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ECLAIR
Emission inventory toolkit

Why do we need an emission inventory?

- To produce quantitative information about emissions
 - How large are emissions from road-traffic, industry, etc.
 - Reporting of emissions (national level)
 - Emission scenarios
- Necessary to diagnose the air quality situation:
 - mapping, to identify air-pollution hot-spots
 - to identify sources of air pollution
 - Designing monitoring networks
- Necessary to evaluate efficiency of abatement measures

Desired properties of an inventory

- Complete (all relevant sources included)
- Consistent (methods do not change over time)
- Standardized classification
- State-of-the art methodology
- Compatible with standard tools (e.g. GIS, Excel)
- Geo-referenced (with coordinates)
- Can be used as input for dispersion modelling
- Maintainable (yearly updates)
- Well documented
- QA/QC

Top-down vs. bottom-up

- Top-down:
 - Calculate national total emissions from statistics
 - Distribute the emissions spatially using proxy data
 - Example: distribute emissions from agricultural machinery over farms and arable land
- Bottom-up:
 - Calculate emissions from individual sources (roads, industries etc.)
 - Sum of all individual sources to calculate the total emission

Often, a combination of bottom-up and top-down is required in a complete emission inventory

Technical challenges

- ✓ Different emission sectors / source types
 - ✓ Road traffic (fleet composition, fuels, emission factors, cold-start, wear emissions)
 - ✓ Stationary sources
 - ✓ Diffuse sources
- ✓ Calculation of hourly emissions
- ✓ Gridding of emissions
- ✓ Maintainable using standard tools (GIS, Excel)
- ✓ Calculation of total emissions (per sector, substance and within a given area)

Conceptual design

- Inventory stored in a single file (SQLite database)
- Inventory can be exported/imported to spreadsheet (xlsx)*
- Editing supported through spreadsheet and GIS
- Visualization, calculations etc. in QGIS
- Compatibility with CLAIR air quality modelling system (for dispersion modeling)

* grid-sources (top-down emission sources) are exported to GIS-format

To be improved

- Improved user-interface
- User manual
- Adaptation of functionality to support specific work-flows
 - Gridding emissions for reporting under CLRTAP
- Publish openly in QGIS plugin repository