Evaluation of energy consumption, pollutant and GHG emissions of road transport

OPTEER (GHG-Energy-Air quality) observatory
Franche-Comté region, France

October 16th 2014
A few words about the Climate-Air Quality-Energy observatory OPTEER...

Conception of an internet website with territorial analysis tools in the energy field by the ThéMA research laboratory (CNRS) with an original funding of the Region Franche-Comté, ADEME and Grand-Dole.

2005 - 2008
Research program

2009
Transition phase

2010 - 2014
Animation by ATMO FC

- Expanding to the GHG and air quality themes (in the context of the new regional plans “SRCAE”)
- Creating an observatory structure around the existing-updated tool web-platform
- Defining a juridical framework
- Injecting and managing data in the tools
- First full-scale rebuild and upgrade of the tools

A couple figures:
- Over 500 base data on energy/AQ/GHG
- 140 users from 41 structures
- Over 30 territorial management documents are already using the data of the observatory
The use of a traffic model is needed to have an adequate resolution to improve the knowledge of:

- Air pollutants emissions and air quality modelling,
- Energy consumption and GHG emissions evaluation.
Evaluation methodology for road transportation: general view

**Input data**
- Yearly traffic count on roads for year $y$
- Socioeconomic data for year $y$

**Scenario simulation for year $y$**

**Scenario processing for year $y$ to calculate energy consumptions and GES-pollutants emissions**
- Hourly traffic counts on roads for year $y$
- Trucks rates and two-wheelers rates
- Calculation of slope for the road network

**CIRCUL’AIR** (used by most French monitoring air quality agencies)
- Integrating COPERT IV methodology

**Modelling results exploitation**
- Web platform of the observatory OPTEER (data made available to local authorities)
- Air quality models (regional and local)

**Emissions and consumptions database for year $y$**
Evaluation methodology for road transportation

**STEP 1**

- **Input data**
  - Yearly traffic count on roads for year $y$
  - Socioeconomic data for year $y$

- **CUBE software (Citilabs)**

- **Scenario simulation for year $y$**

**Emissions and consumptions database for year $y$**

**Calculation of slope for the road network**

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**Integrating COPERT IV methodology**

**Trucks rates and two-wheelers rates**

**Modelling results exploitation**

Web platform of the observatory OPTEER (data made available to local authorities)

**Air quality models** (regional and local)

CUBE software (Citilabs)

**Data4Action - 2014.10.16**
Evaluation methodology for road transportation

**STEP 2**

Scenario processing for year $y$ to calculate energy consumptions and GES-pollutants emissions

- Hourly traffic counts on roads for year $y$
- Trucks rates and two-wheelers rates
- Calculation of slope for the road network

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Air quality models (regional and local)
CUBE software (Citilabs)
Emissions and consumptions database for year $y$
Evaluation methodology for road transportation

STEP 3

Modelling results exploitation

Web platform of the observatory OPTEER (data made available to local authorities)

Air quality models (regional and local)

Emissions and consumptions database for year y

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Trucks rates and two-wheelers rates

Modelling results exploitation

Web platform of the observatory OPTEER (data made available to local authorities)

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Trucks rates and two-wheelers rates
Regional traffic transport modelling in the Franche-Comté regional area

2003 - 2009
First construction/exploitation phase (ORT)

Regional Observatory of Transportation (Observatoire Régional des Transports / ORT) in Franche-Comté:
- Model conception,
- Exploitation,
- Maintenance.

2009
First collaboration with ATMO FC

Collecting and treating the input data for the year 2008 scenario,

2009 - 2011
Transition phase

Model was no longer maintained.

2010 - 2014
Technical management takeover by ATMO FC

Updating and upgrading of the model by ATMO FC with the technical assistance of SYSTRA.
Characteristics of the regional traffic model in Franche-Comté

- Classic 4 steps traffic model
- Multimodal: road and rail transport
- Annual Average Daily Traffic for the passenger car part of the model
- CUBE software (Citilabs)
Updating and upgrading the model for the needs of the observatory

Old version

New version

Zoning

4518 areas

5404 areas

Network

30 000 road sections

200 000 road sections
Three phases will be needed for a multimodal model with both regional and urban scales of use:

- **Phase 1 - 2013-2014**: updating of the model and upgrading of the passenger car modeling (2010 and 2012 scenarios)

- **Phase 2 – 2014-2015**: further updating of the components of the traffic generation step + activation of the freight modeling (HDT) + updating of the rail transport (infrastructure, timetables, pricings, new public transportation traffic matrix, calibration, ...)

- **Phase 3 – 2015-2016**: Upgrading of the multimodal approach of the model (passenger car / public transport / freight) (new multimodal reference matrix, updated traffic generation sources, ...)
Traffic modeling for the ORT: what has been done in 2013-2014 (1st phase)

- Heavy investment of ATMO FC in the update of the traffic modeling tool:
  - 1,300 man-hour (mostly engineering level) at this point,
  - 22 K€ of software license, training and tech support from SYSTRA.

- Achieved parts of the first update phase:
  - Adapting the model to the up to date version of the CUBE software,
  - Improving the spatial resolution in the dense urban areas,
  - An updated and improved road network (VP)
  - Gathering and processing of the input data to create a new scenario for the year 2010 (socio-economical data, traffic counts, ...).

- The steps to be finishes this year:
  - Model calibration to be finalized,
  - Scenarios for the year 2010 and 2012.
Thanks for your attention,
Any questions?

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