Operational Procedure for Emission Reduction Assessment

Application of RIAT+ on the Alsace region (France)

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Agenda

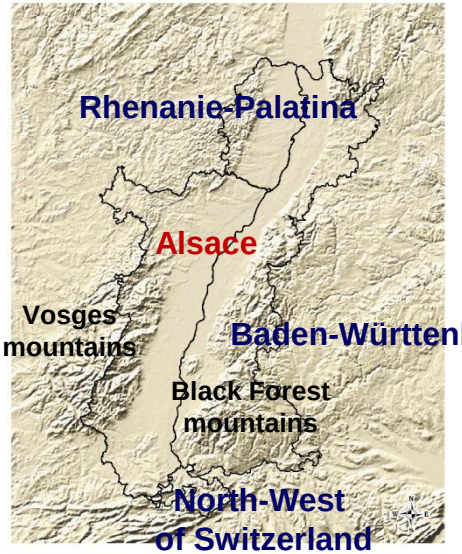
- **Initial situation in Alsace**
- **Local and regional policies on air quality**
- **RIAT+:**
  - **Preparation of inputs**
  - **Preliminary results**
- **Conclusion and outlook**

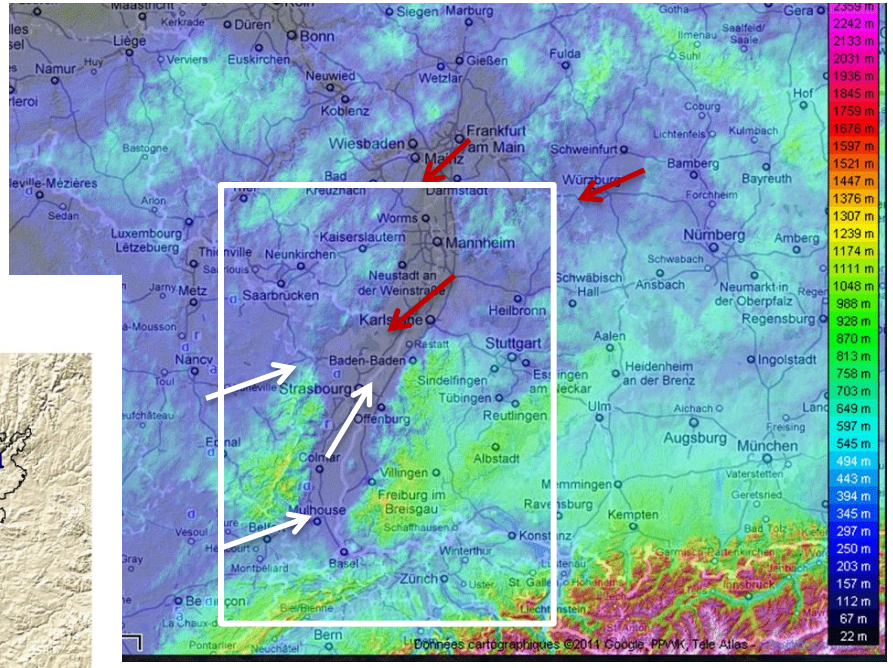
Upper Rhine Area
Geographical situation

Alsace between the Vosges and the Black Forest

South and West winds induce south winds in the valley

East winds induce North wind in the valley





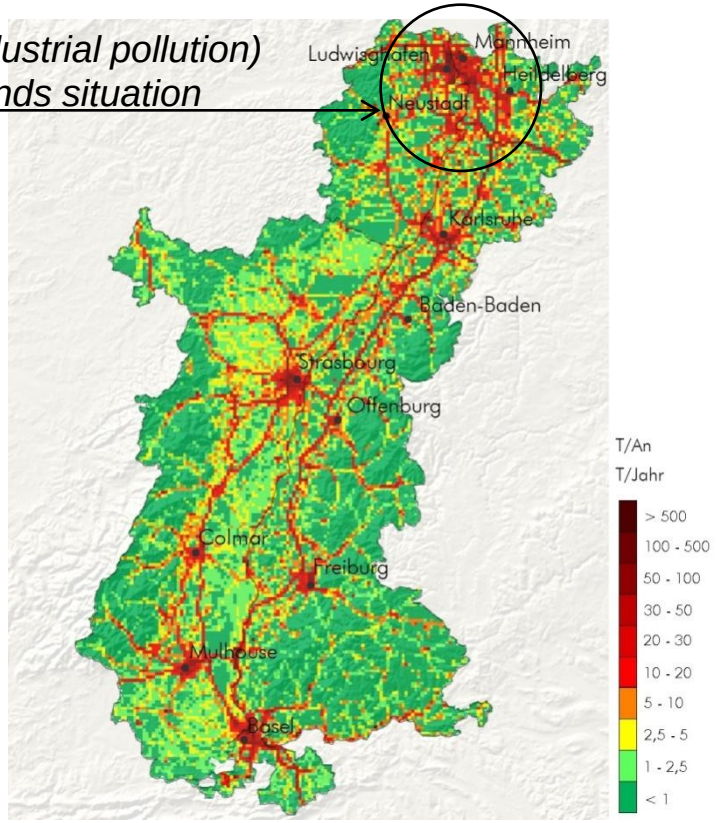
Pollution context

High source of emissions (mainly industrial pollution)
Influencing the valley in north winds situation

Dense populated area
with several cities along the valley

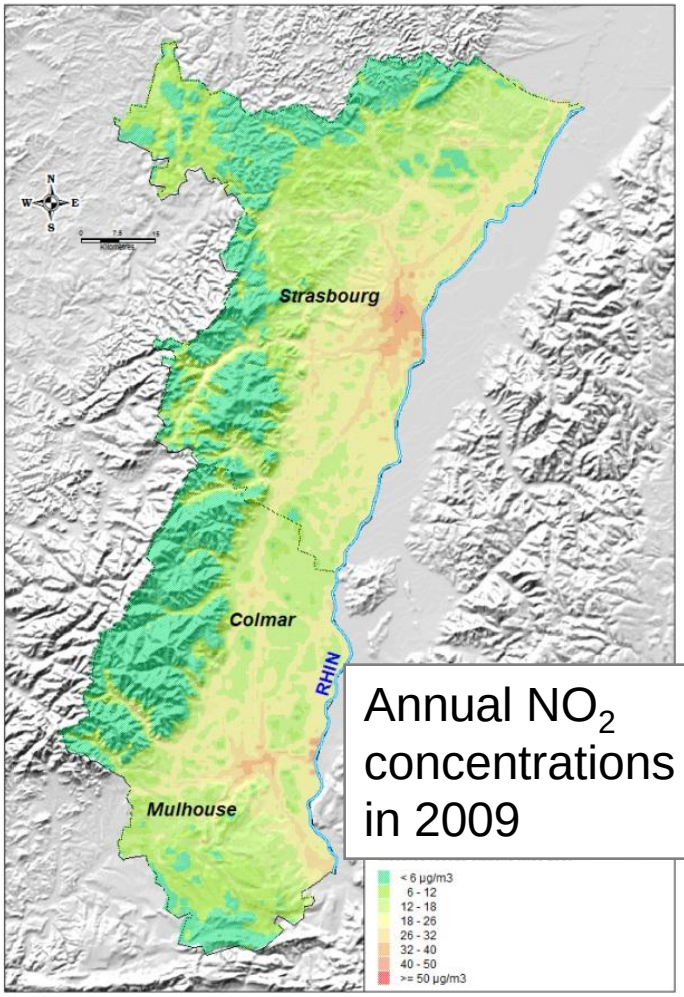
Several industrial sites

High traffic (with heavy trucks coming from all over Europe)



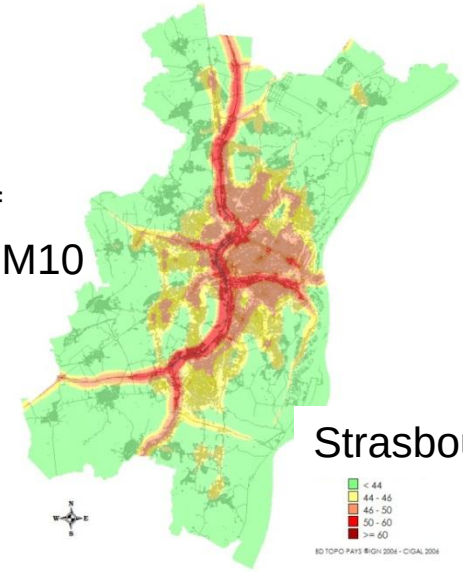
NO_x Annual emissions

Current challenges in Alsace

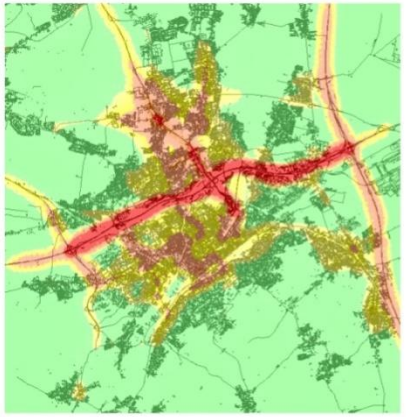


Annual NO_2 concentrations in 2009

Percentile of exceeding of daily limit of 50 µg/m^3 of PM10 concentration

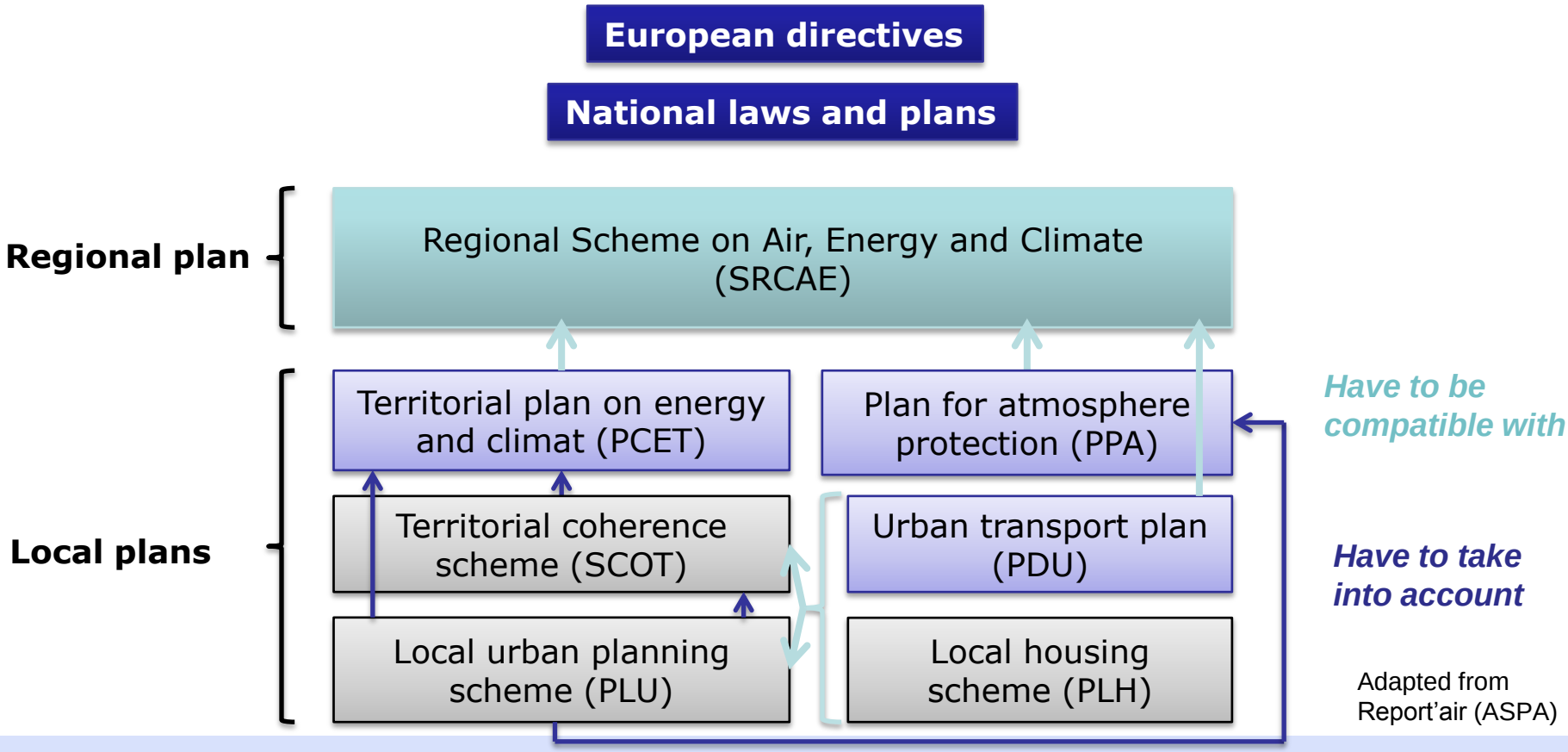


Strasbourg



Mulhouse

National, regional and local air quality plans in France



Adapted from Report'air (ASPA)

Regional Scheme on Air, Energy and Climate (SRCAE)

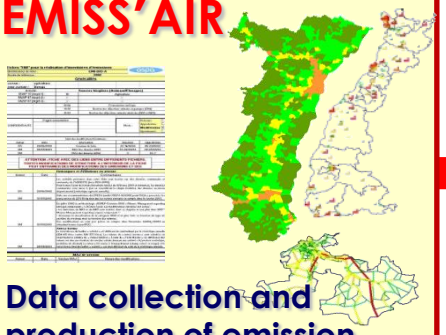
- Strategical document
- Released on 29/06/2012
- According to law grenelle 2
- Axis 3: “Prevent and reduce air pollution”
- Orientations 2020 – 2050
- Sensitive zones (29% of the territory, 63% of population)

Different tools to prepare RIAT+ input

Speciation and aggreation of COVNM and PM (CITEPA/IER/ASPA)

Abatment reductions for 22 scenarios

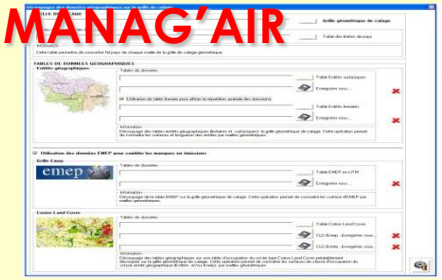
EMISS'AIR



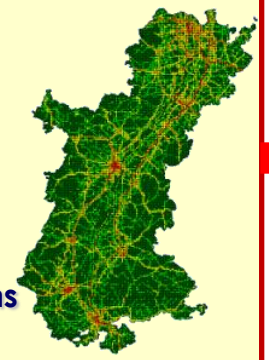
Data collection and production of emission inventories over Alsace

2005

MANAG'AIR

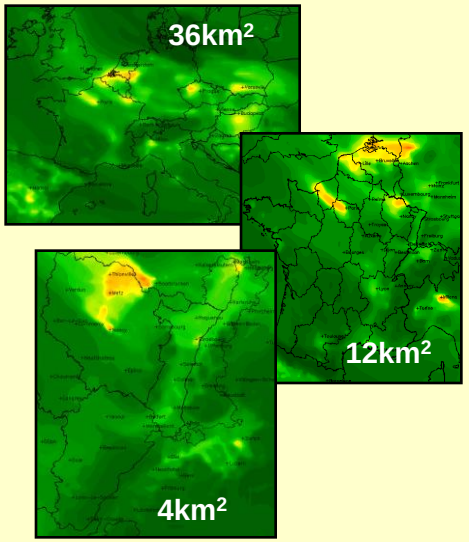


Computation of hourly emissions for inputs of ATMO-RHENA

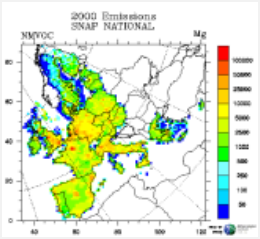


ATMO-RHENA

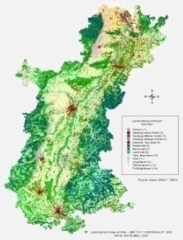
WRF/CHIMERE (CNRS)



Simulations of O_3, NO_X, COV, PM10, PM2.5 concentrations



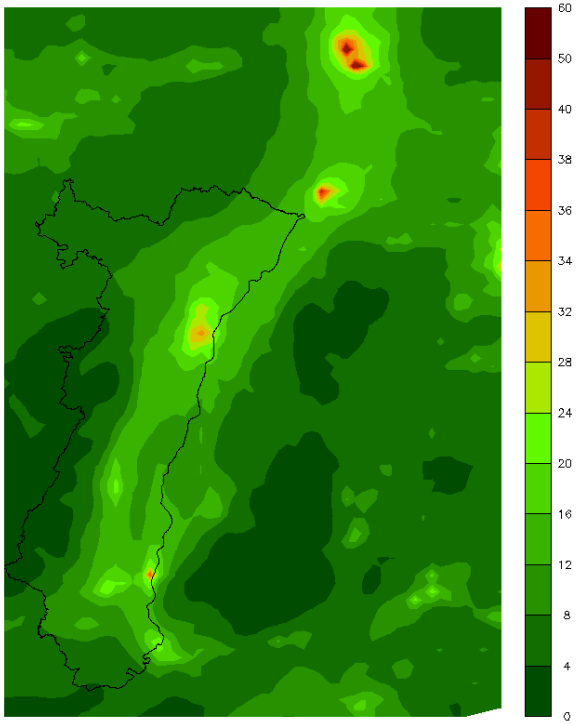
Emissions for unknown areas (EMEP)



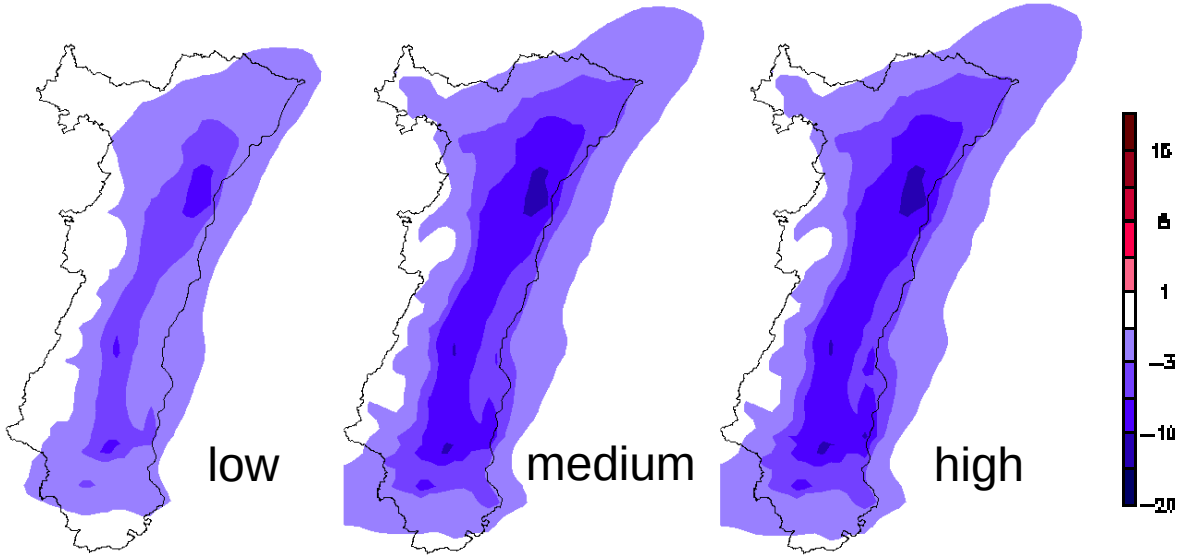
Landuse (CLC)

Hourly/seasonal variabilities (CITEPA/IER/ASPA)

Simulation of 22 scenarios and calculation of six air quality indicators



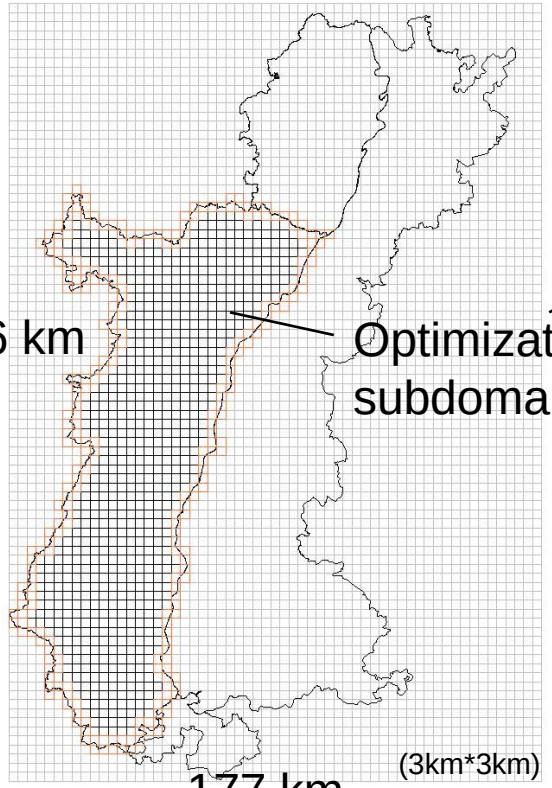
Basecase scenario



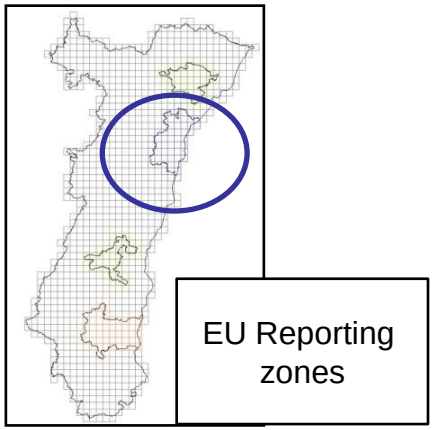
Mean NO_2 (µg/m^3)

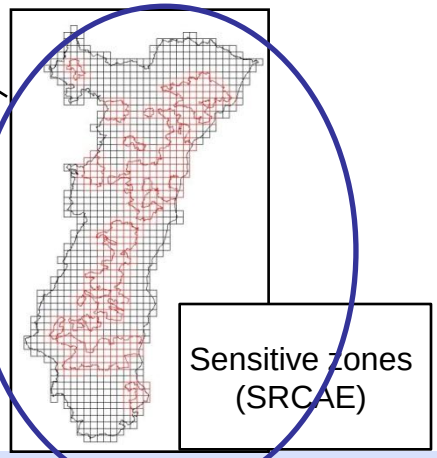
RIAT+ configuration for Alsace

Simulation domain

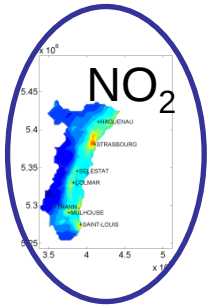


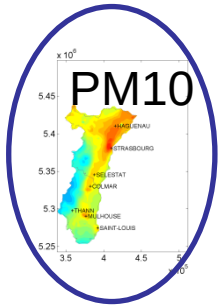
Optimization subdomains

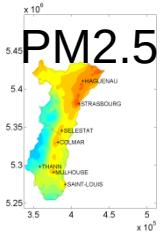


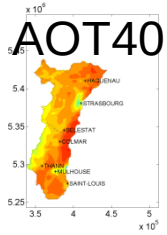


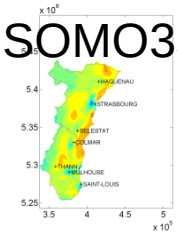
Air Quality Index (AQI)

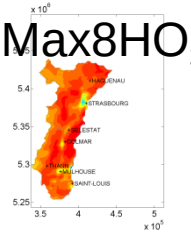




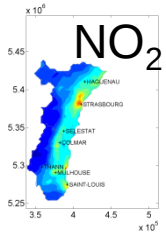




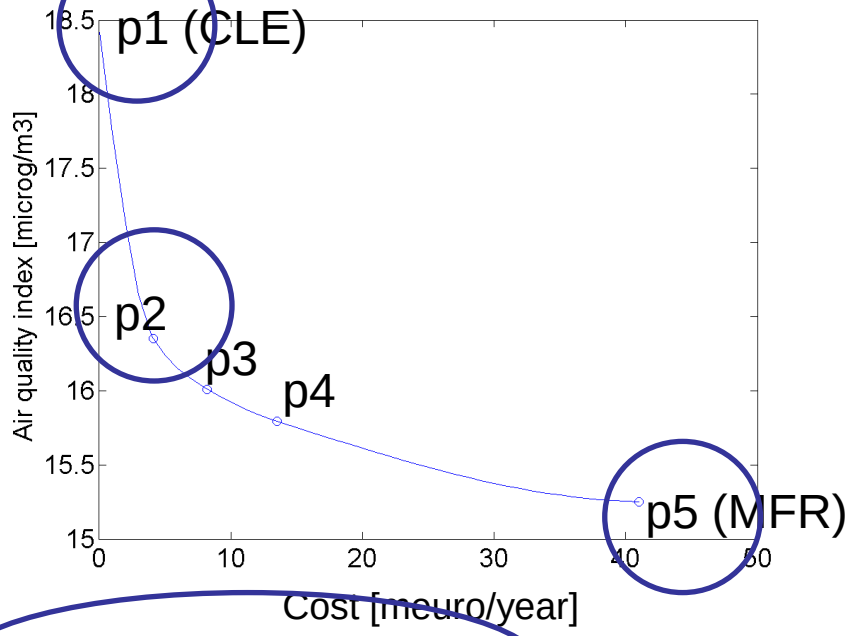




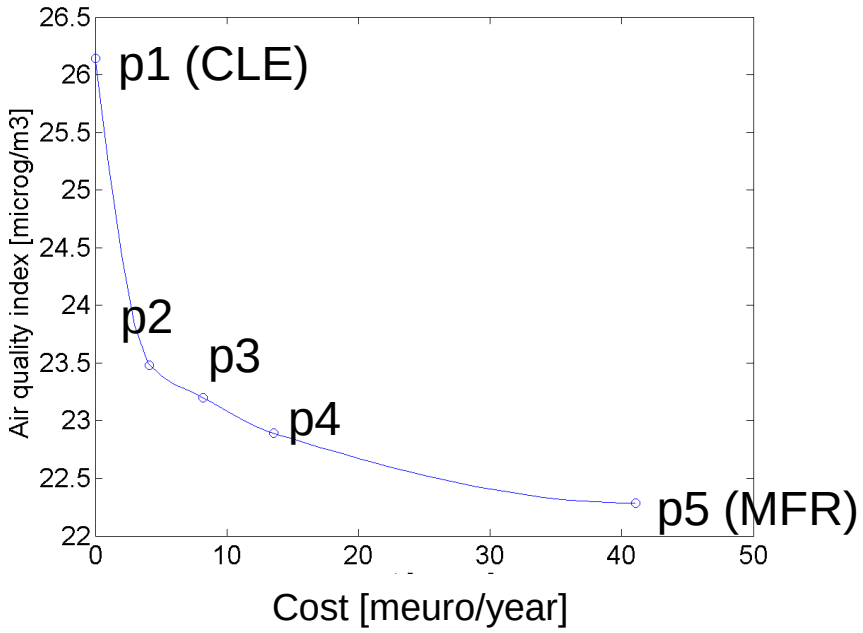
year – summer – winter



Pareto curves: NO_2 winter (population weighted)

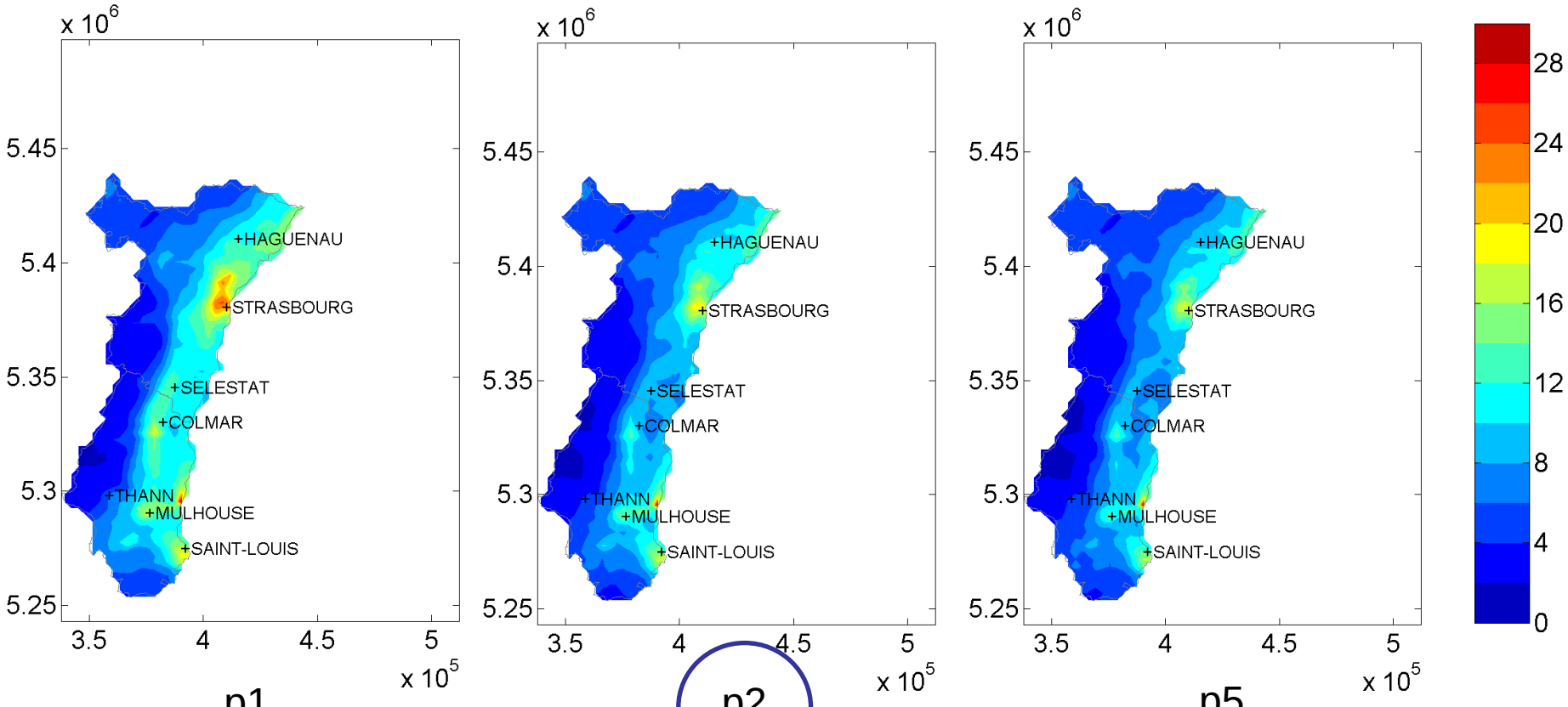


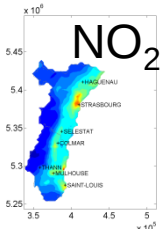
Sensitive zones



Strasbourg greater area

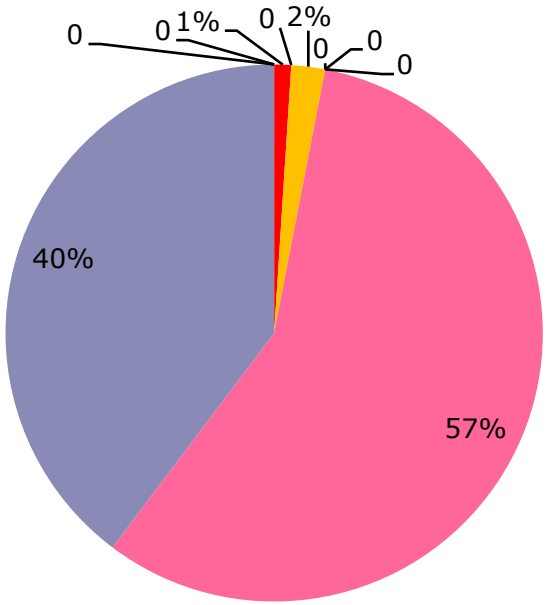
Mean NO_2 (year, µg/m^3)



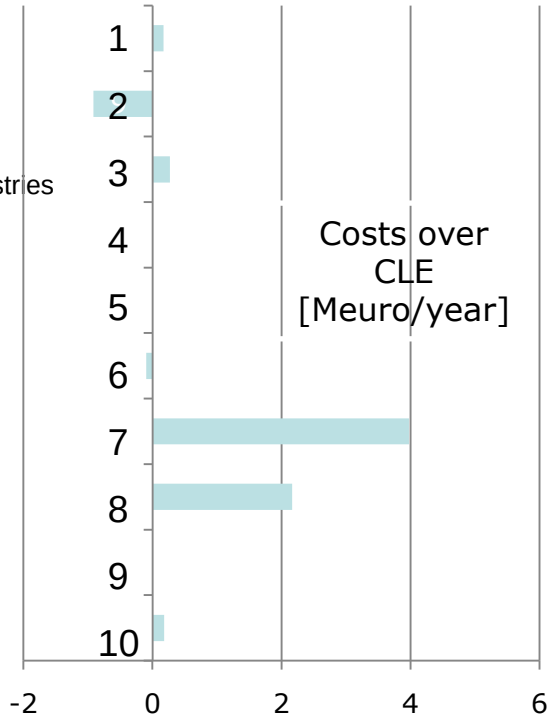


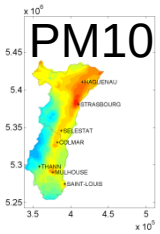
Results for p2: emission reductions and costs

emission reduction for NO_x [tons/year]

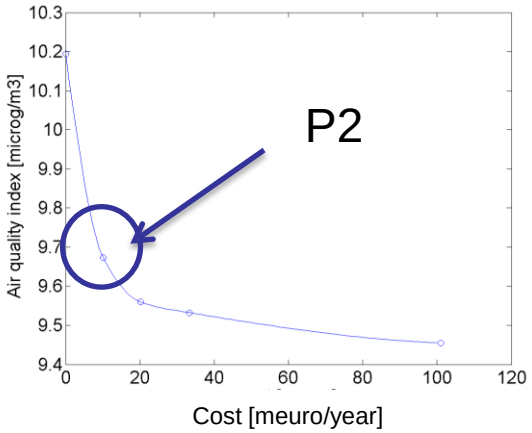


1 Combustion in energy and transformation industries
2 Combustion in agriculture and the third sector
3 Combustion in manufactoring industry
4 Production processes
5 Extraction and distribution of fossil fuels
6 Solvent and other product use
7 Road transport
8 Other mobile sources
9 Waste treatment and disposal
10 Agriculture and forests

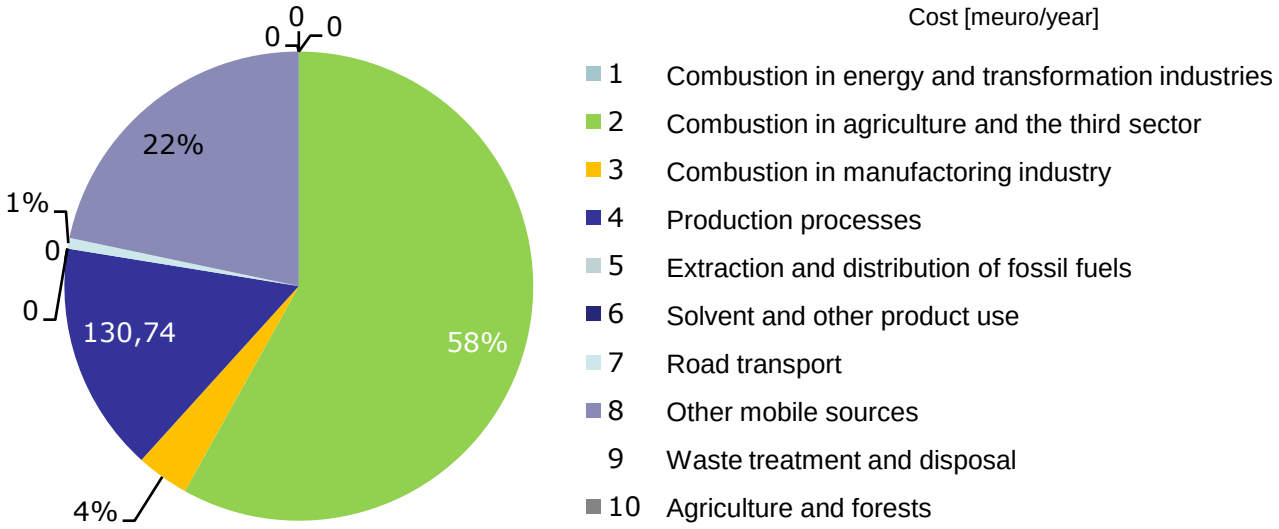


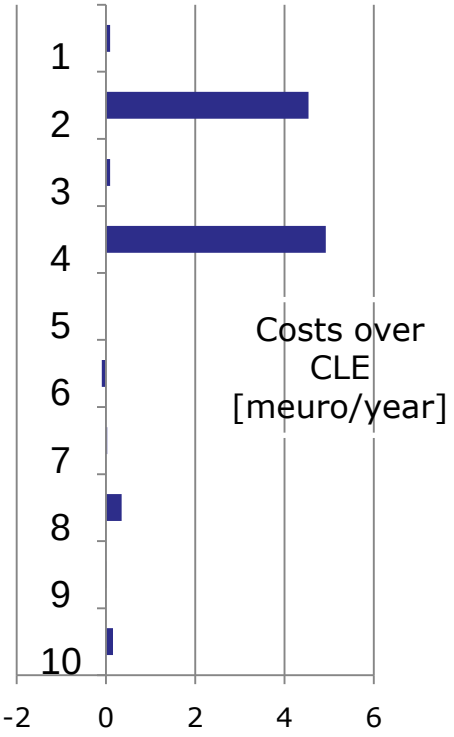


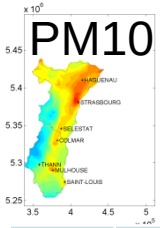
Optimization for PM10



PM10 emission reduction [tons/year]







Main Technical measures in point 2: emission reductions in tons/year

MS	sector	activity	technology	NO_x	VOC	NH_3	PM10	PM2.5	SO_2
2	Residential-commercial: fireplaces	Fuelwood direct	Fireplace improved	0	1364	0	479	469	0
8	Other transport: agriculture & forestry	Medium distillates (diesel, light fuel oil, includes biofuel)	Stage 3B control on construction and agriculture mobile sources	2484	632	0	163	155	0
4	Construction activities	No fuel use	Spraying water at construction places	0	0	0	124	30	0
3	Ind. Process: Aluminium production - secondary	No fuel use	High efficiency deduster-industrial processes	0	0	0	22	9	0

Conclusion and outlook

Preliminary application shows:

- Integrated approach for classifying most cost-efficient measures:
  - For different AQI, subdomains, …
  - Output: Information on all AQI, pollutants, macrosectors
- Orders of magnitude of emission reductions and costs
- Overview of possible strategies to improve air quality in Alsace
  -> new ideas can emerge

Next steps:

- Other optimizations
- Further sensitivity analysis
- Adding non-technical measures
- Further discussions with local decision makers
- Proposal for local action plan

Thank you for your attention!