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MISSION FOR ENVIRONMENT

COPERT - SIBYL workshop

21-22 October 2015

Brussels, Belgium

New elements

- Software improvements
  - Improved software interface
  - Calculation of long time series in one file
  - Automated software updates
  - Other software updates (e.g. import data from the standard Excel template for the CO_2 correction etc.)
- Methodological improvements
  - Offering both a Tier 2 and a Tier 3 methodology
  - Urban split to peak-off peak
  - Energy calculation (in addition to fuel consumption)
  - Uncertainty calculations
  - Automated fuel balance
  - Advanced vehicle technologies (e.g. plug-in hybrids, range extenders, etc.)

COPERT development support group

- 110 members
  - 1st step – comments on COPERT 4
    - so far 65 replies
  - 2nd step – debugging on draft version
    - has not started yet

Some statistics from the group

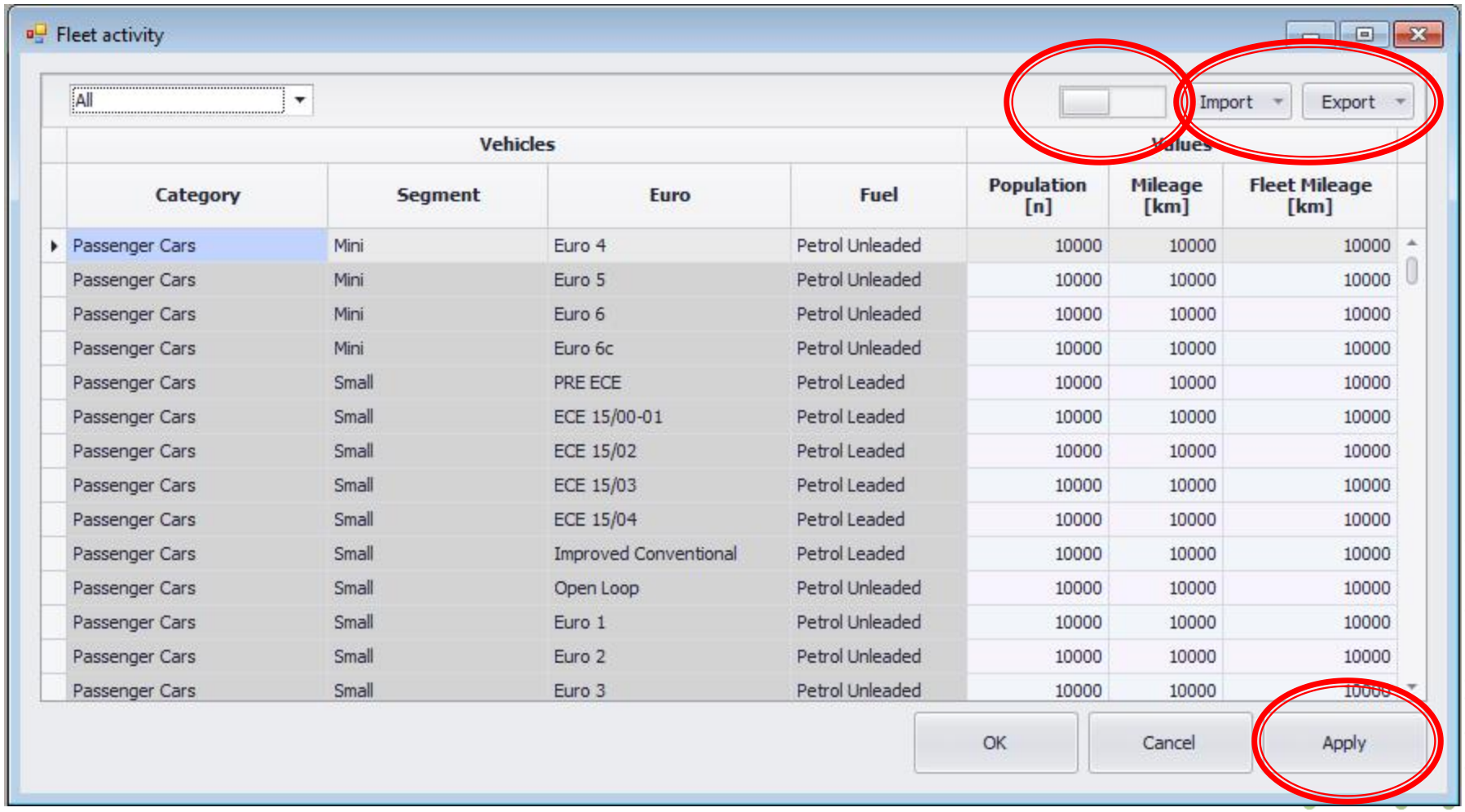
- Always – 5 : Never - 0

Question	Answer
Copert Usage	~ once a month
Save file	3.2
Wizard	2.4
Import data from Excel	3.1
Export data to Excel	3.3
Add new vehicle type	1.9
CO_2 from A/C	1.5
Vehicle Load	1.5
Road Slope	1.6

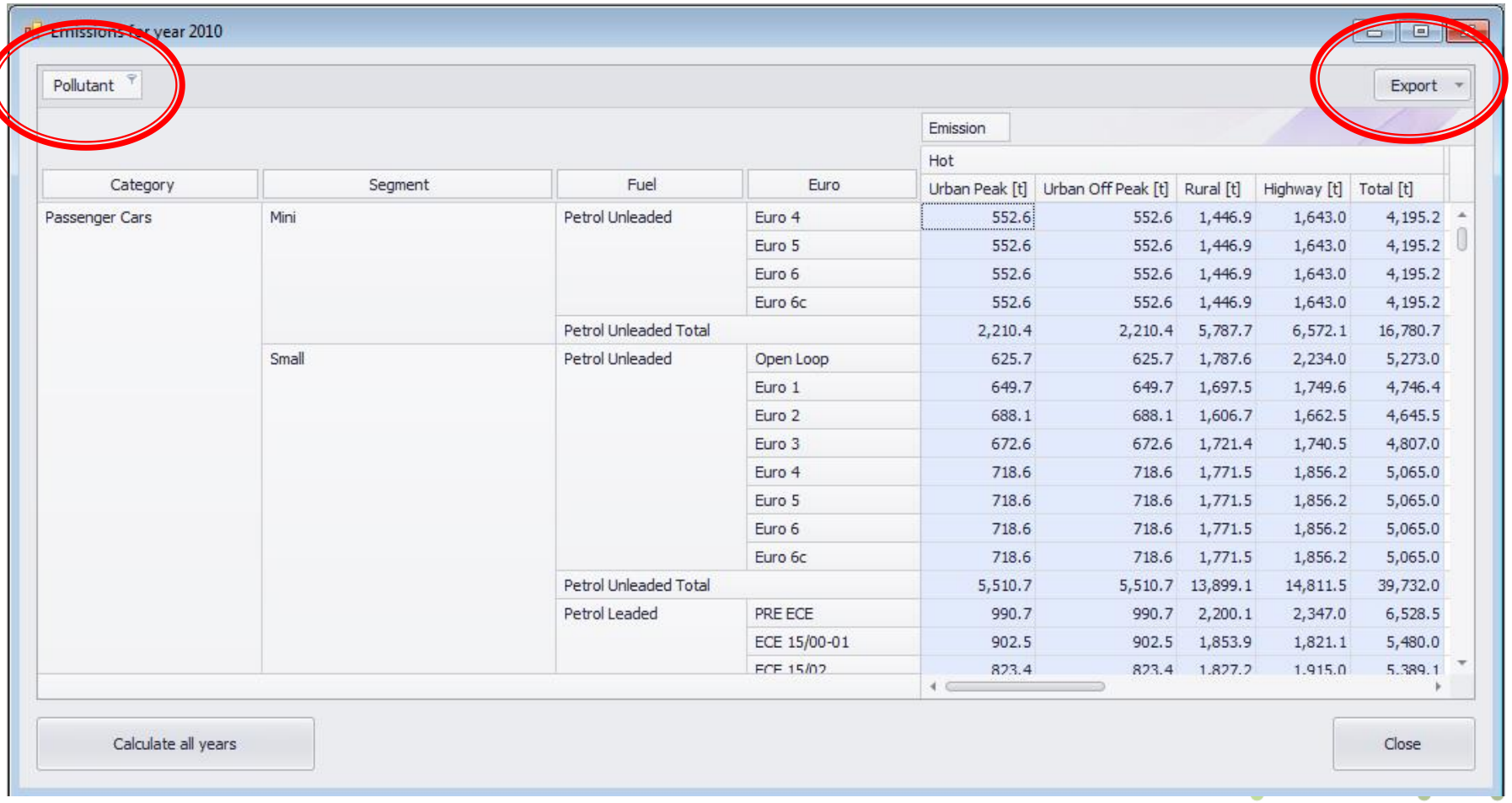
Software improvements

- Interface: DevExpress
- Form design:
  - Filters
  - Pivot table format
  - Undo
  - Track changes
  - Import/Export
  - Copy and Paste

Form design (1 of 3)

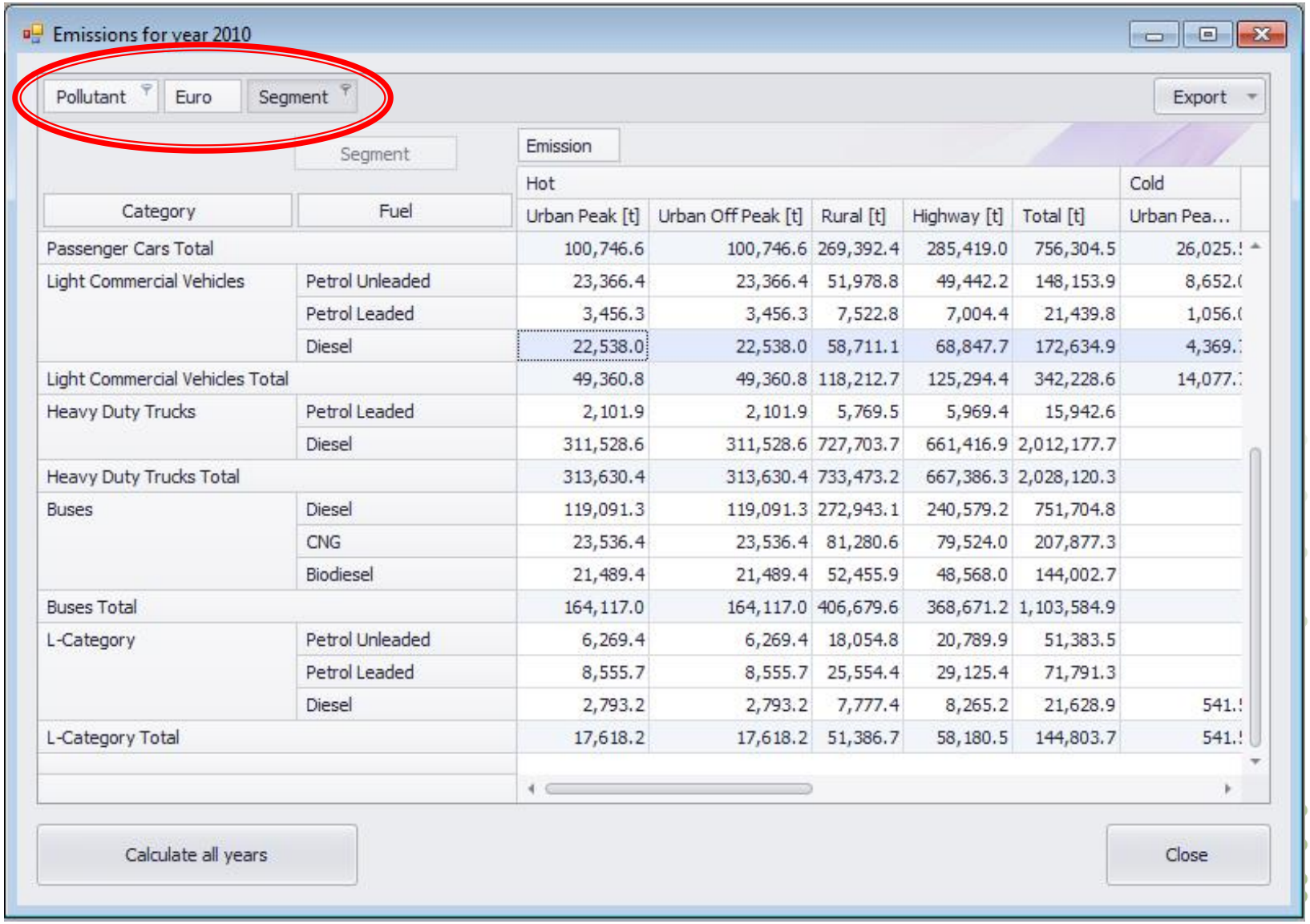


Form design (2 of 3)



Category	Segment	Fuel	Euro	Urban Peak [t]	Urban Off Peak [t]	Rural [t]	Highway [t]	Total [t]
Passenger Cars	Mini	Petrol Unleaded	Euro 4	552.6	552.6	1,446.9	1,643.0	4,195.2
			Euro 5	552.6	552.6	1,446.9	1,643.0	4,195.2
			Euro 6	552.6	552.6	1,446.9	1,643.0	4,195.2
			Euro 6c	552.6	552.6	1,446.9	1,643.0	4,195.2
		Petrol Unleaded Total		2,210.4	2,210.4	5,787.7	6,572.1	16,780.7
	Small	Petrol Unleaded	Open Loop	625.7	625.7	1,787.6	2,234.0	5,273.0
			Euro 1	649.7	649.7	1,697.5	1,749.6	4,746.4
			Euro 2	688.1	688.1	1,606.7	1,662.5	4,645.5
			Euro 3	672.6	672.6	1,721.4	1,740.5	4,807.0
			Euro 4	718.6	718.6	1,771.5	1,856.2	5,065.0
			Euro 5	718.6	718.6	1,771.5	1,856.2	5,065.0
			Euro 6	718.6	718.6	1,771.5	1,856.2	5,065.0
			Euro 6c	718.6	718.6	1,771.5	1,856.2	5,065.0
		Petrol Unleaded Total		5,510.7	5,510.7	13,899.1	14,811.5	39,732.0
		Petrol Leaded	PRE ECE	990.7	990.7	2,200.1	2,347.0	6,528.5
			ECE 15/00-01	902.5	902.5	1,853.9	1,821.1	5,480.0
			ECE 15/02	823.4	823.4	1,827.2	1,915.0	5,389.1

Form design (3 of 3)



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Other improvements

- Time series

	COPERT 4	COPERT 5
COPERT file	Access mdb file	SQL compact
Temporal analysis	7-10 years in one file	80 years
Calculation time	2 min per year	10 sec per year
File size	Unzipped file	Zipped file

- Notification for software updates
- Import/Export for all input information and results

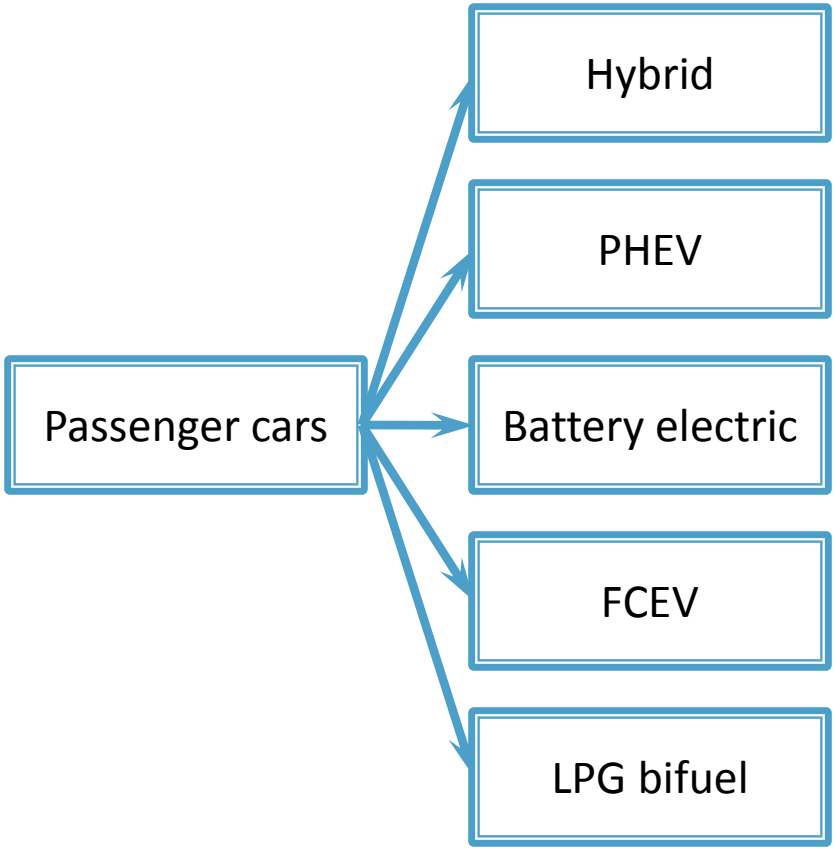
Methodological improvements

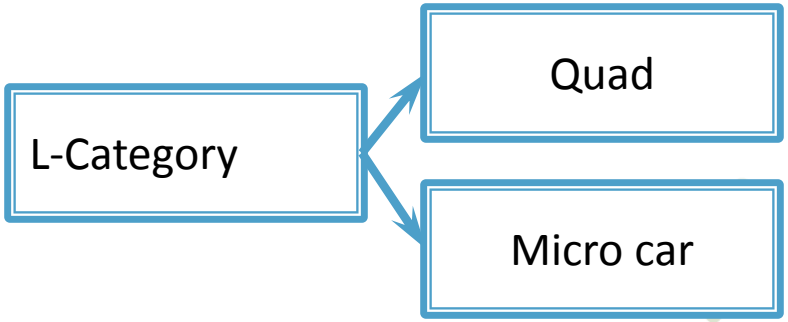
- Tier 2 and a Tier 3 methodology
  - Tier 3 structure is in being tested
  - Tier 2 under development
- Uncertainty calculations
  - Under development
- Automated fuel balance
  - Step 1: fuel consumption calculation
  - Step 2: statistical fuel consumption user data input
  - Step 3: mileage correction based on statistical fuel consumption
  - Step 4: remaining pollutants emission calculation

Extension of vehicle categories

Category	Segment		Category	Segment
Passenger Cars	**Mini**		Buses	Urban Buses Midi <=15 t
Passenger Cars	**Small**		Buses	Urban Buses Standard 15 - 18 t
Passenger Cars	**Medium**		Buses	Urban Buses Articulated >18 t
Passenger Cars	**Large-SUV-Executive**		Buses	Coaches Standard <=18 t
Light Commercial Vehicles	**Petrol N1-I**		Buses	Coaches Articulated >18 t
Light Commercial Vehicles	**Petrol N1-II**		Buses	Urban CNG Buses
Light Commercial Vehicles	**Petrol N1-III**		Buses	Urban Biodiesel Buses
Light Commercial Vehicles	**Diesel N1-I**		**L-Category**	Mopeds 2-stroke <50 cm^3
Light Commercial Vehicles	**Diesel N1-II**		**L-Category**	Mopeds 4-stroke <50 cm^3
Light Commercial Vehicles	**Diesel N1-III**		**L-Category**	Motorcycles 2-stroke >50 cm^3
Heavy Duty Trucks	Gasoline >3,5 t		**L-Category**	Motorcycles 4-stroke <250 cm^3
Heavy Duty Trucks	Rigid <=7,5 t		**L-Category**	Motorcycles 4-stroke 250 - 750 cm^3
Heavy Duty Trucks	Rigid 7,5 - 12 t		**L-Category**	Motorcycles 4-stroke >750 cm^3
Heavy Duty Trucks	Rigid 12 - 14 t		**L-Category**	**Quad**
Heavy Duty Trucks	Rigid 14 - 20 t		**L-Category**	**Micro-car**
Heavy Duty Trucks	Rigid 20 - 26 t			
Heavy Duty Trucks	Rigid 26 - 28 t			
Heavy Duty Trucks	Rigid 28 - 32 t			
Heavy Duty Trucks	Rigid >32 t			
Heavy Duty Trucks	Articulated 14 - 20 t			
Heavy Duty Trucks	Articulated 20 - 28 t			
Heavy Duty Trucks	Articulated 28 - 34 t			
Heavy Duty Trucks	Articulated 34 - 40 t			
Heavy Duty Trucks	Articulated 40 - 50 t			
Heavy Duty Trucks	Articulated 50 - 60 t			

Advanced vehicle technologies

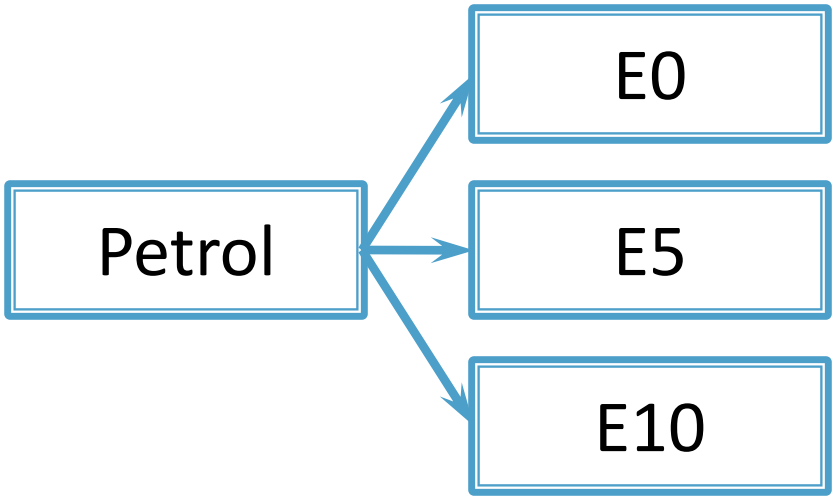


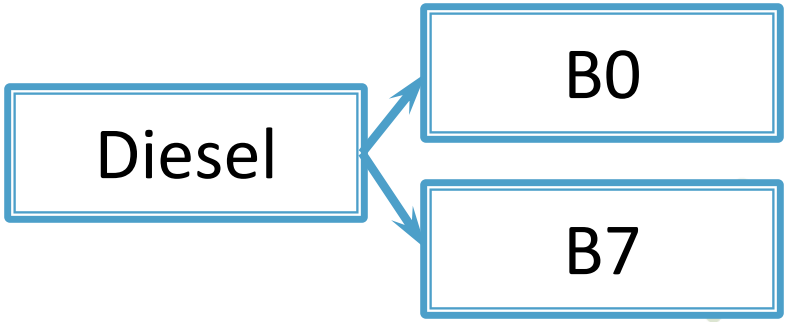


New engine technology split

Category	Fuel 1	Fuel 2	Tech 1	Tech 2	Tech 3	Tech 4
Passenger Cars	Petrol		PFI	GDI		
Passenger Cars	Diesel		-	DPF		DPF+SCR
Passenger Cars	H2					
Passenger Cars	LPG	Petrol Unleaded				
Passenger Cars	CNG	Petrol Unleaded				
Passenger Cars	Electricity	Petrol Unleaded				
Light Commercial Vehicles	Petrol Unleaded		PFI	GDI		
Light Commercial Vehicles	Diesel		-	DPF		DPF+SCR
Heavy Duty Trucks	Diesel		-	DPF	SCR	DPF+SCR
Buses	Biodiesel		-	DPF	SCR	DPF+SCR
L-Category	Petrol Leaded					
L-Category	Petrol Unleaded					
L-Category	Diesel					

Biofuels





Examples of vehicle “objects”

Category	Segment	Euro	Fuel Label		Fuel 1	Fuel 2		Tech 1	Tech 2	Tech 3	Tech 4
Passenger Cars	Small	Euro 4	Petrol		Petrol	-		PFI	GDI	-	-

Category	Segment	Euro	Fuel Label		Fuel 1	Fuel 2		Tech 1	Tech 2	Tech 3	Tech 4
Heavy Duty Trucks	Rigid <=7,5 t	Euro V	Diesel		Diesel	-		-	DPF	SCR	DPF+SCR