Joint Research Centre (JRC)

JRC contribution to COPERT development

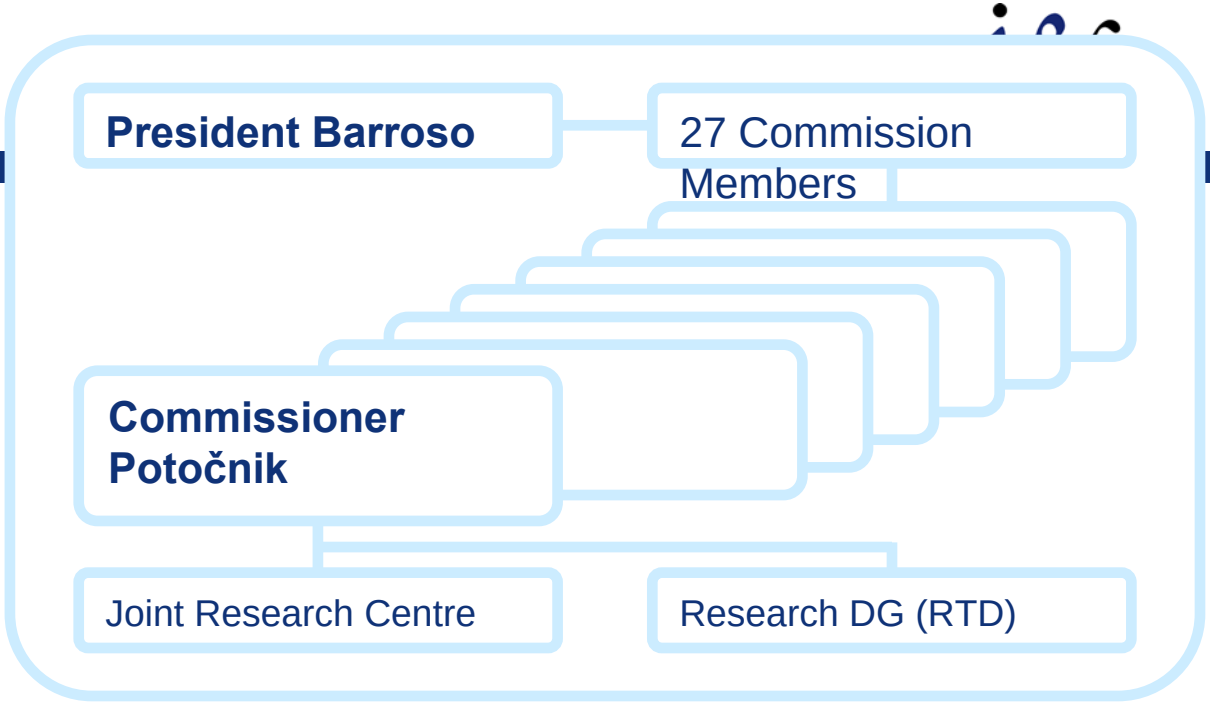
IES - Institute for Environment and Sustainability

Ispra - Italy

http://ies.jrc.ec.europa.eu/

http://www.jrc.ec.europa.eu/

Where does the JRC fit in the European Commission?



The Mission of the Joint Research Centre

is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies.

As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union.

Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

Our Structure: 7 Institutes in 5 Member States

IRMM - *Geel, Belgium*
Institute for Reference Materials and Measurements

ITU - *Karlsruhe, Germany*
Institute for Transuranium Elements

IE - *Petten, The Netherlands*
Institute for Energy

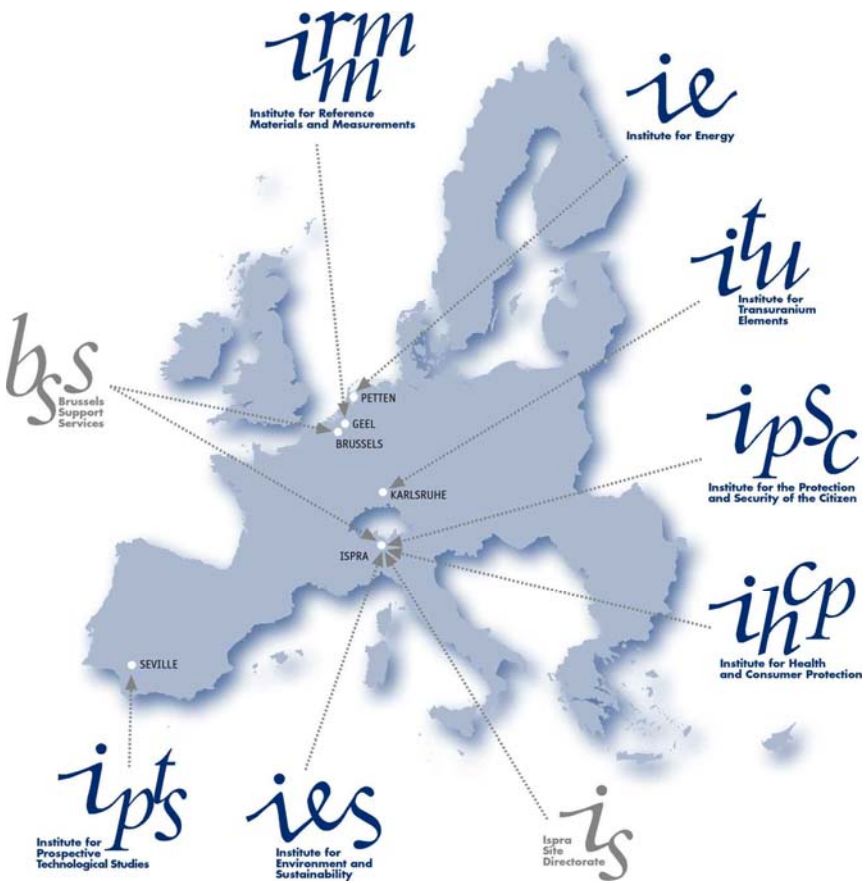
IPSC - *Ispra, Italy*
Institute for the Protection and Security of the Citizen

IES - *Ispra, Italy*
Institute for Environment and Sustainability

IHCP - *Ispra, Italy*
Institute for Health and Consumer Protection

IPTS - *Seville, Spain*
Institute for Prospective Technological Studies

~ 2800 staff **~ 300 M€/y budget**
(+ 40 M€/y competitive income)



JRC co-leader of Transport Panel in TFEIP

- **Set-up a web site for panel** http://transportpanel.jrc.it/
- Launched a study on the use of PEMS measurements for the validation of COPERT EF
  - LAT, TUG, 19 months, start Jan '08
  - Extensive JRC experimental programme
- Launched studies on the improvement of emission factors of LDV and of non regulated pollutants for use in road transport emission models
- Launched a study on the parameterization of FC/CO2 passenger car emission for modeling purpose
- Launched a study on the estimation of COPERT IV uncertainty
- ERMES group coordination

http://transportpanel.jrc.it/

TFEIP Expert Panel on Transport.

European Commission
Joint Research Centre
Institute for Environment and Sustainability

European Commission » Joint Research Centre » IES » The Institute » Units » Transport and Air Quality Unit

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february 2009

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PEER

JRC-IES is member of Partnership for European Environmental Research

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TFEIP Expert Panel on Transport

The Expert Panel on Transport is part of the Task Force on Emission Inventories and Projections (TFEIP), which operates under the Convention on Long-range Transboundary Air Pollution (CLRTAP). The expert panels are ad hoc groups under TFEIP. There are currently three sectoral panels, one on Combustion and Industry, one on Agriculture and Nature, and one on Transport. The mandate of the panels describes their role and responsibilities. In this site you may find information and news on Transport issues.

This web site was created in the hope to provide a easily accessible web-forum in order to take ahead the activities of transport emission inventories, both by promoting new research, where such is needed, as well as by putting together experts and promoting the exchange of views and information.

We, as Chairs of the TFEIP Expert Panel, only hope to mediate this process, but the real work, is up to you the Experts. With this we invite you to use our contacts in order to make suggestions and proposals both for the web-site, as well as to the content of the work of the Panel. If you want to contact us, please go to the Chairpersons / Contacts page from the menu.

Riccardo De Lauretis, Panagiota Dilara, Leonidas Ntziachristos.

Webmaster

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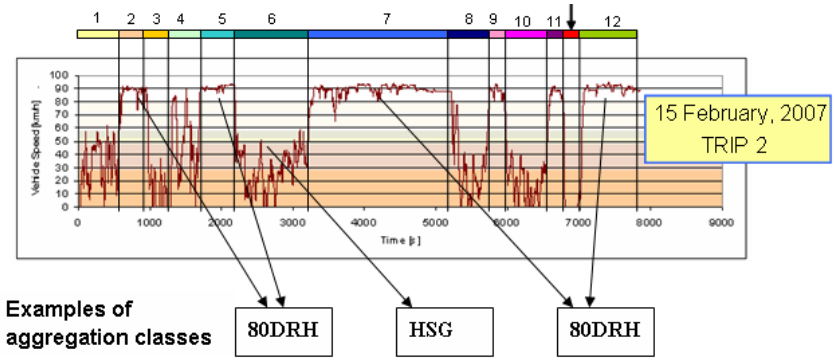
PEMS measurements

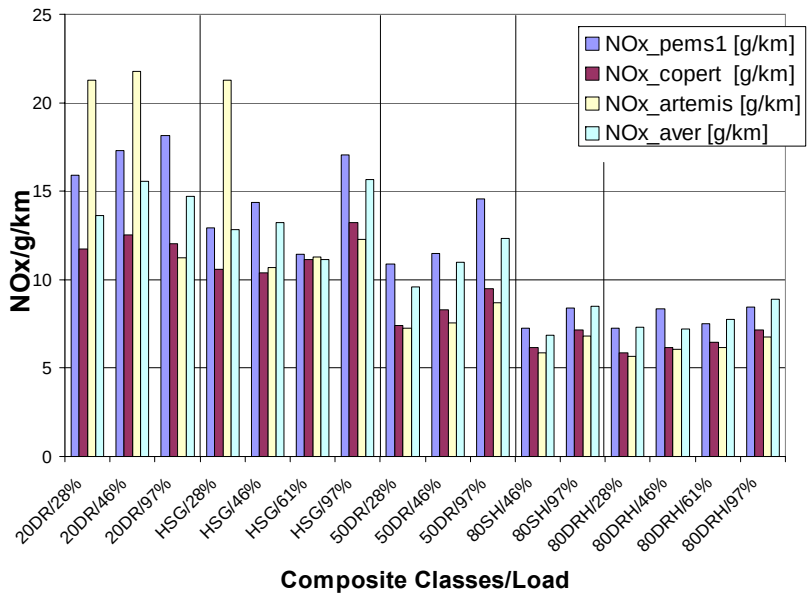
PEMS provide in **real-time** (1s) the monitoring of the pollutants emitted by the engine, together with engine parameters and ambient parameters. JRC has developed **EMROAD software** for PEMS data evaluation and post-processing.

Emission data gathered in one trip of heavy-duty truck traveling in Europe, between Slovenia and Spain, going through Italy and France.



Each trip was split in **sub-trips**.
Data was **processed** using composite classes.
The **emission factors** calculated was then compared with ARTEMIS and COPERT EF.

Aggregation class	Mean speed range	Aggregation criterion - dynamics of driving	Type of road	COMPOSITE CLASS
1	<25	Dynamic	Rural	20DR
2	(0-90)	Stop & Go	Highway	HSG
3	~50	Dynamic	Rural	50DR
4	70-90	Smooth	Highway	80SH
5	70-90	Dynamic	Rural/Highway	80DRH



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LDV emission factors

EF empirical basis is week

Starting from existing available measurements a methodology based on analysis of the engine maps was chosen (**PHEM**).
Appropriate **engine maps**, appropriate LDV cycle, not too aggressive for this kind of vehicles, will be provided in order to estimate emission factors for:

- fuel consumption
- several pollutants: NO*x*, particles, CO and VOC
- from euro 2 to euro 6
- DIESEL & GASOLINE
- emission factors vs average speed

Non regulated pollutants EF

Non regulated pollutant (NO_2, Benzene, Methane, Toluene, Xylene, N_2O and NH_3) emission factors of the emission inventory guidebook are generally based on data collected in studies around the world.

↓

Review the assumptions used so far

↓

Emission factors updates

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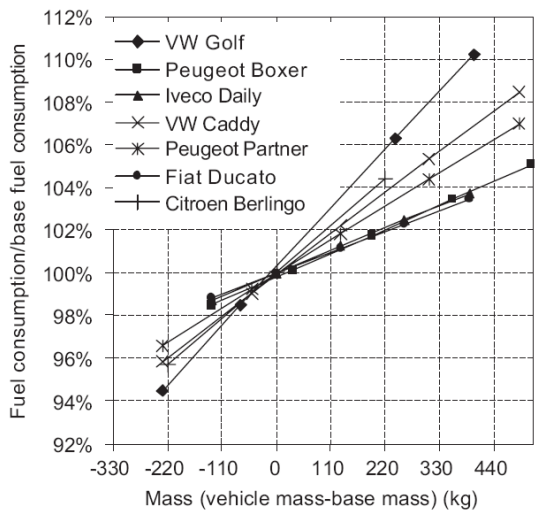
Parameterisations of the fuel consumption (and of CO2) of the passenger cars, both diesel and gasoline vehicle, in relations to the main FC-influencing factors



The parameterisation results has to results in an **energy and efficiency module,** which could be used in the transport emission models used in the European commission**.**

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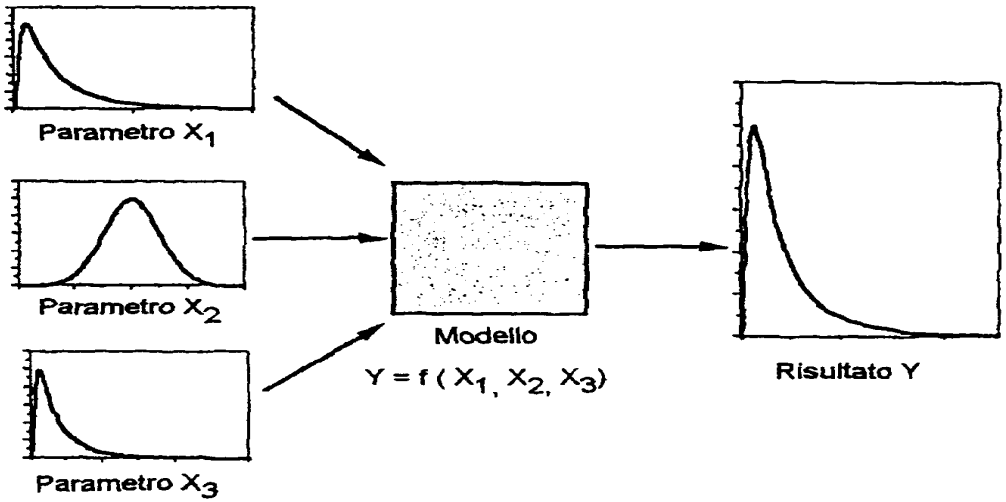
COPERT IV emission uncertainty

Precision of emission estimates depends on the **assumptions made** in the definition of the various model input parameters:

- emission factors;
- traffic activity indicators (number of vehicle, type of vehicle, etc..);
- model parameters (vehicle average speed, driving shares among the cycles, average trip length, mileage, etc..);
- meteorological data (temperature, canister efficiency and reid vapour pressure).

Need to check robustness of emission estimates to poorly known parameters and model assumptions. Reflect our poor knowledge on input parameters by means probability distributions and apply Monte Carlo analysis to estimate probability distributions of emissions.



Representation of a Monte Carlo simulation

COPERT IV emission uncertainty

Integrate uncertainty assessment into COPERTIV programme

Perform a simplified Monte Carlo analysis within the model itself.

Possibility to introduce the uncertainty of the most important input variables.

Guidance for the Tier 3 and Tier 2 methods of the AEIG

The uncertainty guidance will be provided for:

- **Uncertainty ranges of EF**
- **Uncertainty ranges of calculation parameters**
- **Range and source of uncertainty for input data**

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- **ERMES (European Research group on Mobile Emission Sources) group coordination**

Thank you for you attention!