Development and Consolidation of Geospatial Sustainability Services for Adaptation to Environmental and Climate Change Urban Impacts

The **DECUMANUS** project

General presentation

decumanus

European Commission

indra

CONTENT

DEVELOPMENT AND CONSOLIDATION OF GEOSPATIAL SUSTAINABILITY SERVICES FOR ADAPTATION TO ENVIRONMENTAL AND CLIMATE CHANGE URBAN IMPACTS



EO-based Smart City Decision Support Services for Integrated Urban Governance

FP7 cofounded leaded by Indra Sistemas

Theme [SPA.2013.1.1-06]: Stimulating development of downstream services and service evolution

Project Start: December 2013

Project End: May 2016

THE CONSORTIUM - COMPLEMENTARY

Earth Observation Services providers

Urban users expert

Business model

City users

indra

DLR

POLITÉCNICA

EUROSENSE

GeoVille

UWE BRISTOL University of the West of England

CWare

HSY

THE ROYAL BOROUGH OF KENSINGTON AND CHELSEA

Milano Comune di Milano

¡MADRID!

CONTENT

WHAT IS THE REACTION OF THE EUROPEAN UNION IN FRONT OF THE IMPACT OF CLIMATE CHANGE IN EUROPEAN CITIES?

Some legislations face the problem and drive to the cities to change their behavior, their status and their habits. Related European Directives:

- Directive 2012/27/EU of the European parliament and of the council of 25 October 2012 fro Energy Efficiency Directive
- Directive 2009/28/CE of the European Parliament and the Council, 23th April 2009 for the promotion of the use of energy from renewable sources
- European Energy Strategy 20-20-20 and the Roadmap 2030-2050
- European Directive 2010/31/UE for Zero emissions buildings
- European Directive 2012/27/UE –Article 4 and 5 for rehabilitation of buildings
- European Directive 2008/50 and 2004/107 about Air Quality
- Municipalities Urban planning and strategies for mitigation and adaptation to the climate change

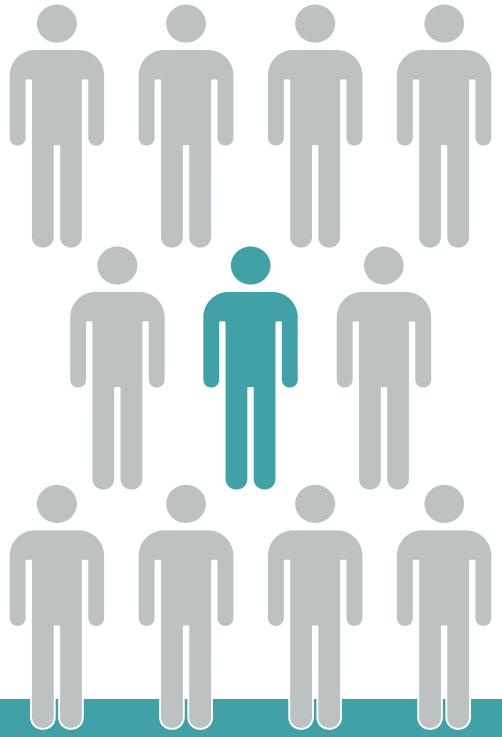
HOW DO THESE IMPACTS AFFECT OUR LIFE?: CITIZENS

- How much does climate change affect our cities?
- How green are our cities?
- How many people are affected by climate change effects?
- How much energy do our buildings lose?
- How high is the air pollution in our cities?
- How does bad air quality affect our daily life?

WHAT CAN WE DO?

The key to effective governance of cities is the generation of the necessary intelligence to inform decision making by politicians,

- to guide urban policy making and implementation
- to inform and engage all citizens in the delivery of sustainable urban development



DECUMANUS is dedicated to provide this urban intelligence, and aims fundamentally to secure the more effective governance of the cities of Europe.

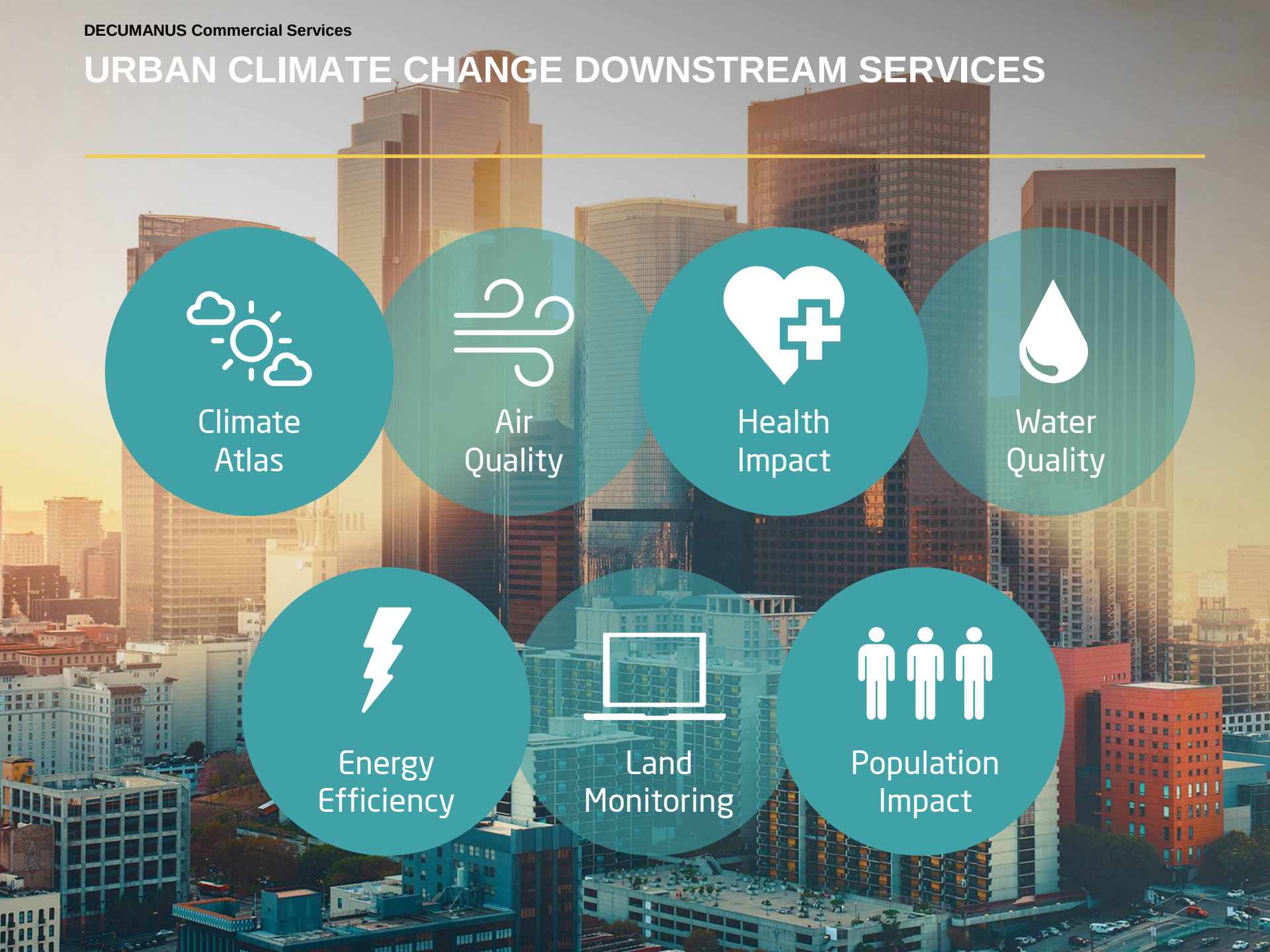
WHAT DO WE PROVIDE?

DECUMANUS provides services accessible to urban managers dealing with societal challenges including climate change, based on the philosophy that it is possible to adapt to, and mitigate, the challenges if you can understand and measure them.

CONTENT

DECUMANUS Commercial Services

URBAN CLIMATE CHANGE DOWNSTREAM SERVICES

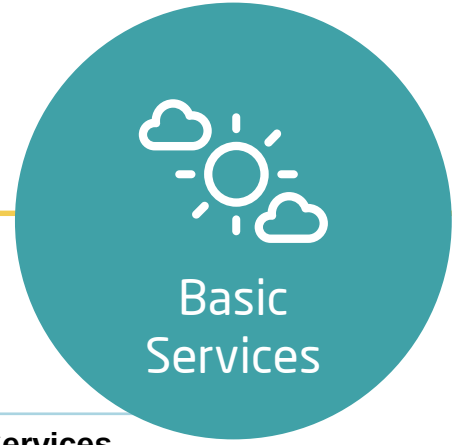


TWO KIND OF PRODUCTS

- 90 indicators
- Open and free access
- Obtained from open sources
- Low detail: district/city level
- Reproducible methodologies in any city

- 56 different indicators
- According to cities requirements
- Obtained from sources not always free access: high value added
- Very high detail: building level
- Advanced processing chains.

THE SERVICES: BASIC SERVICES



Basic Services	
Users requirements	✓
Products definition and development	✓
Users feedback	✓

Quantification of Basic Services	
Nº of services	7
Nº of products	75

Basic Services: products	Nº	Coverages
Climate Atlas and air Quality indicators	34	Europe and 5 cities
Healt Impact indicators	24	5 cities
Energy Efficiency	3	5 cities 1 product for all Europe
Land Monitoring	2	5 cities 1 product for all Europe
Population Impact assessment	2	5 cities
Water Quality	5	5 cities

THE SERVICES: BASIC SERVICES

CLIMATIC PARAMETERS

- Precipitation
- Sensible Heat Flux
- Temperature
- Zonal Wind Component
- Meridional Wind Component
- Heat waves
- Humidex
- Maximum Temperature
- Minimum Temperature
- Precipitation Events
- Summer Days
- Tropical Nights

AIR QUALITY

- Carbon Monoxide
- Nitrogen Dioxide
- Ozone
- Particle Matter
- Sulphur Dioxide

LAND MONITO

- Urban Growth
- Impervious Surface

HEALTH INDICATORS

- Respiratory Hospital Admissions
- Changes in Cardiovascular Hospital Admissions
- Changes in Respiratory Hospital Admissions
- Mortality – All causes
- Mortality – Cardiovascular causes
- Mortality – Respiratory causes
- Mortality +65 years – All causes
- Mortality +65 years – Cardiovascular causes
- Mortality +65 years – Respiratory causes
- Changes in mortality – All causes
- Changes in mortality – All Cardiovascular causes
- Changes in mortality – All Respiratory causes
- Mortality +65 years – All causes
- Mortality +65 years – Cardiovascular causes
- Mortality +65 years – Respiratory causes
- Changes in mortality – All causes
- Changes in mortality – All Cardiovascular causes
- Changes in mortality – All Respiratory causes

ENERGY EFFICIENCY

- Heat Loss
- Building Relative Emission
- Light Emission

WATER QUALITY

- Hidrocarbons
- CDOM
- Turbidity
- Clorophil
- Sea Surface Temperature

POPULATION IMPACT

- Population disagregation grid
- Population impact for: (*)
  - Heat loss
  - Light emissions
  - Health indicators
- Light emissions normalized by population for Europe (*)

THE SERVICES: PREMIUM SERVICES

Premiun Services	
Users requirements	✓
Products definition and development	✓
Users feedback	✓

Quantification of Premium Services	
Nº of services	7
Nº of products	91

Premium Services: products	Nº	Coverages
Climate Atlas and air Quality indicators	40	Milan
Healt Impact indicators	30	Milan
Energy Efficiency	11	Helsinki
Land Monitoring	3	RBCK
Population Impact assessment	2	Helsinki
Water Quality	5	Helsinki, Madrid, London (TBC)

THE SERVICES: PREMIUM SERVICES

CLIMATE CHANGE ATLAS

- Precipitation
- Sensible Heat Flux
- Temperature
- Zonal Wind Component
- Meridional Wind Component
- Heat waves
- Pedestrian Wind and Thermal comfort
- Humidex
- Maximum Temperature
- Minimum Temperature
- Precipitation Events
- Summer Days
- Tropical Nights
- Energy fluxes

HEALTH INDICATORS

- Respiratory Hospital Admissions
- Changes in Cardiovascular Hospital Admissions
- Changes in Respiratory Hospital Admissions
- Mortality – All causes
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- Mortality +65 years – Respiratory causes
- Changes in mortality – All causes
- Changes in mortality – Cardiovascular causes
- Changes in mortality – Respiratory causes

AIR QUALITY

- Carbon Monoxide
- Nitrogen Dioxide
- Nitrogen Monoxide
- Ozone
- Particle Matter (PM10)
- Sulphur Dioxide

ENERGY EFFICIENCY

- Full thermographic mosaic
- Roof insulation map

District heating: leakage detection

- Luminance map
- Over-exposure map
- EN classification map
- True-color ortho-photo
- Relative brightness map
- Redness index
- Full-resolution insolation map
- Suitable areas for photovoltaic modules
- Max. potential annual electricity yield
- Max. potential annual CO_2 savings

LAND MONITORING

- Green Roof Detection
- Green Roof Potential
- Tree Location

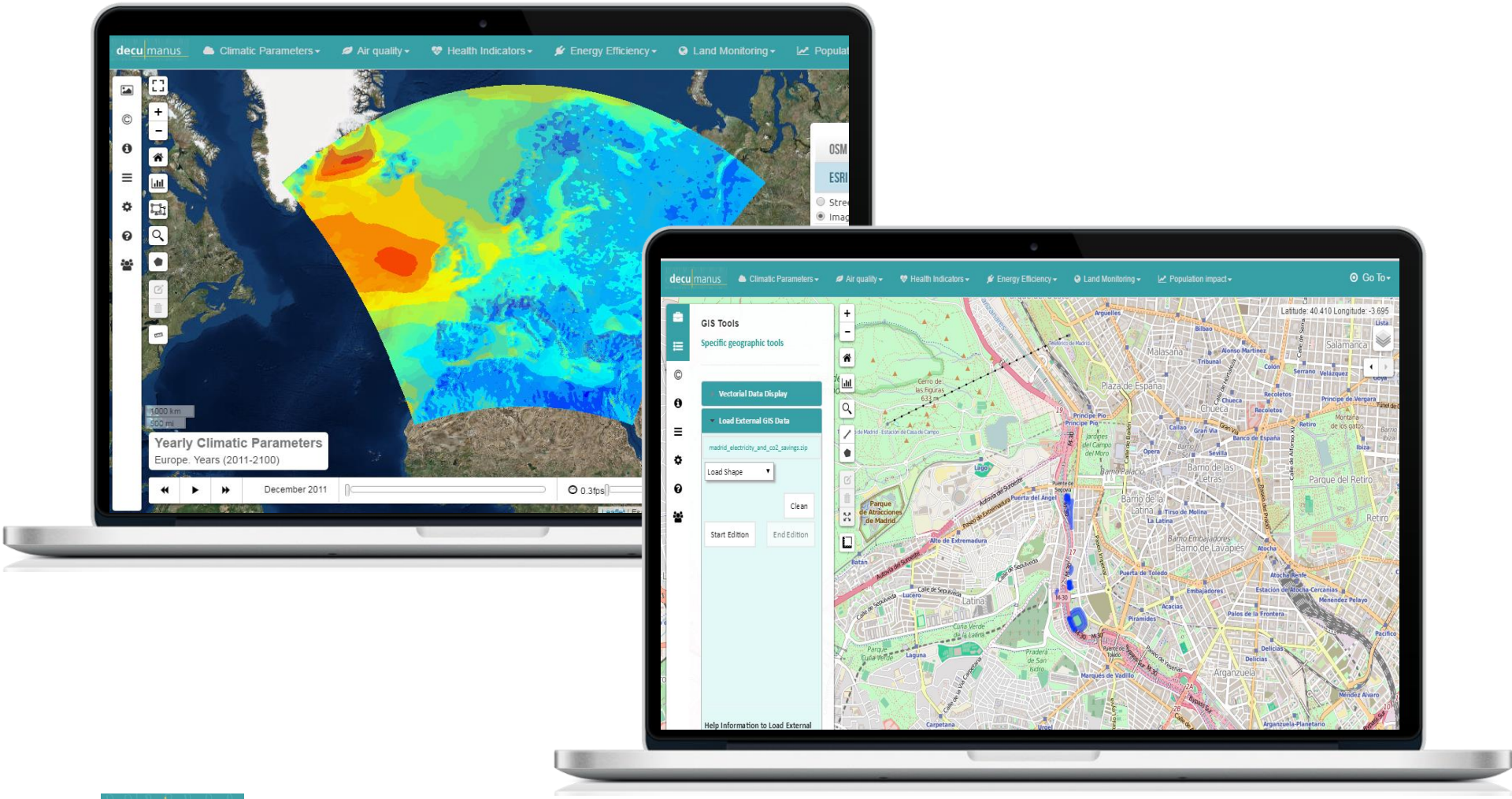
WATER QUALITY

- Hidrocarbons
- CDOM
- Turbidity
- Clorophil
- Sea Surface Temperature

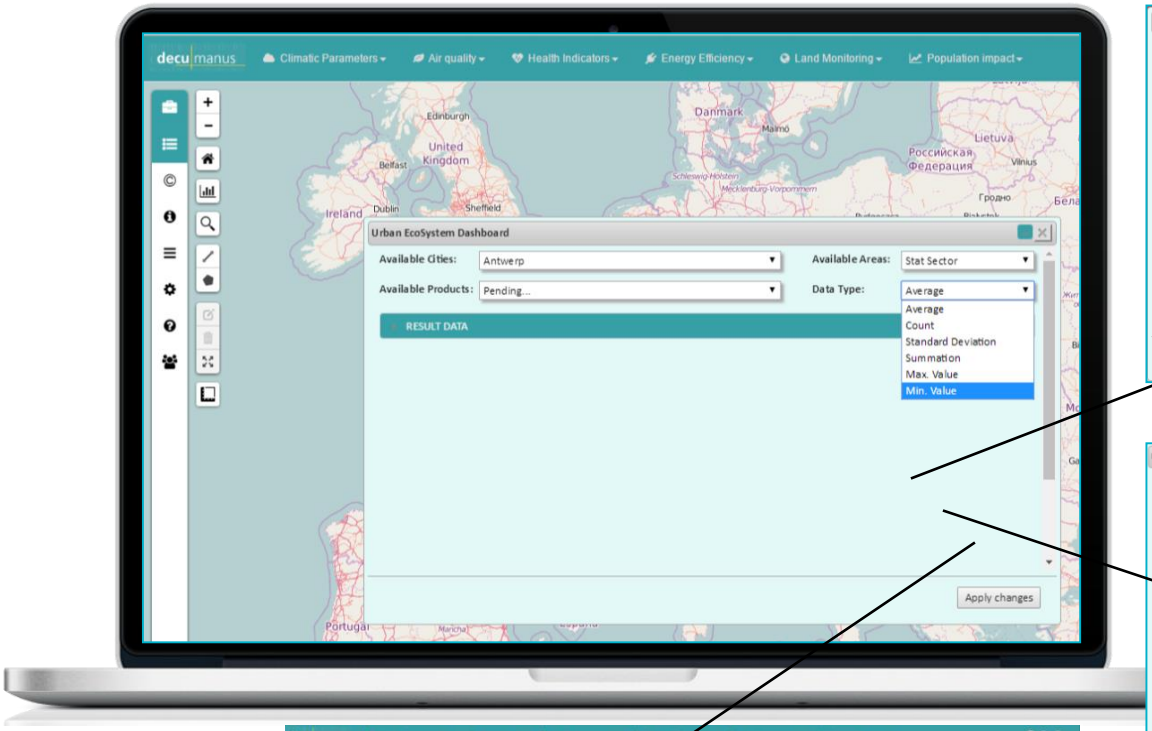
POPULATION IMPACT

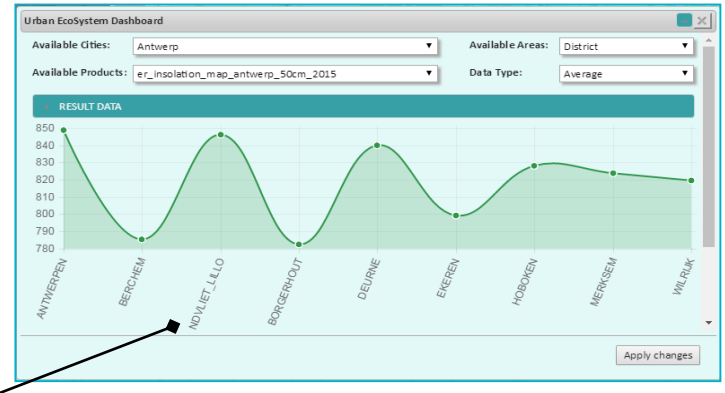
- Population disagregation grid
- Population impact for: (*)
  - Heat loss
  - Light emissions
  - Health indicators
- Light emissions normalized by population for Europe (*)

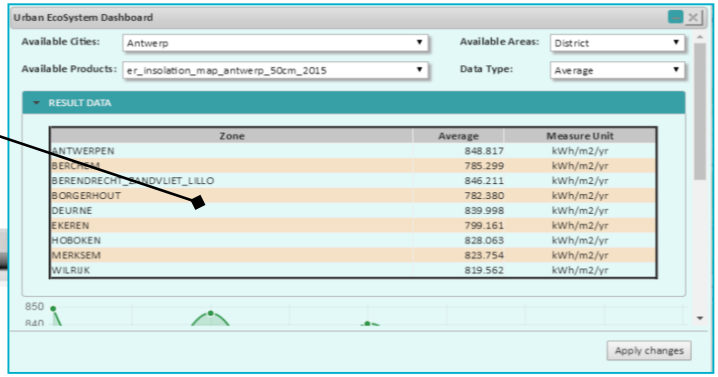
THE DECUMANUS GEOPORTAL WITH SOCIAL MEDIA AND *IN SITU* DATA INTERACTIONS

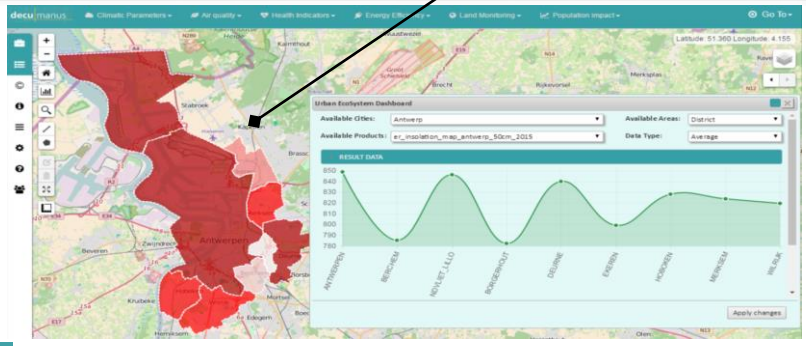


THE DECUMANUS GEOPORTAL FOR DATA ANALYSIS







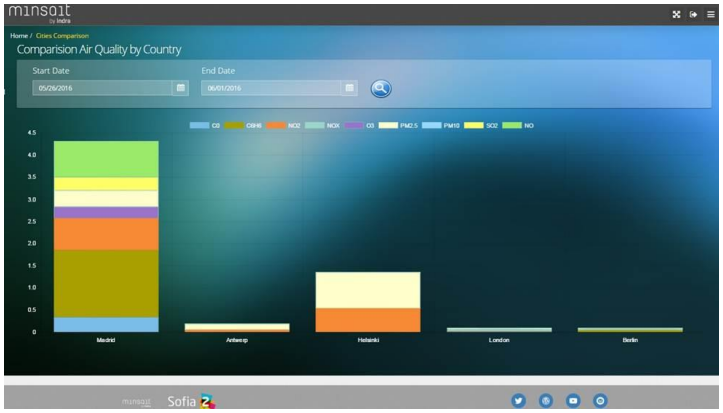


Possibility to make ad-hoc or pre-made consultation and view it in graphs, Tables and maps

THE DECUMANUS GEOPORTAL FOR DATA ANALYSIS

European Air
Quality *in situ* networks

Social Media connections.
Citizens feelings monitoring



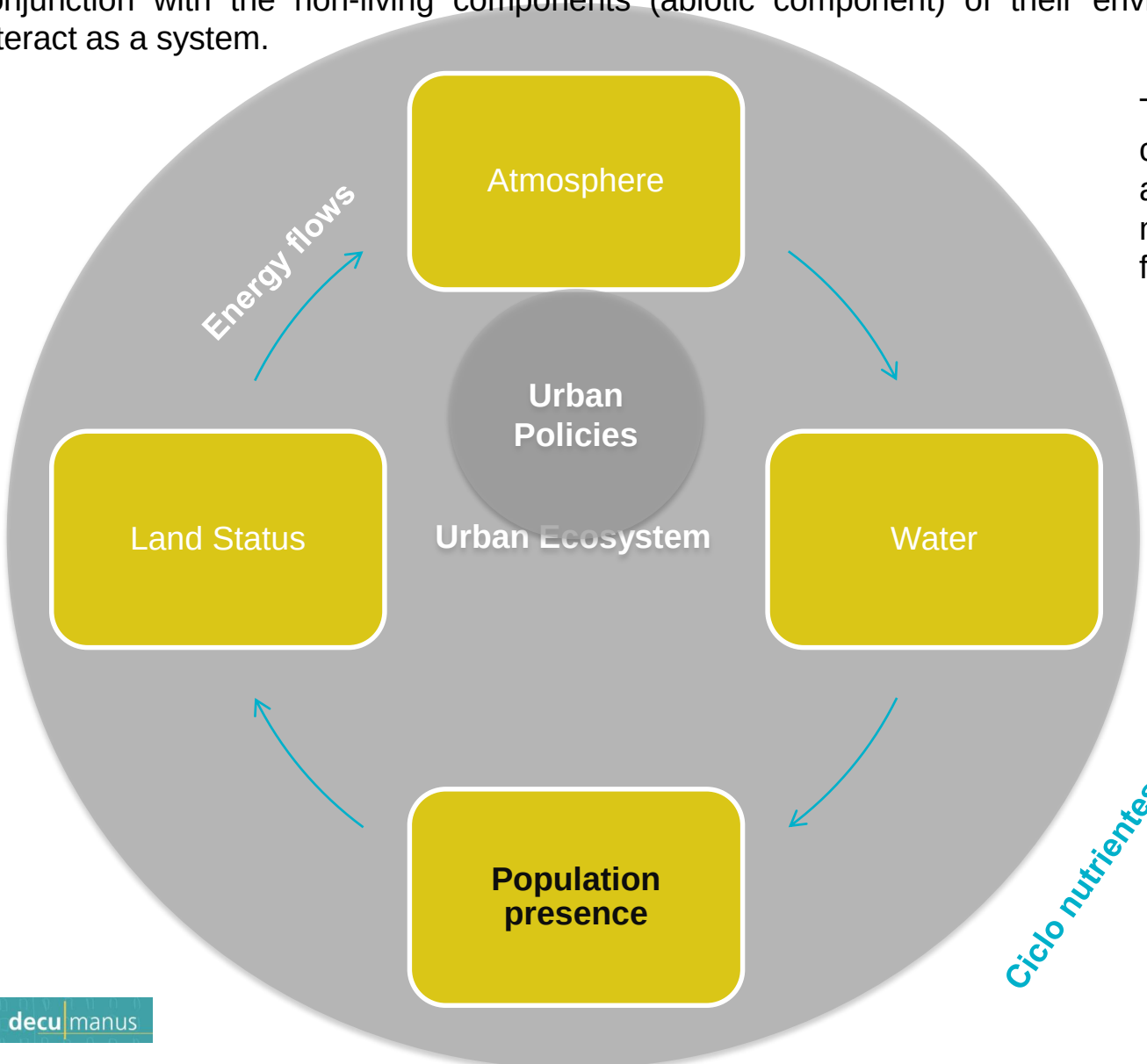
CONTENT

THE CHALLENGES: THE COMMERCIAL DOWNSTREAM SERVICES

Data + technology + ideas.
Smart Donwstream services are empowered with latest technological trends in data management.

THE CHALLENGES: THE URBAN ECOSYSTEM

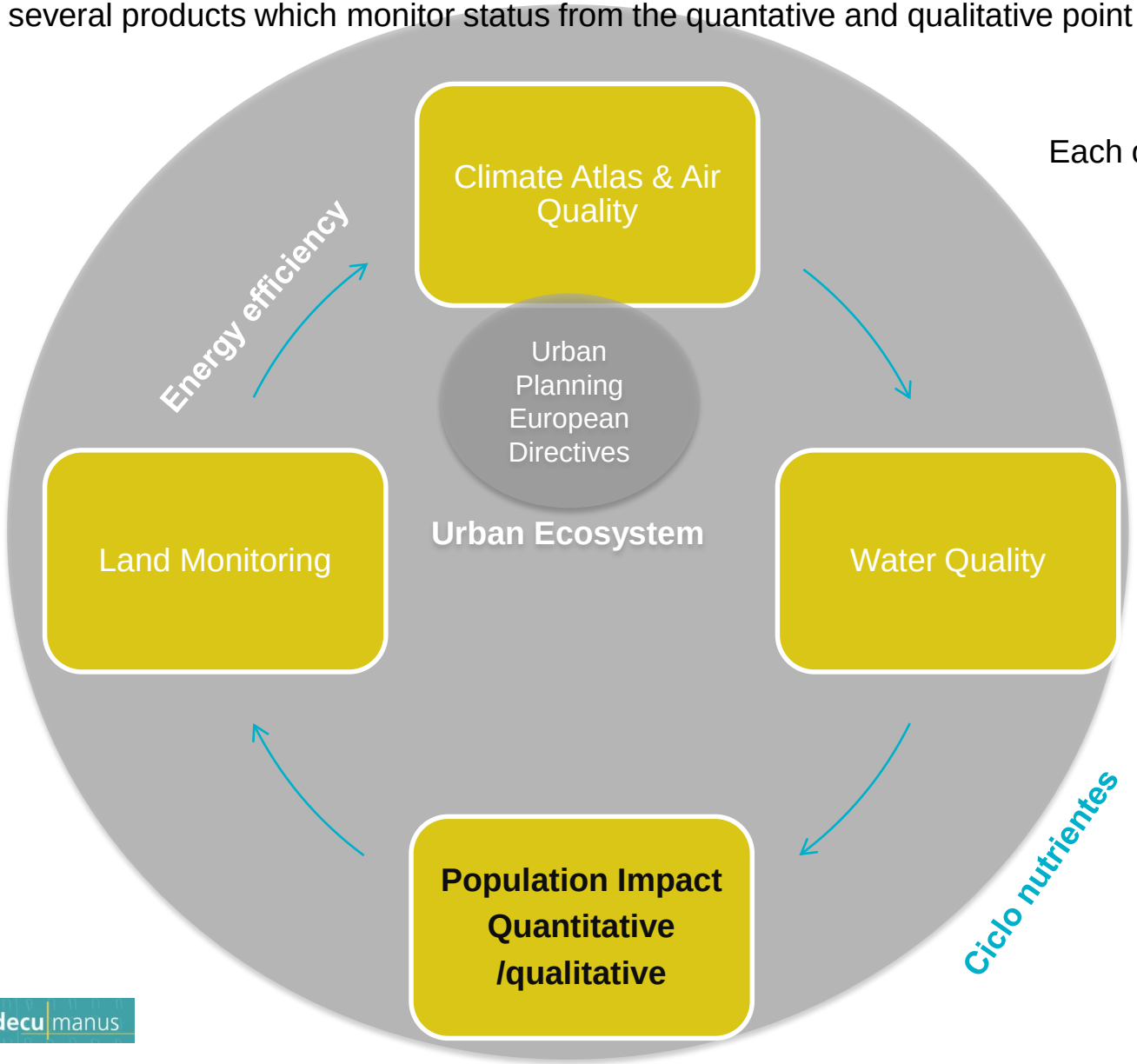
An ecosystem is typically defined as a community of living organisms (biotic components) in conjunction with the non-living components (abiotic component) of their environment which interact as a system.



These biotic and abiotic components are regarded as linked together through nutrient cycles and energy flows.

THE CHALLENGES: THE URBAN ECOSYSTEM

DECUMANUS translates each of the Urban Ecosystem components into a Service composed by several products which monitor status from the quantative and qualitative point of view.



Each of the service individually

Gracias por vuestra atención

¿Interesado en aceptar nuestros retos?
¿Interesado en proponernos un reto?

Contacta
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