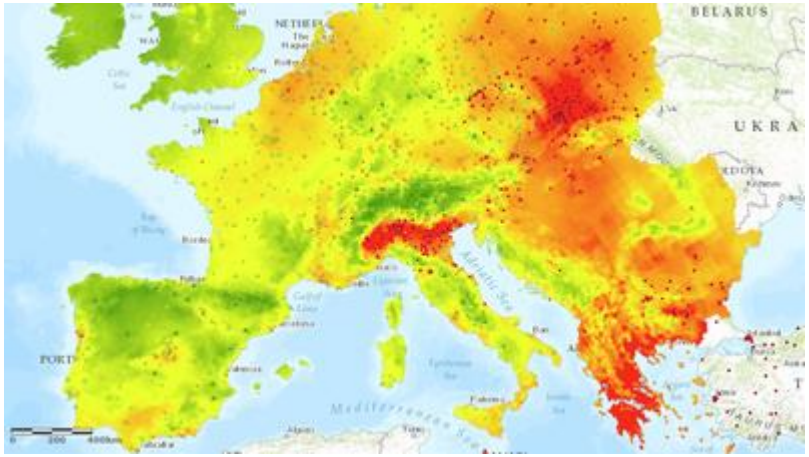
Małopolska
in a healthy atmosphere

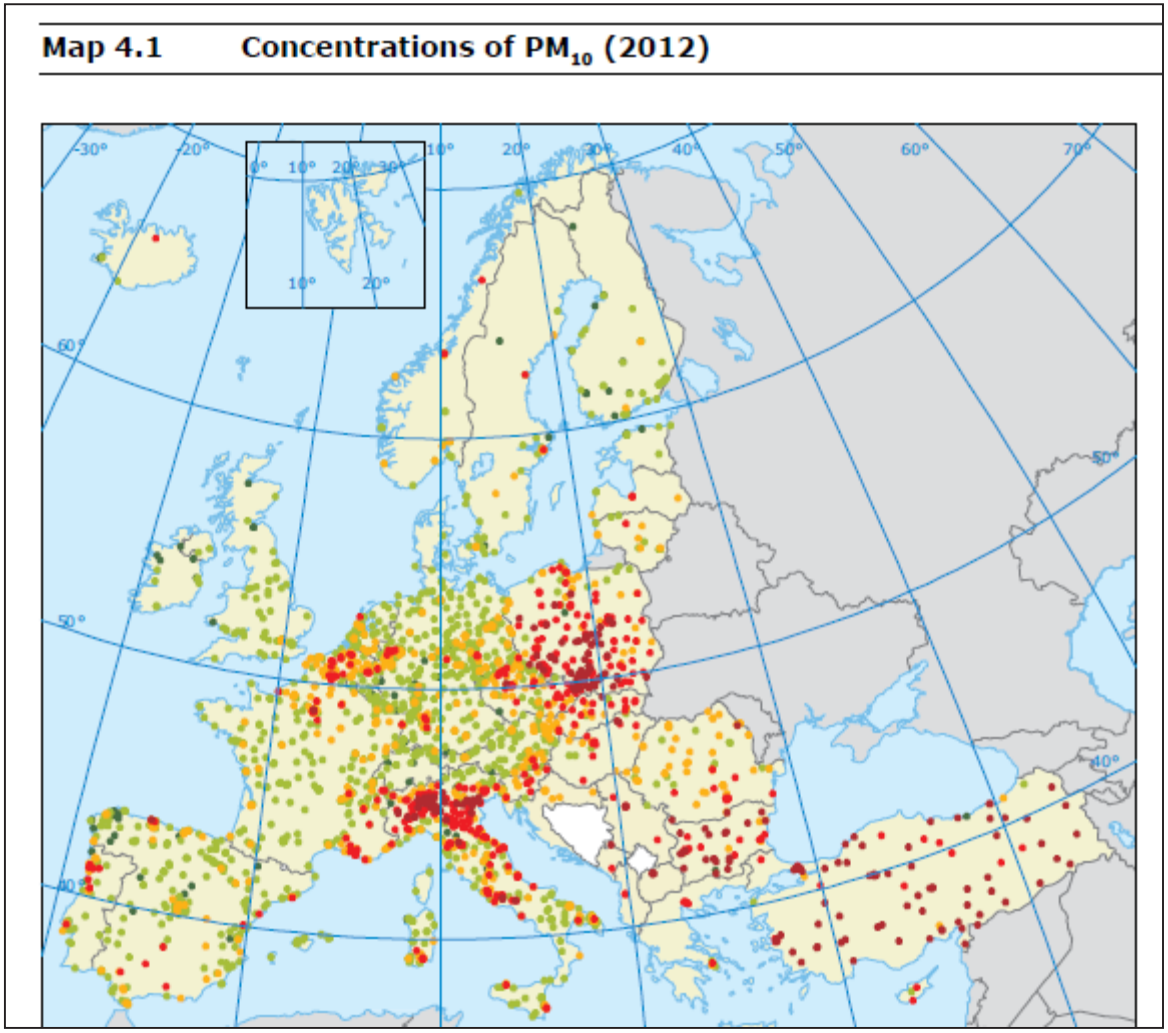


THE ROLE & PLANNED ACTIVITIES OF VITO
LIFE IP KO MEETING
22 JUNE 2016, KRAKOW

WHERE ARE THE HOT SPOTS?

e.g. for particulate matter

PM_{10}



Source: EEA

HOW CAN WE IMPROVE IT?

European policies help to bring down emissions and improve air quality.
Air pollution modelling is a powerful tool to support and implement air quality policies

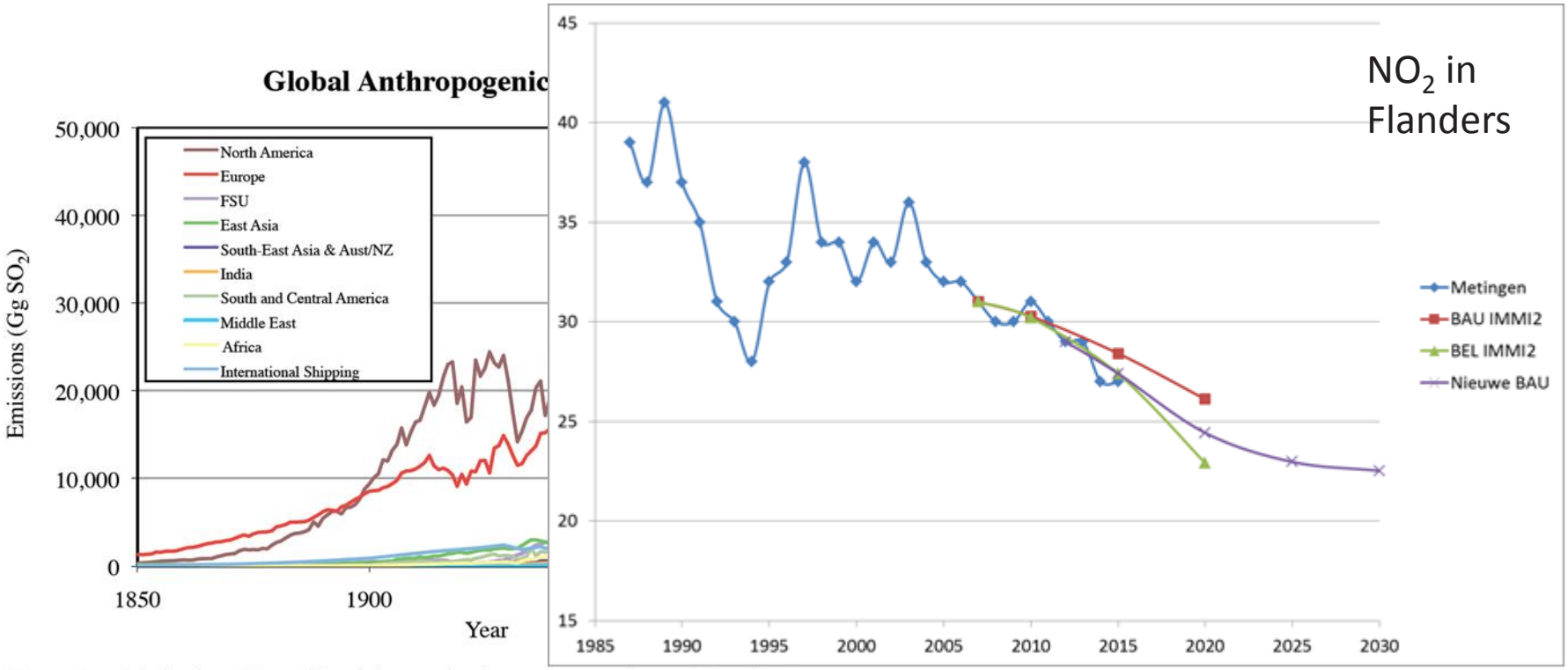


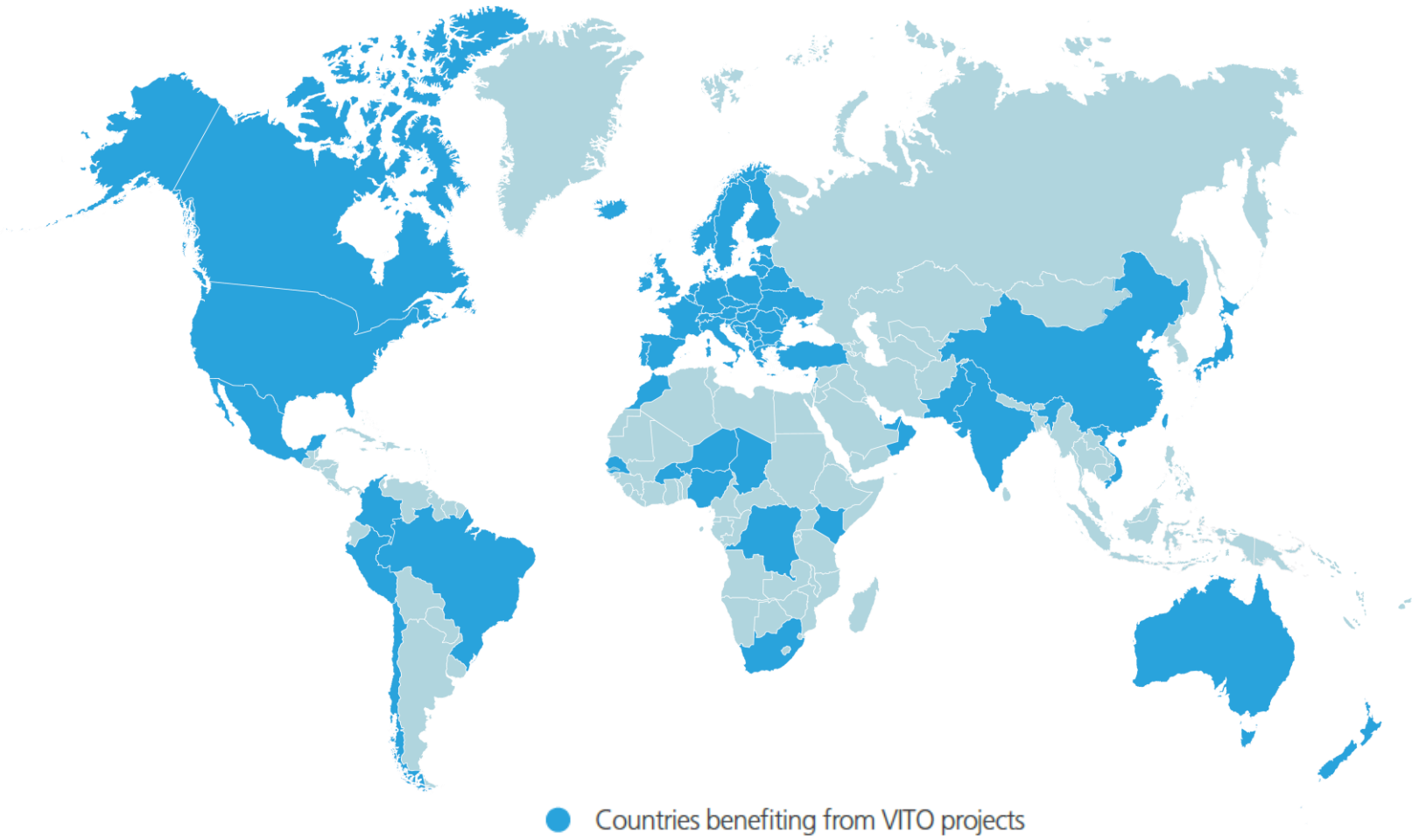
Fig. 6. Global sulfur dioxide emissions by region (North America = USA + Canada; East Asia = Japan, China+, and South Korea).

Smith et al., Atmos. Chem. Phys., 11, 1101–1116, 2011

VITO - MORE THAN 40 YEARS OF EXPERIENCE IN AIR POLLUTION MODELLING

Starting from Gaussian modelling in 1972 (Bultynck & Malet) towards the advanced air quality modelling systems at various scales of today.

VITO – WE ACCELERATE THE TRANSITION TO A SUSTAINABLE WORLD THROUGH PROJECTS WORLDWIDE



VITO IN NUMBERS

» 772 employees
» 24 nationalities

» HQ in Mol, Belgium. Offices in Ostend, Berchem, Ghent, Genk
» Subsidiaries in China and Qatar

» 1902 research projects

» More than 500 research partners

» More than 400 patents worldwide

» 250 scientific articles in 2015

» 147 mio € turnover in 2015

VITO: AREAS OF EXPERTISE

Energy

Materials

Chemistry

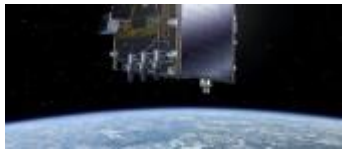
Health

Land use

SUSTAINABLE LAND USE

Our expertise

Remote sensing technology



Spatial data services

Agriculture

Water management

Ecosystem monitoring

Sustainable cities

Greener mobility

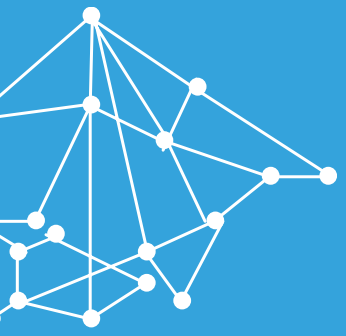
Air quality

Land use

proba VEGETATION

ATMOSYS
Air Quality Modelling System

vito



LIFE IP Malopolska – The role & planned activities of VITO

LIFE IP MALOPOLSKA – VITO'S ROLE

Key Tasks

1. **Provide Air Quality modelling tools (strengthen capacity) & share our experiences to support the Air Quality Plans.**

2. **Facilitate establishment of a harmonised transboundary emission database & air quality modelling platform within the greater PM hotspot area (SK, CZ, southern-PL).**

3. **Monitoring the impacts of the Air Quality Plans: share experience in low-cost sensors evaluation, monitoring & citizen science.**

4. **Dissemination to other PM hotpots in Europe (BG, RO…).**

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VITO'S ROLE - PROVIDE AQ MODELLING TOOLS & STRENGTHEN CAPACITY

Why?

Air quality plans: policy measures at regional (Malopolska) & local level (Krakow)

*To assess **most effective policy measures for the future** → need **user friendly** modelling tools that cover **multiple spatial scales**.*

LIFE+ Project: ATMOSYS "*Policy support system for atmospheric pollution hot spots*"

User friendly web based platform to support all aspects (forecast, assess, plan) of air quality management.

End conference (Dec 2013) → www.atmosys.eu

Invited by to a meeting in Bratislava, August 2014 to demonstrate ATMOSYS tools to stakeholders from the Central PM hotspot.

ATMOSYS AQ Management Dashboard

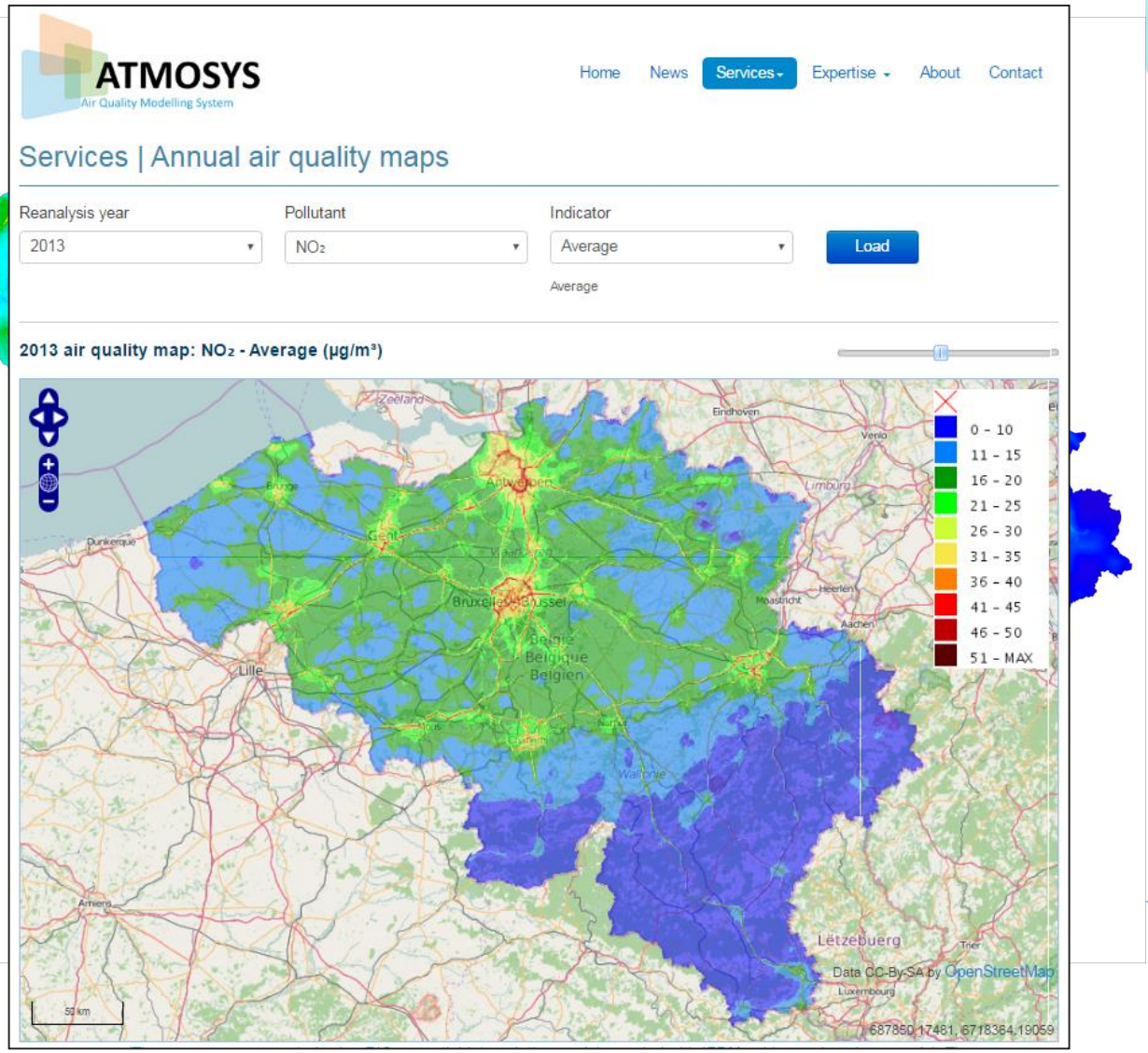
ATMOSYS dashboard is a **generic set of modular expert "apps"** which can be configured and implemented in any air pollution (hotspot) region to support air quality management

- ✓ choose your own dashboard components
- ✓ use your own models - statistical/deterministic....
- ✓ interoperable → plug-ins into existing (public) website
- ✓ link to e-Reporting (INSPIRE - SOA architecture)

VITO'S ROLE - PROVIDE AQ MODELLING TOOLS & STRENGTHEN CAPACITY

ATMOSYS High Resolution Multi-Scale Modelling Experience

ATMOSYS
Air Quality Modelling System



Life

NO_2 AIR QUALITY MAP OF BELGIUM

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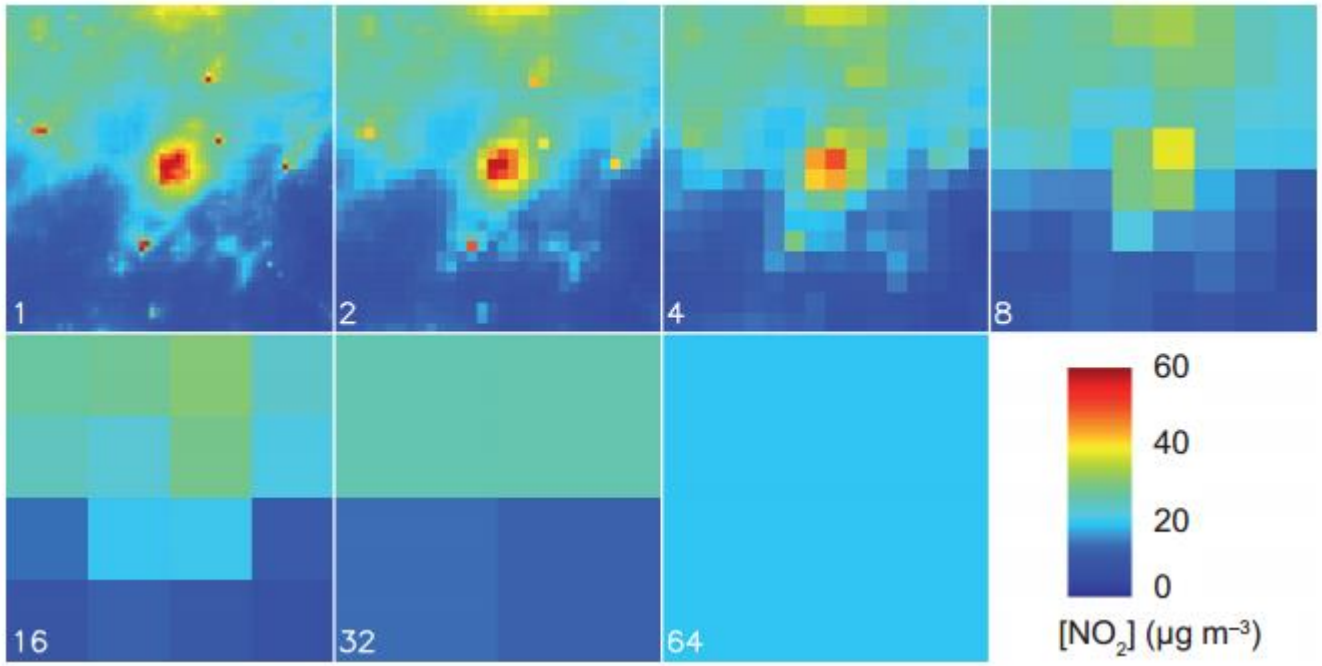
VITO'S ROLE - PROVIDE AQ MODELLING TOOLS & STRENGTHEN CAPACITY

Need for High Spatial Resolution

Example Brussels from 1km to 64km scale



Source: De Ridder, K. 2014. The impact of model resolution on simulated ambient air quality and associated human exposure. Atmósfera 27, 403–410.

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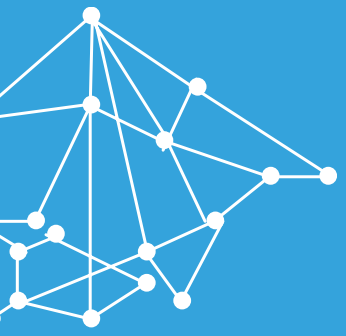
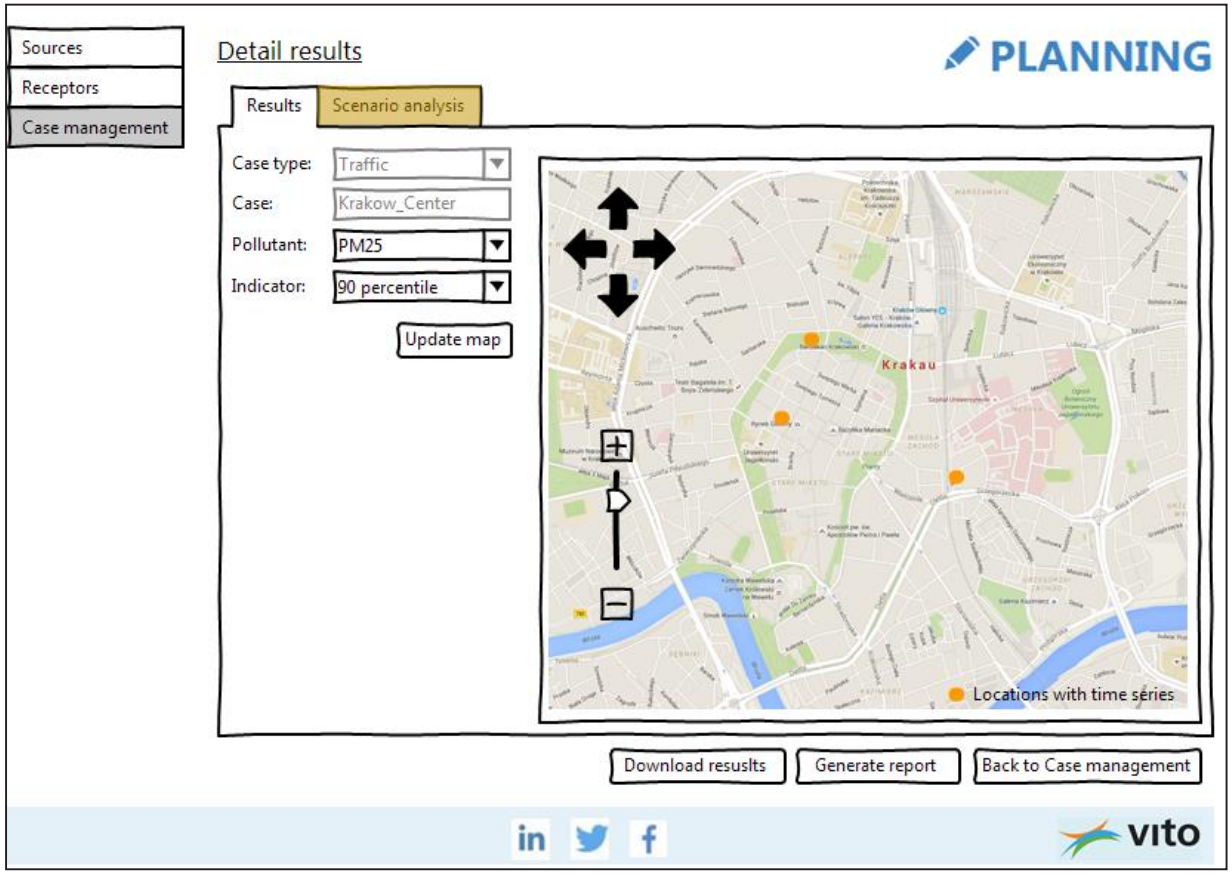


Tool for Air Quality Management (Traffic) - City of Krakow.

TOOL FOR AIR QUALITY MANAGEMENT IN KRAKOW

ATMOSYS Planning Tool for Evaluating Local Traffic Policy Measures for Krakow.

ATMOSYS
Air Quality Modelling System



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TOOL FOR AIR QUALITY MANAGEMENT IN KRAKOW

Evaluate Local Traffic Policy Measures for Krakow

ATMOSYS
Air Quality Modelling System

1. **Measures**
2. **Linked to input data (emissions)**
3. **Model the different emission scenarios**

Individual Measures at city level
- Extension local mobility plan
- Changing traffic circulation
- Speed limit: 30 km/h in the inner-city
- Defining traffic areas: car free, low traffic…
- Reducing number of heavy duty vehicles in the city
- Expanding and improving public transport
- Greening the car fleet of the municipality
- Ecofriendly and silent buses

Low Emission Zone
- Restricted access for the most polluting vehicles

Measures in the residential sector
- Restriction on fuel types & usage

TOOL FOR AIR QUALITY MANAGEMENT IN KRAKOW

ATMOSYS
Air Quality Modelling System

User Friendly Tool
- Model Input Screen

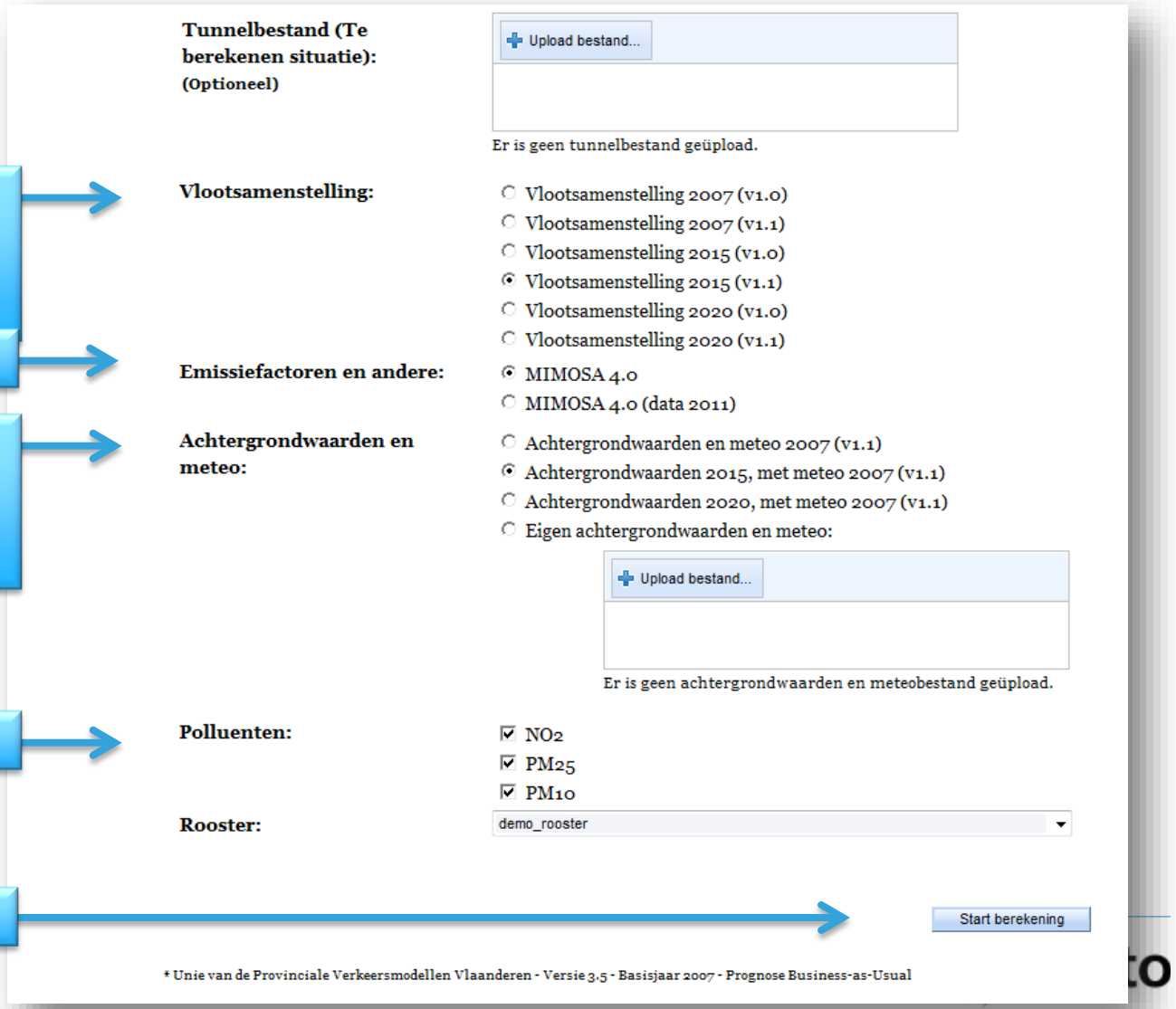
Vehicle Fleet composition (Krakow)

Emission factors

Background Air Quality & meteo (VITO)

Pollutants

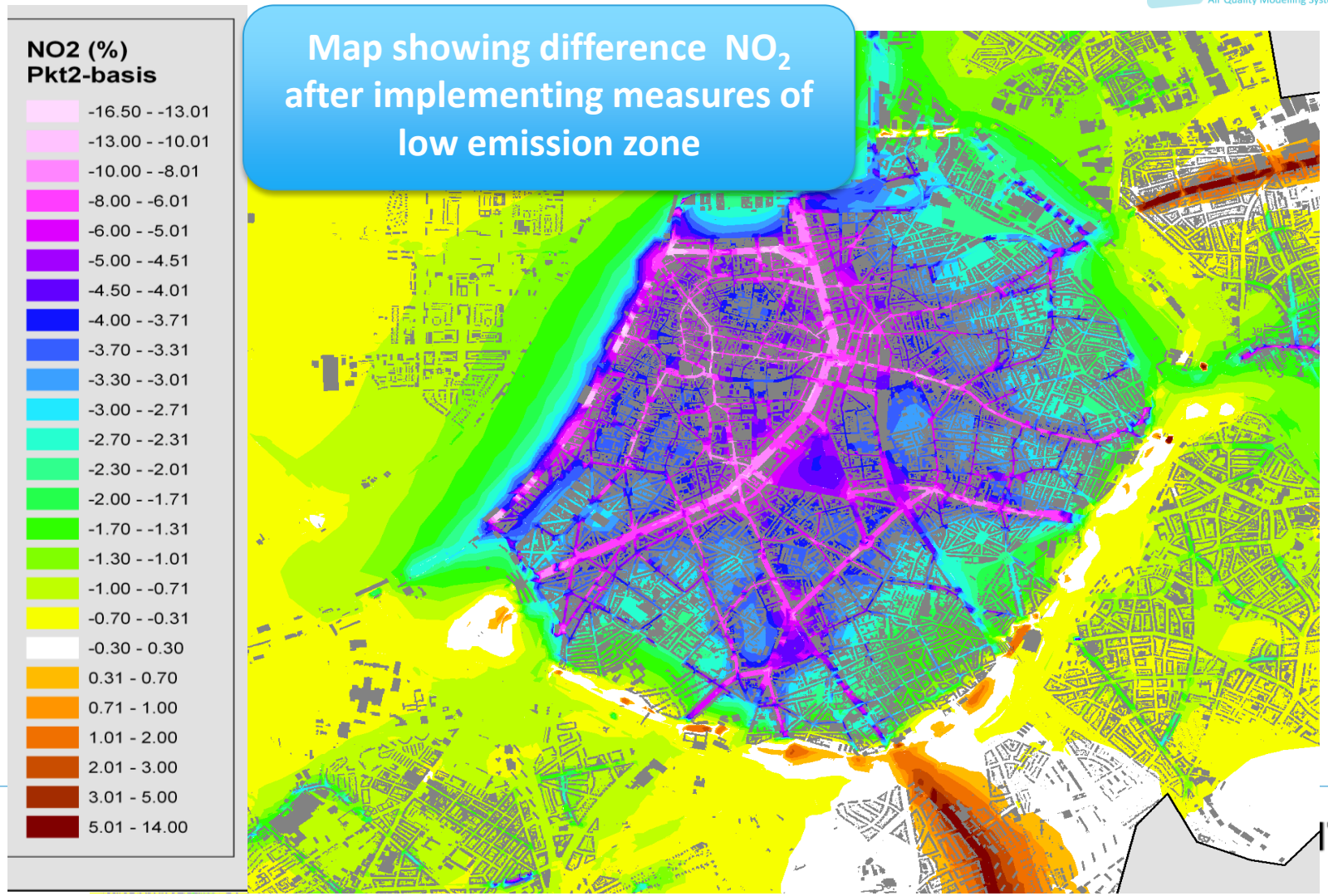
START



TOOL FOR AIR QUALITY MANAGEMENT IN KRAKOW

Evaluate Local Traffic Policy Measures for Krakow

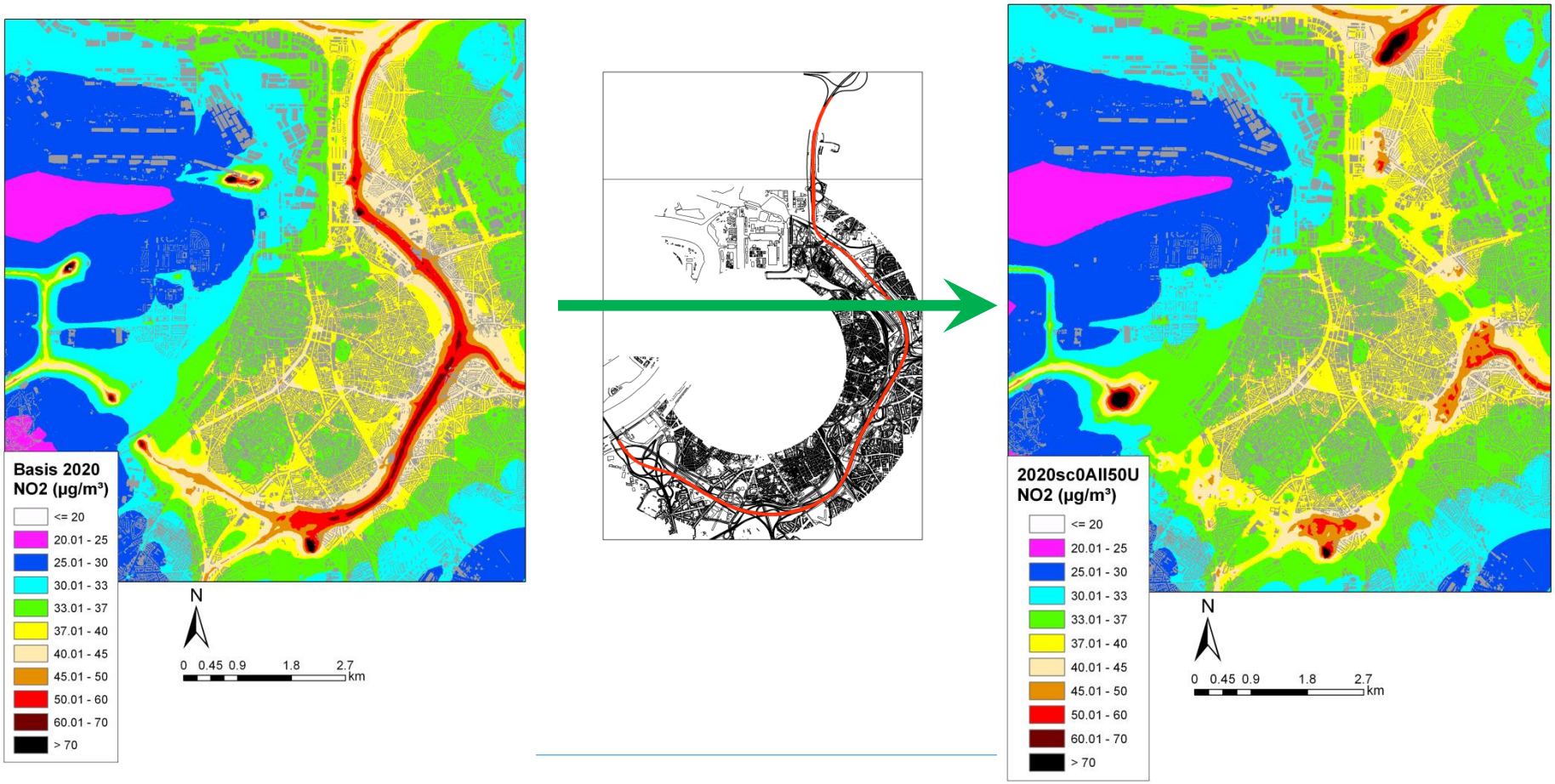
ATMOSYS
Air Quality Modelling System



TOOL FOR AIR QUALITY MANAGEMENT IN KRAKOW

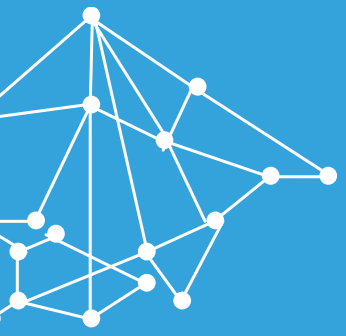
Scenarios: covering a (Antwerp's ring) road: impact on air quality

ATMOSYS
Air Quality Modelling System



VITO

Establishment of a transboundary emission database & AQ modelling platform within the greater PM hotspot area.



AIR QUALITY MODELLING INFORMATION FOR THE WHOLE HOTSPOT

Why? Air quality plans: policy measures at regional (Malopolska) & local level (Krakow)

*→ need PM information from outside the region as **PM is a transboundary pollutant***

*→ **need consistency across** the regions to ensure using the best information & reduce border effects*

*→ (residential) **emission data** is key to analysing scenario options*

International Partners

SHMÚ

ČHMÚ

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AIR QUALITY MODELLING PLATFORM FOR THE WHOLE HOTSPOT

Harmonised Residential Emission Inventories

- Key Source of PM
- Include BaP
- Use existing support tools – previous LIFE projects

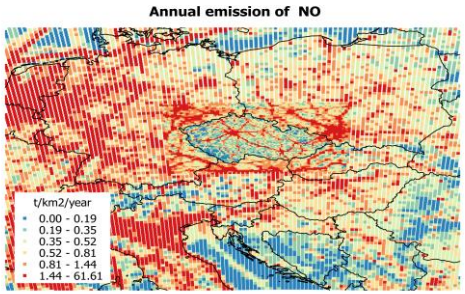
Trans-boundary Emission Data Base

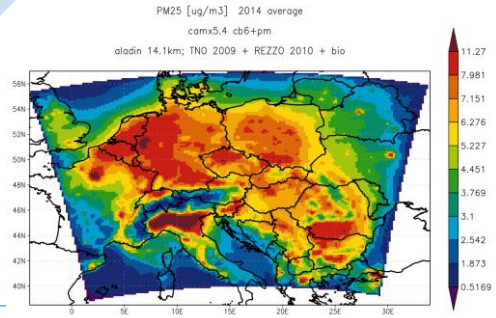
- PM: transboundary pollutant
- Air Quality Policies: emissions are critical
- Reduce cross country border effects

Inter-regional Air Quality Modelling

- Assess current situation
- Impact: show year on year 'improvement'
- Future Scenarios: what decisions to make

Exchange best practices & tools (emissions, modelling..)





Emission Inventory Support System Air *EISSA*

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AIR QUALITY MODELLING PLATFORM FOR THE WHOLE HOTSPOT

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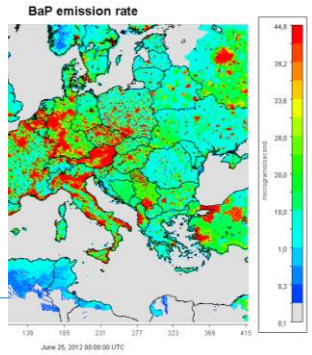
Inter-regional Air Quality Modelling

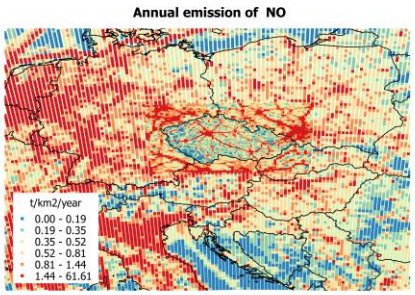
- Assess current situation
- Impact: show year on year 'improvement'
- Future Scenarios: what decisions to make

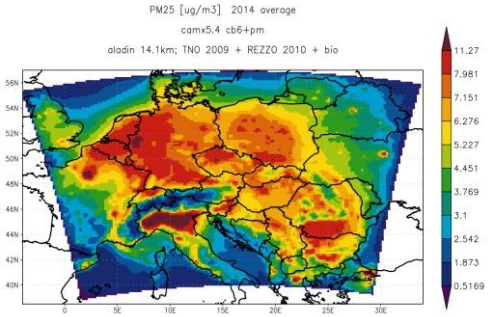
Sustainable service

- Continued co-operation
- Outreach
  - Other Polish regions
  - Bulgaria
  - Romania
  - ……

Exchange best practices & tools (emissions, modelling..)







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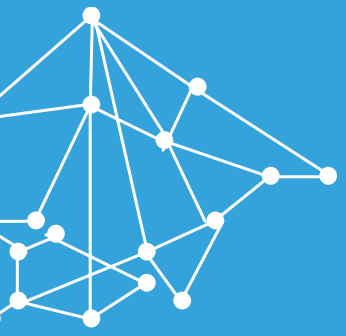
Monitoring the Air Quality Plan Impacts: Low-Cost Sensors Evaluation, Monitoring, Citizen Science.

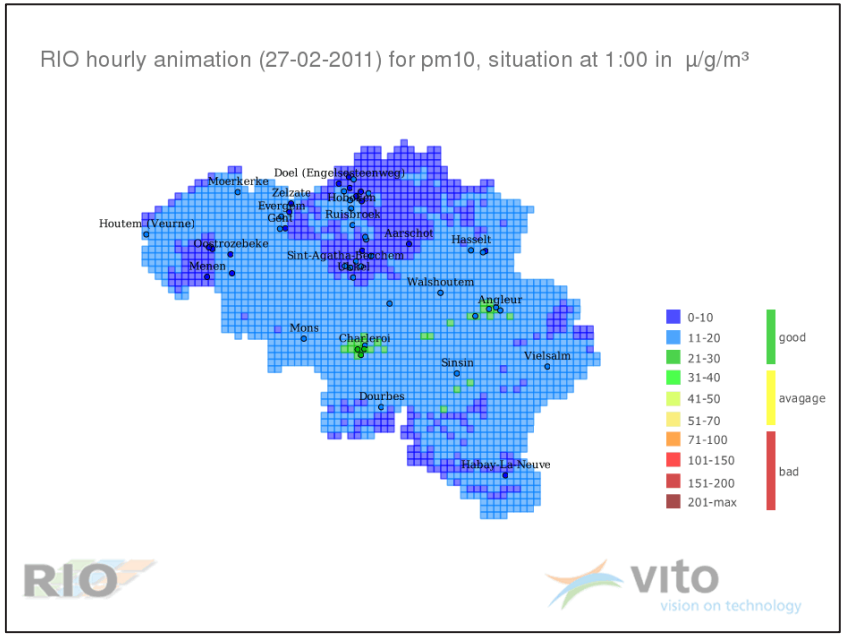


AQ MONITORING – SENSOR TESTING / VALIDATION / NRT MAPS

Increased Awareness across Malopolska

'Verify'

Sensor Data for Widespread Dissemination



NRT Maps of the 'Interpolated' Measurements

Citizen Science Experience

Enhance Environmental Awareness through Social Information Technologies

EVERYAWARE

Flamenco
FLAnders Mobile ENacted Citizen Observatories

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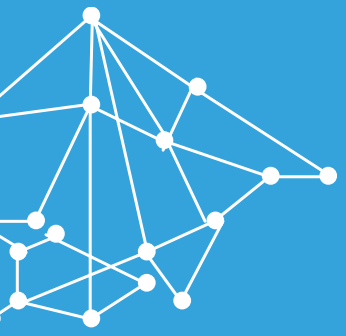

Thank-you.