ICOS | Cities

Developing services for urban GHG monitoring systems

ICOS Cities Talks, Wednesday 14.6.2023 (9:00–10:00 CET)

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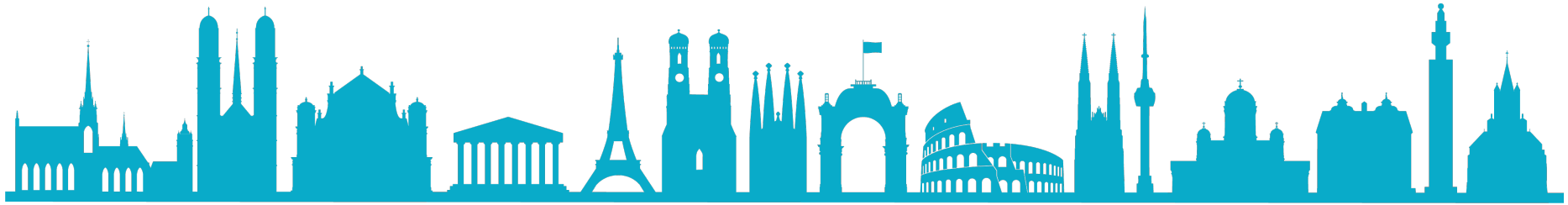
ICOS Cities PAUL project, WP1 team



ICOS Cities, aka Pilot Applications in Urban Landscapes - Towards integrated city observatories for greenhouse gases (PAUL), has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101037319

Agenda for the session

9:00–9:05	Opening session
9:05–9:30	Developing services for urban GHG monitoring systems
9:30–9:50	Interaction – ideating services
9:50–10:00	Discussion and closing the session

Tatu Marttila is currently working as a researcher and senior lecturer in department of design at Aalto University, Finland. In the ICOS Cities PAUL project, with the lead of professor İdil Gaziulusoy he is working in to support the co-design of services for urban GHG monitoring.

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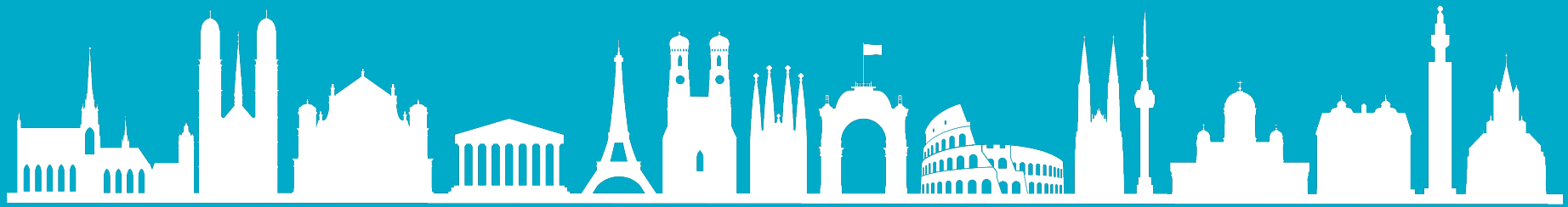
Introduction to services for urban GHG monitoring



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Introduction to the talk

The ICOS Cities PAUL project (Pilot Applications in Urban Landscapes) is focusing on the development of urban GHG monitoring systems and their use in cities climate governance.

Work Package (WP) 1 and Task 1.4 focuses on the co-design of service prototypes. The aim of the task is to assess the emission related urban services and to design improved service concepts for the use of major European cities. Task 1.4 also refines a methodology for service development for the use of other cities and other needs identified in the process.

Sub-task 1.4.1 is benchmarking and evaluating existing services, based on background research and interviews, and a report benchmarking current situation was completed on February 2023 (ICOS Cities deliverable 1.12).
(see: https://www.icos-cp.eu/projects/icos-cities/deliverables)

Benchmarking services

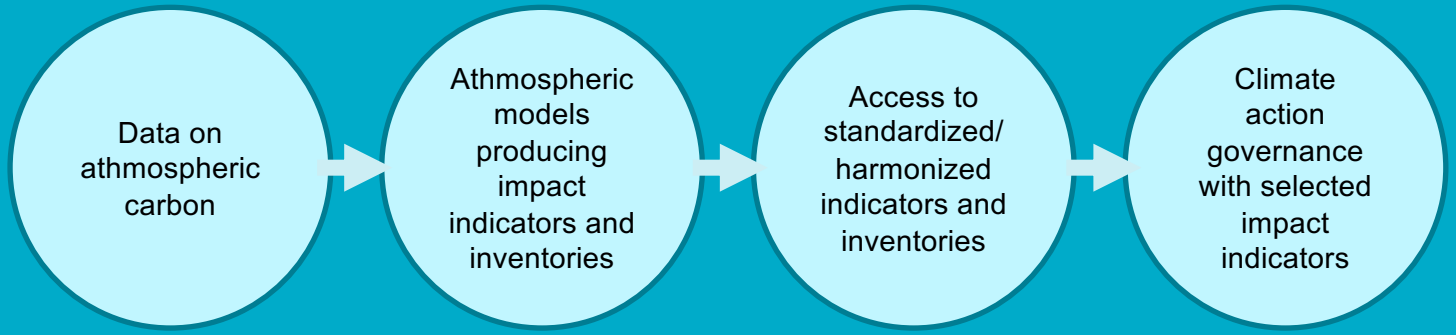
Sub-task 1.4.1 aims to develop an in-depth understanding of existing services used by the cities to make sense of emission data and feed into policy processes. Besides the PAUL City Network of 15 cities, specific focus is on three pilot cities of the PAUL project, Paris, Munich, and Zurich.

To achieve the aim, a number of stakeholders in different European cities have been interviewed to collect data on the existing services.

The work is guided by the following research questions:

- *What types of CO2 monitoring services exist and how do they contribute to cities' climate program activities and follow-up?*
- *How are these monitoring services used in the three pilot cities of the PAUL project?*
- *What types of services could be connected to monitoring data? Who could be the users and providers of these services?*

The existing ‘system’ of services in relation to climate indicators:



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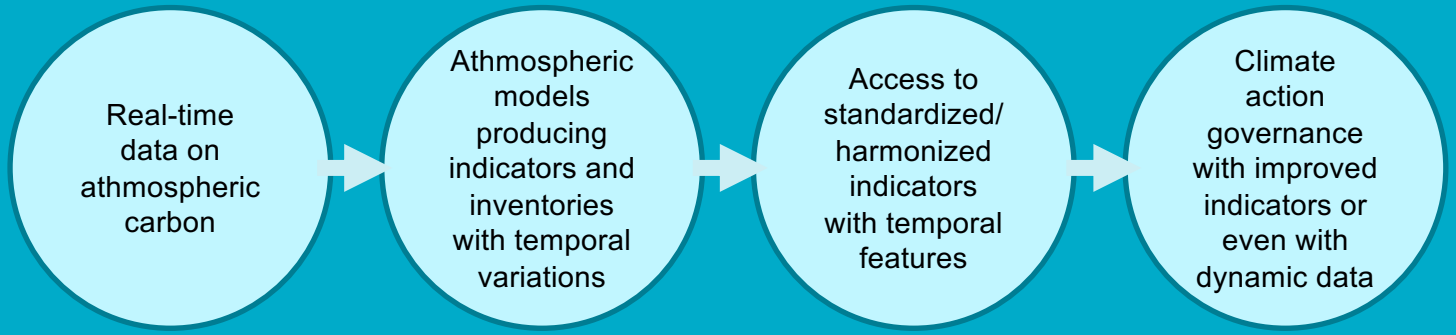
The envisioned ‘system’ of services in relation to climate indicators:



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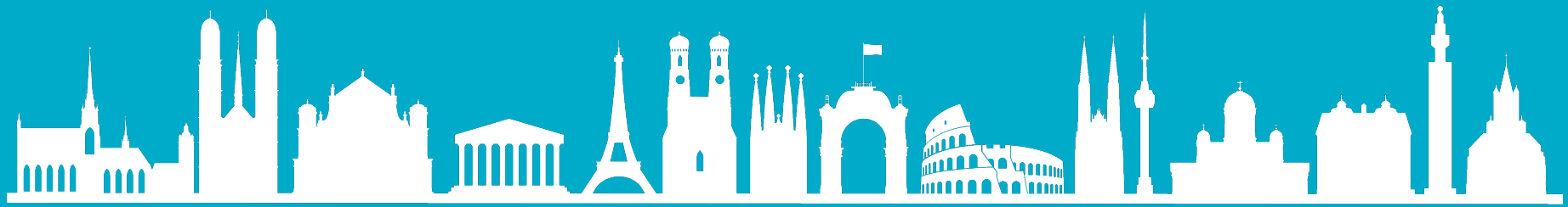
Urban GHG monitoring – results of benchmarking



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Networks and organisations

Research networks and organisations:

- **IG3IS** (Integrated Global Greenhouse Gas Information System) by the World Meteorological Organization (WMO) aims to coordinate an integrated global greenhouse gas information system from data harmonisation to inventory development.
- **ICOS** (Integrated Carbon Observation System) is a European research infrastructure for GHG observation, and the coordinator of the PAUL project.

City-level actors and organisations:

- **The Global Covenant of Mayors** (GCoM) is an alliance for city climate leadership of over 11,500 cities and local governments.
- **ICLEI – Local Governments for Sustainability** is is a global network of more than 2500 local and regional governments committed to sustainable urban development.
- **C40 Cities** is a global network or around 100 cities promoting climate action in urban context; They have introduced a C40 GHG protocol for GHG impact assessment.

Existing of monitoring services

Information on climate actions and GHG data on national and city-level is available, and there also exists some sectoral extrapolation of impact information.

Impact information can be collected from agreements, and also real-time data on energy consumption, traffic, etc (ie. 'big data').

Examples of GHG data services on a national and city-level:

- **ClimateWatch** (https://www.climatewatchdata.org/) is an international service including national GHG data, and national level agreements, long-term climate strategies, including links to national strategy documents
- **TNO-GHGco inventory** has been prepared within the VERIFY EU-project for estimated GHG emissions in Europe at a resolution of approximately 6x6 km for the years 2005–2017, with a spatial 're-gridding' at a much higher resolution of approximately 1x1 km
- **Environmental Insights Explorer** (https://insights.sustainability.google/) by Google and the GCoM provides basic information on city emission impacts, distributed into building (residential & non-residential) and transport (inbound & outbound) emissions

Existing of monitoring services

New tools are being developed to connect gridded and near real-time GHG monitoring to service platforms to support climate actions.

City-level monitoring with a distributed monitoring network enables direct measurements of impacts for different purposes.

Examples of services based on gridded GHG monitoring and evaluation:

- **ClimateOS** by ClimateView is a collaborative decision-making platform for cities to plan, simulate and execute their climate transition (https://www.climateview.global/)
- **VisionCarbon** and **MeteoCarbon** by Origins.Earth is a tool for automating the evaluation of GHG emissions and defining reduction strategies (https://www.origins.earth/solutions)
- **Climate Plan Mapper** is a tool under development in the PAUL project, allowing to assess the expected changes in impacts in relation to various climate actions

Service platforms:

ClimateOS interface (by ClimateView)

Vision Carbon interface (by Origins.Earth)

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Existing of monitoring services

However, urban GHG monitoring is not directly connected to city needs…

- Cities are communicating progress in climate actions not continuously but rather when revisiting targets
- Systems are resource-heavy and require expertise and skill for use
- Progress in climate action also requires translation into sustainability impacts

Examples of services for broader sustainability assessment:

- **Mayors Indicators** (https://www.mayorsindicators.com/) is a service to follow Sustainable Development Goal (SDG) development on a municipal level, for the use of cities in Finland, Sweden, and in UK
- **The World Bank DataBank** (https://databank.worldbank.org/) is an online tool that contains data on a variety of topics, for example on World Development Indicators, SDGs, etc.

Situation in three PAUL pilot cities

- **Paris** has quite ambitious climate program initiated already in 2007 which has been regularly updated (although in previous elections the agenda was not popular)
- Program actions are communicated in public reports and stakeholder interaction is active
- However, there is no public portal for follow-on, and various initiatives are progressing in silos hidden from public
- Paris has a high accuracy network for CO2 monitoring, provided by AIRPARIF, an organisation responsible for monitoring air quality in the Paris agglomeration

- **In Munich,** climate program was developed with citizens: The basic decision on the Integrated Action Program on Climate Protection (IHKM) initiated already in 2008
- Every 3 years measures will be adopted as a climate protection programme under the Integrated Action Program
- However, no active or consistent public follow-up or monitoring of progress of climate program actions
- Munich has a permanent high accuracy network for CO2 monitoring operated by the Technical University of Munich (MUCCNet)

- **In Zurich,** there is an on-going climate program since 2014, and also a lot of citizen activism and involvement, pressure to political system
- Strategies and actions communicated on website
- However, no public follow-on of progress in climate program actions
- Zurich has mid-cost sensors for CO2 monitoring
- Development on the emission inventory together with EMPA (Swiss Federal Laboratories for Materials Science and Technology)

Summary of results

What types of CO2 monitoring services exist and how do they contribute to cities' climate program activities and follow-up?

- There exists only few examples on (even near) real-time monitoring; Rather, the monitoring data contributes to climate program action follow-on only indirectly
- The way climate program actions are monitored varies from action to another and has in general limited connections to monitoring data; Focus has been rather in setting strategies and targets, than in monitoring
- However, case studies and also scenario work is regularly done; Improvement done with impact indicators and inventories

What types of services could be connected to monitoring data?

- Obvious focus areas in climate progam action follow-on and validation
- A lot of potential for scaling-up as business, but still mixed interest

Typology for service development

Service focus	Target users, stakeholders
Real-time gridded GHG monitoring	Researchers; Private sector, intermediaries
GHG data translation into impact indicators	City planners, policy development; Researchers; Private sector, intermediaries
Climate plan action progress monitoring	City planners, policy development; General public
Scenario tools	City planners, policy development; Private sector, intermediaries
Impact assessment services	City planners, policy development; Private sector, intermediaries; General public
Compensation services	Private sector, intermediaries

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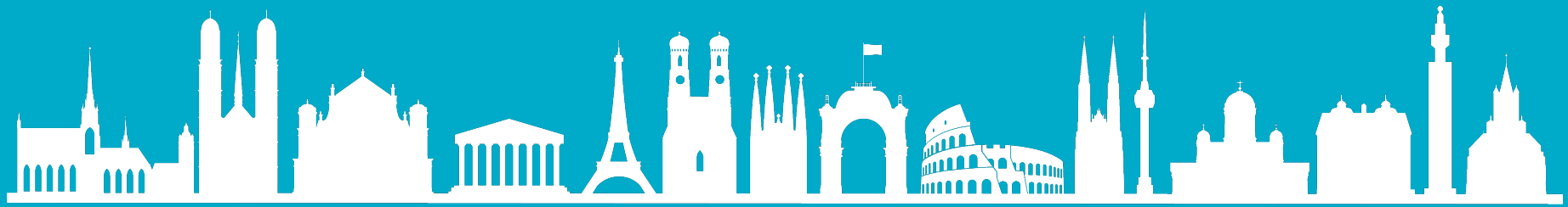
Example of service ideation process



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Service ideation

Example of service ideation co-design process:

- Workshop in PAUL project General Assembly meeting in March 2023
- Collaborative assessment and ideation supported with a working canvas and facilitated process

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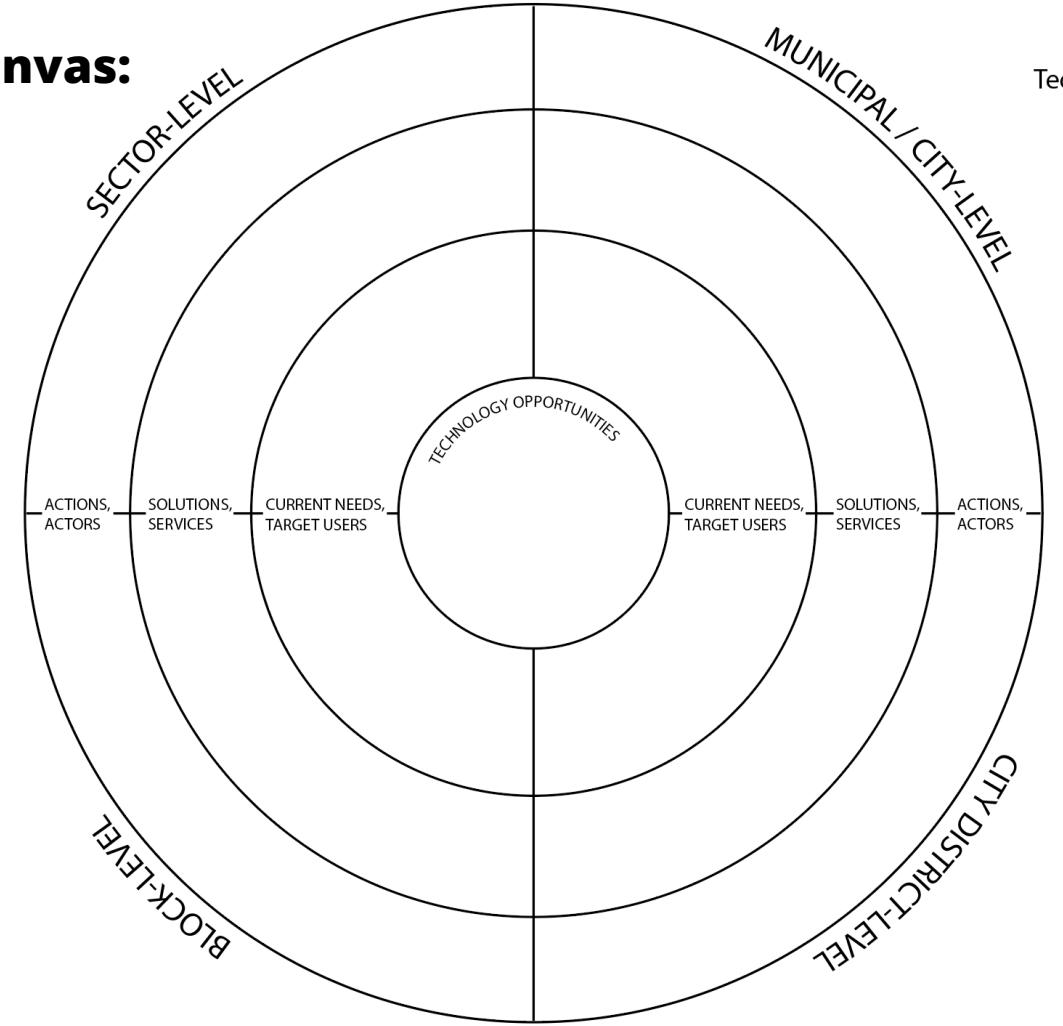
Working canvas:



POST-IT COLOURS:

- Technology opportunities, possibilities
- Needs or expectations
- Solutions & service ideas
- Actors and actions needed
- Barriers, gaps, challenges

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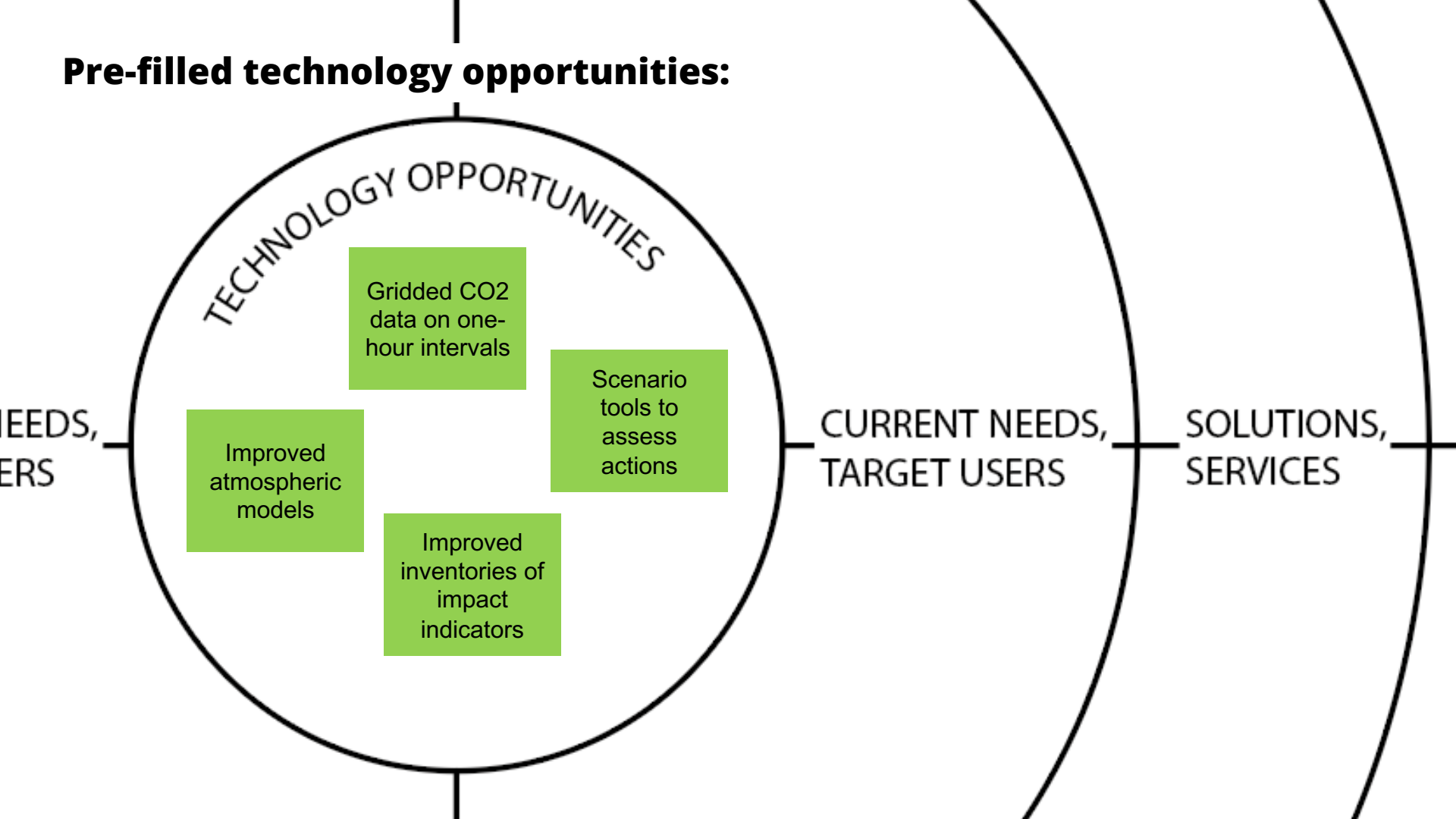
Pre-filled technology opportunities:



Analysis:

Technology opportunities

Needs or expectations

Barriers, gaps, challenges

Solutions & service ideas

Actors and actions

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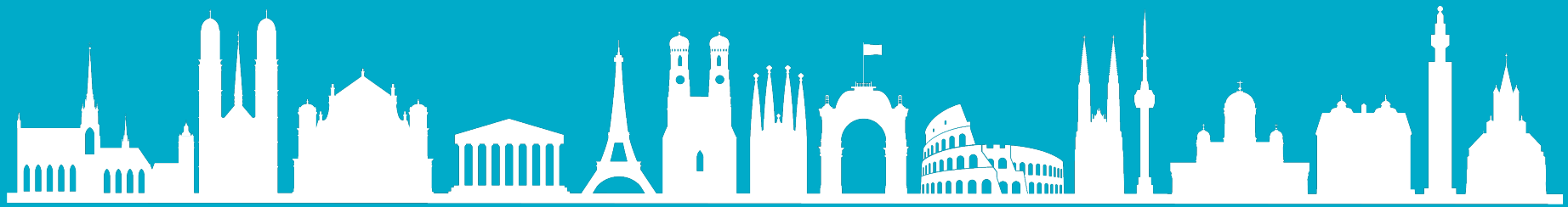
Interaction – ideating services



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Interaction for service ideation

While continuing to go through the results of the benchmarking report, please **contribute to the discussion** by answering questions on possible services and their importance.

We will utilise **presemo platform** for input…

Link for interaction: https://presemo.aalto.fi/paul2023/

Urban GHG monitoring services and city actors

In the city context, urban GHG monitoring data needs to be connected to climate actions for validation and planning.

Potential emphases in service design:

- Access to indicators on GHG impacts of various sectoral activities for assessment and planning of climate actions
- Support from research and intermediaries for monitoring impacts
- Tools to monitor and communicate on progress
- However, emphasis also on stakeholder communications…

Link for interaction: https://presemo.aalto.fi/paul2023/

Interaction results:

To what extent is gridded and/or real-time urban GHG monitoring important for city actors?

52% Very important

48% Somewhat important

0% Not that important

How and why is urban GHG monitoring important for the cities?

58% To monitor progress in climate strategy

32% To validate climate actions

0% For assessing new projects and developments

11% For stakeholder communications

(See additional text document for comments...)

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Urban GHG monitoring services and citizens and business

Services can also be envisioned for citizens and business, as users, providers, or stakeholders.

Potential emphases in service design for business:

- Access to indicators on GHG impacts of various sectoral activities for assessment and planning of climate actions
- Support from intermediaries for monitoring impacts
- Tools to monitor and communicate on progress

Potential emphases in service design for citizens:

- Easy-to-use services to assess and compare personal life-style impacts
- Services to assess impacts of various other activities and/or products or services

Link for interaction: https://presemo.aalto.fi/paul2023/

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Interaction results:

To what extent is urban GHG monitoring important for business actors?

33% Very important

50% Somewhat important

17% Not that important

In what way is urban GHG monitoring important for business?

17% Mainly as a business opportunity

83% As a requirement for future business

0% Only for internal development

(See additional text document for comments...)

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Urban GHG monitoring services and research community

Also research community benefits of services to access data and communicate results.

Potential emphases in service design for researchers:

- Access to data for research and, model and indicator development
- Support for scientific communication on results
- Support to connect to policy development

Link for interaction: https://presemo.aalto.fi/paul2023/

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Interaction results:

To what extent is service development on gridded GHG monitoring needed to support researchers' work?

100% Very important

0% Somewhat important

0% Not that important

Key comments & discussion:

What is needed by the research community?

- Access to raw data, i.e. no pre-analysis or very minimal pre-analysis needed
- Refined emission inventories from the cities

What type of actions (policy, regulation, standardisation) is needed to scale up research on urban GHG monitoring?

- Legal requirement on national level to monitor ghg in the same way as air pollution

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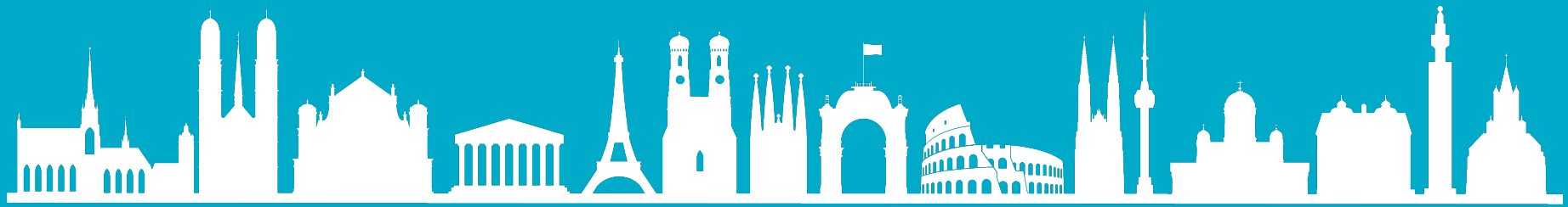
Summary of the session



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Summing up and next steps…

- **Work on ideation for services around urban GHG monitoring continues in 2023–2024** and concludes in a deliverable on service ideas and design approaches.
- Later on, the work in PAUL project WP1 Task 1.4 continues with service protoryping in 2024–2025, and concludes in a portfolio of services for the use of cities.
- **More interaction with PAUL City Network will follow later in Fall 2023…**
- We will also be in touch with the extended ICOS network!

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Thank you for participation… Q&A?

The benchmarking report with references:

https://www.icos-cp.eu/projects/icos-cities/deliverables

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