact person	SME, larger company, natural person, university / research institute, other	% of contract value allocated to main contractor: [complete] % % of activities for the contract performed by the main contractor in EU Member States or countries associated with Horizon 2020: [complete] %	Main contractor logo
Other consortium member(s) (if applicable) Name legal entity Address legal entity Name contact person Phone nr contact person E-mail address contact person *Complete as many times as there are other consortium members*	SME, larger company, natural person, university / research institute, other	% of contract value allocated to contractor [x]: [complete] % % of activities for the contract performed by contractor [x] in EU Member States or countries associated with Horizon 2020: [complete] %	Other contractor(s) logo(s)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Subcontractors (if applicable) Name legal entity Address legal entity Name contact person Phone nr contact person E-mail address contact person *Complete as many times as there are subcontractors*	SME, larger company, natural person, university / research institute, other	% of contract value allocated to subcontractor [x]: [complete] % % of activities for the contract performed by subcontractor [x] in EU Member States or countries associated with Horizon 2020: [complete] %	Subcontractor(s) logo(s)
Project abstract *(+/- 1000 characters maximum)*			
[Add an abstract of the winning tender, giving a brief project description agreed with the contractor that is suitable for publication purposes]			
Previous EU funding			
Is the project based on / a continuation of R&D activities that were previously funded by the EU?: YES/NO If yes, identify this EU funding: [name EU funding programme] — [project name] — [grant number]			

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

TENDER DOCUMENT 8
TECHNICAL OFFER
(TD 8)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

TECHNICAL OFFER (TD8)

To:

Public Buyer

Address

RE: Pre-Commercial Procurement contract concerning R&D services of "Climate Challenge….."

I, the undersigned [*name and surname*] [38]

_____

As [*capacity*]

_____

Of the following legal entity/entities *[if acting as a Consortium]* [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

fax

_____

VAT reg. no.

_____

[38] In case of consortium/association of entities, this Form should only be filled in **once** for the whole Consortium.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Declare that provides as part of Document B the following documents related to the Technical Offer:

- Proof of Selection Criteria as defined in section 3.3 of the Request for Tenders (TD1).
    - Proof of previous R&D projects. The Technology Provider shall indicate the level of technical resources to perform R&D and provide a description (free text) of the capabilities of the organization to commercially exploit the Results of the PCP.
    - At least two CVs of engineers or scientists working for the Technology Provider. At least one of them must be employed by the Technology Provider.
    - Two CVs of personnel related to Project Management tasks. The personnel should have project management experience in at least two projects.
    - At least two CVs of personnel capable of implementing the Climate change solutions. At least one of them must be employed by the Technology Provider.
    - At least one reference case of implementing a project in a scientific research environment (description of (a) case(s), not older than 3 years).

- A description of the Technical Offer following the award criteria described in section 3.4 of the Request for Tenders (TD1). Technology Providers are suggested to describe their Bid for Phase 1 and their plans for Phase 2 and 3 in a **maximum of 50 pages** (not including the reference case(s) and the CVs).
- The Technical Offer must, at least, detail its compliancy with the functional requirements and the technical specifications as described in the use cases in Annex 2.

Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

TENDER DOCUMENT 9

FINANCIAL OFFER & COST BREAKDOWN

(TD 9)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

FINANCIAL OFFER & COST BREAKDOWN (TD9)

See excel document TD9

Financial offer and Cost Breakdown

The purpose of this Annex is to provide the Buyers Group with:

A) A fixed total Price for Phase 1, broken down to show unit prices and the number of each unit needed to carry out Phase 1 (given in euros, excluding VAT but including any other taxes and duties).

B) Binding unit prices for the entire duration of the Framework Agreement. If additional elements and unit prices are added for Phase 2 and 3 they will become binding.

C) An estimated maximum total price for phases 2 and 3

For the above purpose a Total Cost and a Cost Breakdown shall be submitted.

Financial Offers which are not submitted using this Annex will be excluded. All six sections of this document must be presented. Tenderers should however add further fields (rows and columns) with additional cost elements, as needed. Full justifications and details must always be provided.

Declaration
The Lead Tenderer is assumed to have discussed the tender within their own company and any other body whose co-operation will be required to deliver the project. The Lead Tenderer will need to obtain consent from an authorised officer or appropriate signatory who will sign the contract if successful. The Contract is a legally binding document and subject to the outcome of this award procedure. By submitting the Tender, you are confirming that the information given in this application is complete, that you are actively engaged in this project and responsible for its overall management and agree to administer the contract if made. You are confirming that ▪ your organisation is prepared to carry out this project at the stated price, ▪ you are not subject to the Exclusion criteria, and ▪ that the services offered are within Research and Development as mentioned, and ▪ that you comply with the exclusion, selection, pass/fail award criteria and weighted award criteria stated in the Request for Tenders (TD1).

Name of Lead Tenderer	
Name of Authorised Signatory	
Function	
Signature	
Date	
Stamp, if available	

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

GENERAL INSTRUCTIONS - Mandatory reading

Please read section 4. Financial Offer of the Tender of the Request for Tenders (TD1) .

Technology providers must specify binding maximum unit prices for all items needed for carrying out Phase 1 and for items that are expected to be needed for Phases 2 and 3 (given in euros, excluding VAT, but including any other taxes and duties).

The price paid to the contractor will cover all costs incurred by the contractor, including but not exclusively, software, facilities, integration costs, and so on. The Lead Procurer is not going to pay any additional costs.

The maximum unit prices quoted for each category of items remain binding for all Phases (i.e. for the duration of the Framework Agreement).

Technology providers must provide a cost breakdown for Phase 1, resulting in a fixed total price for Phase 1 and an estimated total price for Phases 2 and 3 broken down to show maximum unit prices and the number of each unit needed to carry out the Phases (given in euros, excluding VAT, but including any other taxes and duties).

The price for Phase 2 and 3 offers must be based on the maximum binding unit prices in the Tender and the price conditions set out in the Framework Agreement. Where new units/unit prices (e.g. for new tasks or equipment) are subsequently added to the Phase 2 or 3 offers, they will become maximum binding unit prices for the remaining Phases.

The Cost Breakdown shall provide:

1. Aa price breakdown that shows the price for R&D services and the price for supplies of products (to demonstrate compliance with the definition of R&D in pass/fail award criterion A).

2. A price breakdown that shows the location or country in which the different categories of activities are to be carried out (e.g. x hours of senior researchers in country L at y euro/hour; a hours of junior developers in country M at b euro/hour) (to demonstrate compliance with the requirement relating to place of performance in pass/fail award criterion C).

3. The financial compensation valuing the benefits and risks of the allocation of ownership of the IPRs to the contractor (i.e. IPRs generated by the contractor during the PCP), by giving an absolute value for the price reduction between the price offered in the tender compared to the exclusive development price (i.e. the price that would have been quoted were IPR ownership to be transferred to the procurers). The financial compensation should be at least 10% of the total price for the three phases. The offer must indicate how this is translated into each of the Phases (by showing two prices in the offer for each Phase). In Phase 2 and 3 the % of the discount can be increased

The financial compensation for IPRs must reflect the market value of the benefits received (i.e. the opportunity that the IPRs offer for commercial exploitation) and the risks assumed by the contractor (e.g. the cost of maintaining IPRs and bringing the products onto the market).

To ensure that a fair market price is offered, Tenderers must state two prices:

1. The “discount” price that they would have quoted if all Intellectual Property Rights, including the ownership of results under the PCP, would be fully retained by the Buyers Group and technology providers would not have the possibility to exploit the results.
2. The “actual” price that takes into account the fact that the Technology providers keep ownership of the Intellectual Property Rights attached to the results under PCP, in accordance with the provisions of the contracts, and that they can exploit these results.

Note that the price must comply with the R&D definition and the total sum of non Personnel costs (such as material/Travelling/Subcontracting/Other costs) offered in each Phase must be less than 50 % of the total value of Total Price of each Phase.

Actual prices quoted for each phase must respect the maximum budgets specified per Contractor per each Phase. All offers above those amounts shall be excluded from the process.

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Estimation of market price

Indicate, by means of a calculation/explanation, an estimation of future market price of the developed solution and exploitation of interims results

Binding maximum unit prices

Provide the maximum unit prices for all items needed for carrying out Phase 1 and for items that are expected to be needed for Phases 2 and 3 (given in euros, excluding VAT but including any other taxes and duties). This unit prices are binding, not subject to change during the entire duration of the Framework Agreement, by means of a calculation/explanation, an estimation of future market price of the developed solution and exploitation of interims results

Personnel unit prices

A.	Category	R&D cost? (Yes/No)	Description	Price per hour
A.1	[e.g. Senior Researcher]	[e.g. Yes]	[e.g. Prepare solution design and prototype creation]	… €/hour
A.2	[e.g. Junior Developer]	[e.g. Yes]	[e.g. Prepare solution design and prototype creation]	… €/hour
A.3	[e.g. Marketing expert]	[e.g. No]	[e.g. Preparation of business model for concept solution]	… €/hour
…				

add rows as needed

Other Costs

B.	Category		Description	Unit price
B.1	[e.g. Hardware, licenses, storage, …]		[describe what the cost consist of, overall intended usage or application for such type of cost, and if applicable, the your unit price definition]	… €/unit
B.2	Travel cost		Average cost per trip	… €/unit
B.3	General and administration costs (overheads)		[describe what the cost consist of, overall intended usage or application for such type of cost, and if applicable, the your unit price definition]	

add rows as needed

Subcontracting

C.	Category	R&D cost? (Yes/No)	Description	Unit price
C.1	[e.g. Testbed set-up]	[e.g. Yes]	[describe what the cost consist of, overall intended usage or application for such type of cost, and if applicable, the your unit price definition]	
C.2	[e.g. Graphic designer]	[e.g. Yes]		
…				

add rows as needed

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

COST BREAKDOWN - Phase 1: Solution Design (Binding)

Provide the cost breakdown for your proposed solution for Phase 1.
This information will be used to check if you are indeed proposing R&D Services. It will also be used for the overall Tender evaluation.

Type	A. Personnel costs	Description of activities	Discount Price					Actual Price
			Price per hour	Amount of hours	Total price	% of labour allocated to R&D services	Country or location of performance	
A.1	[e.g. Senior Researcher - 1]	[link to proposed work activities]				[e.g. 100%]		
A.2	[e.g. Senior Researcher - 2]					[e.g. 100%]		
A.3	Commercial representative - 1					[e.g. 0%]		
...								
					> add rows as needed			
		Sub-Total Personnel costs		**0,0**	- €			**€ -**

Type	B. Other Costs	Description of activities	Discount Price			Actual Price
			Unit price	Amount	Total price	
B.1	[e.g. Hardware, licenses, storage, ...]					
B.2	[Travel cost]					
B.3	[General and administration costs (overheads)]					
...						
					> add rows as needed	
		Sub-Total Materials & Equipments		**0,0**	- €	**€ -**

Type	C. Subcontracting	Description of activities	Discount Price					Actual Price
			Unit price	Amount	Total price	% of labour allocated to R&D services	Country or location of performance	
C.1	[e.g. Graphic designer]	[link to proposed work activities]				[e.g. 100%]		
...						[e.g. 0%]		
					> add rows as needed			
		Sub-Total Subcontracting		**0,0**	- €			**€ -**

Phase 1 TOTAL Costs	
Discount Price (exc. VAT)	
Actual Price (Exc. VAT)	
Actual Price (inc. VAT)	

Comments, clarifications and remarks

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

COST BREAKDOWN - Phase 2: Solution Prototype (Estimated)

Provide envisioned cost breakdown for your proposed solution for Phase 2. Only unit prices are binding. Overall resources are merely estimations.
This information will be used to check if you are indeed proposing R&D Services. It will also be used for the overall Tender evaluation.

Type	A. Personnel costs	Description of activities	Discount Price					Actual Price
			Price per hour	Amount of hours	Total price	% of labour allocated to R&D services	Country or location of performance	
A.1	[e.g. Senior Researcher - 1]	[link to proposed work activities]				[e.g. 100%]		
A.2	[e.g. Senior Researcher - 2]					[e.g. 100%]		
A.3	Commercial representative - 1					[e.g. 0%]		
...								
					> add rows as needed			
		Sub-Total Personnel costs		**0,0**	**-**	**€**		**€ -**

Type	B. Other Costs	Description of activities	Discount Price			Actual Price
			Unit price	Amount	Total price	
B.1	[e.g. Hardware, licenses, storage, ...]					
B.2	[Travel cost]					
B.3	[General and administration costs (overheads)]					
...						
					> add rows as needed	
		Sub-Total Materials & Equipments		**0,0**	**- €**	**€ -**

Type	C. Subcontracting	Description of activities	Discount Price					Actual Price
			Unit price	Amount	Total price	% of labour allocated to	Country or location of	
C.1	[e.g. Graphic designer]	[link to proposed work activities]				[e.g. 100%]		
...						[e.g. 0%]		
					> add rows as needed			
		Sub-Total Subcontracting		**0,0**	**- €**			**€ -**

Phase 2 TOTAL Costs - Estimated	
Discount Price (exc. VAT)	
Actual Price (Exc. VAT)	
Actual Price (inc. VAT)	

Comments, clarifications and remarks

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

COST BREAKDOWN - Phase 3: Operational Validation(Estimated)

Provide envisioned cost breakdown for your proposed solution for Phase 3. Only unit prices are binding. Overall resources are merely estimations
This information will be used to check if you are indeed proposing R&D Services. It will also be used for the overall Tender evaluation.

Type	A. Personnel costs	Description of activities	Discount Price					Actual Price
			Price per hour	Amount of hours	Total price	% of labour allocated to R&D services	Country or location of performance	
A.1	[e.g. Senior Researcher - 1]	[link to proposed work activities]				[e.g. 100%]		
A.2	[e.g. Senior Researcher - 2]					[e.g. 100%]		
A.3	Commercial representative - 1					[e.g. 0%]		
...								
					> add rows as needed			
		Sub-Total Personnel costs		**0,0**	- €			**€ -**

Type	B. Other Costs	Description of activities	Discount Price			Actual Price
			Unit price	Amount	Total price	
B.1	[e.g. Hardware, licenses, storage, ...]					
B.2	[Travel cost]					
B.3	[General and administration costs (overheads)]					
...						
					> add rows as needed	
		Sub-Total Materials & Equipments		**0,0**	- €	**€ -**

Type	C. Subcontracting	Description of activities	Discount Price					Actual Price
			Unit price	Amount	Total price	% of labour allocated to R&D services	Country or location of performance	
C.1	[e.g. Graphic designer]	[link to proposed work activities]				[e.g. 100%]		
...						[e.g. 0%]		
					> add rows as needed			
		Sub-Total Subcontracting		**0,0**	- €			**€ -**

Phase 3 TOTAL Costs - Estimated	
Discount Price (exc. VAT)	
Actual Price (Exc. VAT)	
Actual Price (inc. VAT)	

Comments, clarifications and remarks

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

TENDER DOCUMENT 10
DECLARATION OF HONOUR
(TD 10)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

DECLARATION OF HONOUR (TD10)

TENDER DOCUMENT 4 (TD 4): DECLARATION OF HONOUR

To:

Public Buyer

Address

RE: Pre-Commercial Procurement contract concerning R&D services on *"Climate change challenge… "*

I, the undersigned [*name and surname*][39]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

IF APPLICABLE:

Acting in the context of a consortium or association of several entities together with the following entities:

_____

[39] If the Tenderer is a Consortium or association of several entities, **each** of the Consortium's/association's members should issue this Form.

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_____

_____

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

SECTION 1

The Technology Provider is not involved in any of the exclusion grounds set out under section 3 of the Request for Tenders (TD1) (or, if existing, under similar regulations in the country in which it is established).

Accordingly, the undersigned formally declares that the information stated below and the certificates and other forms of documentary evidence provided are accurate and correct and that they have been set out in full awareness of the consequences of serious misrepresentation.

The undersigned formally declares to be able, upon request and without delay, to provide other certificates or forms of documentary evidence referred to, except where the contracting authority has the possibility of obtaining the supporting documentation concerned directly by accessing a national database of a Member State that is available free of charge. This should be possible on the condition that the Technology Provider has provided the necessary information, thus allowing the Lead Procurer to have access. Where required, this must be accompanied by the relevant consent to do so.

A) Conflict of Interest

Is the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control involved in any current or potential conflict of interest, as indicated in the Tender Documents, due to its participation in the procurement procedure or for any other reason?

Yes / No

If yes, please describe it:

B) Breach of obligations relating to the payment of taxes or social security contributions

Is the Technology Provider in breach of its obligations relating to the payment of taxes or social security contributions and this has been established by a judicial or administrative decision having final and binding effect?

Yes / No

If this exclusion ground applies but the Technology Provider has fulfilled these obligations by paying or entering into a binding arrangement with a view to paying the taxes or social security contributions, the Technology Provider is asked to submit proof of this arrangements to be allowed to participate in the PCP.

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C) Bankruptcy & professional misconduct

Has the Technology Provider violated applicable obligations referred to in Article 18(2) of the Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014?

Yes / No

Is the Technology Provider bankrupt or subject of insolvency or winding-up proceedings, are his assets being administered by a liquidator or by the court, is there an arrangement with creditors, are his business activities suspended or is the Technology Provider in any analogous situation arising from a similar procedure under national laws and regulations (e.g., has indefinitely stopped its payments or is subject to a prohibition on conducting business)?

Yes / No

Has the Technology Provider itself been convicted by a judgment which has the force of *res judicata* for an offence relating to professional practice? Has the Technology Provider been guilty of grave professional misconduct and can the procuring agencies prove this?

Yes / No

D) Criminal offences

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for participation in a criminal organisation, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction

_____

Reason

_____

Who has been convicted

_____

Length of the period of exclusion

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for corruption, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

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_____

Reason:

_____

Who has been convicted:

_____

Length of the period of exclusion:

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for fraud, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

_____

Reason:

_____

Who has been convicted:

_____

Length of the period of exclusion:

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for terrorist offences or offences linked to terrorist activities, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

_____

Reason:

_____

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Who has been convicted:

_____

Length of the period of exclusion:

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for money laundering or terrorist financing, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

_____

Reason:

_____

Who has been convicted:

_____

Length of the period of exclusion:

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for child labour and other forms of trafficking in human beings, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

_____

Reason:

_____

Who has been convicted:

_____

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Length of the period of exclusion:

_____

E) Proposed solution already available in the market

Is the solution proposed by the Technology Provider already available on the market?

Yes / No

F) Compliance with GDPR

Is the Technology Provider compliant with the legislation and regulations applicable to the processing of personal Data in Europe?

Yes / No

(If applicable) Will the Technology Provider ensure compliance with Article 28(7) of Regulation (EU) 2016/679 of the European Parliament and of the Council and Article 29(7) of Regulation (EU) 2018/1725 of the European Parliament and of the Council (on standard contractual clauses between controllers and processors)?

Yes / No

G) Compliance with Minimum Documentation requirements

The Technology Provider has the capability to provide with the Minimum Documentation listed in Annex 4.

Yes / No

SECTION 1

The Technology Provider fulfils the selection criteria set out under section 3.4. Selection criteria of the Request for Tenders (TD1).

Accordingly, the undersigned formally declares that the information and the certificates and other forms of documentary evidence provided are accurate and correct and that they have been set out in full awareness of the consequences of serious misrepresentation.

The undersigned formally declares to be able, upon request and without delay, to provide other certificates or forms of documentary evidence referred to, except where the Lead Procurer has the possibility of obtaining the supporting documentation concerned directly by accessing a national database of a Member State that is available free of charge. This should be possible on the condition that the Technology Provider has provided the necessary information, thus allowing the Lead Procurer to have access. Where required, this must be accompanied by the relevant consent to do so.

SECTION 3

The Technology Provider fulfils the compliance criteria set out under section 3. Award criteria of the Request for Tenders (TD1).

Accordingly, the undersigned formally declares that the information below and the certificates and other forms of documentary evidence provided are accurate and correct and that they have been set out in

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

full awareness of the consequences of serious misrepresentation.

The undersigned formally declares to be able, upon request and without delay, to provide other certificates or forms of documentary evidence referred to, except where the Lead Procurer has the possibility of obtaining the supporting documentation concerned directly by accessing a national database of a Member State that is available free of charge. This should be possible on the condition that the Technology Provider has provided the necessary information, thus allowing the Lead Procurer to have access. Where required, this must be accompanied by the relevant consent to do so.

A) Compliance with the definition of R&D Services

Does the Technology Provider guarantee that it is in compliance with the requirements regarding the definition of R&D Services as set out in the Request for Tenders?

Yes / No

Please note that according to the Request for Tenders this circumstance must be accredited by the presentation of the financial part of the offer, which must contain the following information:

The financial part of the offer for the Framework Agreement must provide binding unit prices for all foreseeable items for the duration of the whole Framework Agreement.

The financial part of the offer for each Phase must give breakdown of the Price for that Phase in terms of units and unit prices for every type of item in the Contract, distinguishing clearly the units and unit prices for items that concern products.

The offers for all three Phases may include only items needed to address the challenge in question and to deliver the R&D Services described in the Request for Tenders.

The offer for all the three Phases must offer services matching the R&D definition above.

The total value of products offered in Phase 1 and in Phase 2 must be less than 50% of the value of the Phase 1 and Phase 2 Contracts' value.

The value of the total amount of products covered by the Contract must be less than 50 % of the total value of the PCP Framework Agreement.

Technology providers that go beyond the provision of R&D Services will be excluded.

B) Compliance with other public financing

Does the Technology Provider guarantee that it is not receiving any public funding not permitted by EU legislation from other sources, including EU state aid rules, in areas of work related to the scope of the provision of services for the procurement in the terms established in the Request for Tenders?

Yes / No

C) Compliance with requirements relating to the place of performance of the Contracts

Does the Technology Provider guarantee that in case of selection it will comply with the requirements stated in the Request for Tenders regarding the place of performance of the Contracts?

Yes / No

Please note that according to the Request for Tenders the following evidence is required:

A list of staff working on the specific Contract (including for subcontractors), indicating clearly their role in performing the Contract (i.e. whether they are principal R&D staff or not) and the location (country) where they will carry out their tasks under the Contract.

Please attach this list to this Declaration of Honour.

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D) Compliance with ethics requirements

Does the Technology Provider guarantee that in case of selection it will comply with the rules regarding ethics, Data protection and research integrity set out in the Request for Tenders?

Yes / No

Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

TENDER DOCUMENT 11
DECLARATION OF HONOUR RUSSIA
(TD 11)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

DECLARATION OF HONOUR RUSSIA (TD11)

As of 9 April 2022, in accordance with Council Regulation (EU) 2022/576, it is prohibited to award any public or concession contract to any person or company that has a connection with Russia as defined in the Regulation. This includes persons or companies acting directly as Tenderers or Contractors as well as subcontractors, suppliers, or companies whose capacities are relied on for the proper performance of the Contract, where these capacities account for more than 10% of the Contract value.

A **connection with Russia as defined in the Regulation** exists where:

a) the Technology Provider is a Russian national or where the Technology Provider is established in Russia;

b) a natural person or a company fulfilling one of the criteria referred to in a) owns more than 50 % of the proprietary rights of the Technology Provider; or

c) the Technology Provider acts on behalf of or at the direction of persons or companies fulfilling the criteria of a) and/or b).

Contracts with such persons or companies with a connection with Russia that were concluded before 9 April 2022 may only continue to be executed until 10 October 2022.

I, the undersigned [*name and surname*][40]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

[40] If the Tenderer is a Consortium or association of several entities, **each** of the Consortium's/association's members should issue this Form.

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IF APPLICABLE:

Acting in the context of a Consortium or association of several entities together with the following entities:

_____

_____

_____

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

I. **None** of the cases described in a) to c) applies to my/our company.

II. In order to execute the Contract for parts of the Services, I/we

☐ will **not** rely on/have **not** relied on the capacities of persons or companies described in a) to c) (for the proper performance of the Contract).

☐ will rely on/have relied on the capacities of the following persons or companies described in a) to c) (for the proper performance of the Contract).

(Details of companies providing such capacities)

☐ No services provided by **any** company commissioned for the proper performance of the contract exceed 10% of the Contract value.

☐ The commissioning of such persons/companies is permitted by way of derogation (Article 5k(2) of Council Regulation (EU) 2022/576).

☐ The contract was concluded before 9 April 2022 and the collaboration will be terminated before 10 October 2022.

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☐ will **not** commission/have **not** commissioned any of the persons or companies described in a) to c) as subcontractors.

☐ will commission/have commissioned the following persons or companies described in a) to c) as subcontractors.

(Details of companies commissioned as subcontractors)

☐ No services provided by any subcontractor exceed 10 % of the contract value.

☐ The commissioning of such persons/companies is permitted by way of derogation (Article 5k(2) of Council Regulation (EU) 2022/576).

☐ The contract was concluded before 9 April 2022 and the collaboration will be terminated before 10 October 2022.

☐ will **not** commission/have **not** commissioned any of the persons or companies described in a) to c) as suppliers.

☐ will commission/have commissioned the following persons or companies described in a) to c) as suppliers:

(Please state any such companies commissioned as suppliers.)

☐ No services provided by any supplier exceed 10% of the Contract value.

☐ The commissioning of such persons/companies is permitted by way of derogation (Article 5k(2) of Council Regulation (EU) 2022/576).

☐ The contract was concluded before 9 April 2022 and the collaboration will be terminated before 10 October 2022.

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Date and signature

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TENDER DOCUMENT 12
CONSORTIA STATEMENT (TD 12)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

CONSORTIA STATEMENT (TD12)

I, the undersigned [*name and surname*], acting in the name of [*name of the one of the members of the Consortium*], a company duly incorporated under the law of_______________, with registered office _______________________, with VAT no. _________________, in my capacity as ____________;

I, the undersigned [*name and surname*], acting in the name of [*name of the one of the members of the Consortium*], a company duly incorporated under the law of_______________, with registered office _______________________, with VAT no. _________________, in my capacity as ____________;

I, the undersigned [*name and surname*], acting in the name of [*name of the one of the members of the Consortium*], a company duly incorporated under the law of_______________, with registered office _______________________, with VAT no. _________________, in my capacity as ____________;

I, the undersigned [*name and surname*], acting in the name of [*name of the one of the members of the Consortium*], a company duly incorporated under the law of_______________, with registered office _______________________, with VAT no. _________________, in my capacity as ____________;

Acting in the context of a consortium or association of several entities (hereafter the **"Consortium"**)

[*name of the Consortium or the association*]

HEREBY STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

1.- In connection with the Climate change PCP Tender, we have agreed to set up a team to participate jointly in the above-mentioned Tender, undertaking to form and to maintain a designed temporary Consortium of Technology Providers, in order to comply jointly with the purposes of the PCP Tender and with the Contracts. Within this Tender, the team may be awarded to the Consortium in the event of being selected to have access/to access to Phase 1. During the whole period of validity of the commitment to maintain the Consortium of Technology Providers, which shall coincide with the period of time during which the Consortium is participating in the C;imate change PCP Tender, each of the members of the Consortium shall assume the following participation:

Name of the Technology Provider	Participation (%)	Location	Statement

2.- All of the members of the Consortium shall remain jointly and severally liable towards the Lead Procurer and the Public Buyers Group.

3.- During the period of the PCP Tender, the Consortium will be represented by [*name of the single authorized representative of the Consortium*], with sufficient powers to exercise the rights and comply with the obligations that arise from the Climate change PCP Tender.

4.- During the management of the Bids selection, for the purposes of communications that may be necessary for its development, the team will be represented by [*name, address, telephone, email*].

The undersigned persons apply for admission to the above-mentioned PCP Tender, having expressed their acceptance of all the provisions and conditions set out in the Climate change PCP Request for Tenders (TD1).

Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

TENDER DOCUMENT 13
SUBCONTRACTING STATEMENT
(TD 13)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

SUBCONTRACTING STATEMENT (TD13)

I, the undersigned [*name and surname*]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

IF APPLICABLE:

Acting in the context of a Consortium or association of several entities together with the following entities:

_____

_____

_____

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

1.- According to the provisions set out in the Tender Documents, the Technology Providers intent on subcontracting the following parts of the scope of the Climate change PCP Tender:

Name of the subcontractor	Activity to be subcontracted and percentage	Location	Statement

2.- I rely on the capacities of the proposed Subcontractors and/or Third Parties to perform part of the work in compliance with the requirements stated in the Request for Tenders and in its related documentation.

3.- Hereby acknowledge and unconditionally states that the Subcontractor(s) and/or Third Parties are fully aware of the provisions set out in the Tender Documents, that it/they meet(s) the requirements for the subcontracted service and that it/they have/has its/their resources at the Technology Provider's disposal for the entire duration of the Contract.

Date and signature

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TENDER DOCUMENT 14

LEGAL CAPACITY OF THE TECHNOLOGY PROVIDER STATEMENT

(TD 14)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

LEGAL CAPACITY OF THE TECHNOLOGY PROVIDER STATEMENT (TD14)

I, the undersigned [*name and surname*]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

IF APPLICABLE:

Acting in the context of a Consortium or association of several entities together with the following entities:

_____

_____

_____

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

SECTION 1

The Technology Provider is empowered to contract with the Lead Procurer and is free to act.

Accordingly, the undersigned formally declares that the information stated under Section 2 and the certificates and other forms of documentary evidence provided are accurate and correct and that they have been set out in full awareness of the consequences of serious misrepresentation.

The undersigned formally declares to be able, upon request and without delay, to provide other certificates or forms of documentary evidence referred to, except where the Lead Procurer has the possibility of obtaining the supporting documentation concerned directly by accessing a national database of a Member State that is available free of charge. This should be possible on the condition that the Technology Provider has provided the necessary information, thus allowing the Lead Procurer to have access. Where required, this must be accompanied by the relevant consent to do so.

SECTION 2

Declare furthermore that the Technology Provider (just in case of legal persons) is registered at the following register of legal persons according to the law of the country of establishment:

_____

The activity performed is

_____

The registration number is

_____

The Technology Provider has run from

_____

The legal form of the Technology Provider is

_____

The social object of the Technology Provider is

_____

The nationality of the Technology Provider is

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_____

The address of the Technology Provider is

_____

Date and signature

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TENDER DOCUMENT 15
DECLARATION OF PRE-EXISTING RIGHTS
(TD 15)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

DECLARATION OF PRE-EXISTING RIGHTS (TD15)

I, the undersigned [*name and surname*]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

The following list contains all the pre-existing rights of the Technology Provider as whole (including all members of the group in a joint Bid, subcontractors and Third Parties on which the Technology Provider relies to fulfil some selection criteria) that are attached to the proposed solution or parts of the proposed solution in my Technical Offer for this Request For Tender.

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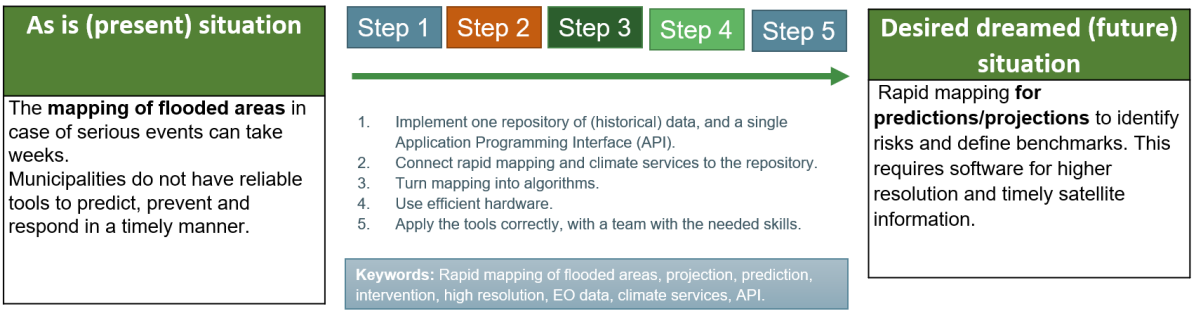
Part / aspect of the proposed solution concerned	Pre-existing material concerned	Rights to pre-existing material	Identification of rights' holder

Date and signature

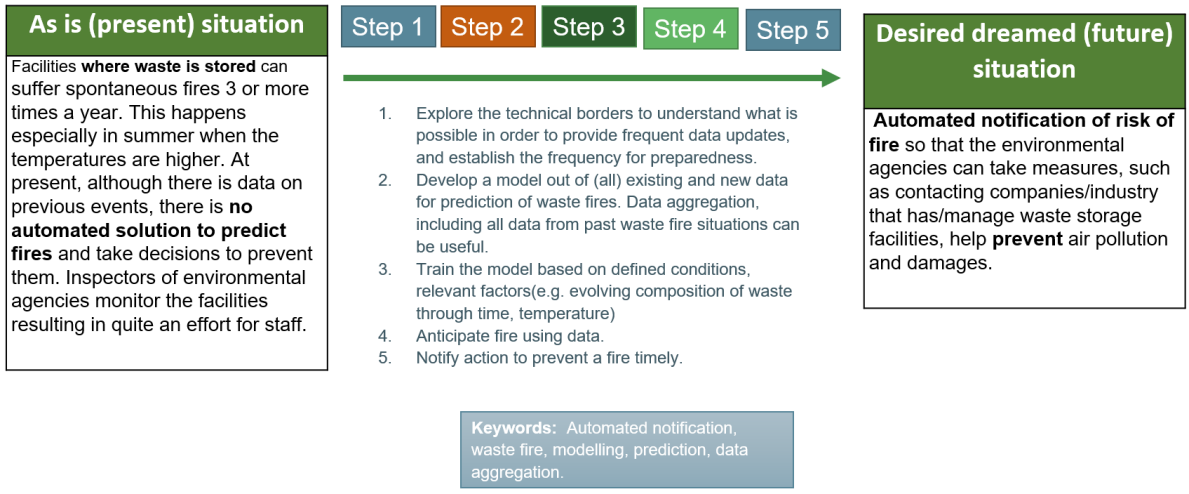
ANNEXES

Annex 1. Use cases

FLOODS



FIRES



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WATER

As is (present) situation	Step 1	Step 2	Step 3	Step 4	Step 5	Desired dreamed (future) situation
The demand for sweet water is unpredictable. The supply and demand of sweet water is not connected. There are regulations determining the use of water from channels, treated water from the sewage and drinking water (in each EU Member State). There is no common language among different stakeholders in the water cycle chain. There is a lot of data in certain regions but the data hubs or repositories are not connected.	1. Understand what is happening at present and the mechanisms in place (also from a policy perspective). Learn how the problem of drought regarding supply and demand of water is addressed, to define the type of new services that support coping with stress situations based on a common language. Understand which are the relevant responsible public authorities and users. Also, identify the data gaps. 2. Develop a system that combines data and uses AI for modelling. 3. Use database driven solutions to improve the distribution of water (e.g. identify saline concentration, pollution, substances, algea, etc.) 4. Provide information to water authorities that need to know how to collect, when and how to distribute water (treated in a certain way) to supply the specific demand, and avoid discharging sweet water. 5. Build a resilient system where different stakeholders (water companies, farmers, industry) cooperate during drought.					**The demand for sweet water is predictable.** The regulatory landscape and policies are clearly defined. The system can cope with stress situations based on data for informed decision making and interventions. **Supply and demand for sweet water are connected based on needs of diverse users** (e.g., famers, companies, industry) and the understanding on the conditions and water quality required for different purposes. Decision and guidance from a policy perspective is achieved to understand the consequences and combine relevant data in the whole water chain cycle under a taxonomy.

Keywords: Drought, AI for modelling, data combination, water demand and supply connection, water quality, distribution.

SUSTAINABLE AND RESILIENT INFRASTRUCTURE

As is (present) situation	Step 1	Step 2	Step 3	Step 4	Step 5	Desired dreamed (future) situation
Vulnerable urban & regional areas (heatwaves, heavy snow or ice, subsidence).	1. Identify vulnerabilities 2. Define type of data required 3. Use AI to define scenarios and modelling. 4. Work on resilience plans based on input from data analysis and predictions. 5. Implement resilience plans for re-development, restoring & adaptation of infrastructure.					**Sustainable and resilient infrastructures** (re-development, restoring & adaptation of existing neighbourhoods)

Keywords: urban heat, urban morphology, early warning, thermal map, monitoring.

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Annex 2. Checklist of documents and actions

TENDER DOCUMENT (TD)	DESCRIPTION / ACTION FOR TECHNOLOGY PROVIDERS
TD1: Call for Tenders	It provides the rules of the Tender, including the evaluation scheme. Technology Providers should read TD1 in conjunction with the other Tender Documents.
TD 2: Framework Agreement	The framework contract with the provisions that will regulate Phase 1, Phase 2 and Phase 3 of the PCP. TD2 should be signed by Technology Providers who have been awarded the Framework Agreement and Phase 1 Contract.
TD 3: PCP Contract for Phase 1	The Contract awarded for Phase 1 after the evaluation of Bids and final award.
TD 4: PCP Contract for Phase 2	The Contract awarded to Contractors for phase 2 after the Call-Off for Phase 2 of the PCP.
TD 5: PCP Contract for Phase 3	The Contract awarded to Contractors for Phase 3 after the Call-Off for Phase 2 of the PCP.
TD 6: PCP End of Phase (1, 2, 3) report	Template to be used by Technology Providers to report the outcomes of Phase 1, Phase 2 and Phase 3.
TD 7: Contractor details and Project abstracts	Template to be filled in by Technology Providers in Phase 1, Phase 2 and Phase 3 of the PCP.
TD 8: Technical Offer	Template to be completed by Technology Providers with their technical proposal.
TD 9: Financial Offer & Cost Breakdown	Template in excel to be completed by Technology Providers with their Financial Offer and Cost Breakdown.
TD 10: Declaration of Honour	Template to be filled in by Technology Providers to declare that they do not fall under exclusion criteria and they comply with selection and award criteria.
TD 11: Declaration of Honour RUSSIA	Template to be filled in by Technology Providers to declare they comply with the regulations that restrict procurement with RUSSIA.
TD 12: Consortia Statement	Template to be filled in by Technology Providers in case of a Consortium presenting a Bid.

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TD 13: Subcontracting Statement	Template to be filled in by Technology Providers in case of subcontracting tasks.
TD 14: Legal Capacity of the Technology Provider Statement	Template to be filled in by Technology Providers to declare their legal capacity.
TD 15: Declaration of pre-existing rights	Template to be filled in by Technology Providers to indicate their Background IPR required for the purpose of their Bids.
Annex 1. Use cases	Five use cases that describe the functional and technical requirements.
Annex 2. Checklist of documents and actions	Check list to guide Technology Providers in the preparation and submission of their Bids.
Annex 3. Information about the Public Buyers Group	Brief profile of the organisations part of the Public Buyers Group.
Annex 4. Preexisting rights of the Public Buyers Group	Relevant IPR that the organisations part of the Public Buyers Group possess (if any).
Annex 5. List of environmental, social and labour law obligations established by EU law, national legislation, collective agreements or the international environmental, social and labour conventions which tenders must comply with.	List of relevant regulations regarding environmental, social and labour obligations.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 3. Information about the Public Buyers

The City of Haarlem together with the citizens and other stakeholders work on the challenges, such as the climate adaptation, circular economy, energy transition, safe and sustainable neighborhoods, social, healthy and inclusive city. The City of Haarlem is a beautiful historical city situated in the West of the Netherlands. City of Haarlem is a frontrunner on sustainability, circular procurement and social responsibility.

In the role as coordinating city of the Urban Agenda Partnership on Innovative and Responsible Public Procurement, the City of Haarlem is going to disseminate gained knowledge of PROTECT within European network, promote market consultations with regards to climate adaptation and sustainability. The City of Haarlem is a frontrunner on circular procurement and lead partner in Metropolis Region of Amsterdam on climate adaptation. The Urban Agenda Partnership has experience with developing training courses, organising conferences and events.

www.haarlem.nl

ISEM – International Security and Emergency Management Institute is a non-profit organisation providing publicly beneficial services. ISEMI is a professional platform of former or active police and national security officers, military, civil protection and crisis management experts from around the world with necessary security clearance and relevant long-term experience in crime prevention, counter-terrorism and CBRN-E threats in the fight against organised crime, environmental crime, trafficking in human beings, cybercrime, drugs and weapons smuggling. Our team also has a broad experience in intelligence analysis, defence policy, border protection, critical infrastructure protection, countering hybrid threats, rescue and emergency assistance, health protection, and justice and prosecution.

ISEM – International Security and Emergency Management Institute will mobilise stakeholders and procurers in the security sector to take concrete and sustainable actions towards the urgent need to effectively address their escalating climate change issues. Through this, we will build and engage a community of procurers in the security sectors and enhance their knowledge and skills. Furthermore, ISEM will participate through its experts in analysing the legal frameworks focusing on the member states in central and eastern Europe.

https://www.isemi.sk/

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 4. Pre-existing rights of the Public Buyers Group

ORGANISATION	RELEVANT PRE-EXISTING IPR

Annex 5. List of environmental, social and labour law obligations established by EU Law, national legislation, collective agreements which bids must comply with

ILO Convention 87 on Freedom of Association and the Protection of the Right to Organise
ILO Convention 98 on the Right to Organise and Collective Bargaining
ILO Convention 105 on the Abolition of Forced Labour
ILO Convention 138 on Minimum Age
ILO Convention 111 on Discrimination (Employment and Occupation)
ILO Convention 100 on Equal Remuneration
ILO Convention 182 on Worst Forms of Child Labour
Vienna Convention for the protection of the Ozone Layer and its Montreal Protocol on substances that deplete the Ozone Layer
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention)
Stockholm Convention on Persistent Organic Pollutants (Stockholm POPs Convention)
Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (UNEP/FAO) (The PIC Convention) Rotterdam, 10 September 1998, and its 3 regional Protocols

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 6. Contract Notice template

NETHERLANDS: RESEARCH AND DEVELOPMENT SERVICES AND RELATED CONSULTANCY SERVICES
PROTECT-PCP FOR THE CUSTOMISATION/PRE-OPERATIONAISATION OF PROTOTYPES OF END-USER SERVICES IN THE AREA OF CLIMATE CHANGE.

Contract or concession notice – standard regime

1 *Buyer*

1.1 *Buyer*
Official name: GEMEENTE HAARLEM
Legal type of the buyer: Body governed by public law, controlled by a central government authority
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO
Legal type of the buyer: International organisation
Activity of the contracting authority: Public order and safety

2 *Procedure*

2.1 *Procedure*
Title: PROTECT-PCP for the Customisation/Pre-Operationaisation of prototypes of end-user services in the area of Climate Change.
Description: This contract notice invites interested operators to submit tenders to this PCP procurement. Participation in the tendering procedure is open on equal terms to all types of operators that are established in EU Member States or Horizon Europe associated countries. The PCP of R&D services is a competitive procedure in 3 phases: Phase 1 solution design, Phase 2: Prototype development and Phase 3: testing and validation of prototypes. The tender documents can be downloaded in the following [link]. This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592.
Procedure identifier: 384f7481-f944-4b8b-a6f7-eca5d81e389d
Type of procedure: Open

2.1.1 *Purpose*
Main nature of the contract: Services
Main classification (cpv): 73000000 Research and development services and related consultancy services

2.1.4 *General information*
Legal basis:
Directive 2014/24/EU

2.1.6 *Grounds for exclusion*
Conflict of interest due to its participation in the procurement procedure:
Guilty of misrepresentation, withheld information, unable to provide required documents and obtained confidential information of this procedure:
Guilty of grave professional misconduct:
Payment of taxes:
Bankruptcy:
Analogous situation like bankruptcy under national law:

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Participation in a criminal organisation:
Terrorist offences or offences linked to terrorist activities:
Money laundering or terrorist financing:
Fraud:
Corruption:
Child labour and other forms of trafficking in human beings:

5 *Lot*

5.1 *Lot technical ID*: LOT-0001
Title: Not Applicable
Description: Not Applicable
Internal identifier: Not Applicable

5.1.1 *Purpose*
Main nature of the contract: Services
Main classification (cpv): 73000000 Research and development services and related consultancy services

5.1.3 *Estimated duration*
Other duration: Unknown

5.1.6 *General information*
Reserved participation: Participation is not reserved.
Procurement Project fully or partially financed with EU Funds.
The procurement is covered by the Government Procurement Agreement (GPA): no

5.1.9 *Selection criteria*
Criterion:
Type: Technical and professional ability
Criterion:
Type: Suitability to pursue the professional activity

5.1.11 *Procurement documents*
Address of the procurement documents: https://www.protect-pcp.eu/consortium/

5.1.12 *Terms of procurement*
Terms of submission:
Electronic submission: Allowed
Address for submission: https://www.protect-pcp.eu/consortium/
Languages in which tenders or requests to participate may be submitted: English
Electronic catalogue: Not allowed
Deadline for receipt of tenders: 31/05/2024 12:00 +02:00
Deadline until which the tender must remain valid: 3 *Month*
Terms of contract:
The execution of the contract must be performed within the framework of sheltered employment programmes: No
Electronic invoicing: Allowed
Electronic ordering will be used: yes
Electronic payment will be used: yes

5.1.15 *Techniques*
Framework agreement:

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Framework agreement, with reopening of competition
Information about the dynamic purchasing system:
No dynamic purchase system
Electronic auction: no

5.1.16 *Further information, mediation and review*
Review organisation: GEMEENTE HAARLEM

8 *Organisations*

8.1 ORG-0001
Official name: GEMEENTE HAARLEM
Registration number: 927684430
Postal address: GROTE MARKT 2
Town: Haarleem
Postcode: 2003 RN
Country subdivision (NUTS): Agglomeratie Haarlem (NL324)
Country: Netherlands
Email: vopejko@haarlem.nl
Telephone: +31-6-46215424
Internet address: www.haarlem.nl
Roles of this organisation:
Buyer
Review organisation

8.1 ORG-0003
Official name: ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO
Registration number: 937551658
Postal address: VYSOKOSKOLAKOV 41
Town: ZILINA
Postcode: 010 08
Country subdivision (NUTS): Žilinský kraj (SK031)
Country: Slovakia
Email: kostolny@isemi.sk
Telephone: +421910850285
Internet address: http://www.isemi.sk
Roles of this organisation:
Buyer

11 *Notice information*

11.1 *Notice information*
Notice identifier/version: ffc443f2-0438-437b-94b5-74025d4253b9 - 01
Form type: Competition
Notice type: Contract or concession notice – standard regime
Notice dispatch date: 10/05/2024 08:00 +00:00
Languages in which this notice is officially available: English

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

11.2 *Publication information*

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 7. Contract Award Notice template

NETHERLANDS: RESEARCH AND DEVELOPMENT SERVICES AND RELATED CONSULTANCY SERVICES
PROTECT-PCP FOR THE CUSTOMISATION/PRE-OPERATIONALISATION OF PROTOTYPES OF END-USER SERVICES IN THE AREA OF CLIMATE CHANGE

Contract or concession award notice – standard regime

1 *Buyer*

1.1 *Buyer*
Official name: Gemeente Harlem (HAA)
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO (ISEMI)
Legal type of the buyer: Body governed by public law, controlled by a central government authority
Activity of the contracting authority: Public order and safety

2 *Procedure*

2.1 *Procedure*
Title: PROTECT-PCP for the Customisation/Pre-Operationalisation of prototypes of end-user services in the area of Climate Change
Description: The PCP of R&D services is a competitive procedure in 3 phases: Phase 1 solution design, Phase 2: Prototype development and Phase 3: testing and validation of prototypes. The tender documents can be downloaded in the following [link]. This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592.
Procedure identifier: 4554272e-ba6f-4f6a-9901-5291fba48173
Type of procedure: Open

2.1.1 *Purpose*
Main nature of the contract: Services
Main classification (cpv): 73000000 Research and development services and related consultancy services

2.1.4 *General information*
Legal basis:
Directive 2014/24/EU

5 *Lot*

5.1 *Lot technical ID*: LOT-0001
Title: Not applicable
Description: Not applicable
Internal identifier: Not applicable

5.1.1 *Purpose*
Main nature of the contract: Services

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Main classification (cpv): 73100000 Research and experimental development services

5.1.6 *General information*

Procurement Project fully or partially financed with EU Funds.

The procurement is covered by the Government Procurement Agreement (GPA): *no*

5.1.10 *Award criteria*

Criterion:

Type: Quality

Description: Not applicable

Description of the method to be used if weighting cannot be expressed by criteria: Not applicable

5.1.12 *Terms of procurement*

Information about review deadlines: N/A

5.1.15 *Techniques*

Framework agreement:

Framework agreement, with reopening of competition

Information about the dynamic purchasing system:

No dynamic purchase system

5.1.16 *Further information, mediation and review*

Mediation organisation: North Holland District Court

Review organisation: North Holland District Court

Organisation providing more information on the review procedures: North Holland District Court

6 *Results*

6.1 *Result lot Identifier*: LOT-0001

At least one winner was chosen.

8 *Organisations*

8.1 ORG-0001

Official name: Gemeente Harlem (HAA)

Registration number: 927684430

Department: Program and Area Management

Postal address: Grote Mark 2

Town: Haarlem

Postcode: 2003 RN

Country subdivision (NUTS): Agglomeratie Haarlem (NL324)

Country: Netherlands

Contact point: Valentina Schippers-Opejko

Email: vopejko@haarlem.nl

Telephone: +31-6-46215424

Internet address: www.haarlem.nl

Roles of this organisation:

Buyer

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

8.1 ORG-0002

Official name: ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO (ISEMI)
Registration number: 937551658
Department: ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO
Postal address: VYSOKOSKOLAKOV 41
Town: ZILINA
Postcode: 010 08
Country subdivision (NUTS): Žilinský kraj (SK031)
Country: Slovakia
Contact point: Martin Kostolny
Email: kostolny@isemi.sk
Telephone: +421910850285
Internet address: www.isemi.sk
Roles of this organisation:
Buyer

8.1 ORG-0003

Official name: North Holland District Court
Registration number: 0000000
Postal address: Simon de Vrieshof 1
Town: Haarlem
Postcode: 2019 HA
Country subdivision (NUTS): Agglomeratie Haarlem (NL324)
Country: Netherlands
Email: communicatie.rb-nho@rechtspraak.nl
Telephone: +31 88 - 361 61 00
Internet address: https://www.rechtspraak.nl/English/Contact/Pages/Contact-information-of-the-courts.aspx
Roles of this organisation:
Review organisation
Organisation providing more information on the review procedures
Mediation organisation

11 *Notice information*

11.1 *Notice information*

Notice identifier/version: 897f635e-4f5c-42e3-b50a-fa3439b286b7 - 01
Form type: Result
Notice type: Contract or concession award notice – standard regime
Notice dispatch date: 13/05/2024 15:24 +00:00
Languages in which this notice is officially available: English

11.2 *Publication information*

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 6. Tender documents template

PCP-WISE Tender Documents (TD1 to TD15)

Lead beneficiary: CPS

Dissemination level: Sensitive

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

DISCLAIMER: This document consists of draft Tender Documents for a Pre-Commercial Procurement which require finetuning and tailoring to include the reference to the laws and regulations of the Lead Procurer MS and the respective consortium.

Project acronym	PROTECT
Project title	Preparing a Pre-Commercial Procurement for end-user services based on Environmental Observation to adapt and mitigate climate change
Thematic priority	HORIZON-CL6-2021-GOVERNANCE-01
Type of action	SEN - Sensitive
Deliverable number and title	D3.3 Report of results of WP3 – Tender documents
Work package	WP3
Due date	31/05/2024
Submission date	30/05/2024
Start date of the project	01/06/2022
End date of the project	30/06/2024
Deliverable responsible partner	Corvers Procurement Services B.V. (CPS)
Version	V1
Status	Final
Author(s) name(s)	Analucia Jaramillo (CORVERS), Beatriz Gómez Fariñas (CORVERS), Stephan Covers (CORVERS); Abed El Maijd Nasser (CORVERS); Azra Atalan (CORVERS); Dionysios Pelekis (CORVERS); Katerina Nikolaidou (CORVERS GREECE); Maria Niniatsoudi (CORVERS GREECE), Spyrangelos Georgatos (CORVERS GREECE); Maria Kampa (CORVERS GREECE), Egli Rrokaj (CORVERS GREECE).
Contributing partners	Melissa Campagno (GAC)
Reviewer(s)	Melissa Campagno (GAC)
Document type	R – Report
Dissemination level	SEN – Sensitive

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Disclaimer

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Versioning and contribution history			
Version	Date	Modified by	Comments
0.1	14-08-2023	Ana Lucia Jaramillo (CORVERS)	Draft version
0.2	25-02-2024	Ana Lucia Jaramillo (CORVERS)	Draft version update
0.3	17-02-2024	Ana Lucia Jaramillo (CORVERS)	Draft version update
0.4	09-04-2024	Ana Lucia Jaramillo (CORVERS)	Draft version update
0.5	18-04-2024	Katerina Nikolaidou (CORVERS); Maria Niniatsoudi (CORVERS).	Draft version review
0.6	22-04-2024	Beatriz Gómez Fariñas (CORVERS)	Draft version review
0.7	29-04-2024	Ana Lucia Jaramillo (CORVERS)	Draft version update
1.0	30-05-2024	Ana Lucia Jaramillo (CORVERS), Melissa Campagno (GAC)	Final version and final quality review

Project abstract

PROTECT aims at levering innovation procurement to unlock the climate service (CS) market's potential to support urgent climate adaptation and mitigation. The project will allow public and private organisations to build up and integrate their knowledge and skills about climate change, environmental observation (EO) and innovation procurement, notably enabling public authorities to shift to a proactive governance model, using innovative public procurement approaches to increase value and climate impact for money. It shall increase access of CS SME providers across Europe to public procurement markets and shape solutions that best address public demand, both specific and systemic. The initial focus will be on five encompassing application domains (Utilities, Green cities, Health, Land use & Marine environment, and Security) and their contributions to the areas of sustainability in Horizon Europe's Cluster 6. The project will source and assess existing and high-potential CS solutions and technologies that use EO data. It will engage with an extensive and varied community of procurers, inform the definition and aggregation of their needs and functional requirements for CS, explaining, fostering and supporting a 'buying with impact' approach. Clearer, less fragmented demand shall guide and support R&D for future CS. PROTECT will prepare the operational ground for one or more joint, cross-border or coordinated pre-commercial procurement (PCP) processes and identify short-term actions so that Public Procurement of Innovative Solutions (PPI) can be activated towards or right after the project's end. At policy level, it will provide decision-makers for procurement, climate and policy, at EU, national, regional and local levels, with practical recommendations and guidelines to boost the use of innovation procurement for climate action.

Keywords

Pre-Commercial Procurement (PCP), Request For Tenders (RFT), Framework Agreement (FA), Specific Phase Contract, Exclusion, Selection, Award and Compliance Criteria, Evaluation, Intellectual Property Rights (IPR).

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

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Abbreviations and Acronyms

AI	Artificial Intelligence
AKIS	Agricultural Knowledge and Innovation Systems
COTS	Commercial Off-The-Shelf
CS	Climate Services
EAFIP	European Assistance For Innovation Procurement
EO	Earth Observation
EOOS	European Global Ocean Observing System
ESA	European Space Agency
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FRAND	Fair, Reasonable and Non-Discriminatory
GEO	Group on Earth Observation
GEOSS	Global Earth Observation System of Systems
GDPR	General Data Protection Regulation
GPA	Agreement on Government Procurement
HAA	City of Haarlem
HE	Horizon Europe
IPRs	Intellectual Property Rights
IoT	Internet of Things
KCEO	Knowledge Centre on Earth Observation
KPI	Key Performance Indicator
NDA	Non-Disclosure Agreement
OMC	Open Market Consultation
PBG	Public Buyers Group
PC	Project Coordinator
PCP	Pre-Commercial Procurement

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PIN	Prior Information Notice
R&D	Research and Development
SMEs	Small and Medium Enterprises
SOTA	State Of The Art
TCO	Total Cost of Ownership
TED	Tenders Electronic Daily
TRL	Technology Readiness Level
WTO	World Trade Organization

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PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

PCP TENDER DOCUMENT 1

REQUEST FOR TENDERS (TD1)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

This Request for Tenders, designated as Tender Document 1 (TD1), should be read in conjunction with other Tender Documents related to this PCP, listed hereunder:

Tender Document 2 (TD 2): Framework Agreement
Tender Document 3 (TD 3): PCP Specific Contract for Phase 1
Tender Document 4 (TD 4): PCP Specific Contract for Phase 2
Tender Document 5 (TD 5): PCP Specific Contract for Phase 3
Tender Document 6 (TD 6): PCP End of Phase (1, 2, 3) report
Tender Document 7 (TD 7): Contractor details and Project abstracts
Tender Document 8 (TD 8): Technical Offer
Tender Document 9 (TD 9): Financial Offer & Cost Breakdown
Tender Document 10 (TD 10): Declaration of Honour
Tender Document 11 (TD 11): Declaration of Honour Russia
Tender Document 12 (TD 12): Consortia Statement
Tender Document 13 (TD 13): Subcontracting Statement
Tender Document 14 (TD 14): Legal Capacity of the Technology Provider Statement
Tender Document 15 (TD 15): Declaration of pre-existing rights

And Annexes:
Annex 2. Use cases
Annex 3. Checklist of documents and actions
Annex 4. Information about the Public Buyers Group
Annex 5. Preexisting rights of the Public Buyers Group
Annex 6. List of environmental, social and labour law obligations established by EU law, national legislation, collective agreements or the international environmental, social and labour conventions which Bids must comply with.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PREFACE

This PCP-WISE Request for Tenders (RFT) invites all interested parties to present their offers to customize/pre-operationalize water intelligence innovations from space for European climate resilience.

The project, spanning phases from solution design to field validation targeting TRL 8, aims to address water-related crises (floods, fires, infrastructure impacts) using space and Earth Observation data.

With climate change impacting water availability and distribution, PCP-WISE seeks to enhance EO-based information for better regional water management, promoting resilience across EU borders. In this sense, PCP-WISE expects to obtain water intelligence solutions to: predict, prevent, mitigate and manage water-related crises, driven by a unified water taxonomy and Earth observation-based modelling. Through comprehensive research and development solutions, PCP-WISE wishes to boost adaptation across the EU, targeting stakeholders in water management, environment, first responders, cities, and agriculture.

PCP-WISE is a research & development (R&D) services procurement which is conducted through a Pre-Commercial-Procurement (PCP).

The Request for Tenders (RFT) in Tender Document 1 (TD) contains the following sections:

Section 1. General Context and Background: provides the underlying rationale of PCP-WISE, and explains the PCP approach and how it differs from traditional procurement.

Section 2. Tender Profile: introduces the tender profile, including the description of the services to be procured, overall Water intelligence challenge this PCP must address and the motivation behind it. It explains the different phases of the PCP and the expected outcome of each phase. In addition, a general introduction to the procurers involved (also referred to as 'Buyers Group') is provided. This Section also provides with an overview of the timeline, budget, and procurement approach. Finally, Intellectual Property Right (IPR) considerations are addressed.

Section 3. Evaluation of Tenders: explains the preconditions for submitting a Tender, and an overview of the criteria to be used in the evaluation of the Tenders. The processes for the evaluation is also explained in this section.

Section 4. Content and Format of Tenders: describes how the bids should be presented in the administrative, technical and financial sections. It also explains the conditions of the contracts between the winning Tenderers and the Buyers Group, including the monitoring process, results evaluation, payment conditions and communication with the Buyers Group.

Section 5. Miscellaneous: addresses issues such as language, bidding offer, communication, confidentiality, cancellation of the tender and the procedures for appeal.

This PCP-WISE procurement is part of a project that is funded by Horizon Europe Research and Innovation Programme, under Grant Agreement *[number] (project website)]*

The contracts are therefore subject to additional rules based on the EU GA No [ ]

Attention: The EU (and/or any of its services) is not participating as a Contracting Authority in this procurement.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP REQUEST FOR TENDERS (TD1)

1. GENERAL CONTEXT AND BACKGROUND

This Pre-Commercial Procurement (PCP) is a cross-border joint procurement of R&D services to reinforce public demand driven innovation in end-user services in the area of Climate Change Adaptation and Mitigation. Solutions are expected to achieve TRL 7-8. The PCP should deliver successful innovative and fully tested product(s) and/or service(s) that meet the common needs of the Public Buyers Group (PBG) to procure research, develop innovative marketable solutions, speed up the time-to-market and provide best value for money.

More concretely, PCP-WISE aims to customize/pre-operationalize water management innovations from space for European climate resilience through PCP. The project, spanning phases from solution design to field validation, targets TRL 8. It addresses water-related crises (floods, fires, infrastructure impacts) using space and Earth Observation data. Objectives include common operational information products, interoperability mechanisms, and an active user network. With climate change impacting water availability and distribution, PCP-WISE seeks to enhance EO-based information for better regional water management, promoting resilience across EU borders.

PCP-WISE focuses on local dynamics in water availability and aims to anticipate extreme climate conditions through an integrated water intelligence system. It's significance lies in its potential to mitigate water-related crises, driven by a unified water taxonomy and Earth observation-based modelling. Through comprehensive research and development solutions, PCP-WISE aims to boost adaptation across the EU, targeting stakeholders in water management, environment, first responders, cities, and agriculture. The project's objectives are designed to address business, technical, economic, and policy goals. Key results include capacity-building efforts, climate-related inputs, stakeholder engagement, and the dissemination of innovative solutions to advance water resilience both locally and globally.

PCP-WISE aims to contribute to the European Green Deal related domains and benefit from further deployment, uptake and exploitation of Environmental Observation data and products. Furthermore, it will be contributing to fit-for-purpose Environmental Observation Systems and a strengthened Global Earth Observation System of Systems (GEOSS). The project must use satellite-based earth observation, positioning, navigation and/or related timing data and services of Copernicus and/or Galileo/EGNOS (although other data and services may additionally be used).

The joint PCP will include activities for awareness raising, networking, training, evaluation, validation and dissemination of results, to which providers are expected to cooperate.

The PCP builds on the outcomes coming from the PROTECT project funded under HORIZON-CL6-2021-GOVERNANCE-01-15: Preparing for pre-commercial procurement (PCP) for end-user services based on environmental observation in the area of climate change adaptation and mitigation (the PROTECT project), the work done previously under Horizon 2020 and Horizon Europe (e.g., from e-shape, climate service projects and downstream services projects), and GEOSS initiatives.

The jointly identified challenge fit into the mid-to-long-term innovation plans of the PBG. The Open Market Consultation carried out in the context of PROTECT confirmed that solutions currently available on the market or under development are not meeting their needs of the end-to-end solutions as expressed in the challenges above, to tackle concrete targets for the desired functionality/performance improvement in the quality and efficiency of their public services.

Moreover, the future solutions should take advantage of the use, uptake, and deployment of environmental observations as well as digital and data-based green solutions, assessed through the European Green Deal's 'do no harm' principle, to contribute to innovative governance models and for designing, implementing and monitoring science-based policy.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Innovative governance

The project to be carried out under the HE-funded PCP should contribute to innovative governance supporting the European Green Deal objectives recognizing, coping with and promoting resilience and inclusiveness in the face of on-going shocks and disruptions across Europe and the world, whether these be climatic, ecological, economic, social, geopolitical or related to agricultural inputs and resources, food, health, bio-based sectors or the wider bioeconomy. The creation of networks with the public (citizen engagement) and researchers, including also through digital technologies, can step up transformation and enhance resilience in different areas.

Critical risk assessment and reduction strategies need to be incorporated, including the diversification of infrastructures, resources and knowledge through more self-sufficiency and autonomy.

Environmental observation

The results of the PCP should deploy and add value to environmental observations. Data and information obtained through environmental observation is of great value when assessing the state of the planet and is crucial to supporting the European Green Deal and the climate and ecological transitions.

It is foreseen the integration of information from different sources (space-based, airborne including drones, in-situ and citizens observations) with other relevant data and knowledge while ensuring (better) accessible, interoperable or deployable information for shaping the direction of policy development with a link to Copernicus, the European Earth observation and monitoring part of the EU Space programme and the European Space Agency's (ESA) Earth observation programme, as well as support to the Group on Earth Observation (GEO), its European regional initiative (EuroGEO), the Global Earth Observation System of Systems (GEOSS) and the European Commission initiative Destination Earth.

R&D activities relevant to the ocean, seas and coastal waters will complement and support the UN Decade of Ocean Science for Sustainable Development and the UN Decade on Ecosystem Restoration, the G7 Future of the Seas and Oceans Initiative, the European Global Ocean Observing System (EOOS) and the GOOS 2030 strategy.

Digital and data-based innovation

Digital and data-based innovation, in complementarity with the Digital Europe Programme, should bring benefits for citizens, businesses, researchers, the environment, society at large and policymakers. The potential of the ongoing digital transformation, and its wider impacts – both positive and negative – need to be better understood and monitored in view of future policy design and implementation, governance, and solution development.

The potential for digital and data technologies, including AI, IoT, and augmented reality-based solutions, should be applied to increase the sustainability and resilience of production and consumption systems, as well as industry and services.

Solutions should contribute to the development, support and take up of innovative digital and data-based solutions to support communities, economic sectors and society at large to achieve sustainability objectives. The focus is on overall sustainable solutions tailored to the needs of end-users and/or the systems. More specifically, R&D activities will contribute to economic circularity by promoting reuse of materials and waste reduction, adding value to existing knowledge and increasing cost-effectiveness, safety and trustworthiness of innovative environmentally friendly technologies in and across primary production sectors, food systems, bio-based sectors, bioeconomy, and sectors related to the oceans and biodiversity.

Particular attention should be given to precision and collaborative technologies and contribute to the human-centric twin green and digital transitions. This is a key policy objective that is also supported by the cross-cutting objective of the EU digital strategy, the European industrial strategy, the circular economy action plan, the SME strategy and the European data strategy.

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Strengthening Agricultural Knowledge and Innovation Systems (AKIS)

Knowledge and advice to all relevant actors are key to improving sustainability. For instance, primary producers have a particular need for impartial and tailored advice on sustainable management choices. AKIS go beyond agriculture, farming and rural activities and cover environment, climate, biodiversity, landscape, bioeconomy, consumers and citizens, i.e. all food and bio-based systems including value chains up to the consumer. Effective AKIS is a key driver to bridge the gap between science and practice and to enhance co-creation. This will speed up innovation and the take-up of results needed to achieve the European Green Deal objectives and targets.

Where appropriate, proposals are encouraged to cooperate with the European Commission Knowledge Centre on Earth Observation (KCEO)).

Social innovation

Social innovation is also relevant when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake. It is envisaged the coordination with European Space Agency (ESA) actions so that ESA space data and science can be proactively integrated into the relevant research actions.

In this context, the common challenge will be tackled through this **Pre-Commercial Procurement procedure** to develop innovative solutions in the area of Climate Change using Earth Observation (EO) data.

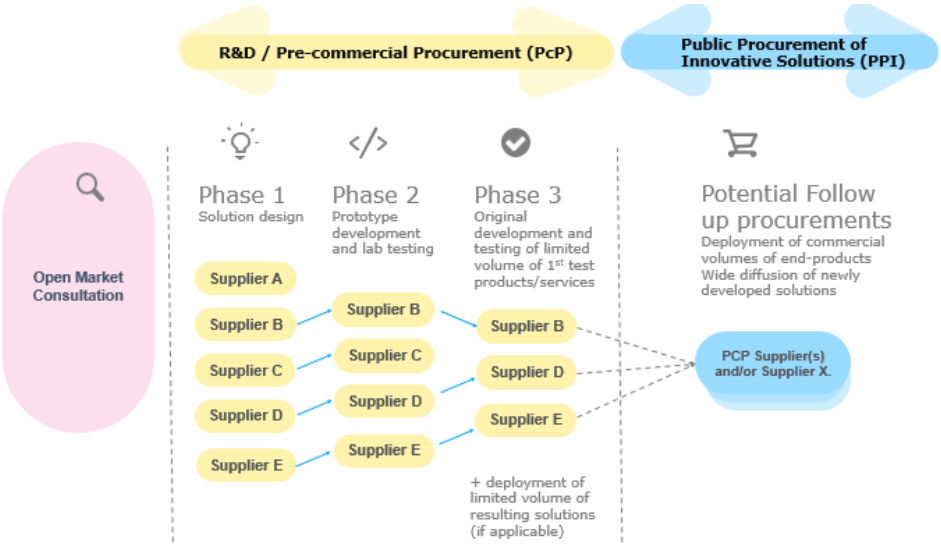

Figure 1. PCP phased process and a follow up PPI

PCP is characterised by the following five **features**:

1. Competitive development in phases to identify the solutions offering the best value for money

PCP targets situations that require radical innovation or R&D and for which there are typically no solutions on or close to the market yet. Different competing providers may have different ideas for solutions to the problem. As R&D is yet to take place, there is not yet any proof as to which of these potential alternative solutions would best meet customers' needs.

CP therefore awards R&D contracts to a number of competing contractors at the same time, in order to compare different approaches to solving the problem. It thus offers innovators an opportunity to show how well their solution compares with others. It also allows a first customer test reference to be obtained from countries of the procurers that will test the solutions.

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The R&D for this PCP is split into 3 phases (Phase 1: solution design, Phase 2: prototyping and lab testing, Phase 3: original development, installation, wider field testing and validation of a limited set of 'first' products or services).

Evaluations after each phase will progressively identify the solutions that offer the best value for money and meet the customers' needs. This phased approach allows successful contractors to improve their offers for the next phase, based on lessons learnt and feedback from procurers in the previous phase. Using the phased approach with gradually growing contract sizes per phase will also make it easier for smaller companies to participate in the PCP and enable SMEs to grow their business step-by-step with each phase.

Depending on the outcome of the PCP (whether it will result in innovative solutions that meet the tender requirements and offer good value for money), procurers may or may not decide to follow-up the PCP with a public procurement to deploy the innovative solutions (PPI).

2. Public procurement of R&D services

PCP addresses mid- to long-term public procurement needs for which either no commercially stable solutions yet exist on the market, or existing solutions exhibit structural shortcomings which require further R&D to resolve. PCP is a way for procurers to trigger the market to develop new solutions that address these shortcomings. PCP focuses on specific identified needs and provides customer feedback to businesses from the early stages of R&D. This improves the likelihood of commercial exploitation of the newly developed solutions.

PCP is explained in the PCP communication COM/2007/799 and the associated staff working document SEC/2007/1668. The R&D services can cover research and development activities ranging from solution exploration and design, to prototyping, right through to the original development of a limited set of 'first' products or services in the form of a test series. Original development of a first product/service may include limited production/supply in order to incorporate the results of field-testing and demonstrate that the product/service is suitable for production/supply in quantity to acceptable quality standards. R&D does not include quantity production or supply to establish the commercial viability or to recover R&D costs.[1] It also excludes commercial development activities such as incremental adaptations or routine/periodic changes to existing products, services, production lines, processes or other operations in progress, even if such changes may constitute improvements.

3. Open, transparent, non-discriminatory approach — No large-scale deployments

Unless there are specific participation and/or control restrictions *(see section 3.1)*, PCP procurements are normally open at least to all operators in EU Member States or HE associated countries, on equal terms, regardless of the size, geographical location or governance structure.

Access is extended to operators from WTO GPA signatory countries and other third countries if there are not sufficient operators in EU Member States or associated countries that can perform the R&D work (*see section 3.1*).

In all cases, there is, however, a place of performance requirement that a predefined minimum percentage of the contracted R&D services must be performed in EU Member States or Horizon Europe associated countries (or a more restricted list of countries; *see section 3.1*).

All communication (before, during and after the procurement) will normally be carried out in English (and other languages, if mentioned in section 5).

Any subsequent public procurement of innovative solutions (PPI), for the supply of commercial volumes of the solutions developed in the PCP, will be carried out under a separate procurement procedure.

[1] See also Article XV(1)(e) WTO GPA 1994 and the Article XIII(1)(f) of the revised WTO GPA 2014.

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Participation in the PCP is thus not a prerequisite for the provisioning of a solution on a commercial scale.

4. Sharing of IPR-related risks and benefits under market conditions

PCP procures R&D services at market price, thus providing contractors with a transparent, competitive and reliable source of financing for the early stages of their research and development.

Giving each contractor the ownership of the IPRs attached to the results (foreground) they generate during the PCP means that they can widely exploit the newly developed solutions commercially. In return, the tendered price must contain a financial compensation for keeping the IPR ownership — compared to the case where the IPRs would be transferred to the procurers (the tendered price must be the 'non-exclusive development price'). Moreover, the procurers must receive license-free rights to use the R&D results for internal use, and licensing rights subject to certain conditions.

The contractors also retain ownership of their background rights (albeit subject to certain rights of use by the procurers, see section 2.7).

- **For more information, *see PCP on the Europa website*.**

5. Exemption from EU Public Procurement Directives, WTO Government Procurement Agreement (GPA) and EU state aid rules

PCP procurements are exempted from the EU Public Procurement Directives because the procurers do not retain all the benefits of the R&D (the IPR ownership stays with the contractors).[2]

They are also exempted from the WTO Government Procurement Agreement (GPA) because this Agreement does not cover R&D services[3] (— the PCP being limited to such services and any subsequent PPI procurements relating to commercial-scale supply of such solutions not being part of the PCP procurement).

PCP procurements do not constitute state aid under the EU state aid rules[4] if they are implemented as defined in the PCP communication[5], namely by following an open, transparent, competitive procedure with risk- and benefit-sharing at market price. The division of all rights and obligations (including IPRs) and the selection and award criteria for all phases must be published at the outset; the PCP must be limited to R&D services and clearly separated from any potential follow-up PPI procurements; PCP contractors may not be given any preferential treatment in a subsequent procurement for provision of the final products or services on a commercial scale.

Other things to know

The start of this PCP procurement was proceeded by an open market consultation *(see summary and Q&A on [https://www.protect-pcp.eu/relevant-resources/]* .

This procurement is part of a project that is funded by the European Union's Horizon Europe Research and Innovation Programme, under grant agreement No [insert number] — [insert project acronym] *(see [insert project website])*.

2 See Article 16(f) of Directive 2004/18/EC (Article 14 of Directive 2014/24/EU), Article 24(e) of Directive 2004/17/EC (Article 32 of Directive 2014/25/EU) and Article 13(f)(j) of Directive 2009/81/EC.

3 See the EU's Annex IV of Appendix I to the WTO GPA.

4 See Point 33 of the Commission Communication on a framework for state aid for research and development and innovation (C(2014) 3282).

5 Commission Communication: Pre-Commercial Procurement: driving innovation to ensure sustainable, high quality public services (COM(2007) 799) and PCP staff working document (SEC(2007)1668).

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2. TENDER PROFILE

2.1 Description of services to be procured

PCP challenge

The challenge of PCP-WISE consists of the development, testing and field validation of innovative water intelligence solutions beyond the state of-the-art for climate adaptation using space and EO (Earth Observation)-based information to predict, prevent, mitigate and manage water-related crises (floods, fires, infrastructure impacts). The general objective is to be more climate resilient through a better EO-based information position and alignment.

The objectives of PCP-WISE include common operational information products, interoperability mechanisms, and an active user network. With climate change impacting water availability and distribution, PCP-WISE seeks to enhance EO-based information for better regional water management, promoting resilience across EU borders. PCP-WISE focuses on local dynamics in water availability and aims to anticipate extreme climate conditions through an integrated water intelligence system.

The significance of PCP-WISE lies in its potential to mitigate water-related crises, driven by a unified water taxonomy and Earth observation-based modelling. Through comprehensive research and development solutions, PCP-WISE aims to boost adaptation across the EU, targeting stakeholders in water management, environment, first responders, cities, and agriculture.

Following the results of PROTECT CSA, it became apparent that the Water intelligence challenge aligns with the long-term innovation goals of public organisations and supporting stakeholders. In this sense, PCP-WISE will address the development of new technologies to improve the functions of mapping, predicting, preventing, restoring and adapting.

In this context, the PCP aims to achieve the:

a) Customization/pre-operationalisation of prototypes of services in the area of Climate Change Adaptation and Mitigation contributing to the European Green Deal related domains validated by end-users.
b) Exploitation of Environmental Observation data and products.
c) Contribution to fit-for-purpose Environmental Observation Systems and a strengthened Global Earth Observation System of Systems (GEOSS).
d) Potentialization of digital and data technologies, including AI, IoT, and augmented reality-based solutions to increase the sustainability and resilience of production and consumption systems, as well as industry and services.
e) Development, support and take up of innovative digital and data-based solutions to support communities, economic sectors and society at large to achieve sustainability objectives.
f) Sustainable solutions tailored to the needs of end-users and/or the systems.
g) Solutions that contribute to economic circularity adding value to existing knowledge and increasing cost-effectiveness, safety and trustworthiness of innovative environmentally friendly technologies.
h) Solutions that contribute to the human-centric twin green and digital transitions.
i) Solutions that contribute to strengthening the Agricultural Knowledge and Innovation Systems (AKIS).

Scope of the R&D services to be procured

This procurement is for R&D services to develop Water intelligence solutions beyond the state-of-the-art solutions. The specific functional and performance requirements are explained in the use cases of Annex 1.

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PCP-WISE focuses especially on better regional water management, promoting resilience across EU borders understanding that weather conditions lead to extreme local water-related crises.

For the envisaged development of an integral Water intelligence system (using EO data) as a prerequisite to anticipating extreme climate conditions and their potential impacts on society, the organisation and governance of PCP-WISE foresees different groups of users, notably: (a) water management agencies; (b) environmental agencies; (c) first responders; (d) sustainable and resilient cities; (e) agricultural agencies.

In the abovementioned context, the intention is that the PCP project focuses especially on the local regions and their soil-water-vegetation conditions and their local dynamics in water availability for the aforementioned sectors. When local weather conditions lead to extreme (long) drought spells (lack of rain) or high temperature the pressure on the soil-water system will increase with all kinds of consequences and ultimately crises situations. And when weather conditions lead to extreme local (high intensity and/or long lasting) rains the soil-water system cannot cope with and store the abundance of water with impacts to rural and urban infrastructure from runoff, erosion, and inundation. Factors with no physical origin also apply - due to land use, urban sprawling, territorial development patterns, but also usage and behaviours, all factors that do not originate directly in climate change but have a much more critical impact due to climate change and to the partial or downright insufficient awareness of the consequences of such choices in a context of climate change with accelerating consequences.

In this regard, PCP-WISE seeks to leverage Earth observation-based modelling as it holds significant potential for managing and mitigating water dynamics' societal impacts. For this purpose, the Water intelligence challenge comprises a selection of representative use cases and stakeholders across Europe to guide the procurement process and ensure harmonization in standards.

The main quality/efficiency improvements sought for are set by the selected use cases: [indicate the target quality/efficiency and/or functionality/performance improvements, compared to the current best available solutions, *e.g. 30 % energy efficiency improvement, interoperability*].

- To use satellite data for water intelligence to obtain day-to-day operational information.
- To mitigate extreme climate situations and its consequences by data analysis and modelling.

In this context, PCP-WISE aims to steer the European market to make synergies for the development of solutions based on the functional needs identified from the demand side. Through the Pre-commercial Procurement process, several contractors will be able to compete in the creation of innovative solutions, opening the possibility for researchers and companies to work on future technologies and services that will contribute to more sustainable processes, while fostering new business opportunities to the commercialisation of products and services. The functional specifications and technical requirements will be aligned with the destination topics on innovative governance, environmental observations and digital solutions in support of the Green Deal, and deploying and adding value to environmental observations, as well as contributing to the Agricultural Knowledge and Innovation Systems (AKIS) by having relevant use cases.

The PCP phases

The R&D for PCP-WISE will be split into 3 phases (Phase 1: solution design, Phase 2: prototyping and lab testing, Phase 3: original development, installation, wider field testing and validation of a limited set of ‘first’ products or services).

PCP PHASE 1 – SOLUTION DESIGN [4 months]: During this phase, the contractors will be asked to describe the solution providing the complete architecture and design thereof and verifying the technical, economic and organisational feasibility of their solution to address the PCP challenge.

PCP PHASE 2 – PROTOTYPE DEVELOPMENT (and testing of technologies) [9 months]: This phase concerns the development of the first prototypes of the solutions, which will be tested. Contractors will develop a first prototype based on the design documents delivered in the previous phase and test their solutions in lab conditions. Prototypes will be tested and verified to provide a measure of the technical performance of each solution in a controlled environment. During and at the end of phase 2,

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the PBG will request from the contractors a series of deliverables in order to evaluate their progress and the performed activities and obtained results, as well as an end of phase report.

PCP PHASE 3 – VALIDATION AND DEMONSTRATION OF THE SOLUTIONS (end-users piloting services in operational environment) [6 months]: This phase will validate the final solutions in diverse conditions, using the detailed scenarios and processes developed in the verification and validation strategy. During phase 3, a feedback mechanism will be established between the PBG and the selected contractors in order for the latter to receive requests for improvements directly from the end users. The PBG will request from the contractors an Integration Report. Finally, a Field Acceptance Report related to the accomplishment that the two final solutions which have been deployed and that the validation tests have been successfully performed in a real operational environment will be requested.

Evaluations by the relevant committee after each phase will progressively identify the solutions that offer the best value for money and meet the customers' needs. This phased approach allows successful contractors to improve their offers for the next phase, based on lessons learnt and feedback from procurers in the previous phase.

The PCP budget, with the maximum per phase and contractor, is shown in the Table in section 2.5. The reasoning for the PCP budget allocation with emphasis in Phase 2 is based on the complexity of the technology and the development required given the multiple layers and use cases that will be clustered and tackled in Phase 2.

Drivers behind the PCP to improve the quality and efficiency of the public services

The Water intelligence challenge is underpinned by the fact that climate change has more and more consequences on our water availability and distribution and with that an increasing impact to our daily European life. The European River basins are a result of melting snowpacks of the European mountainous areas (upstream) and local rainwater (along the river basin). Both sources of water are under constant change due to dynamics in (extreme) weather patterns and regressing/decreasing snow areas and glaciers in the mountains. As the main European rivers are sharing their basins/tributaries amongst the various European country borders (Rhine, Danube, Meuse, etc.), it is important to cooperate with each other in terms of managing the sparse fresh water along the whole extent of the basin. A joint European water intelligence is required within the basin area, between the countries (cross border) and between the water management areas/administrations.

The distribution of water along the river basin and the dynamic weather patterns (rain/temperatures/wind) requires a joint water management strategy based on an overall local monitoring of the soil-water-vegetation-atmosphere system. The core is the water balance of this system, which can be actualised locally and spatially by using a day-to-day regular frequent EO-based hydrological modelling validated by local inspections and knowledge of water management authorities. The Copernicus River Basin monitoring system (EFAS) on (supra) national level is a first good guess for the primary river systems in Europe and can provide the boundary conditions and prior general indication for the local situation in local river systems.

Across Europe, recent water system imbalances have led to extreme events and localized crises, underscoring the need for proactive crisis anticipation. Water managers in both rural and urban areas must employ common water intelligence garnered from regular monitoring across various scales. By being the first responders equipped with water intelligence, they can develop current spatial risk maps, aiding in crisis prioritization and refining risk reduction strategies.

A unified water taxonomy is essential for monitoring local water balance, crucial in anticipating climate change-induced crises. Leveraging Earth observation-based water balance modelling holds significant potential for managing and mitigating water dynamics' societal impacts. Integration of knowledge and capacity into matured operations, reaching Technology Readiness Level (TRL) 8, stands to benefit water, nature, agriculture, and urban managers alike. Therefore, the PCP-WISE strategy mandates comprehensive research and development of solutions, ranging from TRL5 to TRL8, necessitating collaboration among larger and smaller SME consortia.

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Climate change of the past decades has already had a major impact on water sources. This impact is expected to increase further in the future. Therefore, the need to integrate and monitor the anticipated and potential impacts of climate change in a structural and consequent manner seems imperative, as has been done in meteorology with weather parameters for more than a century. In PCP-WISE, demonstrations of potential solutions will take place across important sectors such as agriculture, nature, urban livelihoods, and safety in general, with information from integrated EO based service development in space and time.

In the preparation of PCP-WISE representative use cases been selected representing an important range of stakeholders across Europe that will guide the procurement process, ensuring harmonization in water intelligence standards. While those use cases generally start from short term issues encountered by the concerned stakeholders, climate change tends to increase their frequency, intensity and coupling with other issues it aggravates, resulting in long-term systemic crises.

The PCP may include the purchase of a limited set of *[*prototype(s)*][*and*][*or*][*first products or services*]* resulting from the R&D. The limited set of prototype(s)/first test products/services are needed for R&D purposes (*e.g. if the existing solution used by the procurers has to be destroyed in order to test the new solutions developed during the PCP and/or the procurers need to carry out further testing of the newly developed solutions after the PCP is finished)*.

[Explain clearly who is procuring which/how many prototypes/first products or services and where and when and to who they need to be delivered].

⚠ **PCP-WISE will award the tender on best value for money solutions, not to the lowest price only solutions, thus. NOT ONLY requirements regarding the price are considered, but also regarding quality improvements of the innovative solutions.**

The targets for the quality/efficiency improvements are set in the [Use Cases Annex specifications] so that they clearly enable to make a step-change beyond what currently available solutions are able to deliver. Annex 1 includes functional or performance-based specifications that include technical minimum requirements that innovative solutions must meet. The analysis on the shortcomings of solutions available on the market, the analysis of the needs of the procurers and the outcome of the open market consultation can be found [here].

The specific requirements of the subsequent phases *(e.g. for phase 2: local technical and safety conditions where prototype testing is planned to take place at one of the procurers' labs; for phase 3: local technical, environmental, ethics and safety/security requirements for field-testing] are provided in Annex x.* The metrics or indicators that the procurers will use to evaluate and validate, at the end of each PCP phase, to what extent each competing solution has made progress towards reaching the targets are included in each use case (Annex 1).

The targets for the quality/efficiency improvements of the required solutions are set to enable a step-change beyond what currently available solutions are able to deliver. The functional or performance-based specifications (see Annex x) include technical minimum requirements that innovative solutions must meet. Based on specific use cases defined (see Annex x), it is possible to establish the shortcomings of solutions available on the market. The analysis of the needs of the procurers has set the grounds for the selected use cases, and the outcome of the open market consultation revealed the room for innovation and the technological gaps that can be tackle through R&D activities (see Annex x).

Tenderers should take into account the specific requirements of each of the PCP phases. For phase 2, the local technical and safety conditions of the place where the prototype testing is planned to take place at procurers' labs should be taken into account. For phase 3, the local technical, environmental, ethics and safety/security requirements for field-testing should be taken into account. The procurers will use metrics and indicators to evaluate and validate, at the end of each PCP phase, to what extent each competing solution has made progress towards reaching the targets (see Annex 1).

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Expected outcomes (per phase)

The following tables describe the objectives, the associated output, results and the tasks to be carried out (milestones and deliverables) for each of the PCP phases (solution design, prototyping, original development and testing of a limited set of 'first' products or services):

Expected outcomes (table for 3 phases)					
Phase 1: Solution design					
	Objective:	Perform research to: 1. elaborate the solution design and determine the approach to be taken to develop the new solutions and 2. demonstrate the technical, financial and commercial feasibility of the proposed concepts and approach to meet the procurement need			
	Output and results:	Solution design (Proof of Concept)			
	Milestones and deliverables		**By when?**	**How?**	**Output and results**
	Milestones:	M1.1) Kick off meeting	[dd.mm.yyyy] Start of the phase 1	[*e.g.sent by email to lead procurer, on-site visit*] Online meeting with procurer	Initial plan and project abstracts (in the format required by the EU for publication)
		M1.2) Follow up meeting	Mid of phase 1	Online meeting with procurer	Follow up on work performed
		M1.3) End of phase report	End of phase 1	Online meeting with procurer and report sent via email.	Solution design
	Deliverables:	D1.1) Plan for phase 1	First week of the start of phase 1	Send planning via email to contact person of procurer	Phase 1 plan and project abstracts (in the format required by the EU for publication)
		D1.1a) Presentation on activities	Week 4 of phase 1	Online meeting with procurer	Update on progress

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		D1.1b) Report on activities	Week 6 of phase 1	Online meeting with procurer	Deliverable report on progress
		D1.2) Solution design draft	Week 8 of phase 1	Present draft in online meeting with procurer	Progress draft of solution design
		D1.3) Update on activities	Week 12 of phase 1	Online meeting with procurer	Progress report of activities
		D1.3a) Update on activities	Week 14 of phase 1	Online meeting with procurer	Progress report on solution design
		D1.4) End of phase report and abstract	Week 16 of phase 1	Send end of phase report to procurer	End of phase report with the Solution Design and a section that explains the IPR measures taken by the contractors to protect the results and lists the names and location of personnel that carried out the R&D activities
		D1.5) End of phase report and abstract	End of phase 1	Send summary in the EU format for publication	A summary of the main results achieved by each contractor and conclusions from phase 1 (in the format required by the EU for publication)
Phase 2: Prototyping					

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	Objective:	Develop, demonstrate and validate prototypes in lab conditions			
	Output and results:	Solutions tested in lab of procurers based on use cases			
	Milestones and deliverables		**By when?**	**How?**	**Output and results**
	Milestones:	M2.1) Kick off meeting	[dd.mm.yyyy] Start of phase 2	[*e.g. sent by email to lead procurer, on-site visit*] Online/site meeting with procurer	Phase 2 planning and project abstracts (in the format required by the EU for publication)
		M2.2) Progress update	Week 2 of phase 2	Online meeting with procurer	Progress on plan
		M2.3) Progress update	Week 4 of phase 2	Online meeting with procurer	Progress on plan
		M2.4) Progress update	Week 6 of phase 2	Online meeting with procurer	Progress on plan
		M2.5) Progress update	Week 8 of phase 2	Online meeting with procurer	Progress on plan
		M2.6) Progress update	Week 10 of phase 2	Online meeting with procurer	Progress on plan
		M2.7) Progress update	Week 12 of phase 2	Online meeting with procurer	Progress on plan
		M2.8) Progress update	Week 14 of phase 2	Online meeting with procurer	Progress on plan
		M2.9) Start of testing	Week 16 of phase 2	Preparation of testing plan sent to contact person	Testing plan
		M2.10) Testing update	Week 18 of phase 2	Lab testing report	Test results
		M2.11) Testing update	Week 20 of phase 2	Lab testing report	Test results
		M2.12) Testing update	Week 22 of phase 2	Lab testing report	Test results
		M2.13) Testing update	Week 24 of phase 2	Lab testing report	Test results

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		M2.14) Testing update	Week 26 of phase 2	Lab testing report	Test results
		M2.15) Testing update	Week 28 of phase 2	Lab testing report	Test results
		M2.16) Testing update	Week 30 of phase 2	Lab testing report	Test results
		M2.17) End of phase	Week 32 of phase 2	End of phase online meeting	Report with and phase 3 planning
		M2.18) End of phase	Week 32 of phase 2	End of phase report sent to contact person	Testing report and phase 3 planning
		M2.19) Prptotype demonstration	End of phase 2	Prototype demonstration to the EU	A demonstration to the EU of the prototypes developed during phase 2
	Deliverables:	D2.1) Prototype and testing plan	Week 1 of phase 2	Online/site meeting on testing plan	Testing plan finetuned and project abstracts (in the format required by the EU for publication)
		D2.1a) Prototype and testing presentation	Week 1of phase 2	Online/site presentation	Testing plan finetuned
		D2.1b) Prototype and testing plan report	Week 2 of phase 2	Prototype and testing plan	Testing plan finetuned
		D2.2) Prototype testing report	Week 16 of phase 2	Online/site meeting on prototype testing results	Progress on prototype testing results
		D2.3) Prototype testing finetuning	Week 22 of phase 2	Online/site meeting of testing	Progress on prototype testing finetuning

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		D2.3a) Interim report on testing results	Week 30 of phase 2	Online/site meeting of testing and document sent to contact person	Report on testing results
		D2.4) End of phase report	Week 32 of phase 2	End of phase report sent to contact person	End of phase report with recommendation and a section that explains the IPR measures taken by the contractors to protect the results and lists the names and location of personnel that carried out the R&D activities
		D2.5) End of phase report and abstract	Week 32 of phase 2	Send summary in the EU format for publication	A summary of the main results achieved by each contractor and conclusions from phase 2 (in the format required by the EU for publication)
		D2.6) Demonstration	End of phase 2	Prototype demonstration to the EU	A demonstration to the EU of the prototypes developed during phase 2
	Points to be addressed in report:	Prototype design and testing plan. Finetuning of the plan based on recommendations. Results of the lab testing based on use cases and KPIs. Abstract and end-of phase report on the required template. A summary of the main results achieved by each contractor and conclusions from phase 2 (in the format required by the EU for publication)			

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Phase *[3]*: Development & testing					
	Objective:	Original development and field-testing of a limited set of first services in 5 testing sites located in 5 EU Member States *[products] [services]* (the test series)			
	Output and results:	Solutions tested in operational environments based on use cases in 5 sites			
	Milestones and deliverables		**By when?**	**How?**	**Output and results**
	Milestones:	M3.1) Kick off meeting	[dd.mm.yyyy] Start of phase 3	[*e.g. sent by email to lead procurer, on-site visit*] Online/site meeting with procurer	Phase 3 planning testing in operational environment and project abstracts (in the format required by the EU for publication)
		M3.2) Testing setup in operational site 1	Week 2 of phase 3	Online/site meeting with procurer	Finetuned plan for site 1
		M3.3) Testing progress in operational site 1	Week 3 of phase 3	Online/site meeting with procurer	Progress and test results in site 1
		M3.4) Testing progress in operational site 1	Week 4 of phase 3	Online/site meeting with procurer	Progress and test results in site 1
		M3.5) Testing progress in operational site 1	Week 5 of phase 3	Online/site meeting with procurer	Progress and test results in site 1
		M3.6) Testing setup in operational site 2	Week 6 of phase 3	Online/site meeting with procurer	Finetuned plan for site 2
		M3.7) Testing progress in operational site 2	Week 7 of phase 3	Online/site meeting with procurer	Progress and test results in site 2

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		M3.8) Testing progress in operational site 2	Week 8 of phase 3	Online/site meeting with procurer	Progress and test results in site 2
		M3.9) Testing progress in operational site 2	Week 9 of phase 3	Online/site meeting with procurer	Progress and test results in site 2
		M3.10) Testing setup in operational site 3	Week 10 of phase 3	Online/site meeting with procurer	Finetuned plan for site 3
		M3.11) Testing progress in operational site 3	Week 11 of phase 3	Online/site meeting with procurer	Progress and test results in site 3
		M3.12) Testing progress in operational site 3	Week 12 of phase 3	Online/site meeting with procurer	Progress and test results in site 3
		M3.13) Testing progress in operational site 3	Week 13 of phase 3	Online/site meeting with procurer	Progress and test results in site 3
		M3.14) Testing setup in operational site 4	Week 14 of phase 3	Online/site meeting with procurer	Finetuned plan for site 4
		M3.15) Testing progress in operational site 4	Week 15 of phase 3	Online/site meeting with procurer	Progress and test results in site 4
		M3.16) Testing progress in operational site 4	Week 16 of phase 3	Online/site meeting with procurer	Progress and test results in site 4
		M3.17) Testing progress in operational site 4	Week 17 of phase 3	Online/site meeting with procurer	Progress and test results in site 4
		M3.18) Testing setup in	Week 18 of phase 3	Online/site meeting with procurer	Finetuned plan for site 5

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		operational site 5			
		M3.19) Testing progress in operational site 5	Week 19 of phase 3	Online/site meeting with procurer	Progress and test results in site 5
		M3.20) Testing progress in operational site 5	Week 20 of phase 3	Online/site meeting with procurer	Progress and test results in site 5
		M3.21) Testing progress in operational site 5	Week 21 of phase 3	Online/site meeting with procurer	Progress and test results in site 5
		M3.22) Testing results in 5 sites	Week 22 of phase 3	Online/site meeting with procurer	Progress and test results of 5 sites
		M3.23) End of phase report	Week 23 of phase 3	End of phase online/site meeting	End of phase report with recommendations
		M3.24) Final report	Week 24 of phase 3	End of phase report sent to contact person	End of PCP report with recommendations
		M3.25) Summary of results	End of phase 3	End of phase report sent to contact person	A summary of the main results achieved by each contractor and conclusions from the PCP in the format required by the EU for publication.
	Deliverables:	D3.1) Plan to test solutions in operational	Week 1 of phase 3	Online/site meeting and testing plan	Testing plan finetuned and project abstracts (in

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		environments in 5 sites		sent to contact person	the format required by the EU for publication)
		D3.1a) Interim report on finetuned plan for 5 sites	Week 2 of phase 3	Online/site presentation	Testing plan finetuned
		D3.1b) Progress report of testing in site 1	Week 3 of phase 3	Progress report	Site 1 testing results
		D3.2) Progress report of testing in site 1 and 2	Week 10 of phase 3	Online/site meeting on service testing results	Progress on service testing results in site 1 and 2
		D3.3) Progress report of testing in site 3, 4 and 5	Week 22 of phase 3	Online/site meeting of testing	Progress on prototype testing finetuning
		D3.3a) Interim report on results of testing in 5 sites	Week 23 of phase 3	Online/site meeting of testing and document sent to contact person	Report on testing results
		D3.4) End of phase report	Week 24 of phase 3	End of phase report sent to contact person	End of phase report with recommendation and a section that explains the IPR measures taken by the contractors to protect the results and lists the names and location of personnel that carried out the R&D activities
		D3.5) Summary of results	End of phase 3	End of phase report sent to contact person	A summary of the main results

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					achieved by each contractor and conclusions from the PCP in the format required by the EU for publication.
		D3.6) Deadline for lessons learned	End of phase 3	Online meeting and deadline agreement	A deadline by which the contractors must agree on the text for the summary of overall lessons learnt and results achieved from the PCP, for publication
		D3.6) Demonstration of services	End of phase 3	Demonstration to the EU	A final demonstration to the EU of the final products or services developed during the 3 phases.
	Points to be addressed in report:	Results of services testing in operational environments in 5 sites. End-user evaluation of solutions based on use cases and KPIs. A summary of the main results achieved by each contractor and conclusions from the PCP in the format required by the EU for publication, recommendations.			

The tasks and expected outcomes of each milestone and deliverable are detailed below:

- For each end-of phase deliverable, a section that explains the IPR measures taken by the contractors to protect the results and lists the names and location of personnel that carried out the R&D activities
- At the start of phase 1, phase 1 project abstracts (in the format required by the EU for publication)
- At the end of phase 1, a summary of the main results achieved by each contractor and conclusions from phase 1 (in the format required by the EU for publication)
- At the start of phase 2, phase 2 project abstracts (in the format required by the EU for publication)

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- At the end of phase 2, a summary of the main results achieved by each contractor and conclusions from phase 2 (in the format required by the EU for publication)
- At the end of phase 2, a demonstration to the EU of the prototypes developed during phase 2
- At the start of phase 3, phase 3 project abstracts (in the format required by the EU for publication)
- At the end of phase 3, a summary of the main results achieved by each contractor and conclusions from the PCP in the format required by the EU for publication)]
- A deadline by which the contractors must agree on the text for the summary of overall lessons learnt and results achieved from the PCP, for publication
- At the end of the PCP, a final demonstration to the EU of the final products or services developed during the 3 phases.

For phase 2 the prototype validation is expected to be done at the premisses of the procurer(s)/contractors in [ ]. The different use cases should all be tackled by each contractor/consortia.

For phase 3, the testing of services in operational environment will take place in [ ] according to the finetuned plan from week 2 until week 22 of phase 3. Each contractor/consortium is expected to develop (1) solution for the limited test series.

For phase [3], provide information on the timing and the site(s) where the procurers will carry out the testing and validation of the test series. State clearly how many solutions each contractor is expected to develop for the limited test series. Specify whether contractors need to set aside resources for testing the solutions on the premises of all or only some procurers. Indicate whether they need to plan to have resources available to carry out testing sequentially or in parallel at the different sites. For PCPs with lots, clarify if there is a need for field testing of products/services developed by contractors in different lots together (to test dependencies between lots and to ensure that building blocks developed in different lots ultimately work together as expected).

The contractors/consortia need to set aside resources for testing the solutions on the premises of (5) procurers. Contractors/consortia need to plan having resources available to carry out testing sequentially (or in parallel) at the different sites covering the different use cases.

2.2 Tender closing time

Tender closing time will be: [**date and hour, e.g. 5 September 2025, 17.00h**]

2.3 Public buyers and other parties involved in the PCP

This procurement relates to a joint PCP that will be carried out by the following lead procurer: **STICHTING TOEGEPAST ONDERZOEK WATERBEHEER (STOWA),** based in The Netherlands.

The lead procurer is appointed to coordinate and lead the joint PCP, and to sign and award the framework agreement and the specific contracts for all phases of the PCP, in the name and on behalf of the following buyers group:

1. HET WATERSCHAPSHUIS (hWh) (NL)
2. FORUM VIRIUM HELSINKI OY (FVH) (FI)
3. MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY (MINISTRY OF INTERIOR SLOVAKIA) (MoI) (SK)
4. GEMEENTE HAARLEM (CITY OF HAARLEM (NL)
5. BUNDESANSTALT TECHNISCHES HILFSWERK (THW) (GE)

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6. REGION OF CENTRAL MACEDONIA (RCM) (GR)
7. FORENINGEN KLIMATORIUM (KLIMATORIUM) (DE)
8. BENEGO – GRENSPARK KALMTHOUTSE HEIDE (BE)
9. INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA (ICGC) (SP)
10. CITY OF ROTTERDAM (NL)
11. SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA (SLOVAK ENVIRONMENTAL AGENCY) (SEA) (SK)

The lead procurer is part of the PBG.

The procurers in the PBG have the following background/profile/responsibilities for:

- [name 1]: [insert responsibilities]
- [name 2]: [insert responsibilities]
- ……

The responsibilities which the procurers in the PBG have in their respective countries with regard to setting the acquisition and/or regulatory strategy for the innovative solutions are as follows:[…}.

The following entities are not in the PBG but participate as third parties giving in-kind contributions to the procurers for the purpose of carrying out the PCP:

- [name, country]
- [name, country]
- …

The following entities are participating as preferred (technical) partners with an interest in the PCP, but without being part of the PBG or giving in-kind contributions for carrying out the PCP:

- BAYERISCHES ROTES KREUZ (BRK) (GER)
- INSTITUT D'ESTUDIS ESPACIALS DE CATALUNYA FUNDACION (IEEC) (SP)
- FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV (FRAUNHOFER) (GE)
- UNIVERSITEIT TWENTE (UT-ITC) (NL)
- ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO (ISEMI) (SK)
- EVENFLOW (BE)
- FUNDACIO PRIVADA I2CAT, INTERNET I INNOVACIO DIGITAL A CATALUNYA (I2CAT) (SP)
- ENRICH GLOBAL (FR)
- CLIMATE-KIC HOLDING BV (CLIMATE KIC) (NL)
- COVERS PROCUREMENT SERVICES (CPS) (NL)

The preferred partners will be kept informed about the PCP [indicate what type of information concerning the PCP they will have access to and whether they will attend certain parts of the PCP implementation such as product demonstrations and testing. Explain that they will not have rights to results or IPRs].

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The main roles and responsibilities are as follows:

Lead procurer — Appointed by the PBG to organise and lead the joint procurement; also part of the PBG.

Public Buyers Group — The group of procurers that contribute to the procurement budget. For procurers that participate in the EU grant as sole participants *(i.e. entities representing several members, e.g. a central purchasing body, a European research infrastructure consortium or a European regional cooperation group)*, indicate which of the members contribute to the PCP procurement budget.

Third parties that provide in-kind contributions to the PCP — Entities that are neither lead procurer nor part of the PBG, but that give in-kind contributions to the PCP.

Preferred partners — Entities that are neither lead procurer nor part of the PBG nor third parties providing in-kind contributions, but that have a special interest in closely following the PCP *(entities involved in the Horizon Europe grant 'related additional networking activities'; other potential buyers for the solutions that have expressed a special interest in the PCP)*.

2.4 Contracting approach

The PCP will be implemented by means of a **framework agreement** with call-offs for **specific contracts** for each of the PCP R&D phases (altogether 'contracts').

Following the tendering stage, a framework agreement and a specific contract for phase 1 will be awarded to a minimum of 5 contractors. If less that the minimum contractors present a bid the PBG shall motivate a decision to stop or continue the PCP.

A call-off will be organised for phase 2, with the aim of awarding a minimum of 3 phase 2 contracts. Only offers from contractors that successfully completed phase 1 will be eligible for phase 2. The procurers will validate the phase 2 prototypes [identify the site: in the procurer's labs or the contractors' lab].

A second call-off will be organised for phase 3, with the aim of awarding a minimum of 2 phase 3 contracts. Only offers from contractors that successfully completed phase 2 will be eligible for phase 3.*]*

Field-testing of the first products/services is expected to take place [insert where *(e.g. at all the sites where procurers of the PBG are based)*.

The framework agreement will set all the framework conditions for the duration of the PCP (covering all the three phases). There will be no renegotiation. The framework agreement will remain binding for the duration of all phases for which contractors remain in the PCP. Tenderers that are awarded a framework agreement will also be awarded a specific contract for phase 1 (evaluation of tenders for the framework agreement and phase 1 are combined). Tenderers are therefore asked not only to submit their detailed offer for phase 1, but also to state their goals, and to outline their plans (including price conditions) for phase 2 *[*and 3*]* — thus giving specific details of the steps that would lead to commercial exploitation of the R&D results.

The brief overview of the overall timing of the PCP (including the expected start and finish dates) and of the individual phases is as follows: […]

The PCP will start on (M1) and finish on (M19). The duration of phase 1 will be 4 months. The duration of phase 2 will be 9 months and the duration of phase 3 will be 6 months.

The offers for the next phase will be requested only *after* the end-of phase deliverables of the previous phase and after the contractors have been informed of successful completion of the previous phase — in this case only the contractors that successfully completed the previous phase will be invited to make offers for the next phase.

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2.5 Total budget and budget distribution (per phase)

The total budget for the PCP, the maximum budget per phase and the maximum budget per tender per phase, as well as the minimum number of contractors and the duration of each is expressed in the table below.

PCP Phase	No. Contractors	Budget per contractor	Total budget	Phase duration
Phase 1 solution design	5	300000	1500000	4 months
Phase 2 prototype development	3	2400000	7200000	9 months
Phase 3 testing and validation	2	1554544	3109088	6 months
		TOTAL	**11809088**	**19 months**

Table 7: PCP phases, number of suppliers, budget and phase duration

Flexibility will be provided to transfer leftover budget from one phase to the next phase in case offers with lower price than expected are received. For all phases, contracts will be financed until the remaining budget is insufficient to fund the next best tender. The exact number of contracts finally awarded will thus depend on the prices offered and the number of tenders passing the evaluation. As leftover budget from the previous phase will be transferred to the next phase, the total budget available for phase 2 *[*and 3*]* may eventually be higher than stated here (but the maximum budget per contractor for phase 2 *[*and 3*]* will remain the same). The lower the average price of tenders, the more contracts can be awarded. However, the total value of the contracts awarded can also be lower than initially expected if there are fewer tenders than expected that meet the minimum evaluation criteria.

The number of expected contractors may increase to allow more contracts than initially expected to be awarded if there are more high quality tenders at cheaper prices than expected.

2.6 Time schedule

The time schedule is the following:

Planned time schedule (table for 3 phases)	
Date	**Activity**
	First tender procedure (framework agreement and phase 1 contracts)
[dd.mm.yyyy]	Publication of contract notice in TED
…	Deadline for requesting the tender documents
	Deadline for submitting questions about the tender documents
	Deadline for the lead procurer to publish replies to questions (Q&A document)
	Deadline for submission of tenders for the framework agreement and phase 1
	Opening of tenders
	Tenderers are notified about the decision on awarding contracts
	Signature of framework agreements and phase 1 specific contracts

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	Publication of the contract award notice in TED
	Implementation of phase 1
	Start of phase 1
	Names of winning phase 1 contractors and their project abstracts to be sent to EU (template*) and published on [insert acronym] PCP project website
	Visit of phase 1 contractors to the premises(s) of the procurer(s) to learn about the operational boundary conditions governing the design of targeted solutions
	Deadline for phase 1 interim milestone(s)/interim deliverable(s)
	Visit(s) of the phase 1 supervisor/monitoring team to the contractors' premises to check completion of milestone(s)/interim deliverable(s)
	Feedback from phase 1 supervisor/monitoring team on phase 1 interim milestone(s)/interim deliverable(s)
	Interim payments (if applicable)
	Deadline for phase 1 final milestone(s)/final report/deliverable(s)
	Assessment of phase 1 final milestone(s)/final report/deliverable(s)
	Phase 1 contractors notified as to whether they have completed this phase satisfactorily and successfully
	End of phase 1
	Summary of the results and conclusions achieved by each contractor during the phase sent to EU (template*)
	Payment of balance for phase 1 to contractors that completed this phase satisfactorily
	Second tender procedure (call-off for phase 2)
	Launch call-off for phase 2 (only offers from contractors that successfully completed phase 1 are eligible)
	Deadline for submitting questions on phase 2 call-off documents
	Deadline for the lead procurer to circulate replies to questions to phase 2 tenderers
	Deadline for submitting phase 2 offers
	Opening of phase 2 offers
	Contractors are notified about the decision on awarding phase 2 contracts

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	Signature of phase 2 specific contracts
	Implementation phase 2
	Start of phase 2
	Names of winning phase 2 contractors and their project abstracts to be sent to EU (template*) and published on [insert acronym] PCP project website
	Visit of phase 2 contractors to the premises(s) of the procurer(s), where applicable
	Deadline for phase 2 interim milestone(s)/deliverable(s)
	Visit(s) of the phase 2 supervisor/monitoring team to the contractors' premises to check completion of interim milestone(s)/deliverable(s)
	Feedback from phase 2 supervisor/monitoring team on phase 2 interim milestone(s)/deliverable(s)
	Interim payments (if applicable)
	Lab testing of the prototype developed during phase 2
	Feedback from phase 2 supervisor/monitoring team on lab testing of the prototype
	Deadline for submission of phase 2 final milestone(s)/final report /deliverable(s)
	Demonstration of prototype for the EU technical review of phase 2
	Assessment of phase 2 final milestone(s)/final report/deliverable(s)
	Phase 2 contractors notified as to whether they have completed this phase satisfactorily and successfully
	End of phase 2
	Summary of the results and conclusions achieved by each contractor during the phase sent to EU (template*)
	Payment of balance for phase 2 to contractors that completed this phase satisfactorily
	/Third tender procedure (call-off for phase 3)
	Launch call-off for phase 3 (only offers from contractors that successfully completed phase 2 are eligible)
	Deadline for submitting questions about phase 3 call-off documents

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	Deadline for the lead procurer to circulate replies to questions to phase 3 tenderers
	Deadline for submitting phase 3 offers
	Opening of phase 3 offers
	Contractors are notified about decision to award phase 3 contracts
	Signature of phase 3 specific contracts
	Implementation phase 3
	Start of phase 3
	Names of winning phase 3 contractors and their project abstracts to be sent to EU (template*) and published on [insert acronym] PCP project website
	Visit of phase 3 contractors to premises(s) of procurer(s), where applicable
	Deadline for phase 3 interim milestone(s)/deliverable(s)
	Visit(s) of the phase 3 /monitoring team to the contractors' premises to check completion of phase 3 interim milestone(s)/deliverable(s)
	Feedback from phase 3 monitoring supervisor/monitoring team on phase 3 interim milestone(s)/deliverable(s)
	Interim payments (if applicable)
	Field-testing of products/services developed during phase 3
	Feedback from phase 3 supervisor/monitoring team on field-testing of the products/services
	Deadline for submission of phase 3 final milestone(s)/final report/ deliverable(s)
	Final demonstration of products/services developed during phase 3 (including to EU representatives)
	Assessment of phase 3 final milestone(s)/final report/deliverable(s)
	Phase 3 contractors notified as to whether they have completed this phase satisfactorily and successfully
	End of phase 3*]*
	Summary of the results and conclusions achieved by each contractor during the PCP sent to EU for publication purposes (template*).
	Payment of balance for phase 3 to contractors that completed this phase satisfactorily

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2.7 Intellectual Property Rights (IPR)

Ownership of results (foreground)

Each contractor will keep the ownership of the IPRs attached to the results they generate during the PCP implementation. The price offered in the tender is expected to take this into account.

The ownership of the IPRs will be subject to the following conditions:

- The PBG has the right to:
  - access the results, on a royalty-free basis, for their own use.
  - grant (or require the contractors to grant) non-exclusive licences to third parties to exploit the results under fair and reasonable conditions (without the right to sub-license).
- The PBG has the right to require the contractors to transfer ownership of the IPRs if the contractors fail to comply with their obligations, notably concerning the protection or exploitation of the results or to protect public interests (including security interests).

The contractors must ensure that the results are not subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries set out in section 3.1 of this request for tenders — unless otherwise agreed with the granting authority.*]*

Commercial exploitation of results

The market potential of the results is estimated at [insert available figures for the expected size and type of the potential total market size, *i.e. beyond the PCP procurers*].*]*

The contractors are expected to start commercial exploitation of the results at the latest [insert number of years (minimum of four years after the end of the Horizon Europe grant)] years after the end of the framework agreement.

Contractors are required to undertake specific activities beyond product development to commercially exploit the results, e.g. certification of solutions or contribution to standardisation

The PBG will undertake to actions help remove barriers to the introduction onto the market of the solutions to be developed during the PCP (e.g. promotion of R&D results among other public procurers, contribution made by the demand side to regulation, standardisation, and certification).

The PCP is subject to exploitation restrictions/additional exploitation obligations under the HE call conditions [ ].:

The feasibility of the business plan to commercially exploit the R&D results will be assessed as part of the award criteria.

The contractors may not transfer ownership of their results or grant licences to third parties which are established in countries which are not [include the list of eligible countries set out in the HE call conditions] (or, if applicable, are controlled by such countries or entities from such countries) — unless they have requested and received prior approval by the contracting authority who will request prior approval from the granting authority that is co-financing the PCP.*]*

The contractors must promote the dissemination of their results, in particular through [publications and] contribution to standardisation. The contractors and the contracting authority will establish at the start of the framework agreement a list of [planned publications about the results and] appropriate standards to contribute to, and will keep this list updated throughout the framework agreement. The contractors must — up to four years after the end of the PCP — inform the contracting authority, who will inform in

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its turn the granting authority that is co-financing the PCP, if the results could reasonably be expected to contribute to European or international standards.*]*

In case of a public emergency, the contractors must (if requested by the granting authority) grant for a limited period of time specified in the request, non-exclusive licences — under fair and reasonable conditions — to their results to legal entities that need the results to address the public emergency and commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions.*]*

In addition the HE call conditions impose additional exploitation obligations, as follows [add them here].

The contractors may not transfer ownership or the results or give exclusive licenses, if this would conflict with the right of first refusal for the PBG to buy the results. [explain further the exact procedure that the PBG should follow to invoke the right of first refusal, unless already explained in the framework agreement].*]*

For more information, see section 5.5 in the framework agreement that describes in more detail the rights and obligations regarding exploitation of results.

Declaration of pre-existing rights (background and sideground)

The ownership of pre-existing rights will remain unchanged.

In order to be able to distinguish clearly between results and pre-existing rights (and to establish which pre-existing rights are held by whom):

- Tenderers are requested to elaborate the proposed list of pre-existing rights that they wish to use for their proposed solution in their offers.
- Procurers and contractors will establish an agreed list of pre-existing rights to be used, before the start of the Framework Agreement and this list will be updated at the start of each specific contract.

The procurers *[*and third parties providing in-kind contributions to the PCP*]* do not hold any pre-existing rights relevant to the PCP contracts. The procurers *[*and third parties providing in-kind contributions to the PCP*]* hold the following pre-existing rights relevant to the PCP contracts: [list all pre-existing rights that tenderers should be aware about to prepare their offer — and specify those that are available for use and those that must be used to build upon for carrying out the R&D for the PCP].*]*

Specific conditions may apply:

[OPTION 1 if there is NO relevant background held by lead procurer, buyers group and third parties providing in-kind contributions:

The contractors must ensure that background that is subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries set out in section 3.1 and that impact the exploitation of the results (i.e. would make the exploitation of the results subject to control or restrictions) must not be used and must be explicitly excluded from the list of pre-existing rights agreed between the contractors and the contracting authority that will be used for the PCP — unless otherwise agreed with the contracting authority.*]*

For PCPs with control restrictions due to strategic interests in the HE call conditions (e.g. specific control restrictions on background), the call conditions shall prevail and must be applied. [If no, the conditions on background should only use similar restrictions if the buyers group has justified reasons to do so and in agreement with the granting authority.]

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Note that impact the exploitation of results should be understood as making the exploitation of the results subject to control or restrictions, for example if exploitation would require the agreement of the entity owning the background. If such background needs to be used this must be agreed with the granting authority.

The members of the PBG will receive rights to use the background IPR related to the developed solution for free during and for the purpose of the PCP. They are not buying developed prototypes or first products/services as part of this PCP. However, they will receive rights to use the background rights related to the developed solution after the PCP at fair and reasonable conditions, the price for which will be established if and when the procurers conduct after the PCP a follow-up procurement to buy developed solutions or first prototypes.

Or

The members of the PBG receive rights to use the background rights related to the developed solution for free during and for the purpose of the PCP. They will be buying [specify whether it is 'developed prototypes' or 'first products'] as part of this PCP and, therefore, also receive rights to use the background rights related to the developed solution for a duration of [specify the duration for which the procurer want to keep using the PCP solution and the associated background rights after the PCP] after the PCP. This to be taken into account in your financial offer for the PCP.*]*

Rights to use the background related to the developed solution must be granted under the same conditions as above also to entities that are under the direct or indirect control of procurers of the PBG, or under the same direct or indirect control as procurers of the PBG, or directly or indirectly controlling procurers of the PBG, subject to applicable control restrictions.

The framework agreement will contain a provision that describes in more detail the rights and obligations of the different parties regarding the pre-existing rights and results.

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3. EVALUATION OF TENDERS

3.1 Eligible tenderers, joint tenders and subcontracting

Eligibility of tenderers

Participation in the tendering procedure is open on equal terms to all types of operators that are established in EU Member States or Horizon Europe associated countries[6]

Explain whether the call for tenders is open to all types of operators (companies or other type of legal entities) or whether there are any eligibility restrictions:

[OPTION for PCPs for which the open market consultation has shown that there are NOT sufficient potential interested bidders in the EU Member States and HE associated countries: that are established in [add WTO GPA signatory countries and other third countries if needed to obtain sufficient amount of offers]] on equal terms, regardless of the size, geographic location or governance structure].]

[OPTION 2 if there are participation and/or control restrictions in the HE call conditions: Participation in this call for tenders is open only to interested operators established in [and controlled from] [add the list of countries to which participation and/or control is restricted].

Participation in this call for tenders is open only to interested operators established in *[*and controlled from*]* [add the list of countries to which participation and/or control is restricted].

'Control' is defined as the possibility to exercise decisive influence on the operator, directly or indirectly, through one or more intermediate entities, 'de jure' or 'de facto'. Each tenderer must complete Annex [xxx] Declaration of ownership and control to indicate its country of establishment and its country/ies of control and must present the supporting evidence normally acceptable under the law of that/those country/ies as requested in Annex [xxx]. In addition, such a declaration (and supporting evidence) must be submitted for each subcontractor, expert and other entities on whose capacity the tender relies). Additional evidence may be requested by the contracting authority after the submission deadline.

Please note that in case of participation and/or control restrictions, the contractors will have to ensure that the participation and/or control requirements are extended to their subcontractors, affiliated entities and other third parties (including suppliers of components used for the innovative solution) and that any cooperation with nationals of third countries that are not eligible countries or that are controlled by such a country and/or by a national of such a country does not affect the strategic assets, interests, autonomy or security of the EU and its Member States and avoids potential negative effects over security of supply of inputs that are critical to the procurement.*]*

Please also note that participation in the PCP contract is not open to entities that are subject to EU restrictive measures under Article 29 of the Treaty on the European Union (TEU) and Article 215 of the Treaty on the Functioning of the EU (TFEU)[7] — in any capacity (not as main contractor, member of a grouping/consortium, subcontractors, experts or any other type of entity on whose capacity the tender

6 List of Horizon Europe participating countries.

7 Please note that the EU Official Journal contains the official list and, in case of conflict, its content prevails over that of the EU Sanctions Map.

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relies or other third parties that are cooperated with).In addition, the contractors must ensure that none of the contracted services are performed in countries nor by entities that are subject to EU restrictive measures (sanctions). They must ensure that none of the goods procured or used for the procurement were developed, produced or supplied in countries or by entities that are subject to such EU restrictive measures. In order to ensure that the EU restrictive measures are respected throughout the supply chain that will be involved in delivering the contract results, the contractors must ensure that these obligations also apply to their subcontractors, affiliated entities and other third parties (including suppliers of components used for the innovative solution) they cooperate with in the research, development, testing and subsequent commercialisation of the results, as well as to any entities succeeding them in their ownership or development of the results.

Tenders submitted in collaboration with others

Tenders may be submitted by a single entity or in collaboration with others. The latter can involve either submitting a joint tender or subcontracting, or a combination of the 2 approaches.

For joint tenders:

- the group of tenderers must assume joint and several liability for the performance of the contract.
- the group of tenderers must mandate one of them with the power to sign the framework agreement and specific contracts provide in their name and on their behalf ('lead contractor')

For subcontracting:

- [specify if there are restrictions on the allowed amount(s) that can be subcontracted]
- [indicate the provisions of national law that apply to subcontracting]
- [explain that the tender must mention which parts of the contract will be subcontracted]
- specify that the contractors remain fully liable to the procurers for the performance of the contract (and that this is the reason why also the subcontracts must reflect the rules of the Horizon Europe grant, including as relates to the place of performance, the definition of R&D services, confidentiality, results and IPRs, the visibility of EU funding, conflicts of interest, language, obligation to provide information and keep records, audits and checks by the EU, the processing of personal data, liability for damages as well as environmental, ethics and security requirements).

Other

Prior participation in the open market consultation is not a pre-condition for submitting a tender.

However, for phase 2 *[*and 3*]*, participation is limited to tenderers that successfully completed the preceding phase.

3.2 Exclusion criteria

The exclusion criteria are as follows:

Exclusion criteria	Evidence
A) Conflict of interest	Declaration of Honour (TD10)

B) Breach of obligations relating to the payment of taxes or social security contributions	Declaration of Honour (TD10)
C) Bankruptcy or professional misconduct	Declaration of Honour (TD10)
D) Criminal offences	Declaration of Honour (TD10)
E) Proposed solution already available in the market	Declaration of Honour (TD10)
F) Compliance with GDPR	Declaration of Honour (TD10)
G) Compliance with Minimum Documentation requirements	Declaration of Honour (TD10)

⚠ **Tenderers that do not comply with these criteria will be excluded.**

Each exclusion criterion is explained in more detail below.

B) Conflict of interest

Tenderers that are subject to a conflict of interest may be excluded when the situation cannot be effectively remedied by other less intrusive measures. If there is a potential conflict of interest, tenderers must immediately notify the lead procurer in writing

A conflict of interest covers both personal and professional conflicts. Personal conflicts are any situation where the impartial and objective evaluation of tenders and/or implementation of the contract is compromised for reasons relating to economic interests, political or national affinity, family, personal life *(e.g. family of emotional ties)* or any other shared interest. Professional conflicts are any situation in which the contractor's (previous or ongoing) professional activities affect **the** impartial and objective evaluation of tenders and/or implementation of the contract.

Provided the above, in the context of PROTECT Tender will be excluded if they fall within one of the following categories, relating to the structure of groups of operators:

- Where a single economic operator or affiliated entity is participating within more than one group of operators or both as single tenderer and as a member of a group of operators.
- Where a single economic operator or affiliated entity has already participated as a subcontractor or partner in PROTECT project.
- Where a single economic operator or affiliated entity participated in PROTECT CSA (GA 101060592) project.

Affiliated Entity means any legal entity directly or indirectly controlling, controlled by, or under common control with that economic operator or its subsidiary, for so long as such control lasts.

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⚠ **If an actual or potential conflict of interest arises at a later stage *(i.e. during the implementation of the contract)*, the contractor concerned must contact the lead procurer, who is required to notify the EU and to take steps to rectify the situation. The EU may verify the measures taken and require additional information to be provided and/or further measures to be taken.**

C) Breach of obligations relating to the payment of taxes or social security contributions

A Tenderer or Contractor, a member of the Consortium, a subcontractor and/or a Third Party on whose resources it relies upon (if applicable) can be excluded from further participation in the PCP if it is in breach of its obligations relating to the payment of taxes or social security contributions and where this has been established by a judicial or administrative decision having final and binding effect.

D) Bankruptcy or professional misconduct

A Tenderer or Contractor, a member of the Consortium, a subcontractor and/or a Third Party on whose resources it relies upon (if applicable) can be excluded from further participation in the PCP in any of the following situations:

- Where the Contracting Authority can demonstrate by any appropriate means a violation of applicable obligations referred to in Article 18(2) of the Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014.
- Where the Tenderer is bankrupt or is the subject of insolvency or winding-up proceedings, where its assets are being administered by a liquidator or by the court, where it is in an arrangement with creditors, where its business activities are suspended or it is in any analogous situation arising from a similar procedure under national laws and regulations.
- Where the Lead Procurer can demonstrate by appropriate means that the Tenderer is guilty of grave professional misconduct, which renders its integrity questionable.
- Where the Lead Procurer has sufficiently plausible indications to conclude that the Tenderer has entered into agreements with other economic operators with the intention of distorting competition.
- Where the Tenderer has shown significant or persistent deficiencies in the performance of a substantive requirement under a prior public contract, a prior contract with a contracting entity or a prior concession contract which led to early termination of that prior contract, damages or other comparable sanctions.
- Where the Tenderer has been guilty of serious misrepresentation in supplying the information required for the verification of the absence of grounds for exclusion or the fulfilment of the selection criteria.
- Where the Tenderer has undertaken to unduly influence the decision-making process of the Lead Procurer, to obtain confidential information that may confer upon it undue advantages in the procurement procedure, or to negligently provide misleading information that may have a material influence on decisions concerning exclusion, selection or award.

Where the Tenderer has failed to maintain relevant licensing or membership of an appropriate trading or professional organisation where required by law.

E) Criminal offences

The Tenderer, or a representative of the Tenderer, a member of the Consortium, a subcontractor and/or a Third Party on whose resources it relies upon (if applicable) will be excluded from the PCP it has been convicted by final judgment for a criminal offence listed below:

- Participation in a criminal organisation, as defined in Article 2 of Council Framework Decision 2008/841/JHA.

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- Corruption, as defined in Article 3 of the Convention on the fight against corruption involving officials of the European Communities or officials of Member States of the European Union (2) and Article 2(1) of Council Framework Decision 2003/568/JHA as well as corruption as defined in the national law of the contracting authority or the economic operator.
- Fraud within the meaning of Article 1 of the Convention on the protection of the European Communities' financial interests.
- Terrorist offences or offences linked to terrorist activities, as defined in Articles 1 and 3 of Council Framework Decision 2002/475/JHA, respectively, or inciting or aiding or abetting or attempting to commit an offence, as referred to in Article 4 of that Framework Decision.
- Money laundering or terrorist financing, as defined in Article 1 of Directive 2005/60/EC of the European Parliament and of the Council.
- Child labour and other forms of trafficking in human beings as defined in Article 2 of Directive 2011/36/EU of the European Parliament and of the Council.

F) Proposed solution already available in the market

Tenderers whose proposed solution is already available in the market will be excluded.

G) Compliance with GDPR

The Tenderers shall comply with the legislation and regulations applicable to the processing of personal data in Europe. In particular and if applicable, the Tenderer, members of a Consortium, subcontractors and Third Parties if applicable will have to ensure compliance with Article 28(7) of Regulation (EU) 2016/679 of the European Parliament and of the Council and Article 29(7) of Regulation (EU) 2018/1725 of the European Parliament and of the Council (on standard contractual clauses between controllers and processors).

H) Compliance with Minimum Documentation requirements

The Tenderer has the capability to provide with the Minimum Documentation listed in Annex 4.

3.3 Selection criteria

The selection criteria are as follows:

Selection criteria	Evidence
A) Ability to perform R&D up to original development of the first products or services and to commercially exploit the results of the PCP, including intangible results in particular IPRs	Proof of previous R&D projects of similar nature and scale. The Tenderer shall indicate the level of technical resources to perform R&D. The Tenderer will provide a description (free text) of the capabilities of the organization to commercially exploit the Results of the PCP.
B) Suitability to pursue the professional activity	Legal Capacity of the Tenderer Statement

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C) Demonstration of expertise and working experience required to undertake an innovative R&D project that entails relevant technology.	CVs of the Team, including minimum…employed by…capable of...having experience in… The quality of the CVs will be evaluated as part of the weighted award criteria.
D) At least one reference case per relevant domain (to tackle in the use cases) in a scientific research environment.	Description of (a) case(s), not older than 3 years (template provided). The quality of the reference case(s) will be evaluated as part of the weighted award criteria.

⚠ **Tenderers that do not comply with these criteria will be excluded.**

A) Ability to perform R&D up to original development of the first products or services and to commercially exploit the results of the PCP, including intangible results in particular IPRs

Tenderers must have:

- The capacity, tools, material and equipment to:
  - carry out research and lab prototyping.
  - produce and supply a limited set of first products or services and demonstrate that these products or services are suitable for production or supply in quantity and to quality standards defined by the procurers.
- The financial and organisational structures to:
  - manage, exploit and transfer or sell the results of the PCP (including tangible and intangible results, such as new product designs and IPRs).
  - generate revenue by marketing commercial applications of the results (directly or through subcontractors or licensees).

B) Suitability to pursue the professional activity

Tenderers must be legally and technically able to deliver the R&D services necessary to tackle the PCP challenge.

C) Demonstration of expertise and working experience required to undertake an innovative R&D project that entails relevant technology.

Tenderers must have the expertise and working experience required to undertake an innovative R&D project that entails relevant technology. ***Please note that this is a performance clause.***

D) At least one reference case per relevant domain (to tackle in the use cases) in a scientific research environment.

Tenderers must have been involved in (a) relevant case(s) per domain, not older than 3 years before the deadline to submit the Bids.

Should there be any doubt as to any of these criteria, tenderers may be requested to provide additional information.

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3.4 Award criteria

There are 2 types of award criteria (on/off criteria and weighted criteria).

On/off award criteria

Tenders must comply with the following on/off award criteria:

Pass/fail award criteria	Evidence
A) Compliance with the definition of R&D services[10]	Declaration of Honour Additionally: - The offers for all 3 Phases may include only items needed to address the challenge in question and to deliver the R&D services described in this Request for Tenders. - The total value of products offered in Phase 1 and in Phase 2 must be less than 50% of the value of the Phase 1 and Phase 2 Contracts' value. - The value of the total amount of products covered by the contract must be less than 50 % of the total value of the PCP Framework Agreement. Tenders that go beyond the provision of R&D services will be excluded.
B) Compatibility with other public financing	Declaration of Honour for absence of other incompatible public financing.
C) Compliance with the requirements regarding the place of performance of the contract	Declaration of Honour Additionally: - A list of staff working on the specific contract *(including for subcontractors)*, indicating clearly their role in performing the contract *(i.e., whether they are principal R&D staff or not)* and the location *(country)* where they will carry out their tasks under the contract. - A list of geographical locations where the data is hosted (and backup sites).

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D) Compliance with ethics requirements	Declaration of Honour If the Tender involves activities that raise ethical issues, the Tenderer must submit an ethics self-assessment that: - Describes how the tender meets the legal and ethical requirements of the country or countries where the tasks raising ethical issues are to be carried out. - Explains in detail how the tenderer intends to address the ethical issues identified, in particular as regards objectives *(e.g., dual-use goods[16]);* methodology *(e.g., involvement of children and related consent procedure and protection of data collected)* and the potential impact *(e.g., issues relating to the dual use of goods, stigmatisation of particular social groups).* Before starting the particular task that raises ethical issues, Contractors must provide a copy of any ethics committee opinion required under national law; and any notification or authorisation for activities raising ethical issues required under national law.
E) Security	Declaration of Honour
F) Other…	

⚠ **Tenders that do not comply with these criteria will be excluded. The contracting authority reserves the right to ask for proof of compliance with the exclusion/selection/award criteria at any moment throughout the procedure. The tenderer shall provide all the necessary evidence within 5 days**

Each criterion is explained in more detail below.

A) Compliance with the definition of R&D services

Tenders that go beyond the provision of R&D services will be excluded.

R&D covers fundamental research, industrial research and experimental development, as per the definition given in the EU R&D&I state aid framework[8]. It may include exploration and design of solutions and prototyping up to the original development of a limited volume of first products or services in the form of a test series. Original development of a first product or service may include limited production or supply in order to incorporate the results of field-testing and to demonstrate that the product or service is suitable for production or supply in quantity to acceptable quality standards.[9] R&D does not include quantity production or supply to establish commercial viability or to recover R&D costs. It also excludes commercial development activities such as incremental adaptations or routine or periodic changes to existing products, services, production lines, processes or other operations in progress, even if such

[8] See Point 15 of the Commission Communication on a framework for state aid for research and development and innovation (C(2014) 3282).

[9] See Article XV(1)(e) WTO GPA 1994 and the Article XIII(1)(f) of the revised WTO GPA 2014.

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changes may constitute improvements. The purchase of commercial volumes of products or services is not permitted.

The definition of services means that the value of the total amount of products covered by the contract must be less than 50 % of the total value of the PCP framework agreement.

The following evidence is required:

- The financial part of the offer for the framework agreement must provide binding unit prices for all foreseeable items for the duration of the whole framework agreement.
- The financial part of the offer for each phase must give a breakdown of the price for that phase in terms of units and unit prices for every type of item in the contract, distinguishing clearly the units and unit prices for items that concern products.
- The offers for all PCP phases may include only items needed to address the challenge in question and to deliver the R&D services described in the request for tenders.
- The offers for all PCP phases must offer services matching the R&D definition above.
- The total value of products offered in phase 1/*[/*phase 2*]* must be less than 50 % of the value of the phase 1*[/*phase 2*]* contract and the total value of products offered in the last phase must be so that the total value of products offered in all phases is less than 50% of the total value of the PCP framework agreement.
- …

⚠ **Both percentages for the product value inside phase 1 and phase 2 must be set at less than 50% to ensure that tenders that do not go through to phase 2 or phase 3 still satisfy the definition of an R&D services contract.**

B) Compatibility with other public financing

Tenders that receive public funding from other sources will be excluded, if this leads to double public financing or an accumulation of different types of public financing that is not permitted by EU legislation, including EU state aid rules.

The evidence require is a declaration of honour for absence of other incompatible public financing.

C) Compliance with requirements relating to the place of performance of the contract

Tenders will be excluded if they do not meet the following requirements relating to the place of performance of the contract:

- At least 50% of the total value of activities covered by each specific contract for PCP phase 1 *[*and 2*]* must be performed in the EU Member States or in Horizon Europe associated countries[10]. The principal R&D staff working on each specific contract must be located in the EU Member States or Horizon Europe associated countries.
- At least 50% of the total value of activities covered by the framework agreement (i.e. the total value of the activities covered by all phases) must be performed in the EU Member States or Horizon Europe associated countries. The principal R&D staff working on the PCP must be located in the EU Member States or Horizon Europe associated countries.

All activities covered by the contract are included in the calculation (i.e. all R&D and operational activities that are needed to perform the R&D services, *e.g. research, development, testing and certifying*

10 List of Horizon Europe participating countries.

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solutions). This includes all activities performed under the contract by contractors and, if applicable, their subcontractors.

The principal R&D staff are the main researchers, developers and testers responsible for leading the R&D activities covered by the contract.

Moreover, at least 100% of the contracted R&D services on security components of the solution must be performed in [add the list of countries to which participation and/or control is restricted] or [add 'EU Member States or Horizon Europe associated countries']*].]*

The contractors must in addition ensure that the performance of the contract takes place in [add the list of countries to which participation and/or control is restricted] — unless otherwise approved by the granting authority.*]*

The following evidence is required:

- The financial part of the offer must provide binding unit prices for all foreseeable items for the duration of the whole framework agreement and give a breakdown of the price for the current phase in terms of units and unit prices (hours and unit price per hour), for every type of item in the contract *(e.g. junior and senior researchers).*
- A list of staff working on the specific contract (including for subcontractors), indicating clearly their role in performing the contract (i.e. their personnel profile, whether they are principal R&D staff or not, whether they are working on security components or not*]*) and the location (country) where they will carry out their tasks under the contract.
- A confirmation or declaration of honour that, where certain activities forming part of the contract are subcontracted, subcontractors will be required to comply with the place of performance obligation to ensure that the minimum percentage of the total amount of activities that has to be performed in the EU Member States or HE associated countries is respected.
- …

⚠ **Both percentages for phase 1 *[*and phase 2*]* must be set at the minimum percentage to ensure that tenders that do not go through to phase 2 *[*or phase 3*]* still satisfy the place of performance requirement.**

D) Ethics and research integrity

Tenders will be excluded if they:

- Do not comply with the following rules:
  - Ethical principles (including the highest standards of research integrity, notably as set out in the European Code of Conduct for Research Integrity[11], and, in particular, avoiding fabrication, falsification, plagiarism and other research misconduct).
  - Applicable international, EU and national law.
- Include plans to carry out activities in a country outside the EU if they are prohibited in all Member States or plans to destroy human embryos.
- Include activities whose aim is to:
  - Carry out human cloning for reproductive purposes.

[11] The European Code of Conduct for Research Integrity of ALLEA (All European Academies).

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  - Modify the genetic heritage of human beings in such a way as could make such changes heritable (with the exception of research relating to cancer treatment of the gonads).
  - Create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.
- Include activities that do not focus exclusively on civil applications.
- Do not comply with the following ethics requirements:
  - [insert the ethics deliverables from Annex 1 to the EU grant agreement]*]*.

If the tender involves activities that raise ethical issues, the tenderer must submit an ethics self-assessment that:

- Describes how the tender meets the legal and ethical requirements of the country or countries where the tasks raising ethical issues are to be carried out.
- Explains in detail how the tenderer intends to address the ethical issues identified, in particular as regards:
  - Objectives *(e.g. dealing with vulnerable populations and dual-use goods[12], ensuring* that *development, deployment and/or use of AI is ethical, robust, safe and lawful).*
  - Methodology *(e.g. involvement of children and related consent procedure and* protection *of data collected, ensuring human oversight and transparency of AI).*
  - The potential impact *(e.g. issues relating to the dual use of goods, environmental damage, stigmatisation of particular social groups, political or financial retaliation, benefit-sharing and malevolent use of results, trustworthy AI systems)*.

If the tender involves development, deployment and/or use of artificial intelligence (AI)-based techniques, the self-assessment must address the ethics issues related to the involvement of AI in order to ensure that this is done in a way that is ethical, robust, safe and lawful.

⚠ **For information on ethics issues, *see the guidance for EU grant beneficiaries How to complete your ethics self-assessment*.**

Call-offs for phases 2 *[*and 3*]* may request that this information be updated in the offers submitted for these phases.

Before starting the particular task that raises ethical issues, contractors must provide a copy of:

- Any ethics committee opinion required under national law; and
- Any notification or authorisation for activities raising ethical issues required under national law.

The framework agreement will contain a provision on ethics.

E) Security

Tenders will be excluded if they do not:

[12] See Article 2(1) EU Export Control Regulation No 428/2009.

- Comply with:
  - EU, national and international law on dual-use goods or dangerous materials and substances.
  - The security aspect letter (SAL) annexed to the Horizon Europe grant agreement and Decision No 2015/444[13], in case the HE grant agreement provides for a security classification that affects the PCP contracts.
  - The following security recommendations:
    - [insert the security recommendations from Annex 1 to the Horizon Europe grant agreement].*]*

Tenders themselves must not contain any classified information.

If the output of activities or results proposed in the tender raise security issues or uses EU-classified information, the tenderer must show that these issues are being handled correctly. In such a case, tenderers are required to ensure and to provide evidence of the adequate clearance of all relevant facilities. They must examine any issues (*such as those relating to access to classified information or export or transfer control*) with the national authorities before submitting their offer. Tenders must include a draft security classification guide (SCG), indicating the expected levels of security classification. If necessary for the tender procedure or for performing the contract itself, contractors will be requested to ensure appropriate security clearance for third parties *(e.g. for personnel)*.

i For information on security, *see the guidance for EU grant beneficiaries: Guidelines on the classification of information in Horizon Europe projects* and *Guidance on how to handle security-sensitive projects.*

Call-offs for phases 2 *[*and 3*]* may request that this security information be updated in the offers submitted for that phase.

Before starting the particular task that raises security issues, contractors must provide a copy of any export or transfer licences required under EU, national or international law.

The framework agreement and/or the specific contracts will contain a provision on security.

Weighted award criteria

The award criteria (and sub-criteria, where applicable), weightings and thresholds for each of the PCP phases are provided in the following table.

These criteria and related sub award criteria will be used to evaluate the award of the Framework Agreement (TD2) and the Phase 1 Contract (TD3), according to a quality assessment.

The criteria and related sub award criteria will also be used to evaluate the award of the Phase 2 Contract (TD4), according to a quality assessment. Please note that the sub award criteria and its relative weighting can be finetuned depending on the outcomes of Phase 1.

The criteria and related sub award criteria will be used to evaluate the award of the Phase 3 Contract (TD5), according to a quality assessment. Please note that the sub award criteria and its relative weighting can be finetuned depending on the outcomes of Phase 2.

[13] Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information.

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Weighted award criteria (table for 3 phases)	**Maximum points**	**Thresholds**	**Weighting**
Phase 1: Solution design			
Technical quality criteria			
A) IMPACT ON THE CHALLENGE **Sub award criteria**: **A.1**. Level of match with the functional requirements of the use cases **A.2.** The approach demonstrates commercial feasibility and a realistic commercialization plan, including the market analysis **A.3.** Environmental impact of the proposed project activities and the subsequent solution commercialisation. **A.4.** Contribution to digitalisation harmonisation across EU.	28	20	40%
B) VALIDITY OF THE TECHNICAL APPROACH **Sub award criteria** **B.1.** Quality of the methodology – Design, development and installation of the solution **B.2.** Use of EO-based data and cooperation with GEOSS. **B.3.** Expertise skills of the technical team **Please note that this is a performance clause.*	12	9	15%
C) QUALITY OF THE TENDER **Sub award criteria** **C.1.** Quality of the proposal **C.2.** Quality of the methodology - Project management **C.3.** Expertise of the project management team **Please note that this is a performance clause.* **C.4.** Similar projects enlightened in the proposal (PCP, R&D, AI, Climate data	12	9	15%

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Analytics Development, hydrology)			
Total technical quality criteria			
Price			20%
Phase 2: Prototype development and lab testing			
Technical quality criteria			
A) IMPACT ON THE CHALLENGE **<u>Sub award criteria</u>**: **A.1**. Level of match with the functional requirements of the use cases **A.2.** The approach demonstrates commercial feasibility and a realistic commercialization plan, including the market analysis **A.3.** Environmental impact of the proposed project activities and the subsequent solution commercialisation. **A.4.** Contribution to digitalisation harmonisation across EU.	40	25	50%
B) VALIDITY OF THE TECHNICAL APPROACH **<u>Sub award criteria</u>** **B.1.** Quality of the methodology – Design, development and installation of the solution **B.2.** Use of EO-based data and cooperation with GEOSS. **B.3.** Expertise skills of the technical team **Please note that this is a performance clause.*	24	18	30%
C) QUALITY OF THE TENDER **<u>Sub award criteria</u>** **C.1.** Quality of the proposal **C.2.** Quality of the methodology - Project management **C.3.** Expertise of the project management team **Please note that this is a performance clause.*	16	8	20%

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C.4. Similar projects enlightened in the proposal (PCP, R&D, AI, Climate data Analytics Development, hydrology)			
Total technical quality criteria			
Price			20%
Phase *[3]*: First product/service development & field testing			
Technical quality criteria			
A) IMPACT ON THE CHALLENGE **<u>Sub award criteria</u>**: **A.1**. Level of match with the functional requirements of the use cases **A.2.** The approach demonstrates commercial feasibility and a realistic commercialization plan, including the market analysis **A.3.** Environmental impact of the proposed project activities and the subsequent solution commercialisation. **A.4.** Contribution to digitalisation harmonisation across EU.	44	30	55%
B) VALIDITY OF THE TECHNICAL APPROACH **<u>Sub award criteria</u>** **B.1.** Quality of the methodology – Design, development and installation of the solution **B.2.** Use of EO-based data and cooperation with GEOSS. **B.3.** Expertise skills of the technical team **Please note that this is a performance clause.*	20	15	25%
C) QUALITY OF THE TENDER **<u>Sub award criteria</u>** **C.1.** Quality of the proposal **C.2.** Quality of the methodology - Project management **C.3.** Expertise of the project	12	8	15%

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management team **Please note that this is a performance clause.* **C.4.** Similar projects enlightened in the proposal (PCP, R&D, AI, Climate data Analytics Development, hydrology)			
Total technical quality criteria			
Price			20%

Each weighted award criterion is explained in more detail below:

A) IMPACT ON THE CHALLENGE

The impact on the challenge refers to the matching the functional requirements stated in the selected use cases from different end-users who will validate the solutions in operational environments. The approach should demonstrate a feasible path to commercialization, contributing to the digital harmonisation in the EU and positive environmental impacts.

This criterion includes several sub award criteria which may be finetuned along the PCP phases:

A.1. Level of match with the functional requirements of the use cases. This sub award criterion will be evaluated against the functional and performance requirements described in each of the selected use cases.

A.2. The approach demonstrates commercial feasibility and a realistic commercialization plan, including the market analysis. This sub award criterion will be evaluated based on a commercialization plan in the proposal and its update throughout the different PCP phases

A.3. Environmental impact of the proposed project activities and the subsequent solution commercialisation. This sub award criterion should consider the following:

Do no significant harm principle

Explain how your tender ensures compliance with the 'do no significant harm' principle as per Article 17 of the EU Taxonomy Regulation (EU) No 2020/852[14], i.e. is designed in a way that it is not significantly harming any of the six following environmental objectives of the EU Taxonomy Regulation:

- Climate change mitigation.
- Climate change adaptation.
- The sustainable use and protection of water and marine resources.
- The transition to a circular economy.
- Pollution prevention and control.
- The protection and restoration of biodiversity and ecosystems.

Compliance means that the proposed activities must not support or carry out activities that do significant harm to any of the six above objectives. This needs to be assessed both for the activities that are proposed to be carried out during the course of the PCP contract (for the R&D activities and for

[14] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (OJ L 198, 22.6.2020, p. 13).

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complementary activities such as project management, travel, etc) as well as for the expected lifecycle impact of the innovative solution at a subsequent commercialization stage.

Compliance of the tender's project methodology with this principle has several benefits. Not only will it allow to ensure that the newly developed innovative solution contributes to protecting the environment. It will also help to improve your position on the financial market, increasing your chances to obtain financial investments for your business, including in particular for further development and commercialisation of the innovative solution developed during the PCP. The EU Taxonomy Regulation provides uniform criteria that enable financial investors to determine the degree of environmental sustainability of different economic activities and shift their financial investments towards environmentally sustainable economic activities.

Additional environmental standards

The following additional environmental requirements go beyond the 'do no significant harm principle' and create positive environmental impacts, in order to contribute to reverse current disastrous trends and/or restore the environment *(e.g. decrease GHG emissions and combat climate change, move to a cleaner mix of energy and resource usage, reduce waste, increase circularity, restore precious ecosystems and their biodiversity, improve the air and water quality etc.)*.

Tenderers should demonstrate how their approach for both the proposed PCP project activities and the subsequent solution commercialisation will result in a positive environmental impact.

A smart use of Green Public Procurement principles should be made, such as the EU GPP and/or ecodesign criteria, life-cycle costing etc.

The PCP aims to be future proof and the resulting solutions will be well-positioned to meet both future legislative trends and growing environmental customer demands by the time they will be commercialised on the market.

The relevant call conditions of the HE grant containing additional environmental requirements shall apply under this criterion.

Broader environmental legislation in the specific field(s) addressed by the PCP (e.g. climate change, environment, etc). For instance, the European Green Deal created a wave of new legislative initiatives that have either already or will still come into force over the coming years. In addition, the national environmental requirements (e.g. several EU countries have already implemented stricter Green Public Procurement action plans, targets and rules than the European ones) shall be taken into account. The PCP procurement should comply with those.

The PCP will create positive environmental impacts, in order to contribute to reverse current disastrous trends and/or restore the environment (e.g. decrease GHG emissions and combat climate change, move to a cleaner mix of energy and resource usage, reduce waste, increase circularity, restore precious ecosystems and their biodiversity, improve the air and water quality etc).

The relevant environmental requirements for the PCP (see Annex) and request tenderers to demonstrate how their approach for both the proposed PCP project activities and the subsequent solution commercialisation will result in a positive environmental impact. Make smart use of Green Public Procurement principles, such as the EU GPP and/or eco-design criteria, life-cycle costing etc.

Such additional criteria will help to ensure that the PCP is future proof and the resulting solutions will be well-positioned to meet both future legislative trends and growing environmental customer demands by the time they will be commercialised on the market.

A.4. Contribution to digitalisation harmonisation across EU. This sub award criterion should consider the following:

Digitalisation

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This Horizon Europe funded PCPs should embrace and take into account the digital transition. The European Digital Decade policy[15] has set targets for all Member States to reach 100% digitalisation of public services by 2030 and to boost investments in innovative digital solutions to make this happen *(e.g. robotics, AI/big data, blockchain, digital twins, virtual/augmented reality and the metaverse, quantum computing, advanced semiconductor solutions, digital design and manufacturing)*. Modernising both manufacturing processes and resulting products with digital technologies can enable the public sector as early adopter of digitally enabled solutions to provide faster, cheaper and higher quality public services to European citizens.

The first report on the status of the Digital Decade calls on Member States to develop action plans in support of innovation procurement and step up efforts to more than double public procurement investments in developing, testing and deploying innovative digital solutions in order to reach full speed adoption of innovative digital solutions in public services[16]. There is a need for significantly higher investment in all fields of public sector activity, such as health, public administration, transport, security, education and culture, construction, energy, water, and environment. Moreover, a Commission recommendation[17] has identified 10 technology areas as 'critical' for the EU's economic security, meaning areas that require substantial increased investments in Europe: artificial intelligence, robotics and autonomous systems, advanced semiconductors, advanced connectivity and advanced digital technologies, quantum, advanced sensing, space, and energy and biotechnologies, advanced materials, manufacturing and recycling technologies. Clearly, ICT technologies prominently appear as critical for Europe's economic security. Therefore, the technical requirements and the award criteria are set to encourage tenderers to make best use of existing digital technologies and/or to develop and test new digital innovations, in order to deliver the PBG higher quality and/or lower cost solutions.

The Horizon Europe requirements for certain digital technologies and/or other relevant EU legislation/EU initiatives shall be taken into account in the specification of your technical requirements.

Artificial intelligence

Artificial Intelligence can bring enormous benefits to improve the efficiency and effectiveness of public sector processes with intelligent data analysis. Where the procurement involves artificial intelligence, it should follow the Guidance on Ethics by design and Ethics of use approaches for AI[34] to ensure that the AI is trustworthy, i.e. lawful, ethical and technically robust.

Due diligence is required regarding the trustworthiness of all artificial intelligence-based systems or techniques. AI-based systems or techniques must be developed in a safe, secure and responsible manner, with a clear identification of and preventative approach to risks. To a degree matching the type of risk that the AI application presents[18], AI-based systems or techniques should be, or be developed to become (implicitly or explicitly contributing to one or several of the following objectives):

- Technically robust, accurate and reproducible, and able to deal with and inform about possible failures, inaccuracies and errors, proportionate to the assessed risk posed by the AI-based system or technique
- Socially robust, in that they duly consider the context and environment in which they operate
- Reliable and to function as intended, minimising unintentional and unexpected harm, preventing unacceptable harm and safeguarding the physical and mental integrity of humans
- Able to provide a suitable explanation of its decision-making process, whenever an AI-based system can have a significant impact on people's lives.

Data handling

15 https://digital-strategy.ec.europa.eu/en/policies/europes-digital-decade
16 https://digital-strategy.ec.europa.eu/en/library/2023-report-state-digital-decade
17 Recommendation and Annex respectively: https://defence-industry-space.ec.europa.eu/system/files/2023-10/C_2023_6689_1_EN_ACT_part1_v8.pdf and https://defence-industry-space.ec.europa.eu/system/files/2023-10/C_2023_6689_1_EN_annexe_acte_autonome_part1_v9.pdf
18 See the European AI act for the different risk levels and the corresponding requirements for each level: https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence

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The PCP procurement should be in line with the EU open data strategy[19].

Using publicly available data in procurements and making more data resulting from procurements publicly available is essential to enable new services and applications across Europe. Therefore, it will be ensured to follow the requirements on open data resulting from Horizon Europe and from the EU directives on open data.

For procurements that involve physical products that include software, it should be ensured compliance with the EU Data Act[20] and the right to repair that open possibilities for products to be repaired by third parties.

Where relevant the new European data spaces should be taken into account. The nine initial Common European data spaces are the following:

- An industrial data space — to support the competitiveness and performance of the EU's industry.
- A Green Deal data space — to use the major potential of data in support of the Green Deal priority actions on issues such as climate change, circular economy, pollution, biodiversity, and deforestation.
- A mobility data space — to position Europe at the forefront of the development of an intelligent transport system.
- A health data space — essential for advances in preventing, detecting and treating diseases as well as for informed, evidence-based decisions to improve the healthcare systems.
- A financial data space — to stimulate innovation, market transparency, sustainable finance, as well as access to finance for European businesses and a more integrated market.
- An energy data space — to promote a stronger availability and cross-sector sharing of data, in a customer-centric, secure and trustworthy manner.
- An agriculture data space — to enhance the sustainability performance and competitiveness of the agricultural sector through the processing and analysis of data.
- Data spaces for public administrations — to improve transparency and accountability of public spending and spending quality, fighting corruption, both at EU and national level.
- A skills data space — to reduce the skills mismatches between the education and training systems and the labour market needs.

The tender requirements are in line with the EU GDPR Regulation[21] to ensure correct handling of privacy issues and processing of personal data. Where required by the Regulation, the handling of personal data requires consent from the owner of the data and must be restricted in scope and time duration. In particular, in relation to [the text of the detailed in the contractual provisions for personal data in the contract(s) *(see Framework Agreement, Article 11– Processing of personal data)*.

If needed, also other security sensitive project data should be restricted geographically, to trusted geographical locations *(e.g. restriction of locating the servers handling the data in EU countries only)*. In particular, in relation to [the text here detailed in the contractual provisions for security related data in the contract(s) *(see Framework Agreement, Article 10 – Security related obligations).*

Cybersecurity

With the digitalisation of public services and an increasing dependence on networks, another key concern is to consider security requirements in the procurement of ICT-based solutions, in order to

19 https://digital-strategy.ec.europa.eu/en/policies/strategy-data
20 Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (COM (2022)68 final).
21 https://eur-lex.europa.eu/eli/reg/2016/679/oj

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protect essential services and critical infrastructures. Therefore, the tender requirements are compliant with the EU Network Information Security Directive (NIS), where needed. The new NIS directive (NIS II) extends the digital security obligations to a wider group of entities, i.e. in addition to entities that were already covered by NIS I (healthcare, energy, water supply, transport, banking and financial market infrastructure, digital infrastructures and digital services) the following new sectors are targeted under NIS II: public administrations, waste management, food, space, postal/courier services, manufacturing of certain critical products such as pharmaceuticals, chemicals.

In order to better protect Europe against cyber-attacks, the EU Cyber Resilience Act[22] is defining minimum cybersecurity requirements for digital products and the EU has mandated the ENISA Agency to prepare European cybersecurity certification schemes[23] for ICT products, ICT services and ICT processes — with the goal of establishing (and harmonizing) the cybersecurity compliance of these products, services and processes. Currently, ENISA is developing certification schemes for ICT products, cloud services and mobile networks (in particular, 5G). The resulting certificates will be recognised in all EU Member States.

Blockchain

In case the procurement uses blockchain technology, it should be considered if it can make use of the European Blockchain Services Infrastructure (EBSI)[24]. EBSI is a European wide infrastructure (covering all EU Member States, Norway and Liechtenstein) that enables public administrations, and eventually also companies, to provide cross-border blockchain based services across Europe.

Green digital solutions

In case the procurement has a digital element, the tender requirements should align with the green initiatives in the digital sector in Europe.

For example, in the context of the EU Green Deal the EU has announced the introduction of Digital Product Passports that will help buyers to verify and follow up the circularity and green claims of the products they buy on the EU market.

The EU has set also objectives to green datacenters, telecommunications and blockchain networks and is strengthening the eco-design criteria and energy labels to reduce the environmental impact of ICT solutions (reducing CO2 emissions, improving energy efficiency, repairability, circularity etc).

The EU is also working together with European Green Digital Coalition to develop methods that can be used by public procurers to measure the net environmental impact of green digital solutions (that can consist of a combination of hardware and software)[25]. This effort is expected to feed into the European Commission's planned activities to define additional green public procurement criteria for the ICT sector.

Should there be any doubt as to any of these criteria, tenderers may be requested to provide additional information.

- ⚠ **Additional sub-criteria may be added for the call-offs for phase 2 *[*and 3*]*, as a way of making the award criteria more precise, provided that they do not substantially change the existing criteria.**
- ⚠ **The weighted award criteria shall ensure that the procurers get the best value for money. Therefore, the lowest price as the sole criterion is not used, without taking quality into account, neither the highest quality is used as the sole criterion, without taking price into account.**

The technical quality and price award criteria, weightings and thresholds are set so as to favour the most economically advantageous tenders. The thresholds per criterion and the total threshold are defined above.

22 https://digital-strategy.ec.europa.eu/en/library/cyber-resilience-act
23 https://www.enisa.europa.eu/topics/certification
24 https://digital-strategy.ec.europa.eu/en/policies/european-blockchain-services-infrastructure
25 https://www.greendigitalcoalition.eu/

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3.5 Evaluation procedure

Opening of tenders

The Administrative Procurement Committee (APC) composed by at least three members of the Lead Procurer will open the tenders. The APC will check the tenders vis-à-vis the exclusion, selection and pass/fail award criteria.

Tenders not complying with the formal requirements will be excluded from the tender evaluation.

The date for the opening of the tenders and how tenderers can participate is explained below..

For phases 2 *[*and 3*]*, there may be differences in the composition of the opening committee or in the procedure, as explained below.

Evaluation

For the purpose of the evaluation of the bids, the following different Committees are appointed. Also for the implementation of the PCP tender the following four bodies will guarantee the soundness of the procedure:

The Administrative Procurement Committee (APC) will be composed by at least three members of the Lead Procurer and will have a dedicated role with the view to support and spend up the tender procedures during the procurement execution. In this regard, the APC members will support the Lead Procurer on the tender's evaluation (evaluating the tenders against the exclusion and selection criteria, contact excluded bidders).

The Financial Evaluation Committee (FEC) will be constituted by a group of experts, representatives from the Buyers Group, specialising in economic and business aspects of the procurement process. Chaired by the Lead Procurer's representative, the FEC receives supplementary assistance from economic advisors as necessary. The FEC conducts comprehensive reviews to assess the project's financial and business viability.

Throughout all phases of the PCP process, the FEC supports the evaluation of the end-of-phase reports submitted by contractors. Its primary objective is to ensure alignment with economic and business-related requirements as drafted in the tender as well as to provide feedback on their commercialisation plans. Decisions within the FEC are reached through consensus and are then presented to the Procurement Evaluation Board (PEB) for final decision-making. This collaborative approach ensures that financial considerations are carefully integrated into the broader project framework, ultimately enhancing the project's overall success.

The Technical Evaluation Committee (TEC) will be comprised of technical and domain-specific experts, a representative from the Buyers Group, and chaired by the Lead Procurer's representative. It will receive support (without voting rights) from expert advisors as needed. The primary responsibility of the TEC is to ensure the project progresses in a timely manner and the delivery of high-quality results.

Throughout all phases of the PCP process, the TEC will review the end of phase reports and the proposals submitted by contractors, ensuring compliance with technical requirements. The committee proposes acceptance or rejection of deliverables and the proposals to the PEB. The TEC addresses complaints submitted by economic operators during the tendering process, providing recommendations to the PEB for final decision. Decisions within the TEC are reached through consensus, reflecting a collaborative approach to project oversight and decision-making.

The Procurement Evaluation Board (PEB), chaired by the Lead Procurer representative and integrated of at least one representative from each end user, will serve as the decision-making body overseeing the tendering process and subsequent contract execution.

Bids will be evaluated in a non-discriminatory and transparent manner.

At the end of the evaluation procedure, a ranking will be drawn up, in which the technology providers will be inserted based on the overall score achieved, in descending order.

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In case the bids of two or more technology providers obtain the same overall score, but with different partial scores for the price and for all the other different evaluation elements, the technology provider who obtained the best score on the technical offer will be placed first in the ranking.

The evaluation process and initial contract award will follow steps:

- Step 1: Checking the exclusion criteria per technology provider. Performed by the APC.
- Step 2: For technology providers passing step 1, checking the selection criteria per technology provider. Performed by the APC.
- Step 3: For technology providers passing step 2, checking the pass/fail award criteria per technology provider. Performed by the APC.

Formal Approval by PEB of the outcome of the three prior steps.

- Step 4: For technology providers passing step 3, evaluating the Bids based on the weighted award criteria. Performed by TEC.
- Step 5: Opening of the financial offers. Performed by APC.
- Step 6: Evaluation of the financial offers. Performed by FEC.

Formal Approval by PEB of the outcome of the two prior steps.

- Step 7: Final ranking by PEB.
- Step 8: Provisional award decision by PEB & communication thereof.
- Step 9: Final award decision after the standstill period (ten days) & signing of framework agreement and phase 1 contract.

This approach should be further fine-tuned based on the detailed design of the procurement strategy and the evaluation scheme.

Scoring

The system for scoring, qualitative appraisal and ranking consist of [ ] *(e.g. starting from a first round of individual evaluations and concluding with a final agreed qualitative appraisal; the scoring for each tender and the final ranking list of all tenders agreed by the lead procurer and the PBG)*.

The table below contains the Scoring Model that will be used by the TMC and the PEC to assess and score the extent to which a Tender/Offer is meeting the Award Criteria.

Score	Description
0	The description fails to address the Objective or cannot be assessed due to missing or incomplete information.
0,2	Poor – Objective is inadequately addressed or there are serious inherent weaknesses.
0,4	Fair – The description broadly addresses the Objective, but there are significant weaknesses.
0,6	Good – The description addresses the Objective well, but a number of shortcomings are present.
0,8	Very good – The description addresses the Objective very well, but a small number of shortcomings are present.
1	Excellent – The description successfully addresses all relevant aspects of the Objective. Any shortcomings are minor.

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Every score per quality criterion (all, will be multiplied with the weight for the criterion). For example, if a tender scores 0,8 points (Very good) for sub criterion X, this means this tender receives 0,8 points * 5 = 4 points in total for this criterion out of a maximum of 5 points. Per criterion, this same methodology will be used. If a tender would score the maximum number of points for every criterion, it will receive the total maximum technical score of 80 points.

Awarded points for each criterion will be multiplied by weighting percentage for particular criteria leading to a final score per criteria. The final score for Tenderer is a sum of all final criteria scores.

The maximum scoring obtained after the proposal evaluation shall be 100 points, where:

- 20 percentage of the points correspond to the **Financial Offer**, and
- 80 percentage of the points correspond to the **Technical Offer**

Following the Scoring Model:

Li = 80 * (Ti /Tmax) + 20 * [(Fmin for Phase 1/Fi for Phase 1) + (Fmin Phase 2/Fi for Phase 2) + (Fmin for Phase 3/Fi for Phase 3)]

Where

- Tmax Technical Score of the Best Technical Tender for the Phase
- Ti Technical Score of the Tender i
- Fmin Lowest Price of all Tenders for each Phase
- Fi Price of the Tender i for each Phase
- Li Total Score of the Offer i rounded to two decimals places.

This formula will be used for all the Phases of the PCP.

The type of feedback tenderers will receive from the evaluation of their tender consists of [ ].

For phases 2 *[*and 3*]*, differences in the composition of the evaluation committee or in the procedure may be finetuned and communicated in due time. In particular, it is highlighted that the evaluation of offers for phase 2 *[*and 3*]* has only 2 steps: evaluating the offers based on the on/off and weighted award criteria.

⚠ **Under the HE grant, the PBG and lead procurer are obliged to evaluate the tenders and offers for the call-offs for phase 2 *[*and 3*]* *jointly* and must make a *joint* award decision.**

Any potential conflicts of interest shall be avoided.

For each phase and each tender received, the evaluation documents must be submitted as deliverable under the HE grant agreement — at the end of the tender evaluation. These deliverables should include: the final scores awarded, a qualitative appraisal per evaluation criterion, minutes of the evaluation meeting and the final ranking list.

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4. CONTENT AND FORMAT OF TENDERS

4.1 Format

The tenders must meet the formal requirements (including the address for submission of the tender and requirements relating to the presentation of the offer and its packaging).

The tenders must:

- Contain administrative, technical and financial sections.
- Indicate their minimum validity period (from submission).
- Be signed by an authorised representative.

Tenders that do not comply with the formal requirements will automatically be rejected.

More detailed information about the final layout requirements for the phase 2 *[*and 3*]* offers will be provided in the call-off.

Submission and communication via TenderNed

This is a fully digital tendering procedure that runs through TenderNed (www.tenderned.nl). This means that all communications including the Tenders are only possible via TenderNed and must be directed to the contact person of STOWA. It is not permitted to have any other contact about this PCP tender with other employees of the contracting authority, unless explicit written permission from a contact person has been received. Failure to comply with this provision may lead to exclusion.

The use of this platform is done on a voluntary base, as this procurement is a PCP that falls outside the scope of the Gewijzigde Aanbestedingswet 2012.

A Tenderer must register on TenderNed, free of charge. If Tenderer already has a company registration on TenderNed, no new registration is needed. Registration is possible via www.tenderned.nl by filling in a web form. Note: the registration can take up to a week. Suppliers are responsible for timely registration. The "TenderNed Terms of Use" apply.

A Tenderer is expected to have all the required knowledge to be able to correctly complete a tender procedure in TenderNed. The functioning of TenderNed is explained in the manual that can be downloaded from the main page after the Tenderer has logged in. If you need instructions in English, please follow this link https://www.tenderned.nl/cms/english/six-stepsbidding-public-procurement-contracts-online-through-tenderned

On the basis of this Request for Tender, the Tenderer must fill-out the requested data on TenderNed and add the accompanying statements and information. Suppliers are explicitly requested to use the formats in TenderNed. The use of other formats leads to the invalidation of the Tender.

For technical questions about TenderNed, the Tenderer should contact the TenderNed helpdesk, which can be reached on workdays via telephone number 0800 - 836 33 76 or via the e-mail address https://www.tenderned.nl/cms/contact/mailen

Tenderers must ensure that WBL has the correct e-mail address and telephone number of the Tenderer's contact person. It is recommended that, in addition to the specified contact person, at least one replacement contact person has access to the tender via TenderNed at all times during the tendering procedure with a view to possible illness, vacation or unforeseen issues. For further instructions on this, see the TenderNed user manual.

As soon as new documents with regard to this Request for Tender are available in TenderNed, all registered contact persons will receive an e-mail notification via servicedesk@tenderned.nl

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The tenderer is responsible for ensuring that these e-mail notifications are permitted by e-mail protection (firewall, spam filters). Neither STOWA, nor TenderNed is responsible in the event that these e-mail notifications are blocked by the e-mail security of the Tenderer. Advice: add the e-mail address to trusted addresses or contact your own system manager for this. If Tenderer (for whatever reason) has not received an email notification, the consequences thereof will be for the account and risk of the Tenderer.

The date and time indications in this Request for Tender are leading. Only updated date and time indications written in notices of information of STOWA will prevail over the indications in this Request for Tender.

STOWA reserves the right to switch to another electronic platform during the term of the Framework Agreement. STOWA will inform the Tenderer of this change in a timely manner, at least one month in advance.

STOWA cannot guarantee (and also provides no guarantee) that TenderNed can be accessed or used at any time without any problems. If there are problems with gaining access to TenderNed and / or the use thereof, the Tenderer must immediately report this to the TenderNed support team, whereby the Tenderer also sends an e-mail to the e-mail communicated by STOWA. If there is a disruption at TenderNed just before the expiry of the term for submission of the Tender, STOWA reserves the right to extend this term provided that it has not yet opened the already submitted Tenders.

If the Tenderer wishes to withdraw from participating in the tender at any time, he must announce this on TenderNed via the “Revoke the Tender” dashboard, possibly accompanied by a reason.

Format requirements

The following requirements will apply regarding the format of tenders. Tenderers or Contractors that do not comply with the formal requirements will be excluded from further participation in the PCP:

- Where a signature is requested, the relevant document must be validly signed by a duly authorized person(s). The signature must be from a staff member or staff members who according to the extract from the professional register or trade register is authorized to represent the Tenderer. If a document is signed by a person not listed in the professional register or trade register, an adequate proxy must be attached. Such a proxy must be signed by a person or persons who according to the extract from the trade register or the professional register or according to the articles of association are authorized to represent and bind the Company. The proxy must clearly state that the proxy holder is authorized to represent the company in connection with this tender.
- The Tender must be submitted in English.
- All Tenders must be made using the Tender Forms.
- Tenders must not be qualified or accompanied by statements or a covering letter that might be construed as rendering the tender equivocal.
- The Tender has the character of an irrevocable offer with a validity period of 30 calendar days, counting from the closing date for submission of tenders. If the award decision is objected to in preliminary relief proceedings, the validity period will be extended. The validity period will then be extended by 30 calendar days, counting from the first day on which it ceased to be possible to appeal from the court judgment regarding the objection to the provisional award.
- Amounts must be stated in euros, excluding VAT, unless otherwise stated.
- All tenders must contain an administrative, technical and financial section (see Tender forms).
- More detailed information about the final layout requirements for the phase 2 and 3 offers will be provided in the call-off for that specific phase.

Tenders that do not comply with the formal requirements may be rejected.

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4.2 Administrative section

Tenders must include the following information (the documentary evidence necessary to identify the tenderer and to evaluate the tender against the exclusion, selection and on/off award criterion B and — for joint tenders — the mandate for the lead contractor).

For PCPs that impose control restrictions based on the HE call conditions, it is necessary to include the Annex [xxx] Declaration of ownership and control.

The lead procurer may request clarification or additional evidence where there is any doubt.

More detailed information for the phase 2 *[*and 3*]* offers will be provided in the call-offs.

4.3 Technical section

Tenders must include a technical offer containing:

- A technical plan that outlines: 1) the tenderer's idea for addressing all the requirements given in the PCP challenge description, relating both to functionality and performance; and 2) technical details of how this would be implemented, including also the proposed approach for complying with the do no significant harm principle *[*and with the gender dimension (if relevant).
- A draft business plan that explains the proposed approach to commercially exploit the results of the PCP and to bring a viable product or service onto the market.
- A list of the pre-existing rights (background) relevant to the tenderer's proposed solution, in order to allow IPR dependencies to be assessed.
- A risk assessment and risk mitigation strategy.
- A reply to the question "Does this tender involve ethical issues? (YES/NO)" and if YES, an ethics self-assessment, with explanations how the ethical issues will be addressed.
- A reply to the question "Does this tender involve: activities or results that may raise security issues and/or EU-classified information[26] as background or results? (YES/NO)" and if YES information on how these issues will be addressed.
- …

Tenders failing to meet these requirements will be excluded.

The technical part must provide a *detailed* technical offer for phase 1 (including an explanation of the methodology, a work plan and details of deliverables and milestones) and must specify the plans for and objectives of the subsequent phases 2 *[*and 3*]* and beyond (including a plan for commercial exploitation of the results).

The technical section of the tender should be drafted according to **the template provided (TD8).**

The information provided in the technical section of the tender will be used to evaluate the tenders, on the basis of the technical award criteria and the on/off award criteria A, D and E. Information regarding on/off award criteria B and C is verified through the financial section of the tender.

More detailed information for the phase 2 *[*and 3*]* offers (in particular on the technical implementation plan, updated business plan and list of IPRs) will be provided in the call-offs.

[26] See Decision 2015/444/EC, Euratom on the provisions on security of EU-classified information.

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4.4 Financial section

The tender must include a detailed financial offer specifying:

- Binding unit prices for all items needed for carrying out phase 1 and for items that are expected to be needed for phase 2 *[*and phase 3*]* (given in euros, excluding VAT but including any other taxes and duties)
- A fixed total price for phase 1 and an estimated total price for phase 2 *[*and 3*]*, broken down to show unit prices and the number of each unit needed to carry out phase 1 (given in euros, excluding VAT but including any other taxes and duties).

In addition, the financial section must include:

- A price breakdown that shows the price for R&D services and the price for supplies of products (to demonstrate compliance with the definition of R&D in on/off award criterion A).
- A price breakdown that shows the location or country in which the different categories of activities are to be carried out *(e.g. x hours of senior researchers in country L at y euro/hour; a hours of junior developers in country M at b euro/hour),* which personnel profile corresponds to principle R&D personnel. *PCPs that involve security related R&D should indicate* which personnel profile is working on security components*]* (to demonstrate compliance with the requirement relating to place of performance in on/off award criterion C).
- The financial compensation valuing the benefits and risks of the allocation of ownership of the IPRs to the contractors (i.e. IPRs generated by the contractors during the PCP), either:
  - *[OPTION 1 if the procurers choose 'ex ante' valuation of the IPRs:* by giving an absolute value for the price reduction between the price offered in the tender compared to the exclusive development price (i.e. the price that would have been quoted were IPR ownership to be transferred to the procurers)*]*
  - *[OPTION 2 if the procurers choose 'ex post' valuation of the IPRs:* by confirming the tenderers' agreement with the chosen royalty scheme specified by the procurers, including the percentage of royalties that contractors will have to pay on sales/profits made from commercial exploitation of the IPRs*]*

  in order to ensure compliance with the EU R&D&I state aid framework.

⚠ **The unit prices quoted for each category of items *(e.g. hourly rates for junior and senior researchers, developers and testers)* remain binding for all phases (i.e. for the duration of the framework agreement).**

The financial section of the tender should be written following the template provided (TD9).

The following formula will be used for unit prices that can be indexed for phase 2 *[*and 3*]*.

[ ]

The financial compensation for allocating IPR ownership to the contractors must reflect the market value of the benefits received *(i.e. the opportunity that the IPRs offer for commercial exploitation)* and the risks assumed by the contractors *(e.g. the cost of maintaining IPRs and bringing the products onto the market)*. Note that when the value of the risks equals or exceeds the value of the benefits, the financial compensation offered by vendors may be zero.

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The information provided in the financial section of the tender will be used to evaluate the tenders on the basis of the price award criteria and the on/off award criteria A, B and C. For on/off criterion B, the financial section can contain a self-declaration asking the tenderer to declare compliance of his offer with other public financing sources.

More detailed information for the phase 2 *[*and 3*]* offer will be provided in the call-off. The price for phase 2 *[*and 3*]* offers must be based on the binding unit prices in the tender and the price conditions set out in the framework agreement. Where new units/unit prices *(e.g. for new tasks or equipment)* are subsequently added to the offers for phase 2 *[*or phase 3*]*, they will become binding for the remaining phases.

Similar price breakdowns will be requested for the call-offs for phase 2 *[*and 3*]*.

The VAT regime(s) that apply are as follows [ ]. If all contractors will be paid by the lead procurer *(centralised payments)*, it will be the VAT regime of the lead procurer. If the contractors will be paid by each procurer in the PBG individually (pro rata to its contribution to the PCP procurement budget; decentralised payments), it will be the VAT regime for each procurer for its share of the payment.

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5. MISCELLANEOUS

5.1 Language

All communication (relating to either the tender procedure or the implementation of the contract) must be carried out in English.

Tenders as well as offers for phase 2 *[*and 3*]* call-offs must be submitted in English.

Deliverables must be submitted in English.

Indicate specific language requirements, if necessary (for example, if certain tasks need to be carried out in cooperation with third parties locally, e.g. for field-testing with end-users who may speak only the local language).

5.2 Tender constitutes binding offer

A signed tender will be considered to constitute a firm, irrevocable, unchangeable and binding offer from the tenderer.

The signature of an authorised representative will be considered as the signature of the tender (and will be binding on the tenderer or, for joint tenders, the group of tenderers).

5.3 Unauthorized communication — Questions

The Q&A from the open market consultation can be found on [indicate the website where the Q&A from the open market consultation phase can be found].

For further questions, you may contact [the lead procurer via email and/or by other means] in English [and any additional languages chosen by the lead procurer and the PBG] until [insert date].

The summary of all questions and answers will be presented in an anonymised Q&A document that will be published on [indicate the website where the Q&A will be uploaded] in English [and any additional languages chosen by the lead procurer and the PBG] (final version planned for [insert date]). For phase 2 and *[3]*, the answers will not be published, but distributed to all contractors that successfully completed the previous phase.

⚠ **All other contacts (or attempted contacts) will be considered unauthorised and may lead to the exclusion of your tender.**

5.4 Confidentiality

Tenderers must keep confidential any information obtained in the context of the tender procedure (including EU-classified information[27]).

[27] Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU-classified information.

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5.5 Contract implementation

Successful tenderers will be requested to sign both a framework agreement for the entire duration of the PCP and specific contracts for each phase *(see the models given in Annexes 1 and 2)*.

Monitoring

During each phase, contract implementation will be monitored periodically and reviewed against the expected outcomes (milestones, deliverables and output or results) for the phase.

Each contractor will be assigned a main contact person (their supervisor) from the monitoring team appointed by the procurers.

There will be regular monitoring meetings between contractors and the supervisor/monitoring team.

[Explain how often they will take place, how they will be conducted (physical meetings or remote/online meetings), and what they will involve. The contractors could be asked to discuss the results achieved in the preceding period and present their updated work plan; the monitoring team or supervisor could visit the contractors' premises to periodically monitor progress; the contractors could visit the procurer's premises (in particular at the start of a phase to get to know better the operational environment that solutions need to be designed for). Clarify that the contractors must cover their own costs and thus foresee personnel and travel budgets in their offer. In case of PCPs with lots, clarify if and when there will be meetings that involve contractors from the different lots to sort out dependencies between lots and to ensure that building blocks under development in different lots will ultimately work together as expected.]

The monitoring team [or supervisor] will provide regular feedback to contractors after meetings or visits.

[Explain how and when this will take place and how this will allow contractors to continuously improve the way in which their solutions address the problem set out in the PCP description.]

Payments based on satisfactory completion of milestones and deliverables of the phase

Payments corresponding to each PCP phase will be subject to the satisfactory completion of the deliverables and milestones for that phase.

Satisfactory completion will be assessed by an assessment committee composed of [describe the composition of the assessment committee, without mentioning their names].

Satisfactory completion will be assessed according to the following requirements:

- If the work corresponding to that milestone/deliverable has been carried out.
- If a reasonable minimum quality has been delivered.
- If the reports have been submitted on time.
- If the monies have been allocated to the planned objectives.
- If the monies have been allocated and the work has been carried out according to the on/off award criteria (place of performance, public funding and R&D definition criteria).
- If the work has been carried out in compliance with the provisions of the contract (including in particular verification if the contractors have duly protected and managed IPRs generated in the respective phase).

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'Reasonable minimum quality' of a report means that:

- The report can be read by somebody who is familiar with the topic, but not an expert.
- The report gives insight in the tasks performed in and the results.
- The report is made using the end of phase report form or (if applicable) the milestone report form and the requirements of this form have been met.
- …

'Reasonable minimum quality' of a demonstration (for phase 2 *[*or 3*]*) means:

- The demonstration can be understood by somebody who is familiar with the topic, but not an expert (for instance, somebody with operational but not technical knowledge).
- The demonstration shows how the innovation works, how it can be used and (if applicable) how it is operated and maintained.
- The demonstration is accessible to parties appointed by the procurers, unless these are direct competitors of the contractors.
- ...

Satisfactory completion in each of the phases does not mean successful completion. *(A PCP could, for instance, be satisfactorily completed even if it concludes that the innovation is not feasible.)*

The assessment will consider the efforts made by contractors to take into account the feedback from the supervisor or the monitoring team.

[Specify the terms of approval for deliverables (for reports and demonstrations respectively), in particular how many days the contractors have to approve/request modifications/reject deliverables, how many days the contractors have to resubmit deliverables.]

Where the assessment committee judges the completion of deliverables or milestones to be unsatisfactory, [explain what happens, in particular the possible consequences in terms of reducing or withdrawing payments for that deliverable and/or terminating the contract].

Invoices must be submitted *[*to the contracting authority*] [*pro-rata to each member of the PBG*]*.

In case pro-rata payments are used*:* For every payment, the contractors must create [insert a number equal to the number of procurers in the PBG] invoices which divide the amount according to the following distribution:

- [insert percentage that equals the ratio between the financial contribution of procurer X to the total PCP costs (including the applicable VAT in country X) and the total PCP costs (including VAT)] percent of the payment to be invoiced to [insert name of procurer X]]
- […] percent of the payment to be invoiced to [insert name of procurer Y]]
- …

Contractors' invoices must provide:

- A price breakdown showing the price for R&D services and the price for supplies of products (in order to demonstrate compliance with the definition of R&D in on/off award criterion A).
- A price breakdown showing the location or country in which the different categories of activities were performed *(e.g. x hours of senior researchers in country L at y euro/hour, a hours of junior*

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developers in country M at b euro/hour), which personnel profile corresponds to principle R&D personnel *[OPTION for PCPs that involve security related R&D:* and which personnel profile is working on security components*]* (to demonstrate compliance with the requirement relating to the place of performance in on/off award criterion C).

The payments will be made according to the following scheme [explain]. The amounts of the pre-instalments and interim payments (where applicable) and the payment of the balance will be as follows [explain].

Eligibility for the next phase based on successful completion of the phase

Eligibility for participation in the next phase will be subject to successful completion of the preceding phase.

Successful completion of a phase will be assessed by the assessment committee against the following requirements:

- If all milestones have been successfully completed.
- If the R&D results meet the minimum functionality/performance requirements of the challenge description *(i.e. the minimum quality/efficiency improvements which the procurers set forward for the innovative solutions to achieve).*
- If the results of the R&D are considered to be promising.
- …

'Promising' means:

- For phase 1, that the feasibility is convincing.
- *[for standard PCPs with 3 phases*: for phase 2, that the feasibility, the applicability in an operational setting and the potential impact of the product is convincing*].*

⚠ **Note that there is a difference between satisfactory completion (requirement for payment) and successful completion (prerequisite for passing from one phase to the next).**

Finalisation of phase 3: Possible follow-up PPI procurements

Follow-up PPI procurements for a *limited* set of prototypes and/or test products developed during this PCP procurement ('limited follow-up PPIs') may be awarded by negotiated procedure (with invitation to minimum 3 potential providers, including those that successfully completed this PCP).

Follow-up PPI procurements for a *commercial volume* of the innovative solutions developed in this PCP procurement will be subject to a new call for tenders.

[If possible, please provide an indicative schedule for the procurement process that the PBG would organise for deploying commercial volumes of the solutions, were the PCP to be completed successfully.]

5.6 Cancellation of the tender procedure

STOWA may, at any moment, cease to proceed with the tender procedure and cancel it. In particular, STOWA reserves the right to suspend or terminate the procedure in whole or in part, to change the time schedule (with the exception of shortening the legally established minimum periods) and to revoke and/or revise the Award Decision stating the reasons without being obliged to pay any compensation until the moment of signing the Framework Agreement.

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The procurers reserve the right not to award any contracts at the end of the tender procedure.

The procurers are not liable for any expense or loss the tenderers may have incurred in preparing their offer *[*except for [insert if mandatory limits under national law]*].*

5.7 Procedures for appeal

Any legal claim, petition or application for judicial review, with regard to the present procurement procedure, shall be lodged solely within the 15 calendar days after the award decision before Rechtbank [ ]. Any other judicial review for phase 2 and phase 3 award decision is not possible.

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PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

PCP TENDER DOCUMENT 2 FRAMEWORK AGREEMENT (TD2)

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PCP FRAMEWORK AGREEMENT (TD2)

DISCLAIMER: Contractors are aware that the Framework Agreement (and subsequent Contracts, if applicable) will be signed in its English version. With the submission of their Tenders, Contractors accept this fact.

PREAMBLE

This is a framework agreement ("Agreement" or "Framework Agreement") between the following parties:

on the one part, the "lead procurer" (contracting authority), **STICHTING TOEGEPAST ONDERZOEK WATERBEHEER (STOWA)** [ ]

acting in the name and on behalf of the *[*other*]* members of the Public Buyers Group (PBG) (together with the lead procurer: "procurers"):

1. HET WATERSCHAPSHUIS (hWh) (NL)
2. FORUM VIRIUM HELSINKI OY (FVH) (FI)
3. MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY (MINISTRY OF INTERIOR SLOVAKIA) (MoI) (SK)
4. GEMEENTE HAARLEM (CITY OF HAARLEM) (NL)
5. BUNDESANSTALT TECHNISCHES HILFSWERK (THW) (GE)
6. REGION OF CENTRAL MACEDONIA (RCM) (GR)
7. FORENINGEN KLIMATORIUM (KLIMATORIUM) (DE)
8. BENEGO – GRENSPARK KALMTHOUTSE HEIDE (BE)
9. INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA (ICGC) (SP)
10. CITY OF ROTTERDAM (NL)
11. SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA (SLOVAK ENVIRONMENTAL AGENCY) (SEA) (SK)

and on the other hand, the "contractor", [insert details of the contractor],

[*OPTION for joint tenders:* acting in the name and on behalf of the other members of group of tenderers:

1. [insert the details of the members of the group of tenderers]
2.

The members of the group of tenderers are hereafter collectively referred to as "the contractor" and will be jointly and severally liable vis-à-vis the lead procurer for the performance of this Framework Agreement and the Specific Contracts.***]***

The lead procurer, the PBG and the contractor(s) shall be referred to together as "parties", unless otherwise specified.

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By signing this Agreement, the parties agree to implement the Pre-Commercial Procurement (PCP) in accordance with the Agreement and all the obligations it sets out.

The Agreement is composed of:

Preamble

Terms and Conditions

Annex 1 Request for tenders

Annex 2 Contractor's tender

Now therefore, between the Parties, as above represented,

IT IS AGREED AS FOLLOWS:

TERMS AND CONDITIONS

Article 1 — Subject of the agreement

1.1. This Framework Agreement defines the general terms and conditions for the implementation of the PCP procurement of R&D services set out in Article XX and for the Specific Contracts that will be awarded for each of the PCP phases.

1.2. The Contractor irrevocably undertakes towards the Lead Procurer to carry out the activities referred to in the PCP Request for Tenders (TD1), in the Financial Offer (TD9) and the Technical Offer (TD8) submitted by the Contractor and to comply with all obligations incumbent thereupon under this Framework Agreement (TD2) and any awarded Phase Contracts (TD3, TD4, TD5) in a professional and skilful manner, meeting best industry practice.

1.3. The Contractor confirms to be aware of and to agree with the fact that the Lead Procurer may enter into similar agreements, relating to the same Project, with other Contractors of Phase 1, Phase 2 and/or 3.

Article 2 — Conditions for the execution of activities

2.1. The Contractor undertakes to fulfil the obligations under this Framework Agreement with its own means, by organizing and managing at its own risk.

2.2. The Contractor shall inform the Lead Procurer in compliance with and, in any case, promptly upon the Lead Procurer's first request, of the progress of the Project. Without prejudice to other provisions hereunder, especially in Article 5 Duties of the Parties, the Contractor shall notify the Lead Procurer of any proposed deviation from the agreed scope of work or if significant developments occur as R&D work progresses as soon as possible after the Contractor becomes aware of the necessity or usefulness of such deviation.

2.3. The Contractor shall ensure the communication between the Parties of this Framework Agreement and any other third party as may be required and duly notified to the Contractor by the Lead Procurer. Moreover, if needed, the Contractor shall provide advice to the Lead Procurer as required on the Project.

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2.4. The Contractor shall implement the Contract in compliance with all of the following obligations in line with the requirements of the Call for Tender (TD1):

a) The 'Compliance with the definition of R&D Services'.

b) The 'Place of performance obligation'.

c) The 'Place of establishment and control'.

In case of breach of any of the above contractual obligations, the Lead Procurer is entitled to require that the Contractor transfers the ownership of the Results to the Lead Procurer.

2.5. During the execution of the Framework Agreement and without any interference in the Contractor internal processes, the Lead Procurer and the Public Buyer Group reserve the right to monitor periodically the progress of the contractual performance.

2.6. The Contractor undertakes not to subcontract essential parts of the contracts, nor the management of the PCP activities (these tasks will have to be performed by the Contractor or at least by full-subsidiary companies owned by the Contractor), unless deemed necessary by both Parties and agreed upon in writing between the Parties. The Lead Procurer shall terminate this agreement forthwith in case of failure by the Contractor to comply with the provisions under this Article.

2.7. In providing the Services as required under this Framework Agreement and Phase Contract(s), the Contractor shall ensure full compliance with the requirements on R&D Services as defined in the most recent version of the Frascati Manual and, where applicable, its latest annexes.[28]

2.8. Subject to the confidentiality obligations set forth in Article 10, the Contractor grants to the Lead Procurer (acting, as the case may be, through agents authorized for that purpose) and to any statutory or regulatory auditors of the Lead Procurer, a right to access (and, if necessary, to copy) the relevant financial records during normal business hours.

2.9. Upon signing of this Agreement, the Contractor shall appoint a representative for this Framework Agreement, which will be the contact person with the Lead Procurer. The Contractor's representative will then have the ability, unless otherwise decided, to represent for all purposes the same Contractor.

2.10. At the execution date of this agreement, the Contractor will have to communicate the name, phone number and e-mail address of the representative.

Article 3 — Duration

3.1. The Project is divided into the following Phases:

- Phase 1: Solution design.
- Phase 2: Prototype development
- Phase 3: Operational Validation in 9 pilot sites.

3.2. Each Phase will have a duration in accordance with the planning provided in the Request for Tenders (TD1) and as agreed in each Phase Contract.

[28] OECD (2015), Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris, https://doi.org/10.1787/9789264239012-en)

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3.3. The Framework Agreement becomes effective upon signing by both Parties and shall remain in effect (unless terminated in accordance with Article 24) until the Completion Date (as defined in the Request for Tender) of Phase 1 or of a later Phase that has been awarded to the Contractor. However, confidentiality related obligations shall remain applicable for a period of four (4) years after the end of the Framework Agreement in accordance with Article 10.

3.4 The period of execution of the tasks may be extended only with the express written agreement of the Parties before the expiration of the period for execution of the tasks, in compliance with the provisions of Article X.

Article 4 — R&D services to be provided

The contractor shall provide the R&D services (tasks, deliverables and milestones) to develop solutions to tackle the challenge set out in the tender and the Specific Contracts, in compliance with the rules of the state aid framework for R&D&I in its latest version.[29]

Article 5 — Duties of the Parties

5.1. The Contractor is entering into this Framework Agreement on the assumption that the details of the Project as provided by the Lead Procurer are accurate and complete.

5.2. The Contractor undertakes to perform all the activities subject of this Framework Agreement in accordance with its provisions, the applicable regulations and the terms and conditions contained in the Tender Documents and related annexes, as well as the Financial Offer (TD3) and the Technical Offer (TD2). The Contractor undertakes to allocate sufficient resources to each Phase of the PCP that the Contractor is awarded, in order to comply with its obligations in each Phase. The Contractor also undertakes to ensure that each member of the Contractor's staff engaged on the Project observes the terms and conditions of this Framework Agreement and any amendment entered into between the Parties hereto. The Contractor's staff will be informed of any changes in the scope of the Framework Agreement or the PCP Project.

5.3. The Contractor undertakes to:

a) Co-operate with the Lead Procurer in all matters relating to the Project.

b) Obtain and at all times maintain during the collaboration all necessary Licenses and consents required for the performance of this Framework Agreement.

c) Subject to the prior written approval of the Lead Procurer, appoint or, at the written request of the Lead Procurer, holding reasonable grounds for the request, replace without delay:

i. The Contractor's representative; and/or

ii. The key staff, who shall be suitably skilled, experienced and qualified to carry out the Project.

d) Ensure the availability of the Contractor's representative and (key) staff for the purposes of the Project. The Contractor undertakes to ensure that all required key staff will be available to deliver the required Services at agreed levels of quality and in a timely manner. Notwithstanding the provisions of Article 24, the Lead Procurer may terminate this Framework Agreement with a Contractor if any of the Contractor's key staff are not available for the entire period needed to

[29] Framework for state aid for research and development and innovation https://ec.europa.eu/competition/state_aid/modernisation/rdi_framework_en.pdf

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fulfil their duties in the Project, subject to prior discussion having first been held with the Contractor to attempt to identify and agree a mutually acceptable replacement and where the lack of availability of one or more of the key staff causes a material risk to the fulfilment of the delivery objective of the Project.

e) Promptly inform the Lead Procurer of the absence of the Contractor's representative and/or key staff. If required by the Lead Procurer, the Contractor shall provide a suitably qualified replacement.

f) Not make any changes to the Contractor´s representative, sub-contractors or the key staff without the prior written approval of the Lead Procurer. Such approval not to be unreasonably withheld or delayed.

g) Ensure that the Contractor's team uses reasonable skill and care during the Project.

h) Be responsible for the accuracy and completeness of all drawings, documentation and information supplied to the Lead Procurer in connection with delivery of this Framework Agreement. The Contractor shall:

i. Observe, comply and ensure that the Contractor's team observes and complies with all rules, regulations and technical requirements and all any other reasonable requirements and safety regulations as well as those that may subsequently be enacted or issued by the Lead Procurer. For the avoidance of any doubt, the Contractor undertakes that any increased costs, resulting from the need to observe the rules and regulations referred to in the previous paragraph, even if entered into force after the signing of the Framework Agreement, will remain the exclusive responsibility of the Contractor, unless it would be unreasonable for Contractor to, in which case the Parties will consult with each other in all fairness how to deal with any of these increased costs. Therefore, the same Contractor cannot claim any payments against the Lead Procurer, the members of the Public Buyers Group and/or any other Third Parties, to the extent of its jurisdiction, and will assume all the risks related to any subsequent amendments to the law in force, which may impose additional charges subsequent to those provided at the time of the submission of Bids. The Contractor expressly agrees to indemnify and hold harmless the Lead Procurer, the members of the Public Buyers Group and/or any Third Party, for all the consequences arising from any breach by the Contractor of the rules and technical requirements, safety, and other related regulations.

ii. Acknowledge and adjust to any modification with respect to the specifications made by the Lead Procurer.

iii. Notify the Lead Procurer as soon as it becomes aware of any issues which arise in relation to the Project.

5.4. The Lead Procurer shall:

a) Co-operate with the Contractor in all matters relating to the Project. The main contact point will be [email], to which all relevant legal, administrative and technical representatives will have access to.

b) Provide access to the Lead Procurer's (and, if needed, the members of the Public Buyers Group) premises and sensitive Data if it is in accordance with Data protection officials, office accommodation and other facilities as may reasonably be requested by the Contractor and in line with the rules and regulations agreed in writing in advance with the Contractor for the purposes of the Project.

c) Provide such information as the Contractor may reasonably request and the Contractor considers reasonably necessary, in order to carry out the Project, in a timely manner, and ensure that it is accurate in all material respects.

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5.5. The Contractor acknowledges and unconditionally accepts that the Lead Procurer and the Public Buyers Group are and remain unconditionally entitled to analyse the Results of the PCP Phases and to re-use, integrate and to publish the advice (or parts thereof), in whatever form or manner the Lead Procurer deems necessary.

5.6. The Contractor will allow the European Commission, the European Court of Auditors (ECA) and the European Anti-fraud Office (OLAF) to exercise their auditing rights. This obligation applies to all its subcontractors.

5.7. Due to the short duration of the PCP, no changes in the members of a Consortium and/or subcontractors will be allowed unless in case of exceptional reasons that could not be foreseen. If that is the case, the new member of the Consortium and/or subcontractor has to meet all exclusion and selection criteria, to comply with the minimal Technical Requirements. The new member of the Consortium and/or subcontractor will have to sign the declarations of honour and any other required statements. The replacement cannot not entail a substantial modification of the Contract conditions.

Article 6 — Warranties and representations

6.1. The Contractor warrants and represents to have full capacity and authority to send all necessary usage Licenses, permits and consents with the related rights related to the PCP Project and continues to have this full capacity, authority, usage Licenses, permits and consents during the duration of the Framework Agreement.

6.2. The Contractor warrants that the information it will provide under the Framework Agreement will be correct, accurate and up to date.

6.3. The Contractor warrants that during the term of this Framework Agreement and up-to a period of four (4) years after termination of this Framework Agreement, it shall fully comply with, act in accordance with and respect the open hardware terms and conditions as well as the opensource licensing terms and conditions as detailed in the requirements.

Article 7 — Pricing, payment and accounting

7.1. The Lead Procurer will be responsible for the payments on behalf of the Public Buyers Group.

7.2. The total amount to be paid by the Lead Procurer to the Contractor shall not exceed the relevant amounts detailed in the Request for Tender (TD1).

7.3. The price for the R&D services to be implemented for each PCP phase will be set out in the Specific Phase Contracts.

7.4. Prices indicated and submitted by the Contractor in the Financial Offer (TD8) during the tender shall be considered a binding maximum for the duration of the Framework Agreement and include all the costs and expenses. If the Lead Procurer decides to shift remaining budget to Phase 2 and/or Phase 3, the binding maximum may be adjusted for the call offs of Phase 2 and/or Phase 3, allowing the formulation of bids accordingly.

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7.5. Payments for the Contractor's Services for each Phase will be made according to the following provisions:

PHASE I: The Contractor may request a payment of thirty per cent (30%) in Month 2 of PCP Phase 1. The remaining seventy per cent (70%) will be invoiced following the communication of the Procurement Evaluation Board (PEB) decision confirming that the Contractor has completed Phase 1 satisfactorily. In case of non-satisfactory completion of Phase 1, any payment already made may be reclaimed, including the case in which the PEB concludes that Phase I was not even satisfactorily completed.

PHASE II: The Contractor may issue an invoice for the payment of an interim-payment equal to fifty per cent (50%) of the Price for Phase 2 following the communication of the PEB that the Contractor has satisfactorily completed D2.2 Intermediate progress report. The Contractor may issue an invoice for the remaining payment of fifty per cent (50%) following the communication of the PEB confirming that the Contractor has completed Phase 2 satisfactorily.

PHASE III: The Contractor may issue an invoice for the pre-payment equal to fifty per cent (50%) of the Price for Phase 3 after signing the Phase 3 Contract (TD5). The Contractor may issue an invoice for the final payment of fifty per cent (50%) following the communication of the PEB confirming that the Contractor has complied with the Performance Conditions and the functional specifications applicable to Phase 3 and has completed it satisfactorily.

7.6. Payments will be made by the Lead Procurer following the award of the Phase Contract and according to the payment schedule as defined in the PCP Request for Tender (TD1).

7.7. Payments for the Contractor's Services for each Phase will be made according to the following provisions: Payments corresponding to each PCP Phase will be subject to the satisfactory/successful completion of the deliverables for that Phase.

7.8. Payments will be made by the Lead Procurer following the submission of the relevant invoices. The Contractor will send the invoice once the deliverable has been accepted. Invoices are to be submitted in Euros. The Contractor shall state the Price with and without VAT. Any other taxes, levies, tariffs and duties (including sales, service, use, lease, personal property, consumption, excise, withholding, or property) associated with the Contractor's performance of the Framework Agreement or which may be levied on the Price shall be the Contractor's responsibility.

7.9. The Lead Procurer will liquidate the mentioned invoices in the dedicated current account detailed by the Contractor. The Lead Procurer may suspend the payment at any time if, in the view of the Lead Procurer or the PEB, acting reasonably, satisfactory progress on the Project has not been maintained, or reports have not been submitted as required.

7.10. All activities necessary to a full and regular compliance with the contractual terms and conditions shall be the sole responsibility of the Contractor and are included in the consideration specified in the Financial Offer, even if not specified in this Framework Agreement.

7.11. Prices shall be based on the maximum binding unit prices for all foreseeable items which have been stated in the economic offer and are binding (as a maximum) for the duration of the whole Framework Agreement. If unit prices are added to Phase 2 or 3 offers, they shall become binding for the remaining Phases.

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7.12. The Contractor accepts, upon request from the Lead Procurer, to provide the Lead Procurer with complete, relevant and clear information as well as documentary evidence about the allocation of amounts paid by the Lead Procurer. The Contractor shall maintain proper financial records relating to the Project at all times during the Project period and for a period of four (4) years after the end of the Project period.

7.13. Payments to Third Parties employed or hired by the Contractor, if any, shall remain the sole responsibility of the Contractor, who shall ensure that such payments are made promptly and hold the Lead Procurer (and the Public Buyers Group) harmless against any claim by such Third Parties.

7.14. Where the Contractor enters into a subcontract with a supplier or Contractor for the purpose of performing the Agreement, it shall include a clause requiring the payment of undisputed sums by the Contractor to the subcontractor within a specified period not exceeding thirty (30) calendar days from the receipt of a valid invoice.

7.15. Wherever, under the Agreement, any sum of money is recoverable from or payable by the Contractor (including any sum that the Contractor is liable to pay to the Lead Procurer in respect of any breach of the Contract), the Lead Procurer may unilaterally deduct that sum from any sum then due, or which at any later time may become due to the Contractor under the Agreement or under any other agreement with the Lead Procurer.

7.16. If at any time an overpayment has been made to the Contractor for any reason whatsoever, the amount of such overpayment shall be considered when assessing any further payments or shall be recovered from the Contractor at the Lead Procurer's discretion.

7.17. The Contractor shall make any payments due to the Lead Procurer without any deduction whether by way of set-off, counterclaim, discount, abatement or otherwise, unless the Contractor has a final and enforceable court order requiring an amount equal to such deduction to be paid by the Lead Procurer to the Contractor.

Article 8 — Rights and obligations regarding results (foreground), pre-existing rights (background and sideground) and the related rights (including intellectual and industrial property rights)

GENERAL DISPOSITIONS

8.1. The Contractor is responsible for the management of its IPRs, including protection, and bears the costs associated with them. The Contractor shall take all appropriate and necessary measures to ensure the proper management of the Intellectual Property Rights generated by the PCP-WISE project. This includes:

- Measures to ensure full compliance with the open co-creation goal, open source software Licenses where applicable.

- The obligation of the Contractor to clearly describe, detail, distinguish, manage and update the parts of the Results that are being qualified as Foreground and Sideground pre-existing IPR.

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8.2. The Contractor shall ensure that its Results are identified, recorded and carefully distinguished from outputs of other Research and Development activities which are not covered by the PCP-WISE project. The Contractor shall ensure that prior to any dissemination of the Results, the protection of any protectable Results is duly considered and in case filed at the relevant Member State or European Patent Office. In such a case, the Contractor shall ensure that all applications for the protection of Results are diligently executed and prosecuted having regard to all relevant circumstances.

8.3. If the Contractor becomes aware of any product or activity of any Third Party that involves or may involve infringement or other violation of the Project's IPR, the Contractor shall promptly notify the Lead Procurer about the infringement or violation.

8.4. The Lead Procurer has the right to monitor the management of the IPRs.

8.5. The Contractor must inform the Public Buyers Group (via the Lead Procurer) of Results that can be exploited, regardless of whether they can be protected or not, within thirty (30) days from when they are generated and before any dissemination or protection action. The notification sent to the Lead Procurer must include information about the contents of the Results, any intention by the Contractor to protect them, the type of protection that will be pursued and the planned timing and geographical scope of the protection, such as the jurisdictions where the Contractor will seek to obtain protection.

8.6. Article 8.1 up-and-to article 8.5 will apply for prototypes and first products resulting from the R&D, design, prototype and first product/service specifications, simulations, Data models, drawings, and source code.

8.7. During the execution of the three Phases of the PCP, the Contractor acknowledges and accepts to upload, amend and update the concept design of its Results on the *designated database or repository (as described in the Request for Tender TD1).* These Results are only accessible by the specific Contractor and the Public Buyers Group during the PCP. The Contractor grants the Public Buyers Group a full and unrestricted right for free to access these Results for the duration of the PCP for monitoring and evaluation purposes of the PCP-WISE project.

8.*8. During the execution of the three Phases of the PCP, the PBG will have the right to use the Project's IPRs, the relevant Background IP and the Results related to the design specifications developed by the contractor non-commercially. Non-commercial means that the members of the PBG cannot commercialise the PCP results, without impeding the use for other purpose (such as trials).*

8.9. At the end of PCP Phase 3, all the prototypes will be returned to the Contractors who produced them.

8.10. At the end of PCP Phase 3, upon first request of the Public Buyers Group, the Contractor who has successfully completed Phase 2 warrants to upload and make publicly available the documentation related to its Results or the relevant parts thereof that have been qualified by the Public Buyers Group as publicly available through *designated database or repository*. The Contractor will ensure full compliance with the specific requirements set out in Use Cases: Functional Requirements, and as detailed in its Bid. Leaving unimpeded Public Buyers Group other rights under this Framework

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Agreement, in case the Contractor fails to comply with what is stated in the first and/or second sentence of this Article, the Contractor grants the Public Buyers Group the unconditional and irrevocable right to fulfil these obligations in name and on behalf of the Contractor. It is understood and agreed that, after the PCP Phase 3, each of the members of the Public Buyers Group or any Party who has permission to access the *designated database or repository*, may use the documentation published in accordance with requirements set in the Use Cases: Functional Requirements and as detailed in the Bid of the (respective) Contractor(s).

8.11. After the end of PCP Phase 3, the PBG and any Third Party will be entitled to use and exploit the designed specifications in accordance with the *open source software Licenses and Creative Common Licences as agreed upon.*

FOREGROUND IPRs

8.12. The Contractor retains the ownership of all the Results that it generates. This includes newly created material generated by the Contractor and Background/Sideground material provided/generated by the Contractor that may be included in the Results or that is essential for the functioning of the use of the Results.

8.13. If the Contractor decides not to protect the Results that it generated during the Project or does not seek timely or sufficient protection to enable the Public Buyers Group to use the Results as defined in this Framework Agreement, for example in terms of jurisdictions for registered IPRs, the Lead Procurer retains the right to seek itself protection of these Results and to obtain ownership of the rights on these Results. In the event that the Lead Procurer decides to exercise this right, it will inform the Contractor in writing of its decision to exercise this right.

8.14. The Contractor is required - upon first request of the Lead Procurer - to deposit copies of the Results (e.g. the source code and design specifications) to guarantee the Public Buyers Group continued access to the Results in case of financial bankruptcy of the Contractor (or any of its subcontractors):

a) Under an ESCROW agreement for software.

b) By providing to the Public Buyers Group a copy of designs, drawings, reports and specifications.

BACKGROUNDS AND SIDEGROUND IPRs

8.15. All pre-existing rights remain the property of the Party introducing them (Lead Procurer, members of the Public Buyers Group, Contractor or any Third Party supplier that owns it) and nothing contained in this Framework Agreement or any License contract pertaining or pursuant to the Project shall affect the ownership rights of either Party in its pre-existing IPR.

8.16. The Contractor acknowledges and agrees that:

a) Data and/or Data sets (or any parts thereof) provided for by the Public Buyers Group are being qualified as pre-existing rights of the Public Buyers Group; and

b) The Data and/or Data sets (or any parts thereof) provided by the Public Buyers Group shall be used for the sole purpose of executing the Project, including trials and/or pilots set up to test the validity of the Results. Any other use is forbidden.

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8.17. The Contractor must provide in its Bid for this Framework Agreement (using the Declaration of pre-existing rights – TD15) a list of the relevant (for the Project) pre-existing Results and preexisting IPRs it holds and/or has access to (e.g. via its subcontractors). The Contractor must also provide an updated version of it to the Public Buyers Group (via the Lead Procurer) within the Bid for each Phase Contract in order to have the updated list approved by the Public Buyers Group at the latest thirty (30) days after the start of each Phase Contract. If there are no preexisting materials nor pre-existing IP, the Contractor must provide a declaration to that effect.

8.18. The Contractor shall inform the Public Buyers Group about any evolutions in any of its preexisting Results and pre-existing IPRs that affect the performance of this Framework Agreement. This includes any changes to the Background IPRs and the generation of new Sideground IPRs within thirty (30) days from the change or generation and at the latest by the end of the corresponding Phase and with each Bid for the next Phase.

8.19. Upon request by the Public Buyers Group, the Contractor must provide evidence that it has the ownership or the right to use all the listed pre-existing Results and IPR. The Public Buyers Group (via the Lead Procurer) may request this evidence even after the end of this Framework Agreement.

8.20. This evidence must include, as appropriate:

a) The name and version number of a software product.

b) The full identification of the original work and authors with their affiliation and all following modifications addressing developer, creator, translator, Data entry person.

c) A copy of the Licence to use the Background IPR or of the agreement granting the relevant rights to the Contractor or a reference to this Licence.

d) A copy of the agreement or extract from the employment contract granting the relevant rights to the Contractor where parts of the Results were created by its personnel.

e) The text of the disclaimer notice, if any.

Provision of evidence does not release the Contractor from its responsibilities if it is found that it does not hold the necessary rights, regardless of when and by whom this fact is revealed.

8.21. The Parties must grant each other a royalty-free, non-exclusive, irrevocable and non-sublicensable License to use its Background and Sideground IPR for the performance of the tasks assigned to them in the PCP and for the duration of the PCP. These Licenses are in addition to rights provided for by law, such as the unwaivable rights of, and exceptions for the benefit of lawful users of software or of databases, as foreseen by applicable law.

8.22. If the Contractor intends to rely on the pre-existing Background and Sideground IPR of subcontractors and/or Third Parties, it must ensure to obtain all necessary rights (transfer, Licences or other) from them, as if they were generated by itself. If obtaining those rights is impossible, it should refrain from using subcontractors and/or Third Parties.

8.23. It is understood that this Article can be modified as a result of the feedback from the Technology Providers during the procurement process.

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Include provisions that clarify the rights and obligations related to pre-existing rights (background, sideground) and results (foreground) for:

- *the procurers (contracting authority and the PBG),*
- *the contractor, and*
- *its subcontractors (if any).*

Do not forget to include the special IPR provisions from the HE grant agreement into the PCP contracts (e.g. EU right to object to transfers or licencing of results; additional exploitation or dissemination obligations, additional control restrictions, access to research data, etc).

In addition to what is listed in this section, you may specify additional intellectual property provisions, provided they:

- *do not conflict with the obligations under the Horizon Europe grant agreement, and*
- *help the procurers or the contractor to implement the PCP as well as disseminate and exploit the results.*

IPR DEFINITIONS

8.24. The follow definitions apply to this Framework Agreement:

- 'Results (i.e. foreground)' means any tangible or intangible output that is generated in the PCP, whatever its form or nature, whether or not it can be protected. This includes any material, document, technology, solution, data, knowledge or information (foreground material) as well as any rights attached to it, including intellectual property rights ('rights on results' or 'IPRs attached to the results').
- 'Rights on results': any rights, including industrial or intellectual property rights on the results. They may consist of rights on newly created materials and rights on pre-existing materials (background rights and sideground rights) that are included in the results. They may consist in a right of ownership, a licence right and/or right of use belonging to the contractor, the creator, the contracting authority, the PBG or to any other third parties, including subcontractors.
- 'Background' means any material, document, technology, solution, data, know-how or information (background material) — whatever its form or nature (tangible or intangible), regardless of whether or not it can be protected, including any attached rights such as intellectual property rights ('background IPRs') — that (1) is held prior to the signing of the Framework Agreement or a Specific Contract, (2) identified by the parties involved in the PCP as background and (3) needed to implement the PCP or exploit the results of the PCP.
- 'Background rights': any rights, including industrial and intellectual property rights on background. They may consist in a right of ownership, a licence right and/or right of use belonging to the contractor, the creator, the contracting authority, the PBG or to any other third parties, including subcontractors.
- 'Sideground' means any material, document, technology, solution, data, know-how or information (sideground material) — whatever its form or nature (tangible or intangible), regardless of whether or not it can be protected, including any attached rights such as intellectual property rights ('sideground IPRs') — that is (1) generated during the timespan of the PCP but not in the PCP and (2) needed to implement the PCP or to exploit the results of the PCP.
- 'Sideground rights': any rights, including industrial and intellectual property rights on sideground material. They may consist in a right of ownership, a licence right and/or right of use belonging to the contractor, the creator, the contracting authority, the PBG or to any other third parties, including subcontractors.

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- 'Pre-existing material': any material, document, technology, solution, information, data or know-how, whatever its form or nature, tangible or intangible, regardless of whether or not it can be protected, which exists prior to the contractor using it for the production of a result in the implementation of the Framework Agreement or a Specific Contract. It includes both the background material and the sideground material.
- 'Pre-existing rights': any rights, including industrial and intellectual property rights on pre-existing material. It may consist in a right of ownership, a licence right and/or right of use belonging to the contractor, the creator, the contracting authority as well as to any other third parties, including subcontractors. It includes both background rights and sideground rights.
- 'Fair and reasonable conditions' means appropriate conditions, including financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access *(for example, the actual or potential value of the results, background or sideground to which access is requested and/or the scope, duration or other characteristics of the exploitation envisaged)*.
- 'Generated in the PCP' means in the implementation of activities described in the PCP Framework Agreement or Specific Contracts.
- 'Not generated in the PCP' means not generated in the implementation of activities described in the PCP Framework Agreement or Specific Contracts.

OBLIGATIONS OF CONTRACTOR

8.25. The contractor is responsible for ensuring that all third parties that it collaborates with during and after the Framework Agreement and the Specific Contracts respect all intellectual and industrial property-related obligations towards the contracting authority and the PBG and must pass on its obligations to those entities.

8.26. The contractor must ensure that the rights of the contracting authority and the PBG under the Framework Agreement and the Specific Contracts are upheld under all circumstances, including in case of merger, split, takeover or other corporate restructuring.

OWNERSHIP OF THE RESULTS

8.27. Subject to the conditions set out in Articles XX.2, XX.3, XX.4, XX.5 and XX.6, the contractor retains the ownership of all the rights on the results that it generates. This includes the rights on newly created material generated by it and the rights on background and sideground material that may be included in the results or that is essential for the functioning of the use of the results *(see Articles XX.8 and XX.9 on pre-existing rights)*.

[additional OPTION when the PBG wants to buy own foreground material and own it after the end of the PCP: Notwithstanding this, the members of the PBG will each become owners of [enter number of copies required: e.g. at least one] exemplar of each foreground material, together with all the necessary documentation to use the foreground material as foreseen by the Framework Agreement and Specific Contracts. This applies both where foreground material is software, physical/hardware prototypes or first solution implementations (products or services), simulations, designs, data models, etc. In order to enable them to use and adapt these results *(see Article XX.4)*, they also have the right to obtain a copy of the source code and of the design specifications and any other relevant technical documentation concerning the creation, construction and functioning of the results.

8.28. The contractor will retain the ownership of all the other exemplars of the foreground material, generated for which the members of the PBG do not obtain ownership.

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PBG OWNERSHIP IN CASE OF BREACH OF CONTRACT TO PRESERVE PUBLIC INTERESTS OT TO PROTECT OR COMMERCIALISE THE RESULTS

Conditions

8.29. The members of the PBG may exceptionally require transfer of the ownership of results generated under the PCP procurement to them, if the contractor:

- Does not (or no longer) comply with one of the following obligations:
  - 'Compliance with definition of R&D services' obligation in section [XXX] of the request for tenders.
  - 'Place of performance obligation' obligation in section [XXX] of the request for tenders.
  - 'Place of establishment and control' obligation in section [XXX] of the request for tenders.
- Decides not to protect the results that it generated or does not seek timely or sufficient protection to enable the buyers group to use the results as provided for in the Framework Agreement or a Specific Contract *(see Article XX.3).*
- Fails to commercially exploit the results within the four years time period and the circumstances of the case show that it has not used its best efforts to do so *(see Article XX.5.1).*
- Uses the results to the detriment of the public interest *[OPTION when EU security and/or strategic autonomy interests need safeguarding*, including EU strategic autonomy or security interests*] (see Article XX.5.2).*
- Is subject to a merger or acquisition and the impact analysis concludes that the merger or acquisition negatively impacts the access to or the commercial exploitation of the results, including the EU security interests and EU strategic autonomy objectives set out in Art XX.5 *(see Article XX.5.3)*.

Procedure

8,30. The members of the PBG will notify the contractor of their intention to require the transfer of ownership of results through the contracting authority.

8.31. Before exercising their rights, the contracting authority will first contact the contractor to verify any measures that the contractor has taken to achieve successful commercial exploitation of the results, to safeguard EU strategic autonomy and security interests and rules, to prevent use of the results to the detriment of the public interest and to comply with its contractual obligations.

8.32. Following the transfer of the ownership of the results to the members of the PBG, the members of the PBG may grant licenses to third parties to ensure further protection, usage and exploitation of the results *(see Article XX.).*

8.33. The contractor shall ensure that the commercial exploitation of the results by the members of the PBG will not infringe any of its other obligations under this Framework Agreement or a Specific Contract, such as its obligations regarding security, confidentiality and the protection of intellectual property or its obligations under data protection legislation.

PROTECTION OF THE RESULTS

8.34. The rights and obligations in relation to protection of results are explained below:

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- Each contractor is responsible for the management *(including protection)* of its IPRs and bears the costs associated with this.
- Procurers have the right to monitor the management of the IPRs.
- The contractor must inform the PBG (via the lead procurer) of results that can be exploited, regardless of whether they can be protected or not, within [insert number] days from when they are generated. The information submitted to the lead procurer must include information about the contents of the results, the confirmation by the contractor to protect them and the planned timing for protection.
- If a contractor does not seek protection for results that should be protected, the PBG has the right to itself protect the results.
- If the HE call conditions impose control restrictions due to strategic interests, make sure that the results of the PCP will be protected in such a way that they will be free from such restrictions.
- Whether the contractor is required to deposit copies of results *(e.g. the source code and design specifications)*, *for example, under an ESCROW agreement designed to guarantee the buyers group continued access to results in the case of financial bankruptcy of the contractor (or any of its subcontractors)*.

⚠ ***If the lead procurer (the contracting authority of the PCP) is also financially investing in the PCP and therefore also wants to receive the same IPR-related rights as the buyers group (e.g. ownership of some copies of the foreground material, and access and licensing rights to the attached IPR rights), then the buyers group needs to be defined in such a way that the contracting authority is part of the buyers group.***

8.35. The contractor shall be responsible for the management of all the rights on the results that it holds and shall bear the associated costs, including for the protection, examination, grant, maintenance, defence and litigation of the rights on the results.

8.36. The contracting authority and members of the PBG shall be entitled to monitor the management of all rights on the results held by the contractor. The contractor shall submit periodical reports, when requested by the contracting authority and the PBG, no more frequently than [enter a reasonable period, e.g. annually] on the exploitation of the results, including the rights on the results, by the contractor, its licensees or assignees. The contractor shall respond at any time to requests for information from the contracting authority and the PBG about the handling of the rights on the results.

8.37. The contractor shall ensure that the results are identified, recorded and carefully distinguished from the outputs of other research and development activities that are not covered by the Framework Agreement or a Specific Contract.

8.38. The contractor shall inform the contracting authority of any results it generates that can be exploited, regardless of whether they can be protected or not, at the latest [enter a reasonable time, e.g. two months] from the generation of the result. The notification shall include information about the contents of the results, the confirmation by the contractor of its decision to protect said results, the type of protection that will be pursued and, for registered IPRs such as patents and design rights, the planned timing and geographical scope of such protection/ jurisdictions for which the contractor will seek to obtain protection.

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8.39. If the contractor decides to protect its results, it shall ensure that an application for protection is filed to the relevant authority (national, European Patent Office (for patents) or European Union Intellectual Property Office (for trademarks and designs)) within [enter a reasonable time, e.g. one year] after notifying the contracting authority, and in any case prior to any publication on them. Where possible, the applications for protection shall include the following statement: 'These results were achieved with EU support. The European Union has certain rights in these results'.

8.40. In case of any decision not to continue an application for protection, not to pay maintenance fees, or not to defend in a re-examination or opposition proceeding, the contractor shall notify the contracting authority not less than [enter a reasonable time, e.g. 60 days] before the deadline for responding to the procedure for protection, maintenance or litigation.

8.41. If the contractor decides not to protect the results that it generated or does not seek timely or sufficient protection to enable the buyers group to use the results as provided for in the Framework Agreement or a Specific Contract, for example in terms of jurisdictions for registered IPRs, the members of the buyers group retain the right to require that the contractor transfers the ownership of the result to them so that the buyers group can ensure that the results are protected.

[*additional OPTION when depositing of results under escrow is required:* The contractor shall put a copy of the results it generates (e.g. source codes of software and all related documentation, design specifications of prototypes, documentation about the foreground IP etc) under escrow with a reputable escrow agent. If requested by the contracting authority, a tri-party agreement shall be signed between the escrow agent, the contractor and the contracting authority (on behalf of the members of the buyers group), duly protecting the interests of the contracting authority and the buyers group in case of bankruptcy or liquidation of the contractor and ensuring that in such cases the members of the buyers group shall obtain a copy of the results.***]***

8.42. If the contractor becomes aware of any product or activity of any third party that involves or may involve infringement or other violation of the rights on the results, the contractor shall promptly notify the contracting authority of the infringement or violation.

If the HE call conditions impose control restrictions due to strategic interests, add the following option: [OPTION for PCPs with control restrictions due to strategic interests in the HE call conditions: The contractor must ensure that the results are not subject to control or other restrictions by a country (or entity from a country) which is not [specify the list of countries in line with the list of eligible countries defined in section 3.1 of the request for tenders] — unless otherwise agreed with the contracting authority.*]*

ACCESS RIGHTS TO THE RESULTS FOR THE CONTRACTING AUHTORITY AND THE PBG

8.43. The rights and obligations in relation to access to the results are the following:

- The contractor grants to the PBG irrevocable, royalty-free, non-exclusive, world-wide access rights to use the results, for their own purposes (for IPRs: until their expiry date).
- For results that are an implementation of design specifications into simulations, prototypes, demonstrators or first products /services, those access rights are limited to a duration of [insert duration] years and to the following purposes for fulfilling the R&D objectives of the PCP: [specify those purposes for your PCP].
- The PBG has *[*the right to grant*]* *[*the right to require the contractor to grant — within a reasonable time period specified in the request —*]* non-exclusive licences to third parties to

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commercially or non-commercially exploit the results under fair and reasonable conditions, without the right to sub-license.

8.44. The contractor must ensure that it complies with its obligations under the framework agreement and specific contracts if it uses subcontractors; that it must obtain all necessary rights (transfer, licences or other) from the subcontractors, as if they were generated by itself; that it should refrain from using subcontractors if obtaining those rights is impossible).

8.45. The contractor grants the members of the PBG, including their affiliated entities, a royalty-free, non-exclusive, worldwide, irrevocable and non-sub-licensable (except as explicitly authorised under this Framework Agreement) license to use its results for their own purposes, during and after the Framework Agreement and Specific Contracts. The contractor also grants a royalty-free, non-exclusive, worldwide, irrevocable and non-sub-licensable license to contractors and subcontractors of the PBG to practice the results for their own purposes, during and after the Framework Agreement and Specific Contracts.

- For those results that are design specifications (including the rights on such type of results), the access rights are unlimited in duration, or at least until expiration of the attached rights if any. For the avoidance of any doubt, use for its own purposes also allows the buyers group (and any contracting authority appointed by the buyers group to implement a procurement on their behalf) to use the design specifications in tender specifications of future public procurements related to the results.
- For those results that are an implementation of the design specifications into simulations, prototypes, demonstrators or first products /services, the access rights are ***[****OPTION 1 when the buyers group intends to continue to use the results indefinitely:* unlimited in duration***]*** ***[****OPTION 2 when the buyers group intends to continue to use the results for a limited time:* limited to a duration of [enter the envisaged usage period, e.g. 4] years after the end of the Framework Agreement and Specific Contracts***]***, with the aim to [define the purpose, e.g. 'enable wider validation of the results in production (e.g. across a larger set of future use cases, datasets and users)'], and the license is limited to use of the results for the buyers group own non-commercial purposes. Except in exceptional conditions and subject to the conditions in Article XX. (decision of the contractor not to protect/exploit certain results), XX. (failure of the contractor to license results to third parties) and XX. (failure of the contractor to commercially exploit the results or abuse of the results against the public interest), the contracting authority and members of the buyers group do not aim to commercially exploit/sell itself the contractor's results. Commercial exploitation of the contractor's results is in the first place the responsibility of the contractor, as specified in Article XX. (commercialisation of results).

8.46. Without prejudice to above rights to access the results for various purposes, the members of the PBG, their (sub)contractors, any contracting authority appointed by the PBG to implement a procurement in their name and/or on their behalf, enjoy in particular:

- The right to make the results available to their staff and to persons and entities working for them or cooperating with them, including contractors, subcontractors.
- The right to integrate the results into the PBG's infrastructure and to use the results as part of this infrastructure (including the right to load, display, transmit and run the results on the infrastructure) at least for [enter the same envisaged usage period as above, e.g. 4 years] years after the end of the Framework Agreement and Specific Contracts.
- The right to make the necessary copies of the results for internal distribution, archiving, back-up, correcting errors, studying or testing of the functioning of the results.

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- The right to make compilations, translations, adaptations or other types of arrangements or alterations to the results as is necessary for their intended use, for example to ensure interoperability with other systems implemented by the PBG.
- The right to publish summaries of the results, after consultation with the contractor to ensure that no confidential information is thereby disclosed or that the publication would not interfere with the protection of intellectual or industrial property rights. These rights are in addition to the rights provided for by law, such as the unwaivable rights of, and exceptions for the benefit of lawful users of software or of databases, as foreseen under the applicable EU or national laws.

8.47. These rights do not allow, unless expressly permitted by the contractor, the right for the contracting authority and the buyers group to make the results available to the market, neither for free or under open licence terms (open source, open data) nor under market commercial conditions, neither to the general public nor to sectors of the economy. However, the members of the buyers group reserve the right to make available to the public, even for free, any public service provided by them that makes use of the new functionalities enabled by the results that have been integrated in the PBG's infrastructure.

8.48, The contractor retains the right to commercial exploitation of the results, as specified in Article XX. (commercial exploitation of results), for any purposes of using the results beyond the scope of the current PCP. The members of the PBG reserve the right to require the contractor (see Article XX. access to results for third parties) to give access under fair and reasonable conditions to the results to third parties, for example to third parties interested in developing and commercialising their own use cases on top of the PBG's infrastructure.

8.49. In case of commercial exploitation of products, services or processes arising or developed from the results by the contractor (or by entities affiliated to it or succeeding it in the ownership or development of the results), the contractor shall ensure that the members of the PBG (or any contracting authority appointed by the PBG to implement a procurement in their name and/or on their behalf) are offered the commercial products or services at the best price offered by the contractor (or the entities affiliated or succeeding it) in similar situations to any other third party (in particular without charging for licenses or other rights which the PBG already have under other provisions of this Framework Agreement or a Specific Contract).

⚠ **The limitation of the scope and/or duration of the access rights (to 'what is needed by the PBG to fulfil the R&D objectives of the PCP') is needed for the PCP to remain an 'R&D procurement' where the 'procurers do not retain all the benefits' and thus be exempted from the WTO rules and the EU public procurement directives.**

ACCESS RIGHTS TO THE RESULTS FOR THE EU

8.50. The EU has the right to use non-sensitive information relating to the PCP and materials and documents received from the contracting authority and the PBG for policy, information, communication, dissemination and publicity purposes — during the EU grant or afterwards. This concerns notably summaries for publication, as well as any other material, such as pictures or audio-visual material, and other deliverables submitted by the contracting authority and the PBG to the EU, in paper or electronic form.

8.51. The right for the EU to use these materials, documents and information is granted in the form of a royalty-free, non-exclusive and irrevocable licence, which includes the following rights:

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(a) Use for its own purposes (in particular, making them available to persons working for the EU granting authority or any other EU service (including institutions, bodies, offices, agencies, etc.) or EU Member State institution or body; copying or reproducing them in whole or in part, in unlimited numbers; and communication through press information services).

(b) Distribution to the public (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes).

(c) Editing or redrafting (including shortening, summarising, inserting other elements (e.g. meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation).

(d) Translation.

(e) Storage in paper, electronic or other form.

(f) Archiving, in line with applicable document-management rules.

(g) The right to authorise third parties to act on its behalf or sub-license to third parties the modes of use set out in Points (b), (c), (d) and (f), if needed for the information, communication and publicity activity of the granting authority.

(h) Processing, analysing, aggregating the materials, documents and information received and producing derivative works.

The rights of use are granted for the whole duration of the industrial or intellectual property rights concerned.

8.52. If materials or documents are subject to moral rights or third party rights (including intellectual property rights or rights of natural persons on their image and voice), the contractor must ensure that they comply with their obligations under this Framework Agreement and Specific Contracts (Articles XX. and XX. on pre-existing rights) in particular, by obtaining the necessary licences and authorisations from the rights holders concerned.

8.53. Where applicable, the EU granting authority will insert the following information: "© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the EU under conditions."

ACCESS RIGHTS TO THE RESULTS FOR THIRD PARTIES

8.53. If requested by the contracting authority or the PBG, the contractor shall, within a reasonable time period specified in the request, grant to the third parties specified in the request a non-exclusive and non-sub-licensable license to use and exploit the results, and any background or sideground which may be necessary for the use or exploitation of the results, under fair and reasonable conditions.

8.54, If the contractor fails or refuses to grant the requested licenses, the contracting authority and members of the buyers group retain the right to grant themselves a non-exclusive and non-sub-licensable license to the third parties to use and exploit the results (or to appoint an independent third party to do so).

COMMERCIAL EXPLOITATION OF RESULTS

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8.55. The contractor shall take prompt action to ensure that its results are exploited commercially (directly or indirectly through another entity, through transfer or licensing), even if they cannot be protected, in order to ensure swift availability of the developed solutions on the wider market and to generate revenue by marketing commercial applications of the results.

It is important that the period of time allowed for commercial exploitation of results is set in such a way as to give the contractor a fair and reasonable amount of time to exploit the results in the relevant sector. This will ensure that the potential for marketing the product or service is valued correctly (Horizon Europe uses as an appropriate length of time 4 years). The period should take account of the fact that: 1) the contractor needs to start producing the good or service in quantity and to invest in large scale promotion activities and 2) the potential first customers, public procurers, generally take time to prepare and launch a PPI after the PCP has been completed.

⚠ ***If the duration of the Horizon Europe grant is finally longer than initially foreseen (i.e. if the HE action duration is extended), you must also extend duration of the framework agreement and the specific contracts (via an amendment). The formulation above ensures that if this happens, the duration for the obligation on the commercial exploitation in the framework agreement will also be automatically extended (as it will start counting from the new end date specified in the amendment).***

8.56. In particular, the contractor must use its best efforts to exploit its results up to [four] years after the end of the Framework Agreement and Specific Contracts, including where they are capable of commercial exploitation, to exploit them commercially (i.e. marketing a commercial application of the results, directly or indirectly, through a subcontractor or licensee).

8.57. If, despite a contractor's best efforts, the results are not exploited within one year after the end of the Framework Agreement and Specific Contracts, the contractor must (unless otherwise agreed in writing with the contracting authority and the PBG) use the Horizon Europe Results Platform[30] to find interested parties to exploit the results.

8.58. If the contractor fails to commercially exploit the results within the four years time period and the circumstances of the case show that it has not used its best efforts to do so, the members of the PBG retain the right to require that the contractor transfers the ownership of the results to them so that the PBG can ensure that the results are commercially exploited.

ADDITIONAL OBLIGATIONS/LIMITATIONS FOR THE EXPLOITATION OF RESULTS DUE TO PUBLIC INTERESTS

Security or strategic autonomy

8.59. [OPTION when safeguarding of EU security interests is important, in particular when the PCP involves security related R&D and/or when the HE call conditions impose specific additional security obligations: In order to [explain the reason, e.g. safeguard the delivery of public services through the PBG's infrastructure against potential physical and cyber threats and to protect the exchange of security sensitive information], the contractor shall ensure to safeguard EU security interests in the commercial exploitation of the results.***]***

30 Horizon Europe Results Platform

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8.60. *[OPTION when safeguarding of EU strategic autonomy is important, in particular when the PCP involves critical technologies or critical assets, and/or when the HE call conditions impose specific additional EU strategic autonomy obligations:* In order to safeguard security of supply of inputs critical to the functioning of the buyers group's infrastructure and fair competition in the supply chain compliant with EU rules and interests, the contractor shall ensure to safeguard EU strategic autonomy in the commercial exploitation of the results. For this purpose, the contractor shall ensure that a significant amount of the commercial exploitation of the results takes place in the EU Member States and/or countries associated to Horizon Europe[31]. In particular, the contractor must produce minimum [enter a reasonable percentage, e.g. 50%] of the products, services or processes that incorporate results or that are produced through the use of results in [add the list of countries in line with the list of eligible countries defined in section 3.1 of the request for tenders].

8.61. [additional OPTION for PCPs that involve security-related R&D: Moreover, for results that are security components, the contractor must moreover produce [enter a reasonable percentage (typically more demanding than the one in the previous paragraph), e.g. 100%] in *[OPTION if there are participation and/or control restrictions in the HE call conditions*: [add the list of countries to which participation and/or control is restricted]*][OPTION if there are no participation and/or control restrictions in the HE call conditions*: [add 'EU Member States or Horizon Europe associated countries']*].]*

8.62. *[additional OPTION when EU security and/or strategic autonomy interests need safeguarding, in particular when imposed by the HE call conditions:* The contractor must ensure that, in the commercial exploitation of results, any cooperation with entities established in other countries, or controlled by such countries or entities from such countries, does not affect the EU security or strategic autonomy interests and avoids potential negative effects over security of supply of inputs critical to the functioning of the buyers group's infrastructure.*]*

Standardisation

8.63. [OPTION if there are additional obligations related to standardisation in the HE call conditions: The contractors must promote the dissemination of their results, in particular through [publications and] contribution to standardisation. The contractors and the contracting authority will establish at the start of the Framework Agreement a list of [planned publications about the results and] appropriate standards to contribute to, and will keep this list updated throughout the Framework Agreement and for each Specific Contract. The contractors must — up to four years after the end of the Framework Contract and Specific Contracts — inform the contracting authority, who will inform in its turn the granting authority that is co-financing the PPI, if the results could reasonably be expected to contribute to European or international standards.*]*

Public emergency

8.64. [OPTION if there are additional exploitation obligations in case of a public emergency in the HE call conditions: In case of a public emergency the contractor must, if requested by the contracting authority on behalf of the buyers group or the EU, commit to rapidly and broadly exploit the products and/or services resulting from the PCP at fair and reasonable conditions to address the public emergency. This provision applies up to four years after the end of the PCP.*]*

Other

[31] List of Horizon Europe participating countries.

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[Where the HE call conditions impose other additional exploitation obligations, add them here.]

8.65. If the contractor uses the results to the detriment of the public interest *[OPTION when EU security and/or strategic autonomy interests need safeguarding, in particular when imposed by the HE call conditions:*, including EU strategic autonomy or security interests*]*, the members of the PBG are entitled to require that the contractor transfers the ownership of the results to them, in order to stop use of the results against the public interest and ensure commercial exploitation of the results by another party in line with the exploitation conditions.

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. specific exploitation obligations or control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

8.66. The contractor must ensure that these obligations also apply to its subcontractors, affiliated entities and other third parties it cooperates with in the commercialisation of the results, as well as to any entities succeeding them in their ownership or development of the results.

OBLIGATION TO NOTIFY A PLANNED MERGER OR ACQUISITION

8.67. In case of a merger or acquisition by an entity from a country (or controlled by a country) that is not an EU Member State or Horizon Europe associated country, the contractor must notify the contracting authority at least [enter a reasonable period, e.g. three (3) months] in advance of the decision to implement the merger or acquisition and:

- Describe in detail the identity, ownership and control structure of the potential new merged entity or the potential new owner(s)
- Include a reasoned assessment of the likely impact of the possible merger/acquisition on:
  - The access to the results and to the background and sideground that is essential for accessing the results, as foreseen by the Framework Agreement and Specific Contracts for the contracting authority and for third parties.
  - The commercialisation exploitation of the results, including the EU security interests and EU strategic autonomy objectives above.

8.68. The contracting authority and the PBG may request the contractor for additional information to verify the potential impact, upon which the contractor must promptly provide the requested information.

8.69. In case the impact analysis concludes that the merger or acquisition negatively impacts the access to or the commercial exploitation of the results, including the EU security interests and EU strategic autonomy objectives set out in Article XX, the members of the PBG are entitled to require that the contractor (both the contractor before or after the merger or acquisition) transfers the ownership of the results to them so that the buyers group can ensure that the interests are preserved and protected.

TRANSFER AND LICENSING OF RESULTS

8.70. The rights and obligations in relation to transfer and licensing of results are the following:

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- The contractor may grant non-exclusive licences to third parties allowing them to exploit the results (or otherwise give the right to exploit them) — unless this impedes the access rights of the buyers group or unless the HE call conditions impose restrictions to a specific list of eligible countries.
- The contractor may transfer ownership or give exclusive licenses to its results — unless this is prohibited (or restricted) by the HE call conditions or the ethics, security or EU strategic autonomy obligations and provided that it ensures that its obligations (in respect of the results) apply to the new owner and that this new owner is obliged to pass them on in any subsequent transfer *(e.g. by including a requirement to do so in their arrangements with the new owner).*

8.71. A right of first refusal for the PBG to buy the results is foreseen.

The procedure for transfers when there are procurers in the buyers group that still have (or may still request) access rights to the results is [ ] *(e.g. that the contractor must give them at least 45 days advance notice of its intention to transfer ownership of the results and that this notification must include sufficient information on the new owner to enable the procurers to assess the effects on their access rights. A procurer can object within 30 days of receiving notification, if it can show that the transfer would adversely affect its access rights. Should an objection be raised, the transfer may not take place until agreement has been reached between the parties concerned).*

NON-EXCLUSIVE LICENSING OF RESULTS

8.72. [OPTION 1 by default (no restrictions): The contractor may on its own initiative without prior authorisation from the contracting authority, give non-exclusive licenses to third parties to exploit the results that it owns to the extent that:

- such licenses do not affect the rights — including the access rights — of the contracting authority, the PBG or the EU related to the results, and
- such licenses do not affect the obligations — including the security and ethical obligations — of the contracting authority and the PBG related to the results, and
- such licenses are not granted to entities which are subject to EU restrictive measures under Article 29 of the Treaty on the European Union (TEU) and Article 215 of the Treaty on the Functioning of the EU (TFEU)[32] (sanctions).

8.73. The contractor must ensure in the licensing agreement that all its obligations under the Framework Agreement and Specific Contracts are passed on to the third party and that the third party has the obligation to pass on these obligations in any potential subsequent licensing.***]***

8.74, [OPTION 2 if there are participation and/or control restrictions in the HE call conditions: Non-exclusive licensing is subject to the same restrictions as exclusively licensing of results, as specified in Article XX.]

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

[32] Please note that the EU Official Journal contains the official list and, in case of conflict, its content prevails over that of the EU Sanctions Map.

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EXCLUSIVE LICENSING AND TRANSFER OF OWNERSHIP OF RESULTS

Conditions

8.78. Exclusive licensing and transfers of ownership of the results are restricted as follows:

- The contractor may not transfer or give exclusive licenses if this would affect the rights — including the access rights — of the contracting authority, the PBG or the EU related to the results.
- The contractor may not transfer or give exclusive licenses if this would affect the obligations — including the security and ethical obligations — of the contracting authority and the PBG related to the results.
- The contractor may not transfer or give exclusive licenses to entities that are subject to EU restrictive measures under Article 29 of the Treaty on the European Union (TEU) and Article 215 of the Treaty on the Functioning of the EU (TFEU)[33] (sanctions)
- *[OPTION if the HE call conditions include a right for the EU to object to transfers or licensing:* the contractor may not transfer ownership of its results or give licences to third parties which are established in a non-EU country not associated with Horizon Europe if the EU granting authority objects to the transfer; the notification procedure below must be followed*]*
- *[OPTION if there are participation and/or control restrictions in the HE call conditions:* the contractor may not transfer ownership of its results or give licences to third parties which are established in countries which are not [include the list of eligible countries set out in section 3.1 of the request for tenders] (or, if applicable, are controlled by such countries or entities from such countries) — unless they have requested and received prior approval by the contracting authority who will request prior approval from the granting authority that is co-financing the PCP. The notification procedure below must be followed.*]*
- *[OPTION if there is a right of first refusal for the PBG:* the contractor may not transfer ownership or the results or give exclusive licenses, if this would conflict with the right of first refusal for the buyers group to buy the results. [explain further what is the exact procedure for the buyers group to invoke the right of first refusal].*]*

8.79. The contractor must ensure in the transfer/licensing agreement that all its obligations under the Framework Agreement and Specific Contracts are passed on to the new owner/licensee and that this new owner/licensee has the obligation to pass them on in any subsequent transfer/licensing.

Notification procedure

8.80. If the contractor intends to transfer or grant a licence to a third party in one of the notification cases listed above, they must notify the contracting authority who will request prior authorisation to the EU granting authority. The notification must be done at least [specify an appropriate period, e.g. three months] in advance and:

- Identify the specific results concerned.
- Describe in detail the intended new owner or licensee and the planned or potential exploitation of the results.
- Include a reasoned assessment of the likely impact of the intended transfer or exclusive license on:

[33] Please note that the EU Official Journal contains the official list and, in case of conflict, its content prevails over that of the EU Sanctions Map.

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- The access rights to the results and on the background and sideground that is essential for accessing the results as foreseen by the Framework Agreement and Specific Contracts for the contracting authority, the members of the PBG or for third parties.
- The commercialisation exploitation of the results in line with public interests and EU interests, in particular regarding competitiveness *[OPTION when safeguarding of EU strategic autonomy interests is important for the PBG, in particular when the PCP involves security-related R&D and/or when the HE call conditions impose specific additional security obligations:* and EU strategic autonomy objectives as specified in Article XX.5*]* as well as consistency with ethical principles and security considerations on EU interests.

8.81. The contracting authority may on behalf of the EU granting authority request the contractor for additional information to verify the potential impact, upon which the contractor must promptly provide the requested information.

8.82. Before granting the authorisation, the EU granting authority will verify the potential impact of the intended transfer or exclusive licensing.

8.83. The EU granting authority may object to the transfer or exclusive licensing or may condition its authorisation to measures ensuring that the transfer or exclusive licensing will not have unintended or undesirable consequences.

8.84. Before the EU granting authority gives its written authorisation, the transfer may not take place and any transfer or exclusive licensing agreement concluded before or without a written authorisation will be null and void.

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. specific control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

PRE-EXISTING MATERIALS AND PRE-EXISTING RIGHTS (BACKGROUND AND SIDEGROUND)

8.85. The rights and obligations concerning pre-existing materials and rights (background and sideground) are the following:

- Rules regarding ownership of pre-existing rights (remains unchanged).
- The parties must inform each other about the generation of/changes in pre-existing rights within [insert number] days from the generation /change.
- The contractor introducing background must within [define period] of the signing of the PCP framework agreement provide the lead procurer with a list of the pre-existing rights it holds and/or has access to *(e.g. via its subcontractors)* at the date of the agreement and a list of the software necessary for the operation of the prototype and first products/services that will be developed during the PCP, specifying which software is closed source software. An updated list (to the extent necessary) must be provided with each bid for the next phase.
- The access that the parties must grant each other to each other's pre-existing rights and sideground for carrying out the tasks assigned to them in the PCP, for exploitation of results generated in the PCP and for using the results for their own purposes (normally at least to the PBG).

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- The conditions for access should be fair and reasonable to all parties, e.g. — as appropriate for your PCP:
  - On a royalty-free, non-exclusive basis, access to each other's background, for carrying out the tasks assigned to them in/during the PCP.
  - Under fair and reasonable conditions and on non-exclusive basis, access to each other's background, for exploitation of results generated in the PCP and for using the results for their own purposes in particular also after the PCP.
  - Under fair and reasonable conditions and on non-exclusive basis, access to each other's sideground, for carrying out the tasks assigned to them in the PCP, for exploitation of results generated in the PCP and for using the results for their own purposes in particular also after the PCP.
  -

OWNERSHIP OF AND ACCESS TO PRE-EXISTING MATERIALS AND RIGHTS

8.86. Background and sideground remain the property of the party providing it, or as the case may be, its licensor(s) and nothing contained in this Framework Agreement or a Specific Contract shall affect the rights of each party in their background or sideground.

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. specific control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

8.87. Subject to pre-existing obligations that may apply to background or sideground, the members of the PBG grant the contractor a royalty-free, non-exclusive, irrevocable and non sub-licensable license to use their background and sideground for the performance of the Framework Agreement and Specific Contracts, during the period of the Framework Agreement or Specific Contract.

8.88. [OPTION 1 in case the procurers have background that is relevant to the PCP: The PBG hold the following background that is relevant to the PCP: [specify relevant background].] [OPTION 2 in case the procurers do NOT have background that is relevant to the PCP: The PBG do not hold any background that is relevant to the PCP.]

8.89. Subject to pre-existing obligations that may apply to background or sideground, the contractor grants the PBG and (sub)contractors that assist them in executing the Framework Agreement and Specific Contracts (including in particular in evaluation or testing of solutions) a royalty-free, non-exclusive, irrevocable and non-sub-licensable (except as explicitly authorised under this Framework Agreement) license to use its background and sideground for the execution of the Framework Agreement and Specific Contracts and during the period of the Framework Agreement and Specific Contracts.

8.90. Regarding the rights to use for the background rights, choose option 1 or 2 below, as applicable:
[*OPTION 1 for PCPs in which procurers do not buy resulting prototypes/first products/services:*
The members of the PBG are not purchasing developed prototypes or first products/services as part of this PCP. However, subject to pre-existing obligations that may apply to background or sideground, the contractor grants to the members of the PBG — and also to (sub)contractors that practice the results for the PBG's own non-commercial use — a license to use its background and sideground under fair and reasonable conditions to the extent needed to use the results for

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the the PBG's own non-commercial purposes, beyond the execution of the Framework Agreement and Specific Contracts and after the Framework Agreement and Specific Contracts.***]*** ***[****OPTION 2 for PCPs in which procurers buy resulting prototypes or first products/services:* The members of the PBG are purchasing [specify whether it is 'developed prototypes' or 'first products'] as part of this PCP. Subject to pre-existing obligations that may apply to background or sideground, the contractor grants to the members of the PBG — and also to (sub)contractors that practice the results for the PBG's own non-commercial use — a royalty-free, non-exclusive, irrevocable and non-sub-licensable (except as explicitly authorised under this Framework Agreement) license to use its background and sideground to the extent needed to use the results for the PBG's own non-commercial purposes, beyond the execution of the Framework Agreement and Specific Contracts and after the Framework Agreement and Specific Contracts for [specify the duration for which the procurers want to keep using the PCP solution and the associated background rights after the PCP. This period must be the same as in request for tenders and must be aligned with the period for usage rights that is defined for access of the PBG to the results in Article XX.4.1].***]***

These licenses are in addition to rights provided for by law, such as the unwaivable rights of, and exceptions for the benefit of lawful users of software or of databases, as foreseen under the applicable EU or national laws.

8.91. Subject to pre-existing obligations that may apply to background or sideground, the contractor also grants rights to use its background and sideground — under the same conditions as above — to entities that are under the direct or indirect control of members of the PBG, or under the same direct or indirect control as members of the PBG, or directly or indirectly controlling members of the PBG ***[****OPTION for PCPs with control restrictions in the HE call conditions:,* subject to applicable control restrictions***]***.

LIST OF PRE-EXISTING MATERIALS AND PRE-EXISTING RIGHTS

8.92. In order to be able to distinguish clearly between rights on newly created materials, and newly created rights on the one hand and pre-existing materials and pre-existing rights on the other hand, and to establish which pre-existing materials and rights are held by whom, the parties must establish an agreed list of all their pre-existing materials and pre-existing rights (background and sideground) that may be used for the performance of this Framework Agreement and Specific Contracts, including identification of the rights' owners.

8.93. The contractor must provide the declaration listing pre-existing materials and pre-existing rights in its offer for the Framework Agreement and must provide an updated version of it to the contracting authority within the bid for each Specific Contract in order to have the updated list approved by the contracting authority at the *latest [specify a reasonable time, e.g. 30 days]* after the start of each Specific Contract. If there are no pre-existing materials nor pre-existing rights, the contractor must provide a declaration to that effect.

8.94. The list of pre-existing material and pre-existing rights shall identify, for each pre-existing material and right, the tasks, deliverables or other aspects related to the performance of the Framework Agreement and Specific Contracts contract that may be affected by pre-existing material/right, the pre-existing material/right concerned, the rights to the pre-existing material, the rights holder and any prior obligations on the pre-existing rights that may apply to the results. Such list will include, but is not limited to, a list of the software necessary for the performance of the Framework Agreement and Specific Contracts (including but not limited to software necessary for the

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operation of the prototypes and products or services that will be developed during the Framework Agreement or Specific Contract), specifying which software is closed source software.

8.95. The contractor shall inform the contracting authority about any evolutions in any of its pre-existing material and pre-existing rights that affect the performance of the Framework Agreement or a Specific Contract. This includes any changes to the background (including the rights on the background) and about the generation of new sideground (including new rights on the sideground) within [specify a reasonable time, e.g. 30 days] from the change or generation and at the latest by the end of the corresponding phase and with each bid for the next phase.

8.96. [OPTION for PCPs with control restrictions due to strategic interests in the HE call conditions: The contractor must ensure that background that is subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries set out in section 3.1 of the request for tenders and that impact the exploitation of the results (i.e. would make the exploitation of the results subject to control or restrictions) must not be used and must be explicitly excluded from the list of pre-existing rights agreed between the contractor and the contracting authority that will be used for the PCP — unless otherwise agreed with the contracting authority.*]*

Note that background that impacts the exploitation of results should be understood as making the exploitation of those results subject to control or restrictions, for example if exploitation would require the agreement of the entity owning the background. If such background needs to be used this must be agreed with the granting authority.

Check carefully if the call conditions for your HE grant impose specific requirements (e.g. specific control restrictions). If yes, they prevail and must be applied. If no, such restrictions should only be used if the buyers group has justified reasons to do so and in agreement with the granting authority.

EVIDENCE OF PRE-EXISTING RIGHTS

8.97. If requested by the contracting authority, the contractor must, in addition to the list mentioned under Article XX., provide evidence that it has the ownership or the right to use all the listed pre-existing materials and rights, except for the rights owned or licensed by the contracting authority and the PBG.

The contracting authority may request this evidence even after the end of this Framework Agreement and Specific Contracts.

This evidence may refer, for example, to rights to: parts of other documents, images, graphs, sounds, music, tables, data, software, technical inventions, know-how, IT development tools, routines, subroutines or other programs (‘background technology’), concepts, designs, installations or pieces of art, data, source or background materials or any other parts of external origin.

This evidence must include, as appropriate:

- The name and version number of the work.
- The full identification of the work and its author, developer, creator, translator, data entry person, graphic designer, publisher, editor, photographer, producer.
- A copy of the licence to use the product or of the agreement granting the relevant rights to the contractor or a reference to this licence.
- A copy of the agreement or extract from the employment contract granting the relevant rights to the contractor where parts of the results were created by its personnel.

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– The text of the disclaimer notice if any.

Provision of evidence does not release the contractor from its responsibilities if it is found that it does not hold the necessary rights, regardless of when and by whom this fact is revealed.

Article 9 — Confidentiality

9.1. The parties shall keep confidential any data, documents or other material (in any form) that is identified as confidential at the time it is disclosed. This applies during the implementation of the Framework Agreement and Specific Contracts and up to [insert number of years (minimum 4 years after the end of the Horizon Europe grant)] years after their end.

9.2. If information has been identified as confidential only orally, it shall be considered to be confidential only if this is confirmed in writing within 15 days of the oral disclosure.

9.3. Unless otherwise agreed between the parties, they may use confidential information only to implement the Framework Agreement and Specific Contracts.

9.4. The parties may disclose confidential information to their staff or to third parties involved in the PCP implementation only if:

(a) They need to be aware of this information in order to implement the PCP activities under the Framework Agreement and Specific Contracts, and

(b) They are bound by an obligation of confidentiality.

9.5 The contracting authority and members of the PBG may disclose confidential information to the EU granting authority if required under their Horizon Europe grant agreement.

9.6. The confidentiality obligations cease to apply if:

(a) The disclosing party agrees to release the other party from the obligation,

(b) The information becomes generally and publicly available, without breaching any confidentiality obligation, or

(c) The disclosure of the information is required by EU or national law.

This does not change the security obligations, which still apply. Stricter confidentiality obligations apply for information that is EU-classified or subject to a security recommendation.

⚠ ***If the duration of the Horizon Europe grant agreement is longer than foreseen (i.e. if the action duration is extended), you must also extend the confidentiality obligation for the framework agreement (via an amendment).***

Article 10 — Staff appointment provisions

10.1. All staff providing Services in connection with this Framework Agreement shall be bound by the same terms and conditions of service which are normally applicable to the Contractor's staff.

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10.2. The Lead Procurer has a commitment to equal opportunities which the Contractor must adhere to. The Contractor must not discriminate on the grounds of gender, race, disability, sexuality, age, religion or otherwise or otherwise allow any applicable employment law to be breached.

Article 11 — Promotion, publicity and communication

DISSEMINATION OBLIGATIONS

11.1. The contractor shall undertake communication activities to create publicity about its participation to the procurement, and to promote the objectives and the results of the R&D carried out under the PCP (in particular, to other potential customers with the objective to achieve commercial exploitation of the results; see Article XX on commercial exploitation of results).

11.2. When undertaking these activities, the contractor shall ensure that they do not infringe any of its other obligations under this Framework Agreement or a Specific Contract, such as its obligations regarding protection of intellectual property, confidentiality, security restrictions or its obligations under data protection legislation.

Where the PBG or HE call conditions impose additional dissemination obligations (e.g. open access obligations) on the PCP contractors for the results of the PCP, add them here.

OBLIGATION OF PRIOR NOTIFICATION OF THE CONTRACTING AUTHORITY

11.3. During the implementation of the Framework Agreement and Specific Contracts and for a period of [insert number] *[*years*][*months*]* after the end of the Framework Agreement and Specific Contracts, the contractor shall inform the contracting authority [indicate number] days in advance of any (written or oral) publication or any other type of communication (in any media or form) relating to the services or results. Information on communication activities expected to have a major media impact shall be provided sufficiently in advance to allow the lead procurer to inform the EU.

11.4. The contractor must, in particular, submit a draft copy of any publications:

- For written publications — at the same time as the submission to the editor for publication or at least one month before the date intended for publication, whichever is earlier.
- For oral communications or other types of disclosure — twenty calendar days before the forecasted date of submission to the organiser of a scientific meeting or of said other type of disclosure.

11.5. If requested by the contracting authority, the contractor shall remove any confidential or security sensitive information before the disclosure.

11.6. Both parties agree that they will balance any of their requests to remove confidentiality, security or intellectual property-sensitive aspects from a publication proposed by the other party against the other party's objective to maintain sufficient information related to the performance of the Framework Agreement and Specific Contracts or the results that is necessary for the appropriate presentation or understanding of the publication.

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RECOGNITION OF EU FUNDING

11.7. All communication activities about the PCP and/or its results (including in electronic form and via social media), as well as infrastructure, equipment and major results financed by the PCP shall display the EU emblem and include the following text:

- For communication activities: 'This [publication][communication] is part of the [acronym of the HE grant] project that has received funding from the European Union's Horizon Europe Research and Innovation Programme'.
- For infrastructure, equipment and major results: 'This [infrastructure][equipment][insert type of result] is part of the [acronym of HE grant] project that has received funding from the European Union's Horizon Europe Research and Innovation Programme'.

11.8. If results are incorporated in a standard, the contractor must — unless the contracting authority requests or agrees otherwise in writing or unless it is impossible — ask the standardisation body to include the following statement in (information related to) the standard: 'Funded by the European Union'.

11.9. If results are protected through registered IPR, the contractor must — wherever possible under the applicable rules — include in its applications for protection the following statement: 'These results were achieved with EU support. The European Union has certain rights in these results'.

11.10. When displayed together with another logo, the EU emblem shall have appropriate prominence. The contractor may use the EU emblem without first obtaining approval from the EU. This does not, however, give the contractor the right to exclusive use. Moreover, the contractor may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

11.11. All communication activities shall indicate that the opinions expressed reflect only the author's views and do not represent the contracting authority's or the EU's official position. The contracting authority, in agreement with the EU granting authority, may waive this obligation in writing or provide the text of the disclaimer.

COMMUNICATION/PUBLICATION RIGHTS FOR THE CONTRACTING AUTHORITY AND THE BUYERS GROUP

11.12. The contracting authority and members of the PBG may use, for the purposes of communication and publicity, all information relating to the PCP, documents (notably summaries) and deliverables, and any other material (such as pictures or audio-visual material) from the contractor (including in electronic form).

11.13. The contracting authority and members of the PBG may, in particular, publish the name of the contractor and its project abstracts, the summaries of the main results from the R&D and the lessons learnt during the PCP *(e.g. relating to the feasibility of the different approaches to meeting the procurers' requirements that were explored, and the lessons learnt for potential future use of the solutions proposed)*.

This does not change the confidentiality obligations under Article 6.

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Moreover, before publishing this information, the contracting authority shall consult the contractor, in order to avoid harm to legitimate business interests *(e.g. regarding aspects of the solutions that could be IPR-protected)* or distortion of competition.

COMMUNICATION/PUBLICATION RIGHTS FOR THE EU

11.14. The EU may use, for the purposes of communication and publicity, information relating to the PCP, documents (notably summaries) and deliverables, and any other material (such as pictures or audiovisual material) from the contractor (including in electronic form).

11.15. If the EU's use of these materials, documents or information would risk compromising legitimate interests, the contractor may, however, ask the contracting authority to request the EU granting authority not to use it.

11.16, The right to use the contractor's materials, documents and information includes:

(a) Use for its own purposes (in particular, making them available to persons working for the EU granting authority or any other EU service (including institutions, bodies, offices, agencies, etc.) or EU Member State institution or body; copying or reproducing them in whole or in part, in unlimited numbers; and communication through press information services).

(b) Distribution to the public (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes).

(c) Editing or redrafting (including shortening, summarising, inserting other elements (e.g. meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation).

(d) Translation.

(e) Storage in paper, electronic or other form.

(f) Archiving, in line with applicable document-management rules.

(g) The right to authorise third parties to act on its behalf or sub-license to third parties the modes of use set out in Points (b), (c), (d) and (f), if needed for the information, communication and publicity activity of the granting authority.

(h) Processing, analysing, aggregating the materials, documents and information received and producing derivative works.

11.17. If the right of use is subject to rights of a third party (including the contractor's staff), the contractor shall ensure that it obtains the necessary approval from the third parties concerned.

Article 12 — Commercial exploitation of the results

12.1. The Contractor shall, within four (4) years after the end of this Framework Agreement, take measures to ensure that the Results of the PCP are exploited commercially (directly or indirectly, through transfer or licensing) to clients other than the Public Buyers Group.

12.2. The Contractor is and remains entitled for four (4) years after the end of the Framework Agreement to request on a case-by-case basis a non-exclusive and not-transferrable licence for definite time to use Public Buyers Group pre-existing rights, Foreground and Sideground, insofar

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duly justified by the Contractor for the commercial exploitation of the Results of the PCP, under Fair, Reasonable And Non Discriminatory (FRAND) terms and conditions to be agreed upon. The Contractor acknowledges and accepts that the Public Buyers Group remains unconditionally entitled to conclude similar agreements with other third parties.

12.3. The Contractor shall ensure that the commercial exploitation of the Results will not infringe any of its other obligations under this Framework Agreement, such as its obligations regarding security, confidentiality and the protection of Intellectual Property or its obligations under the Data protection legislation.

12.4. The Lead Procurer has the right to monitor the exploitation of the Results by the Contractor during and after the Framework Agreement. The Contractor shall submit reports, when requested by the Lead Procurer, no more frequently than annually, on the exploitation of the Results, including the rights on the Results, by the Contractor, its Licensees or assignees. The Contractor shall respond at any time to requests for information from the Lead procurer about the exploitation of the Results.

12.5. If the Contractor fails to commercially exploit the Results within this period (or uses the Results to the detriment of the public interest, including security interests), the Lead procurer has the right to require that ownership of the Results be transferred to him and the members of the Public Buyers Group at no cost. Failure to commercially exploit the Results means not marketing a commercial application of the Results (directly or indirectly, through a subcontractor or licensee).

12.6. Before exercising the right to require the transfer of the ownership of the Results, the Lead Procurer will first contact the Contractor to verify any measures that the Contractor has taken to achieve successful commercial exploitation of the Results, to safeguard EU strategic autonomy and security interests and rules, to prevent use of the Results to the detriment of the public interest and to comply with its contractual obligations.

12.7. In this case, the Contractor shall be requested to give the source code to the Public Buyers Group with all its documentation at no cost. Equally, the Public Buyers Group will own, including - but not limited to - any patents, trademarks, trade names, domain names, design rights, rights in databases, know-how, in each case whether registered or unregistered and including applications for the grant of any such rights, and all rights having equivalent or similar effect anywhere in the world. According to the previsions of this Article, the Public Buyers Group may transfer these rights to Third Parties to assure further product development and market deployment.

12.8. Following the transfer of the ownership of the Results to the Public Buyers Group, the Public Buyers Group may grant Licenses to Third Parties to use and exploit the Results.

12.9. In order to safeguard the cross-border delivery of Services against potential physical and cyber threats and to protect the exchange of security sensitive information, the Contractor shall ensure the safeguard of EU security interests in the commercial exploitation of the Results. For this reason, if the Contractor wishes to commercialise its solution outside the EU, it will have to comply with the Regulation (EU) 2021/821 of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items (if applicable).

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12.10. The Contractor must ensure that, in the commercial exploitation of the Results, any cooperation with entities established in other countries, or controlled by such countries or entities from such countries, does not affect the EU security or strategic autonomy interests. The Contractor must ensure that these obligations also apply to its subcontractors, affiliated entities and other Third Parties it cooperates with in the commercialisation of the Results, as well as to any entities succeeding them in their ownership or development of the Results.

12.11. If the Contractor uses the Results to the detriment of the public interest, including EU strategic autonomy or security interests, the Lead Procurer is entitled to require that the Contractor transfers them the ownership of the Results, in order to cease the use of the Results against the

Article 13 — Conflicts of interest

13.1. The contractor shall take all measures necessary to prevent a situation arising where the impartial and objective implementation of the Framework Agreement or a Specific Contract is compromised for reasons involving economic interests, political or national affinity, family, personal life or any other shared interest.

The contractor shall also take all measures necessary to prevent a situation in which its (previous or ongoing) professional activities affect the impartial and objective implementation of the Framework Agreement or a Specific Contract.

13.2. The contractor shall notify the contracting authority without delay of any situation constituting or likely to lead to a conflict of interest (including changes of ownership) and shall immediately take all steps necessary to rectify this situation.

The contracting authority may instruct the contractor to take specific measures to remedy the situation.

Article 14 — Cession of contractual position

14.1. A Third Party may replace a Contractor or a member of the Contractor in case of a Consortium activity as a result of universal succession in the position of the Contractor following corporate restructuring, including takeover, merger, acquisition or in an Insolvency Event, provided that the Third Party meets all exclusion, selection, compliance and minimal technical criteria and the succession does not entail a substantial modification of the Contract.

14.2. Contractors that are in a procedure to consider a possible merger with or a takeover by an entity from a country (or controlled by a country) that is not an EU Member State or country associated by Horizon Europe, must notify the Lead Procurer at least three (3) months in advance of the decision to implement the possible merger or takeover and: a) Describe in detail the identity, ownership and control structure of the potential new merged entity or the potential new owner(s). b) Include a reasoned assessment of the likely impact of the possible merger/takeover on the access to the Results and to the Background and Sideground that is essential for accessing the Results for the members of the Public Buyers Group and for Third Parties and the commercialisation exploitation of the Results, including the EU security interests and EU strategic autonomy.

14.3. The Lead Procurer may request the Contractor for additional information to verify the potential impact, upon which the Contractor must promptly provide the requested information. In case the impact analysis concludes that the merger or takeover negatively impacts the access to or the commercial exploitation of the Results, including the EU security interests and EU strategic autonomy objectives, the Lead Procurer is entitled to require that the Contractor (both the

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Contractor before or after the merger or takeover) transfers the ownership of the Results to the members of the Public Buyers Group. The Contractor may on its own initiative without prior authorization from the Lead Procurer, give non-exclusive Licenses to Third Parties to exploit the Results that it owns, to the extent that such Licenses do not affect the rights of the members of the Public Buyers Group related to such Results. The Contractor must thus ensure in the licensing agreement that all its obligations under the Framework Agreement are passed on to the Third Party and that the Third Party has the obligation to pass on these obligations in any potential subsequent licensing.

14.4. Due to EU strategic autonomy and security reasons, exclusive licensing and transfers of ownership of the Results are restricted as follows: a) The Contractor may not transfer ownership of its Results or give exclusive Licences if the Results would become subject to controls or other restrictions by a country (or entity from a country) which is not an EU Member State or country associated to Horizon Europe. b) The Contractor must ensure that its obligations under the Framework Agreement are passed on to the new owner and licensee and that this new owner/licensee has the obligation to pass them on in any subsequent transfer/licensing. c) Contractors that intend exclusive licensing or transfers of ownership of the Results to an entity from a country (or controlled by a country) that is not an EU Member State or country associated by Horizon Europe, must request prior authorisation from the Lead Procurer.

14.5. The intention of such exclusively licensing or transfer must first be notified to the Lead Procurer at least three (3) months in advance and: a) Identify the specific Results concerned. b) Describe in detail the intended new owner and the planned or potential exploitation of the Results. c) Include a reasoned assessment of the likely impact of the intended transfer or exclusive License on the access rights to the Results and on the Background and Sideground that is essential for accessing the Results as foreseen by the Framework Agreement for the members of the Public Buyers Group and for Third Parties, as well as on the commercialisation exploitation of the Results, including the EU security interests and EU strategic autonomy objectives.

14.6. The Lead Procurer may request the Contractor for additional information to verify the potential impact, upon which the Contractor must promptly provide the requested information. Before granting the authorisation, the Lead Procurer will verify the potential impact of the intended transfer or exclusive licensing. The Lead Procurer may condition its authorisation to measures ensuring that the transfer or exclusive licensing will not have unintended or undesirable consequences. Before the Lead Procurer gives its written authorization, the transfer may not take place and any transfer or exclusive licensing agreement concluded before or without a written authorization will be null and void.

Article 15 — Ethics and research integrity

15.1. The contractor shall carry out the tasks assigned to it in the Framework Agreement and Specific Contracts in compliance with:

(a) Ethical principles (including the highest standards of research integrity).
(b) Applicable international, EU and national law.

15.2. The contractor must commit to and ensure the respect of basic EU values (such as respect for human dignity, freedom, democracy, equality, the rule of law and human rights, including the rights of minorities). The contractor must pay particular attention to the principle of proportionality, the right to privacy, the right to the protection of personal data, the right to the physical and mental

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integrity of persons, the right to non-discrimination, the need to ensure protection of the environment and high levels of human health protection.

15.3. In case the development, deployment and/or use of the PCP solution involves artificial intelligence (AI), the contractor must ensure that the artificial intelligence is trustworthy, i.e. lawful, ethical and technically robust. The artificial intelligence system must preserve and protect the following six general ethical principles based on fundamental rights as enshrined in the Charter of Fundamental Rights of the European Union (EU Charter), and in relevant international human rights law[34]:

- Respect for human agency: human beings must be respected to make their own decisions and carry out their own actions. Respect for human agency encapsulates three more specific principles, which define fundamental human rights: autonomy, dignity and freedom.
- Privacy and data governance: people have the right to privacy and data protection and these should be respected at all times.
- Fairness: people should be given equal rights and opportunities and should not be advantaged or disadvantaged undeservedly.
- Individual, social and environmental well-being: artificial intelligence systems should contribute to, and not harm, individual, social and environmental wellbeing.
- Transparency: the purpose, inputs and operations of artificial intelligence programs should be knowable and understandable to its stakeholders.
- Accountability and oversight: humans should be able to understand, supervise and control the design and operation of artificial intelligence-based systems, and the actors involved in their development or operation should take responsibility for the way that these applications function and for the resulting consequences.

15.4. The contractor may not:

- Carry out activities in a Member State for an activity which is forbidden in that Member State.
- Carry out activities in a country inside or outside the EU, if they are prohibited in all EU Member States.

15.5. The contractor may not carry out activities which:

(a) Aim at human cloning for reproductive purposes.

(b) Intend to modify the genetic heritage of human beings in a way which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads).

(c) Intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

(d) Lead to the destruction of human embryos (for example, for obtaining stem cells).

15.6. The contractor may not carry out activities that do not focus exclusively on civil applications.

[34] For more information, *see Horizon Europe guidance on ethics by design and ethics of use approaches for AI*.

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15.7. The contractor shall respect the fundamental principle of research integrity — as set out in the European Code of Conduct for Research Integrity[35].

This implies compliance with the following essential principles:

- Reliability in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources.
- Honesty in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way.
- Respect for colleagues, research participants, society, ecosystems, cultural heritage and the environment.
- Accountability for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts.

and means that the contractor must ensure that persons carrying out research tasks follow the good research practices and refrain from the research integrity violations described in this Code.

15.8. Before starting any activity that raises an ethical issue, the contractor shall submit to the lead procurer a copy of:

(a) Any ethics committee opinion required under national law.

(b) Any notification or authorisation for activities raising ethical issues required under national law.

15.9. [OPTION if the HE grant agreement contains ethics requirements that concern the PCP contracts:

In addition, the contractor shall comply with the following additional ethics requirements:

– [insert the ethics deliverables from Annex 1 to the HE grant agreement].**]**

Article 16 — Security-related obligations

[*OPTION if the PCP involves dual-use goods or dangerous materials or substances:*

16.1. Activities involving dual-use goods or dangerous materials and substances shall comply with applicable EU, national and international law.

Before starting the activity, the contractor shall provide the contracting authority with a copy of any export or transfer licences required.***]***

[*OPTION if the HE grant agreement provides for a security classification that affects the PCP contracts:*

16.2, Classified information shall be treated in accordance with the security aspect letter (SAL) annexed to the Horizon Europe grant agreement and EU Decision No 2015/544[36] until it is declassified.

Tasks involving classified information may not be subcontracted without prior written approval from the contracting authority.

The contractor shall inform the contracting authority of any changes relating to security and, if necessary, request an amendment.***]***

35 European Code of Conduct for Research Integrity of ALLEA (All European Academies).

36 Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU-classified information.

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[OPTION if the HE grant agreement contains security recommendations restricting disclosure or dissemination that affect the PCP contracts:

16.3. The following results may be disclosed or disseminated only if the contractor has first obtained written approval from the contracting authority:

– [insert the results subject to a security recommendation restricting disclosure or dissemination from Annex 1 to the HE grant agreement].*]*

[OPTION if the HE grant agreement contains other security recommendations that affect the PCP contracts:

16.4. In addition, the contractor shall comply with the following additional security recommendations:

– [insert the security recommendations from Annex 1 to the HE grant agreement].***]***

Define the applicable rules regarding location, access and processing of security related data. In case the HE call conditions impose other geographic restrictions (e.g. restrictions on the participation and/or control of contractors to the procurement, place of performance requirements, etc), agree in cooperation with the granting authority how to best ensure consistency of the rules on handling of security related data with those other restrictions.

The localisation of and access to [all security related data handled under the contract] [all data related to contract activities that are performed on the security components of the solution] […] processed by the contractor shall comply with the following:

– The data shall only be processed within the territory of [the European Union and the Horizon Europe associated countries[37]] [the European Union][…] and will not leave that territory

– The data shall only be held in data centres located with the territory of [the European Union and the Horizon Europe associated countries] [the European Union][…]

– [No access shall be given to such data outside of [the European Union and the Horizon Europe associated countries] [the European Union][…] or [access to data may be given on a need to know basis only to authorised persons established in a country which has been recognised by the European Commission as providing adequate protection to security related data [as defined in EU Decision No 2015/544] […]]

– The contractor may not change the location of data processing without the prior written authorisation of the contracting authority.

Article 17 — Processing of personal data

17.1. The contractor shall process personal data in compliance with the applicable EU and national law on data protection, in particular Regulation 2016/679[38] (including as relates to authorisations and notification requirements).

17.2. Contractors must ensure that personal data is:

– Processed lawfully, fairly and in a transparent manner in relation to the data subjects.

37 List of Horizon Europe participating countries.

38 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC ('GDPR') (OJ L 119, 4.5.2016, p. 1).

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- Collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes.
- Adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed.
- Accurate and, where necessary, kept up to date.
- Kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the data is processed.
- Processed in a manner that ensures appropriate security of the data.

Define the conditions to be respected regarding location, access and processing of personal data. In case the HE call conditions impose other geographic restrictions (e.g. restrictions on the participation and/or control of contractors to the procurement, place of performance requirements, etc), agree in cooperation with the granting authority how to best ensure consistency of the rules on handling of personal data with those other restrictions.

17.3. The localisation of and access to the personal data processed by the contractor shall comply with the following:

- The personal data shall only be processed within the territory of [the European Union and the Horizon Europe associated countries[39]] [the European Union][…] and will not leave that territory.
- The data shall only be held in data centres located with the territory of [the European Union and the Horizon Europe associated countries] [the European Union][…].
- [No access shall be given to such data outside of [the European Union and the Horizon Europe associated countries] [the European Union][…] or [access to data may be given on a need to know basis only to authorised persons established in a country which has been recognised by the European Commission as providing adequate protection to personal data].
- The contractor may not change the location of data processing without the prior written authorisation of the contracting authority.
- Any transfer of personal data under the Framework Agreement or a Specific Contract to third countries or international organisations shall fully comply with the requirements laid down in Chapter V of Regulation (EU) 2016/679.

17.4. The contractor may grant its staff access to data only in so far as is strictly necessary for implementing, managing and monitoring the Framework Agreement and Specific Contracts.

17.5. The contractor must inform the staff whose personal data are collected and processed by the procurers and/or the EU. For this purpose, the contractor must provide them with the privacy statements of the procurers and the EU, before transmitting their data. If explicit prior consent from the data subjects is needed, the contractor must obtain such consent.

39 List of Horizon Europe participating countries.

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Article 18 — Obligation to provide information and keep records

18.1. The contractor must, at any time during the implementation of the Framework Agreement and Specific Contracts or afterwards, provide any information requested by the procurers in relation to the Agreement or Contracts.

18.2. The contractor must keep, for a period of up to [insert number of years (minimum 5 years after the end of the HE grant agreement)] years after the end of the Framework Agreement and Specific Contracts, records and other supporting documentation relating to their implementation.

This obligation includes records and other supporting documentation on scientific and technical implementation (in line with the accepted standards in the field) and on the price charged and the costs incurred by the contractor.

18.3. The contractor must keep the original documents. Digital and digitalised documents are considered originals if they are authorised under national law.

18.4. Should there be ongoing checks, reviews, audits, investigations, litigation or other pursuits of claims (including claims by a third party against the procurers), the contractor must keep all records and other supporting documentation until the end of these procedures.

Article 19 — EU checks, reviews, audits and investigations

19.1. Should the EU (including the European Court of Auditors, the European Public Prosecutor's Office (EPPO) or the European Anti-Fraud Office (OLAF)) decide to carry out a check, review, audit or investigation, the contractor must make available all information, records and other supporting documents relating to the implementation of the Framework Agreement and Specific Contracts.

19.2. Should there be an on-the-spot visit, the contractor must allow access to its premises and must ensure that the information requested is readily available.

Article 20 — EU impact evaluation

20.1. Should the EU carry out an impact evaluation (of its grant to the procurers), the contractor must make available all information, records and other supporting documents relating to the implementation of the Framework Agreement and Specific Contracts.

Article 21 — Monitoring and reporting

21.1. During each PCP Phase, the implementation by the Contractor of the R&D Services will be monitored periodically and reviewed against the expected outcomes (deliverables and output or Results) for that Phase.

21.2. To this end, the Contractor will be assigned a main contact person (their supervisor) from the Technical Evaluation Committee (TEC) appointed by the Lead Procurer. There will be regular monitoring meetings between the Contractor and the TEC.

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21.3. For the purpose of such monitoring activities, the Lead Procurer is entitled to carry out physical visits to the Contractor's premises at any time during the implementation of the PCP. The meetings will take place after formal communication. The Contractor could be asked to discuss the Results achieved in the preceding period and present their updated work plan.

21.4. The Lead Procurer may request to witness (or request that a designated party witnesses) any tests or measurements to be performed by the Contractor or his subcontractor(s). The Contractor shall give the Lead Procurer a prior notice - with sufficient time and, in any case, no less than ten (10) days - in writing of the date(s) and place(s) of such tests and measurements. Failure to notify with sufficient time will allow the Lead Procurer to demand that such tests and measurements be repeated at the expense of the Contractor, who shall be liable for any delay resulting thereof.

21.5. The PEC will provide regular feedback in writing to Contractors after meetings or visits.

END OF PHASE REPORTING

21.6. The Contractor shall submit to the Lead Procurer an End of Phase (1, 2, 3) report at the end of each relevant Phase (Phase 1: Solution design, Phase 2: Prototype Development and Phase 3: Operational Validation), on the Completion Date.

21.7. The Contractor shall draft the End of Phase (1, 2, 3) report using TD6 and shall take into account any and all recommendations provided by the Lead Procurer. The End of Phase (1, 2, 3) report shall include the Data, methods, Results and final conclusions together with the information management and any other information relating to the Project Phase it concerns up to the Completion Date thereof. The ownership of necessary reports of all Phases will be transferred to the Lead Procurer.

21.8. The Evaluation of each End of Phase (1, 2, 3) Report shall be carried out at the Lead Procurer premises or at any other place indicated thereby by the PEB.

21.9. The evaluation of the End of Phase (1, 2, 3) report will be made within the timeline as provided in the Request for Tender (TD1). 1.9. The evaluation will assess whether the Contractor has achieved the objectives mentioned in the Financial Offer (TD9) and the Technical Offer (TD8), in accordance with the Request for Tender (TD1) and each Phase objectives.

21.10. The evaluation will be documented in a specific report, indicating the date and the Results of the same and will be signed by all the members of the PEB.

SUCCESSION OF PHASE 1, PHASE 2 AND PHASE 3 OF THE PROJECT

21.11. By signing the Framework Agreement, the Lead Procurer and the Contractor accept the general conditions set by this Framework Agreement and the Phase Contract for Phase 1.

21.12. In case the Contractor gets awarded contracts for Phase 2 and Phase 3, these have to be signed by Lead Procurer and the Contractor. The Contractor has the obligation of performing the Services within the scope of the respective Phases of the Project.

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ASSESSMENT OF PHASE 1 AND AWARD OF PHASE 2

21.13. On the Completion Date of Phase 1, the Contractor shall submit to the Lead Procurer the End of Phase 1 report (TD6) together with the deliverables belonging to Phase 1, which shall be reviewed and assessed by the TEC.

21.14. The outcome of the evaluation shall result in the decision of the PEC regarding the unsatisfactory, satisfactory or successful completion of Phase 1 (as defined in the Request for Tenders – TD1). This decision will be issued according to the timeline of the Request for Tenders. In case a longer evaluation process is needed, the Contractor will be duly informed of the new timeline for the evaluation outcome.

21.15. The following rules shall apply:

a) In case the Contractor has not satisfactorily completed Phase 1:

i. The Contractor shall reimburse the received pre-payment to the Lead Procurer.

ii. The Contractor will not receive further payment for the work carried out in Phase 1.

iii. The Contractor will not be invited to submit a Bid for Phase 2.

iv. This Framework Agreement and Phase 1 Contract shall terminate.

b) In case the Contractor has satisfactorily, but not successfully completed Phase 1:

i. The Contractor shall not reimburse the received pre-payment to the Lead Procurer.

ii. The Contractor will be entitled to the payment for the work carried out in Phase 1.

iii. The Contractor will not be invited to submit a Bid for Phase 2.

iv. This Framework Agreement and Phase 1 Contract shall terminate.

c) In case the Contractor has successfully completed Phase 1:

i. The Contractor shall not reimburse the received pre-payment to the Lead Procurer.

ii. The Contractor will be entitled to the payment for the work carried out in Phase 1.

iii. The Contractor will be invited to submit a Bid for Phase 2

21.16. The Contractor that has successfully completed Phase 1 will be invited to submit a Bid for Phase 2. The Lead Procurer will communicate the award decision after the deadline for submitting the Bids. This will take place according to the planning provided in the Request for Tender (TD1). Any changes in the timeline above will be duly communicated to the Contractors.

21.17. If the Contractor is selected for Phase 2, this Framework Agreement shall continue in force for the duration of the following Phases. The Contractor shall thereupon sign a Contract for that Phase. Alternatively, if the Contractor is not selected for Phase 2, this Framework Agreement shall, without prejudice to any surviving clauses, cease to have any effect upon the date announced by the Lead Procurer for final award of Phase 2.

ASSESSMENT OF PHASE 2 AND AWARD OF PHASE 3

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

21.18. On the Completion Date of Phase 2, the Contractor shall submit to the Lead Procurer the End of Phase 2 report (TD12) together with the deliverables belonging to Phase 2, which shall be reviewed and assessed by the TEC. This assessment shall be performed according to the planning provided in the Call for Tenders (TD1).

21.19. The outcome of the evaluation shall result in the decision of the PEB regarding the unsatisfactory, satisfactory or successful completion of Phase 2 (as defined in the Request for Tenders – TD1). This decision will be issued according to the planning provided in the Request for Tenders. In case a longer evaluation process, the Contractor will be duly informed of the new timeline for the evaluation outcome.

21.20. The following rules shall apply:

a) In case the Contractor has not satisfactorily completed Phase 2:

i. The Contractor shall reimburse the received pre-payment to the Lead Procurer.

ii. The Contractor will not receive further payment for the work carried out in Phase 2.

iii. The Contractor will not be invited to submit a Bid for Phase 3.

iv. This Framework Agreement and Phase 2 Contract shall terminate.

b) In case the Contractor has satisfactorily, but not successfully completed Phase 2:

i. The Contractor shall not reimburse the received pre-payment to the Lead Procurer.

ii. The Contractor will be entitled to the payment for the work carried out in Phase 2.

iii. The Contractor will not be invited to submit a Bid for Phase 3.

iv. This Framework Agreement and Phase 2 Contract shall terminate.

c) In case the Contractor has successfully completed Phase 2:

i. The Contractor shall not reimburse the received pre-payment to the Lead Procurer.

ii. The Contractor will be entitled to the payment for the work carried out in Phase 2.

iii. The Contractor will be invited to submit a Bid for Phase 3.

21.21. The Contractor that has successfully completed Phase 2 will be invited to submit a Bid for Phase 3. The Lead Procurer will communicate the award decision after the deadline for submitting the Bids. This will take place according to the planning provided in the Request for Tender (TD1). Any changes in the timeline above will be duly communicated to the Contractors.

21.22. If the Contractor is selected for Phase 3, this Framework Agreement shall continue in force for the duration of the following Phases. The Contractor shall thereupon sign a Contract for that Phase. Alternatively, if the Contractor is not selected for Phase 3, this Framework Agreement shall, without prejudice to any surviving clauses, cease to have any effect upon the date announced by the Lead Procurer for final award of Phase 3.

ASSESSMENT OF PHASE 3

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

21.23. On the Completion Date of Phase 3, the Contractor shall submit to the Lead Procurer the End of Phase 2 report (TD6) together with the deliverables belonging to Phase 3, which shall be reviewed and assessed by the TEC. This assessment shall be performed according to the planning provided in the Call for Tenders (TD1).

21.24. The outcome of the evaluation shall result in the decision of the PEB regarding the unsatisfactory, satisfactory or successful completion of Phase 3 (as defined in the Request for Tenders – TD1). This decision will be issued according to the planning provided in the Request for Tender. In case a longer evaluation process, the Contractor will be duly informed of the new timeline for the evaluation outcome.

21.25. The following rules shall apply:

a) In case the Contractor has not satisfactorily completed Phase 3:

i. The Contractor shall reimburse the received pre-payment to the Lead Procurer,

ii. The Contractor will not receive further payment for the work carried out in Phase 3.

iii. This Framework Agreement and Phase 3 Contract shall terminate.

b) In case the Contractor has satisfactorily, but not successfully completed Phase 3:

i. The Contractor shall not reimburse the received pre-payment to the Lead Procurer.

ii. The Contractor will be entitled to the payment for the work carried out in Phase 3.

c) In case the Contractor has successfully completed Phase 3:

i. The Contractor shall not reimburse the received pre-payment to the Lead Procurer.

ii. The Contractor will be entitled to the payment for the work carried out in Phase 3.

21.26. Successful completion of Phase 1 is a prerequisite to receiving an invitation for Phase 2. Successful completion of Phase 2 is a prerequisite to receiving an invitation for Phase 3.

21.27. Any award for Phases 2 and 3 will be communicated in writing by the Lead Procurer to the Contractor.

21.28. Any reference in this Framework Agreement to the Project refers also to any of the Phases awarded to the Contractor.

21.29. The members of the Public Buyers Group cannot make use of any of the deliverables of the Contractor in the event the Contractor needs to reimburse the payment for the work carried out under a PCP Phase.

21.30. The Lead Procurer reserves the right not to award contracts for Phases for which it has not received any suitable or acceptable offer in relation to the Project, as well as to stop, cancel, revoke, re-issue the PCP or not to award any Phase Contract for objective reasons. The Lead

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Procurer assumes no obligation whatsoever to compensate or indemnify the Contractors for any expense or loss that may occur in the preparation of their Bids.

Article 22 — Breach of contract

22.1. The following provisions constitute a non-exhaustive list of clauses that lead to breach of Contract.

22.2. The Contractor shall ensure timely submission of deliverables. If the Contractor fails to deliver the Results or other deliverables as described in the Call for Tenders (TD1) - including, but not limited to, End of Phase (1, 2, 3) Reports - and to comply with this Framework Agreement and the Phase Contracts (TD3, 4 and 5), the Lead Procurer shall give the Contractor the opportunity to remedy it within an appropriate period (no longer than ten (10) days), unless the delay is not attributable to the Contractor. If the Lead Procurer is still not satisfied after that period,

it may (at its discretion):

a) Withhold payments until satisfactory delivery.

b) Cancel payments.

c) Have all sums previously paid by the Lead Procurer to the Contractor for and under the Phase which is then running (not being previous Phases), refunded by the Contractor.

d) Hold the Contractor accountable for additional costs, which the members of the Public Buyers Group reasonably incurred.

e) Refuse to accept any subsequent performance of the Project which the Contractor attempts to make.

f) Exclude the Contractor from the any subsequent Phases on the basis that the Contractor has not successfully completed the present Phase.

g) Terminate the Framework Agreement, in whole or in part, and/or any Phase Contract without liability to the Contractor.

22.3. Acceptance by the Lead Procurer of any deliverable or Result shall not limit the Contractor's liability, if those deliverables or Results are later discovered to be non-compliant with the requirements of the Framework Agreement, nor for any loss or damage which may arise as a Result.

LIABILITY

22.4. The Contractor undertakes to fulfil all the obligations arising out of this Framework Agreement, with the best possible diligence required by the nature of the Services.

22.5. The Contractor assumes liability for any and all damages caused – not covered by its professional insurance/liability policy – to anyone who is caused, in relation to the performance of the Contractual Services, relieving the Lead Procurer of any liability.

22.6. The Contractor shall be responsible and liable for any damage caused by it, or its employees, agents and/or sub-contractors, directly to the members of the Public Buyers Group or any Third Parties (including cost of restoration, penalties, loss of profits, costs and expenses, also legal expenses) which the Lead Procurer is required to compensate, because of the Contractor's delay or failure to comply with its obligations.

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22.7. The Contractor shall also be responsible and liable for any damages or injuries suffered by his/her property or by people who cooperate with him/her or are employed by him/her and agrees to indemnify the members of the Public Buyers Group, even in court.

22.8. The Contractor hereby agrees to provide, within ten (10) days as of the signing of this Framework Agreement, evidence of the conclusion of a professional insurance/liability policy concluded with a primary insurance company and undertakes to keep such policy insurance in force for the entire duration of this Framework Agreement and the Phase Contracts (TD 3, 4 and 5) to cover all direct or indirect material damage to persons or property. For the avoidance of any doubt, the limit for each event, corresponding at least to what the law provides for at least in the field of liability and insurance, cannot be considered, under any circumstances, as a limit to compensation for damage.

22.9. To further clarify, the Contractor shall indemnify and hold harmless the Lead Procurer and the members of the Public Buyers Group, their employees, officers, directors and agents fully against any and all liabilities, claims, actions, suits or proceedings whatsoever in respect of:

a) Any damage to property, including any infringement of Third Parties' IPRs.

b) Any injury to persons, including injury resulting in death.

c) Resulting from or in the course of, or in connection with the performance of the Services, except in so far as such damages or injury shall be due to any act or negligence of the Lead Procurer or any member of the Public Buyers Group.

22.10. The Contractor shall promptly notify the Lead Procurer in writing of any such liabilities, claims, actions, suits or proceedings, and in particular of any action brought against the Contractor for infringement or alleged infringement of IPRs which might affect the Project, within thirty (30) days after receipt of notice of any complaint, claim or injury opening an indemnification right.

22.11. In no event shall the Lead Procurer (and the members of the Public Buyers Group) be liable to the Contractor for punitive damages, indirect or consequential loss or damage suffered by Contractor.

DAMAGES

22.12. The contractor must compensate the contracting authority and members of the PBG if they are held liable by the EU for damage sustained as a result of the implementation of the Framework Agreement or a Specific Contract (or because it was not implemented properly).

22.13. The EU cannot be held liable for any damage caused to the contractor or caused by the contractor in connection with the implementation of the Framework Agreement or a Specific Contract.

Set out clear rules for termination of the Framework Agreement and Specific Contracts, reduction or recovery of payments and liquidated damages. Think of including not only such rules for typical breach of contract situations that may occur in any type of procurement, but think also of how to use them for breaches of PCP specific provisions (e.g. breaches of compliance with the place of performance requirements, with the R&D

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definition, with the place of establishment and control requirements (if any), with IPR and commercialisation requirements).

[OPTION in case there are preferred partners and third parties providing in-kind contributions to the PCP: **Article XX — Participation of preferred partners and third parties providing in-kind contributions to the PCP)**

Complete as applicable to the specificities of the PCP. Name the preferred partners and third parties providing in-kind contributions to the PCP and explain the boundary conditions for their participation, i.e. the rights and responsibilities under the agreement and specific contracts.

Pay particular attention to clearly set out the rules for participating in testing/monitoring/evaluation of results, confidentiality, processing of personal data and communication.

Specify also clearly the IPR-related rights (e.g. access rights to results needed to follow the implementation of the PCP) and obligations of preferred partners and third parties providing in-kind contributions to the PCP (e.g. access rights to pre-existing rights, sideground or results (foreground) needed by contractors to implement the PCP or exploit its results).]

Article 23 — Causes and consequences of termination

23.1. The Lead Procurer may terminate this Framework Agreement without liability for any damage, loss or expenses arising as a Result of or in connection with such termination (except otherwise provided in specific clauses hereunder) in the following cases:

a) Any approvals or Licenses required under this Framework Agreement or to enable the Services to be carried out lawfully are not given unconditionally within one (1) month of the commencement of the Project; or lapse, terminate or otherwise cease to have effect during the term of this Agreement and the Contractor does not seek to have the necessary permits within two (2) weeks.

b) An appeal under the bankruptcy law or any other law applicable to insolvency proceedings has been filed against the Contractor, proposing the dissolution, liquidation, amicable composition, the debt restructuring or a settlement with creditors, or if a liquidator, a trustee, a guardian or a person having similar functions, which come into possession of the goods or is responsible for managing the business the Contractor is appointed.

c) Any of the members of the governing body or the managing director or the general manager or the technical manager of the Contractor are subject to a judgment which has the force of res judicata for crimes against the public administration, public policy, public faith or public property.

d) The Contractor has informed the Lead Procurer that they are not willing or not able for whatever reason to continue the Project.

e) The Contractor is in breach of an obligation under this Framework Agreement, if: i. the breach can be remedied and the Contractor has failed to remedy the breach within thirty (30) days of written notice being sent to the Contractor specifying the breach and requiring its remedy; or ii. the breach cannot be remedied (but does not constitute a serious or repeated breach or grave professional misconduct by the Contractor).

f) The Contractor, or any sub-contractor on whose resources he has relied in the PCP, becomes subject to any exclusion criteria listed in the Request for Tenders (TD1).

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g) Failure by the Contractor to comply with the contractual obligations (including those related to the Phase Contracts – TD3, 4 and 5) in accordance with the law in force and the conditions, procedures, terms and requirements contained in this Framework Agreement, its Annexes and in the Phase Contracts, including, but not limited to:

i. Breach of any of its confidentiality obligations.

ii. A situation of Conflict of Interest according to Article 9 arises during the implementation of the Contract, including subcontractors.

iii. Breach of any of its Data protection obligations.

iv. Failure to submit a deliverable or to meet any expected outcome/result within ten (10) days of the date by which it was meant to be achieved, or repeatedly fails over a period of three (3) consecutive months to submit a deliverable or to meet any expected outcome/Result by the date(s) on which they were meant to be achieved.

h) The Services are not in compliance with the requirements on R&D Services as defined in the most recent version of the Frascati Manual and, where applicable, its latest annexes[40] or in case of non-compliancy with any other requirement mentioned in the Call for Tender (TD1) and declared in the signed declaration that is part of the tender.

i) The necessary must and safety requirements are not complied with. Lack of the necessary must and safety requirements may also lead to partial termination of the Framework Agreement and the Phase Contract.

j) Any provision of this Framework Agreement (other than as previously specified in the preceding provisions of this Article 25) expressly entitles the Lead Procurer to terminate this Framework Agreement.

23.2. In the event of serious or repeated breach of the agreement or grave professional misconduct by the Contractor, leading the Lead Procurer to conclude that the Contractor is unsuitable to comply with its obligations hereunder, the Lead Procurer reserves the right to terminate this Framework Agreement at the Contractor's expense, subject only to a notice of termination by certified e-mail or registered letter with acknowledgement of receipt, without prejudice to the right to claim further damages.

23.3. In the event of termination of the Framework Agreement for serious or repeated breach or grave professional misconduct by the Contractor, the Lead Procurer shall be entitled to apply a penalty in the amount of maximum ten per cent (10%) of the Price for the PCP set out in the Phase Contract concerning the ongoing Phase, and/or claim for compensation of damages.

23.4. Termination of this Framework Agreement by the Lead Procurer shall (at the option of the Lead Procurer) take place with immediate effect as from the date of service of the notice of that termination or from the expiry of a period specified in that notice. If this occurs, the Lead Procurer shall not be obliged to make any further financial payment to the Contractor.

23.5. The Lead Procurer is and remains unconditionally entitled to terminate this Framework Agreement and any Phase Contract hereunder without cause, by giving a three (3) month notice in writing. The Lead Procurer shall in that case only be obliged to pay to the Contractor for the reasonable

[40] OECD (2015), Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris, https://doi.org/10.1787/9789264239012-en

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costs for the remaining obligations of the Contractor for that Phase that can objectively not be undone.

23.6. The Lead Procurer may, by giving due notice in writing, terminate this Framework Agreement without liability for any damage, loss or expenses arising as a result of or in connection with such termination if there is a change of control in the Contractor which the Lead Procurer can reasonably demonstrate is prejudicial. The Lead Procurer shall only be permitted to exercise its rights pursuant to this clause for six (6) months after any such change of control and shall not be permitted to exercise such rights where the Lead Procurer has agreed in advance in writing to the particular change of control and such change of control takes place as proposed. The Contractor shall notify the Lead Procurer within two (2) weeks of any change of control taking place, unless the new controlling entity originates from a country (or is controlled by a country) that is not EEA and HE associated, in which case the provisions of Article 14 will apply. The Lead Procurer shall not unreasonably withhold its approval and provide Contractor with a decision within two (2) weeks after receiving such a notification.

23.7. The assignments and/or Licenses granted under the Framework Agreement by the Contractor to the Lead Procurer, any member of the Public Buyers Group or any other Third Party shall continue notwithstanding any expiry or termination of this agreement.

23.8. Termination or expiry of this agreement shall be without prejudice to any rights, remedies or obligations of either Party accrued under this Framework Agreement before termination or expiry.

23.9. Within thirty (30) days of the date of termination or expiry of this Framework Agreement, the Contractor shall return or destroy at the request of the Lead Procurer any personal Data received from or on behalf of the Lead Procurer and/or the members of the Public Buyers Group, or Confidential Information belonging to the Lead Procurer and/or the members of the Public Buyers Group, either in its current format or in a format nominated by the Lead Procurer.

23.10. Unless expressly stated to the contrary, the service of a notice to terminate this Framework Agreement shall operate as a notice to terminate any Phase Contract in force.

Article 24 — Force Majeure

24.1. In accordance with this Framework Agreement, neither Party may be held responsible by the other Party for circumstances beyond the Party's control and which the Party, on signing the Framework Agreement or the Phase Contract, could not have taken into consideration or avoided or overcome. Circumstances that a diligent Contractor could have prevented by taking the customary and reasonable precautions are not considered force majeure, including those relating to internal strikes and illness, and/or any default of a Service, defect in equipment or material or delays, unless they stem directly from a relevant case of force majeure.

24.2. Force majeure may only be asserted for the number of working days that the force majeure situation persists.

24.3. Insofar as a deadline for the Contractor is deferred because of force majeure, the payments relating to this deadline will be deferred correspondingly.

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24.4. Any situation constituting force majeure must be formally notified to the other party without delay, stating the nature, likely duration and foreseeable effects. Force majeure may only be cited if the affected Party has given written notification thereof to the other Party no later than ten (10) working days after the commencement of the force majeure.

24.5. The Parties must immediately take all the necessary steps to limit any damage due to force majeure and do their best to resume implementation of the action as soon as possible. The party prevented by force majeure from fulfilling its obligations under the Framework Agreement cannot be considered in breach of them.

24.6. The Party not affected by force majeure is entitled to cancel orders if the agreed delivery time is exceeded by thirty (30) working days as a consequence of force majeure.

24.7. The Parties may terminate this Framework Agreement in writing without notice if the impediment or delay as a consequence of the force majeure situation will last or lasts longer than six (6) months.

Article 25 — Amendments

25.1. If at any time any provision of this Framework Agreement needs to be amended, the Contractor shall immediately inform the Lead Procurer in writing requesting an amendment, giving full details of the justification for the request and giving proposals for the amendment to this Framework Agreement at no additional cost to the Lead Procurer. Upon receipt of such a request, the Lead Procurer may:

a) Agree to modify the Framework Agreement provided such variation is non-discriminatory and does not lead to a substantial change of the Framework Agreement, the scope of Services or the scope of the Results as allowed following the case law of the European Court of Justice;

b) Amend the Project in a manner which the Contractor agrees can be carried out within the duration of the Project and the Price allocated to the relevant Phases; or

c) Refuse the request and require the continuation of the Project in accordance with the Framework Agreement.

25.2. Any amendment to this Framework Agreement shall be made after agreement between the Parties.

25.3. Any amendment to this Framework Agreement shall be set out in writing, in an addendum to it and signed by both Parties.

25.4. No amendment shall have the purpose or the effect of making material changes to the Framework Agreement and Phase Contracts (TD11, 14 and 15), which might call into question the decision awarding the Contract or result in unequal treatment of Technology Providers. If it is not possible to continue with the Project in accordance with the Framework Agreement, the agreement and Phase Contracts shall be terminated.

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Article 26 Interpretation

26.1. The Framework Agreement constitutes the entire Agreement between the Parties relating to its subject matter. Each Party acknowledges that it has not entered into this Framework Agreement on the basis of any warranty, representation, statement, agreement or undertaking except those expressly set out in this Framework Agreement. Each party waives any claim for breach of this Framework Agreement, or any right to rescind this Framework Agreement in respect of, any representation, which is not an express provision of this Framework Agreement. However, this Article does not exclude any liability which either party may have to the other (or any right which either party may have to rescind this Framework Agreement) in respect of any fraudulent misrepresentation or fraudulent concealment prior to the execution of this Framework Agreement.

26.2. In case of discrepancy between the Framework Agreement and the PCP Call for Tenders document, the documents shall prevail in the following descending order:

a) Phase Contract

b) Framework Agreement

c) PCP Call for Tenders

d) Other Tender Documents

26.3. The terms and conditions set out in the Call for Tenders (TD1) have precedence over the Contractor's Bid.

26.4. A reference to any act, law, statute, enactment, order, regulation or other similar instrument shall be construed as a reference to the act, law, statute, enactment, order, regulation or instrument as subsequently amended or re-enacted (regardless of whether or not expressly so stipulated).

26.5. The headings in this Framework Agreement are for ease of reference only and shall not affect its interpretation or construction.

26.6. Where the context allows, references to any gender include the other gender and the neuter, and the singular includes the plural and vice versa.

Include a provision specifying that the terms set out in the framework agreement have precedence over those in annexes and that the terms set out in Annex 1 (request for tenders) have precedence over those set out in Annex 2 (contractor's tender).

Specify that the same applies to the specific contracts.

Article 27 — Applicable law and dispute settlement

27.1. The applicable law is the Dutch law.

27.2. Any disputes between the parties, arising with reference to the interpretation, performance, validity, effectiveness and termination of this Agreement and the Phase Contracts, shall be first topic of amicable settlement by Parties and if that is not possible, shall be the exclusive competence of the Rechtbank [ ].

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Article 28 — Entry into force

28.1. This Framework Agreement shall enter into force on the date it is signed by the parties hereto.

SIGNATURES

The lead procurer signs for the PBG and — in case of joint tenders — the lead contractor for the group of contractors.

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PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

PCP TENDER DOCUMENT 3

SPECIFIC PHASE CONTRACT (TD3)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP SPECIFIC CONTRACT FOR PHASE 1 (TD3)

PREAMBLE

This is a PCP Specific Contract between the following parties:on the one part, the “lead procurer” (contracting authority), STICHTING TOEGEPAST ONDERZOEK WATERBEHEER (STOWA) [ ]

acting in the name and on behalf of the [other] members of the Public Buyers Group (PBG) (together with the lead procurer: “procurers”):

1. HET WATERSCHAPSHUIS (hWh) (NL)
2. FORUM VIRIUM HELSINKI OY (FVH) (FI)
3. MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY (MINISTRY OF INTERIOR SLOVAKIA) (MoI) (SK)
4. GEMEENTE HAARLEM (CITY OF HAARLEM) (NL)
5. BUNDESANSTALT TECHNISCHES HILFSWERK (THW) (GE)
6. REGION OF CENTRAL MACEDONIA (RCM) (GR)
7. FORENINGEN KLIMATORIUM (KLIMATORIUM) (DE)
8. BENEGO – GRENSPARK KALMTHOUTSE HEIDE (BE)
9. INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA (ICGC) (SP)
10. CITY OF ROTTERDAM (NL)
11. SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA (SLOVAK ENVIRONMENTAL AGENCY) (SEA) (SK)

and on the other hand, the “contractor”, [insert details of the contractor],

[OPTION for joint tenders: acting in the name and on behalf of the other members of group of tenderers:

1. [insert the details of the members of the group of tenderers]

2.

The members of the group of tenderers are hereafter collectively referred to as “the contractor” and will be jointly and severally liable vis-à-vis the lead procurer for the performance of this Framework Agreement and the Specific Contracts.]

The lead procurer, the PBG and the contractor(s) shall be referred to together as “parties”, unless otherwise specified.

Similar set-up as the framework agreement: Lead procurer concludes and signs in in the name and on behalf of the PBG.

Annex the contractor’s offer.

Specific contracts must contain at least the following elements/provisions:

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TERMS AND CONDITIONS

Article 1 — Subject of the contract

This Specific Contract defines the specific terms and conditions for the implementation of the PCP procurement of R&D services set out in Article XX — for the *[1st][2rd][3rd]* PCP phase.

Article 2 — Duration

The duration of the specific contract is [ ] and starting date is [ ] and end date for the implementation of the tasks is [ ].

The period of execution of the tasks may be extended only with the express written agreement of the parties before the expiration of the period for execution of the tasks.

Article 3 — R&D services to be provided

The contractor shall provide the R&D services (tasks, deliverables and milestones) set out in the offer for this phase.

Specify the scope of the specific contract (i.e. which phase and which lot, if any).

Specify the individuals in charge of carrying out the R&D activities for the specific contract and their location (country where they carry out the R&D activities).

Article 4 — Price and payment arrangements

The price to be paid by *[*the lead procurer*][*the procurers in the PBG*]* for the R&D services set out in Article XX shall be *[*EUR*][*other currency*]* [amount in figures and in words].

Specify the amounts of pre-instalments and interim payments (if applicable) and final payment in figures and words. In case of pro rata payments by the procurers in the PBG, split the amount pro rata per procurer according to their contribution to the total PCP costs (with and without VAT).

Specify which invoice for which payment x the contractor has to send to whom (lead procurer or PBG) after approval of deliverable x. Specify how many days after receipt of the invoice payment(s) have to be made to the contractor.

Specify the contractor's bank account details and the currency in which payments will be made.

Article 5 — Security related obligations

Add a provision on security if specifically needed for the phase and not already covered by the provision in the framework agreement.

Article 6 — Entry into force

Specify the entry into force date.

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SIGNATURES

Same as for framework agreement: The lead procurer signs for the PBG and — in case of joint tenders — the lead contractor for the group of contractors.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

PCP TENDER DOCUMENT 4

SPECIFIC CONTRACT FOR PCP PHASE 2 (TD4)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP SPECIFIC CONTRACT FOR PHASE 2 (TD4)

PREAMBLE

This is a PCP Specific Contract between the following parties:on the one part, the “lead procurer” (contracting authority), STICHTING TOEGEPAST ONDERZOEK WATERBEHEER (STOWA) [ ]

acting in the name and on behalf of the [other] members of the Public Buyers Group (PBG) (together with the lead procurer: “procurers”):

1. HET WATERSCHAPSHUIS (hWh) (NL)
2. FORUM VIRIUM HELSINKI OY (FVH) (FI)
3. MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY (MINISTRY OF INTERIOR SLOVAKIA) (MoI) (SK)
4. GEMEENTE HAARLEM (CITY OF HAARLEM) (NL)
5. BUNDESANSTALT TECHNISCHES HILFSWERK (THW) (GE)
6. REGION OF CENTRAL MACEDONIA (RCM) (GR)
7. FORENINGEN KLIMATORIUM (KLIMATORIUM) (DE)
8. BENEGO – GRENSPARK KALMTHOUTSE HEIDE (BE)
9. INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA (ICGC) (SP)
10. CITY OF ROTTERDAM (NL)
11. SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA (SLOVAK ENVIRONMENTAL AGENCY) (SEA) (SK)

and on the other hand, the “contractor”, [insert details of the contractor],

[OPTION for joint tenders: acting in the name and on behalf of the other members of group of tenderers:

1. [insert the details of the members of the group of tenderers]

2.

The members of the group of tenderers are hereafter collectively referred to as “the contractor” and will be jointly and severally liable vis-à-vis the lead procurer for the performance of this Framework Agreement and the Specific Contracts.]

The lead procurer, the PBG and the contractor(s) shall be referred to together as “parties”, unless otherwise specified.

Similar set-up as the framework agreement: Lead procurer concludes and signs in in the name and on behalf of the PBG.

Annex the contractor’s offer.

Specific contracts must contain at least the following elements/provisions:

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

TERMS AND CONDITIONS

Article 1 — Subject of the contract

This Specific Contract defines the specific terms and conditions for the implementation of the PCP procurement of R&D services set out in Article XX — for the *[1st][2rd][3rd]* PCP phase.

Article 2 — Duration

The duration of the specific contract is [ ] and starting date is [ ] and end date for the implementation of the tasks is [ ].

The period of execution of the tasks may be extended only with the express written agreement of the parties before the expiration of the period for execution of the tasks.

Article 3 — R&D services to be provided

The contractor shall provide the R&D services (tasks, deliverables and milestones) set out in the offer for this phase.

Specify the scope of the specific contract (i.e. which phase and which lot, if any).

Specify the individuals in charge of carrying out the R&D activities for the specific contract and their location (country where they carry out the R&D activities).

Article 4 — Price and payment arrangements

The price to be paid by *[*the lead procurer*][*the procurers in the PBG*]* for the R&D services set out in Article XX shall be *[*EUR*][*other currency*]* [amount in figures and in words].

Specify the amounts of pre-instalments and interim payments (if applicable) and final payment in figures and words. In case of pro rata payments by the procurers in the PBG, split the amount pro rata per procurer according to their contribution to the total PCP costs (with and without VAT).

Specify which invoice for which payment x the contractor has to send to whom (lead procurer or PBG) after approval of deliverable x. Specify how many days after receipt of the invoice payment(s) have to be made to the contractor.

Specify the contractor's bank account details and the currency in which payments will be made.

Article 5 — Security related obligations

Add a provision on security if specifically needed for the phase and not already covered by the provision in the framework agreement.

Article 6 — Entry into force

Specify the entry into force date.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

SIGNATURES

Same as for framework agreement: The lead procurer signs for the PBG and — in case of joint tenders — the lead contractor for the group of contractors.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

PCP TENDER DOCUMENT 5

SPECIFIC CONTRACT FOR PCP PHASE 3 (TD5)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP SPECIFIC CONTRACT FOR PHASE 3 (TD5)

PREAMBLE

This is a PCP Specific Contract between the following parties:on the one part, the “lead procurer” (contracting authority), STICHTING TOEGEPAST ONDERZOEK WATERBEHEER (STOWA) [ ]

acting in the name and on behalf of the [other] members of the Public Buyers Group (PBG) (together with the lead procurer: “procurers”):

1. HET WATERSCHAPSHUIS (hWh) (NL)
2. FORUM VIRIUM HELSINKI OY (FVH) (FI)
3. MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY (MINISTRY OF INTERIOR SLOVAKIA) (MoI) (SK)
4. GEMEENTE HAARLEM (CITY OF HAARLEM) (NL)
5. BUNDESANSTALT TECHNISCHES HILFSWERK (THW) (GE)
6. REGION OF CENTRAL MACEDONIA (RCM) (GR)
7. FORENINGEN KLIMATORIUM (KLIMATORIUM) (DE)
8. BENEGO – GRENSPARK KALMTHOUTSE HEIDE (BE)
9. INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA (ICGC) (SP)
10. CITY OF ROTTERDAM (NL)
11. SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA (SLOVAK ENVIRONMENTAL AGENCY) (SEA) (SK)

and on the other hand, the “contractor”, [insert details of the contractor],

[OPTION for joint tenders: acting in the name and on behalf of the other members of group of tenderers:

1. [insert the details of the members of the group of tenderers]

2.

The members of the group of tenderers are hereafter collectively referred to as “the contractor” and will be jointly and severally liable vis-à-vis the lead procurer for the performance of this Framework Agreement and the Specific Contracts.]

The lead procurer, the PBG and the contractor(s) shall be referred to together as “parties”, unless otherwise specified.

Similar set-up as the framework agreement: Lead procurer concludes and signs in in the name and on behalf of the PBG.

Annex the contractor’s offer.

Specific contracts must contain at least the following elements/provisions:

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TERMS AND CONDITIONS

Article 1 — Subject of the contract

This Specific Contract defines the specific terms and conditions for the implementation of the PCP procurement of R&D services set out in Article XX — for the *[1st][2rd][3rd]* PCP phase.

Article 2 — Duration

The duration of the specific contract is [ ] and starting date is [ ] and end date for the implementation of the tasks is [ ].

The period of execution of the tasks may be extended only with the express written agreement of the parties before the expiration of the period for execution of the tasks.

Article 3 — R&D services to be provided

The contractor shall provide the R&D services (tasks, deliverables and milestones) set out in the offer for this phase.

Specify the scope of the specific contract (i.e. which phase and which lot, if any).

Specify the individuals in charge of carrying out the R&D activities for the specific contract and their location (country where they carry out the R&D activities).

Article 4 — Price and payment arrangements

The price to be paid by *[*the lead procurer*][*the procurers in the PBG*]* for the R&D services set out in Article XX shall be *[*EUR*][*other currency*]* [amount in figures and in words].

Specify the amounts of pre-instalments and interim payments (if applicable) and final payment in figures and words. In case of pro rata payments by the procurers in the PBG, split the amount pro rata per procurer according to their contribution to the total PCP costs (with and without VAT).

Specify which invoice for which payment x the contractor has to send to whom (lead procurer or PBG) after approval of deliverable x. Specify how many days after receipt of the invoice payment(s) have to be made to the contractor.

Specify the contractor's bank account details and the currency in which payments will be made.

Article 5 — Security related obligations

Add a provision on security if specifically needed for the phase and not already covered by the provision in the framework agreement.

Article 6 — Entry into force

Specify the entry into force date.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

SIGNATURES

Same as for framework agreement: The lead procurer signs for the PBG and — in case of joint tenders — the lead contractor for the group of contractors.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

PCP TENDER DOCUMENT 6
END OF PHASE (1, 2, 3) REPORT (TD6)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP END OF PHASE REPORT (TD6)

Results & conclusions

Contractors
1. The innovative solution *Provide a short description (that is suitable for publication purposes) of:* **The innovative solution** (in its current form) **Where exactly lies the innovation in the solution**: In which ways and to which extent does the solution go beyond what existing solutions can achieve? **The degree of innovation**: indicate if your innovative solution is (a) a totally new product / service / process / method; (b) an improvement to an existing product / service / process / method; (c) a new combination of existing products / services / processes / methods and (d) a new use for existing products / services / processes / methods).
2. Commercialisation success *Provide a short description (mark parts that are not suitable for publication purposes) of:* **How mature is the innovative solution in terms of its readiness to commercialise widely**: Which steps towards wide scale commercialisation have been completed so far? *(do not forget: IPR protection, certification, CE marking, attracting additional investors to grow the business, setting up sales / distribution channels / marketing activities to expand sales to other countries etc.)* **What is the current commercialisation success of the solution**: *e.g. awards / other forms of recognitions obtained, sales / increase in market share already achieved, licensing agreements already concluded, collaboration agreements with other partners (e.g. retailers) to commercialise the solutions already signed, additional investments attracted to further commercialise the solution.*
3. Other benefits obtained *Provide a short description (mark parts that are not suitable for publication purposes) of any other benefits that you obtained from participating in the procurement, e.g.* **Getting easier access to (a new segment of) the public procurement market** (e.g. did the procurement enable you to work with procurers/end-users that you were not working with beforehand?) **Growing your business across borders and/or to other markets** *(e.g. private markets)* due to the first customer references provided by the procurement **Shortening the time-to-market for your innovation** due to early customer/end-user feedback **Other benefits / lessons learnt:** complete if applicable

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

4. Business growth

Provide a short description (mark parts that are not suitable for publication purposes) of:

How much has your business already grown during the procurement?

In terms of (a) personnel growth; (b) turnover growth; (c) growth in market share etc.

What are the prospects to grow your business via wider commercialisation of the solution:

1. How large is the potential market for your solution? is it a growing / steady / declining market?
2. By when can commercialisation start (now / in 1 / in 3 / in 5 / in more than 5 years)?
3. Is competition patchy (no major players) / established (but no comparable offering) / fierce?

Which future steps do you plan to take to further grow your business? *(e.g. attracting additional investors to grow your business, mergers / acquisitions / joint ventures / spin-offs / IPO, setting up sales / distribution channels / marketing activities, expanding to other countries etc.)*

5. Final remarks *(not for publication purposes, to assess how further EU support could best help you)*

What are the remaining bottlenecks to commercialise your solution? (e.g. certification, legislation etc.)

What type(s) of assistance do you need to address those bottlenecks and grow your business / commercialise your solution more widely? (e.g. EU regulation on x, finding investors, IPR help etc.)

How important was the procurement for your business? (Would/could you have done it on your own?)

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PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

TENDER DOCUMENT 7

CONTRACTOR DETAILS AND PROJECT ABSTRACTS

(TD 7)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

CONTRACTOR DETAILS AND PROJECT ABSTRACTS (TD7)

Document type	Deliverable
Document version	Final
Document Preparation Date	[complete]
Classification	Public
Author(s)	All project partners
File Name	[Project Name] *[*PCP Phase 1*]* *[*PCP Phase 2*]* *[*PCP Phase 3*]* — Contractor details and project abstracts

For PCPs: complete this table for each contractor that was awarded a PCP Phase 1, 2 or 3 contract.

Contactor Details	Type/ size of legal entity	Place of performance of contract activities	Logo
Main contractor Name legal entity Address legal entity Name contact person Phone nr contact person E-mail address contact person	SME, larger company, natural person, university / research institute, other	% of contract value allocated to main contractor: [complete] % % of activities for the contract performed by the main contractor in EU Member States or countries associated with Horizon 2020: [complete] %	Main contractor logo
Other consortium member(s) (if applicable) Name legal entity Address legal entity Name contact person Phone nr contact person E-mail address contact person *Complete as many times as there are other consortium members*	SME, larger company, natural person, university / research institute, other	% of contract value allocated to contractor [x]: [complete] % % of activities for the contract performed by contractor [x] in EU Member States or countries associated with Horizon 2020: [complete] %	Other contractor(s) logo(s)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Subcontractors (if applicable) Name legal entity Address legal entity Name contact person Phone nr contact person E-mail address contact person *Complete as many times as there are subcontractors*	SME, larger company, natural person, university / research institute, other	% of contract value allocated to subcontractor [x]: [complete] % % of activities for the contract performed by subcontractor [x] in EU Member States or countries associated with Horizon 2020: [complete] %	Subcontractor(s) logo(s)
Project abstract *(+/- 1000 characters maximum)*			
[Add an abstract of the winning tender, giving a brief project description agreed with the contractor that is suitable for publication purposes]			
Previous EU funding			
Is the project based on / a continuation of R&D activities that were previously funded by the EU?: YES/NO If yes, identify this EU funding: [name EU funding programme] — [project name] — [grant number]			

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

TENDER DOCUMENT 8
TECHNICAL OFFER
(TD 8)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

TECHNICAL OFFER (TD8)

To:

Public Buyer

Address

RE: Pre-Commercial Procurement contract concerning R&D services of "Climate Challenge….."

I, the undersigned [*name and surname*] [41]

_____

As [*capacity*]

_____

Of the following legal entity/entities *[if acting as a Consortium]* [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

fax

_____

VAT reg. no.

_____

[41] In case of consortium/association of entities, this Form should only be filled in **once** for the whole Consortium.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Declare that provides as part of Document B the following documents related to the Technical Offer:

- Proof of Selection Criteria as defined in section 3.3 of the Request for Tenders (TD1).
    - Proof of previous R&D projects. The Technology Provider shall indicate the level of technical resources to perform R&D and provide a description (free text) of the capabilities of the organization to commercially exploit the Results of the PCP.
    - At least two CVs of engineers or scientists working for the Technology Provider. At least one of them must be employed by the Technology Provider.
    - Two CVs of personnel related to Project Management tasks. The personnel should have project management experience in at least two projects.
    - At least two CVs of personnel capable of implementing the Climate change solutions. At least one of them must be employed by the Technology Provider.
    - At least one reference case of implementing a project in a scientific research environment (description of (a) case(s), not older than 3 years).

- A description of the Technical Offer following the award criteria described in section 3.4 of the Request for Tenders (TD1). Technology Providers are suggested to describe their Bid for Phase 1 and their plans for Phase 2 and 3 in a **maximum of 50 pages** (not including the reference case(s) and the CVs).
- The Technical Offer must, at least, detail its compliancy with the functional requirements and the technical specifications as described in the use cases in Annex 1

The Technical Offer should indicate:

A) Level of originality and innovativeness of the proposed solution and ability of generating a technological advance that could go beyond the state-of-the-art technology.

- Please provide a title and brief description of your proposed idea/ solution/ technology and the level of originality, novelty and innovativeness thereof. You may attach an image or diagram separately with the tender form, if appropriate..

B) Level of completeness and responsiveness of the solution to meet the functional requirements.

C) Technical validity and robustness of the solution proposed

Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

TENDER DOCUMENT 9

FINANCIAL OFFER & COST BREAKDOWN

(TD 9)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

FINANCIAL OFFER & COST BREAKDOWN (TD9)

See excel document TD9

Financial offer and Cost Breakdown

The purpose of this Annex is to provide the Buyers Group with:

A) A fixed total Price for Phase 1, broken down to show unit prices and the number of each unit needed to carry out Phase 1 (given in euros, excluding VAT but including any other taxes and duties).

B) Binding unit prices for the entire duration of the Framework Agreement. If additional elements and unit prices are added for Phase 2 and 3 they will become binding.

C) An estimated maximum total price for phases 2 and 3

For the above purpose a Total Cost and a Cost Breakdown shall be submitted.

Financial Offers which are not submitted using this Annex will be excluded. All six sections of this document must be presented. Tenderers should however add further fields (rows and columns) with additional cost elements, as needed. Full justifications and details must always be provided.

Declaration
The Lead Tenderer is assumed to have discussed the tender within their own company and any other body whose co-operation will be required to deliver the project. The Lead Tenderer will need to obtain consent from an authorised officer or appropriate signatory who will sign the contract if successful. The Contract is a legally binding document and subject to the outcome of this award procedure. By submitting the Tender, you are confirming that the information given in this application is complete, that you are actively engaged in this project and responsible for its overall management and agree to administer the contract if made. You are confirming that ▪ your organisation is prepared to carry out this project at the stated price, ▪ you are not subject to the Exclusion criteria, and ▪ that the services offered are within Research and Development as mentioned, and ▪ that you comply with the exclusion, selection, pass/fail award criteria and weighted award criteria stated in the Request for Tenders (TD1).

Name of Lead Tenderer	
Name of Authorised Signatory	
Function	
Signature	
Date	
Stamp, if available	

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

GENERAL INSTRUCTIONS - Mandatory reading

Please read section 4. Financial Offer of the Tender of the Request for Tenders (TD1) .

Technology providers must specify binding maximum unit prices for all items needed for carrying out Phase 1 and for items that are expected to be needed for Phases 2 and 3 (given in euros, excluding VAT, but including any other taxes and duties).

The price paid to the contractor will cover all costs incurred by the contractor, including but not exclusively, software, facilities, integration costs, and so on. The Lead Procurer is not going to pay any additional costs.

The maximum unit prices quoted for each category of items remain binding for all Phases (i.e. for the duration of the Framework Agreement).

Technology providers must provide a cost breakdown for Phase 1, resulting in a fixed total price for Phase 1 and an estimated total price for Phases 2 and 3 broken down to show maximum unit prices and the number of each unit needed to carry out the Phases (given in euros, excluding VAT, but including any other taxes and duties).

The price for Phase 2 and 3 offers must be based on the maximum binding unit prices in the Tender and the price conditions set out in the Framework Agreement. Where new units/unit prices (e.g. for new tasks or equipment) are subsequently added to the Phase 2 or 3 offers, they will become maximum binding unit prices for the remaining Phases.

The Cost Breakdown shall provide:

1. Aa price breakdown that shows the price for R&D services and the price for supplies of products (to demonstrate compliance with the definition of R&D in pass/fail award criterion A).

2. A price breakdown that shows the location or country in which the different categories of activities are to be carried out (e.g. x hours of senior researchers in country L at y euro/hour; a hours of junior developers in country M at b euro/hour) (to demonstrate compliance with the requirement relating to place of performance in pass/fail award criterion C).

3. The financial compensation valuing the benefits and risks of the allocation of ownership of the IPRs to the contractor (i.e. IPRs generated by the contractor during the PCP), by giving an absolute value for the price reduction between the price offered in the tender compared to the exclusive development price (i.e. the price that would have been quoted were IPR ownership to be transferred to the procurers). The financial compensation should be at least 10% of the total price for the three phases. The offer must indicate how this is translated into each of the Phases (by showing two prices in the offer for each Phase). In Phase 2 and 3 the % of the discount can be increased

The financial compensation for IPRs must reflect the market value of the benefits received (i.e. the opportunity that the IPRs offer for commercial exploitation) and the risks assumed by the contractor (e.g. the cost of maintaining IPRs and bringing the products onto the market).

To ensure that a fair market price is offered, Tenderers must state two prices:

1. The “discount” price that they would have quoted if all Intellectual Property Rights, including the ownership of results under the PCP, would be fully retained by the Buyers Group and technology providers would not have the possibility to exploit the results.
2. The “actual” price that takes into account the fact that the Technology providers keep ownership of the Intellectual Property Rights attached to the results under PCP, in accordance with the provisions of the contracts, and that they can exploit these results.

Note that the price must comply with the R&D definition and the total sum of non Personnel costs (such as material/Travelling/Subcontracting/Other costs) offered in each Phase must be less than 50 % of the total value of Total Price of each Phase.

Actual prices quoted for each phase must respect the maximum budgets specified per Contractor per each Phase. All offers above those amounts shall be excluded from the process.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Estimation of market price

Indicate, by means of a calculation/explanation, an estimation of future market price of the developed solution and exploitation of interims results

Binding maximum unit prices

Provide the maximum unit prices for all items needed for carrying out Phase 1 and for items that are expected to be needed for Phases 2 and 3 (given in euros, excluding VAT but including any other taxes and duties). This unit prices are binding, not subject to change during the entire duration of the Framework Agreement, by means of a calculation/explanation, an estimation of future market price of the developed solution and exploitation of interims results

Personnel unit prices

A.	Category	R&D cost? (Yes/No)	Description	Price per hour
A.1	[e.g. Senior Researcher]	[e.g. Yes]	[e.g. Prepare solution design and prototype creation]	… €/hour
A.2	[e.g. Junior Developer]	[e.g. Yes]	[e.g. Prepare solution design and prototype creation]	… €/hour
A.3	[e.g. Marketing expert]	[e.g. No]	[e.g. Preparation of business model for concept solution]	… €/hour
…				

add rows as needed

Other Costs

B.	Category		Description	Unit price
B.1	[e.g. Hardware, licenses, storage, …]		[describe what the cost consist of, overall intended usage or application for such type of cost, and if applicable, the your unit price definition]	… €/unit
B.2	Travel cost		Average cost per trip	… €/unit
B.3	General and administration costs (overheads)		[describe what the cost consist of, overall intended usage or application for such type of cost, and if applicable, the your unit price definition]	

add rows as needed

Subcontracting

C.	Category	R&D cost? (Yes/No)	Description	Unit price
C.1	[e.g. Testbed set-up]	[e.g. Yes]	[describe what the cost consist of, overall intended usage or application for such type of cost, and if applicable, the your unit price definition]	
C.2	[e.g. Graphic designer]	[e.g. Yes]		
…				

add rows as needed

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

COST BREAKDOWN - Phase 1: Solution Design (Binding)

Provide the cost breakdown for your proposed solution for Phase 1.
This information will be used to check if you are indeed proposing R&D Services. It will also be used for the overall Tender evaluation.

Type	A. Personnel costs	Description of activities	Discount Price					Actual Price
			Price per hour	Amount of hours	Total price	% of labour allocated to R&D services	Country or location of performance	
A.1	[e.g. Senior Researcher - 1]	[link to proposed work activities]				[e.g. 100%]		
A.2	[e.g. Senior Researcher - 2]					[e.g. 100%]		
A.3	Commercial representative - 1					[e.g. 0%]		
...								
					> add rows as needed			
		Sub-Total Personnel costs		**0,0**	- €			**€ -**

Type	B. Other Costs	Description of activities	Discount Price			Actual Price
			Unit price	Amount	Total price	
B.1	[e.g. Hardware, licenses, storage, ...]					
B.2	[Travel cost]					
B.3	[General and administration costs (overheads)]					
...						
					> add rows as needed	
		Sub-Total Materials & Equipments		**0,0**	- €	**€ -**

Type	C. Subcontracting	Description of activities	Discount Price					Actual Price
			Unit price	Amount	Total price	% of labour allocated to R&D services	Country or location of performance	
C.1	[e.g. Graphic designer]	[link to proposed work activities]				[e.g. 100%]		
...						[e.g. 0%]		
					> add rows as needed			
		Sub-Total Subcontracting		**0,0**	- €			**€ -**

Phase 1 TOTAL Costs	
Discount Price (exc. VAT)	
Actual Price (Exc. VAT)	
Actual Price (inc. VAT)	

Comments, clarifications and remarks

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

COST BREAKDOWN - Phase 2: Solution Prototype (Estimated)

Provide envisioned cost breakdown for your proposed solution for Phase 2. Only unit prices are binding. Overall resources are merely estimations.
This information will be used to check if you are indeed proposing R&D Services. It will also be used for the overall Tender evaluation.

Type	A. Personnel costs	Description of activities	Discount Price					Actual Price
			Price per hour	Amount of hours	Total price	% of labour allocated to R&D services	Country or location of performance	
A.1	[e.g. Senior Researcher - 1]	[link to proposed work activities]				[e.g. 100%]		
A.2	[e.g. Senior Researcher - 2]					[e.g. 100%]		
A.3	Commercial representative - 1					[e.g. 0%]		
...								
					> add rows as needed			
		Sub-Total Personnel costs		**0,0**	**-**	**€**		**€ -**

Type	B. Other Costs	Description of activities	Discount Price			Actual Price
			Unit price	Amount	Total price	
B.1	[e.g. Hardware, licenses, storage, ...]					
B.2	[Travel cost]					
B.3	[General and administration costs (overheads)]					
...						
					> add rows as needed	
		Sub-Total Materials & Equipments		**0,0**	**- €**	**€ -**

Type	C. Subcontracting	Description of activities	Discount Price					Actual Price
			Unit price	Amount	Total price	% of labour allocated to	Country or location of	
C.1	[e.g. Graphic designer]	[link to proposed work activities]				[e.g. 100%]		
...						[e.g. 0%]		
					> add rows as needed			
		Sub-Total Subcontracting		**0,0**	**- €**			**€ -**

Phase 2 TOTAL Costs - Estimated	
Discount Price (exc. VAT)	
Actual Price (Exc. VAT)	
Actual Price (inc. VAT)	

Comments, clarifications and remarks

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

COST BREAKDOWN - Phase 3: Operational Validation(Estimated)

Provide envisioned cost breakdown for your proposed solution for Phase 3. Only unit prices are binding. Overall resources are merely estimations
This information will be used to check if you are indeed proposing R&D Services. It will also be used for the overall Tender evaluation.

Type	A. Personnel costs	Description of activities	Discount Price					Actual Price
			Price per hour	Amount of hours	Total price	% of labour allocated to R&D services	Country or location of performance	
A.1	[e.g. Senior Researcher - 1]	[link to proposed work activities]				[e.g. 100%]		
A.2	[e.g. Senior Researcher - 2]					[e.g. 100%]		
A.3	Commercial representative - 1					[e.g. 0%]		
...								
					> add rows as needed			
	Sub-Total Personnel costs			**0,0**	- €			**€ -**

Type	B. Other Costs	Description of activities	Discount Price			Actual Price
			Unit price	Amount	Total price	
B.1	[e.g. Hardware, licenses, storage, ...]					
B.2	[Travel cost]					
B.3	[General and administration costs (overheads)]					
...						
					> add rows as needed	
	Sub-Total Materials & Equipments			**0,0**	- €	**€ -**

Type	C. Subcontracting	Description of activities	Discount Price					Actual Price
			Unit price	Amount	Total price	% of labour allocated to R&D services	Country or location of performance	
C.1	[e.g. Graphic designer]	[link to proposed work activities]				[e.g. 100%]		
...						[e.g. 0%]		
					> add rows as needed			
	Sub-Total Subcontracting			**0,0**	- €			**€ -**

Phase 3 TOTAL Costs - Estimated	
Discount Price (exc. VAT)	
Actual Price (Exc. VAT)	
Actual Price (inc. VAT)	

Comments, clarifications and remarks

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

DECLARATION OF HONOUR

(TD 10)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

DECLARATION OF HONOUR (TD10)

TENDER DOCUMENT 4 (TD 4): DECLARATION OF HONOUR

To:

Public Buyer

Address

RE: Pre-Commercial Procurement contract concerning R&D services on *"Climate change challenge… "*

I, the undersigned [*name and surname*][42]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

IF APPLICABLE:

Acting in the context of a consortium or association of several entities together with the following entities:

_____

[42] If the Tenderer is a Consortium or association of several entities, **each** of the Consortium's/association's members should issue this Form.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

_____

_____

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

SECTION 1

The Technology Provider is not involved in any of the exclusion grounds set out under section 3 of the Request for Tenders (TD1) (or, if existing, under similar regulations in the country in which it is established).

Accordingly, the undersigned formally declares that the information stated below and the certificates and other forms of documentary evidence provided are accurate and correct and that they have been set out in full awareness of the consequences of serious misrepresentation.

The undersigned formally declares to be able, upon request and without delay, to provide other certificates or forms of documentary evidence referred to, except where the contracting authority has the possibility of obtaining the supporting documentation concerned directly by accessing a national database of a Member State that is available free of charge. This should be possible on the condition that the Technology Provider has provided the necessary information, thus allowing the Lead Procurer to have access. Where required, this must be accompanied by the relevant consent to do so.

A) Conflict of Interest

Is the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control involved in any current or potential conflict of interest, as indicated in the Tender Documents, due to its participation in the procurement procedure or for any other reason?

Yes / No

If yes, please describe it:

B) Breach of obligations relating to the payment of taxes or social security contributions

Is the Technology Provider in breach of its obligations relating to the payment of taxes or social security contributions and this has been established by a judicial or administrative decision having final and binding effect?

Yes / No

If this exclusion ground applies but the Technology Provider has fulfilled these obligations by paying or entering into a binding arrangement with a view to paying the taxes or social security contributions, the Technology Provider is asked to submit proof of this arrangements to be allowed to participate in the PCP.

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C) Bankruptcy & professional misconduct

Has the Technology Provider violated applicable obligations referred to in Article 18(2) of the Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014?

Yes / No

Is the Technology Provider bankrupt or subject of insolvency or winding-up proceedings, are his assets being administered by a liquidator or by the court, is there an arrangement with creditors, are his business activities suspended or is the Technology Provider in any analogous situation arising from a similar procedure under national laws and regulations (e.g., has indefinitely stopped its payments or is subject to a prohibition on conducting business)?

Yes / No

Has the Technology Provider itself been convicted by a judgment which has the force of *res judicata* for an offence relating to professional practice? Has the Technology Provider been guilty of grave professional misconduct and can the procuring agencies prove this?

Yes / No

D) Criminal offences

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for participation in a criminal organisation, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction

_____

Reason

_____

Who has been convicted

_____

Length of the period of exclusion

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for corruption, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

_____

Reason:

_____

Who has been convicted:

_____

Length of the period of exclusion:

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for fraud, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

_____

Reason:

_____

Who has been convicted:

_____

Length of the period of exclusion:

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for terrorist offences or offences linked to terrorist activities, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

_____

Reason:

_____

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Who has been convicted:

_____

Length of the period of exclusion:

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for money laundering or terrorist financing, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

_____

Reason:

_____

Who has been convicted:

_____

Length of the period of exclusion:

_____

Has the Technology Provider itself or any person who is a member of its administrative, management or supervisory body or has powers of representation, decision or control therein been the subject of a conviction by final judgement for child labour and other forms of trafficking in human beings, by a conviction rendered at the most five years ago or in which an exclusion period set out directly in the conviction continues to be applicable?

Yes / No

Date of conviction:

_____

Reason:

_____

Who has been convicted:

_____

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Length of the period of exclusion:

_____

E) Proposed solution already available in the market

Is the solution proposed by the Technology Provider already available on the market?

Yes / No

F) Compliance with GDPR

Is the Technology Provider compliant with the legislation and regulations applicable to the processing of personal Data in Europe?

Yes / No

(If applicable) Will the Technology Provider ensure compliance with Article 28(7) of Regulation (EU) 2016/679 of the European Parliament and of the Council and Article 29(7) of Regulation (EU) 2018/1725 of the European Parliament and of the Council (on standard contractual clauses between controllers and processors)?

Yes / No

G) Compliance with Minimum Documentation requirements

The Technology Provider has the capability to provide with the Minimum Documentation listed in Annex 4.

Yes / No

SECTION 1

The Technology Provider fulfils the selection criteria set out under section 3.4. Selection criteria of the Request for Tenders (TD1).

Accordingly, the undersigned formally declares that the information and the certificates and other forms of documentary evidence provided are accurate and correct and that they have been set out in full awareness of the consequences of serious misrepresentation.

The undersigned formally declares to be able, upon request and without delay, to provide other certificates or forms of documentary evidence referred to, except where the Lead Procurer has the possibility of obtaining the supporting documentation concerned directly by accessing a national database of a Member State that is available free of charge. This should be possible on the condition that the Technology Provider has provided the necessary information, thus allowing the Lead Procurer to have access. Where required, this must be accompanied by the relevant consent to do so.

SECTION 3

The Technology Provider fulfils the compliance criteria set out under section 3. Award criteria of the Request for Tenders (TD1).

Accordingly, the undersigned formally declares that the information below and the certificates and other forms of documentary evidence provided are accurate and correct and that they have been set out in

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

full awareness of the consequences of serious misrepresentation.

The undersigned formally declares to be able, upon request and without delay, to provide other certificates or forms of documentary evidence referred to, except where the Lead Procurer has the possibility of obtaining the supporting documentation concerned directly by accessing a national database of a Member State that is available free of charge. This should be possible on the condition that the Technology Provider has provided the necessary information, thus allowing the Lead Procurer to have access. Where required, this must be accompanied by the relevant consent to do so.

A) Compliance with the definition of R&D Services

Does the Technology Provider guarantee that it is in compliance with the requirements regarding the definition of R&D Services as set out in the Request for Tenders?

Yes / No

Please note that according to the Request for Tenders this circumstance must be accredited by the presentation of the financial part of the offer, which must contain the following information:

- *The financial part of the offer for the Framework Agreement must provide binding unit prices for all foreseeable items for the duration of the whole Framework Agreement.*
- *The financial part of the offer for each Phase must give breakdown of the Price for that Phase in terms of units and unit prices for every type of item in the Contract, distinguishing clearly the units and unit prices for items that concern products.*
- *The offers for all three Phases may include only items needed to address the challenge in question and to deliver the R&D Services described in the Request for Tenders.*
- *The offer for all the three Phases must offer services matching the R&D definition above.*
- *The total value of products offered in Phase 1 and in Phase 2 must be less than 50% of the value of the Phase 1 and Phase 2 Contracts' value.*
- *The value of the total amount of products covered by the Contract must be less than 50 % of the total value of the PCP Framework Agreement.*
- *Technology providers that go beyond the provision of R&D Services will be excluded.*

B) Compliance with other public financing

Does the Technology Provider guarantee that it is not receiving any public funding not permitted by EU legislation from other sources, including EU state aid rules, in areas of work related to the scope of the provision of services for the procurement in the terms established in the Request for Tenders?

Yes / No

C) Compliance with requirements relating to the place of performance of the Contracts

Does the Technology Provider guarantee that in case of selection it will comply with the requirements stated in the Request for Tenders regarding the place of performance of the Contracts?

Yes / No

Please note that according to the Request for Tenders the following evidence is required:

- *A list of staff working on the specific Contract (including for subcontractors), indicating clearly their role in performing the Contract (i.e. whether they are principal R&D staff or not) and the location (country) where they will carry out their tasks under the Contract.*

Please attach this list to this Declaration of Honour.

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D) Compliance with ethics requirements

Does the Technology Provider guarantee that in case of selection it will comply with the rules regarding ethics, Data protection and research integrity set out in the Request for Tenders?

Yes / No

Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

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TENDER DOCUMENT 11
DECLARATION OF HONOUR RUSSIA
(TD 11)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

DECLARATION OF HONOUR RUSSIA (TD11)

As of 9 April 2022, in accordance with Council Regulation (EU) 2022/576, it is prohibited to award any public or concession contract to any person or company that has a connection with Russia as defined in the Regulation. This includes persons or companies acting directly as Tenderers or Contractors as well as subcontractors, suppliers, or companies whose capacities are relied on for the proper performance of the Contract, where these capacities account for more than 10% of the Contract value.

A **connection with Russia as defined in the Regulation** exists where:

a) the Technology Provider is a Russian national or where the Technology Provider is established in Russia;

b) a natural person or a company fulfilling one of the criteria referred to in a) owns more than 50 % of the proprietary rights of the Technology Provider; or

c) the Technology Provider acts on behalf of or at the direction of persons or companies fulfilling the criteria of a) and/or b).

Contracts with such persons or companies with a connection with Russia that were concluded before 9 April 2022 may only continue to be executed until 10 October 2022.

I, the undersigned [*name and surname*][43]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

[43] If the Tenderer is a Consortium or association of several entities, **each** of the Consortium's/association's members should issue this Form.

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IF APPLICABLE:

Acting in the context of a Consortium or association of several entities together with the following entities:

_____

_____

_____

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

I. **None** of the cases described in a) to c) applies to my/our company.

II. In order to execute the Contract for parts of the Services, I/we

☐ will **not** rely on/have **not** relied on the capacities of persons or companies described in a) to c) (for the proper performance of the Contract).

☐ will rely on/have relied on the capacities of the following persons or companies described in a) to c) (for the proper performance of the Contract).

(Details of companies providing such capacities)

☐ No services provided by **any** company commissioned for the proper performance of the contract exceed 10% of the Contract value.

☐ The commissioning of such persons/companies is permitted by way of derogation (Article 5k(2) of Council Regulation (EU) 2022/576).

☐ The contract was concluded before 9 April 2022 and the collaboration will be terminated before 10 October 2022.

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☐ will **not** commission/have **not** commissioned any of the persons or companies described in a) to c) as subcontractors.

☐ will commission/have commissioned the following persons or companies described in a) to c) as subcontractors.

(Details of companies commissioned as subcontractors)

☐ No services provided by any subcontractor exceed 10 % of the contract value.

☐ The commissioning of such persons/companies is permitted by way of derogation (Article 5k(2) of Council Regulation (EU) 2022/576).

☐ The contract was concluded before 9 April 2022 and the collaboration will be terminated before 10 October 2022.

☐ will **not** commission/have **not** commissioned any of the persons or companies described in a) to c) as suppliers.

☐ will commission/have commissioned the following persons or companies described in a) to c) as suppliers:

(Please state any such companies commissioned as suppliers.)

☐ No services provided by any supplier exceed 10% of the Contract value.

☐ The commissioning of such persons/companies is permitted by way of derogation (Article 5k(2) of Council Regulation (EU) 2022/576).

☐ The contract was concluded before 9 April 2022 and the collaboration will be terminated before 10 October 2022.

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Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP WISE

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TENDER DOCUMENT 12

CONSORTIA STATEMENT (TD 12)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

CONSORTIA STATEMENT (TD12)

I, the undersigned [*name and surname*], acting in the name of [*name of the one of the members of the Consortium*], a company duly incorporated under the law of_______________, with registered office _______________________, with VAT no. _________________, in my capacity as ____________;

I, the undersigned [*name and surname*], acting in the name of [*name of the one of the members of the Consortium*], a company duly incorporated under the law of_______________, with registered office _______________________, with VAT no. _________________, in my capacity as ____________;

I, the undersigned [*name and surname*], acting in the name of [*name of the one of the members of the Consortium*], a company duly incorporated under the law of_______________, with registered office _______________________, with VAT no. _________________, in my capacity as ____________;

I, the undersigned [*name and surname*], acting in the name of [*name of the one of the members of the Consortium*], a company duly incorporated under the law of_______________, with registered office _______________________, with VAT no. _________________, in my capacity as ____________;

Acting in the context of a consortium or association of several entities (hereafter the **"Consortium"**)

[*name of the Consortium or the association*]

HEREBY STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

1.- In connection with the Climate change PCP Tender, we have agreed to set up a team to participate jointly in the above-mentioned Tender, undertaking to form and to maintain a designed temporary Consortium of Technology Providers, in order to comply jointly with the purposes of the PCP Tender and with the Contracts. Within this Tender, the team may be awarded to the Consortium in the event of being selected to have access/to access to Phase 1. During the whole period of validity of the commitment to maintain the Consortium of Technology Providers, which shall coincide with the period of time during which the Consortium is participating in the C;imate change PCP Tender, each of the members of the Consortium shall assume the following participation:

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Name of the Technology Provider	Participation (%)	Location	Statement

2.- All of the members of the Consortium shall remain jointly and severally liable towards the Lead Procurer and the Public Buyers Group.

3.- During the period of the PCP Tender, the Consortium will be represented by [*name of the single authorized representative of the Consortium*], with sufficient powers to exercise the rights and comply with the obligations that arise from the Climate change PCP Tender.

4.- During the management of the Bids selection, for the purposes of communications that may be necessary for its development, the team will be represented by [*name, address, telephone, email*].

The undersigned persons apply for admission to the above-mentioned PCP Tender, having expressed their acceptance of all the provisions and conditions set out in the Climate change PCP Request for Tenders (TD1).

Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP WISE

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TENDER DOCUMENT 13
SUBCONTRACTING STATEMENT
(TD 13)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

SUBCONTRACTING STATEMENT (TD13)

I, the undersigned [*name and surname*]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

IF APPLICABLE:

Acting in the context of a Consortium or association of several entities together with the following entities:

_____

_____

_____

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

1.- According to the provisions set out in the Tender Documents, the Technology Providers intent on subcontracting the following parts of the scope of the Climate change PCP Tender:

Name of the subcontractor	Activity to be subcontracted and percentage	Location	Statement

2.- I rely on the capacities of the proposed Subcontractors and/or Third Parties to perform part of the work in compliance with the requirements stated in the Request for Tenders and in its related documentation.

3.- Hereby acknowledge and unconditionally states that the Subcontractor(s) and/or Third Parties are fully aware of the provisions set out in the Tender Documents, that it/they meet(s) the requirements for the subcontracted service and that it/they have/has its/their resources at the Technology Provider's disposal for the entire duration of the Contract.

Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

TENDER DOCUMENT 14

LEGAL CAPACITY OF THE TECHNOLOGY PROVIDER STATEMENT

(TD 14)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

LEGAL CAPACITY OF THE TECHNOLOGY PROVIDER STATEMENT (TD14)

I, the undersigned [*name and surname*]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

IF APPLICABLE:

Acting in the context of a Consortium or association of several entities together with the following entities:

_____

_____

_____

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

SECTION 1

The Technology Provider is empowered to contract with the Lead Procurer and is free to act.

Accordingly, the undersigned formally declares that the information stated under Section 2 and the certificates and other forms of documentary evidence provided are accurate and correct and that they have been set out in full awareness of the consequences of serious misrepresentation.

The undersigned formally declares to be able, upon request and without delay, to provide other certificates or forms of documentary evidence referred to, except where the Lead Procurer has the possibility of obtaining the supporting documentation concerned directly by accessing a national database of a Member State that is available free of charge. This should be possible on the condition that the Technology Provider has provided the necessary information, thus allowing the Lead Procurer to have access. Where required, this must be accompanied by the relevant consent to do so.

SECTION 2

Declare furthermore that the Technology Provider (just in case of legal persons) is registered at the following register of legal persons according to the law of the country of establishment:

_____

The activity performed is

_____

The registration number is

_____

The Technology Provider has run from

_____

The legal form of the Technology Provider is

_____

The social object of the Technology Provider is

_____

The nationality of the Technology Provider is

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_____

The address of the Technology Provider is

_____

Date and signature

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PCP WISE

Pre-Commercial Procurement for the Customisation/pre-operationalisation of Water management Innovations from Space for European Climate Resilience

TENDER DOCUMENT 15
DECLARATION OF PRE-EXISTING RIGHTS
(TD 15)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

DECLARATION OF PRE-EXISTING RIGHTS (TD15)

I, the undersigned [*name and surname*]

_____

As [*capacity*]

_____

Of the following legal entity (hereafter the "**Entity**") [*name of legal entity*]

_____

With registered office in

_____

street address

_____

post code

_____

in the City of

_____

tel.

_____

VAT reg. no.

_____

HEREBY I STATE AND DECLARE

under my own personal responsibility, fully aware that in case of fraudulent statements the penalties provided by the [Dutch] law, pursuant to

THAT

The following list contains all the pre-existing rights of the Technology Provider as whole (including all members of the group in a joint Bid, subcontractors and Third Parties on which the Technology Provider relies to fulfil some selection criteria) that are attached to the proposed solution or parts of the proposed solution in my Technical Offer for this Request For Tender.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Part / aspect of the proposed solution concerned	Pre-existing material concerned	Rights to pre-existing material	Identification of rights' holder

Date and signature

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

ANNEXES

Annex 1. Use cases

	Fast Onset Crises	Slow Onset Crises
Urban	Flash Flood Summer 2021 in Ahr Valley, GER	Slow Onset River Flood 2023/24 in Lower Saxony, GER
	Wild Fires: Slovakia Bratislava (Local city level	Heat Island/subsidence: Multi Climate change scenarios in existing urban areas (Haarlem city, NL)
	Floods: Slovakia Bratislava (Local city level)	Soil saturation: Shallow ground water, Demvig, Denmark
	Floods/stormwater: city critical water management, Helsinki	Subsidence: Terrain subsidizing Lemvig Denmark
	Coastal flooding: Helsinki	Subsidence: City Infrastructure Rotterdam
Rural	Flash Flood Summer 2021 in Ahr Valley, GER	Slow Onset River Flood 2023/24 in Lower Saxony, GER
	Vegetation and peat fire 2023/24 lower Saxony, GER	Drought Impact Model on Agricultural Production – Catalonia region, Andalusia or other (Spain)
	Wild Fires: Slovak Republic (National level), Self-governing regions Banska Bystrica, Zilina (Regional level), Spisska Nova Ves	Drought: Subsidence in rural agricultural grass/peatlands in the water management area of waterauthority HDSR (NL)
	Floods: Surface Runoff Flows according to Rule 5.2-IC of the Roads Instruction (Andalusia, Spain)	Wild Fires: Nature area Kalmthoutse Heide (N, Belgium)
	FloodsL civil protection initiative for the Mygdonia catchment area (Central Macedonia)	Nature/rural: control ecosystem/residential area on groundwater/greening (in former airport region of Helsinki)
	FlashFloodBreaker (Interreg, North-West Europe) with EmschenGenossenschaft(G), Province Limburg (NL) and 'WaterOverlast Programme/Waterveiligheid en Ruimte Limburg' and EMFLoofResilience (Interreg) waterschap Limburg (NL) of cooperation proposal.	

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Annex 2. Checklist of documents and actions

TENDER DOCUMENT (TD)	DESCRIPTION / ACTION FOR TECHNOLOGY PROVIDERS
TD1: Call for Tenders	It provides the rules of the Tender, including the evaluation scheme. Technology Providers should read TD1 in conjunction with the other Tender Documents.
TD 2: Framework Agreement	The framework contract with the provisions that will regulate Phase 1, Phase 2 and Phase 3 of the PCP. TD2 should be signed by Technology Providers who have been awarded the Framework Agreement and Phase 1 Contract.
TD 3: PCP Contract for Phase 1	The Contract awarded for Phase 1 after the evaluation of Bids and final award.
TD 4: PCP Contract for Phase 2	The Contract awarded to Contractors for phase 2 after the Call-Off for Phase 2 of the PCP.
TD 5: PCP Contract for Phase 3	The Contract awarded to Contractors for Phase 3 after the Call-Off for Phase 2 of the PCP.
TD 6: PCP End of Phase (1, 2, 3) report	Template to be used by Technology Providers to report the outcomes of Phase 1, Phase 2 and Phase 3.
TD 7: Contractor details and Project abstracts	Template to be filled in by Technology Providers in Phase 1, Phase 2 and Phase 3 of the PCP.
TD 8: Technical Offer	Template to be completed by Technology Providers with their technical proposal.
TD 9: Financial Offer & Cost Breakdown	Template in excel to be completed by Technology Providers with their Financial Offer and Cost Breakdown.
TD 10: Declaration of Honour	Template to be filled in by Technology Providers to declare that they do not fall under exclusion criteria and they comply with selection and award criteria.
TD 11: Declaration of Honour RUSSIA	Template to be filled in by Technology Providers to declare they comply with the regulations that restrict procurement with RUSSIA.
TD 12: Consortia Statement	Template to be filled in by Technology Providers in case of a Consortium presenting a Bid.

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TD 13: Subcontracting Statement	Template to be filled in by Technology Providers in case of subcontracting tasks.
TD 14: Legal Capacity of the Technology Provider Statement	Template to be filled in by Technology Providers to declare their legal capacity.
TD 15: Declaration of pre-existing rights	Template to be filled in by Technology Providers to indicate their Background IPR required for the purpose of their Bids.
Annex 1. Use cases	Five use cases that describe the functional and technical requirements.
Annex 2. Checklist of documents and actions	Check list to guide Technology Providers in the preparation and submission of their Bids.
Annex 3. Information about the Public Buyers Group	Brief profile of the organisations part of the Public Buyers Group.
Annex 4. Preexisting rights of the Public Buyers Group	Relevant IPR that the organisations part of the Public Buyers Group possess (if any).
Annex 5. List of environmental, social and labour law obligations established by EU law, national legislation, collective agreements or the international environmental, social and labour conventions which tenders must comply with.	List of relevant regulations regarding environmental, social and labour obligations.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 3. Information about the Public Buyers Group

STOWA (Acronym for Foundation for Applied Water Research) is the centre of expertise of the regional water managers (the Dutch Water Authorities). Its mission is to develop, collect, distribute and implement applied knowledge, essential for an effective and efficient water management. Topics of expertise range from applied technical, scientific to administrative-legal, health and social science.

English - Foundation for Applied Water Research STOWA | STOWA

HET WATERSCHAPSHUIS (hwh) is a connecting management organization available for all 21 water boards in the Netherlands that have jointly established the Joint Regulations for the Water Board House to collaborate on programs and projects. The Water Board House promotes water boards working together on the data-driven water board of the future to achieve joint benefits. hwh ensures the purchase and contract management of joint information facilities and data. hwh also supports water boards with digital changes and their consequences within the work of water boards.

Home | Het Waterschapshuis

MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY (MoI) is the Ministry of Interior of the Slovak Republic. It is a central body of state administration for protecting the constitutional system, public order, security of persons and property, protection and administration of the state's borders, the safety and fluency of road traffic, for issues related weapons and ammunition, private security services, the entry to the territory of the Slovak Republic and the stay of foreigners in its territory, identity cards, travel documents and driving licences, refugees and transmigrants, for the registration of population, for the Police Force and the Fire Fighting and Rescuing Corps.

Ministerstvo vnútra Slovenskej republiky (minv.sk)

GEMEENTE HAARLEM (CITY OF HAARLEM) is a city and municipality in the Netherlands. It is the capital of the province of North Holland. Haarle m is situated at the northern edge of the Randstad, one of the more populated metropolitan areas in Europe; it is also part of the Amsterdam metropolitan area. Haarlem had a population of 162,543 in 2021.

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Home | Gemeente Haarlem

BUNDESANSTALT TECHNISCHES HILFSWERK (THW) is the Federal Agency for Technical Relief. THW is the federal government's emergency organization run by volunteers and is part of the Federal Ministry of the Interior. The THW follows the legal mandate laid down in the THW Act. Its tasks include technical assistance in civil protection, local hazard prevention and the implementation of foreign missions on behalf of the federal government.

THW - Startseite

REGION OF CENTRAL MACEDONIA (RCM) is the largest and second most populous region in Greece. It is administratively a secondary governmental organization and covers the central part of Macedonia, with the exception of the Mount Athos peninsula.

Region of Central Macedonia (enpe.gr)

FORENINGEN KLIMATORIUM (KLIMATORIUM) is an innovative climate center located on the west coast of Denmark. It is the meeting point that brings together civil society, authorities, businesses and educational institutions to discuss lifestyle, prevention and adaptation to the climate challenges we face. Climatorium's mission is, through collaboration between private and public companies, knowledge institutions and civil society, to develop new solutions to current and future challenges in the areas: Coastal Climate Challenges, Green Energy, Circular Economy, Water and the Environment. Solutions that can be used and disseminated locally, regionally, nationally and internationally.

Om Klimatorium - KLIMATORIUM

BENEGO – GRENSPARK KALMTHOUTSE HEIDE promotes cross-border cooperation where it counts most: at local level, close to the citizen. 21 border municipalities in the provinces of Antwerp and North Brabant are doing something about it. Climate change, water management, migration flows, organized crime, technological innovation, are particularly important in the region. The Kalmthoutse Heide has developed from wasteland into a nature reserve on both sides of the border. Its management was very dispersed and fragmented. Around 2000 it became clear that a joint approach was necessary. Benego

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

acted as a cross-border legal entity to make this possible. This is how Grenspark Kalmthoutse Heide was created in 2001.

Grenspark Kalmthoutse Heide - BENEGO

INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA (ICGC) (SP) is an entity of the Generalitat de Catalunya whose purpose is to carry out the technical tasks of developing cartographic information within the scope of the powers of the Generalitat.

Inici. Institut Cartogràfic i Geològic de Catalunya (icgc.cat)

CITY OF ROTTERDAM (NL) is a metropolitan municipality in the Dutch province of South Holland and has 671,125 inhabitants (January 1, 2024) according to the Central Bureau of Statistics (CBS) on an area of 319.35 km² (of which more than a third is water). This makes the municipality the second largest municipality in the Netherlands in terms of inhabitants. The municipality is part of the Rotterdam The Hague Metropolitan Region.

Homepage | Rotterdam.nl

SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA (SLOVAK ENVIRONMENTAL AGENCY) (SEA) (SK) is a professional organization of the Ministry of the Environment of the Slovak Republic (MoE SR) with a national scope, focused on caring for the environment and creating the landscape in accordance with the principles of sustainable development. The Slovak Environment Agency was awarded quality management system and environmental management system certificates according to ISO 9001 and 14001 standards in 2005.

Slovenská agentúra životného prostredia | SAŽP (sazp.sk)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 4. Pre-existing rights of the Public Buyers Group

ORGANISATION	RELEVANT PRE-EXISTING IPR

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 5. List of environmental, social and labour law obligations established by EU Law, national legislation, collective agreements which bids must comply with

ILO Convention 87 on Freedom of Association and the Protection of the Right to Organise
ILO Convention 98 on the Right to Organise and Collective Bargaining
ILO Convention 105 on the Abolition of Forced Labour
ILO Convention 138 on Minimum Age
ILO Convention 111 on Discrimination (Employment and Occupation)
ILO Convention 100 on Equal Remuneration
ILO Convention 182 on Worst Forms of Child Labour
Vienna Convention for the protection of the Ozone Layer and its Montreal Protocol on substances that deplete the Ozone Layer
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention)
Stockholm Convention on Persistent Organic Pollutants (Stockholm POPs Convention)
Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (UNEP/FAO) (The PIC Convention) Rotterdam, 10 September 1998, and its 3 regional Protocols

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 6. Contract Notice template

NETHERLANDS: RESEARCH AND DEVELOPMENT SERVICES AND RELATED CONSULTANCY SERVICES
PCP-WISE: CUSTOMISATION/PRE-OPERATIONAISATION OF PROTOTYPES OF END-USER SERVICES IN THE AREA OF CLIMATE CHANGE.

Contract or concession notice – standard regime

1 *Buyer*

1.1 *Buyer*
Official name: STICHTING TOEGEPAST ONDERZOEK WATERBEHEER
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: BENEGO – GRENSPARK KALMTHOUTSE HEIDE
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: GEMEENTE HAARLEM
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: BUNDESANSTALT TECHNISCHES HILFSWERK
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: REGION OF CENTRAL MACEDONIA
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: CITY OF ROTTERDAM
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Legal type of the buyer: Body governed by public law
Activity of the contracting authority: Environmental protection

1.1 *Buyer*
Official name: FORENINGEN KLIMATORIUM
Legal type of the buyer: International organisation
Activity of the contracting authority: Environmental protection

1.1 *Buyer*
Official name: FORUM VIRIUM HELSINKI OY
Legal type of the buyer: International organisation
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: HET WATERSCHAPSHUIS
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

2 *Procedure*

2.1 *Procedure*
Title: PCP-WISE: Customisation/Pre-Operationaisation of prototypes of end-user services in the area of Climate Change.
Description: This contract notice invites interested operators to submit tenders to this PCP procurement. Participation in the tendering procedure is open on equal terms to all types of operators that are established in EU Member States or Horizon Europe associated countries. The PCP of R&D services is a competitive procedure in 3 phases: Phase 1 solution design, Phase 2: Prototype development and Phase 3: testing and validation of prototypes. The tender documents can be downloaded in the following [link]. This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592.
Procedure identifier: 6d81539f-24f6-4714-9333-ea6d7d2583b8
Type of procedure: Open

2.1.1 *Purpose*
Main nature of the contract: Services
Main classification (cpv): 73000000 Research and development services and related consultancy services

2.1.4 *General information*
Legal basis:
Directive 2014/24/EU

2.1.6 *Grounds for exclusion*
Analogous situation like bankruptcy under national law:
Bankruptcy:
Child labour and other forms of trafficking in human beings:
Conflict of interest due to its participation in the procurement procedure:
Corruption:
Fraud:
Guilty of grave professional misconduct:
Guilty of misrepresentation, withheld information, unable to provide required documents and obtained confidential information of this procedure:

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Money laundering or terrorist financing:
Participation in a criminal organisation:
Payment of taxes:
Terrorist offences or offences linked to terrorist activities:

5 *Lot*

5.1 *Lot technical ID*: LOT-0001
Title: N/A
Description: N/A
Internal identifier: N/A

5.1.1 *Purpose*
Main nature of the contract: Services
Main classification (cpv): 73000000 Research and development services and related consultancy services

5.1.3 *Estimated duration*
Other duration: Unknown

5.1.6 *General information*
Reserved participation: Participation is not reserved.
Procurement Project fully or partially financed with EU Funds.
The procurement is covered by the Government Procurement Agreement (GPA): no

5.1.9 *Selection criteria*
Criterion:
Type: Technical and professional ability
Criterion:
Type: Suitability to pursue the professional activity

5.1.11 *Procurement documents*
Languages in which the procurement documents are officially available: English
Address of the procurement documents: https://www.protect-pcp.eu/knowledge-hub/

5.1.12 *Terms of procurement*
Terms of submission:
Electronic submission: Allowed
Address for submission: https://www.protect-pcp.eu/consortium/
Languages in which tenders or requests to participate may be submitted: English
Electronic catalogue: Not allowed
Deadline for receipt of tenders: 31/05/2024 12:00 +02:00
Terms of contract:
The execution of the contract must be performed within the framework of sheltered employment programmes: No
Electronic invoicing: Allowed
Electronic ordering will be used: no
Electronic payment will be used: no

5.1.15 *Techniques*
Framework agreement:
Framework agreement, with reopening of competition
Information about the dynamic purchasing system:

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

No dynamic purchase system
Electronic auction: *no*

5.1.16 ***Further information, mediation and review***
Review organisation: Central Netherlands District Court

8 *Organisations*

8.1 ORG-0001
Official name: STICHTING TOEGEPAST ONDERZOEK WATERBEHEER
Registration number: 995961372
Postal address: STATIONSPLEIN 89 AMERSFOORT
Town: Amersfoort
Postcode: 3818 LE
Country subdivision (NUTS): Utrecht (NL310)
Country: Netherlands
Email: vanleeuwen@stowa.nl
Telephone: +31622393844
Internet address: www.stowa.nl
Roles of this organisation:
Buyer

8.1 ORG-0002
Official name: FORUM VIRIUM HELSINKI OY
Registration number: 997534324
Postal address: UNIONINKATU 24 HELSINKI
Town: Helsinki
Postcode: 00130
Country subdivision (NUTS): Helsinki-Uusimaa (FI1B1)
Country: Finland
Email: hugo.goncalves@forumvirium.fi
Telephone: +358451199410
Internet address: www.forumvirium.fi
Roles of this organisation:
Buyer

8.1 ORG-0003
Official name: MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY
Registration number: 916230088
Postal address: PRIBINOVA 2 BRATISLAVA
Town: Bratislava
Postcode: 812 72
Country subdivision (NUTS): Bratislavský kraj (SK010)
Country: Slovakia
Email: jozef.kubinec@minv.sk
Telephone: +421250941111
Internet address: www.minv.sk
Roles of this organisation:
Buyer

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

8.1 ORG-0004

Official name: GEMEENTE HAARLEM
Registration number: 927684430
Postal address: GROTE MARKT 2 Zijlvest 39 2011 VB
Town: Haarlem
Postcode: 2003 RN
Country subdivision (NUTS): Agglomeratie Haarlem (NL324)
Country: Netherlands
Email: ooosterhof@haarlem.nl
Telephone: +31235113866
Internet address: www.haarlem.nl
Roles of this organisation:
Buyer

8.1 ORG-0005

Official name: BUNDESANSTALT TECHNISCHES HILFSWERK
Registration number: 880119219
Postal address: PROVINZIALSTRASSE 93 BONN
Town: Bonn
Postcode: 53127
Country subdivision (NUTS): Bonn, Kreisfreie Stadt (DEA22)
Country: Germany
Email: nils.krippner@thw.de
Telephone: +49(0)228940-1777
Internet address: www.thw.de
Roles of this organisation:
Buyer

8.1 ORG-0006

Official name: REGION OF CENTRAL MACEDONIA
Registration number: 951347774
Postal address: VASILISSIS OLGAS 198 THESSALONIKI
Town: THESSALONIKI
Postcode: 54110
Country subdivision (NUTS): Θεσσαλονίκη (EL522)
Country: Greece
Email: k.pantazi@pkm.gov.gr
Telephone: 2313330918
Internet address: www.pkm.gov.gr
Roles of this organisation:
Buyer

8.1 ORG-0007

Official name: FORENINGEN KLIMATORIUM
Registration number: 896462167
Postal address: HAVNEN 8 LEMVIG
Town: LEMVIG
Postcode: 7620
Country subdivision (NUTS): Extra-Regio NUTS 3 (DKZZZ)
Country: Denmark

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Email: chro@klimatorium.dk
Telephone: 51851896
Internet address: www.Klimatorium.dk
Roles of this organisation:
Buyer

8.1 ORG-0008
Official name: BENEGO – GRENSPARK KALMTHOUTSE HEIDE
Registration number: 886637231
Postal address: Rouwmoer 7c Essen
Town: Essen
Postcode: 2910
Country subdivision (NUTS): Essen, Kreisfreie Stadt (DEA13)
Country: Belgium
Email: j.weverbergh@grenspark.be
Telephone: +3236419353
Internet address: https://grensparkkalmthoutseheide.com/
Roles of this organisation:
Buyer

8.1 ORG-0009
Official name: INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA
Registration number: 935977542
Postal address: PARC DE MONTJUIC SN BARCELONA
Town: BARCELONA
Postcode: 08038
Country subdivision (NUTS): Barcelona (ES511)
Country: Spain
Email: jordi.corbera@icgc.cat
Telephone: +34935671500
Internet address: www.icgc.cat
Roles of this organisation:
Buyer

8.1 ORG-0010
Official name: CITY OF ROTTERDAM
Registration number: 936956175
Postal address: Meent 106 Rotterdam
Town: Rotterdam
Postcode: 3001 AB
Country subdivision (NUTS): Groot-Rijnmond (NL33C)
Country: Netherlands
Email: jordi.corbera@icgc.cat
Telephone: +34935671500
Internet address: www.stadsregio.nl
Roles of this organisation:
Buyer

8.1 ORG-0011
Official name: SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA
Registration number: 998833057

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Postal address: TAJOVSKEHO 28 BANSKA BYSTRICA
Town: BANSKA BYSTRICA
Postcode: 975 90
Country subdivision (NUTS): Banskobystrický kraj (SK032)
Country: Slovakia
Email: marek.hubacek@sazp.sk
Telephone: +421484374154
Internet address: http://www.sazp.sk
Roles of this organisation:
Buyer

8.1 ORG-0012
Official name: HET WATERSCHAPSHUIS
Registration number: 913379646
Postal address: STATIONSPLEIN 89 AMERSFOORT
Town: AMERSFOORT
Postcode: 3818 LE
Country subdivision (NUTS): Utrecht (NL310)
Country: Netherlands
Email: e.nobbe@hetwaterschapshuis.nl
Telephone: +31638784252
Internet address: www.hetwaterschapshuis.nl
Roles of this organisation:
Buyer

8.1 ORG-0013
Official name: Central Netherlands District Court
Registration number: 000000
Postal address: Vrouwe Justitiaplein 1 Utrecht
Town: Utrecht
Postcode: 3511 EX
Country subdivision (NUTS): Utrecht (NL310)
Country: Netherlands
Email: midden-nederland@rechtspraak.nl
Telephone: +310883620000
Internet address: https://www.rechtspraak.nl/Organisatie-en-contact/Organisatie/Rechtbanken/Rechtbank-Midden-Nederland
Roles of this organisation:
Review organisation

11 *Notice information*

11.1 *Notice information*
Notice identifier/version: 2842b549-61dd-4867-8b7a-15bafb561f3c - 01
Form type: Competition
Notice type: Contract or concession notice – standard regime
Notice dispatch date: 13/05/2024 09:27 +00:00
Languages in which this notice is officially available: English

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

11.2 *Publication information*

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Annex 7. Contract Award Notice template

NETHERLANDS: RESEARCH AND DEVELOPMENT SERVICES AND RELATED CONSULTANCY SERVICES
PCP-WISE: CUSTOMISATION/PRE-OPERATIONALISATION OF WATER MANAGEMENT INNOVATIONS FROM SPACE FOR EUROPEAN CLIMATE RESILIENCE

Contract or concession award notice – standard regime

1 *Buyer*

1.1 *Buyer*
Official name: STICHTING TOEGEPAST ONDERZOEK WATERBEHEER
Legal type of the buyer: Entity with special or exclusive rights
Activity of the contracting authority: Education

1.1 *Buyer*
Official name: FORUM VIRIUM HELSINKI OY
Legal type of the buyer: Body governed by public law, controlled by a local authority
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY
Legal type of the buyer: Central government authority
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: GEMEENTE HAARLEM
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: BUNDESANSTALT TECHNISCHES HILFSWERK
Legal type of the buyer: Body governed by public law, controlled by a central government authority
Activity of the contracting authority: Public order and safety

1.1 *Buyer*
Official name: REGION OF CENTRAL MACEDONIA
Legal type of the buyer: Regional authority
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: FORENINGEN KLIMATORIUM
Legal type of the buyer: Body governed by public law, controlled by a regional authority
Activity of the contracting authority: Environmental protection

1.1 *Buyer*
Official name: Benego - Grenspark Kalmthoutse Heide
Legal type of the buyer: International organisation
Activity of the contracting authority: Environmental protection

1.1 *Buyer*
Official name: INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Legal type of the buyer: Body governed by public law
Activity of the contracting authority: Environmental protection

1.1 *Buyer*
Official name: Stadsregio Rotterdam
Legal type of the buyer: Local authority
Activity of the contracting authority: General public services

1.1 *Buyer*
Official name: SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA
Legal type of the buyer: Body governed by public law, controlled by a central government authority
Activity of the contracting authority: Environmental protection

1.1 *Buyer*
Official name: HET WATERSCHAPSHUIS
Legal type of the buyer: Body governed by public law
Activity of the contracting authority: Housing and community amenities

2 *Procedure*

2.1 *Procedure*
Title: PCP-WISE: Customisation/Pre-Operationalisation of Water Management Innovations from Space for European Climate Resilience
Description: The PCP of R&D services is a competitive procedure in 3 phases: Phase 1 solution design, Phase 2: Prototype development and Phase 3: testing and validation of prototypes. The tender documents can be downloaded in the following [link]. This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592.
Procedure identifier: 6a6d3e98-5964-447e-9ed6-c65ce170f759
Type of procedure: Open

2.1.1 *Purpose*
Main nature of the contract: Services
Main classification (cpv): 73000000 Research and development services and related consultancy services

2.1.4 *General information*
Legal basis:
Directive 2014/24/EU

5 *Lot*

5.1 *Lot technical ID*: LOT-0001
Title: Not applicable
Description: Not applicable
Internal identifier: Not applicable

5.1.1 *Purpose*
Main nature of the contract: Services
Main classification (cpv): 73000000 Research and development services and related consultancy services

5.1.6 *General information*

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Procurement Project fully or partially financed with EU Funds.
The procurement is covered by the Government Procurement Agreement (GPA): no

5.1.10 *Award criteria*
Criterion:
Type: Quality
Description: Not applicable
Description of the method to be used if weighting cannot be expressed by criteria: Not applicable

5.1.15 *Techniques*
Framework agreement:
Framework agreement, with reopening of competition
Information about the dynamic purchasing system:
No dynamic purchase system

5.1.16 *Further information, mediation and review*
Review organisation: The Central Netherlands District Court (Rechtbank Midden-Nederland)
Organisation providing more information on the review procedures: The Central Netherlands District Court (Rechtbank Midden-Nederland)

6 *Results*

6.1 *Result lot Identifier*: LOT-0001
At least one winner was chosen.

8 *Organisations*

8.1 ORG-0001
Official name: STICHTING TOEGEPAST ONDERZOEK WATERBEHEER
Registration number: 995961372
Department: Watersystems Program SAT-WATER
Postal address: STATIONSPLEIN 89
Town: Amersfoort
Postcode: 3818 LE
Country subdivision (NUTS): Utrecht (NL310)
Country: Netherlands
Contact point: Dr. Hans Van Leeuwen
Email: vanleeuwen@stowa.nl
Telephone: +31 622393844
Internet address: www.stowa.nl
Roles of this organisation:
Buyer

8.1 ORG-0002
Official name: HET WATERSCHAPSHUIS
Registration number: 913379646
Department: HET WATERSCHAPSHUIS
Postal address: STATIONSPLEIN 89
Town: Amersfoort

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Postcode: 3818 LE
Country subdivision (NUTS): Utrecht (NL310)
Country: Netherlands
Contact point: Mr. Erik Nobbe
Email: e.nobbe@hetwaterschapshuis.nl
Telephone: +31 638784252
Internet address: www.hetwaterschapshuis.nl
Roles of this organisation:
Buyer

8.1 ORG-0003
Official name: FORUM VIRIUM HELSINKI OY
Registration number: 997534324
Department: Smart City
Postal address: UNIONINKATU 24
Town: HELSINKI
Postcode: 00130
Country subdivision (NUTS): Helsinki-Uusimaa (FI1B1)
Country: Finland
Contact point: Mr. Hugo Goncalves
Email: hugo.goncalves@forumvirium.fi
Telephone: +358 451199410
Internet address: www.forumvirium.fi
Roles of this organisation:
Buyer

8.1 ORG-0004
Official name: MINISTERSTVO VNUTRA SLOVENSKEJ REPUBLIKY
Registration number: 916230088
Department: Public Procurement Department
Postal address: PRIBINOVA 2
Town: BRATISLAVA
Postcode: 812 72
Country subdivision (NUTS): Bratislavský kraj (SK010)
Country: Slovakia
Contact point: Mr. Jozef Kubinec
Email: jozef.kubinec@minv.sk
Telephone: +421 2 5094 1111
Internet address: www.minv.sk
Roles of this organisation:
Buyer

8.1 ORG-0005
Official name: GEMEENTE HAARLEM
Registration number: 927684430
Department: BBOR, Programme and area manangement / Strategy, DIA
Postal address: GROTE MARKT 2
Town: HAARLEM
Postcode: 2003 RN
Country subdivision (NUTS): Agglomeratie Haarlem (NL324)

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement No 101060592

Country: Netherlands
Contact point: Mr. Onno Oosterhof
Email: oosterhof@haarlem.nl
Telephone: +31 235113866
Internet address: www.haarlem.nl
Roles of this organisation:
Buyer

8.1 ORG-0006
Official name: BUNDESANSTALT TECHNISCHES HILFSWERK
Registration number: 880119219
Department: Unit W I 3, Research Projects
Postal address: PROVINZIALSTRASSE 93
Town: BONN
Postcode: 53127
Country subdivision (NUTS): Bonn, Kreisfreie Stadt (DEA22)
Country: Germany
Contact point: Nils Krippner
Email: nils.krippner@thw.de
Telephone: +49 (0) 228 940-1777
Internet address: www.thw.de
Roles of this organisation:
Buyer

8.1 ORG-0007
Official name: REGION OF CENTRAL MACEDONIA
Registration number: 951347774
Department: EU programs & Sinergies
Postal address: VASILISSIS OLGAS 198
Town: THESSALONIKI
Postcode: 54110
Country subdivision (NUTS): Θεσσαλονίκη (EL522)
Country: Greece
Contact point: Mrs. Kallitsa Pantazi
Email: k.pantazi@pkm.gov.gr
Telephone: +30 2313319637
Internet address: www.pkm.gov.gr
Roles of this organisation:
Buyer

8.1 ORG-0008
Official name: FORENINGEN KLIMATORIUM
Registration number: 896462167
Postal address: HAVNEN 8
Town: LEMVIG
Postcode: 7620
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Country: Denmark
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Telephone: 51851896
Internet address: www.Klimatorium.dk
Roles of this organisation:
Buyer

8.1 ORG-0009
Official name: Benego - Grenspark Kalmthoutse Heide
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Town: Essen
Postcode: 2910
Country subdivision (NUTS): Arr. Antwerpen (BE211)
Country: Belgium
Contact point: Mr. Jan Weverbergh
Email: j.weverbergh@grenspark.be
Telephone: +32 36419353
Internet address: https://grensparkkalmthoutseheide.com/
Roles of this organisation:
Buyer

8.1 ORG-0010
Official name: INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA
Registration number: 935977542
Department: CSPCOT, Geoprocessing
Postal address: PARC DE MONTJUIC SN
Town: BARCELONA
Postcode: 08038
Country subdivision (NUTS): Barcelona (ES511)
Country: Spain
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Internet address: www.icgc.cat
Roles of this organisation:
Buyer

8.1 ORG-0011
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Postcode: 3001 AB
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Internet address: www.stadsregio.nl
Roles of this organisation:
Buyer

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8.1 ORG-0012

Official name: SLOVENSKA AGENTURA ZIVOTNEHO PROSTREDIA
Registration number: 998833057
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Postcode: 975 90
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Country: Slovakia
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Email: marek.hubacek@sazp.sk
Telephone: +421484374154
Internet address: http://www.sazp.sk
Roles of this organisation:
Buyer

8.1 ORG-0013

Official name: The Central Netherlands District Court (Rechtbank Midden-Nederland)
Registration number: 0000000
Postal address: Vrouwe Justitiaplein 1
Town: Utrecht
Postcode: 3511 EX
Country subdivision (NUTS): Utrecht (NL310)
Country: Netherlands
Email: midden-nederland@rechtspraak.nl
Telephone: +31 88 - 362 00 00
Internet address: https://www.rechtspraak.nl/English/Contact/Pages/Contact-information-of-the-courts.aspx
Roles of this organisation:
Review organisation
Organisation providing more information on the review procedures

11 *Notice information*

11.1 *Notice information*

Notice identifier/version: edc7c6bd-0b08-4718-a8a5-5f8a9e725856 - 01
Form type: Result
Notice type: Contract or concession award notice – standard regime
Notice dispatch date: 13/05/2024 15:23 +00:00
Languages in which this notice is officially available: English

11.2 *Publication information*

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