Transport models in use by the European Commission

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Joint Research Centre

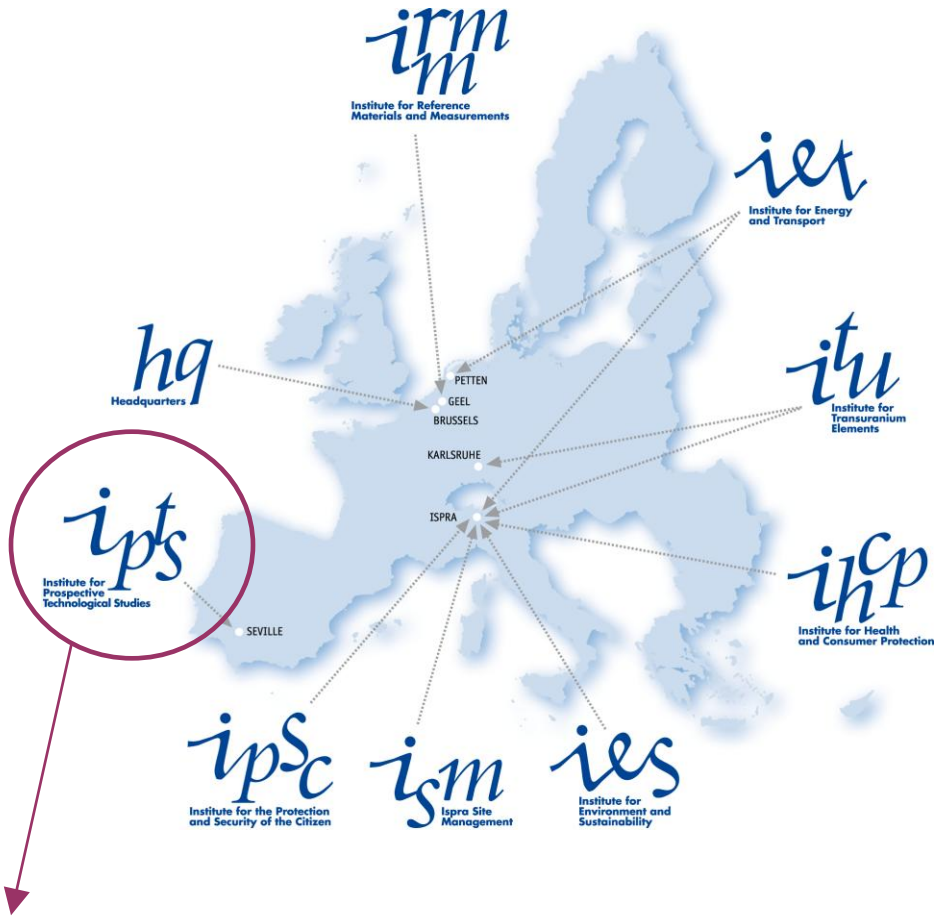
The European Commission's in-house science service

The Joint Research Center

One Directorate-General of the European Commission

7 institutes in 5 countries: Italy, Belgium, Germany, The Netherlands, Spain

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



Unit ECCET on Economics of Climate Change, Energy and Transport

Impact assessment and models in the European Commission

Before the European Commission proposes new initiatives it assesses the potential **economic**, **social** and **environmental** consequences that they may have.

Impact assessment is a process that **prepares evidence for political decision-makers** on the advantages and disadvantages of possible policy options by assessing their potential impacts.

Analysing the impacts of the options and **comparing the options** are two important steps in this process.

=> Impact assessment needs **quantitative tools and model-based analysis by the European Commission**

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Impact assessment and models in the European Commission

Requisites for assessing impacts of mitigation transport policies

Time horizon for Mitigation policies: 2030-2050

Baseline scenario:

- Macro-economic assumptions (GDP, population, oil prices,…)
- Investments (e.g. transport infrastructures)
- Policies in place (MS and EU)
- Technology market

…

Policy scenarios

- Impacts of policies against baseline:
  costs for the transport users, market changes, change in transport demand, energy use, GHG emissions, external costs, welfare

A coherent **modelling framework**

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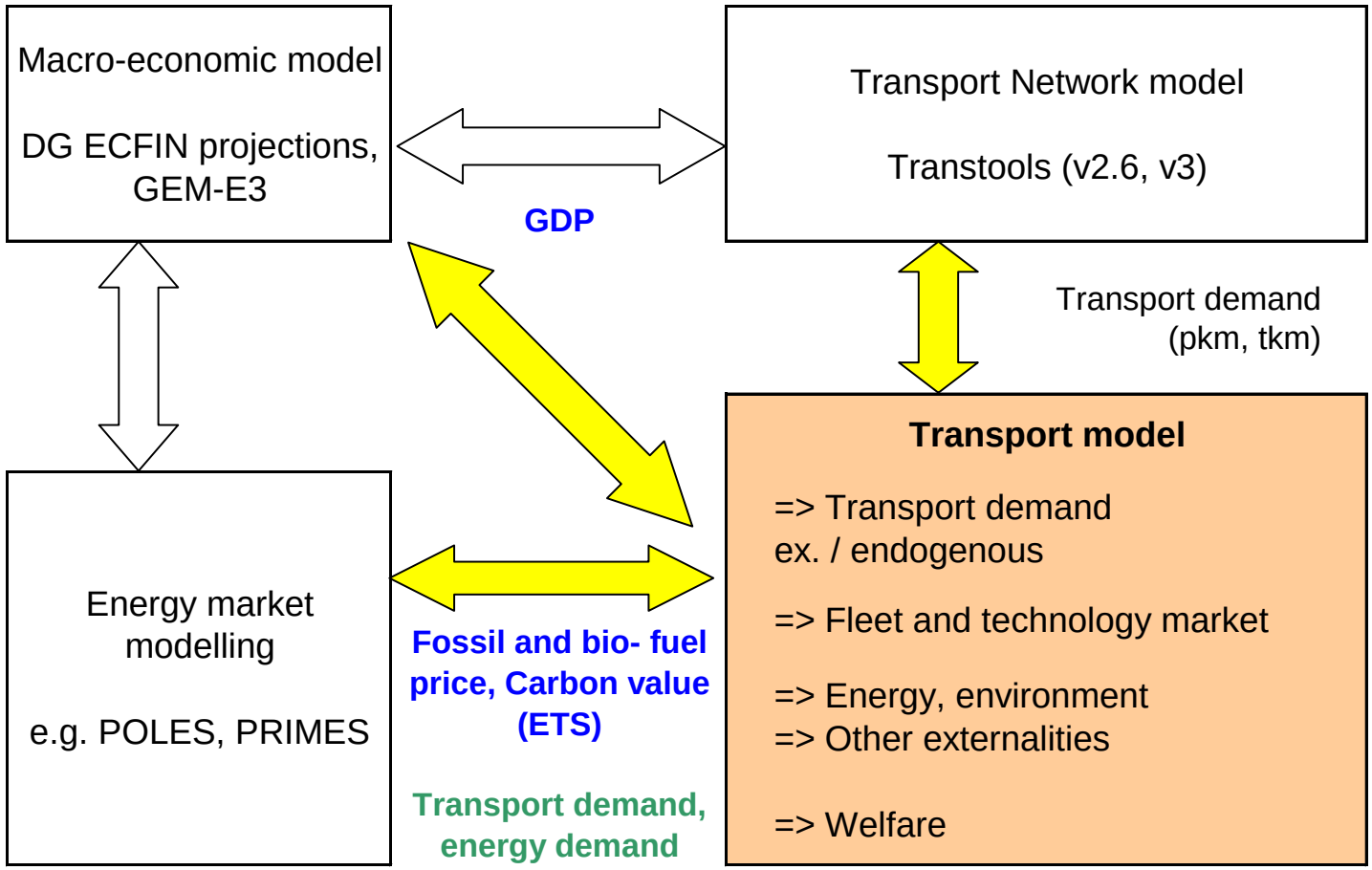
Impact assessment and models in the European Commission

A coherent modelling framework

Input to transport model

Output from transport model



TREMOVE,

PRIMES-TREMOVE:

EU, Exogenous demand

"Model T":

EU+RoW, endogenous demand

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Overall landscape of transport models used for IA

Two complementary models

***TRANSTOOLS**: network based, endogenous demand, v3 in 2014*

http://energy.jrc.ec.europa.eu/transtools/

***TREMOVE**: fleets and emissions, applications for CO2 standards, gradually fading out of use (up to 2030)*

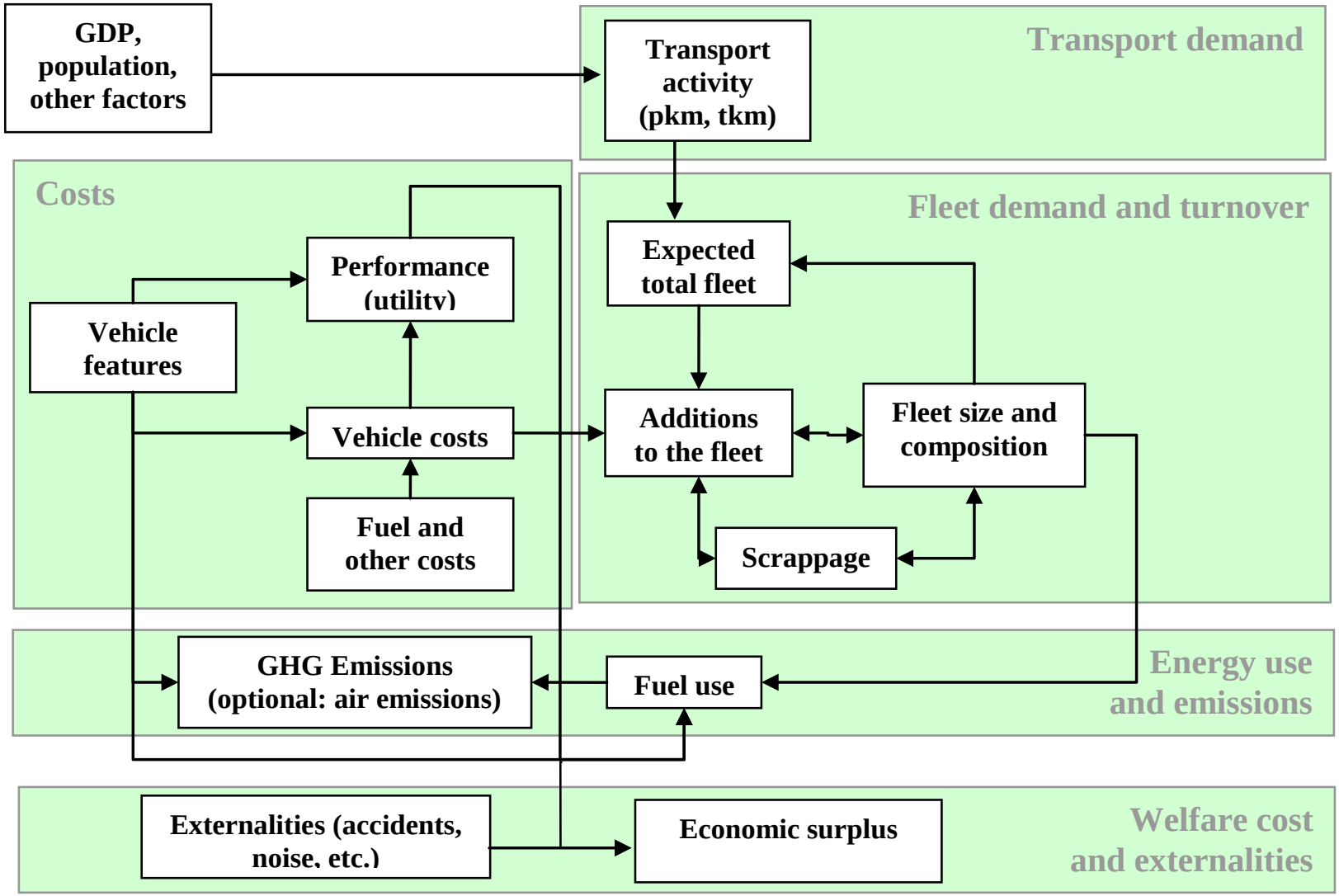
www.tremove.org

***PRIMES-TREMOVE**: TREMOVE-based, soft-link with PRIMES, external provider (up to 2050)*

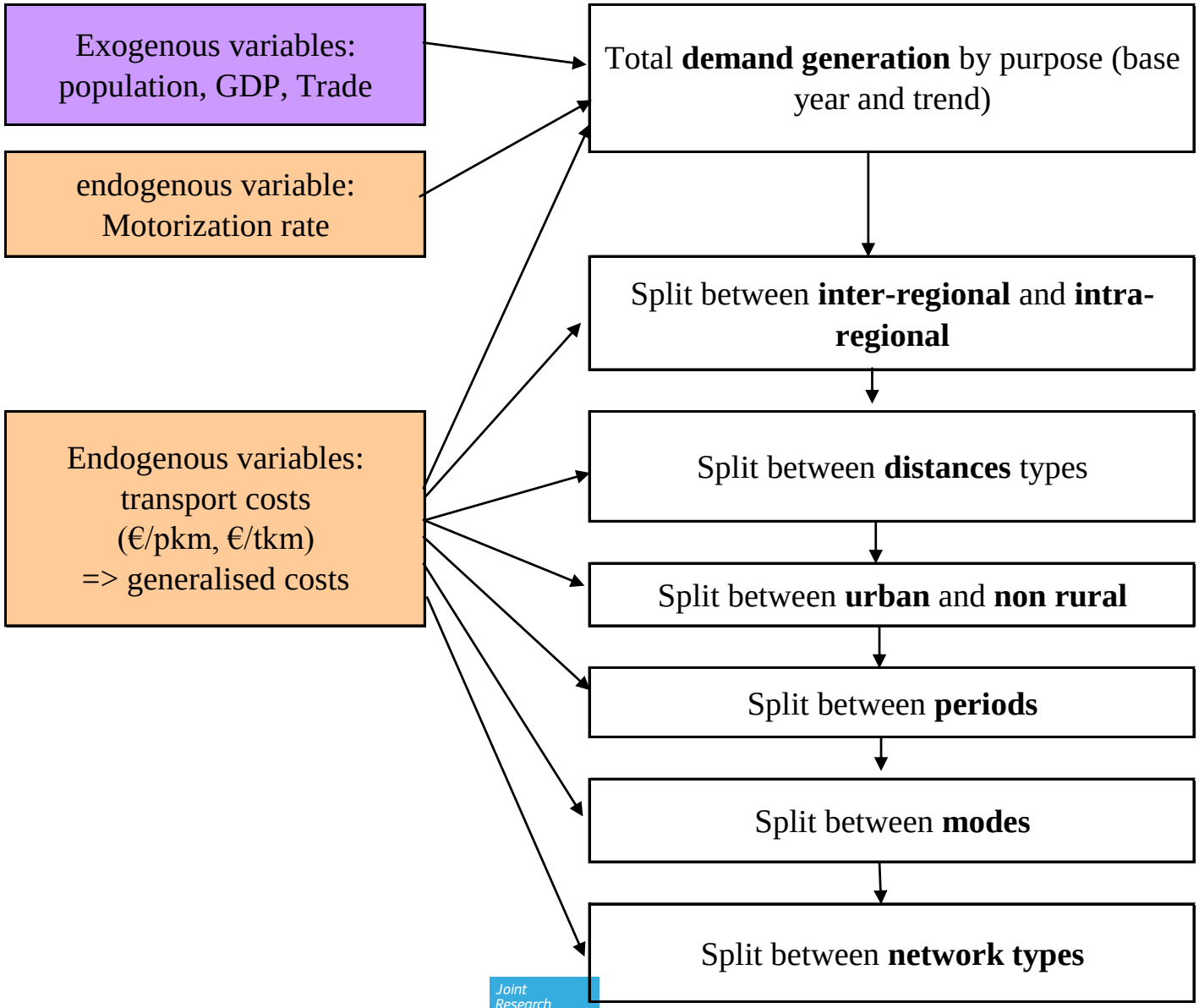
***Model T**: based on TREMOVE + POLES modules, (up to 2050), **endogenous** demand, maintained and operated by EC (JRC)*

Rk: Different EU-funding framework (FP7, supporting contracts…)

Overview of model T



(inland) Transport demand



Fleet and user choice

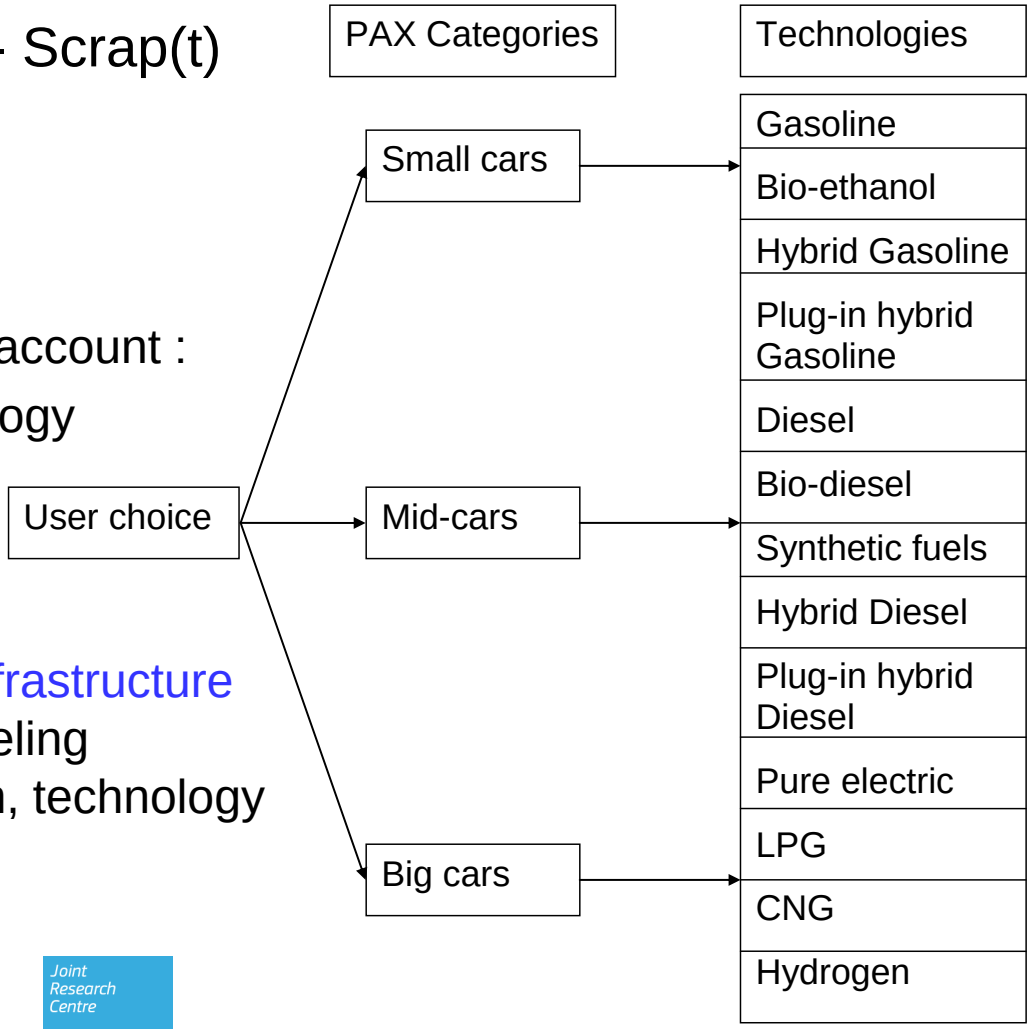
Fleet per vehicle category in year t : Fleet(t)= pkm(t) / (occ. * mileage)

Fleet(t) = Fleet(t-1) + Sales (t) - Scrap(t)

Vehicle sales and technology market:

Discrete choice modelling taking into account :

- Technology costs (including technology learning)
- Fuel costs
- Other non monetary utility factors
- And constraints from Fuel supply infrastructure availability (function of density of refueling infrastructure, trip distance and region, technology performance - e.g. battery capacity)



Fleet demand and vehicle purchase

Coverage of transport modes and travel range by different alternative fuels

(Report of the European Expert Group on Future Transport Fuels – January 2011)

http://ec.europa.eu/transport/urban/cts/future-transport-fuels_en.htm

		Road/passenger			Road/freight			Rail	Water			Air
		short	med	long	short	med	long		inland	sea	maritime	
Electric	**BEV**	■			■			■				
	HFC	■	■		■			■	■			
	Grid	■			■			■				
Biofuels (liquid)		■	■	■	■	■	■	■	■	■	■	■
Synfuels		■	■	■	■	■	■	■	■	■	■	■
Methane	**CNG**	■	■	■	■	■						
	CBG	■	■	■	■	■						
	LNG	■	■	■	■	■	■	■	■	■	■	
LPG		■	■	■	■	■	■		■	■		

Welfare module, external costs

Calculating consumer surplus and quantifying the effects of policy and technological measures on welfare.

It calculates the absolute value of each element:

- consumer surplus,
- external effects,
- distortion effect (due to taxes and subsidies).

The model also considers externalities linked to

- Air pollution,
- congestion
- accident,
- noise,
- wear and tear

Example of transport policies

- **CO2 / fuel efficiency standards (1, 2)**
- **Fuel/CO2 taxation (2)**
- **Vehicle taxation (ownership, circulation tax, feebate) (2, 3)**
- **Road charging and internalisation (+ Transtools) (2)**
- **Logistics efficiency measures (changing load / occupancy)**
- **R&D (technology learning) (4)**
- **Fuel supply Infrastructure (4)**
- **Speed limits**

(1) Impact assessment of CO2 & car, CO2& van regulations

(2) Impact assessment Transport White Paper

(3) Feebate and scrappage systems in EU, Nemry et al, JRC, 2009, http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=2579

(4) Market penetration of electric cars, Nemry et al, JRC, 2010, http://ftp.jrc.es/EURdoc/JRC58748_TN.pdf

European Commission

Thank You!

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Modes available in each transport context

Passenger transport

			Car	Moped and motorcycle	Bus	Tram and metro	train	Airplane
Intercontinental								■
Inter-regional			■		■		■	■
Intra-regional	long distance		■		■		■	
	short distance	non urban	■	■	■			
		urban	■	■	■	■		

Freight transport

		Truck	Train	Inland navigation	Maritime	Airplane
Intercontinental					■	■
Inter-regional		■	■	■	■	■
Intra-regional	long distance	■	■	■	■	■
	short distance	■	■	■		