ECMWF Copernicus Procurement

Invitation to Tender

Copernicus Joint Services

Volume II

Support on user value proposition and societal value assessments

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Contents

1 Objectives and general approach

ECMWF aims to develop a value proposition and linked user outreach material to illustrate the full mix of benefits and societal value it delivers to its current and potential users with a focus on CAMS, C3S and the Copernicus Health and Energy Hubs. A particular focus shall go to the societal benefits of ERA5.

These objectives are reached through the implementation of three Lots:

- Lot 1 focuses on the development of a value proposition strategy for a selection of priority domains. It includes the assessment, collection and development of user specific content and proposals for concrete implementation for value proposition material. *(Duration 36 months)*
- Lot 2 focuses on the design, implementation and maintenance of value proposition material. *(Duration 36 months)*
- Lot 3 focuses on the assessment of the societal value of ERA5 reanalysis products. *(Duration 5 months)*

The strategy shall be presented within the wider societal context as reflected through international, EU and national policy priorities requiring quality assured and operational data products related to atmosphere monitoring and climate change. A number of priority challenges are proposed under Lot 1. The strategy shall as well be tailored to the specific user audiences, or *user personas*, be it to create further user uptake by existing users or by inspiring other potential users. To achieve this, a connection shall be made between selected user personas and the key C3S and CAMS data products and services which are at the core of our value proposition, as well as the Copernicus Health Hub and Copernicus Energy Hub. An in-depth knowledge by Tenderers of the related product portfolios is therefore important. The analysis should address both the current situation and the medium-term potential (3 years), giving recommendations on how to reach this potential.

The strategies and linked implementation plans, shall lead to a series of proposals for content for user outreach material, designed to illustrate the benefits and societal value for current and potential users. This material can include attractive infographics and charts, designs to illustrate a selection of user personas, educational user outreach videos as well as compelling user stories and engaging user testimonials. This material shall be designed in line with EU's Copernicus and C3S and CAMS communication and publicity policy.

Last but not least, this ITT includes a dedicated study on the assessment of the societal value of ERA5 reanalysis products, the most used and impactful products of C3S. The result of this study, which shall be delivered in an attractive and informative format aimed to a wider stakeholder audience.

Separate contracts shall be awarded for each Lot, so Tenderers must provide a distinct proposal for each Lot they wish to be considered for. A Tenderer may be awarded a contract for more than one Lot. The proposed efficiency and budget gains to ECMWF of such a case must be illustrated in the tenders.

Contract	Topic	Description	Duration
CJS2_154a Lot 1	User value proposition strategy and content development	Assessment and development of user specific content for value proposition material. Focus on value proposition strategy for CTH Health, CTH Energy, Missions Climate Adaptation (EEA/Climate-ADAPT), initial ideas for SDGs and Paris Agreement, etc.	36 months
CJS2_154a Lot 2	Design user outreach material	Assessment and development of user specific content for value proposition material.	36 months
CJS2_154a Lot 3	Study on the societal value of ERA5 climate reanalysis	Assessment of the societal value of ERA5 reanalysis products	5 months

2 Background

2.1 Overview of Copernicus Programme

To provide a scope for the establishment of a value proposition, an overview on the different Copernicus components[1], including the six Copernicus services (C3S, CAMS, CEMS, CLMS, CMEMS, CSS), can be found here:
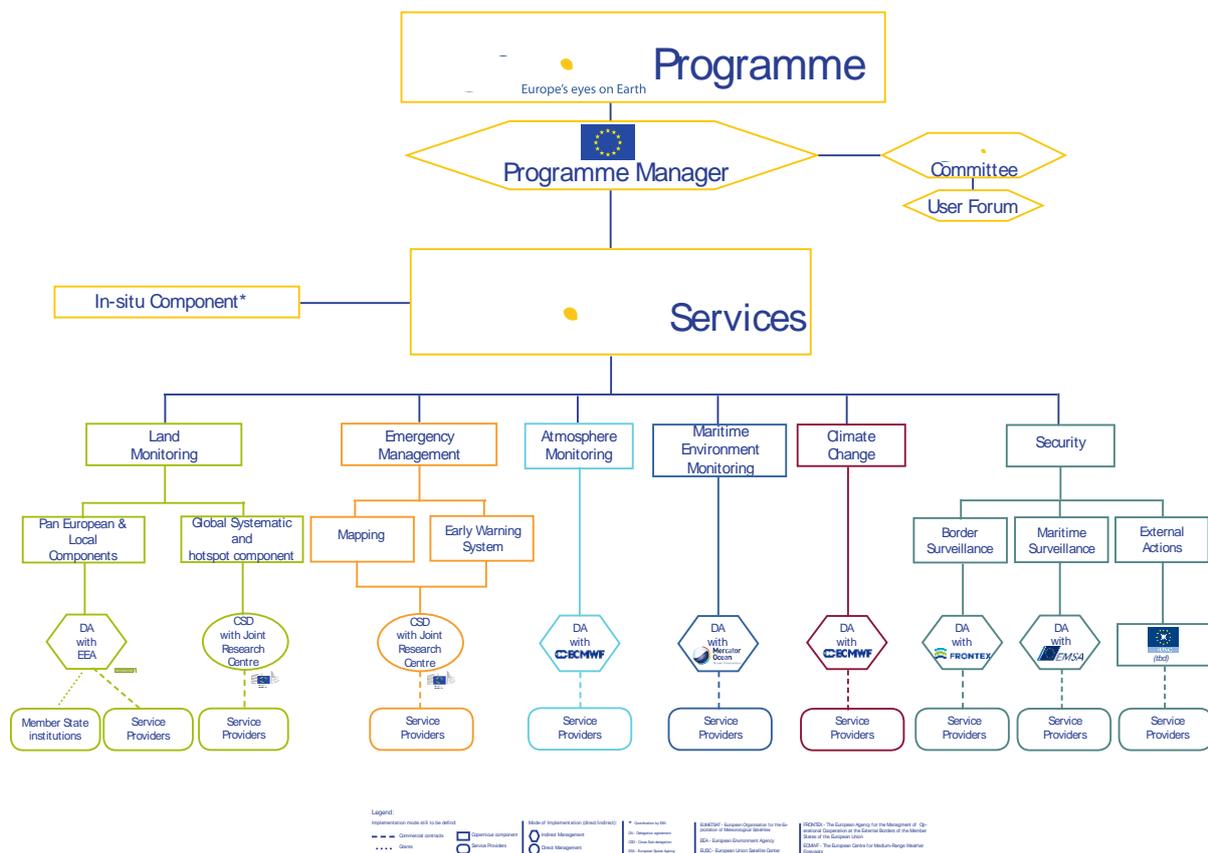
Figure 1: Overview of Copernicus Services and components

ECMWF implements the Copernicus Atmosphere Monitoring Service (CAMS) and the Copernicus Climate Change Service (C3S).

The **Copernicus Atmosphere Monitoring Service (CAMS)** provides consistent and quality-controlled information related to air pollution and health, solar energy, greenhouse gases and climate forcing, everywhere in the world. For details, see https://atmosphere.copernicus.eu/.

The **Copernicus Climate Change Service (C3S)** supports society by providing authoritative information about the past, present and future climate in Europe and the rest of the World. For details, see https://climate.copernicus.eu.

Note that ECMWF also play a role, as the computation centre for floods and fire data products, for the **Copernicus Emergency Monitoring Service (CEMS)**, on behalf of the Joint Research Centre (JRC), this is however not the focus of this ITT.

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[1] https://www.copernicus.eu/en

2.2 Introduction to Copernicus User Engagement

The aim of Copernicus User Engagement (CUE) is to increase user uptake and user satisfaction, unlock new potential applications of data and products and provide training with the ultimate objective to enhance the impact of the Copernicus services. CUE is a joint service component between C3S and CAMS and as such will capitalise on user interactions from both services in an efficient way.

As illustrated in the picture below, User Engagement is built around seven building blocks.

Facilitate the creation of solutions
Connect users with scientists and technical experts to develop innovative solutions

Act as the 'voice' of the users
Internal coordination with operational teams to ensure service delivery tailored to user needs

Enhance user intelligence
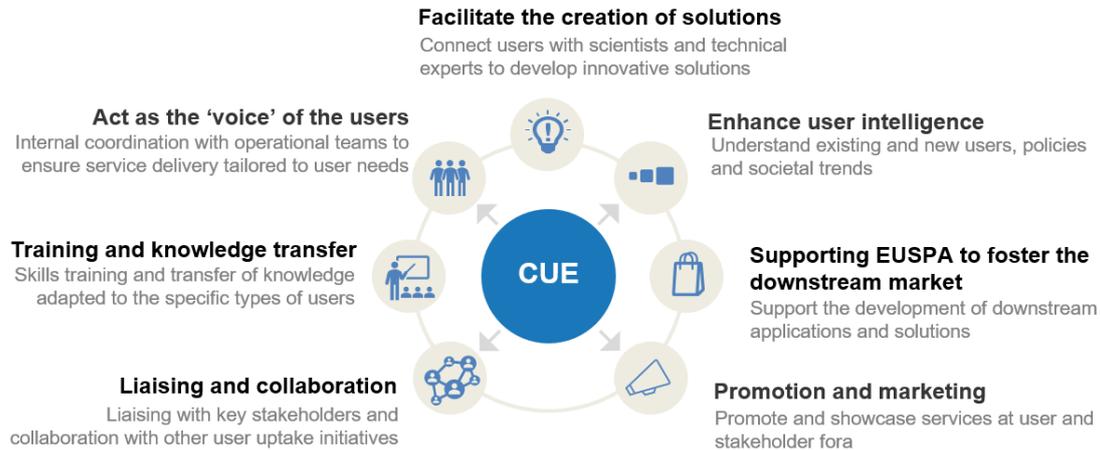Understand existing and new users, policies and societal trends

Training and knowledge transfer
Skills training and transfer of knowledge adapted to the specific types of users

Supporting EUSPA to foster the downstream market
Support the development of downstream applications and solutions

Liaising and collaboration
Liaising with key stakeholders and collaboration with other user uptake initiatives

Promotion and marketing
Promote and showcase services at user and stakeholder fora

Figure 2: Building blocks of Copernicus User Engagement

This ITT serves the objectives of 'Promotion and marketing' building block of which activities are implemented together with the Copernicus Communication team, who take responsibility to make sure the deliverables are in line with the overarching communication policy on branding and overall communication requirements.

Our CAMS and C3S services are presented and showcased at high level events, national as well as international fora with the aim to promote products and services towards stakeholders, purveyors and user communities. **To this end, an impactful value proposition and linked user outreach material tailored to the needs of specific user audiences shall be produced with the overall aim to explain how CAMS and C3S data products and services fill needs of existing and potential users.**

Particular attention shall be given to Earth Observation (EO) data value chain assessments in scope of Business to Government (B2G) engagements.

So called 'Core Users' include the European Union institutions and agencies, national and regional public authorities of the EU 27 Member States (MSs) and associated countries to the Copernicus Programme. Priority shall be given to serve their needs. With this ITT, we target as well international organisations such as the U.N. Specialised Agencies, International Financial Institutions and domain specific international bodies. Furthermore, to serve these end users, close engagement with intermediate users, including public research institutes and private consultancy and service providers, shall be recognised and stimulated. Indeed, close interaction with downstream users are essential to help us to translate the technical specifications and interpretation of our data products and information into solutions and knowledge in support of the Core Users.

Last but not least, the overall user uptake strategy of CAMS and C3S is aligned with the objectives of the European Union Space Programme Agency (EUSPA), responsible for the EU Space market development and user uptake for commercial entities as well as with the Knowledge Centre for Earth Observation (KCEO) as operated by the JRC, responsible for assessing EO data needs by the policy DGs of the EC.

2.3 Introduction to the CAMS and C3S National Collaboration Programmes

CAMS and C3S have each a programme of uptake activities by Member States. The CAMS National Collaboration Programme was the first developed and the first contract with a Member State was signed in December 2022. A strategy for the C3S National Collaboration Programme has been developed with the aim to kick-off the activities by Q4 2023. In this section, more details on the CAMS National Collaboration Programme are provided.

The CAMS National Collaboration Programme proposes a dedicated scheme to support the Member States in achieving maximum benefit from CAMS products and services in the implementation of their mandate. The vision is that over time, all European Union and Copernicus associated countries would have Copernicus data underpinning their national air quality information systems and/or national activities related to Green House Gases (GHG) emissions and the requirements of the UN Paris Agreement related to the nationally determined contributions (NDCs) and the Global Stocktake (GST). At the moment of publication of this ITT, ECMWF has contractual arrangements with authorities in Denmark, France, Germany, Italy, Norway, Poland and Sweden, with several others in the pipeline and the aim to reach all EU-27 and Copernicus contributing countries by mid-2024.

Building on the already on-going CAMS' collaboration with national authorities on user engagement, existing good practices at national level will be captured and fed back to the programme to inform service evolution and maximize the usefulness of the programme's outputs at a national, regional or even local level.

2.4 Introduction to the Copernicus Thematic Hubs

The main objective of the Copernicus Thematic Hubs (CTHs) is to group under one single entry point at the level of the Copernicus programme the ensemble of data, products and information generated by several Copernicus services or components (incl. Space and In-Situ) for specific thematic or geographical areas.
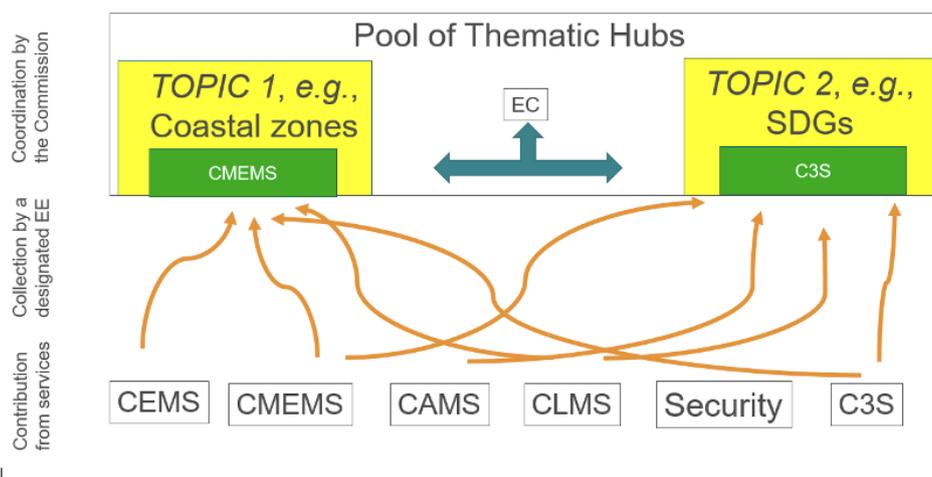
Figure 3: Example of the functional architecture of the Copernicus Thematic Hubs

The scope of these Thematic Hubs will be clearly traceable back to specific policy needs at the European Union level. These Thematic Hubs will allow the programme to address a range of policy aspects that are difficult to address through a single Copernicus service such as issues relating, for instance, to policy coherence or the mainstreaming of specific strategic elements in different policies and addressing geographic region of interest to the European Union.

The goal of this cross-service activity is to ease the user journey and to simplify the access to key information on selected areas of interest for various stakeholders, policy makers and users by building on the offer from

the different relevant Copernicus core services. These areas may include but are not limited to those already identified in the EU Space Regulation and highlighted in the Green Deal, such as biodiversity, health, coastal zones, Arctic, energy, Sustainable Development Goals, cultural heritage, support to the Paris Agreement, environmental compliance assurance, water management, extreme events, support to international development.

The implementation of a Thematic Hub involves three complementary processes, namely a contribution process involving multiple contributing Entrusted Entities, a collection process by a single designated Entrusted Entity and a coordination process supported by the KCEO as operated by the JRC, via so-called "Deep Dive" assessments.

The CTHs aim to:

- Facilitate access to <u>existing</u> Copernicus products relevant for the specific domain (**simple, user friendly, subject oriented**) to a specific **user community.**
- Improve the coordination and information flow between different related projects and initiatives.
- **Facilitate studies** on the selected subject.
- Provide **knowledge and expertise on data/products** (re-directing questions to the products providers, as needed).
- Showcase how the data can be **integrated** with other data/information (**user's stories**).
- Leverage the collaboration/interactions with other organizations and MSs.

2.5 Introduction to ERA5

ERA5 provides hourly estimates of a large number of atmospheric, land and ocean surface climate variables. The data coverage is complete, with a 31km grid of the global scale and resolving the atmosphere using 137 levels from the surface up to a height of 80km. ERA5 includes information about uncertainties for all reanalysis variables at reduced spatial and temporal resolutions. Monthly aggregates are precomputed from the hourly fields, and the hourly fields themselves are also available too. In addition, a dynamically downscaled land product (ERA5-Land) is available.

Most users access ERA5 via an interactive on-line interface to the CDS, where the users can select, download and visualize the sub-sets of data they require and are most interested in. The CDS data belongs to the European Union and is available with a free and open license to all users which allows commercial and research use as well as redistribution[2].

The development and production of ERA5 took place during the first phase of Copernicus (COP1). An extension back to 1940 was produced at the beginning of the second phase (COP2), while timely updates, five days behind real time are maintained as well on a continuous basis. ERA5 follows on from ERA-15, ERA-40 and ERA-Interim reanalyses, which are now superseded. ERA5 has a number of innovative features. These include hourly data throughout the reanalysis period and uniquely amongst all reanalyses to-date also an uncertainty estimate. The uncertainty information is obtained from a 10-member ensemble of data assimilations with 3-hourly output at half the horizontal resolution (63 km grid spacing). Compared to ERA-Interim, ERA5 also provides an enhanced set of output parameters, including for example a 100 m wind product responding directly to the specific needs of the wind energy sector. The move from ERA-Interim to ERA5 represents a step change in overall quality and level of detail. A comprehensive description of the ERA5

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[2] Links to data license https://cds.climate.copernicus.eu/api/v2/terms/static/licence-to-use-copernicus-products.pdf and disclaimer https://cds.climate.copernicus.eu/disclaimer-privacy

configuration, how it was produced and how it fits into the framework of other reanalysis activities at ECMWF can be found in Hersbach et al. (2020)[3].

ECMWF invites tenders to assess the value of ERA5 in commercial consultancy as well as academic (research) settings. The value of ERA5 should be evaluated with respect to a baseline which assumes no reanalysis is available, that is, just the raw observations and whatever may be derived from them through other means without using a physical model.

3 Technical requirements

3.1 Lot 1: User value proposition strategy and content development

ECMWF developed a high-level structured approach to target the different user communities. This strategic approach is based on a segmentation of our user communities in terms of societal sectors and policy domains as well as different type of users. This user segmentation was done to understand the user base of C3S and CAMS and to fine-tune specific user journeys through the data value chains. The user segmentation drives the development of our value proposition and promotion channels, assess gaps in our user driven service offer and helps to design user experience with the aim to increase engagement and satisfaction as well as to inspire further expansion in our user uptake. The ultimate purpose of the user segmentation is to serve the Core Users of CAMS and C3S.

As illustrated in the example overview below, the user segmentation is built around three pillars: the 'Why', 'Who' and 'What'.
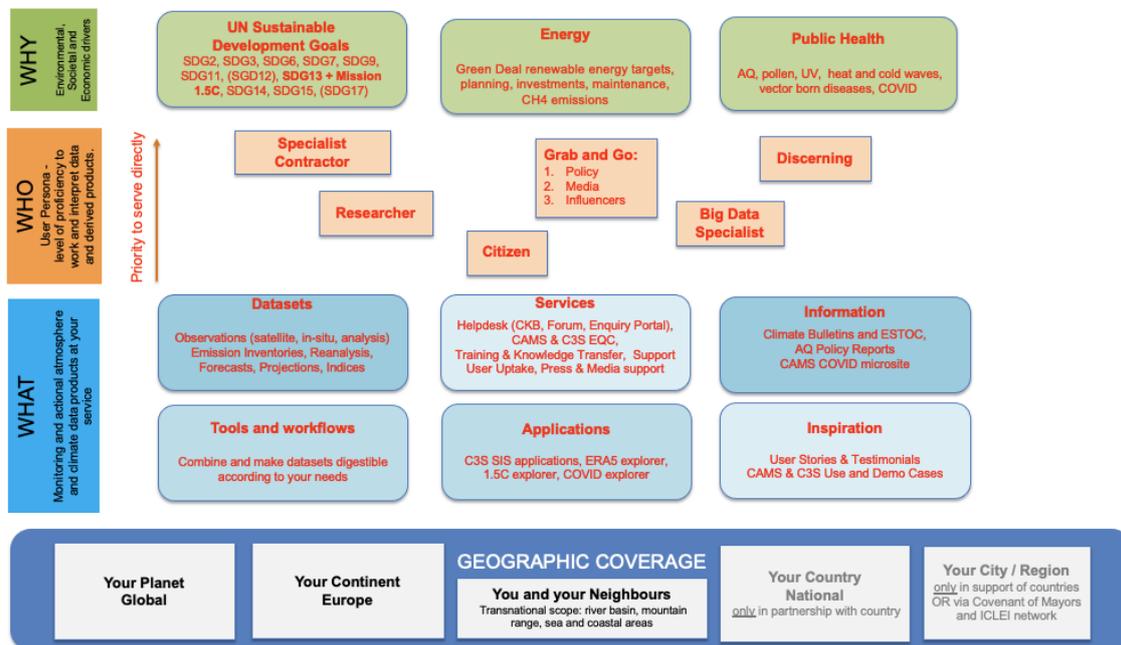
Figure 4: Pillars of user segmentation

The main driver of the user segments is referred to as the 'Why'. It refers to why users reach out to ECMWF, i.e. environmental, societal, economic challenges, which require data product inputs from CAMS and C3S. Examples include energy, public health and support to the UN Sustainable Development Goals (SDGs as

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[3] Hersbach H, Bell B, Berrisford P, Hirahara S, Horányi A, Muñoz-Sabater J, Nicolas J, Peubey C, Radu R, Schepers D, Simmons A. The ERA5 global reanalysis. Quarterly Journal of the Royal Meteorological Society. 2020 Jul; 146(730):1999-2049.

illustrated above but goes much further with, amongst others, support to finance and public assets management and Paris Agreement. Priorities are explained in WP1 below.

Besides the Why, six User Personas have been identified relevant for our services, referred to as the 'Who' (see appendix for more details):

- Specialist contractor: creates added value for a set of clients (end-users).
- Researcher: mainly interested in environmental knowledge creation.
- Discerning user: community users who fully appreciate the added value of C3S/CAMS and focus on strategic aspects rather than on the data as such.
- Big data specialist: no knowledge of climate/atmosphere science but very data savvy.
- Grab & Go: need facts/information to create policy relevant indicators and applications for the Media, policy users and civil society.
- Citizen: taxpayers who need ready-made, easy to understand information.

Each of the User Personas may use information and solutions underpinned by selected CAMS and C3S data products and services. They may use this directly or indirectly and not all are as relevant for each segment. In general, Specialist Contractors, Grab-and-Go and Discerning users are regarded as high priority user personas. While these User Personas serve as a starting point, a further refinement is possible as part of the contract.

A key part of the work is to connect the topics and the users to the products. This level is the core of the CAMS and C3S service offer and includes concrete datasets, services, information, tools and workflows, applications and inspiration. Tenderers shall illustrate in-depth expertise to grasp the essence of these services offer. Concrete links shall be established to specific datasets, services, etc. so that the value proposition, user journeys and linked promotion channels are focused to our actual service offer. Eventual gaps shall be identified as well, both in terms of the current situation as well as in the medium term of 3 years

3.1.1 Work Package 0 (WP0): Management and Coordination

The following management aspects shall be briefly described in the proposal:

- Meetings (classified as tasks and listed in a separate table as part of the proposal):
  - Kick-off meeting
  - ECMWF will organise monthly progress review meetings (by videoconference).
  - ECMWF organises annual C3S and CAMS General Assemblies. The successful Tenderer is expected to attend these meetings and contribute to discussions related to the topic of this ITT.
  - Bidders can propose additional project internal meetings, as they deem needed, as part of their response.
- Quality assurance and control: the quality of reports and Deliverables shall be equivalent to the standard of peer-reviewed publications. The timely delivery as well as final quality check of the deliverables shall be ensured by the prime contractor (in terms of content, use of ECMWF reporting templates for deliverables and reports (Microsoft Word), format, deliverable numbering and naming, typos…); all reports in this project shall be in English. Unless otherwise specified the specific contract Deliverables shall be made available to ECMWF in electronic format.
- Communication management (incl. external and internal communication).
  - It shall be noted that any communication activity must be agreed with the ECMWF Copernicus Communication team in advance. This includes, but not exhaustively, communication planning, branding and visual style, media outreach, website and social media activity, externally facing written and graphic content and events. Agreed activity would also need to be evaluated and reported on once complete so that success measures and KPIs could be provided to the European Commission. (cf. Clause 2.4.6 of the Framework Agreement)

- Set of Key Performance Indicators (KPIs) suitable for monitor contract performance. The proposed KPIs shall be SMART (specific, measurable, actionable, realistic and time bound). Contractor shall report to ECMWF on these KPIs as part of the Quarterly and Annual Implementation Reports. The proposed set of KPIs is expected to be updated upon review with ECMWF at M12 of the contract.
- Implementation of checks, controls and risk management tools for both the prime contractor and subcontractors.
- Resources planning and tracking using the appropriate tools.
- Subcontractor management, including conflict resolution, e.g. the prime contractor is responsible for settling disagreements, although advice/approval from ECMWF may be sought on the subject.
- A list of subcontractors describing their contribution and key personnel shall be provided, as well as back-up names for all key positions in the contract. Tenderers shall describe how the Framework Agreement, in particular Clause 2.9 on Sub-contracting has been flowed down to all their subcontractors.
- Management of personal data and how this meets the requirements of Clause 2.8 on Personal Data Protection and Annex 6 of the Framework Agreement.

List of minimum deliverables and milestones required as part of WP0, covering the contractual and financial reporting obligations towards ECMWF in line with the Terms and Conditions of the Framework Agreement:

WP0 Deliverables			
Deliverable #	Nature	Title	Due
D154.Lot1.0.1.1-YYYY.QQ	Report	**Quarterly Implementation** Report QQ YYYY (QQ YYYY being the previous quarter)	On 15/04, 15/07 and 15/10
D154.Lot1.0.1.2-YYYY	Report	**Annual Implementation Report Part 1** YYYY (YYYY being the Year n-1) This includes: 1) Quarterly implementation Report for the previous quarter Q4 YYYY 2) Preliminary financial form YYYY (YYYY being the Year n-1)	Annually on 15/01
D154.Lot1.0.1.3-YYYY	Report	**Annual Implementation Report Part 2** YYYY (YYYY being the Year n-1)	Annually on 28/02
D154.Lot1.0.1.4	Report	**Final report**	60 days after end of contract
D154.Lot1.0.2.1-YYYY	Report	**Annual Implementation Plan YYYY** (YYYY being the Year n+1)	Annually on 30/09
D154.Lot1.0.3.1-YYYY	Other	Copy of prime contractor's general financial statements and audit report YYYY (YYYY being the Year n-1)	Annually (no-cost associated)

WP0 Milestones			
Milestone #	Title	Means of verification	Due
M154.Lot1.0.1.1-MX	Progress review meetings with ECMWF	Minutes of meeting	Monthly
M154.Lot1.0.1.2	Kick-off Meeting	Minutes of meeting	M1
M154.Lot1.0.2.1	Update of KPIs after review with ECMWF	Technical Note	M12

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

3.1.2 Work Package 1 (WP1): Strategic user engagement outline on the value proposition

Understanding the 'What'

The successful Tenderer shall commit to an induction period during the first two months of the contract (M0-M2). This induction will allow efficient integration of the programmatic and topic domain knowledge from ECMWF into the content creation by the Contractor. In practice, the induction will consist of several interviews with the topic domain and programme management colleagues, mainly online but combined with two days visits to the premises of ECMWF in Bonn and Reading. The Contractor will also get access to user requirement databases (URDBs), user statistics as well as earlier sector specific and regional user uptake studies and UX assessments in support of User Support.

The Commission Staff Working Document on the Expression of User Needs for the Copernicus Programme of 2019 (https://www.copernicus.eu/sites/default/files/2019-10/STAFF_WORKING_PAPER_2019-394-Expression_of_User_Needs_for_the_Copernicus_Programme.pdf), studies and 'deep dives' as developed by the JRC KCEO (https://knowledge4policy.ec.europa.eu/earthobservation_en) and the conclusions from the Copernicus 2035 workshop (https://www.copernicus.eu/en/events/events/copernicus-horizon-2035-colloquium), shall be taken into account, as well as other selected EO user uptake studies at national and international level.

Solid insights shall be established and maintained on the product portfolio and linked documents as included in the CADS, CAMS Weather Room, C3S monthly bulletins and the European State of the Climate Report, as well as data and information as made available via users (e.g. Windy) and media outlets.

Consequently, during the execution period of the contract, the Contractor is expected to be able to pose targeted questions and interact with the relevant domain experts at ECMWF and create as such sufficiently independency. In case of a change in personnel, this 'induction' process may be needed to be redone, at own expenses of the Contractor, including eventual travel costs.

Good initial understanding on science driven data products within the CAMS and C3S domains is essential to facilitate this induction phase and will need to be proven in the tender.

Elaborating the 'Who'

During the first two months (M0-M2), the Contractor shall elaborate a general profile of each User Persona, including a clear description of their characteristics and proposals for visualisation, to be designed and implemented in Lot 2. This will be used as a backbone for further assessments and should be used with the overall, user relationship strategy. A particular focus shall be established to a Business-to-Government (B2G) relationship, be it directly or through a data value chain, involving Business-to-Business relationships.

By month 3 (M3), the Contractor shall launch an open call (by means, for example, of a campaign/survey/questionnaire, as agreed with ECMWF) to collect information and user testimonials of CAMS and C3S users in order to gain insights and build users story or other material. Some reciprocity principle could be used to gain more information and reach a wider audience, for example: "share your experience with us and we will provide some visibility/publicity". An implementation plan shall be proposed to run this call at selected intervals during the full length of the contract with a focus on keeping attracting attention of the user communities in a gentle way (M3 – M36).

Assessing the societal, economic and policy context of the 'Why'

The short-term priority segments for the Contractor to focus on, include:

- **Energy**: focus on renewable energy targets, planning, investments, maintenance and methane emissions in the framework of the European Green Deal

- **Public Health**: relevant topics include air quality, pollen, UV, heat and cold stress, vector-borne diseases, water borne disease, COVID-19, preparedness for health-related emergency situation.

These topics are important as in 2022, ECMWF has been appointed by the European Commission to implement a pilot on the Copernicus Health Hub (CHH), through CAMS and the Copernicus Energy Hub (CEH), through C3S. In consequences these two topics should be extended to the full range of Copernicus activities (cf. Background chapter).

Other priority segments include:

- **UN Sustainable Development Goals (SDGs)**: relevant SDGs include SDG2, SDG3, SDG6, SDG7, SDG9, SDG11, SDG13, SDG14, SDG15 and possibly also SDG12, SDG17
- **UN Paris Agreement**: Support in achieving the Paris Agreement targets based on the CAMS CO_2 Monitoring and Verification Service, currently in pre-operational phase.

Between M1-M4, the Contractor shall deliver brief and focused scoping reports for each of these segments with:

- Relevant background information and key facts on the main societal and economic characteristics of the respective segments including details on key stakeholders, networks and information sources of relevance to needs for data products as delivered by CAMS and C3S.
- Description of relevant EU & UN policies and strategies that impact/matter to them, in coordination with the KCEO (JRC) and their Deep Dive assessments.
- An indication of specific challenges with respect to climate and/or environmental aspects requiring climate and atmosphere monitoring data as delivered by CAMS and C3S.

Tenderers shall propose an approach for the elaboration of these scoping reports.

Note that other scoping studies shall be requested upon specific request by ECMWF after M12. Segments which could be of relevance include:

- **Cultural and Natural Heritage**
- **Public assets (incl. Infrastructure) management, finance and insurance**
- **Water management, including floods and droughts**
- **Agriculture and food security**

Developing a strategy on the user value proposition

Based on the initial scoping studies for the four above mentioned priority segments as provided by M4, the Contractor shall develop a strategy on the value proposition, to be delivered by M6. An initial approach shall already be proposed as part of the tender response.

The strategies shall be updated and fine-tuned on an annual basis, in line with updates on the 'What' and changing needs from existing and new 'Core Users'. Tenderers shall propose a mechanism to enable this.

For each of the segments, a strategic user engagement outline on the value proposition of CAMS and C3S shall be established by the Contractor, including synergies between CAMS and C3S and also contribute to the development of the Copernicus Thematic Hubs (CTHs) hold by CAMS and C3S namely Copernicus Health Hub and Copernicus Energy Hub. In the frame of the CTHs a wider synergy across all Copernicus components will be foreseen.

Keeping in mind an overarching B2G approach, the Contractor is expected to focus on ways to reach a selection of three of the most important User Personas for each of the identified segments. The language and contextual messaging shall be adapted to the characteristics of each User Persona.

The most relevant aspects under the 'What' shall be assessed on their added value for the identified user personas selected for each segment. Data value chains shall be mapped, and user journeys assessed, as part of the strategy. Following the societal impact study of ERA5 reanalysis products (Lot 3), the development of a strategy on user engagement value proposition is a priority as well.

The core part of the strategy shall be concrete proposals on value proposition and linked user outreach material tailored to the needs of each specific segment and targeted promotion actions.

Concrete proposal on ways to reach the specific user communities shall be specified as part of the strategy, based on both the current as well as the medium-term (3 years) potential and a linked gap analysis

Proposed material could include infographics and other visuals, user stories and testimonials, audio-visual content as well as other material to inspire new users.

For each segment, a detailed value proposition document shall be delivered within the allocated timelines. Upon review by ECMWF, it will be proposed to the Contractor of Lot 2. The actual design and supporting visuals as well as the implementation shall be the responsibility of the Contractor under Lot 2. Throughout this process, a close interaction between Contractors of Lot 1 and 2 is required.

Strategies for other segments shall be requested as well after M12.

List of minimum deliverables and milestones required as part of Lot1 WP1:

WP1 Deliverables			
Deliverable #	**Nature**	**Title**	**Due**
D154.Lot1.1.1.1	Report and associated products	Proposal presentation of general profile of each User Persona	M2
D154.Lot1.1.2.1	Report and associated products	Proposal for call for expression of interest user testimonials	M2
D154.Lot1.1.2.2	Report	Report on information collection on user testimonials	M9 and semesterly thereafter
D154.Lot1.1.3.1	Report	Scoping segment report: Energy	M4
D154.Lot1.1.3.2	Report	Scoping segment report: Public Health	M4
D154.Lot1.1.3.3	Report	Scoping segment report: Sustainable Development Goals (SDGs)	M4
D154.Lot1.1.3.4	Report	Scoping segment report: UN Paris Agreement	M4
D154.Lot1.1.3.5	Report	Scoping segment reports: additional segments TBC	M16; TBC
D154.Lot1.1.4.1	Report	Strategy and gap analysis on value proposition: Energy	M6
D154.Lot1.1.4.2	Report	Strategy and gap analysis on value proposition: Public Health	M6
D154.Lot1.1.4.3	Report	Strategy and gap analysis on value proposition: Sustainable Development Goals (SDGs)	M6
D154.Lot1.1.4.4	Report	Preliminary strategy on value proposition: UN Paris Agreement	M6
D154.Lot1.1.4.5	Report	Strategies for additional segments and fine-tuning of strategy and gap analysis for priority segments	M18; M30
D154.Lot1.1.5.1	Other	Overview and assessment of implementation plan	M9; M21; M33

WP1 Milestones			
Milestone #	Title	Means of verification	Due
M154.Lot1.1.1.1	Initial brainstorming meeting	Minutes of meeting	M1
M154.Lot1.1.2.1	Completion of the induction phase "Understanding the What"	Technical note or email exchange	M2
M154.Lot1.1.3.1	Launch of open call for collection of information and user testimonials of CAMS and C3S users	Technical note or email exchange	M3
M154.Lot1.1.4.1	Selection of three key User Personas for each segment	Technical note	M5

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

3.1.3   Work Package 2 (WP2): Conceptional content development for user outreach material

In order to raise awareness and promote the use of or services, user outreach material shall be developed based on the user value proposition strategy and collected information for the priority segments.

While the actual design and development of this material shall be taken care by the Contractor of Lot 2, the concept and outline of the content shall be development by the Contractor of Lot 1 under WP2.

User Stories

User stories are a type of stories provided in an interactive manner using digital tools, hence called 'digital storytelling'. These user stories are web-based and are built on a platform with a strong engaging digital experience. They are scroll-based and include moving images, sounds and scientific graphs/maps with the possibility of embedding them dynamically.

Digital storytelling is a powerful tool as it brings narratives to life. A user story takes the reader on a journey from a problem stating to a solution based on the CAMS and C3S offering. By using these type of stories, potential users feel more connected to the service offering because they get a deeper understanding of how specific data support concrete user needs.

Concepts for user stories shall be developed in scope of the following three needs:

1. The development of a selection of user stories that will be outlined for the different segments and in line with the prioritisation as indicated under WP1. The aim is that for each segment, one overarching user story is developed, complemented by 2 or 3 specific user stories.
2. The development of a selection of user stories built on testimonials from existing users within the different communities. These user testimonials shall be gathered through WP1 via open calls and discussions with ECMWF staff as well as information collected via the Framework Partnership Agreement on Copernicus User Uptake (FPCUP) as implemented by DLR.
3. The co-development of user stories together with Core Users with whom ECMWF established partnerships. Some examples include national authorities contributing to the CAMS and C3S National Collaboration programmes, the European Environmental Agency (EEA) through the partnership on Climate-ADAPT, the European Investment Bank (EIB) and the European Network of Transmission System Operators (ENTSO-E). The proposed topics will be discussed at the start of the contract and will be updated at an annual level.

The aim is to propose conceptional content for a minimum of 18 user stories, to be developed between M4 and M32 for the Lot 2 Contractor to design and implement in parallel. A balance throughout the implementation time shall be guaranteed between topics and data products as covered by CAMS and C3S

Stories shall be developed based on concrete and mature user uptake cases and plans for development (e.g. CO_2 MVS). Tenderers shall propose a process to facilitate this in their tender. For stories co-developed with Core Users, agreed topics and timelines by ECMWF shall be respected.

For each story, the Contractor will propose an outline taking into account the above-mentioned elements and additionally including elements for each single story such as:

- The 'Why' from the perspective of the user(s).
- the 'Who' with a characterisation of the proposed user(s).
- The 'What' with details on the specific data products and services as used by the user(s).
- The key messages on the user value proposition.
- Indication of post-processing of the data needed to turn data and information into solutions.
- An explanation on the user journey, including challenges and bottlenecks.
- Sources to be explored (scientific literature, news articles, reports, …).
- Proposals for options of visual material to be included: existing maps/graphs, proposals for new maps/graphs, etc. (to be discussed with Lot2).
- Proposals for options on strong and clear user testimonials.

Example existing stories are the following:

- https://stories.ecmwf.int/urban-heat-islands-and-heat-mortality/index.html
- https://stories.ecmwf.int/insurance-impacts-of-european-windstorms/index.html

The proposed ideas for user stories shall be presented in batches to the Contractor of Lot 2 who will be responsible for the actual design, editing, videos and interviews and implementation. The Contractor under Lot 1 shall closely interact with the Contractor of Lot 2 during the implementation and will take care of the content related quality assurance throughout the full period of the contract (M0-M36).

Infographics

The infographics (informative graphics) should use strong visual elements and simple supporting text to highlight key information and ideas in an attractive and easy to understand way for the user communities. In the frame of this ITT, it is expecting that the infographics will be oriented on the main area of expertise (see priority segments) but also on major programmes like the CAMS and C3S National Collaboration Programmes.

These infographics should be available for plug-in into PPT slides and a minimum of 10 are expected. The proposed ideas for infographics shall be presented to the contractor of Lot 2 who will be responsible for the actual design, editing and implementation. The Contractor under Lot 1 shall closely interact with the Contractor of Lot 2 during the implementation and will take care of the content related quality assurance throughout the full period of the contract (M4-M36).

Educational user engagement videos

Educational user engagement videos should be a tool that will facilitate the understanding of the usefulness of Copernicus data by the different user persona up to the general public and its applications. The video shouldn't be longer than few minutes and should keep the attention of the viewer high. The first two videos should present the path that is followed from the acquisition of the data by a satellite to the use by scientist of the data to the end users. The first video will be focus on Health (by M8) and the second one on Energy (by M9) in link to the CTHs.

A minimum of 3 more videos will be expected and the specific topics for these videos will be defined later following the strategy used to promote the user uptake.

The proposed ideas for educational user engagement videos shall be presented to the Contractor of Lot 2 who will be responsible for the actual design, editing and building of the videos. The Contractor under Lot 1 shall closely interact with the Contractor of Lot 2 during the implementation and will take care of the further content fine-tuning throughout the full period of the contract (M5-M36), together with ECMWF which overlooks the overall quality assurance.

Other novel user outreach material as proposed by the Lot 2 Contractor

Based on novel ideas as raised under Lot 2, the Lot 1 Contractor may be requested to develop new content. This will be defined at a later stage and accordingly to the strategy developed. The content should cover a minimum of five more subjects.

The Contractor under Lot 1 shall closely interact with the Contractor of Lot 2 during the implementation and will take care of the content related quality assurance throughout the full period of the contract (M4-M36).

List of minimum deliverables and milestones required as part of Lot 1 WP2:

WP2 Deliverables			
Deliverable #	Nature	Title	Due
D154.Lot1.2.1.1	Concepts for content User stories	Draft Conceptional content for 18 User stories	4 by M9 8 by M21 6 by M33
D154.Lot1.2.1.2	Concepts for content User stories	Final Conceptional content for 18 User stories	4 by M12 8 by M24 6 by M36
D154.Lot1.2.2.1	Concepts for content Infographics	Draft Content for 10 infographics (3 per year + 1 on ERA5 at the end of Lot3	1 by M5 on ERA5 2 by M9 5 by M21 2 by M33
D154.Lot1.2.2.2	Concepts for content Infographics	Final Content for 10 infographics (3 per year + 1 on ERA5 at the end of Lot3	1 by M6 on ERA5 2 by M12 5 by M24 2 by M36
D154.Lot1.2.3.1	Content and concept story line Video	Draft Content for 5 Educational user engagement videos	Health by M7 Energy by M8 Other TBD between M12-M30
D154.Lot1.2.3.2	Content and concept story line Video	Final Content for 5 Educational user engagement videos	Health by M8 Energy by M9 Other TBD between M12-M30
D154.Lot1.2.4.1	Report and associated products	Draft Content for 5 other novel user outreach material	Between M4-M32
D154.Lot1.2.4.2	Report and associated products	Final Content for 5 other novel user outreach material	Between M4-M34

WP2 Milestones			
Milestone #	Title	Means of verification	Due
M154.Lot1.2.1.1-MX	Coordination meeting between all partners from Lot1 and Lot2	Minutes of meeting	monthly

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

3.1.4 Work Package 3 (WP3): Coordination with Lot 2 and 3 and ECMWF, review and quality control process

For the segment material, the analysis as outcome of Lot 1 will provide the list of items to develop for each segment. While the Contractor of Lot 1 will be responsible for providing the concept, the outline of all material and the quality assurance on the content, the Contractor for Lot 2 will design the material, manage the implementation process and guarantee the quality control of the lay-out and visual aspects and maintain a repository for all developed material. In that frame, Tenderers are expected to propose an implementation, review and quality control process. This should aim to have the most appropriate material corresponding to the different topics.

Tenderers should also propose a way to coordinate its activities with the Contractors of Lot 2 and Lot 3. The Contractor may participate to brainstorming sessions with Lot 2, Lot 3 and ECMWF to contribute on the initial conceptional aspects that will be developed further.

List of minimum deliverables and milestones required as part of Lot1 WP3:

WP3 Deliverables			
Deliverable #	**Nature**	**Title**	**Due**
D154.Lot1.3.1.1	Other	Review and quality control Protocol	M2
D154.Lot1.3.2.1	Report	Review and quality control for each produced material	Quarterly M2 – M36

WP3 Milestones			
Milestone #	**Title**	**Means of verification**	**Due**
M154.Lot1.3.1.1	Review and quality control protocol update	Technical note	Yearly M12 - M36

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

3.2 Lot 2: Design, implementation and maintenance of value proposition material

Lot 2 focuses on the actual design, development and implementation of proposed value proposition material for ECMWF to be used for user outreach purposes. The outcomes are user stories, infographics, videos, other outreach material based on content developments and designs on user personas, as a result from Lot 1 WP2, as well as a small number of novel user outreach material as proposed to be developed under Lot 2.

In addition, Lot 2 shall develop and/or maintain a repository with all the created outreach material, including overviews of collected user testimonials (cf. Lot 1 WP1).

The Contractor will be required to follow the brand guidance given by the ECMWF Communication team to ensure that material is in line with the obligations to the European Commission and expectations of ECMWF. Other requirements will depend on the material produced and may relate to accessibility, format and templates, for example.

3.2.1 Work Package 0 (WP0): Management and Coordination

The following management aspects shall be briefly described in the proposal:

- Meetings (classified as tasks and listed in a separate table as part of the proposal):
  - Kick-off meeting
  - ECMWF will organise monthly progress review meetings (by videoconference).
  - ECMWF organises annual C3S and CAMS General Assemblies. The successful Tenderer is expected to attend these meetings and contribute to discussions related to the topic of this ITT.
  - Bidders can propose additional project internal meetings, as they deem needed, as part of their response.
- Quality assurance and control: the quality of reports and Deliverables shall be equivalent to the standard of peer-reviewed publications. The timely delivery as well as final quality check of the deliverables shall be ensured by the prime contractor (in terms of content, use of ECMWF reporting templates for deliverables and reports (Microsoft Word), format, deliverable numbering and naming, typos…); all reports in this project shall be in English. Unless otherwise specified the specific contract Deliverables shall be made available to ECMWF in electronic format.
- Communication management (incl. external and internal communication).
  - It shall be noted that any communication activity must be agreed with the ECMWF Copernicus Communication team in advance. This includes, but not exhaustively, communication planning, branding and visual style, media outreach, website and social media activity, externally facing written and graphic content and events. Agreed activity would also need to be evaluated and reported on once complete so that success measures and KPIs could be provided to the European Commission. (cf. Clause 2.4.6 of the Framework Agreement)
- Set of Key Performance Indicators (KPIs) suitable for monitor contract performance. The proposed KPIs shall be SMART (specific, measurable, actionable, realistic and time bound). Contractor shall report to ECMWF on these KPIs as part of the Quarterly and Annual Implementation Reports. The proposed set of KPIs is expected to be updated upon review with ECMWF at M12 of the contract.
- Implementation of checks, controls and risk management tools for both the prime contractor and subcontractors.
- Resources planning and tracking using the appropriate tools.
- Subcontractor management, including conflict resolution, e.g. the prime contractor is responsible for settling disagreements, although advice/approval from ECMWF may be sought on the subject.
- A list of subcontractors describing their contribution and key personnel shall be provided, as well as back-up names for all key positions in the contract. Tenderers shall describe how the Framework Agreement, in particular Clause 2.9 on Sub-Contracting has been flowed down to all their subcontractors.
- Management of personal data and how this meets the requirements of Clause 2.8 and Annex 6 of the Framework Agreement.

List of minimum deliverables and milestones required as part of WP0, covering the contractual and financial reporting obligations towards ECMWF in line with the Terms and Conditions of the Framework Agreement:

WP0 Deliverables			
Deliverable #	**Nature**	**Title**	**Due**
D154.Lot2.0.1.1-YYYY.QQ	Report	**Quarterly Implementation** Report QQ YYYY (QQ YYYY being the previous quarter)	On 15/04, 15/07 and 15/10
D154.Lot2.0.1.2-YYYY	Report	**Annual Implementation Report Part 1** YYYY (YYYY being the Year n-1) This includes: 1) Quarterly implementation Report for the previous quarter Q4 YYYY 2) Preliminary financial form YYYY	Annually on 15/01

		(YYYY being the Year n-1)	
D154.Lot2.0.1.3-YYYY	Report	**Annual Implementation Report Part 2** YYYY (YYYY being the Year n-1)	Annually on 28/02
D154.Lot2.0.1.4	Report	**Final report**	60 days after end of contract
D154.Lot2.0.2.1-YYYY	Report	**Annual Implementation Plan** YYYY (YYYY being the Year n+1)	Annually on 30/09
D154.Lot2.0.3.1-YYYY	Other	Copy of prime contractor's general financial statements and audit report YYYY (YYYY being the Year n-1)	Annually (no-cost associated)

WP0 Milestones			
Milestone #	**Title**	**Means of verification**	**Due**
M154.Lot2.0.1.1-MX	Progress review meetings with ECMWF	Minutes of meeting	Monthly
M154.Lot2.0.1.2	Kick-off Meeting	Minutes of meeting	M1
M154.Lot2.0.2.1	Update of KPIs after review with ECMWF	Technical Note	M12

Additional deliverables and milestones can be added depending on the needs of the contract.

3.2.2 Work Package 1 (WP1): Retrieval and creation of visual material illustrating data products and services.

When creating visual material dedicated to a targeted audience, it is important to understand the need and the level of knowledge of this audience. At the start of Copernicus 2.0, six groups of User Personas were identified relevant for our services, referred to as the 'Who' (see appendix for more details):

- Specialist contractor: creates added value for a set of clients (end-users)
- Researcher: mainly interested in environmental knowledge creation
- Discerning user: community users who fully appreciate the added value of C3S/CAMS and focus on strategic aspects rather than on the data as such
- Big data specialist: no knowledge of climate/atmosphere science but very data savvy
- Grab & Go user: need facts/information to create policy relevant indicators and applications for the Media, policy users and civil society
- Citizen: taxpayers who need ready-made, easy to understand information

In order to have a better overview of the material proposed to the different groups, the Contractor of the Lot 2 shall propose to develop some icons for each user persona. The Contractor will also provide a MS Powerpoint deck of slides that will present the six different user personas (1 slide per user persona) with references to example uses of CAMS and C3S data and services.

In the same way than for the user persona, it is expected for the Contractor of Lot 2 to propose icons for other aspects as requested by ECMWF. This will be discussed during the different brainstorming meetings with Lot 1, Lot 3 and ECMWF.

The scientific visuals as part of the user stories and as part of the segment material shall be retrieved within this contract based on available datasets and/or applications from both the Climate and Atmosphere Data Store (CADS). A wealth of data is available in these sources. Data on the CADS is either downloadable as NetCDF files or it can even be processed in the Toolbox without any need for downloading.

The Contractor shall primarily consult contractors of Lot 1 and 3 and, if needed, the scientific colleagues at ECMWF for retrieving/developing visual material or can opt to develop visual material themselves. Either way, we expect independency from the Contractor in exploring existing material on C3S and CAMS website, gathering relevant screenshots from CADS datasets and applications, the CAMS Weather Room, C3S monthly bulletins and ESOTC reports, and visual data as produced by users (e.g. Windy) and media outlets (e.g. CNN, EuroNews, etc.) and gathering scientific input from product user guides and other documentation.

Background information and credentials on the retrieved and created visual material shall be carefully recorded and quality checked in coordination with ECMWF.

Tenderers should demonstrate expertise in the development of visual material, including data handling and data visualization. In addition to standard graphs and maps, it is possible to create geodynamic content using the ArcGIS account that is owned by ECMWF.

The Contractor shall develop a set of consistent icons covering the different user persona but also the different topics/segments.

List of minimum deliverables and milestones required as part of Lot2 WP1:

WP1 Deliverables		
Deliverable #	Title	Due
D154.Lot2.1.1.1	Presentation of the set of icons identified for user persona and different segments/topics.	M2
D154.Lot2.1.1.1	Slide deck on the six user personas	M3
D154.Lot2.1.1.2	Update on the new icons developed.	M8
D154.Lot2.1.2.1	Visual presentation of material retrieved from CADS or newly developed	Quarterly as of M2

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

3.2.3   Work Package 2 (WP2): Design and development of user outreach material

The outlines of the stories and other material come with a smart-looking design that is specific to the requested needs. This design is made in agreement with the communication lead for CAMS and C3S Services.

For each of the proposed types of user outreach material as indicated below, the Contractor shall propose three options for ECMWF to choose from. Up to two rounds of refinements may need to be accounted for on the selected option.

User stories

The software used for the storytelling is called Shorthand (https://shorthand.com/). ECMWF owns a license for Shorthand and will ensure continuation of the license during the contract period including service and support.

Example user stories developed by ECMWF in Shorthand can be found here: https://stories.ecmwf.int/user-stories/index.html. We expect the bidder to follow a Shorthand full training and to keep learning about newly developed features, either via blog announcements or via the Technical Officer.

The Contractor shall establish a uniform approach and lay-out to develop Copernicus user stories and segment material that is aligned with the Copernicus brand guidance and implement this approach accordingly. A minimum of 18 user stories (on average 6 per year and a balance between CAMS and C3S topics and data products) must be developed according to user needs and approved outlines of the stories

as outcome of the Lot 1. At least one of the 18 user stories should focus on the topic as covered in Lot 3 as a priority during the first two months of the contract.

User testimonial

A crucial element to be delivered under the contract are user testimonials, either in the format of a quote, a short video recording (online or on-site) or an audio recording. Input is collected via Lot 1 WP1, Lot 3 or other means. The testimonial itself shall be done in an attractive and easy-to-digest manner to keep the attention of the audience. Recordings can be made in the mother tongue of the user if this is preferred by the user. In that case, subtitles shall be included.

The Contractor shall develop user testimonial based material that can be used as stand-alone elements but in parallel can be embedded in more elaborated videos and corresponding user story, following the proposal for a person/organization to contact from Lot 1. A minimum of 36 user testimonials shall be developed, of which a minimum of 12 based must be on-site recordings, which shall include additional video shootings of relevant local visuals. Amongst others, national uptake events, policy workshops and thematic meetings in scope of the Copernicus Health and Energy Hubs can be used to optimise reach amongst users and stakeholders and to limit carbon footprints for traveling.

Consent for ECMWF to use the testimonials must also be attained by the Contractor and be made accessible in the database.

Infographics

The development of the infographics should follow the same approach and layout as the user stories. The infographic should be developed in a way it can be used in MS Powerpoint to give an easy access for use and reuse and be adapted to any situation for outreach and new updates on evolving information. A protected pdf should also be provided, as well as a vector form which allows for easy modifications (e.g. on numbers and dates) by ECMWF staff as well as further extensions, in line with the evolution of CAMS and C3S. .

The Contractor is expected to provide at least 10 infographics that should be developed accordingly to user needs and following the outline provided by under Lot 1 and also at least one of them focused on the topic covered in Lot 3 as a priority during the first two months of the contract.

Educational videos

The Contractor is expected to provide at least 5 educational videos following a story frame provided by the Contractor of Lot 1 and guidance by ECMWF.

The videos should be attractive, informative and on easy understanding for the aimed user communities. The type of video will be discussed during a brainstorming with the Contractor of Lot 1, also ideas on the format from the Contractor are welcomed. The production design, including style, mood and visuals, shall be sufficiently compatible with existing CAMS and C3S videos. The successful Tenderer will get access to existing videos library at the start of the contract.

Other novel user outreach material

Tenderers are expected to use their creativity and propose new ways of engaging users and is expected to make some suggestions in their tender.

This novel material should cover at least 5 topics to be proposed before M30. The Contractor should provide its input to the Contractor of Lot 1 and the choice of topics for this new material should be agreed with the Contractor of Lot 1 and ECMWF. Each of the agreed material shall be developed and implemented before the end of the contract (M36).

List of minimum deliverables and milestones required as part of Lot2 WP2:

WP2 Deliverables			
Deliverable #	**Nature**	**Title**	**Due** *(Indicative, depending on Lot 1 and Lot 2 exact contract start date)*
D154.Lot2.2.1.1	Other	User story template and material wide frame	M3
D154.Lot2.2.1.2	User stories (Shorthand)	The draft versions of the 18 user stories including the visuals and captions with the visuals, all in 1 Word Document for 1 specific story, available in the database	6 by M9 6 by M21 6 by M33
D154.Lot2.2.2.1	Infographics	Draft versions of the 10 infographics	1 by M5 on ERA5 3 by M9 3 by M21 3 by M33
D154.Lot2.2.3.1	Video	Draft versions of the 5 educational user engagement videos	Health by M7 Energy by M8 Other TBD between M12-M30
D154.Lot2.2.4.1	Other	Draft versions of the 5 other novel outreach material	Between M4-M32
D154.Lot2.2.1.3	User stories (Shorthand)	18 User stories	6 by M12 6 by M24 6 by M36
D154.Lot2.2.2.2	Infographics	10 infographics	1 by M6 on ERA5 3 by M12 3 by M24 3 by M36
D154.Lot2.2.3.2	Video	5 Educational user engagement videos	Health by M8 Energy by M9 Other TBD between M12-M30
D154.Lot2.2.4.2	Other	5 other novel user outreach material	Between M4-M34
D154.Lot2.2.5.1	Other	Edition of Selection of relevant parts of User Testimonials (for the creation of user stories)	Quarterly

WP2 Milestones			
Milestone #	**Title**	**Means of verification**	**Due** *(Indicative depending on Lot 1 and Lot 2 exact contract start date)*
M154.Lot2.2.1.1	The implemented draft user stories into Shorthand	available as links in the database	6 by M10 6 by M22 6 by M34
M154.Lot2.2.2.1	Collection of User testimonials according to the number of stories approved in Lot 1	Link to the video/audio in full or edited	Quarterly

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

3.2.4   Work Package 3 (WP3): Maintenance of database

The knowledge base should list the final products (stories, infographics, testimonials, videos etc.) per type, geographical region, sector, user persona and potential communication purpose. Each product is

accompanied by all raw material like images, GIS files etc that are necessary to come to the final product. The categorisation is done in a manner that is easy for the ECMWF teams to look up the information when needed. This database is accessible for ECMWF Copernicus Communication and to be updated by ECMWF Copernicus User Engagement and other colleagues.

The Contractor shall use the existing knowledge base being set up in a previous contract and being hosted by ECMWF, which is a digital asset management tool called Filecamp (https://filecamp.com/).

Any personal data as included in this database, user stories or user testimonials shall comply with GDPR and ECMWF's Personal Data Protection rules.

The following minimum deliverables will be required as part of Lot 2 WP3:

WP3 Deliverables		
Deliverable #	Title	Due
D154.Lot2.3.1.1	Maintenance and updates of the database	Quarterly throughout the contract

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

3.2.5 Work Package 4 (WP4) Coordination with the other Lots and ECMWF, review and quality control process

For the segment material, the analysis as result of Lot 1 will provide the list of items to develop for each segment. While the Contractor of Lot 1 will be responsible for providing the concept, the outline of all material and the quality assurance on the content, the Contractor for Lot 2 will design the material, manage the implementation process and guarantee the quality control of the lay-out and visual aspects and maintain a repository for all developed material. In that respect, it is expected from the Contractor to propose an initial version of an implementation, review and quality control process for further discussion with ECMWF at the kick-of phase of the contract with the Contractor of Lot 2. Tenderers should also propose a way to coordinate its activities with the Lot 1. It is expected that the Lot 2 starts its activities 2 months after Lot 1 as the input from Lot 1, and to a certain extend also Lot 3, will be required. The Contractor will participate to brainstorming sessions with Lot 1, Lot3 and ECMWF to contribute on the initial conceptional aspects that will be developed further.

The following minimum deliverables and milestones will be required as part of Lot 2 WP4:

WP4 Deliverables			
Deliverable #	Nature	Title	Due
D154.Lot2.4.1.1	Other	Review and quality control Protocol	M2
D154.Lot2.4.2.1	Report	Review and quality control for each produced material	Quarterly M2 – M36

WP4 Milestones			
Milestone #	Title	Means of verification	Due
M154.Lot2.4.1.1	Review and quality control protocol update	Technical note	Yearly M12 – M36

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

3.3   Lot 3: Assessment of the societal value of ERA5 reanalysis products

The written report of the Lot 3 socio-economic benefits study will constitute a significant component of the mid-term review of C3S in the second phase of Copernicus (COP2), 2021-2027. The mid-term review will be conducted mid-2024 by the European Commission and will be based on inputs as prepared by ECMWF .

The benefits study will analyse the socio-economic benefits in the European Union of ERA5 products on selected societal areas and activities. Similarly, but with less detail, the study will also indicate the value of ERA5 in North America, Asia and other parts of the world where reliable information on ERA5 usage and its benefits can be obtained. Purely in terms of the number of users, China is dominating the global reach of ERA5.

In addition, we ask the successful Tenderer to look ahead to the future and provide their qualitative assessment of the potential additional benefit that could be derived from a sixth-generation reanalysis at ECMWF (called ERA6 for the purpose of this study). The vital likely innovations of such a sixth-generation reanalysis will be provided by C3S to the study team at an early stage of the study.

The ERA5 has impact throughout the EU Member States and beyond, in several ways:

1. The role of reanalyses in climate monitoring applications is now widely recognized. ECMWF reanalysis is the basis for monthly C3S climate bulletins for surface air temperature, sea ice and hydrological variables (https://climate.copernicus.eu/monthly-maps-and-charts). In addition, ERA5 is used regularly, together with other datasets, as input for the World Meteorological Organization's annual assessment of the State of the Climate presented at the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC). ERA5 provides the data for the annual report on the European State of the Climate[4] to EU. ERA5 has been widely referenced in the Sixth Assessment Report (2021[5]).

2. ERA5 is also a resource for the production of Essential Climate Variables (ECVs) (especially those that are difficult to measure directly at a global level) and Climate Indicators recommended by the Global Climate Observing System (GCOS). By optimally combining observations and models, reanalyses provide consistent 'maps without gaps' of ECVs and a coherent representation of the main Earth system cycles (e.g., water and energy). ERA5 has replaced ERA-Interim for these purposes.

3. Reanalysis is also widely used by diverse communities for research and commercial purposes. ERA5 data have been downloaded by approximately 110,000 users worldwide, which jointly downloaded about 700 Tbyte per week. ERA5 is and has been used for a wide range of scientific research ranging from the improved understanding of particular meteorological phenomena, climate studies on extreme weather and low-frequency variability and as driver of tracer models or ocean models. An impression of the breath of studies can be assessed by a Google scholar search for the Hersbach et al. (2020) paper which currently has been referenced by over 8,000 scientific studies.

4. Reanalysis is also widely used for the operational weather forecasting activities at ECMWF, and at the national weather services of the ECMWF Member States, and elsewhere. At ECMWF, reanalysis data are used as a reference to evaluate trends in the skill of the operational weather forecast.

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[4] https://climate.copernicus.eu/ESOTC/2022

[5] IPCC: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, edited by Masson-Delmotte, V., Zhai, P., Pirani, A., Connors, S. L., Péan, C., Berger, S., Caud, N., Chen, Y., Goldfarb, L., Gomis, M. I., Huang, M., Leitzell, K., Lonnoy, E., Matthews, J. B. R., Maycock, T. K., Waterfield, T., Yelekçi, O., Yu, R., and Zhou, B.,   Cambridge University Press, in press, 2021, https://report.ipcc.ch/ar6/wg1/IPCC_AR6_WGI_FullReport.pdf

Reanalysis also provides the initial conditions for re-forecasts. These are in turn used to produce the climatologies needed for probabilistic forecast products, such as the Extreme Forecast Index (a key forecasting tool for high-impact weather events), and for widely used forecast scores, such as the anomaly correlation coefficient. Re-forecasts are also used to statistically calibrate ensemble forecasts in the extended and seasonal forecast ranges.

5. Recently it has been demonstrated that ERA5 is particularly useful in machine learning as it provides comprehensive datasets with global coverage and high temporal resolution. This allows machine learning models to be trained on a wide range of atmospheric and earth system variables and to capture the complex interrelationships between them. There is a significant number of commercial and non-commercial entities who focus on applying machine learning models. Examples of how machine learning models trained on ERA5 exist cover weather forecasting, water management, energy[6] and agricultural sectors[7].

The study shall assess the benefits and impacts resulting from commercial, policy and research use of ERA5. The benefits shall be monetized where possible and assessed in terms of widely used, non-monetary indicators in other areas e.g., scientific publication impact factors, or user counts. Multiplier effects shall be analysed and indirect benefits to end users as generated through combined use with other data and information evaluated as part of a mapping of the EO data value chain.

The study report will provide an outline of the methodology used, a description of assumptions made, and a detailed breakdown of monetized and non-monetized benefits in each of the societal categories. This will be done for a judiciously selected few, and at least four EU Member Countries with adequate geographical representation and variety in GDP levels, as well as for a selection of typical public, academic and commercial service providers. The results shall be aggregated for all of Europe [8] as well as other parts of the world where this is possible, especially for those areas of importance to EU External Actions of relevance The approach is to be developed in agreement between ECMWF and the selected Tenderer .

The socio-economic impact study will be commissioned from an experienced company with the required expertise that has conducted similar economic valuation studies helping to identify the economic benefit attributable to science-based developments in Europe, complemented by experts in the climate data services domain. A previous specific focus on climate and weather-based sectors would be advantageous.

The socio-economic benefit to be assessed is the incremental increased benefit realised from the use of ERA5 climate reanalyses to businesses, government agencies, researchers and other users within the European Union and beyond. All relevant societal areas will be considered, as schematically illustrated in Table 1. The benefit will be monetized primarily for the most relevant sectors, and where sufficient data exist. Where benefits cannot be fully monetized, they shall also be described in detail and/or quantified in alternative ways. Benefits shall be adequately illustrated with figures, infographics, user testimonials and other informative material. On this latter, collaboration with Lot 1 and 2 shall be established under the coordination with ECMWF.

	Commercial activity	Government and policy	Research
Energy	High	High	Medium

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[6] Energy https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/we.2718

[7] https://www.mdpi.com/2072-4292/13/6/1224

[8] For Lot 3, all references to Europe include (separately and aggregated) EU27, Iceland and Norway as well as candidate and potential candidate EU countries, the United Kingdom and Switzerland.

Health	High	Medium	Medium
Water	Medium	Low	Low
Agriculture	Medium	High	Low
Machine learning /Artificial Intelligence	High	High	High
Others TBD	TBD	TBD	TBD

Table 1: Relevance to each societal sector of ERA5 reanalyses. Shown for illustration purposes only

The monetised value should be assessed for the selected European Member countries, and for at least one major commercial actor in each sector. Interviews with representatives from these organisations shall be conducted. The results for Europe will be obtained by careful scaling. Monetized value for other parts of the world should be indicated schematically with less detail.

The realisation of ERA5 value has occurred gradually over time since the data set was first released in 2018. The study will therefore assess the value of ERA5 realised in the 5-year period from July 2018 to June 2023. Initially ERA-Interim and ERA5 co-existed, while users gradually upgraded to ERA5 – it may not be possible to precisely delineate and separate their respective use during the transition, and this will not be expected.

The monetary value will be expressed in Euros as both nominal and real values, accounting for inflation with December 2023 as indicative reference.

The scope of the study includes:

- Identification of the weather and climate sensitive businesses and areas that are most relevant to this study such as energy, finance, transport, health, construction, environmental protection, protection of life and property, etc.
- Identification of the stakeholders who are impacted directly or indirectly by the ERA5 data and benefit from its availability, including public finance, environment, other economic sectors, demand for public services, end users, etc. Data value chains shall be mapped to illustrate impact of end-users and indirect benefits. For each such identified stakeholder, the successful Tenderer shall report on the drivers that created high uptake in that sector and were key to realising value of ERA5.
- quantification of the impact for each category and elaboration of a strategy to monetize the impacts, including existence of reference values, contingent survey, economic data, in terms of revenues and avoided (external) costs.
- determination of the amount of negative or positive surplus variation for each category
- assessment of policy impact for the European Union and its External Action as well as globally as evidenced most clearly in the IPCC AR6 WG1 report where ERA5 is mentioned over 240 times, and where the C3S is presented as an exemplar of climate services.
- data aggregation across the European Union (and beyond), and through the years that ERA5 has been available to users (July 2018 to June 2023).
- monetised societal benefits compared with investment costs as a way to compare value for money.

- identification and description of non-monetised societal benefits, including illustrations through user testimonials, infographics and other visual material as developed in collaboration with Lot 1 and 2.
- Identification and description of eventual differences between estimated actual benefits and potential benefits generated through further advancements on increased user uptake and market development.

Requirements regarding the conduct of the study include:

- Bidders must propose the methodology they would like to apply for the study based on their knowledge and experience with work of a similar nature. Examples of how the proposed approach was applied in previous projects must be provided. The methodology proposed must ensure that the final delivery is fit for purpose and remains within project cost and schedule. (cf. also section 3.3.1 on Work package 0 on management and implementation)
- Meetings either over the phone or in person will take place every two weeks to follow up on progress, to discuss and resolve issue that may emerge. (cf. also section 3.3.1 on Work package 0 on management and implementation)

Information products shall be transparent and fully traceable, by:

- making available a complete documentation of all input data records with full traceability to data source and data set versions.
- as much as possible, making use of input data that could be made available to readers and are free of any restrictions;
- The final outcome of the study includes two reports, an extensive report which includes recommendations for ECMWF on further investment choices and a brief glossy e-report to be shared with stakeholders and users for promotion and user outreach purposes.

The work shall be structured by the following minimum set of Work Packages, as outlined in the following.

3.3.1   Work Package 0 (WP0): Management and Coordination

This Work Package includes overall responsibility for management and implementation of the study. In addition, the Proposer shall include coordination on a technical level with ECMWF reanalysis scientists and management. This coordination will be overseen by the technical officers in charge of the contract at the ECMWF side.

Furthermore, similarly to Lot 1 and Lot 2, the following management aspects shall be briefly described in the proposal:

- Meetings (classified as tasks and listed in a separate table as part of the proposal):
  - ECMWF will organise monthly progress review meetings (by videoconference).
  - Kick-off meeting
  - Bidders can propose additional project internal meetings, as they deem needed, as part of their response.
- Quality assurance and control: the quality of reports and Deliverables shall be equivalent to the standard of peer-reviewed publications. The timely delivery as well as final quality check of the deliverables should be ensured by the prime contractor (in terms of content, use of ECMWF reporting templates for deliverables and reports (Microsoft Word), format, deliverable numbering and naming, typos…); all reports in this project shall be in English. Unless otherwise specified the specific contract Deliverables shall be made available to ECMWF in electronic format.
- Communication management (incl. external and internal communication).
  - It shall be noted that any communication activity must be agreed with the ECMWF Copernicus Communication team in advance. This includes, but not exhaustively,

communication planning, branding and visual style, media outreach, website and social media activity, externally facing written and graphic content and events. Agreed activity would also need to be evaluated and reported on once complete so that success measures and KPIs could be provided to the European Commission. (cf. Clause 2.4.6 of the Framework Agreement)

- Set of Key Performance Indicators (KPIs) suitable for monitor contract performance. The proposed KPIs shall be SMART (specific, measurable, actionable, realistic and time bound).
- Implementation of checks, controls and risk management tools for both the prime contractor and subcontractors.
- Resources planning and tracking using the appropriate tools.
- Subcontractor management, including conflict resolution, e.g. the prime contractor is responsible for settling disagreements, although advice/approval from ECMWF may be sought on the subject.
- A list of subcontractors describing their contribution and key personnel shall be provided, as well as back-up names for all key positions in the contract. Tenderers shall describe how the Agreement, in particular Clause 2.9 on Sub-contracting has been flowed down to all their subcontractors.
- Management of personal data and how this meets the requirements of Clause 2.8 on Personal Data Protection and Annex 6 of the Agreement.

The following minimum deliverables and milestones shall be provided as part of Lot 3 WP0:

WP0 Deliverables		
Deliverable #	**Title**	**Due**
D154.Lot3.0.1.1	Implementation Plan	M1

WP0 Milestones			
Milestone #	**Title**	**Means of verification**	**Due**
M154.Lot3.0.1.1-MX	Progress review meetings with ECMWF	Minutes of meeting	Bi-weekly
M154.Lot3.0.1.2	Kick-off Meeting	Minutes of meeting	M1

Additional deliverables may be proposed and will be discussed during contract negotiation phase.

3.3.2 Work Package 1 (WP1): Societal value assessment

This Work Package includes information gathering, value assessment and reporting of the results. The information gathering will include a literature study on the use and impact of climate reanalyses (whether produced by ECMWF or elsewhere), and on the use and suitability of various impact measures (monetary and non-monetary). It will also include interviews with representative and significant users of ERA5 in the most important sectors. The value assessment should address the commercial, the academic (research) and policy impacts, and be scaled to encompass Europe. Value assessment will be extended to other parts of the world and in particular areas of importance to EU's External Actions of relevance, where this is possible and where sufficient data on ERA5 usage and impacts are available.

The study report will be comprehensive, and fully describe the methodology, the data used, the bases and justification for scaling, and the results of the study.

The study report will contain attractive illustrative graphics, visual material and user stories based on collected testimonials, or similar, that help express and illustrate the non-monetary value of ERA5 as well as data value chains, presenting how different identified end users are reached. Close collaboration with Lot 1 and 2, under the leadership of ECMWF, shall be established in support.

Vice-versa, this study shall serve as a baseline for user outreach material as developed by Lot 1 and Lot 2. Correspondence and exchange with ECMWF, Lot1 and Lot2 will be required.

The following minimum deliverables and milestones will be required as part of Lot 3 WP1:

WP1 Deliverables		
Deliverable #	**Title**	**Due**
D154.Lot3.1.1.1	Draft Study Report *(including inputs from Lot 1 and 2)*	M3
D154.Lot3.1.1.2	Final Full Study Report *(including methodology, study findings and recommendations)*	M5
D154.Lot3.1.1.3	Final visually appealing e-report *(including summary of key facts and figures)*	M5

WP1 Milestones			
Milestone #	**Title**	**Means of verification**	**Due**
M154.Lot3.1.1.1	Detailed outline of methodology and implementation plan, including selected countries and users	Technical Note	M1
M154.Lot3.1.1.2	Refined methodology and implementation plan (upon completion of initial interviews with relevant stakeholders)	Technical Note	M2
M154.Lot3.0.1.2	Teleconference with ECMWF, Lot1 and Lot 2 contractor(s) to discuss the use of study results in a promotion environment	Minutes of meeting	M5

Additional deliverables and milestones may be proposed and will be discussed during contract negotiation phase.

4   Tender Format and Content

General guidelines for the tender are described in Volume IIIB. This section describes specific requirements to prepare the proposal for this particular tender, along with guidelines for minimum content expected to be included in the proposal, additional to the content described in the general guidelines of Volume IIIB. This is not an exhaustive description and additional information may be necessary depending on the Tenderers' response.

4.1   Page Limits

As a guideline, it is expected that individual sections of the Tenderers' response do not exceed the page limits listed below. These are advisory limits and should be followed wherever possible, to avoid excessive or wordy responses.

Section	*Page Limit*
Executive Summary	2
Track Record	2 (for general) and 2 (per entity)
Quality of Resources to be Deployed	2 (excluding Table 1 in Volume IIIB and CVs with a maximum length of 2 pages each)
Technical Solution Proposed	20 (Table 2 in Volume IIIB, the section on references, publications, patents and any pre-existing IPR is excluded from the page limit and has no page limit)
Management and Implementation	6 (excluding Table 4 and Table 5 in Volume IIIB) + 2 per each work package

	description (Table 3 in Volume IIIB)
Pricing Table	No limitation

Table 2: Page limits

4.2   Specific additional instructions for the Tenderer's response

The following is a guide to the minimum content expected to be included in each section, additional to the content described in the general guidelines of Volume IIIB. This is not an exhaustive description and additional information may be necessary depending on the Tenderer's response.

4.2.1   Executive Summary

Tenderers shall provide an executive summary of the proposal, describing the objectives, team and service level.

4.2.2   Track Record

Tenderers shall demonstrate for itself and for any proposed subcontractors that they have experience with relevant projects in the public or private sector at national or international level. ECMWF may ask for evidence of performance in the form of certificates issued or countersigned by the competent authority.

For this tender, Tenderers are expected to demonstrate in their proposal a profound knowledge and deep understanding of strategy design for user outreach and scientific writing for Lot 1, visual material design and development for Lot 2, and impact studies for Lot 3, in the context of Copernicus User Engagement and Outreach, and in line with the specific requirement described in Section 3.

4.2.3   Quality of Resources to be Deployed

Tenderers shall propose a team providing the skills required for providing services that meet the technical requirements. The team shall include a Service Manager with at least five years of experience in management of large-scale projects. Tenderers shall describe the experience of the Service Manager and the technical project team in performing activities related to the various aspects of this tender.

In particular, proposed personnel for this tender are expected to demonstrate profound experience and expertise in strategy design for user outreach and scientific writing for Lot 1, visual material design and development for Lot 2, and impact studies for Lot 3, in the context of Copernicus User Engagement and Outreach, and in line with the specific requirement described in Section 3.

4.2.4   Technical Solution Proposed

Tenderers shall give a short background to the proposed solution to demonstrate understanding of that solution. This section shall also include information on any other third-party suppliers that are used as part of the technical solution, and a statement of compliance for each requirement formulated throughout this document, describing how the proposed solution maps to the requirements.

4.2.5   Management and Implementation

Tenderers shall provide a detailed implementation plan of proposed activities for the duration of the Framework Agreement. Deliverables should be consistent with the technical requirements specified in Section 3. The number of milestones is not restricted, but they should be designed as markers of demonstrable progress in service development and/or quality of service delivery. Adjustments to the proposed implementation plan can be made on an annual basis depending on needs for service evolution, changed user requirements, or other requirements as agreed between the European Commission and ECMWF.

Tenderers shall consider the elements described under Section 3.1.1, Section 3.2.1 and Section 3.3.1 on project management requirements for each Lot of this ITT.

5   Appendices

5.1   Description of the User persona

6 different groups have been defined as user persona: Specialist contractors, Discerning users, 'Grab and go' users, Researchers, Data specialist and Citizens. The first three are our main priorities.

Specialist contractors: They should create some added value for a set of clients (end-users). The downstream users able to translate our data and services into solutions for end users.

- Typical jobs: SMEs, large companies, research institutes with a commercial business model, …

- *Gain creators*: CDS/ADS = 'one-stop' shop, open and free data, operational service, etc.

- *Pain relievers*: APIs, fast amount of data, tools and workflows, training, community creation, etc.

They are essential actors in the data value chain, need for specific marketing plan, assessment of user requirements and collaborations with market uptake initiatives (e.g. EUSPA) to foster uptake. They are served directly and one of our priority users, they will need the webpage to get inspiration and an overview of what is existing, their first need will be in the use cases.

Discerning users: It is the community of users who fully appreciate the added value of Copernicus and the Thematic Hubs compared to other programmes.

- Typical jobs: programme managers and high-level officials at NWHSs, UNFCCC, WMO/WHO, EEA, national environmental agencies, …

- *Gain creators*: access to an operational service, high quality/trusted data, generic indicators, monitoring and information reports, etc.

- *Pain relievers*: funding, EQC, documentation, etc.

They are 'Brother in arms'… no need for specific marketing plan but close collaborations, advisory boards, personal interactions, etc. They are served directly and priority user, they will need indicator and maps that are ready to use, they will need documentation and reports.

'Grab and go' users: They need policy relevant indicators and applications for the Media, Policy Users and Civil Society. They are the users who need easy access to facts and information.

- Typical jobs: Environment and climate policy specialists and consultants, media agencies and journalists, non-governmental organisations and influencers and citizen driven platforms seeking for climate and environmental data to inform society and fund specific actions to protect non-commercial interests in the domain of environmental protection and climate.

- *Gain creators*: trusted source of information and reports, digested data, user stories and visualisations, media content

- *Pain relievers*: jargon-free content, easy access

They are served directly or indirectly and they are our priority user for the thematic hubs. They will need maps and indicator to have easy access, they will need use cases to refer to the application, they will need report and documentation.