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Non-CO2 Forcers and their Climate, Weather, Air Quality and Health Impacts

FOCI

Deliverable 8.5

Report on user requirements for the health applications and energy sector

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Author(s)	Christian Schweizer (WHO), Leilani Dulguerov (WMO), Alexander Baklanov (WMO), Rosa von Borries (WMO), Diarmid Campbell-Lendrum (WHO)	
Other Contributor(s)	WP leaders and product/question focal points: Tomas Halenka (CU), Ranjeet Sokhi (UH), Marco Pandolfi (CSIC), David Grawe (UHAM), Sandro Finardi (ARIANET), Oriol Jorba (BSC), Johan Kuylenstierna (SEI), Tuukka Petaja (UHEL), Twan van Noije (KNMI), Paola Radice (ARIANET), Camillo Silibello (ARIANET), Chris Malley (SEI), Jenniffer Pedraza (SEI), Alberto Troccoli (WEMC), Risto Makkonen (FMI), Radovan Krejci (SU)	
Reviewer(s)	Marco Pandolfi (CSIC)	
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EXECUTIVE SUMMARY

This D8.5 interim report provides a transparent and systematic account of the current status of the project's stakeholder engagement efforts. Within the report, the progression of the initial engagement steps, the methodology employed, and the preliminary results from interactions with stakeholders are detailed.

Recognizing the value and importance of stakeholder feedback, the project has emphasized a stakeholder-centric approach from its inception. The methodology that has been implemented ensures comprehensive engagement with all relevant stakeholders. This report delves into:

- The initial framework developed to ensure that project external stakeholders as well as project work package leaders are not just consulted but are genuinely involved in the project's evolution.
- An account of the preliminary stakeholder engagement activities, illustrating the identified stakeholders, project products for consultations, specific questions, channels of communication, and level of engagement by stakeholders so far.
- The measures put in place to ensure that stakeholder feedback doesn't merely get collected but is also analyzed, understood, and utilized effectively.
- Future steps in expanding consultations to more stakeholders and iterative consultations.

As of the cutoff date for this report, 22 August 2023, a total of 37 stakeholders are in consultation. The feedback received is being made available to the respective relevant project internal focal points through the project’s SharePoint site. Feedback has been received for a total of 18 out of 21 products so far.

The feedback received is being provided to the project internal focal points for each product. The focal points then reflect on the feedback and explore opportunities to integrate it into the product development. Furthermore, the focal points are asked to provide a reply on how the feedback is being addressed which will then be shared with the stakeholders, and thereby creating a feedback loop.

As the project moves forward, the iterative process of stakeholder engagement is maintained. While this report outlines the activities and results thus far, it's essential to understand that the methods are adaptable. Based on the insights and experiences documented here, the approach can and will be adjusted to ensure maximum efficacy. Future stakeholder interactions will be shaped by the lessons learned during this initial phase.

By presenting a detailed account of the stakeholder engagement process up to this point, this interim report emphasizes the project's commitment to transparency, collaboration, and iterative improvement. As progress unfolds, the feedback and insights captured here will act as invaluable guides, ensuring the project continues to align closely with stakeholder expectations.

A summary of the totality of the feedback from stakeholders and how the project integrated it will be presented in a future update of this report.

1. INTRODUCTION

From the very outset, FOCI has recognized the paramount significance of stakeholder feedback, anchoring its foundation on a stakeholder-centric approach. This is not just a guiding philosophy, but a pragmatic strategy, as evidenced by the methodology that has been developed and applied for stakeholder engagement.

The essence of the project revolves around leveraging its outputs to support operational sector-oriented services, which span a diverse range from climate services, operational forecasts, to more specialized domains like health, energy, and urban services. To achieve this, the synergy within the network of project partners and international organizations is instrumental. It's through this network that stakeholder mapping is streamlined and their involvement used for shaping the project products and ultimately for verification of deliverables.

Structured stakeholder consultations are being conducted with the climate, agriculture, health and energy community to determine the critical gaps in information required in support of impact assessments and energy sector transition. Working closely with the operational ESM community through engagement of the modelling community and building on WMO operational groups and network of the World Meteorological Centres, WMO study groups and relevant WHO technical units. Engagement with the operational community will ensure the legacy of the results.

This report on user requirements for the health applications and energy sector is the result of outreach by international organizations in the communication, dissemination and user engagement, as well as connection with operational services to shape the project outputs that meet expressed requirements and promote the scientific project outputs with the network of operational centres that can benefit from the deliverables under all project WPs.

The following chapters describe the methodology that was developed to conduct the stakeholder consultation and highlight the key results obtained so far, ranging from stakeholder analysis to questionnaire development, outreach, feedback collection, data management, feedback sharing, and approaches to responding to feedback to close the feedback look with stakeholders.

2. PURPOSE OF THE REPORT

The primary objective of this report is to chronicle the processes and strategies behind the stakeholder engagement up to this point in the project's lifecycle. As an integral component of the project's development, understanding and documenting stakeholder interaction becomes paramount. This report serves multiple purposes:

- It acts as an official record of the engagement methods, detailing the chosen strategies and the outcomes they have produced.

- It offers team members, stakeholders, and other interested parties insight into the directions the project has taken in terms of stakeholder outreach.
- It provides a foundation upon which future stakeholder engagement activities can be built, refined, and improved upon.

Covering a wide array of topics related to stakeholder engagement, this interim report:

- Discusses at length the methods selected for stakeholder interaction, the reasoning behind their selection, and the outcomes they are anticipated to generate.
- Provides a detailed chronology of the outreach activities that have been executed up until now. This includes specifics regarding stakeholder identification, the mediums used for communication, the nature of feedback solicited, and the responses garnered.
- Outlines the system implemented for feedback assimilation. It delves into how feedback is sorted, prioritized, and subsequently integrated into the project's workflow.
- Gives an overview of the mechanisms and tools employed to continually monitor, track, and respond to the feedback received, ensuring stakeholder perspectives are always in the forefront.

Table 1. Main characteristics of the LIDAR stations where Level 2 data are available

3. METHODOLOGY

Task 8.5 of the project aims to address the use of project outputs in support of sector-oriented services (e.g climate services, operational forecasts, energy, health and urban services). The network of participating international organizations and NGOs will be widely used for the user mapping and deliverables verification. Structured stakeholder consultations will be conducted with the health and energy communities to determine the critical gaps in information required in support of health assessments and energy sector transition. Future scenario runs of air pollution will be shaped by the requirements of the environment and health stakeholders and will be used for the evaluation of health risks associated with the climate and air pollution. Engagement with the stakeholder community will ensure the legacy of the results. To achieve this, a method has been developed to allow for systematic identification and engagement of relevant stakeholders to ensure optimal alignment of the project outputs and products with stakeholder requirements. Figure 1 provides an overview of the various steps and activities of the stakeholder consultation and involvement in the FOCI project.

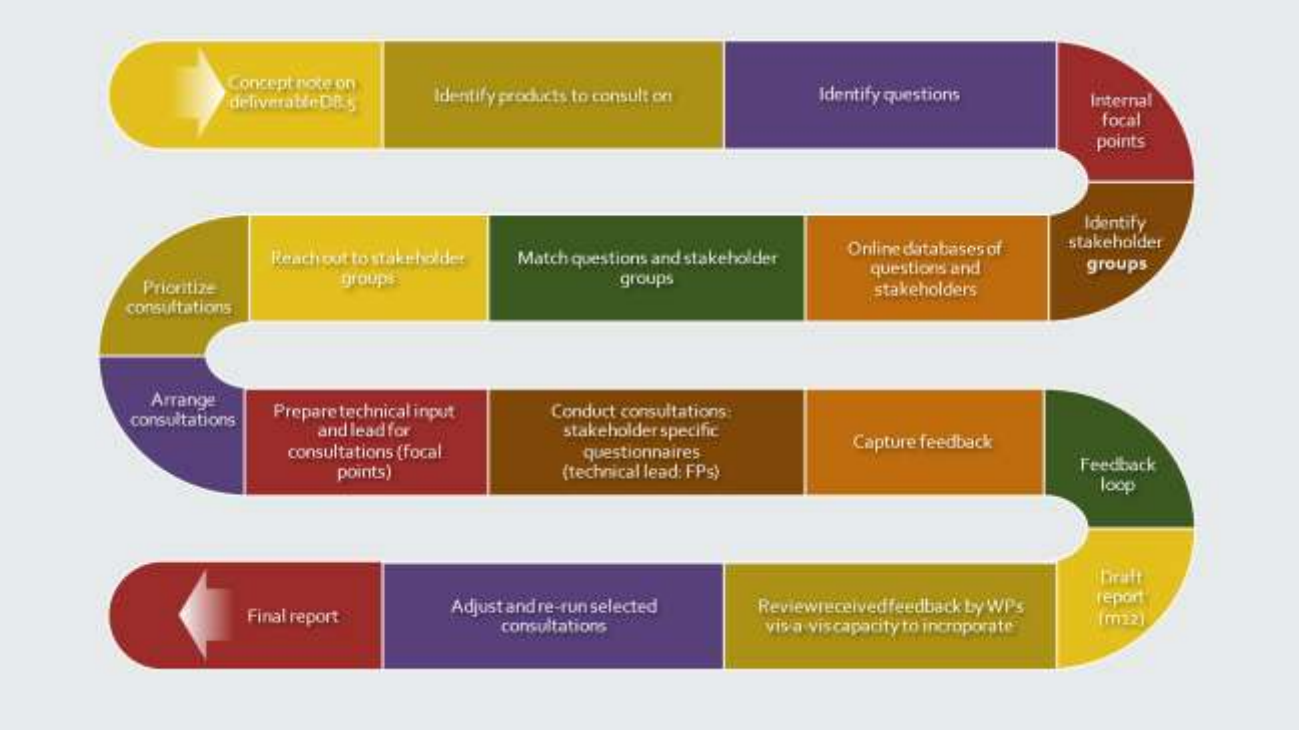

Figure 2. Overview of the process for stakeholder consultation in FOCI.

3.1 Preliminary setup and framework design

3.1.1 Concept & Methodology

Definition and finalization of a concept to act as a foundational guide, inclusive of the methodology for stakeholder consultation. This details the approaches, tools, and metrics for D8.5 development.

3.1.2 Survey Project WP Leaders

1. Engagement with WP leaders from all work packages to discern the necessary input from stakeholders. This alignment of stakeholder engagement with the project's overarching goals is critical. Key elements of the online survey included:

    - Product Content Inquiry: Determine what project outputs each WP will produce that are relevant for stakeholder consultation.
    - Product Requirements: Identify specific stakeholder requirements or expectations for each product.
    - Stakeholder Query Design: Develop questions to be asked to users/stakeholders.
    - Sector & User Group Identification: Recommend sectors and specific user groups for consultation.
    - Feedback Timeline: Set expected deadlines for receiving input.
    - Feedback Integration Opportunities: Explore how stakeholder feedback can be integrated into the project.
    - Assign internal focal points to ensure dedicated responsibility for each query.

3.1.3 Stakeholder Analysis

Analysis of the background, interests, importance, and influence of each stakeholder. This seeks to understand their potential impact on the project and shape engagement strategies.

3.1.4 Online Database Establishment

Creation of a centralized digital database for storing product details, stakeholder questions, and stakeholder information. This ensures organized and rapid access to vital project data.

3.1.5 Drafting the Questionnaire

Design the questionnaire based on insights from WP leaders and the project's scope, aiming to clarify stakeholder preferences, needs, and expectations.

3.1.6 D8.5 Report Outline

Drafting of initial outline for the final D8.5 report. This will provide a clear roadmap for information collation, making the eventual report compilation more systematic.

3.2 Stakeholder outreach & engagement

3.2.1 Mapping Stakeholder Landscape and matching to stakeholder queries

Identification and categorization of potential stakeholders. The key input to this mapping was the list of suggested stakeholders from the survey of the WP leaders and the focal points to be consulted in the identified questions. Additional reviews of project planning documents and individual interviews of WP leaders were also considered. This mapping will guide the outreach and consultation processes and include matching of questions to stakeholders. As a result, stakeholder-specific tailored questionnaires were developed including all questions but indicating the matched questions as of most relevance to them.

3.2.2 Prioritization

Prioritization of questions for consultation with stakeholders by the feedback timeline indicated by the focal points.

3.2.3 Question Refinement

Adjustments and clarifications to consultation questions via assigned focal points to guarantee clarity and relevance.

3.2.4 Stakeholder Outreach

Initiation of contact with each identified stakeholder through e-mails, phone calls and videoconferences. Established mutual understanding on the mode of consultation, focusing primarily on online questionnaires for efficient and broad outreach.

3.2.5 Virtual Consultation Planning

Organization of the project timeline by identifying periods where stakeholder feedback is critical. This ensured timely engagement, optimizing the project’s responsiveness.

3.2.6 Virtual Consultations

Engagement with stakeholders through the online questionnaire, gathering their insights, and understanding their requirements though the questions on relevant project products. This process continues throughout the project, following the earlier prioritization by urgency and relevance.

3.3 Feedback integration & review

3.3.1 Collating Feedback

Continuous collection of all responses to the questionnaires, organizing them in a way that's accessible and easy to analyze.

3.3.2 Feedback Integration Process

Provision of the received stakeholder feedback to the respective focal points for each product-question combination. Possibly organize sessions with focal points to discuss the stakeholder feedback. Focal points to formulate strategies on how the feedback will be integrated into the project. In case no adjustments are made, an explanation should be provided.

3.3.3 Feedback Evaluation Framework

Classification of feedback based on its relevance and urgency. This structured approach ensures the project addresses the most pressing feedbacks first.

3.3.4 Drafting D8.5 Report

Initial compilation of the D8.5 report, integrating the methods, products, consultation questions, and stakeholder feedback.

3.3.5 Internal Review

Re-assessment of stakeholder requirements, identifying gaps and determining if more consultation is required.

3.3.6 Further steps for refinement of user requirements

Individual dialogue with stakeholders to identify specific use cases for the products from FOCI. This would also allow for identifying stakeholders with a particular interest in FOCI to then collaborate on launching the FOCI products and promoting them after the project ends.

3.4 Continuous monitoring & improvement

3.4.1 Follow-up Meetings

Based on an initial review of the received feedback, organization of individual interactions with stakeholders to delve deeper into stakeholder requirements. This aids in fostering stronger relationships and understanding nuanced feedback.

3.4.2 Monitoring & Review

Review of how integrated feedback impacts the project through regular discussions with WP leaders and focal points.

3.4.3 Feedback Loop Closure

Assurance to stakeholders about how their feedback has been considered. Each focal point to draft a reply to the received feedback. This transparency enhances trust and reaffirms their importance to the project.

3.4.4 Data Protection & Confidentiality

Implementation of measures to protect stakeholder data, ensuring compliance with data protection laws and maintaining stakeholder trust.

3.4.5 Documentation & Repository

Maintenance of a log of stakeholder interactions and feedback, enhancing the project's traceability and accountability.

3.4.6 Feedback Analysis Tools

Leverage specialized software or tools that can analyze and categorize feedback. For this purpose, the project's SharePoint site is used for storage and managing the data using SharePoint lists, Word documents and a MS Access database.

3.4.7 Ongoing Dialogue

Ensuring a channel remains open for stakeholders to voice their insights, concerns, or feedback throughout the project.

3.5 Final steps & exploration

3.5.1 Finalizing D8.5 Report

Once all feedback has been considered and integrated, finalize and publish the D8.5 report, signifying the culmination of this stakeholder engagement phase.

3.5.2 Maximizing uptake and final dissemination meeting with stakeholders

Collaboration with prominent stakeholders to devise strategies that ensure widespread adoption and optimal utilization of project results. In collaboration with selected key stakeholders of FOCI project products, launch the project's main outputs. The selected key stakeholders would highlight specific products and their relevance and applicability in the stakeholders' roles and activities.

4. STAKEHOLDER ANALYSIS

Within research-driven environments, a thorough and meticulous understanding of stakeholders is paramount. A stakeholder analysis has been carried out on the identified stakeholders as relevant for the FOCI project in general and its products in particular. This chapter offers a high-level view of the key stakeholders that can influence or are influenced by the project. By acknowledging their roles and interests, this analysis ensures the foundation for rigorous engagement, informed methodologies, and optimized project outcomes.

Outlined below is the structured methodology that has been employed for the stakeholder analysis:

- **Identification:** The initial phase involves a comprehensive list of potential stakeholders. Using previously identified stakeholders in the development process of the project and a survey of project partners complemented by a short review of relevant online sources, a comprehensive list of entities was drawn up.
- **Categorization:** Following identification, stakeholders were initially systematically classified based on qualitative criteria related to their main sector and perspectives and scope of operation.
- **Assessment:** During the assessment phase, an examination of each stakeholder background, motivations, and expertise was carried out to identify potential interests in the project outcomes as well as their particular perspective on the project, i.e. their expertise as relevant for the various project products. At a later stage, additional assessments with methodologies such as SWOT (Strengths, Weaknesses, Opportunities, Threats) and PESTEL (Political, Economic, Social, Technological, Environmental, and Legal) analysis, could also be carried out to create a more thorough understanding of the stakeholders.
- **Engagement Strategy Design:** As part of the FOCI Communication, Dissemination and Exploitation Plan (CDE, D8.2), more detailed engagement plans could be drafted, ensuring interactions that are both substantive and effective. For the purpose of the stakeholder analysis, this step has not been carried out yet.
- **Continuous Review and Refinement:** Recognizing the fluid nature of stakeholder landscapes it is expected that iterative reviews need to be incorporated to expand on the stakeholders that are being consulted. As the project reaches key milestones or deliverables, stakeholder perceptions, interests, and influences would be revisited, ensuring that the analysis remains updated and responsive.

At a later stage of the project, the stakeholder analysis will be expanded to include an assessment by additional criteria to identify a short list of stakeholders that can be of interest for maximizing the dissemination and uptake of the project’s outcomes. Such criteria could include potential magnitude of impact, their strategic importance to the project's objectives and outreach. Such more detailed categorization facilitates the formulation of a more nuanced communication strategy, ensuring effective and targeted engagement for each stakeholder group (see FOCI Deliverable D8.2 Communication, Dissemination and Exploitation Plan).

Starting with the target audiences as listed in the GA (**Chyba! Nenalezen zdroj odkazů.**) and further elaborated in the Communication and Dissemination Strategy, a total of 58 stakeholders have been identified and analyzed. The list below provides an overview of the identified stakeholders as well as their expertise and possible interests in FOCI.

Some stakeholders might have interests in multiple categories or their interests may change over time. It's also essential to engage directly with these stakeholders to understand their specific interests and potential contributions to the FOCI project. This grouping helps to better understand the areas of expertise and focus of each stakeholder, aiding in targeted engagement and communication strategies for the FOCI project.

Table 1. Target groups as defined in the FOCI project proposal (Grant Agreement Annex B) with the expected outcomes of the project. This table is expected to be updated throughout the project.

TARGET GROUPS	OUTCOMES
Who will use or further up-take the results of the project? Who will benefit from the results of the project?	What change do you expect to see after successful dissemination and exploitation of project results to the target group(s)?
Sector specific users – energy, health, transport, agriculture. **Climate services** and weather forecasting agencies **City and regional** authorities **Policy makers** – national governments, policy orientated organisations (e.g. EEA, JRC). **Intergovernmental** frameworks e.g UNFCCC, LRTAP, UNEP, IPCC. **Scientific community** – scientists, conferences (e.g. EGU, AGU, Air Quality Conference) **User groups** – CCAC, C40 **General public** – information via social media and website **Engage with international collaborators** e.g. USEPA, NCAR, UIOWA, IIT Bombay, NARL, CUG, INM-RAS, IEA	**Uptake of a more precise and efficient mitigation options** and future emission scenarios to maximize the effects of the measures (e.g. by IEA, CCAC) for Europe, Africa, Latin America and S Asia (e.g. by ANGA in Africa, IIT Bombay and NARL for presentation to Ministry of Environment, Forests and Climate Change, India). **15 high quality journal articles** (measured with the relative rate of citation index) feeding into the IPCC process **New integrated data of observations and modelling** available to the science and stakeholder communities presented at five international conferences – EGU, AGU, Air Quality 2024. Outcomes of the project to feed into the **CCAC Assessment Reports.** **Key results to feed into the Climate Bulletin** of WMO and Newsletters of WHO. **15 Phd students** being trained with additional 50 through online training

The following Table 2 provides a high-level overview of the stakeholders identified so far and a brief analysis of their relevance for FOCI as well as their potential perspectives based on their expertise and roles and responsibilities (in no particular order).

Table 2. High-level summary of key interests and perspectives of identified stakeholders relevant to the FOCI project.

ID	Stakeholder	Potential interests in FOCI	Perspectives into FOCI
7	African Union Commission (AUC)	Impacts of non-CO2 forcers on African climate and development.	Pan-African policy and development insights, crucial for continent-wide strategies and recommendations.
73	AQ agencies for target cities (London, Paris, Prague, Hamburg, Milan), to be confirmed	Local air quality implications, strategies for urban GHG and aerosol particles mitigation.	Localized data and insight into urban atmospheric conditions, key for regional policy recommendations.
8	Arctic Monitoring and Assessment Programme (AMAP)	Insights into the influence of short-lived GHGs and aerosol particles on Arctic climate.	Deep understanding of Arctic climate changes and its global implications, could provide Arctic-specific data and expertise.
9	ARPA Lombardy (Regional Environmental Protection Agency), Air quality unit	Impact of non-CO2 forcers on regional air quality.	Expertise in air quality management and related policies, could offer regional insight and data.
10	C40 Cities Climate Leadership Group	Impact of non-CO2 forcers in urban environments.	Experience with urban climate solutions, could provide city-specific data and perspectives.
46	Central America Integration System (SICA)	Regional cooperation in Central America related to environmental and climate challenges.	Central American regional policy and cooperation insights, crucial for strategies in the region.
69	CJS2_152a User Intelligence team	Specific Understanding user perspectives and receptivity towards FOCI.	User behavior and preference analytics.
11	Climate and Clean Air Coalition (CCAC) Agriculture Hub	GHG emissions, mitigation, and adaptation strategies in agriculture.	Developing agricultural strategies that are sustainable and environmentally friendly based on FOCI findings.
76	Climate and Clean Air Coalition (CCAC) Fossil Fuel Hub	Impact of fossil fuels as a significant source of non-CO2 forcers.	Transitioning to cleaner fossil fuel alternatives and practices based on FOCI insights.

12	Climate and Clean Air Coalition (CCAC) National Planning Hub	How national planning affects short-lived GHGs.	Tailoring national strategies to reduce emissions based on FOCI findings.
13	Climate and Clean Air Coalition (CCAC) Waste Hub	Strategies for waste management in relation to GHG emissions.	Implement waste management practices that align with FOCI's findings to reduce emissions.
15	ClimateEurope 2 project	Regional climatic impacts of non-CO2 forcers.	Refine regional climate services based on the interplay of non-CO2 forcers and regional climates.
16	Coordinated Regional Climate Downscaling Experiment (CORDEX)	Regional climate projections and interactions with non-CO2 forcers.	Expertise in regional climate modeling and data, key for understanding regional impacts.
68	Copernicus Atmosphere Monitoring Service (CAMS)	The implications of non-CO2 radiative forcers on atmospheric composition and climate.	Expertise in atmospheric monitoring, could provide essential data and modeling capabilities.
80	ENEL	Energy production, consumption, and GHG implications.	Expertise in the energy sector, potential strategies for clean energy production and consumption.
19	Environmental Defense Fund (EDF)	Environmental implications of FOCI findings, advocacy, and policy recommendations.	Strong environmental advocacy and research expertise, potential partner for outreach and impact.
75	European Commission Directorate-General for Agriculture and Rural Development (DG AGRI)	Potential impacts of non-CO2 forcers on agricultural yield and rural development.	Policy formulation and decision-making based on the interrelation of agriculture and climate.
77	European Commission Directorate-General for Climate Action (DG CLIMA)	Influence of non-CO2 forcers on climate, policy implications of FOCI findings.	Influence on EU climate policy and research, could incorporate FOCI findings into European policy development.
18	European Commission Directorate-General for Environment (DG ENV)	Environmental implications of non-CO2 forcers, with focus on preserving biodiversity and ecosystem services.	Understand how FOCI findings can be used to develop EU-wide environmental policies and strategies.
71	European Commission's Joint Research Centre (JRC)	Specific Relevance of FOCI to European policy and scientific standards.	Research-driven insights and European policy alignment.
20	European Environment Agency (EEA)	Environmental impacts of non-CO2 forcers in Europe.	Expertise in European environmental health and policy, could influence environmental

			policy decisions based on FOCI findings.
78	European Forest Institute (EFI)	Forest conservation, management, and mitigation strategies in relation to non-CO2 forcers.	Inform forest-related policies and research incorporating FOCI insights.
21	European Network of Transmission System Operators for Electricity (ENTSO-E)	Electrical grid operations, renewable integration, and energy transition implications.	Expertise in European electricity transmission, ensuring grid reliability amidst changing climate and energy dynamics.
22	Expert Team on Agromet Sciences (ET-ASC)	Atmospheric science, climate monitoring, and data collection.	Technical and scientific expertise in atmospheric conditions and changes, providing rigorous analytical depth.
25	Food and Agriculture Organization of the United Nations (FAO)	Agriculture, forestry, and food security in relation to climate change.	Global agricultural and food security expertise, understanding land use implications of climate shifts.
26	Forest Information System for Europe (FISE)	Forest-related implications of non-CO2 forcers.	Forest conservation and management insights considering FOCI findings.
27	GAPH-TAG Expert Working Group on Climate Change and Air Quality	Detailed understanding of the link between air quality and climate change due to non-CO2 forcers.	Technical and research-based insights into FOCI findings, guiding practical applications.
28	Global Aerosol Synthesis and Science Project (GASSP)	Interactions between aerosol particles and climate, mitigation strategies.	Expertise in aerosol particles science, crucial for understanding aerosol-related aspects of the FOCI project.
29	Global Forum on Human Settlements (GFHS)	Impact of urban development on non-CO2 forcers, and vice versa.	Expertise in sustainable urban development, could provide urban data and influence urban policy based on FOCI findings.
30	Global Methane Hub (GMH)	Detailed understanding of methane as a non-CO2 forcer.	Expertise in methane emissions, could provide methane-related data and inform methane policy recommendations.
31	ICLEI, Sustainable Resources, Climate and Resilience Team, European Secretariat	Local governments' response to global sustainability challenges.	Localized, city-level insights into climate resilience and sustainability initiatives.

38	Intergovernmental Panel on Climate Change (IPCC) Working Group I (WGI)	Comprehensive understanding of the physical scientific aspects of non-CO2 forcers.	Central role in shaping global understanding and policy related to climate change, could incorporate FOCI findings into IPCC assessments.
37	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)	Biodiversity impacts of climate change and pollution.	Ecosystem and biodiversity expertise, understanding ecological implications of atmospheric changes.
32	International Energy Agency (IEA)	Impact of energy sector on non-CO2 forcers, mitigation strategies.	Expertise in global energy policies and technologies, could provide energy-related data and inform energy policy recommendations.
67	International Institute for Applied Systems Analysis (IIASA)	Integrated understanding of how non-CO2 forcers interact with complex global systems.	Expertise in complex systems analysis, could help integrate FOCI findings into larger system models.
39	International Renewable Energy Agency (IRENA)	Renewable energy deployment and its climate implications.	Expertise in global renewable energy trends, strategies, and policies.
72	Lazio Regional Health Service / Department of Epidemiology	Specific Impacts of FOCI on public health in the Lazio region.	Regional health monitoring and epidemiological insights.
74	Public health agencies (national)	Health implications of air quality and climate changes, mitigation strategies.	Expertise in public health research and policy, key for understanding health-related implications of FOCI findings.
70	Spanish Ministry of Environment	Environmental policy, climate action, and sustainable development in Spain.	National environmental policy insights, understanding Spain's specific environmental and climate challenges.
49	UN Environment Programme (UNEP), Africa Office	Specific Interested in potential FOCI implications for African ecosystems.	Prioritization of solutions relevant to African contexts.
50	UN Environment Programme (UNEP), Latin America and the Caribbean Office - Intergovernmental Network on Atmospheric Pollution for Latin America and the Caribbean	Specific Focused on atmospheric pollution implications for the Latin American and Caribbean region.	Emphasis on regional solutions tailored to LAC's specific needs and challenges.

51	UNEP's International Methane Emissions Observatory (IMEO)	Specific FOCI's role in methane emissions monitoring and reduction.	Expertise in methane-related challenges and solutions.
48	United Nations Economic Commission for Europe (UNECE)	Implications of non-CO2 forcers for sustainable economic development.	Influence on regional economic and sustainability policies, could incorporate FOCI findings into economic strategies.
86	WHO Air Quality and Health unit	Analyzing health impacts from climate related air quality changes and advising on air quality and health intersections in FOCI regions.	Expertise on health and air quality, linking health outcomes with climate interventions.
55	WHO Regional Office for Africa (WHO AFRO)	Specific Monitoring the health impacts of FOCI initiatives in Africa.	Focus on health outcomes for African populations.
56	WHO Regional Office for the Americas (WHO PAHO)	Specific Evaluates FOCI impacts on health in the American continents.	Emphasis on health benchmarks and outcomes specific to the Americas.
61	WMO Regional Climate Services (RCS)	Regional climatic impacts of non-CO2 forcers.	Refine regional climate services based on the interplay of non-CO2 forcers and regional climates.
35	WMO Study Group on Integrated Energy Services (SG-ENE)	Impact of non-CO2 forcers on energy production and consumption.	Adaptation of energy services considering the influence of non-CO2 forcers.
85	WMO Study Group on Integrated Urban Services (SG-URB)	Urban environmental impacts of non-CO2 forcers.	Urban planning and strategies influenced by FOCI findings.
57	WMO/GEO Integrated Drought Management Programme	Drought management, climate impacts on water scarcity.	Expertise in drought prediction, management, and mitigation, especially in a changing climate.
63	WMO/WHO Study Group on Integrated Health Services (SG-HEA)	Health implications of non-CO2 forcers.	Health policy and practices adapting to the changing climate based on FOCI insights.
54	World Climate Research Programme (WCRP)	Influence of non-CO2 forcers on climate variability and change.	Expertise in global climate research, could integrate FOCI findings into global climate studies.
66	World Weather Research Programme (WWRP)	Weather prediction, extreme events, and atmospheric dynamics.	Expertise in short-term weather dynamics, critical for understanding immediate atmospheric implications.

For each of the entities, the broad strokes provided here would need to be refined based on direct engagement with the stakeholders, understanding their specific concerns, capacities, and how they see their role in the context of the FOCI project. Each stakeholder brings a unique perspective to the FOCI project, based on their particular focus and expertise. Their potential interests and input can help shape the direction and outcomes of the project, ensuring it is relevant and useful to a broad range of sectors and regions.

5. DEVELOPMENT OF THE STAKEHOLDER QUESTIONNAIRE

Based on feedback from the engaged stakeholders, the preferred instrument for consultation with stakeholders is the online questionnaire. It consists of the questions as identified by the focal points and WP leaders. It is structured around the project products and refined through several rounds of consultation with the focal points and WP leaders. As defined in the methodology in chapter 3, the key steps carried out for the development of the questionnaire included:

- **Survey Project WP Leaders**: Engagement with WP leaders from all work packages to discern the necessary input from stakeholders:
    - Product Content Inquiry
    - Product Requirements
    - Stakeholder Query Design
    - Sector & User Group Identification
    - Feedback Timeline
    - Feedback Integration Opportunities
- **Online Database Establishment**: Creation of a centralized digital database for storing product details, stakeholder questions, and stakeholder information. This ensures organized and rapid access to vital project data.
- **Drafting the Questionnaire**: Design the questionnaire based on insights from WP leaders and the project's scope, aiming to clarify stakeholder preferences, needs, and expectations.
- **Matching stakeholders to questions**: stakeholder-specific tailored questionnaires were developed including all questions but indicating the matched questions as of most relevance to them.
- **Prioritization**: Prioritization of questions for consultation with stakeholders by the feedback timeline indicated by the focal points.
- **Question Refinement**: Adjustments and clarifications to consultation questions via assigned focal points to guarantee clarity and relevance.

The structure of the project internal SharePoint site with the products and questions as developed by the focal points is provided in **Chyba! Nenalezen zdroj odkazů.**. The complete list of questions grouped by project product is given in **Chyba! Nenalezen zdroj odkazů.**

Following the development of the questionnaires, the communication to identified stakeholders to solicit feedback through the questionnaires took place in two phases:

- **Stakeholder Outreach**: Initiation of contact with each identified stakeholder. Established mutual understanding on the mode of consultation, focusing primarily on online questionnaires for efficient and broad outreach.
- **Virtual Consultations**: Engagement with stakeholders through the online questionnaire, gathering their insights, and understanding their requirements.

A first round of feedback from stakeholders has been collected and is provided to the focal points for review, follow up as needed and exploring of options to consider the feedback in the product development.

6. STAKEHOLDER FEEDBACK

The developed questionnaires are continuing to be distributed to stakeholders who have been identified through the stakeholder analysis and have engaged with the FOCI project.

As of the cutoff date for this report, 22 August 2023, a total of 37 stakeholders are in consultation. The list of stakeholders currently engaged can be found in chapter 9.

The feedback received is being made available to the respective relevant project internal focal points through the project's SharePoint site. A summary overview of which products stakeholders have provided feedback on so far is listed in chapter 12.

An overview of the feedback received so far will be provided in the next update to this report.

7. ANALYSIS OF COMMON THEMES AND RECOMMENDATIONS

An analysis of the feedback received by the stakeholders across all FOCI products that were consulted will be developed once the consultations are completed. In the meantime, the individual feedback is shared with project product focal points and fed into the development of the related project products and the feedback loop closed with the stakeholders.

Recommendations for the project as well as for future stakeholder engagements will be developed throughout the stakeholder consultation process and shared with project partners. These recommendations would be integrated to continuously improve the engagement with stakeholders.

8. SUMMARY AND OUTLOOK

Stakeholder engagement and consultation is a crucial part of ensuring the project's success and highest possible relevance. An extensive approach has been developed and implementation advanced. In particular, steps taken so far include:

- Identification of Products: Key products of the FOCI project were identified to understand which aspects would require consultation and insights from stakeholders.
- Drafting of Product-Related Questions: Based on the identified products, a set of tailored questions was developed. These questions aimed to understand stakeholder perspectives, needs, and recommendations on the various products.
- Identification of Stakeholders: A comprehensive list of stakeholders relevant to the FOCI project was curated, encompassing entities from regional agencies to global organizations with interests in health, energy, and agriculture sectors.
- Stakeholder Analysis: Each stakeholder was assessed based on (a) their potential specific interests in FOCI and (b) the unique perspective they can offer to the FOCI project.
- Questionnaire Development: A structured questionnaire, inclusive of the product-related questions, was formulated together with all WP leaders and product specific focal points to gather specific feedback, insights, and suggestions from the stakeholders regarding their involvement in the FOCI project.
- Outreach to Stakeholders: Communication was initiated with the selected stakeholders to introduce the FOCI project's goals and gather their feedback via the designed questionnaire.
- Development of databases: Several databases was constructed to store:
    - Project products and related questions for consultation with stakeholders.
    - Stakeholders
    - Stakeholder feedback from the questionnaire

Challenges:

Some of the main challenges in this exercise so far have been largely around the stakeholder outreach and establishing a responsive engagement and line of communication with each stakeholder. This will require further attention moving forward to keep the engagement active. It is expected that this could be achieved through the planned closing of the feedback look.

Outlook and next steps:

1. **Data Analysis:** Delve into the gathered questionnaire data to derive actionable insights, further illuminating stakeholders' needs and expectations.

2. **Engagement Strategy:** Building on the already established communication with stakeholders, update the communication and dissemination plan with a dimension on engagement with stakeholders. This could serve several purposes, in particular also the exploration of opportunities to involve high impact stakeholders in the launch of FOCI products and its further dissemination. For this, identify key and most engaged stakeholders and identify which products of FOCI would be of most use to them. Start exploring with the identified stakeholders opportunities for them to highlight use cases for the products and develop occasions for advocacy (e.g. at launch event).
3. **Continuous consultation:** continue the consultations, completing the first round increasing the response rate and starting additional rounds as needed.
4. **Integration of feedback:** share received feedback with WP leaders and product focal points and formulate proposals for the integration of the feedback into FOCI.
5. **Feedback loop:** reply to stakeholders with outline of how their feedback is being addressed to ensure the FOCI project remains relevant and impactful.
6. **Harmonization of databases:** merge the data of all products, questions, replies and stakeholders into a one-stop online database for internal use. This could possible be expanded to eventually include the replies of the stakeholders and the feedback from the project as well, in addition to monitoring the interactions and outcomes of the stakeholder engagements.
7. **Regular update of report:** as the understanding of the stakeholders' perspectives grows and more feedback is received, this report will be update regularly.

With these systematic steps and continued stakeholder involvement, the FOCI project is positioned to achieve its objectives while resonating with stakeholder needs.

APPENDICES

Appendix 1: List of stakeholders consulted

List of stakeholders who are in consultation as of the cut-off date of the drafting for this report.

ID	Stakeholder name
7	African Union Commission (AUC)
8	Arctic Monitoring and Assessment Programme (AMAP)
9	ARPA Lombardy (Regional Environmental Protection Agency), Air quality unit
10	C40 Cities Climate Leadership Group
69	CJS2_152a User Intelligence team
11	Climate and Clean Air Coalition (CCAC) Agriculture Hub
76	Climate and Clean Air Coalition (CCAC) Fossil Fuel Hub
12	Climate and Clean Air Coalition (CCAC) National Planning Hub
13	Climate and Clean Air Coalition (CCAC) Waste Hub
15	ClimateEurope 2 project
68	Copernicus Atmosphere Monitoring Service (CAMS)
19	Environmental Defense Fund (EDF)
77	European Commission Directorate-General for Climate Action (DG CLIMA)
18	European Commission Directorate-General for Environment (DG ENV)
71	European Commission's Joint Research Centre (JRC)
20	European Environment Agency (EEA)
78	European Forest Institute (EFI)
21	European Network of Transmission System Operators for Electricity (ENTSO-E)
22	Expert Team on Agromet Sciences (ET-ASC)
29	Global Forum on Human Settlements (GFHS)
30	Global Methane Hub (GMH)
31	ICLEI, Sustainable Resources, Climate and Resilience Team, European Secretariat
38	Intergovernmental Panel on Climate Change (IPCC) Working Group I (WGI)
32	International Energy Agency (IEA)
67	International Institute for Applied Systems Analysis (IIASA)
39	International Renewable Energy Agency (IRENA)

41	Members of the Advisory Board
49	UN Environment Programme (UNEP), Africa Office
50	UN Environment Programme (UNEP), Latin America and the Caribbean Office - Intergovernmental Network on Atmospheric Pollution for Latin America and the Caribbean
48	United Nations Economic Commission for Europe (UNECE)
86	WHO Air Quality and Health unit
61	WMO Regional Climate Services (RCS)
35	WMO Study Group on Integrated Energy Services (SG-ENE)
85	WMO Study Group on Integrated Urban Services (SG-URB)
57	WMO/GEO Integrated Drought Management Programme
63	WMO/WHO Study Group on Integrated Health Services (SG-HEA)
54	World Climate Research Programme (WCRP)

Appendix 2: Structure of project SharePoint site for products/questions for consultation

Column	Type
product ID	Number
Product title	Multiple lines of text
Product description	Multiple lines of text
WP/Task/Deliverable	Single line of text
WP leader	Single line of text
Focal Point (name and e-mail)	Multiple lines of text
Specific question	Multiple lines of text
Supplemental Question	Multiple lines of text
Ability to tailor output to stakeholder needs	Multiple lines of text
Sector	Choice
Stakeholder type	Single line of text
Specific stakeholder/user group	Choice
Deadline month (for receiving stakeholder input)	Single line of text
Comments	Multiple lines of text
Related WPs	Choice
Modified	Date and Time
Created	Date and Time
Created By	Person or Group
Modified By	Person or Group

Appendix 3: List of questions

Table of overview of project products grouped by WP (follow links to jump to corresponding questions).

WP1:

- Product 1: Comprehensive Analysis of Particle Optical Properties and Their Impact on Climate: A Focus on Black Carbon (BC) and Organic Aerosols (OA)

WP3

- Product 5: Report on evaluation of the final model configurations for simulation of near-term climate forcers and precursor gases

WP4

- Product 11: Development of a coupled multiscale framework based on nested RCMs at fine scale (down to urban), including chemistry and aerosol microscale interactions
- Product 12: Performances of the improved RCMs, that will be evaluated against surface observations, satellite remote sensing and reference reanalysis.
- Product 13: Demonstration of the multiscale framework impact on regional to urban climate prediction. Analysis of the results and comparison to other available regional climate simulations

WP5

- Product 6: Global emission scenarios for agriculture related sources for GHGs including non-CO2 forcers / Impact of European agriculture emission reduction measures on non-CO2 GHGs
- Product 7: Inventory of BVOC emissions based on detailed vegetation species mapping under current and future climate projections
- Product 8: Database of gridded agricultural emissions and also waste emissions including GHGs and non-CO2 forcers based on scenarios for the agriculture and waste sectors
- Product 9: Integrated models of energy and environmental systems, national emission scenarios and gridded emissions for GHGs and air pollutants
- Product 10: Global/regional emission scenarios for energy related sources for GHGs including non-CO2 forcers
- Product 27: Urban greening scenarios to estimate thermal environment and biogenic emissions

WP6

- Product 14: Quantification of the past and future contribution of non-CO2 climate forcers to the (de)stabilization of tipping elements with the use of state-of-the-science climate-chemistry models

- Product 15: Dataset and report on climate change driven extremes and concentrations of atmospheric chemical species at regional and urban scale for further mitigation assessment
- Product 16: High-resolution climate analysis for 2010 - 2020 for weather and air quality
- Product 17: High-resolution climate projections for 2025-2035 for weather and air quality
- Product 18: High-resolution climate analysis for 2045-2055 for weather and air quality
- Product 19: Regional and urban multiscale climate impact
- Product 20: Climate impact of non-CO2 emissions on energy systems

WP7

- Product 21: Report describing a comparison of the historic, baseline and mitigation emission reduction potential of nationally-relevant implementation of non-CO2 climate forcing mitigation to assumptions in SSPs
- Product 22: Links between non-CO2 climate forcer mitigation measures and social and economic impacts
- Product 23: New integrated model of energy and environmental system released with capability to calculate multiple benefits of non-CO2 forcer

1	**Comprehensive Analysis of Particle Optical Properties and Their Impact on Climate: A Focus on Black Carbon (BC) and Organic Aerosols (OA)**

Black Carbon (BC) and Brown Carbon (BrC) particles, originating from combustion, efficiently absorb visible light, impacting global warming. BC, being optically "black," has a high light-absorption efficiency. Its accurate representation in climate models requires the Mass Absorption Efficiency (MAC), a variable ratio between BC particles' total absorption and mass concentration, relying on BC's physico-chemical properties and determined experimentally. BrC and other organic carbon (OC) components of aerosols are typically seen as light scattering or "white," creating a cooling effect to counterbalance BC-induced warming. However, specific OC elements, including BrC, absorb near UV and shorter visible wavelengths, influencing radiative forcing. To model BrC, the imaginary refractive index (k), indicating a particle's absorptive properties, is needed. Additionally, climate models commonly use the Single Scattering Albedo (SSA) and asymmetry parameter (g) to denote a particle's capacity to scatter or absorb visible light and backscatter solar radiation.

#	Question to stakeholder	Supplemental question or further considerations
1	Would you consider the BC and BrC contributions to total particle absorption of relevance for the current state of the climate? If not, which other variables would you suggest?	n/a
2	Would you consider particle SSA and g of relevance for the current state of the climate? If not, which other variables would you suggest?	n/a
3	Would you consider BC MAC of relevance for the current state of the climate? If not, which other variables would you suggest?	n/a
4	Would you consider k and MAC of OA and OA sources of relevance for the current state of the climate? If not, which other variables would you suggest?	n/a

5	**Report on evaluation of the final model configurations for simulation of near-term climate forcers and precursor gases**

This report will describe the main results from a series of analyses aimed at evaluating the revised global chemistry-climate models EC-Earth4 and EMAC against observational data sets. The report will provide information on the models' ability to simulate key aspects of the atmosphere's physical climate and chemical composition, with a focus on tropospheric aerosols and tropospheric trace gases that play a role in ozone chemistry. The revised models will be evaluated against a number of observational data sets, including in situ measurements as well as remote sensing observations.

#	Question to stakeholder	Supplemental question or further considerations
5	Would you be interested in learning about the specific contribution of the different model processes (optical properties, aerosol cloud-interactions, etc.) to the improvement of aerosols' representation within ESMs achieved in FOCI?	n/a
6	Which are the most relevant aspects for you when you use aerosol/cloud products from climate forecasting for your specific application (e.g., the total aerosol load, radiative optical properties, clouds, aerosol composition)?	n/a

6	**Global emission scenarios for agriculture related sources for GHGs including non-CO2 forcers / Impact of European agriculture emission reduction measures on non-CO2 GHGs**	
The global emission scenarios will include agriculture emissions that are expected to present significant variation tied to population, GDP and dietary changes. A specific focus will be devoted to agriculture related emission scenarios and possible measures to be applied in Europe to reduce non-CO2 GHGs emissions.		
#	**Question to stakeholder**	**Supplemental question or further considerations**
7	Agriculture is one of the major sources of methane, NO2, and ammonia. Which policies and measures, together with diet change in developed countries, are you interested to evaluate in the changing climate perspective?	Emission scenarios can be tailored to reflect stakeholders i) projections of agricultural production (or drivers of agricultural production, e.g. population, income), ii) target and timeline for implementation of mitigation measures to reduce emissions from agriculture sector, iii) country-specific data on diet, agricultural systems etc.

7	**Inventory of BVOC emissions based on detailed vegetation species mapping under current and future climate projections**

Dataset and report describing the BVOC emission inventory based on detailed vegetation species mapping under current and future climate projections. A plant-specific emission model based on a detailed mapping of the trees species of forest covered areas will be applied to quantify the potential impact of a proper mapping of vegetation species on VOC emission fluxes, with respect to models and approaches based on the Plant Functional Type approach. BVOC are precursors of ozone and secondary aerosols and are considered a relevant source of uncertainty in future climate projections. The amount of BVOC species emitted, their trend during past years and expected future variability will be compared with available reference inventories.

#	Question to stakeholder	Supplemental question or further considerations
8	The impact of BVOC emissions on ozone and BSOA is a relevant source of uncertainty in climate projections. Do you think a continental to global forest species and crops mapping would be relevant to support BVOC emissions estimate improvement?	Can you provide/advice species specific vegetation datasets at continental scale?

8	**Database of gridded agricultural emissions and also waste emissions including GHGs and non-CO2 forcers based on scenarios for the agriculture and waste sectors**

The catalogue of new global emission scenarios for anthropogenic sources (agriculture and waste) for GHGs including non-CO2 forcers with database for the use within the project and other applications, with a report on the data describing the scenarios background. The global emission scenarios will include agriculture emissions that are expected to present significant variation tied to population, GDP and dietary changes.

#	Question to stakeholder	Supplemental question or further considerations
9	How can the results of the assessments and tools developed help you and inform your NDC development, climate reporting, and air quality strategy development related to actions in the waste and agriculture sectors?	How likely is it that the results can be used by your entity for the design of national policies and plans in the agriculture and waste sectors?
10	How can the results help the development of the methane pledge as well as the national roadmaps to reduce these emissions?	Are there any other initiatives, plans or policies in which the results could be applied?

9	**Integrated models of energy and environmental systems, national emission scenarios and gridded emissions for GHGs and air pollutants**	
The catalogue of new regional emission scenarios (Latin America and Africa datasets) for anthropogenic sources for GHGs including non-CO2 forcers with database for the use within the project and other applications, with a report on the data describing the scenarios background and assumptions, source of data, among others.		
#	**Question to stakeholder**	**Supplemental question or further considerations**
11	How can emission analysis models be used to train people in Ministries or in universities, institutes or other supporting organizations of the countries in the region so that they can develop their own models, or enhance existing models?	Are you interested in having a regional emission dataset that can be tailored to national priorities? What type of training might be useful to understand how emission datasets could be useful for your planning?
12	What are the expectations of the target country/region to continue using emission and scenario analysis models and their results in further updates of their NDC or air quality planning?	What kind of datasets are you aware to continue using in further updates of National Inventories?
13	How can the scenarios developed inform decision making on mitigation plans such as NDC or air quality development?	n/a
14	Would an enhanced ability to estimate PM2.5 concentrations at finer resolutions through development of reduced complexity atmospheric modelling enhance the development of science for mitigation?	n/a

10	Global/regional emission scenarios for energy related sources for GHGs including non-CO2 forcers

The catalogue of new global emission scenarios for anthropogenic sources for GHGs including non-CO2 forcers with database for the use within the project and other applications, with a report on the data describing the scenarios background.

#	Question to stakeholder	Supplemental question or further considerations
15	While carbon dioxide (CO2) makes up the vast majority of greenhouse gas emissions from the power sector, smaller amounts of methane (CH4) and nitrous oxide (N2O) are also emitted. Similarly, combustion of natural gas and petroleum products for heating and cooking emits the same three gases, but in different proportions. In scenarios with a high production of hydrogen, or large uptake of EVs, or extensive use of rooftop PV, how will these emissions change? And what other gasses should be considered?	What are the key policies and measures in the energy sector you would like to evaluate? What targets and timelines are available for these measures?

11	**Development of a coupled multiscale framework based on nested RCMs at fine scale (down to urban), including chemistry and aerosol microscale interactions**

Report on the development of a coupled multiscale framework based on nested RCMs. Regional scale air quality models have been developed and applied to reconstruct air quality in present conditions or during the near past on the basis of the most updated and reliable information concerning emissions, meteorology and geography. Updated versions of the models improved and modified to be coupled with climate models and enabling the description of the climate forcing impact on future air quality and its possible feedback on the regional climate will be released. Model improvement are expected concerning the modelling of GHGs impacting on ozone cycle, as CH4, land surface processes treatment, aerosol processes and SLCPs dynamics. The improved models could enable end users to estimate the joint effect of emission scenarios and climate change on future air quality.

#	Question to stakeholder	Supplemental question or further considerations
16	The proposed RCMs nested within global ESMs will provide high resolution projections of climate and air quality indicators. Which AQ species and climate related variables/indicators would be needed to support the analysis of future emissions scenarios in a changing climate?	What resolution of modelling (i.e. PM2.5 concentrations for air pollution health impact assessment) is most useful for your work? What emissions and emissions projections are most useful to combine with the atmospheric modelling?
17	The proposed RCMs nested within global ESMs will provide high resolution projections of climate and air quality indicators. Is the proposed spatial grid resolution of our model simulations (10 km grid spacing at continental scale and 2-3 km at urban scale) sufficient for your needs?	
18	The proposed RCMs nested within global ESMs will provide high resolution projections of climate and air quality indicators. Is our proposed domain extension adequate for the assessment of climate impacts over your region of interest?	
19	Which SLCP related process description needs to be improved?	

12	**Performances of the improved RCMs, that will be evaluated against surface observations, satellite remote sensing and reference reanalysis.**

Report on the performances of the improved RCMs. The performances of the improved RCMs will be evaluated against surface observations, satellite remote sensing and reference reanalysis. The model evaluation procedure will be defined on the basis of state-of-the art methods and practices, considering model evaluation tools already available in European. To make the models performance evaluation useful and quickly understandable, it is important to rely on practices and metrics preferred by the end users in their activities concerning both climate and air quality evaluations and on the pollutants and meteorological variables of priority interest.

#	Question to stakeholder	Supplemental question or further considerations
20	Which pollutants and meteorological variables should be considered as a priority in the evaluation process?	n/a
21	What performance metrics do you consider relevant to evaluate models applied for future projections (e.g., statistical metrics defining capability to reproduce present time observations, sensitivity analyses to emissions changes, or other)?	n/a
22	Are there observation datasets that you are willing to share to support model evaluation in your region of interest?	n/a

13	**Demonstration of the multiscale framework impact on regional to urban climate prediction. Analysis of the results and comparison to other available regional climate simulations**

Demonstration and report on the climate and air quality projections obtained using the coupled multiscale framework to analyze the impact of the nested RCMs on regional to urban scale predictions. Analysis of the results and comparison with other available climate simulations as e.g. CMIP6 and CORDEX ensemble to evaluate the desired improvement in the detection and description of regional to local variability of climate change trend and its impact on weather and air quality. This analysis will synthesize the empowerment of modelling tools developed inside the project and made available for the evaluation of impacts and support of policies.

#	Question to stakeholder	Supplemental question or further considerations
23	Would you be interested to be involved in a demonstration of multiscale modelling tools to predict future climate and air quality change at high resolution?	What emission scenarios are most useful to compare within the atmospheric modeling?
24	Which key aspect should be focused by the demonstration (e.g., simultaneous stressors from weather and air quality, impact on conurbations and largely populated areas, etc.)?	n/a

14	**Quantification of the past and future contribution of non-CO2 climate forcers to the (de)stabilization of tipping elements with the use of state-of-the-science climate-chemistry models**

Report on the analysis of the contributions of changes in atmospheric and/or oceanic circulation due to non-CO2 forcers to tipping elements in climate system, analysing the potential of chemical and microphysical changes to affect large scale responses.

Due to the short atmospheric lifetimes and inhomogeneous geographical distribution of Near Term Climate Forcers (NTCFs), local changes in variables such as temperature, humidity, atmospheric circulation, or even vegetation can lead to diverse effects in the Earth System. Given this regional nature, NTCFs may play a role in the state of climate tipping elements. Tipping elements are components of the climate system that, once pushed beyond a critical threshold, or tipping point, can undergo abrupt and irreversible changes, potentially leading to cascading effects. Some examples of tipping points are: collapses in ocean circulation and continental ice sheets, the complete loss of Arctic sea ice and permafrost, changes in the magnitude and frequency of the El Niño phenomenon, or shifts in the monsoon systems of India and West Africa. This report will provide an assessment of the influence of NTCFs on climate tipping elements based on an extensive analysis of Earth System models climate datasets.

#	Question to stakeholder	Supplemental question or further considerations
25	Will you be interested in learning about the distinct effect of aerosols, ozone and methane in particular on climate tipping elements, like the African or Asian Monsoon, ENSO, or Arctic sea ice loss?	What emission scenarios are most useful to compare within the atmospheric modeling?

15	**Dataset and report on climate change driven extremes and concentrations of atmospheric chemical species at regional and urban scale for further mitigation assessment**

Datasets of climate change driven extremes (e.g. heat stress) and concentrations of atmospheric chemical species for further mitigation assessment. In addition, a report describing the datasets and their uses.

#	Question to stakeholder	Supplemental question or further considerations
26	Will you be interested in joint high-resolution projections of climate and air quality indicators for selected urban areas to quantify the foreseen impact and support adaptation and mitigation policies?	n/a
27	Which meteorological variables, pollutant concentrations, climate and air quality indicators do you suggest to include in the dataset?	n/a

16	**High-resolution climate analysis for 2010 - 2020 for weather and air quality**

Report describing model run setup and analysis of projections of climate change due to non-CO2 forcers, including specific analysis for Europe and other selected regions. These projections will be based on different scenarios for the future, including both more optimistic and middle-of-the-road socioeconomic pathways. They can help in aiding climate policy planning and mitigation strategies.

#	Question to stakeholder	Supplemental question or further considerations
28	Would you consider 2015 period representative of current state of the climate for your region (Europe, Africa, South Asia and Latin America)? If not, which decadal period would you suggest for your region (Europe, Africa, S Asia and Latin America)? Note: for each period we will simulate 10 years around that target year. That is for 2015 we propose to run models for 2010 to 2019.	What emission datasets/scenarios should underpin the climate modelling?

17	High-resolution climate projections for 2025-2035 for weather and air quality

Report describing model run setup and analysis of projections of climate change due to non-CO2 forcers, including specific analysis for Europe and other selected regions. These projections will be based on different scenarios for the future, including both more optimistic and middle-of-the-road socioeconomic pathways. They can help in aiding climate policy planning and mitigation strategies.

#	Question to stakeholder	Supplemental question or further considerations
29	Will near term 2030 and mid term 2050 higher resolution projections be useful for supporting climate adaptation and mitigation and other policies (e.g. air quality, health)? If not, which decadal periods would you suggest for your region (Europe, Africa, South Asia and Latin America)? Note: for each period we will simulate 10 years around that target year. That is for 2030 (2025-2035) and 2050 (2045 – 2055).	What emission datasets/scenarios should underpin the climate modelling?

18	High-resolution climate analysis for 2045-2055 for weather and air quality

Report describing model run setup and analysis of projections of climate change due to non-CO2 forcers, including specific analysis for Europe and other selected regions. These projections will be based on different scenarios for the future, including both more optimistic and middle-of-the-road socioeconomic pathways. They can help in aiding climate policy planning and mitigation strategies.

#	Question to stakeholder	Supplemental question or further considerations
30	How will higher resolution mid-term projections assist you in better defining responses to climate change impacts in terms of specific adaptation and mitigation measures?	What emission datasets/scenarios should underpin the climate modelling?
31	What specific climate and air quality related metrics will be of particular interest to support your work?	What emission datasets/scenarios should underpin the climate modelling?

19	Regional and urban multiscale climate impact	
Datasets of climate change driven extremes (e.g. heat stress) and concentrations of atmospheric chemical species for further mitigation assessment. In addition, a report describing the datasets and their uses.		
#	**Question to stakeholder**	**Supplemental question or further considerations**
32	Which specific impact of climate change relating to extreme weather, high air pollution and health impacts is of interest to you the most?	n/a
33	Which factors do you wish us to consider that are particularly relevant to your region?	n/a
34	In relation to air quality and climate co-benefits and trade-offs, which ones would you prioritise to support air quality and climate policies?	n/a
35	Which urban greening scenarios would you prioritise to tackle air pollution and climate change hazards affecting cities in the focus regions (Latin America, Africa, Southeast Asia, Europe)?	n/a

20	Climate impact of non-CO2 emissions on energy systems	
Report on the quantification of climate change impacts from non-CO2 forcers specifically on energy systems of Europe.		
#	**Question to stakeholder**	**Supplemental question or further considerations**
36	Which emission scenarios would you prioritise to assess the impact of climate projections on energy demand, production and infrastructure affecting the focus regions (Latin America, Africa, Southeast Asia, Europe)?	

21	**Report describing a comparison of the historic, baseline and mitigation emission reduction potential of nationally-relevant implementation of non-CO2 climate forcing mitigation to assumptions in SSPs**

This report will describe a comparison of the historic, baseline and mitigation emission reduction potential of nationally-relevant implementation of non-CO2 climate forcing mitigation (evaluated in WP6) and how these differ from global scenarios (e.g. the SSPs), in particular for which ones where the GHG mitigation pathways have not consider in detail the mitigation options to reduce emissions of non-CO2 climate forcers.

The report will evaluate the difference in the effectiveness of non-CO2 mitigation measures, when taking into account the national circumstances of the country where the mitigation options are being implemented. Since, the resulting regional inventory in the Task 5.2 will consider each country data, the report will outline the major differences or similitudes taking into account national circumstances, policies, plans, among others.

#	Question to stakeholder	Supplemental question or further considerations
37	How can the scenarios developed and the differences between using bottom up regional and national data and the global datasets help inform a better understanding about the development of SLCF emission scenarios?	Would you like to suggest an specific protocol for data collection and processing procedures to be applied in this assessment?
38	What kind of recommendations this results would set to improve the report of regional and national data for further inventories?	How would you apply these results to increase capacity in SLCP emissions inventory development for the agriculture and waste sector?

22	Links between non-CO2 climate forcer mitigation measures and social and economic impacts

This report will describe the health impact assessment methods to be used through FOCI project. Besides, it will identify and describe the quantitative methodologies with a potential to extend the analysis of emissions to quantify additional impacts of implementing non-CO2 mitigation measures including health impacts, economic costs, benefits in climate change adaptation, deforestation and biodiversity, among others.

#	Question to stakeholder	Supplemental question or further considerations
39	How can the additional, multiple benefit estimates help to influence and develop mitigation policy?	Would you use these results to highlight the additional benefits and propose major commitments to mitigate SLCP?
40	What are the key impacts that users would like to have quantified that relate to measures that could be implemented to mitigate?	n/a

23	New integrated model of energy and environmental system released with capability to calculate multiple benefits of non-CO2 forcer

This product includes an open access database of the data sets (input data and results) at the country level for each region modelled (Latin America and Africa), and a concept note explaining the methods and assumptions applied. The database will be available in the website for all new and existing low-emissions development practitioners who sign in to the website.

#	Question to stakeholder	Supplemental question or further considerations
40	How will the addition of multiple benefit estimation help countries and other stakeholders influence policy? Who would want this information?	Which additional benefits (i.e others than health) do you consider important to be evaluated?

27	Urban greening scenarios to estimate thermal environment and biogenic emissions

Urban greening is commonly applied as an adaptation measure for urban climate change through its impact on the thermal environment. The thermal environment of urban green also impacts biogenic emissions with relation to air quality To properly quantify these impacts knowledge of the possible changes in the urban landscape are necessary.

#	Question to stakeholder	Supplemental question or further considerations
45	What amount of building greening and urban greening is possible for each focus city based on the target of current measures as well as the maximum limit given the current urban morphology.	If possible, specify estimates for open spaces, green roofs, green facades and other greening measures separately. What type or species of plants is commonly used?

Appendix 4: Stakeholders feedback

As of the cutoff date for this report (26 August 2023), from the following stakeholders has been received:

- Arctic Monitoring and Assessment Programme (AMAP)
  - Products 1, 5, 12, 14
- Copernicus Atmosphere Monitoring Service (CAMS)
  - Products 11, 12, 15, 18
- European Commission's Joint Research Centre (JRC)
  - Products 6, 7, 10, 12, 13, 17, 20, 27
- WHO Air Quality and Health unit (WHA AQH)
  - Products 9, 13, 15, 19, 20, 22
- WMO Study Group on Integrated Energy Services (SG-ENE)
  - Products 9, 10, 12
- WMO Study Group on Integrated Urban Services (SG-URB)
  - Products 5, 11, 12, 13, 15, 18, 19
- WMO/WHO Study Group on Integrated Health Services (SG-HEA)
  - Products 15, 19, 22
- Members of the Advisory Board (FOCI PAB)
  - Products 1, 5, 6, 7, 9, 11, 12, 13, 14, 17, 18, 23, 27

This table will be continuously updated in future drafts of this report (D8.5). Detailed feedback is available on the SharePoint site and upon request. An analysis of the received feedback will be conducted when all (most) stakeholders have been consulted.

Appendix 5: Abbreviations

GA	Grant Agreement
CA	Consortium Agreement
WP	Work Package
D (number)	Deliverable (number)
CDE	Communication, Dissemination and Exploitation

Appendix 6: List of Tables

Appendix 7: List of Figures