

EMISIA: Short background

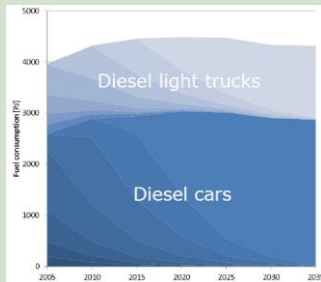
Zürich, 17 November 2017

Who we are, what we do

- Spin-off of AUTH/LAT since March 2008
- Head office in Thessaloniki; Office in Brussels
- Areas of expertise:

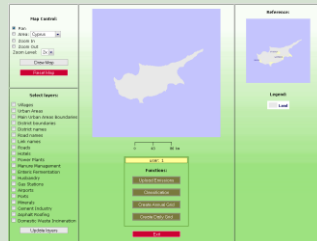
Inventories and projections

- Energy consumption
- Emissions of GHG and air pollutants



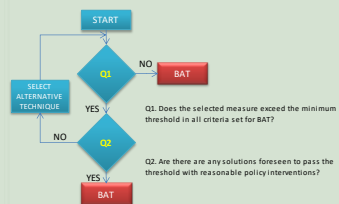
Emissions modelling

- National
- Regional
- Street level



Policy assessment

- Regulations
- Cost-benefit analyses



PEMS testing and data processing

- LD & HD vehicles
- Data QA/QC, visualization



Suite of main tools



- Estimates emissions from on-road vehicle fleets
- Used by 22 out of 28 MS for official submission of road emission inventories
- Developed for the European Environment Agency
- Free for use



- Calculates traffic emissions at street level using COPERT functions
- Can be combined with traffic analysis tools
- Visualization of results on GIS maps

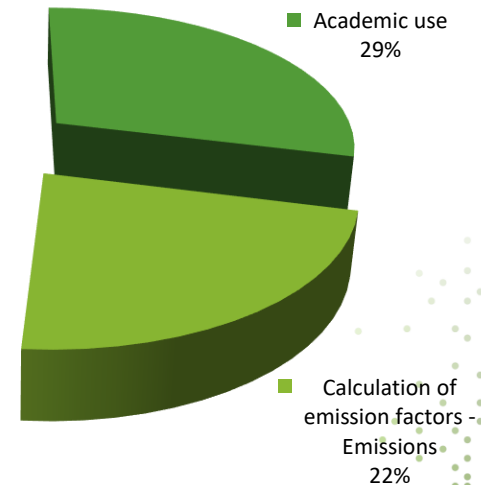
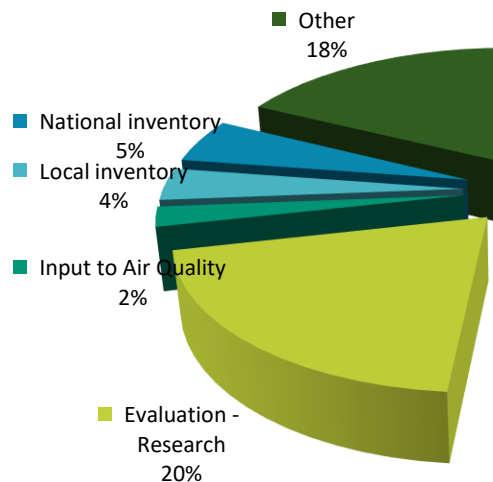
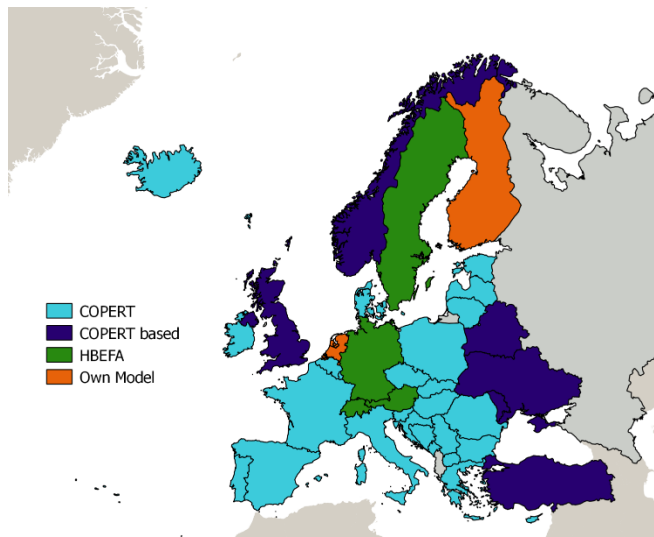


- Provides real-time traffic and environmental information for the city of Thessaloniki
- Enables smart navigation based on user selected criteria
- Available on the web and as an Android application



- Includes historic and projected stock and activity data
- Delivers alternative scenarios for energy and emissions
- Includes advanced technologies and mobility patterns
- Commercially available

- COPERT is the flagship of EMISIA's tools
- Supported by the European Environment Agency
- Estimates all types of pollutants from all road vehicle types
- Hundreds of scientific and policy citations



An online tool to calculate fuel consumption

emisia
MISSION FOR ENVIRONMENT

>start here
The road to Fuel Economy

European Commission

Back to homepage
Reset journey

1 Change your transport means

- Type of car/engine/fuel: Plug-in Hybrid Electric Ve
- Select a charge level: 70 %
- Default fuel price: Price fuel € 1.70 / ltr, Elec. Price € 0.07 / kWh

2 Plan your journey

- Start location: Avenue du Bourget 60, B
- Destination: grand place, brussels
- Map: Brussels area

3 Journey result

Tailpipe Emissions	Consumption	Cost
CO2 = 124 gr/km	0.90 KWh	1.30 EUR

Gasoline consumption total : 0.73 lt
Car: Plug-in Hybrid Electric Vehicle • Driving: Normal • Passengers: 1 • Luggage: no • Peak Hours: Off-peak

What can I do to reduce my fuel consumption? > Change parameters

4 Change parameters

- Style of driving: Gentle (off), Normal (on), Aggressive (off)
- Number of passengers: 0 (off), 1 (off), 2 (on), 3 (off), 4 (off)
- Luggage: No/Yes (Yes selected)
- Peak Hours: No/Yes (No selected)

4 Journey result modified variables

Tailpipe Emissions	Consumption	Cost
CO2 = 135 gr/km	0.92 KWh	1.41 EUR

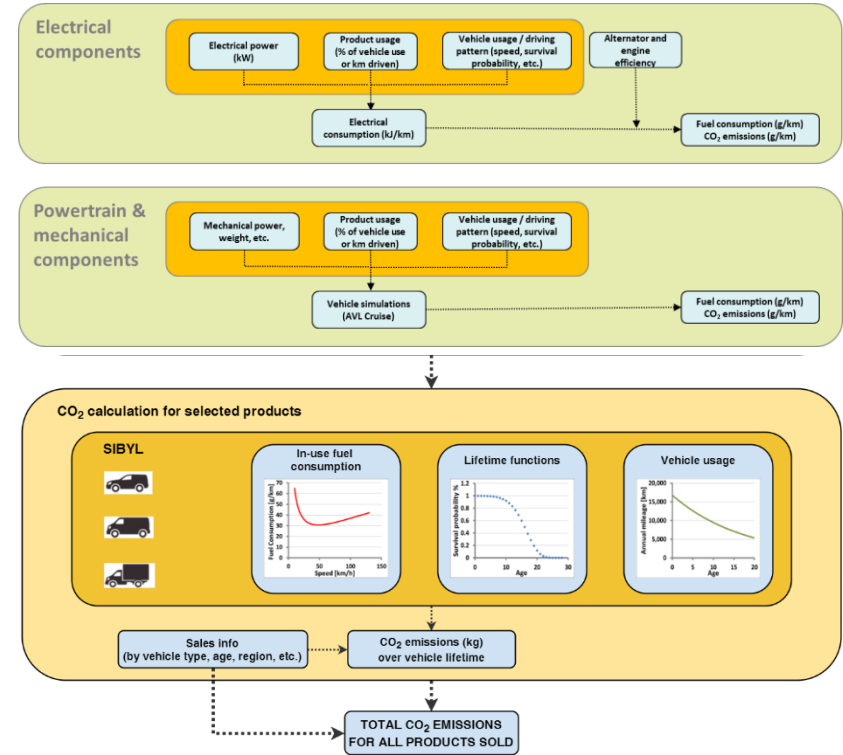
Gasoline consumption total : 0.79 lt
Car: Plug-in Hybrid Electric Vehicle • Driving: Normal • Passengers: 2 • Luggage: yes • Peak Hours: Off-peak

What we do at the JRC to improve fuel consumption and tailpipe emissions

CO₂ gr/km gauge: 0 to 300+

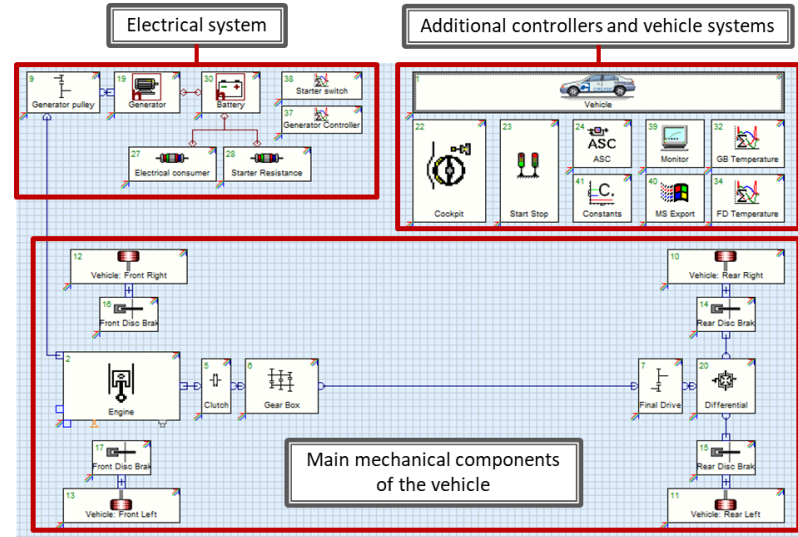
CO₂ emissions from the use of vehicle components

- Calculate CO₂ emissions linked to the use of selected products of a Tier 1 OEM supplier over product lifetime
- All important powertrains considered



CO₂ benefits from the use of a stop-start system

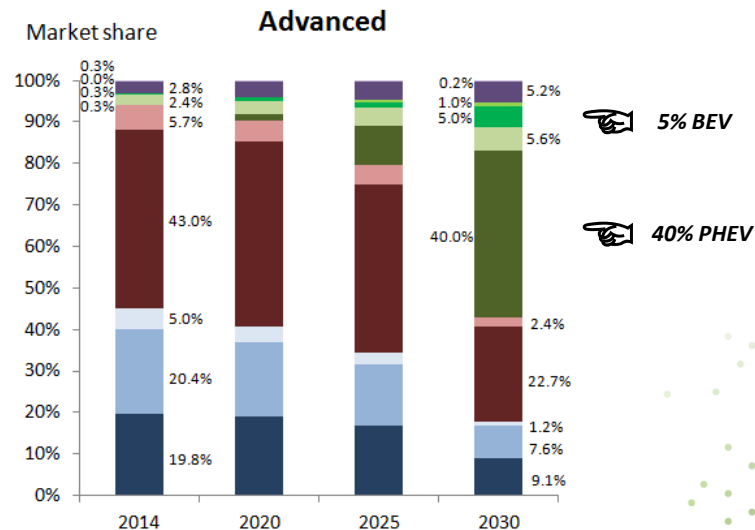
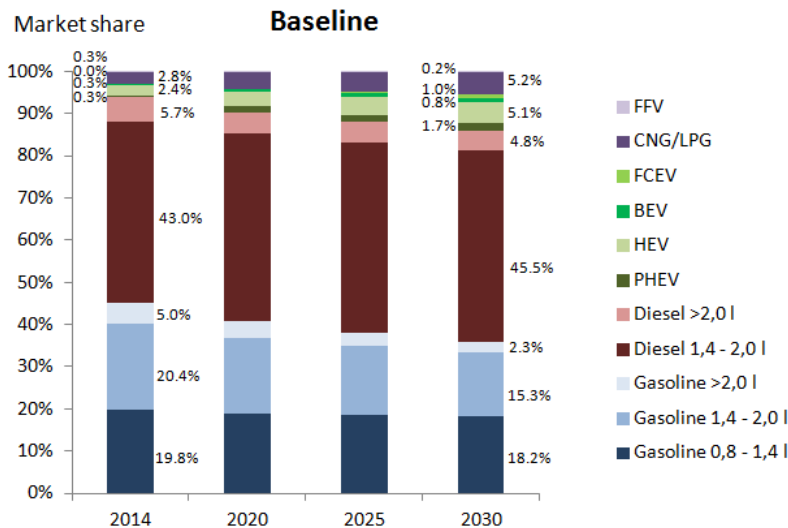
- How to deal with CO₂ reduction systems (mainly powertrain)
- A more complex approach to calculate fuel (and CO₂) savings
- Net effect on CO₂ emissions estimated with a vehicle simulation tool



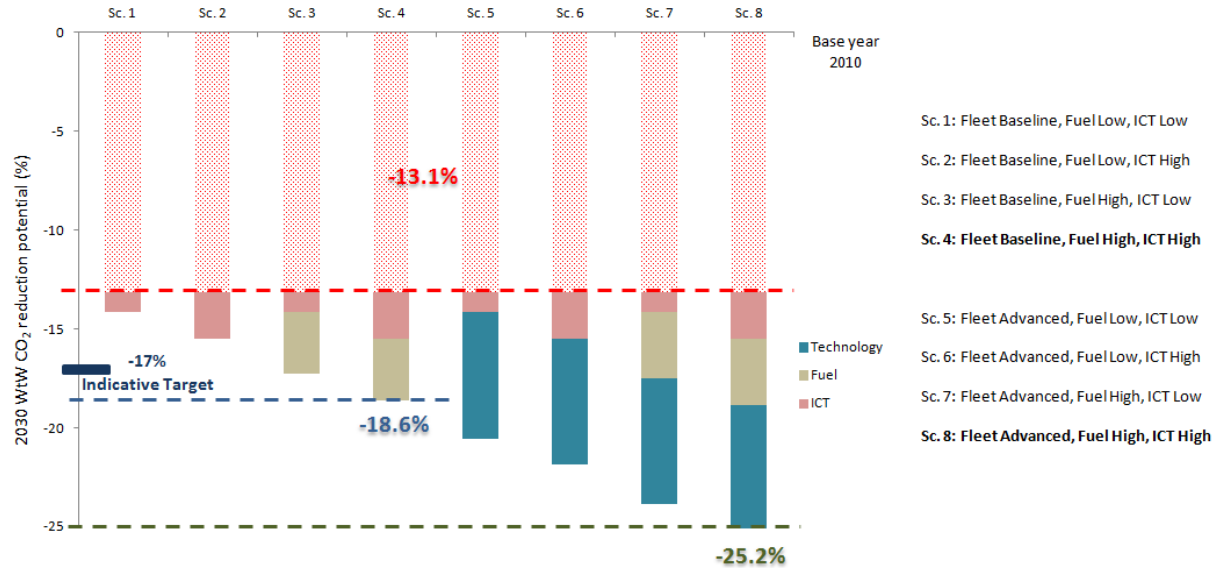
Vehicle	Petrol	Diesel	LPG	CNG	Petrol Hybrid	Diesel Hybrid	Petrol PHEV	Diesel PHEV	REEV
Product lifetime (h)	2,283	3,765	4,030	4,447	2,062	3,309	2,090	2,090	2,090
Product lifetime (km)	151,962	250,545	268,187	295,945	137,220	220,225	139,088	139,088	139,088
Additional fuel consumption (g/km) ^(*)	-2.88	-2.64	-2.29	-2.50	-1.60	-1.63	-0.84	-0.97	-0.93
Fuel consumption due to product use (kg)	-437.8	-661.9	-615.1	-740.7	-219.0	-358.0	-117.1	-134.3	-129.5
Lifetime CO ₂ emissions (kg)	-1322.60	-2064.36	-1855.69	-2037.02	-661.45	-1116.64	-353.85	-418.74	-391.10
Specific CO ₂ emissions (g/km)	-8.70	-8.24	-6.92	-6.88	-4.82	-5.07	-2.54	-3.01	-2.81

Evolution of CO₂ emissions from road traffic

- Projections of real-world (total) CO₂ from road transport taking into account **advanced biofuel** production pathways and deployment of **ICT/ITS**
- Projections based on baseline activity evolution to 2030, agreed in **high-level EU policy** related studies



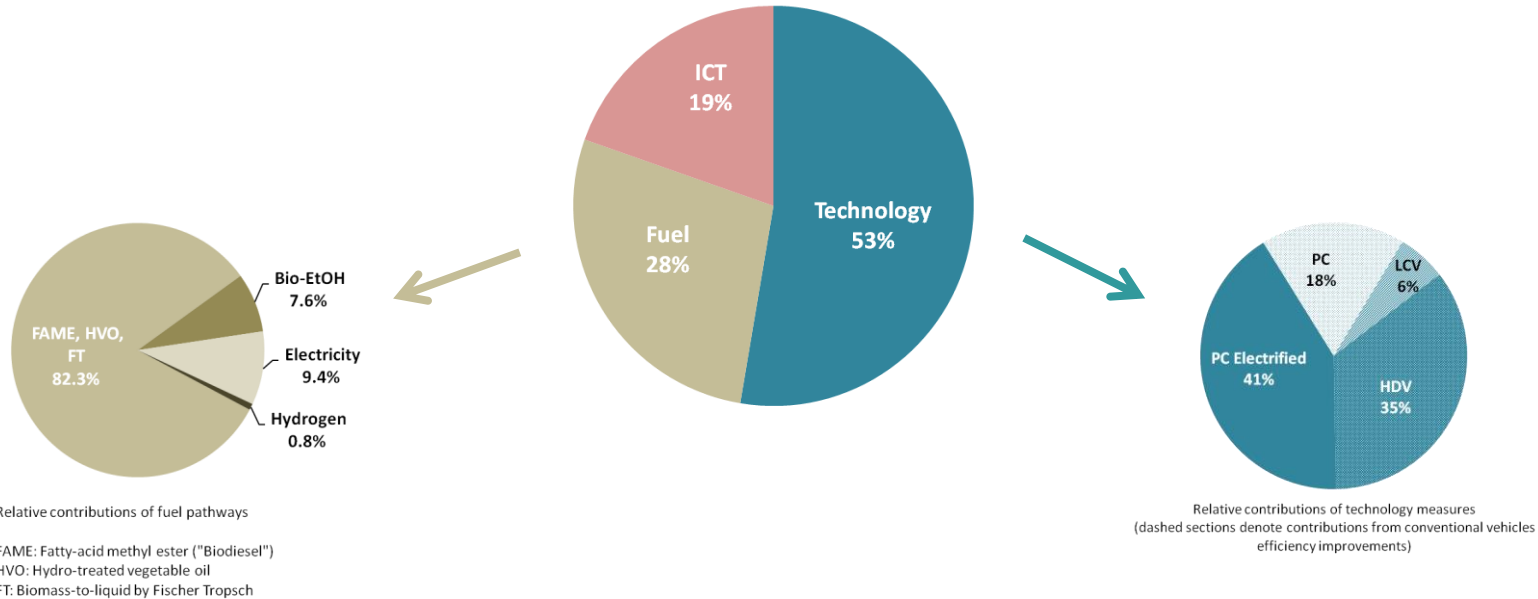
Total CO₂ benefits from scenario combinations



- Low effort fuel scenario already included in baseline scenario due to policy targets
- The 2030 indicative target could only be met with additional efforts in fuels and ICT
- Max 2030 reductions (-25.2%) over 2010 can be achieved with advanced vehicle technology, and high efforts in fuels and ICT measures

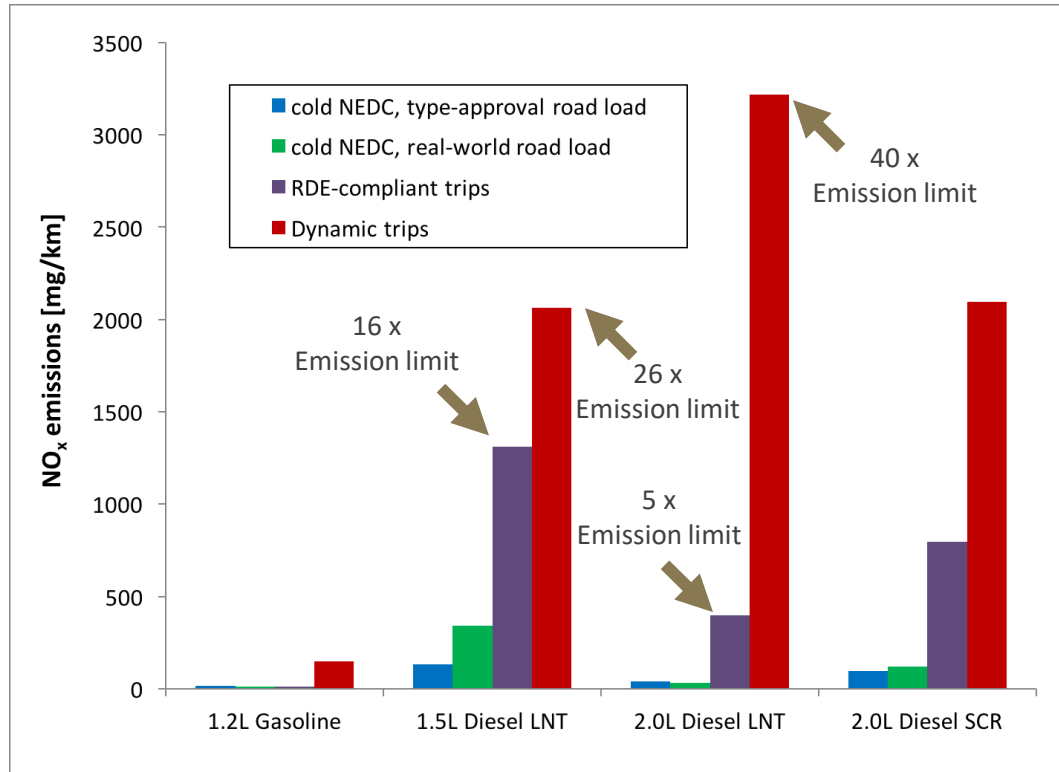
Relative contributions to max CO₂ reductions

Relative contributions in achieving maximum CO₂ reduction



- Reductions are split almost equally between vehicle technology (53%) and other measures
- PC electrification and biodiesel are the two single most important contributors

Real-world emissions testing with PEMS

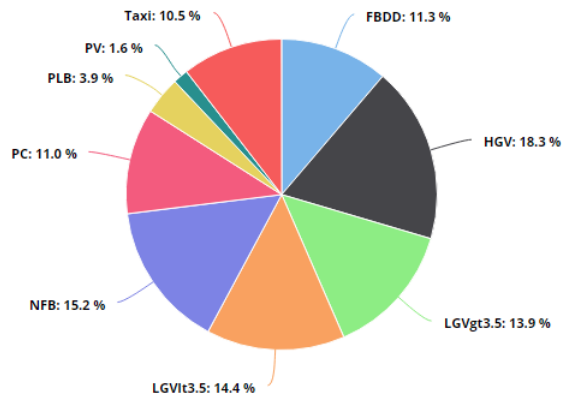


- Under RDE-compliant on-road trips, diesel NO_x emissions from diesel vehicles showed average levels varying from 5 to 16 times the Euro 6 limit.
- NO_x emissions of diesel vehicles driven in more dynamic driving conditions increased further to reach a range from 26 to 40 times the Euro 6 limit.

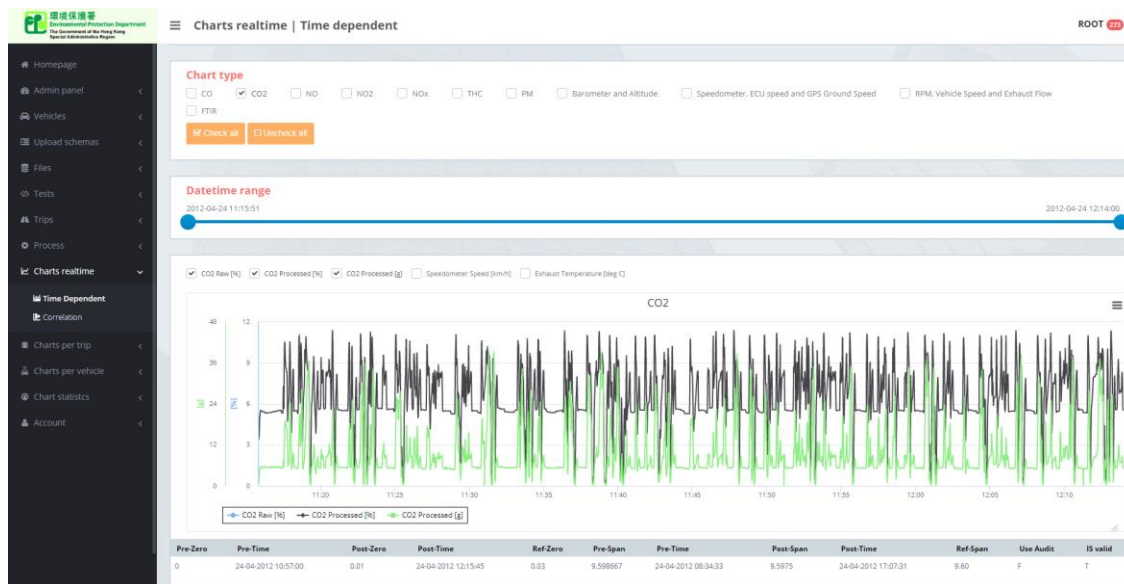


PEMS data infrastructure

- Data organization & retrieval
- PEMS IT System design & development
- System update & maintenance



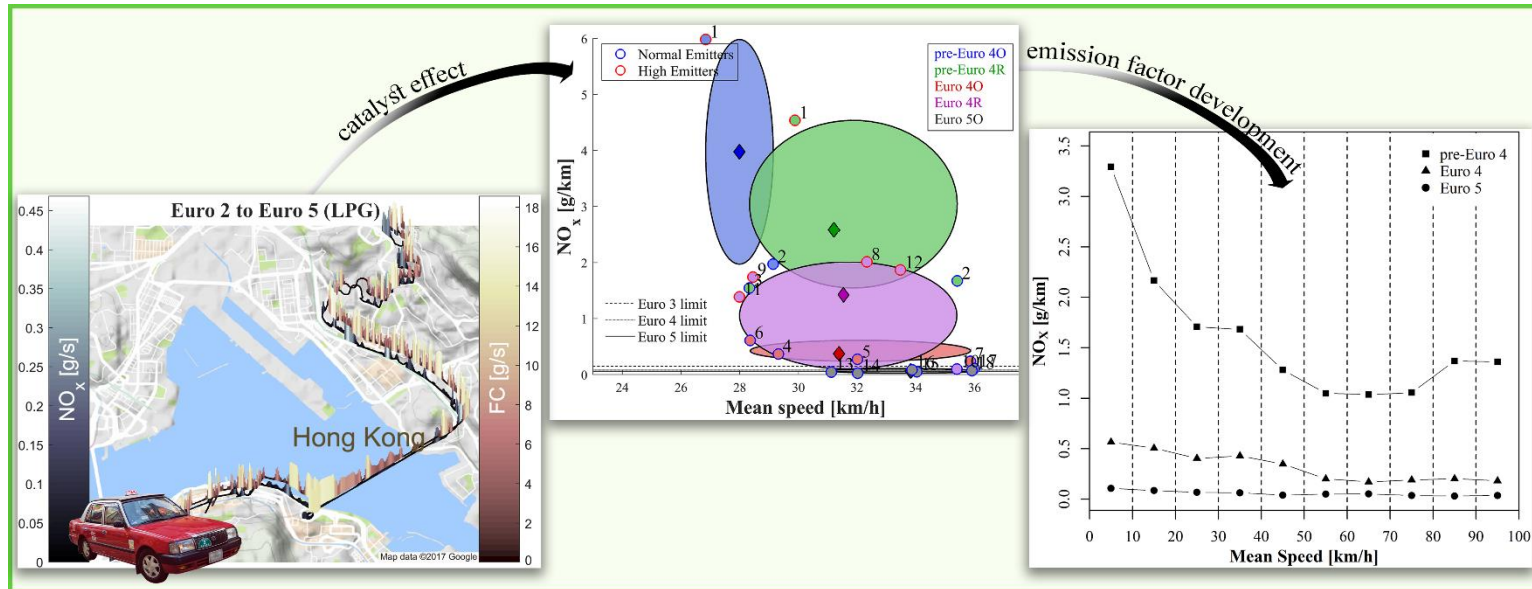
PEMS data measurements – vehicle distribution



PEMS System web application environment

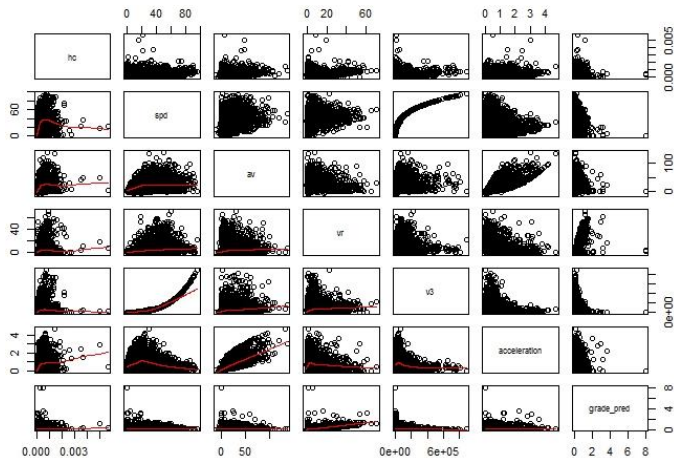
PEMS data analysis

- Data quality (QA/QC)
- Process review & optimization
- Data processing, analysis and assessment

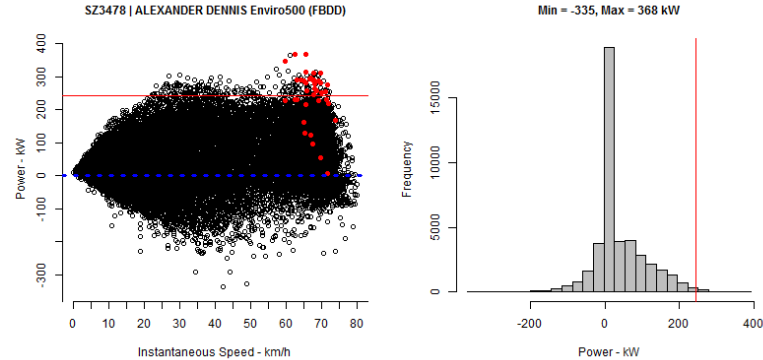


Emissions modelling based on PEMS data

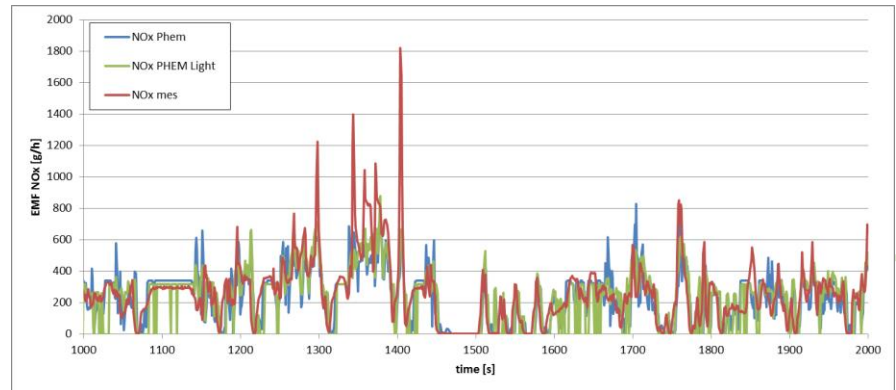
- Models review
- Micro-scale model design
- Meso-scale model design
- Model software implementation



Scatterplot Matrix for HC Emission Rate with Positive VSP Basis Functions



Velocity-power plot and power histogram



NOx emissions – measurement compared to simulation

Thank you for your attention

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