

Preliminary Information for the Health Surveillance Air Quality Pilot's Remote Athens Co- design Workshop

National Observatory of Athens (Pilot Lead) &
ARMINES - PARISTECH MINES (WP2)



e-shape

What is e-shape?

EuroGEO Showcases: Applications Powered by Europe

H2020 project **e-shape** positions Europe as a global force in Earth Observation (EO). **EuroGEO**, Europe's contribution to the Group on Earth Observation (GEO), brings together EO resources in Europe.

e-shape leverages **Copernicus**, making use of existing European capacities and improving user uptake of data. It **builds on existing EU GEO actions, GEO initiatives/flagships & Copernicus-related activities.**



health



agriculture



ecosystem



water



climate



disasters



renewable
energy sources

54 partners creating **27 cloud-based pilot** applications under **7 thematic areas**, which address societal challenges, foster entrepreneurship & support sustainable development (4 years grant).

Moving away from a data-centric to a user-driven approach

@eshape_eu
www.e-shape.eu



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PILOT 3

Health Surveillance Air Quality



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Pilot 3 Introduction

Global Service:

Using satellite data to look at trends of AQ and aggregate health risk index

Athens, Greece:

City-scale AQ modeling data + local health, land use, socioeconomic data



Helsinki / Porvoo / Turku, Finland:

Satellite derived emissions data for oil refinery in peri-urban areas



Vienna, Austria:

Existing citizen science platform + AQ functions (perceived AQ & health & local AQ data)

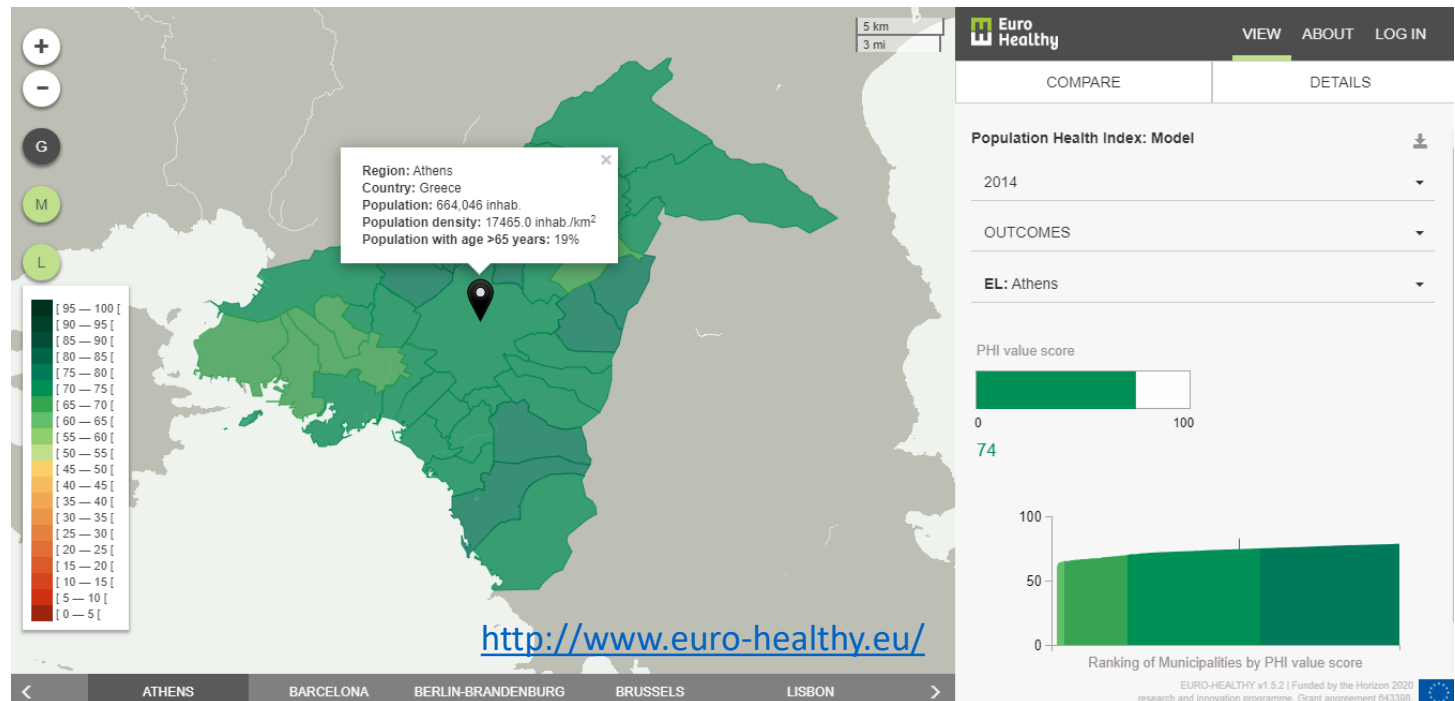


health



Current Landscape + Pilot Value Add

- Existing Euro-Healthy: “Shaping EUROpean policies to promote HEALTH equity” Project & platform (until 2014) displaying population health index for some municipalities
- Our Health Surveillance Air Quality Pilot builds off this as a broad starting point ADDING higher resolution/detailed air quality information, health and socioeconomic data at the municipality level based off user needs

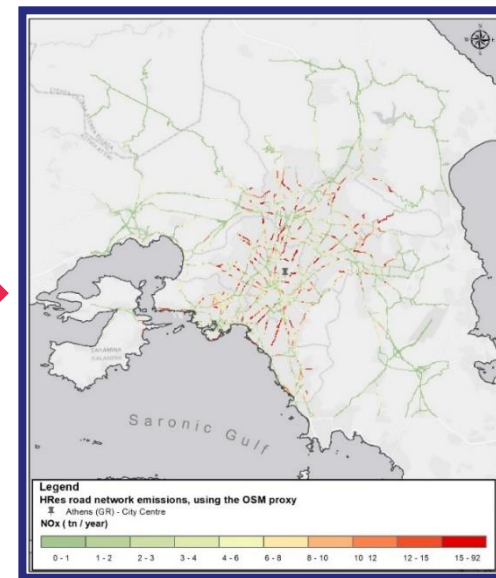
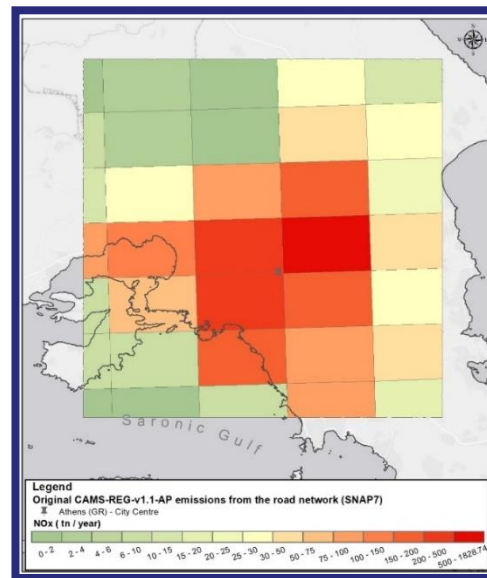
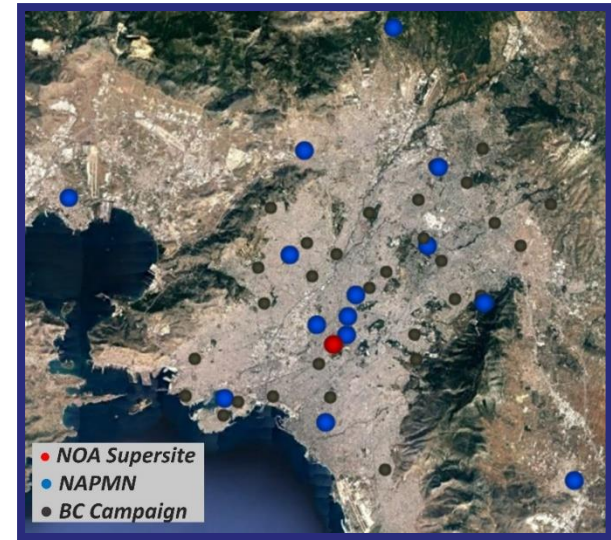




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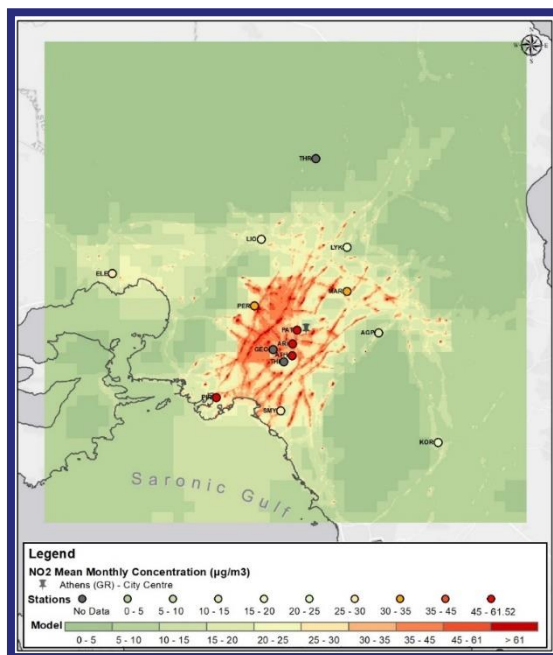
Focus on Athens Air Quality

- High resolution air quality product with city scale modeling – resolution below 1km
- Key regulated pollutants (O_3 , NO_2 , PM_{10} , CO) and BC
- Integrates CAMS regional AQ ensemble forecast, prognostic meteorological model & high-resolution emission inventory (incorporating low/mid-cost smart sensor measurements)



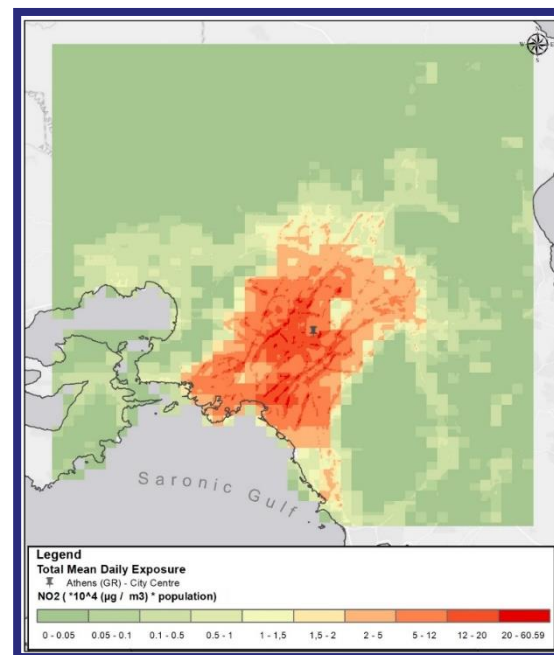
High resolution air pollution emission fields – downscaling CAMS

Building a multi-faceted health surveillance service for Athens (at the municipality level)



Health

- 1980-2016 number of deaths from respiratory & cardiovascular causes (age/sex)
- 1980-2017 daily number of deaths
- Number of hospital beds/doctors/etc.



Socioeconomic

- Inhabitants per square kilometer
- GDP per capita
- % unemployed

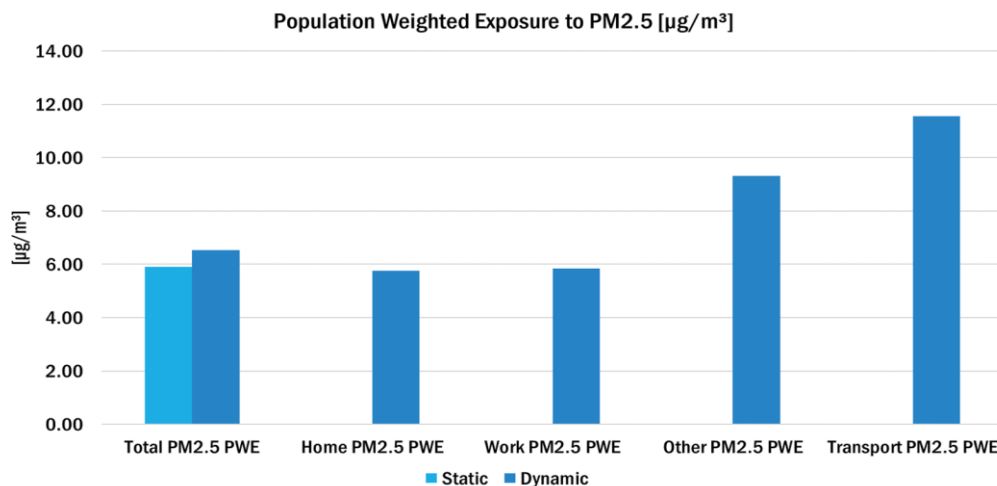
Building a multi-faceted health surveillance service for Athens

Health

- Dynamic population exposure
- Utilisation of Health Impact Assessment PAQ Tool (health loss related to air quality/financial cost)
- Other datasets identified through co-design & interaction with Pilot users

Socioeconomic

- Global Human Settlement Layer – uniform population density grid using built-up area & census information
- Other datasets identified through co-design & Interaction with Pilot users



Static vs. Dynamic - Population Weighted Exposure Athens
December 2018

This is where we need
YOUR input, help,
guidance & data!



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CO-DESIGN PROCESS

WP2



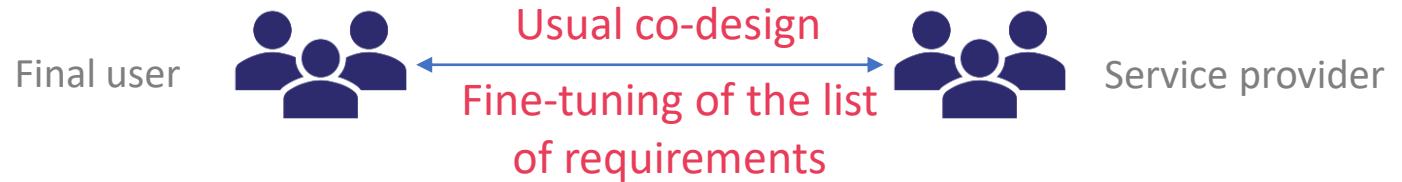
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Co-design in e-shape

Co-design adapted to the Earth Observation context

- Specificities of Earth Observation (EO) context → need of a **specific co-design methodology**, built and experimented in e-shape, in **two phases: (1) diagnosis process (2) implementation of co-design actions**

Usual
context



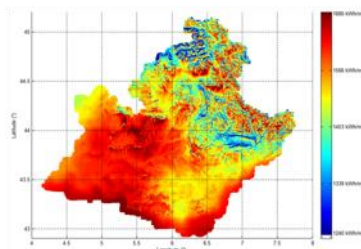
Value for end user ← « Distant » relationship → EO data



Logistics for winter tire change

From the user's point of view,
not self-evident that EO data
might be useful

?



Solar energy potential

?

Even when there are existing usages → what
evolution? → constant invention of new usages...

EO
context

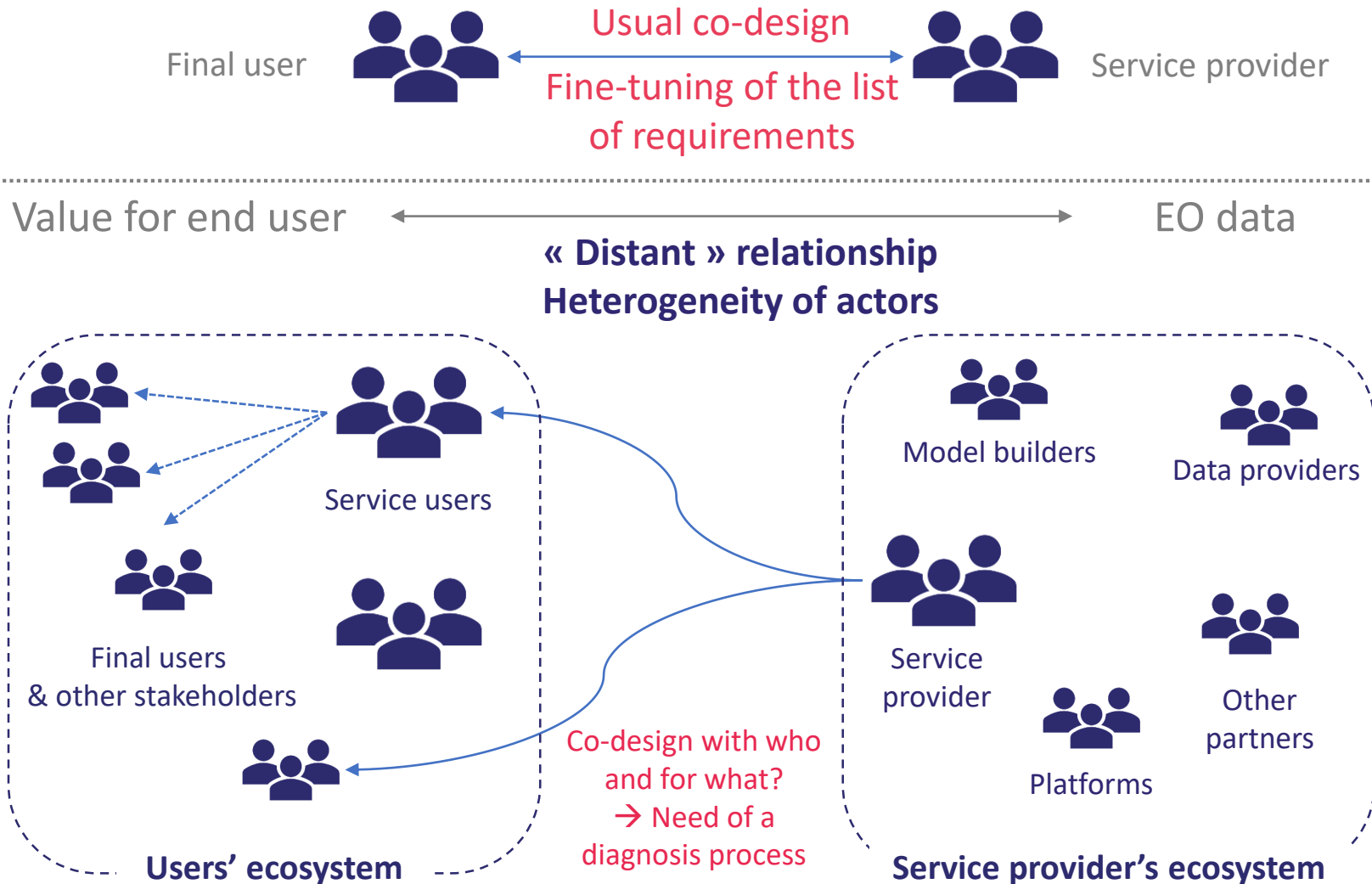


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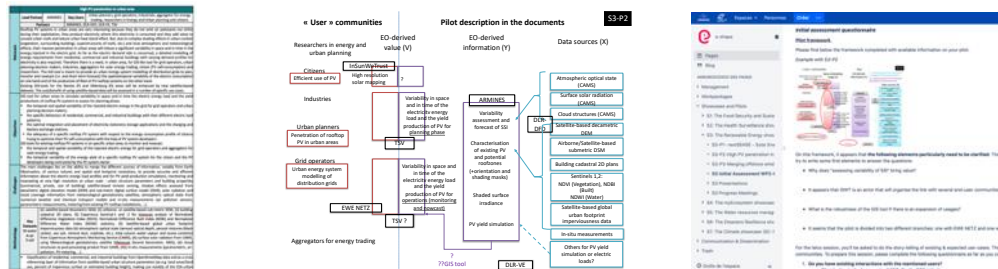


Co-design in e-shape

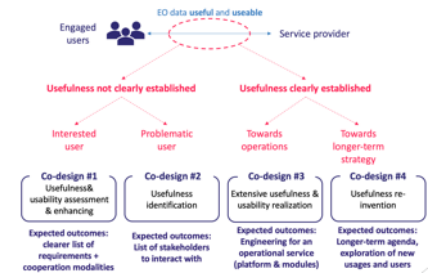
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Diagnosis process



Representation of each pilot on a « value – information – data » framework



Identification of co-design needs

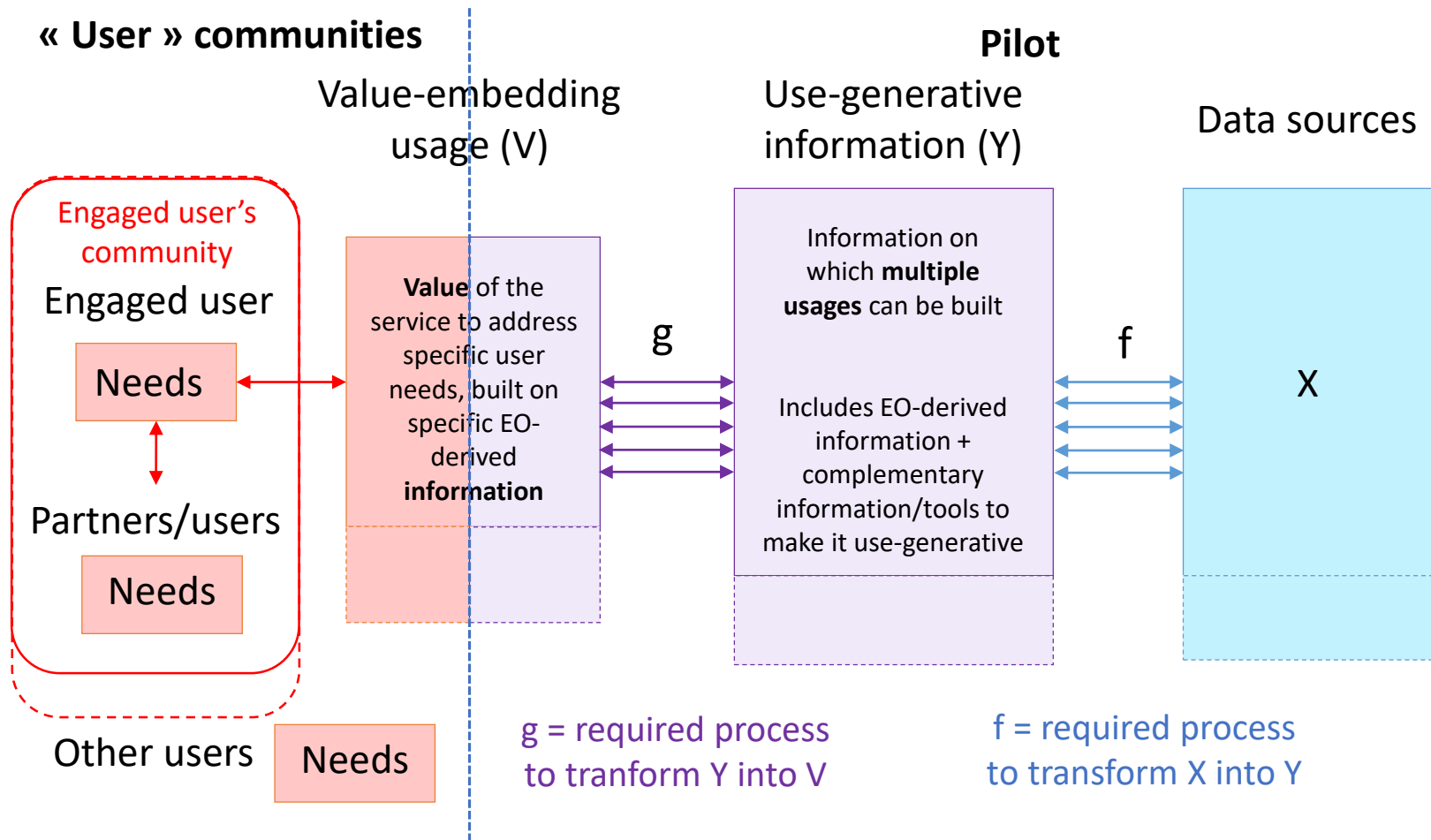
Implementation of co-design actions

Workshop adapted to the identified co-design needs
→ **Today workshop**



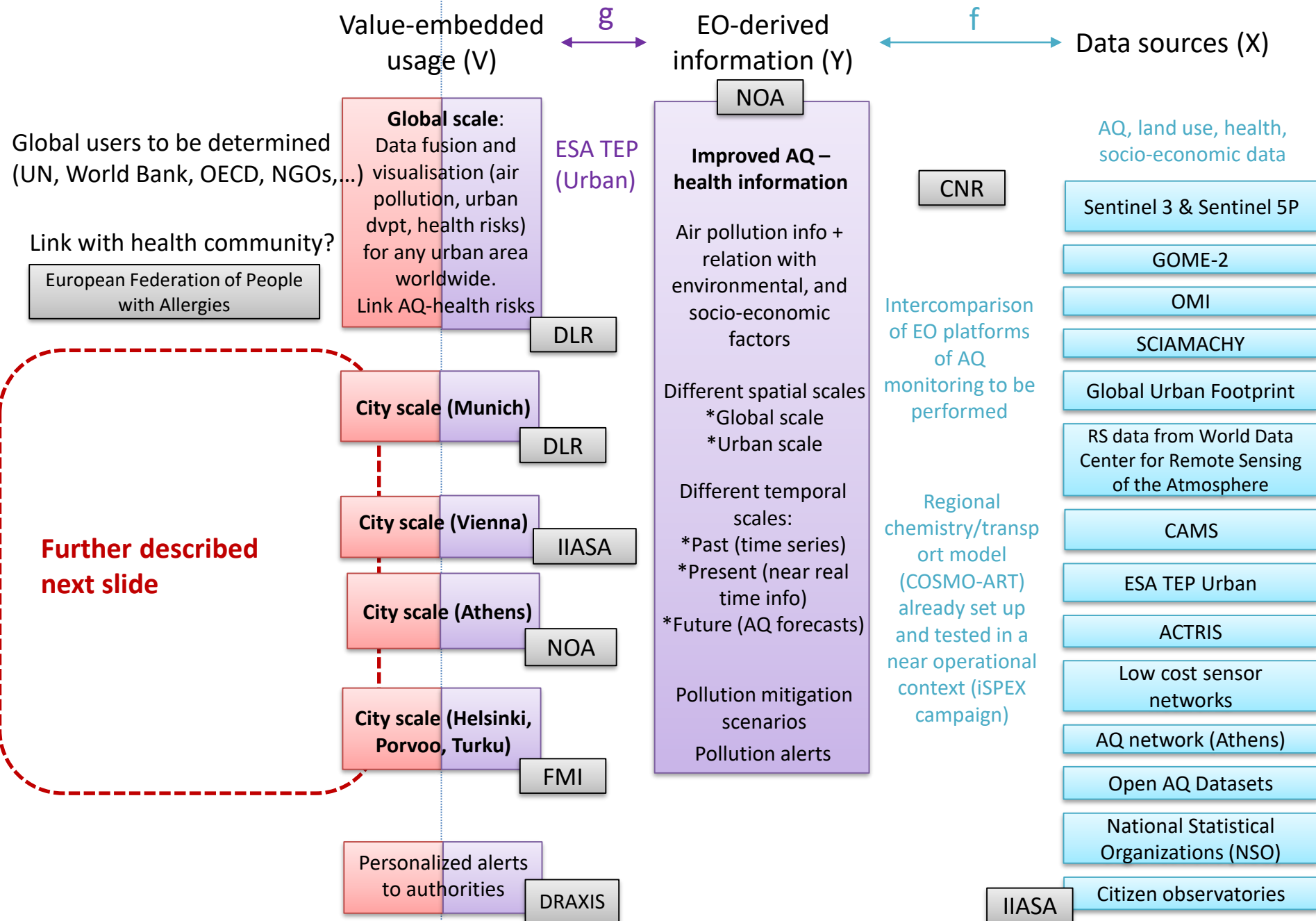
Diagnosis of co-design needs for each pilot

- 1st tool: representation of each pilot with a « value-information-data » framework



« User » communities

e-shape pilot « Air quality & Health »



« User » communities

Value-embedded
usage (V)

g

e-shape pilot « Air quality & Health »

EO-derived
information (Y)

f

Data sources (X)

National authorities: Federal German Environment Agency, Bavarian Ministry of the Environment & Consumer Protection

City scale (Munich)
Testing satellite derived AQ at city level

DLR

National authorities: Austria Environmental Agency

City scale (Vienna)
AQ-health impact + Citizen-based data

IIASA

National authorities: Hellenic Statistical Authority, Greek National Public Health Organisation, Ministry of Environment & Energy
Cities/municipalities: Athens, Region of Attica
Private sector: Karavias Insurance Company, OpenHouse Real Estate
Other networks: Sustainable City Network, PANACEA RI

City scale (Athens)
AQ-health impact tools

NOA

National authorities: Finnish Ministry of Environment, Helsinki Region Environmental Authorities
Cities/municipalities: Helsinki, Porvoo, Turku

Private sector: NESTE refineries

City scale
Focus on local emissions from industry

FMI

Personalized alerts to authorities

DRAXIS

NOA

Improved AQ – health information

Air pollution info + relation with environmental, and socio-economic factors

Different spatial scales

*Global scale

*Urban scale

Different temporal scales

*Past (time series)

*Present (near real time info)

*Future (AQ forecasts)

Pollution mitigation scenarios

Pollution alerts

CNR

Intercomparison of EO platforms of AQ monitoring to be performed

Regional chemistry/transport model (COSMO-ART) already set up and tested in a near operational context (iSPEX campaign)

AQ, land use, health, socio-economic data

Sentinel 3 & Sentinel 5P

GOME-2

OMI

SCIAMACHY

Global Urban Footprint

RS data from World Data Center for Remote Sensing of the Atmosphere

CAMS

ESA TEP Urban

ACTRIS

Low cost sensor networks

AQ network (Athens)

Open AQ Datasets

National Statistical Organizations (NSO)

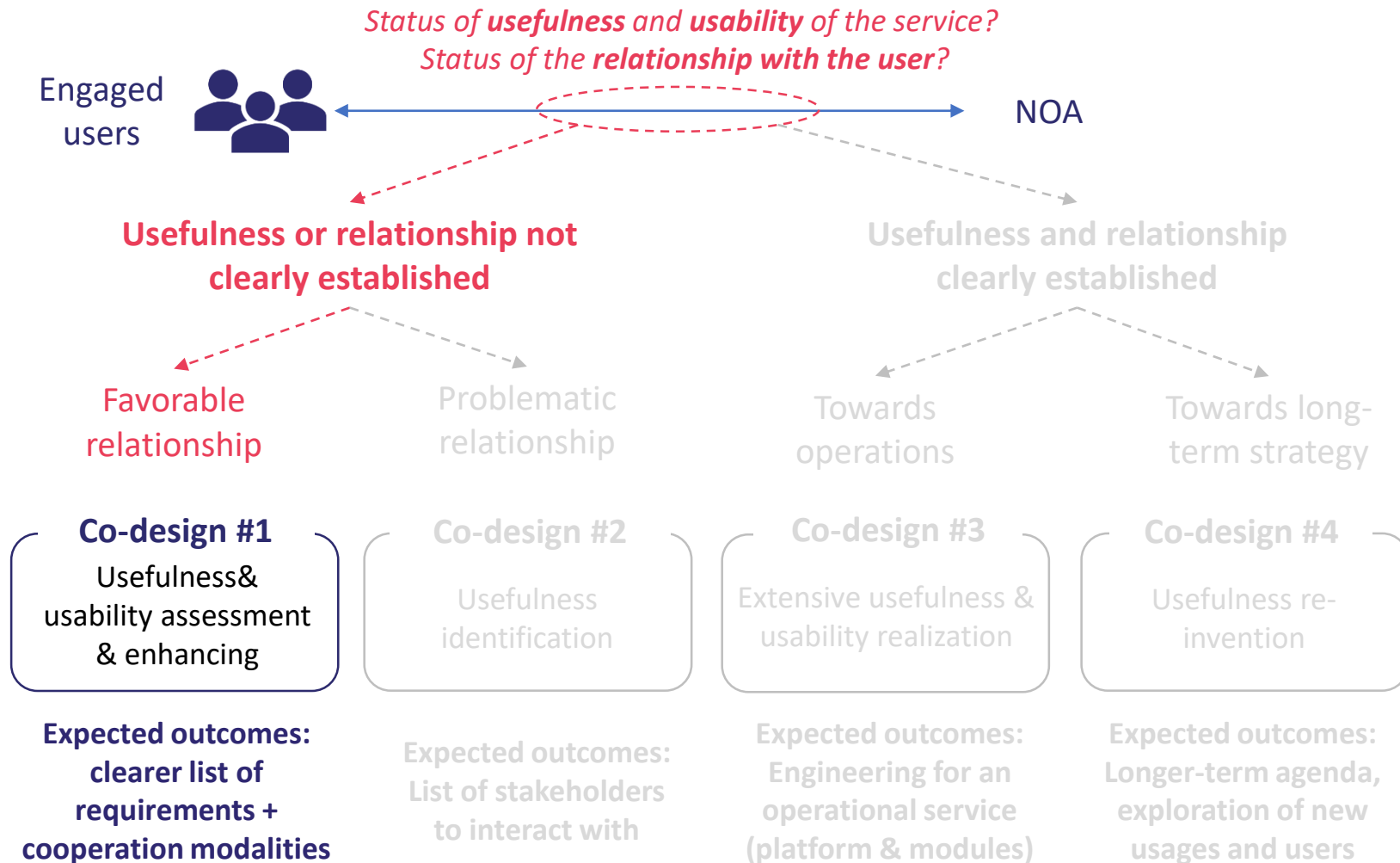
Citizen observatories

IIASA



Diagnosis of co-design needs for NOA's sub-pilot

- e For NOA's sub-pilot: outcomes of the 1st phase of diagnosis = co-design type 1.
→ diagnosis followed by implementation of co-design actions, initialised through this workshop





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WORKSHOP PREPARATION

objectives – agenda – questions for participants



Workshop objectives

Workshop topic

Co-design with potential service users to build an air quality & health surveillance platform in Athens

- e Objective: *assessing and enhancing the list of requirements of the service for the different users.*
- e Expected outcomes:
 1. **Broader range of potential lists of requirements** (related to different types of data-driven actions, from short-term to long-term)
 2. « **Building blocks** » for further development of the service (knowledge shared by participants, identification of missing knowledge/competencies)
 3. **Coordination modalities** between NOA and participants for further development of the service



Workshop agenda

- e **9h - 9h05** – Welcome: Introduction to e-shape
- e **9h05 - 9h15** – Method presentation (MINES ParisTech team)
- e **9h15 – 9h30** - Health Surveillance Air Quality Pilot (Showcase 2 Pilot 3): EO-based pollution-health risks profiling in the urban environment (NOA team)
- e **9h30 – 10h45** – Knowledge exchange by each participant (see next slide for guiding questions)
- e **10h45 – 10h55** - Break
- e **10h55 – 11h45** - Enriching the lists of requirements based on participants' inputs and assessing potential users' involvements (participants + new actors)
 - e *1st generation service: improvement of the service with functions that could be immediately integrated*
 - e *2nd generation services: quick & smart realizations of dream functions*
 - e *3rd generation services: resources to make accessible dream functions*
- e **11h45 – 12h** - Wrap up and next steps



Specific questions to be prepared in advance by each participant for the knowledge sharing phase

- e What are your current operations that would potentially benefit from the Athens service?
- e According to what was presented by NOA, what would you do with this service?
 - e If you use the service for monitoring purposes, what information would you like to monitor?
 - e What types of actions in your operations would it potentially support?
 - e Beyond using the service for your current workflows, how could the service help you to develop new operations or services on a longer-term perspective?
- e What would be the constraints, drawbacks and risks of using the Athens service?
- e If you forget the current technological/resource constraints, what Earth Observation applications would you dream of?