AIR QUALITY PLAN MALAPOLSKA
(LIFE IPE PL 021)

# Tools to model the impact of local air quality plans

# AGENDA

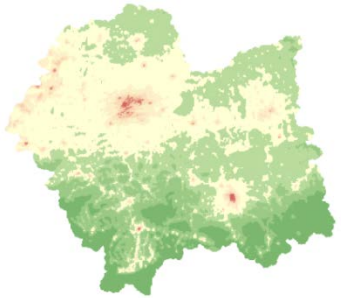

1. Integrated LIFE Project
   - Overview
   - Key Actions

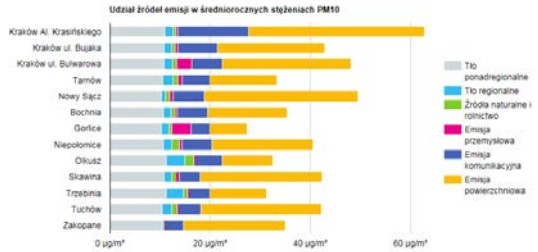
2. Assessment of impact of measures
   - PM, NO2
   - EISSA
   - ATMOSYS Planning

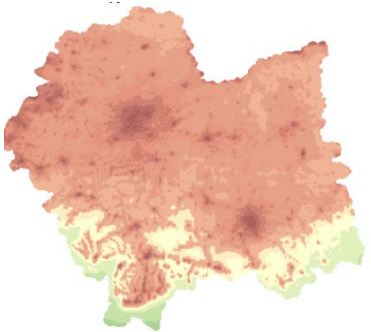
3. Conclusions

# MAŁOPOLSKA REGION – THE AIR QUALITY SITUATION (2015)

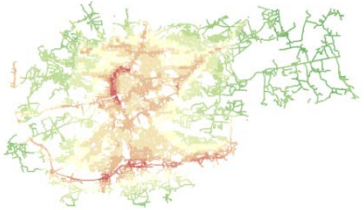
- PM10 exceedences: 350 000 people (10% of the pop.)
- Residential areas of 16 municipalities
- Benzo(a)pyrene: All 182 municipalities in the region exceed the target level of 1 ng/m³





- $NO_2$ exceedences in Krakow



# IMPLEMENTATION OF AIR QUALITY PLAN FOR MAŁOPOLSKA REGION

- Key objective is to accelerate the implementation of the "**Air Quality Plan for the Małopolska Region**" & improve air quality in the region
- Planned actions: from grassroots (municipalities) to the regional level
- Budget: **€16.8M**
- Additional actions: **€800M**
- Duration: **Oct 2015 – Dec 2023**

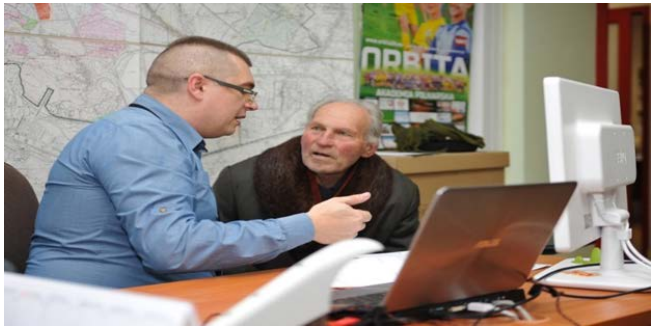

# ACTIONS TO SUPPORT AQP

# IMPLEMENTING REGIONAL POLICY - ANTI-SMOG REGULATIONS

- Kraków: **solid fuel ban** in - adopted 15 Jan 2016, effective from 1 Sept 2019.
- Małopolska: **Eco-design standards** for all boilers, stoves & fireplaces - adopted 23 Jan 2017, effective from 1 June 2017 (new devices) and from 2023 (existing).
- Silesian Region: similar regulation adopted on 7 April 2017
- 6 other regions: regulation being discussed


# LOCAL ACTIONS AT GRASS ROOTS LEVEL (ECOMANAGERS)

- 60 **Eco-managers** across 55 municipalities
- **Accelerate actions** at local level:
  - replacing coal boilers
  - thermal renovation of buildings

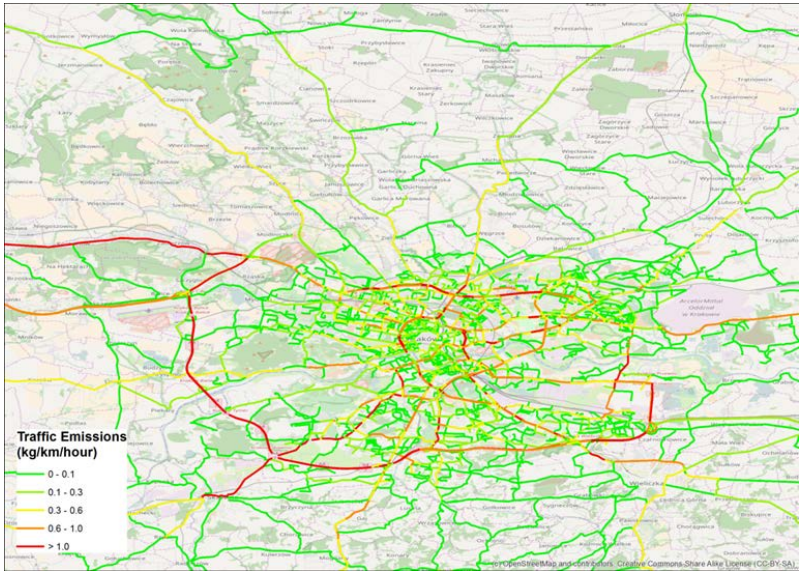


- **Capacity building**, exchange of experiences - local/regional/international.
- **Increase public awareness**

Large scale informative events with >20,000 residents
Thermal imaging surveys for 1,000 private and public buildings.

# LOCAL ACTIONS - SUSTAINABLE URBAN TRANSPORT PLANS

- Krakow's urban transport plans to tackle air pollution:
  - Traffic restrictions
  - Ring road (complete northern)
  - Invest in public transport infrastructure →new tram lines (2020)
  - LEZ



# IMPACT OF MEASURES: RESIDENTIAL EMISSIONS

# AIR QUALITY MODELLING PLATFORM FOR THE WHOLE HOTSPOT

**Harmonised Residential Emission Inventories (for modelling)**

- Key Source of PM, BaP
- Improved bottom-up inventories
- Harmonised/sharing experiences
- Previous LIFE project: EISSA modelling tool

**Trans-boundary Emission Data Base**

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

**Inter-regional Air Quality Modelling**

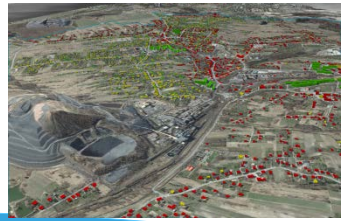
- Assess current situation
- Future Scenarios: 2023
- Impact: show year on year improvement

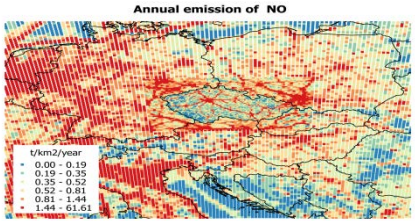
**Sustainable service**

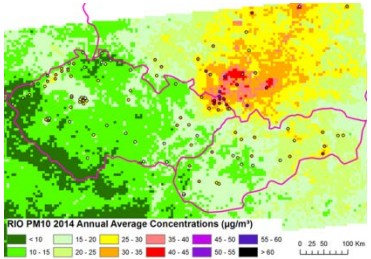
- **Continued co-operation**
- **Outreach**
  - Other Polish regions
  - Bulgaria
  - Romania
  - ……

2016 → 2017 → 2018 → 2019…

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






## HARMONISED RESIDENTIAL EMISSION INVENTORIES

**Findings**: lot of similarities, yet crucial differences exist:

- activity data based on: fuel consumption vs. heat consumption (Malopolska)
- activity data based on statistical data vs. based on surveys
- varying emission factors (EFs) taken from several sources: guidebook, literature, (local) studies, … ;
- different level of detail or different approaches wrt the methodology of emissions calculation

**Uncertainties out of scope→ further studies:**

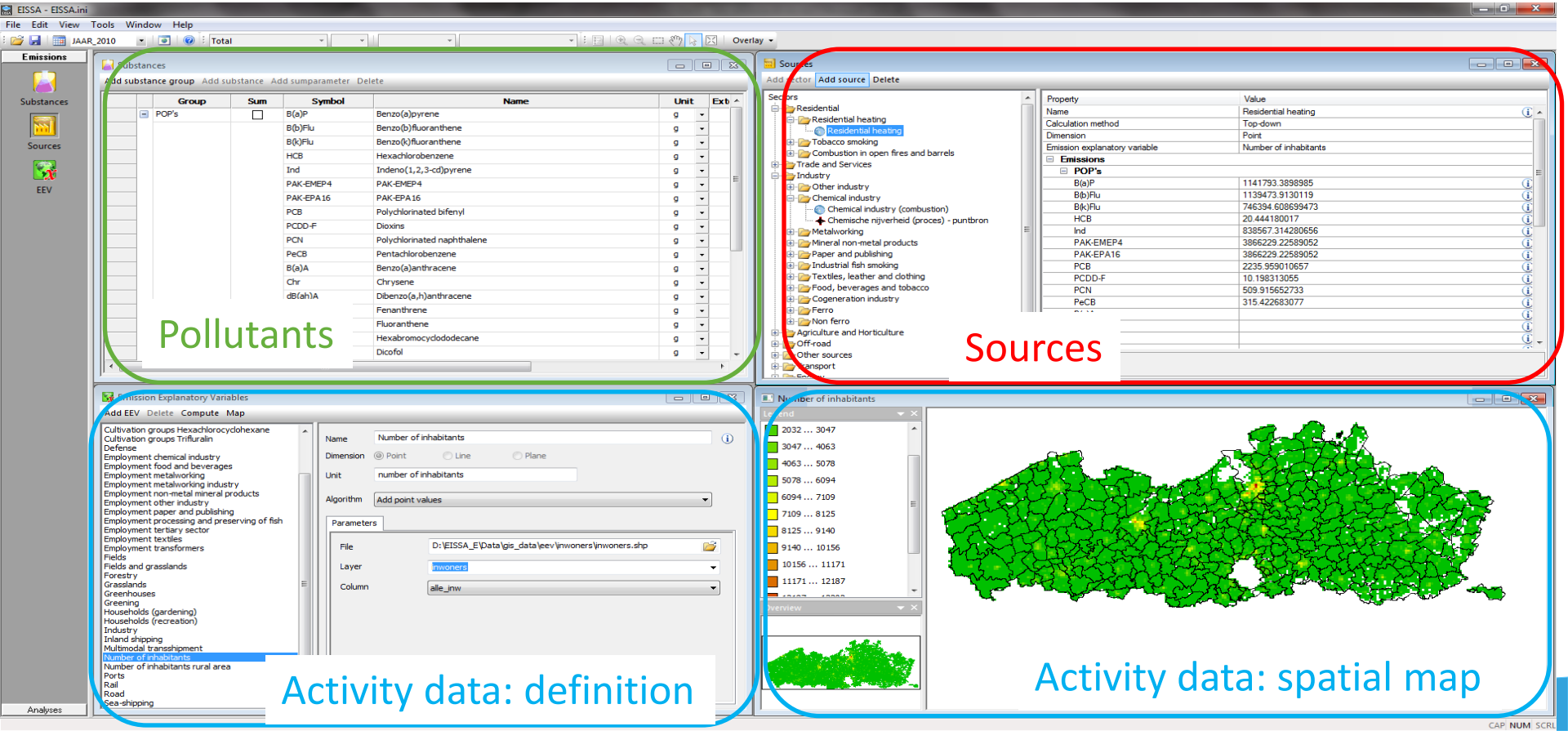
- a. The uncertainty in the fuel usage, combinations
- b. Illegal fuel types (e.g. solid waste) and their emission characteristics
- c. the ‘real‘ emission factors
- d. the ‘real’ burner operations

# TOOL TO SUPPORT EMISSIONS INVENTORY ADMINISTRATIONS: EISSA

- EISSA: **E**mission **I**nventory **S**upport **S**ystem – **A**ir
- User friendly tool to aid emission reporting, analysis of emissions and production of aggregated emission maps.
- One of the products based on the **EISS** framework
  - EISS: framework, empty box
  - Functionalities depending on product (WEISS, EISSA, HEISS)
  - Fill with emission data  & aggregation functionalities

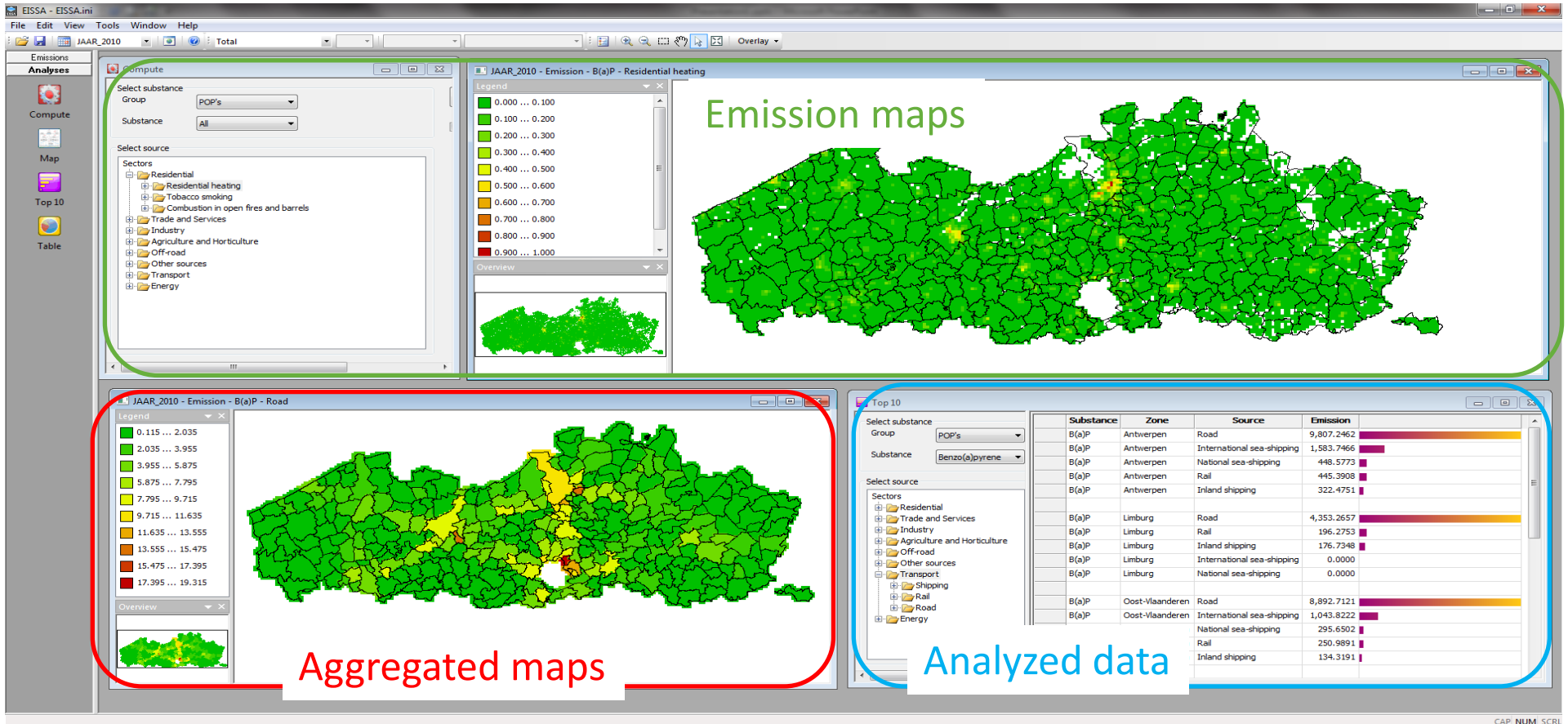
# EISSA – INPUT DATA:

## POLLUTANTS, SOURCES, ACTIVITY DATA



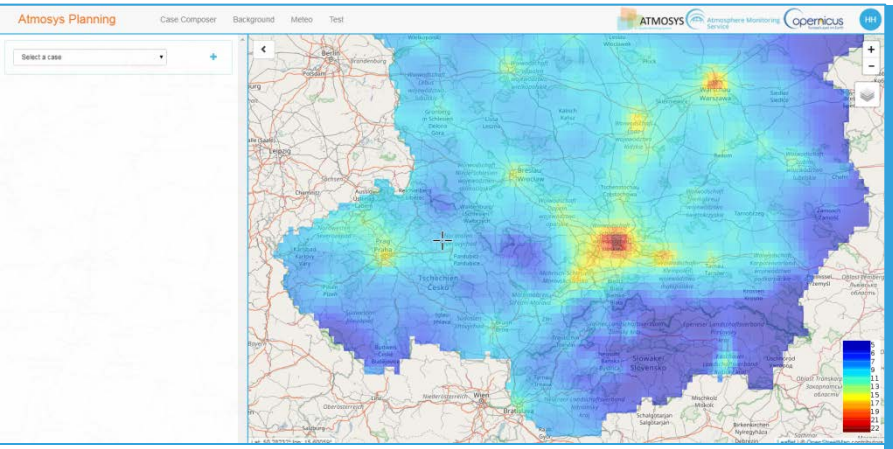
# EISSA – OUTPUT DATA:

## EMISSION MAPS, AGGREGATED MAPS, ANALYZED DATA



## EISSA IN THE LIFE-IP

- Setup of EISSA for the residential sector
- Collection of activity data at high spatial resolution
- Configuration and setup of similar but independent EISSA applications for Malopolska region, Czech Republic and Slovakia
- Harmonization of software platform, methodologies and reporting formats




# IMPACT OF TRANSPORT MEASURES: KRAKOW

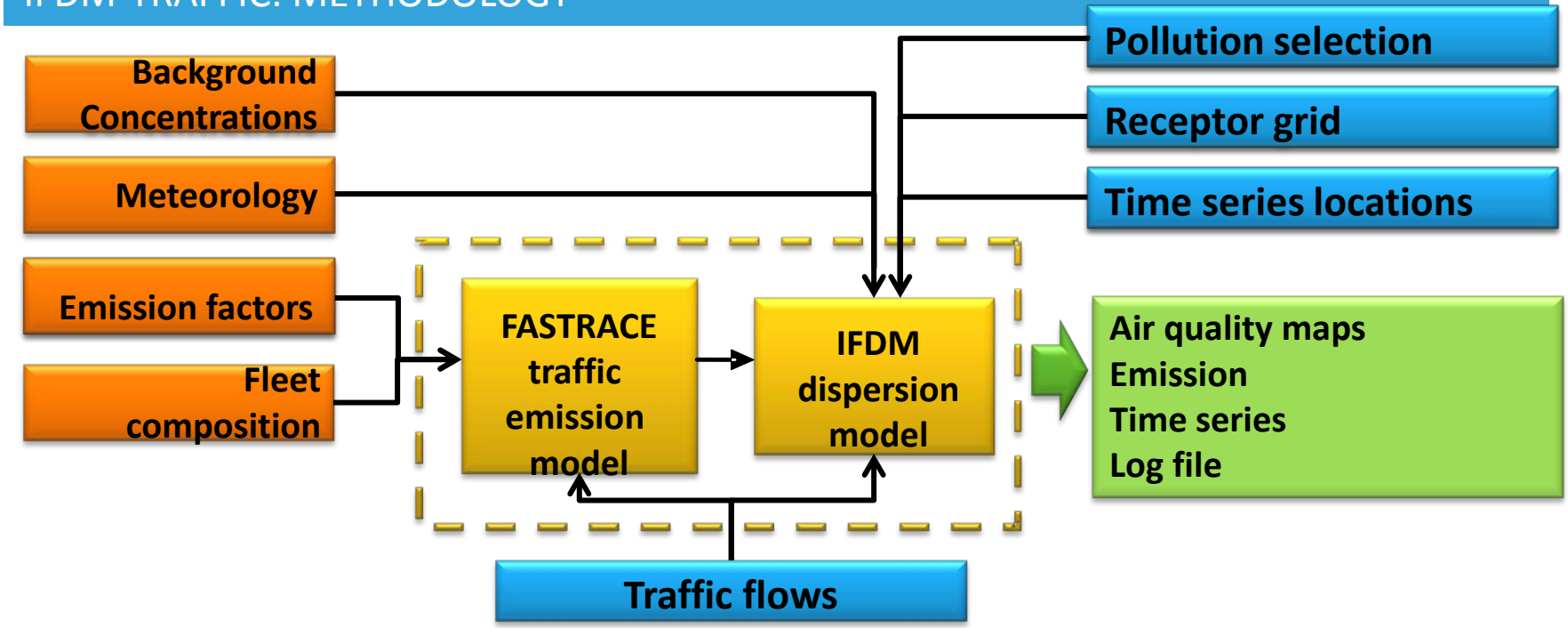
# IFDM-TRAFFIC: AN IMPACT ASSESSMENT TOOL FOR ROAD TRANSPORT SCENARIOS

Main objective: **harmonization** and **transparency** in Environmental Impact Assessments
→ standardized:

- ✓*AQ model*
- ✓*Road transport emission factors*
- ✓*Background concentrations*
- ✓*Meteorology*

- Owned by the Flemish Environmental Agency
- **Freely available** for environmental consultants
- Developed by VITO as a **web-application**
- Up and running since 2011

# IFDM-TRAFFIC: METHODOLOGY



# ATMOSYS PLANNING

International interest in IFDM-Traffic approach
→ ***ATMOSYS Planning***

✓Not only traffic: also point and area sources

✓Modernised user interface

✓Improved scenario case emission manager

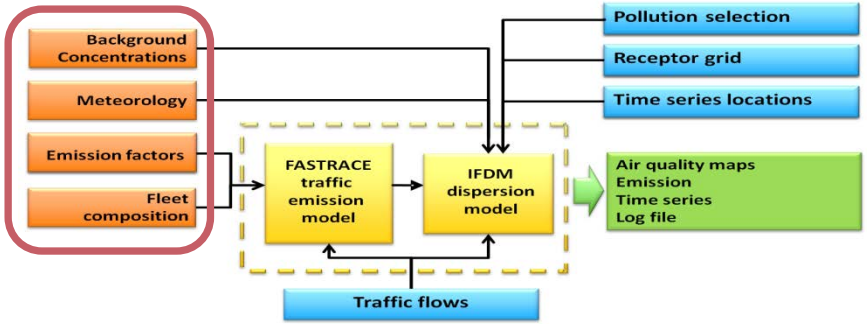
✓LEZ functionality

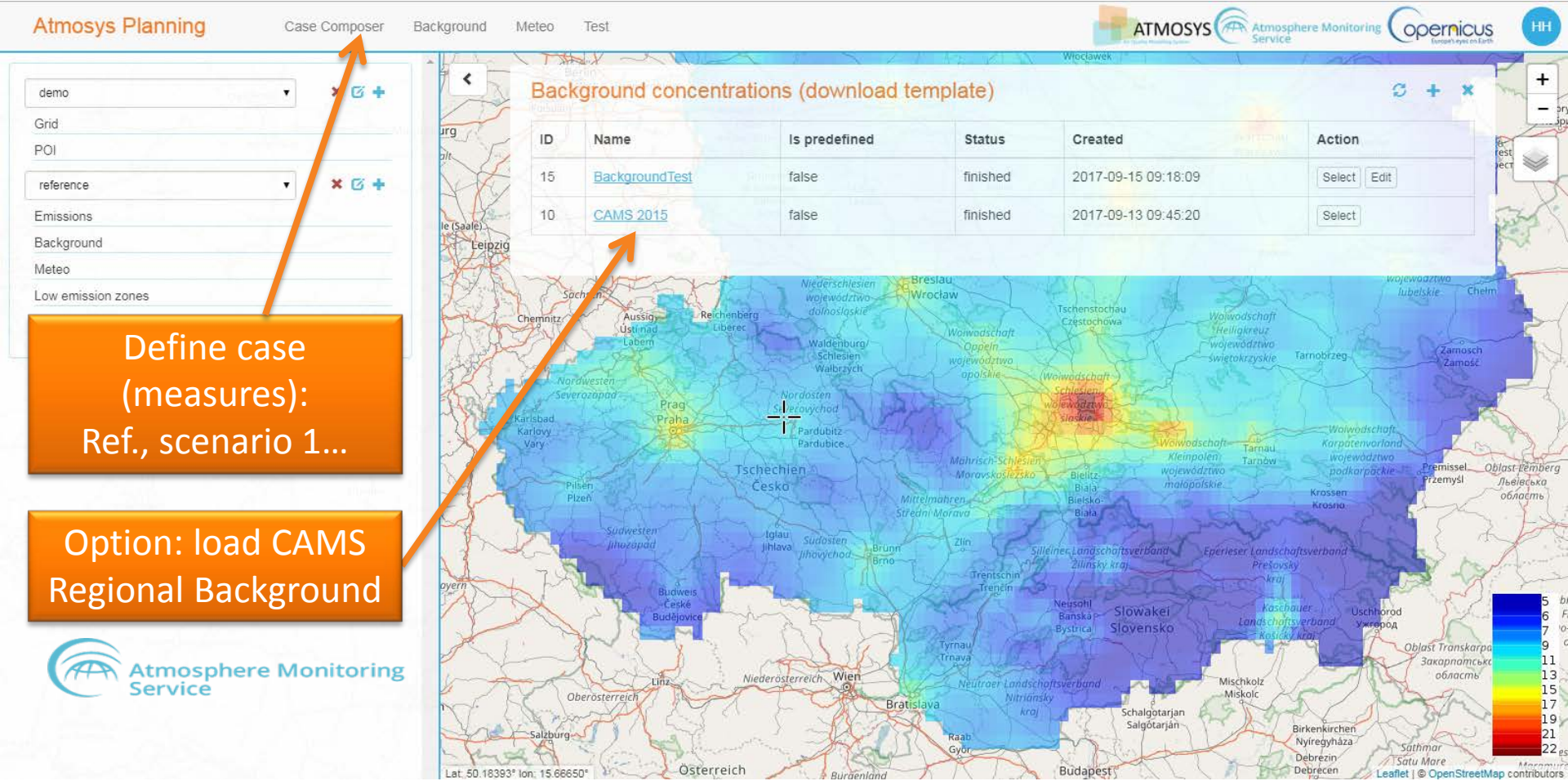
Requirements in other regions:

✓**Local data** sources (fleet compositions) → local partner

✓**Reliable background** concentrations→ available from **CAMS**

ATMOSYS
Air Quality Modelling System

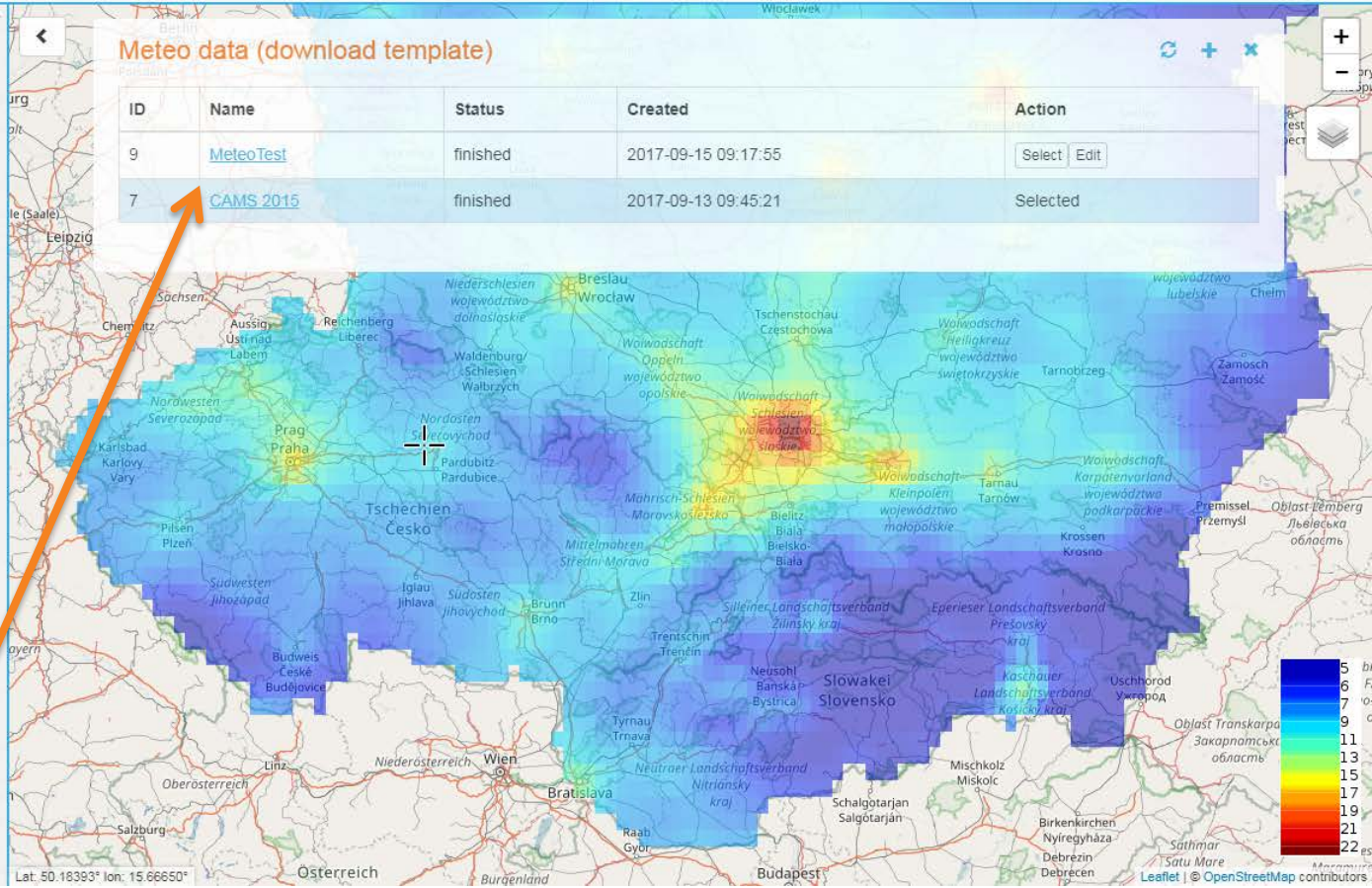


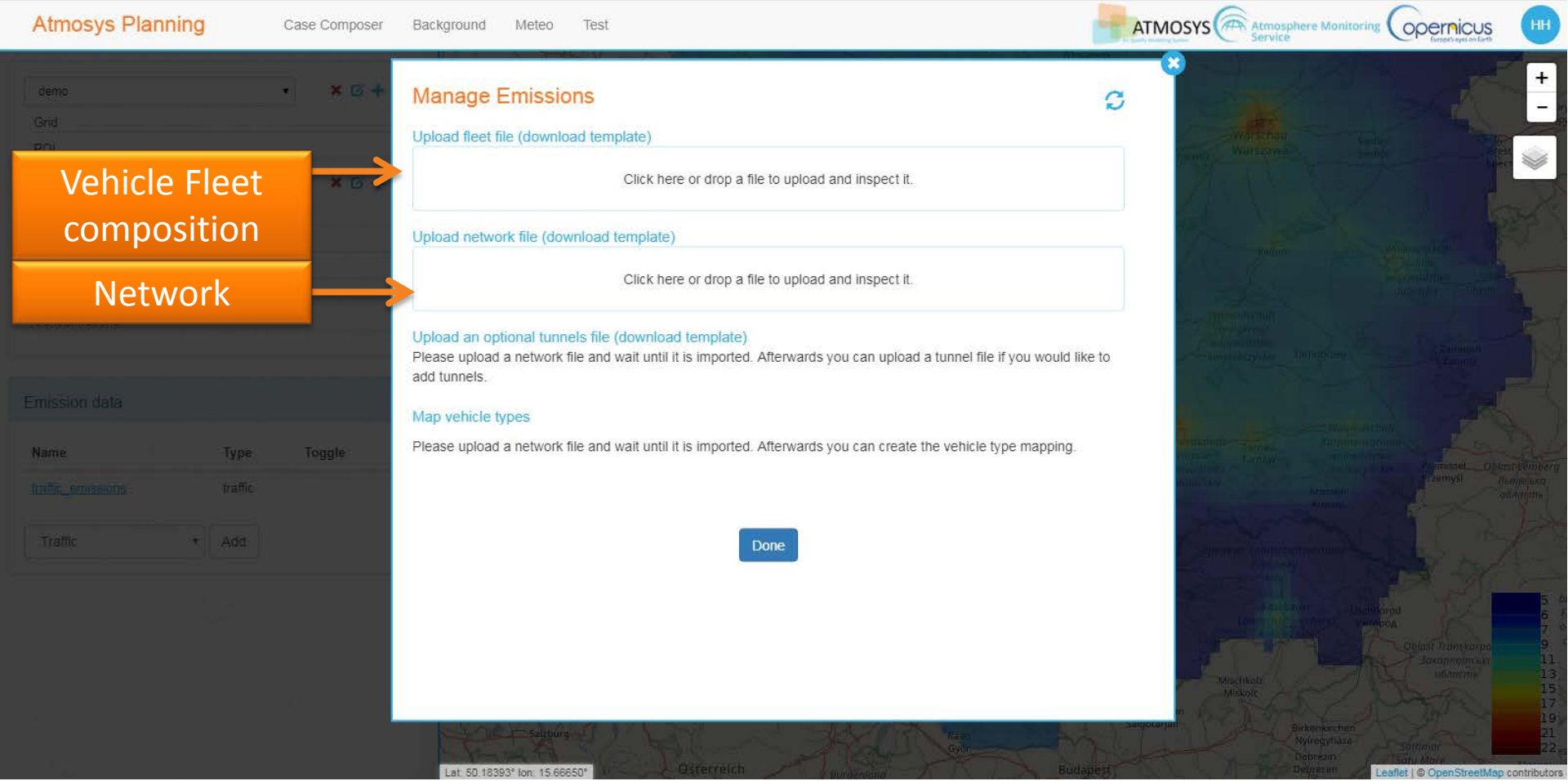

Atmosys Planning
Case Composer
Background
Meteo
Test
ATMOSYS
Atmosphere Monitoring Service
opernicus
HH
demo
Grid
POI
reference
Emissions
Background
Meteo
Low emission zones
Background concentrations (download template)
ID
Name
Is predefined
Status
Created
Action
15
BackgroundTest
false
finished
2017-09-15 09:18:09
Select
Edit
10
CAMS 2015
false
finished
2017-09-13 09:45:20
Select
Define case (measures): Ref., scenario 1…
Option: load CAMS Regional Background
Atmosphere Monitoring Service
Lat: 50.18393° lon: 15.66650°
Leaflet | © OpenStreetMap contributors

demo
Grid
POI
reference
Emissions
Background
Meteo
Low emission zones
Concentrations

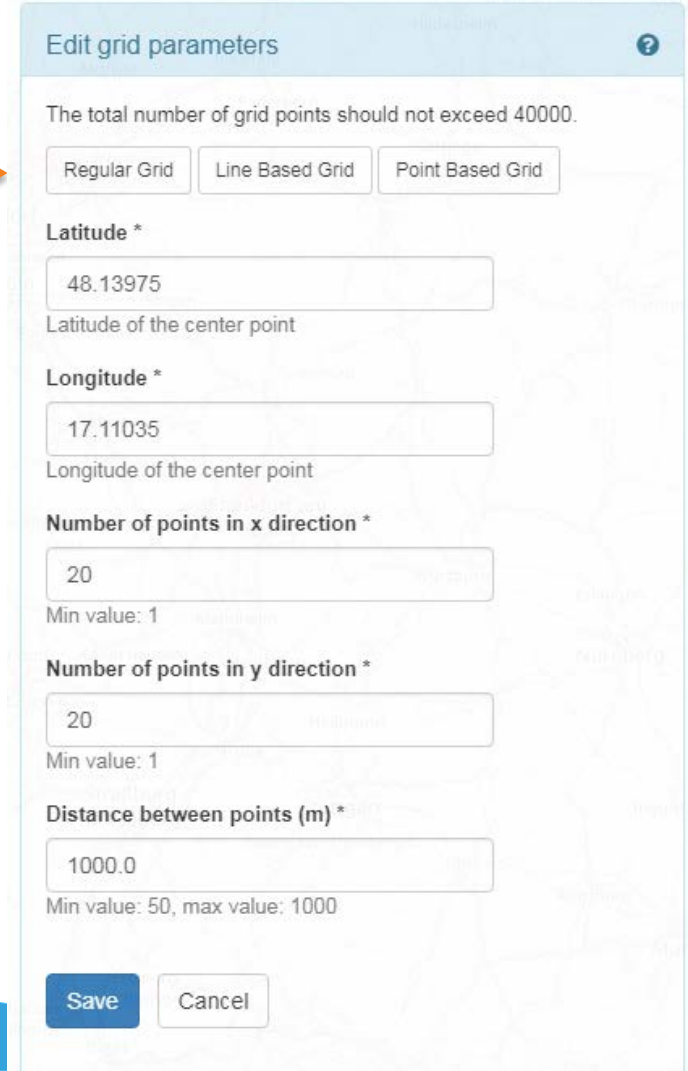
Define Low Emission Zone

Load own meteo data or ECMWF data




Atmosys Planning
Case Composer
Background
Meteo
Test
ATMOSYS
Atmosphere Monitoring Service
Copernicus
HH
demo
Grid
Emission data
Name
Type
Toggle
traffic_emissions
traffic
Traffic
Add
Vehicle Fleet composition
Network
Manage Emissions
Upload fleet file (download template)
Click here or drop a file to upload and inspect it.
Upload network file (download template)
Click here or drop a file to upload and inspect it.
Upload an optional tunnels file (download template)
Please upload a network file and wait until it is imported. Afterwards you can upload a tunnel file if you would like to add tunnels.
Map vehicle types
Please upload a network file and wait until it is imported. Afterwards you can create the vehicle type mapping.
Done
Lat: 50.18393° lon: 15.66650°
Leaflet | © OpenStreetMap contributors

Grid


Edit grid parameters
The total number of grid points should not exceed 40000.
Regular Grid
Line Based Grid
Point Based Grid
Latitude *
48.13975
Latitude of the center point
Longitude *
17.11035
Longitude of the center point
Number of points in x direction *
20
Min value: 1
Number of points in y direction *
20
Min value: 1
Distance between points (m) *
1000.0
Min value: 50, max value: 1000
Save
Cancel

Compleet

Grid

POI

VerkeersemissiesCompleet

Emissions

Background

Meteo

Low emission zones

Concentrations

This case and it's scenarios should not be modified as the result calculation is in progress or finished.

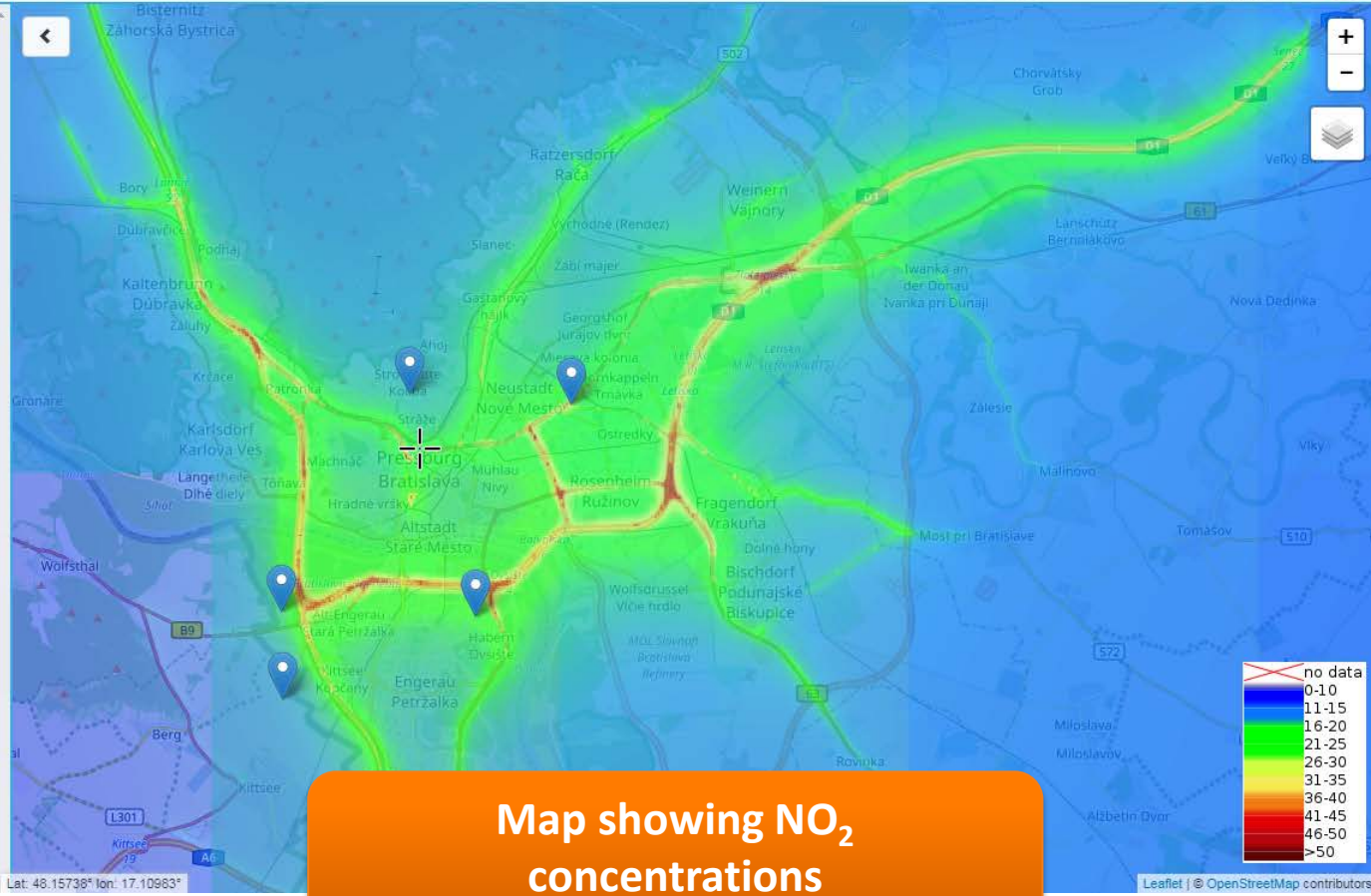
## Concentrations

The calculation is finished.

NO2 - MEAN

Download

Toggle Poi's




**Map showing $NO_2$ concentrations**

Compleet

Grid

POI

VerkeersemissiesCompleet

Emissions

Background

Meteo

Low emission zones

Concentrations

This case and it's scenarios should not be modified as the result calculation is in progress or finished.

## Concentrations

The calculation is finished.

NO2 - MEAN

Download

Toggle Poi's

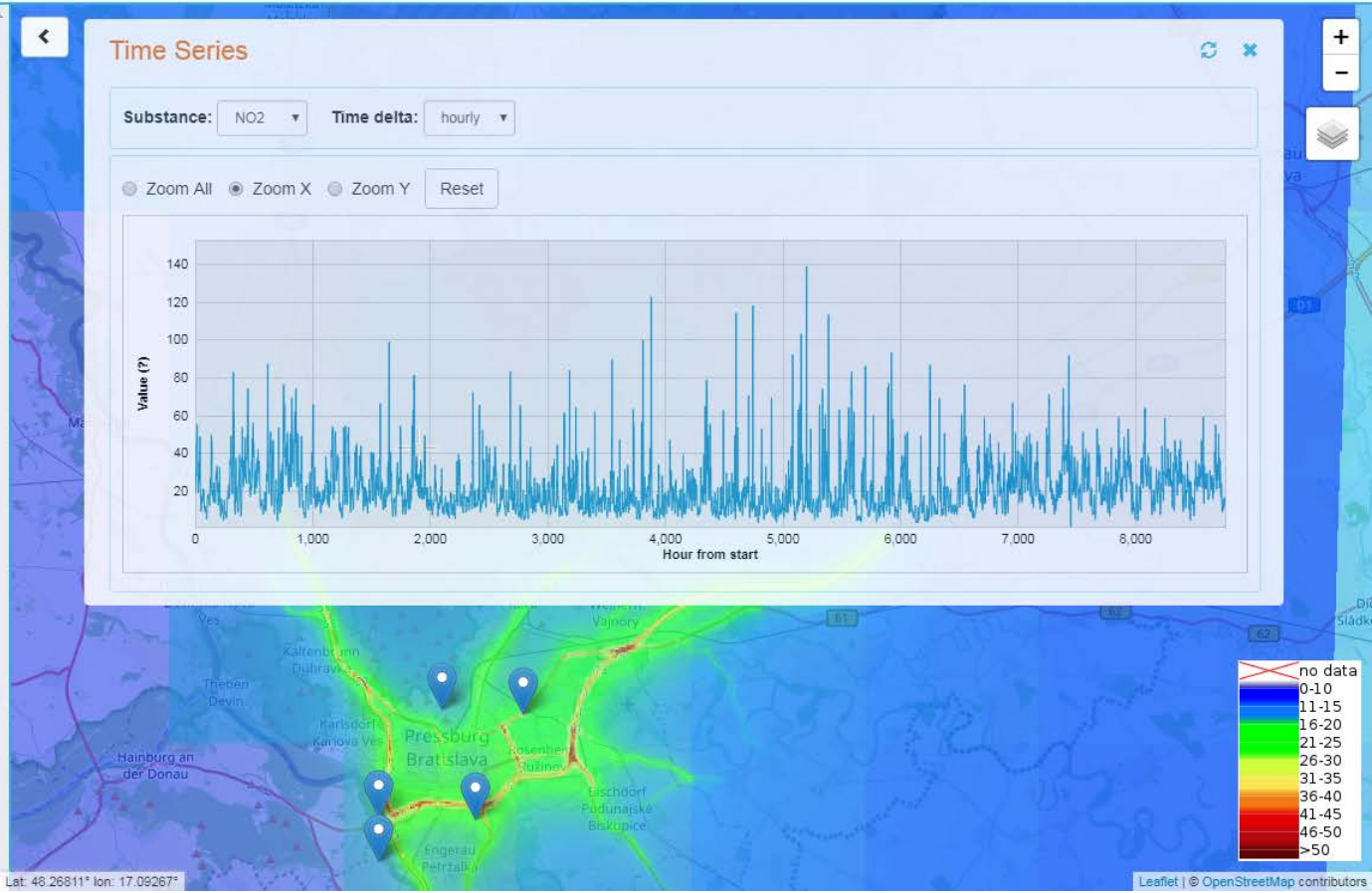
## Time Series

**Substance:** NO2

**Time delta:** hourly

Zoom All | Zoom X | Zoom Y | Reset



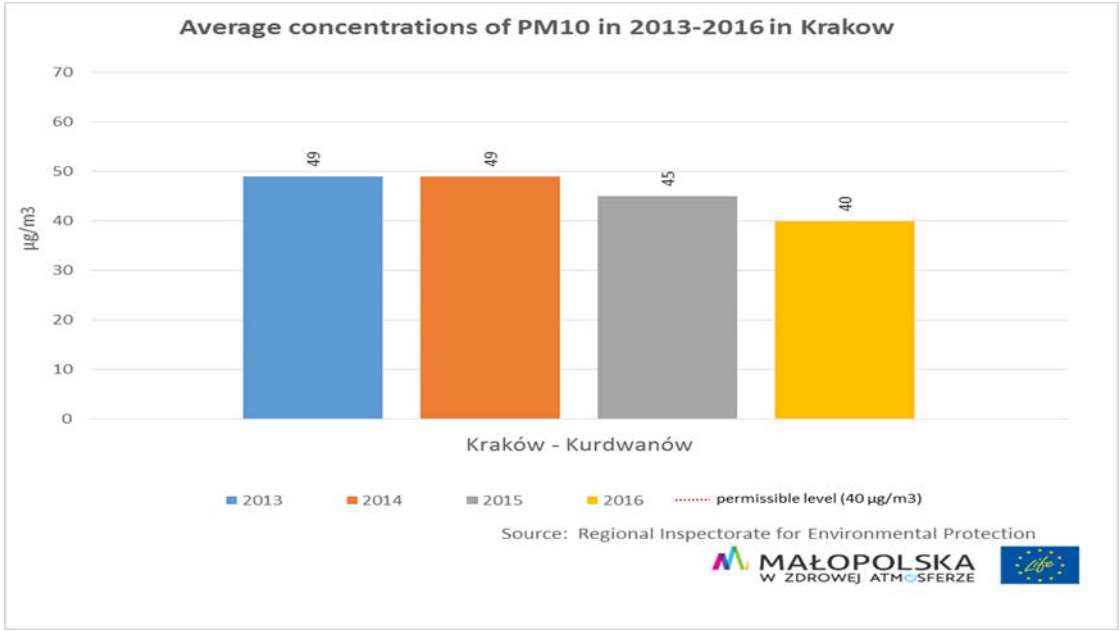



## CONCLUSIONS

- LIFE IP in Malopolska is already making an impact at regional & local level
- Regional modelling cooperation platform across south PL, CZ, SLO to assess the impact of the actions to primarily reduce PM emissions
  - Harmonised residential emission inventories
  - Strengthening modelling capabilities in the regions (EISSA, CAMx…)
- ATMOSYS planning: user friendly web based modelling tool to assess effectiveness of local management plans: traffic, but also point (industry) and area.

# THE IMPACT – REDUCTION IN MEASURED PM LEVELS

- About **100 green jobs** created
- **Capacity building**
- The increase of **public awareness**.
- Support for **additional actions**.



# ACKNOWLEDGEMENTS


- **Malopolska Region: LIFE Team**
- **CHMU Life Team**
- **SHMU Life Team**
- **VITO Colleagues**


## THANK-YOU

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