

ECMWF Copernicus Procurement

Invitation to Tender



Copernicus Atmosphere Monitoring Service

Co-design of GHG policy services in
support of EU Member States and
Copernicus Participating countries

Volume II

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1 Introduction

Copernicus is the European Union's flagship Earth-observation programme, created to achieve operational monitoring of the atmosphere, oceans, and continental surfaces. It aims to provide reliable, validated data and information services for a range of environmental and security applications. The [Copernicus Atmosphere Monitoring Service](https://atmosphere.copernicus.eu/) (CAMS)¹ provides consistent and quality-controlled data and information related to air pollution and health, solar energy, greenhouse gases, and climate forcing.

The European Centre for Medium-Range Weather Forecasts (ECMWF), as the Entrusted Entity for CAMS, invites tenders for the co-design of greenhouse gas (GHG) policy services in support of EU Member States and Copernicus Participating countries.

CAMS is designed around a cloud-based data store, the [Atmosphere Data Store](https://ads.atmosphere.copernicus.eu/#!/home)² (ADS) that provides users with a single point of access to quality-assured data on atmospheric composition. All data are open and free and can be used by anyone for any purpose. In addition, CAMS provides access to several of its data sets with dedicated tools to visualize the data as well as Python-based data access tools.

The CAMS Evaluation and Quality Control (EQC) framework performs independent assessments on most of the datasets and applications by applying basic quality criteria in a quality assurance step (assessing documentation, dataset completeness, etc) and performing in-depth quality assessments in the context of specific user questions.

2 Service Scope and Contract Summary

CAMS is implementing new data services to monitor anthropogenic and natural emissions and removals of greenhouse gases (GHG) in the atmosphere. These new services will support the relevant policy users at European, national, and local scales. Some of these new services are already implemented, such as the monitoring of local methane emissions³ and the global inversion-optimised greenhouse gas fluxes and concentrations⁴, but others are still being ramped up based on preparatory work in various Horizon Europe research projects, such as the monitoring of local CO₂ emissions⁵ and the global monitoring of greenhouse gas fluxes and emissions based on the CAMS global forecasting system. To ensure these new data products will be fit-for-purpose, continuous interactions with the various user communities is critical.

This ITT targets the interaction with national inventory agencies and related institutes that are responsible for national monitoring of GHG emissions and the reporting to the UNFCCC⁶. The successful Tenderer shall carry out the following activities, which are described in more detail in Section 3.2 below:

¹ <https://atmosphere.copernicus.eu/>

² <https://ads.atmosphere.copernicus.eu/#!/home>

³ <https://apps.atmosphere.copernicus.eu/methane-explorer/>

⁴ <https://ads.atmosphere.copernicus.eu/datasets/cams-global-greenhouse-gas-inversion?tab=overview>

⁵ <https://atmosphere.copernicus.eu/cams253c-development-and-provision-observation-based-hot-spot-emissions-ch4-no2-and-co2-existing>

⁶ <https://unfccc.int/>

- Detailed familiarisation of the successful Tenderer with the latest status of current and emerging operational CAMS products and the use of satellite Earth Observations (EO) for GHG emissions monitoring.
- Facilitate collaboration between European national inventory agencies and CAMS.
- Collect, document and analyse user requirements at national level for EU member states and Copernicus participating countries.
- Provide recommendations for the development of policy-relevant tools, including data visualisation, at national level.

The Tender shall ideally bring together a group of entities from the **science community**, representatives from some **national inventory agencies**, and entities with expertise in **scientific data communication**.

3 Technical Specifications

3.1 Background

The concept for an anthropogenic CO₂ and CH₄ emissions Monitoring and Verification Support (CO2MVS) capacity, as part of the CAMS portfolio, is based on the recommendations from the European Commission's CO₂ Monitoring Task Force⁷. As shown in Figure 1, it comprises an integrated system approach capable of inferring emissions from observations (space and in-situ), prior information (such as bottom-up emission estimates from inventories and reporting) and modelling, as well as data assimilation capabilities.

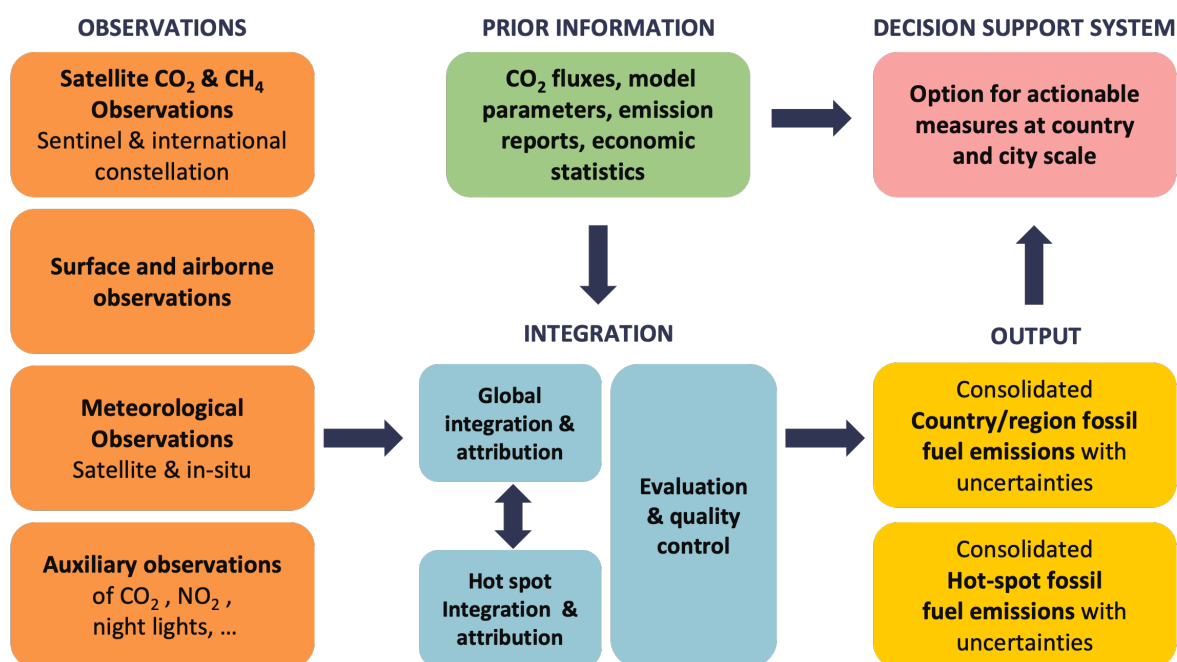


Figure 1 Main building blocks of the functional architecture of a future CO₂ and CH₄ human emissions monitoring system

⁷ The reports from the CO₂ Task Force can be found on <https://www.copernicus.eu/en/news/news/new-co2-green-report-2019-published>

The top four priorities for the new CO₂ and CH₄ service element during phase 2 of CAMS (2021 – 2027) are:

- Transform the various related research activities into a mature pre-operational (and then operational) system that can deliver the required monitoring and verification support capacity.
- Support the European Commission and EU member states with the global stocktake in 2028 using Earth Observation data and state-of-the-art modelling capabilities, to provide accurate and globally consistent estimates of emissions, their uncertainties and their trends.
- Support the European Commission and EU member states with the implementation of the EU Methane Strategy and the EU regulation on reducing methane emissions in the energy sector, as well as the Global Methane Pledge, through a capability for detecting and monitoring global super-emitters.
- Contribute to international coordination frameworks related to the monitoring of greenhouse gas concentrations and fluxes, such as the Global Greenhouse Gas Watch (G3W) of the World Meteorological Organisation (WMO) and the International Methane Emissions Observatory (IMEO) of the United Nations Environment Programme (UNEP).

As recommended in the second CO₂ report from the CO₂ Monitoring Task Force, the CO2MVS capacity will deliver the following high-level products as defined by user requirements:

1. Detection of emitting hot spots such as megacities or power plants,
2. Monitoring of the hot spot emissions to assess emission reductions activities,
3. Assessing emission changes against local reduction targets to monitor impacts of the Nationally Determined Contributions (NDCs),
4. Assessing the national emissions and changes in 5-year time steps to estimate the global stocktake.

The CO2MVS services will, provide additional evidence on the amount of anthropogenic CO₂ and CH₄ emissions reported by national statistical offices and, in particular, help identify and assess the uncertainties and gaps associated with their emission inventories. More generally, the CO2MVS will provide the European Union with a comprehensive and consistent picture on the actual level of emissions and their reductions by all countries worldwide. The new service element is targeted for full operational status in 2028 using observations from the planned CO2M satellite constellation and other satellite sensors.

3.2 Areas of Work

While the ramping-up of CO2MVS services is still taking place, it is important to interact with some of the main user communities to ensure the new products will be fit-for-purpose. Feedback is required not only for the data products, but also for how these data products can be presented to the users and could be transformed into user-friendly applications. This ITT is targeting the user community of national inventory agencies and associated institutes in Europe, who are responsible for the national monitoring of greenhouse gas emissions and the resulting reporting to the UNFCCC.

The activity requested in this ITT shall address the following topics:

Detailed familiarisation of the successful Tenderer with the latest status of current and emerging operational CAMS products and the use of satellite Earth Observations (EO) for GHG emissions monitoring. It is important that the successful Tenderer has a very good understanding of the new CAMS services to ensure effective interactions with the national inventory agencies. The successful

Tenderer shall therefore familiarise themselves with the current and emerging operational CAMS products related to emission monitoring and how satellite observations are used in combination with atmospheric models of various complexities. For this purpose, the successful Tenderer shall interact with ECMWF and relevant CAMS contractors to obtain a good scientific and technical understanding of the products, which is required to effectively interact with prospective users.

Facilitate collaboration between European national inventory agencies and CAMS. The successful Tenderer shall, in coordination with ECMWF, set up mechanisms to interact with national inventory agencies. These interactions are meant to:

- Explain the CAMS products and their potential to prospective national inventory users;
- Gather feedback from the national inventory agencies on existing CAMS services;
- Document current practices, workflows, and data already used by national inventory agencies and identify gaps that can be supported by CAMS;
- Facilitate discussions between agencies from different countries to support European collaboration.

In-person or hybrid meetings shall be used, where possible, to facilitate these interactions, supported by clear documentation and policy briefs. Some countries have expressed the wish to engage with other countries on the topic of observation-based emission monitoring. The meetings as part of this ITT shall therefore facilitate such interactions after consultation with the relevant countries. The costing of the meetings, including covering the cost of travel for inventory agency delegates, shall be part of the Tenderer's proposal.

Collect, document and analyse user requirements at national level for EU member states and Copernicus participating countries. The outcomes of the user interactions shall be comprehensively documented with a clear list of user requirements, an assessment of fitness-for-purpose of the CAMS products, a gap analysis that takes into account the potential as well as the limitations of the CAMS data products, and main areas of further development. The latter shall take into account outcomes from relevant Horizon Europe and ESA research projects (see also below). The report shall take into account the differences between European countries in terms of their emission monitoring practices and shall ensure requirements are documented for countries that are already very active with regards to observation-based national emission monitoring and countries that are less active.

Provide recommendations for development of policy-relevant tools, including data visualisation, at national level. The user interactions shall also address the presentation of CAMS data to national inventory agencies. The successful Tenderer shall provide comprehensive guidelines for policy tools and (interactive) visualisations, with a specific focus on **how to communicate the uncertainties** of the CAMS products.

The interaction with national inventory agencies is not starting from scratch. In various Horizon 2020 and Horizon Europe research projects, such as Verify⁸, CoCO2⁹, Avengers¹⁰, Paris¹¹, EYE-CLIMA¹², EUFOR-G3W¹³, and others, engagement with agencies from various countries has taken place, which helped guiding initial developments. The successful Tenderer shall take stock of the outcomes from

⁸ <https://verify.lsce.ipsl.fr/>

⁹ <https://coco2-project.eu/>

¹⁰ <https://avengers-project.eu/>

¹¹ <https://horizoneurope-paris.eu/>

¹² <https://eyeclima.eu/>

¹³ This project will start in February 2027.

these discussions that are documented through the various public deliverables from these projects. A prime example is the Blueprint for Decision Support¹⁴ from the CoCO2 project.

3.3 Deliverables

While the design of the work package structure is left to the discretion of the Tenderer, it shall include the following deliverables as a minimum:

- Documentation of relevant (pre-)operational CAMS data services related to emission monitoring targeting the national inventory user community. The documentation shall consist of PowerPoint¹⁵ presentations and user-friendly descriptions in Word¹⁵;
- A set of hybrid meetings to interact with national inventory agencies from across Europe ensuring a reasonable mix of advanced and less advanced countries in terms of using observational data to support emission monitoring;
- User requirements document based on the discussions with national inventory agencies;
- Recommendations for the presentation of data to the policy sector at national level.

4 General Requirements

4.1 Implementation Schedule

ECMWF intends to award a single Framework Agreement, which shall be implemented via a single Service Contract expected to commence in Quarter 1 2027 and end in Q4 2028. Tenderers shall provide a detailed implementation plan (including relevant Pert and Gantt charts) in the tender response. The proposed time plan and schedule shall address the main tasks, inputs, outputs, intermediate review steps, milestones, deliverables and dates.

4.2 Work Packages

The work proposed by the Tenderer should be organised in work packages aligned to the main objectives of the proposal. The design of the work package structure is left to the discretion of the Tenderer, with one notable exception: the work package on contract management, the content of which is prescribed by ECMWF, as described below.

4.2.1 Work Package (WP0): Management and Coordination

This work package includes overall responsibility for day-to-day service management and coordination. The effort allocated to contract management and coordination (WP0) is expected to be commensurate with the extent of the management and coordination requirements of the contract.

The following contract management aspects shall be considered and as needed briefly described in the proposal:

Meetings (classified as tasks and listed in a separate table as part of the proposal):

- Kick-off meeting (via teleconference)
- Quarterly progress review meetings (via teleconference) to discuss the service provision, evolution and other topics, prepare corresponding summary minutes of these meetings and maintain a list of agreed actions and their status.

¹⁴ <https://coco2-project.eu/node/408>

¹⁵ Or similar software

- ECMWF organises annual CAMS General Assemblies. The Successful Tenderer is expected to attend these meetings with maximum 2 team members and contribute to discussions related to the topic of this ITT.
- Tenderers can propose additional contract internal meetings (e.g. kick-off meeting, regular meetings to monitor contract performance) as part of their response. Most such meetings should be held by remote participation.

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 Successful Tenderer (in terms of content, use of ECMWF reporting templates for deliverables and reports (Microsoft Word), format, deliverable numbering and naming, spelling and typing errors, etc); all reports and documents shall be provided in English. Unless otherwise specified the specific contract Deliverables shall be made available to ECMWF in electronic editable format (e.g. Microsoft Word/Excel), via the relevant deliverable repository system.

Communication management (incl. external and internal communication). Any external communication activity must be agreed with the ECMWF Copernicus Communication team in advance. This includes, but not exhaustively cover, communication planning, branding and visual style, media outreach, website and social media activity, externally facing text and graphical content and events. Agreed activity would also need to be evaluated and reported on once complete, so that success measures and key performance indicators can be provided to the European Commission (cf. Clause 2.4.6 of the Framework Agreement).

Set of Key Performance Indicators (KPIs) suitable for monitoring contract and service performance. As part of the Tender, Tenderers shall specify a proposed set of KPIs appropriate for the service. The KPIs shall be designed to quantify various aspects of quality of service against the requirements described in this document. The proposed KPIs shall be SMART (specific, measurable, actionable, realistic and time bound).. The Successful Tenderer shall report to ECMWF on these KPIs during the progress review meetings, as well as part of the Quarterly and Annual Implementation Reports. The proposed set of KPIs may be requested to be updated regularly during contract implementation, upon review with ECMWF. The template to be used by the Tenderers to propose and describe the KPIs is included in Volume IIIB of the ITT “Template for Tenderers”.

Risk Management: The proposal shall include a risk register that describes identified risks for each work package, along with a mitigation strategy for each of the identified risks. This mitigation strategy must include both preventive and corrective measures. The risk register shall be updated regularly by the Successful Tenderer, and any update (related to new risks, or changes to likelihood or impact) must be reported during the progress review meeting, as well as part of the quarterly and annual implementation reports.

Resources planning and tracking using the appropriate tools.

Subcontractor management, including allocation of work and 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 backup names for all key positions in the contract. Tenderers shall describe how the Framework Agreement, and 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 WPO, covering the **contractual reporting and planning obligations** towards ECMWF in line with the Terms and Conditions of the Framework Agreement (cf. Clause 2.3 and Annex 5):

WPO Deliverables		
Deliverable #	Title	Due
D0.1.1-YYYY.QX	Quarterly Implementation Report QQ YYYY (QQ YYYY being the previous quarter)	Annually on 15/04, 15/07 and 15/10
D0.1.2-YYYY	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
D0.1.3-YYYY	Annual Implementation Report Part 2 YYYY (YYYY being the Year n-1)	Annually on 28/02
D0.1.4	Final implementation report	end of the contract
D0.2.1-YYYY	Annual Implementation Plan YYYY (YYYY being the Year n+1)	Annually on 30/09
D0.3.1-YYYY	Copy of prime contractor's general financial statements and audit report YYYY (YYYY being the Year n-1)	Annually (no-cost associated)

Table 1: WPO Deliverables

WPO Milestones			
Milestone #	Title	Means of verification	Due
M0.1.1	Kick-off meeting	Minutes of meeting	By M1
M0.1.2.QX	Progress review meetings with ECMWF	Minutes of meeting	Quarterly
M0.1.3.YYYY	Participation to the CAMS General Assembly	Technical note confirming attendance	Annually

Table 2: WPO Milestones

4.3 Deliverables and Milestones

Deliverables should be consistent with the technical requirements specified in this document. A deliverable is a substantial, tangible or intangible good or service produced in response to the specific objectives of the contract. Deliverables are subject to acceptance by ECMWF key personnel (i.e. Technical Officers, Contract Management Officers). All deliverables shall be duly quality controlled before submission to ECMWF (cf. quality assurance and control requirements under section 5.3 of this document).

Each Deliverable shall have an associated resource allocation in person-months and price. The total of these allocated resources shall amount to the requested budget associated with payroll.

Milestones should be designed as markers of demonstrable progress in service development and/or quality of service delivery, as applicable. They should not duplicate deliverables. No resources (effort in person-months) or price shall be allocated to milestones.

Tenderers shall complete the relevant table in Volume IIIA as part of their Tender, which includes the details of deliverables and milestones for all work packages and the schedules for each work package. Volume IIIA will be used by Tenderers to describe the complete list of deliverables, milestones, and schedules for each work package, including proposed due dates for each deliverable and milestone, which shall be realistic and achievable. The deliverables and milestones should be consistent with the technical requirements specified in Section 4 of this document. The submission/completion of the last

deliverables and/or milestones shall be scheduled **not later than 30 days before the expected contract end date**.

All deliverables and milestones shall be numbered as per the following format DX.Y.Z (for deliverables) and MX.Y.Z (for milestones), where X is the WP number, Y is the task number and Z is the deliverable or milestone number under this task. Deliverables delivered annually should be numbered DX.Y.Z-yyyy, where yyyy is the year the deliverable refers to (e.g. DX.Y.Z-2026). Deliverables delivered quarterly should be numbered DX.Y.Z-yyyyQx, where yyyyQx is the quarter of the year the deliverable refers to (e.g. DX.Y.Z-2026Q1, DX.Y.Z-2026Q2). The same numbering format shall be applied for the milestones. Continuous deliverables at higher frequency can be labelled in the same way as quarterly deliverables.

ECMWF will provide the templates for reporting and planning deliverables under WP0 (cf. section 5.3 of this document) at the beginning of the contract. Reporting documents should be short and factual, following the guidance which will be provided by ECMWF.

4.4 Data and IPR

It is a condition of EU funding for Copernicus that ownership of any datasets/software developed with Copernicus funding passes from the suppliers to the European Union via ECMWF. Ownership will pass from the date of creation of the datasets/software. Suppliers will be granted a non-exclusive license to use the datasets/software which they have provided to Copernicus for any purpose.

All software and products used by the Successful Tenderer to produce the Copernicus datasets/software will remain the property of the Successful Tenderer, except for those components which are acquired or created specifically for Copernicus purposes, with Copernicus funding, and which are separable and useable in isolation from the rest of the Successful Tenderer's production system. The identity and ownership of such exceptional components will be passed to the European Union annually. The Successful Tenderer will be granted a non-exclusive license to use them for any purpose.

4.5 Travel Costs

The travel costs shall be presented in accordance with the following provisions:

Travel costs should, in principle, be based on the [European Commission's calculator](#) [Table 3: Unit cost per distance band for air or combined air/rail travel, Commission Decision C(2024)5405], and consider a daily subsistence allowance not to exceed €300.

Travel costs must reflect **estimated actual costs and must not include any profit margin**.

If the proposed travel costs deviate from these reference values, the deviation shall be clearly indicated and duly justified.

The Tenderers are requested to provide a summary table as shown below as part of their bid.

Type of cost	Route/Destination	Estimated number of missions	Estimated unit price [€]
Travel/Subsistence			
Travel/Subsistence			

Travel Costs summary

ECMWF will reserve the right to re-claim any declared unspent or unaccounted budget for “Travel”, as it will be described in the Annex 2 Pricing Tables of the Framework Agreement.

4.6 Payment Plan

Tenderers can propose a Payment Plan in ITT Volume IIIA “Pricing and deliverables” (cf. Excel spreadsheet “Payment Plan preparation”):

- The Payment Milestones should relate to the deliverables and milestones delivered during the corresponding Payment Milestone period (e.g. the payment milestone covering the period January-June would only relate to the deliverables and milestones whose due dates fall within the same period).
- The frequency of Progress Review Meetings might be adapted to synchronise with the anticipated date of completion of each Payment Milestone.
- In case of request for a payment at contract signature, please note that this should be duly substantiated (e.g. in terms of necessary investment prior to implementation or during first weeks/months for ensuring the initial set up of the project). It is necessary to relate this payment to activities subject to other Payment Milestones.

4.7 Ad hoc Support

Whilst communications and user engagement, training and support activities are not part of the scope of this ITT, the Tenderer shall make provisions for possible requirements for technical and scientific expertise in ad hoc support of these activities. The Tenderer shall specify in the Tender the experts available to provide this support. If applicable, a small budget may be proposed to cover such resources.

5 Tender Format and Content

General guidelines for the Tender are described in Volume IIIB. Specific requirements to prepare the proposal for this particular tender are described in the next sub-sections.

5.1 Page Limits

As a guideline, it is expected that individual sections of the Tenderer’s 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.

<i>Section</i>	<i>Page Limit</i>
<i>Executive Summary</i>	2
<i>Track Record</i>	2 (for general) and 2 (per entity)
<i>Quality of resources to be Deployed</i>	2 (excluding Table 1 in Volume IIIB and CVs with a maximum length of 2 pages each)
<i>Technical Solution Proposed</i>	2 + 3 per Work package (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)
<i>Management and Implementation</i>	6 (excluding Table 4 and Table 5 in Volume IIIB) + 2 per each Work package description (Table 3 in Volume IIIB)
<i>Pricing Table</i>	No limitation

Table 3: Page limits

5.2 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.

5.2.1 Executive Summary

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

5.2.2 Track Record

The Tenderer 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.

5.2.3 Quality of Resources to be Deployed

The Tenderer shall propose a team that meets at least the following requirements:

- A senior team member (Prime Investigator) with more than 5 years of experience in managing activities related to this ITT;
- At least one additional senior team members with more than 5 years of experience on performing activities related to the various aspects of this ITT.
- The Successful Tenderer shall appoint a Service Manager, which will be its primary contact for contractual delivery and performance aspects.

These team members shall be involved in the activities of this ITT at a minimum level of 10% of their total working time.

5.2.4 Technical Solution Proposed

The Tenderer is expected to provide a short background to the proposed technical solution to demonstrate understanding of the solution proposed. This should include background of the Tenderer's understanding of the Copernicus Atmosphere Monitoring Service and the current state of building comprehensive and consistent data sets of emissions as well as of the greenhouse gas reporting requirements at national level.

An exhaustive and detailed description of the proposed technical solution for all work packages described above shall be given.

5.2.5 Management and Implementation Plan

As part of the general project management description the tenderer shall consider the following elements listed in section 4.2.1 above.