United Nations
Climate Change

Webinar on the COPERT model to support National Greenhouse Gas Inventories from developing countries under the Enhanced Transparency Framework of the Paris Agreement

UNFCCC
Transparency Division

23 – 27 September 2024

Menouer BOUGHEDAOUI

Day 1

Monday 23 September 2024

15:00 – 17:00 (Bonn Time)

Session 1

Opening Session

- Opening Remarks: objectives, expectations
- Modalities, Procedures and Guidelines for Transparency Framework of Paris Agreement
- Reporting requirements to estimate GHG emissions from anthropogenic sources (Energy - Road Transportation)

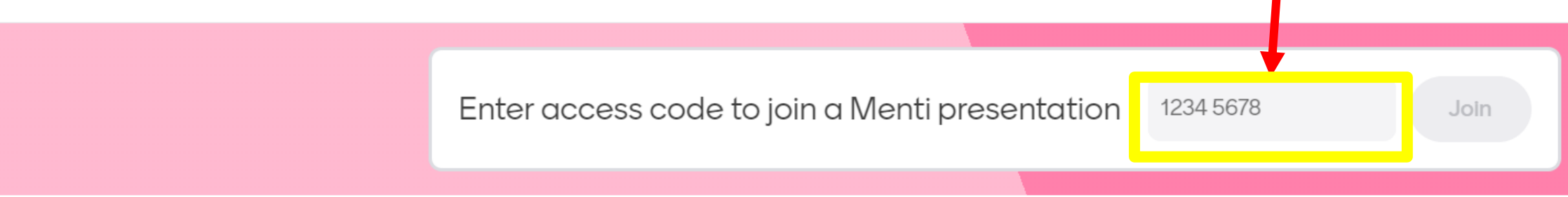
UNFCCC Secretariat

Quiz on Mentimeter

Challenges faced by developing countries to estimate GHG emissions from road transportation in line with 2006 IPCC GLs

https://www.menti.com/alst8x8wzy7b

Mentimeter code: 5948 7113



Session 2

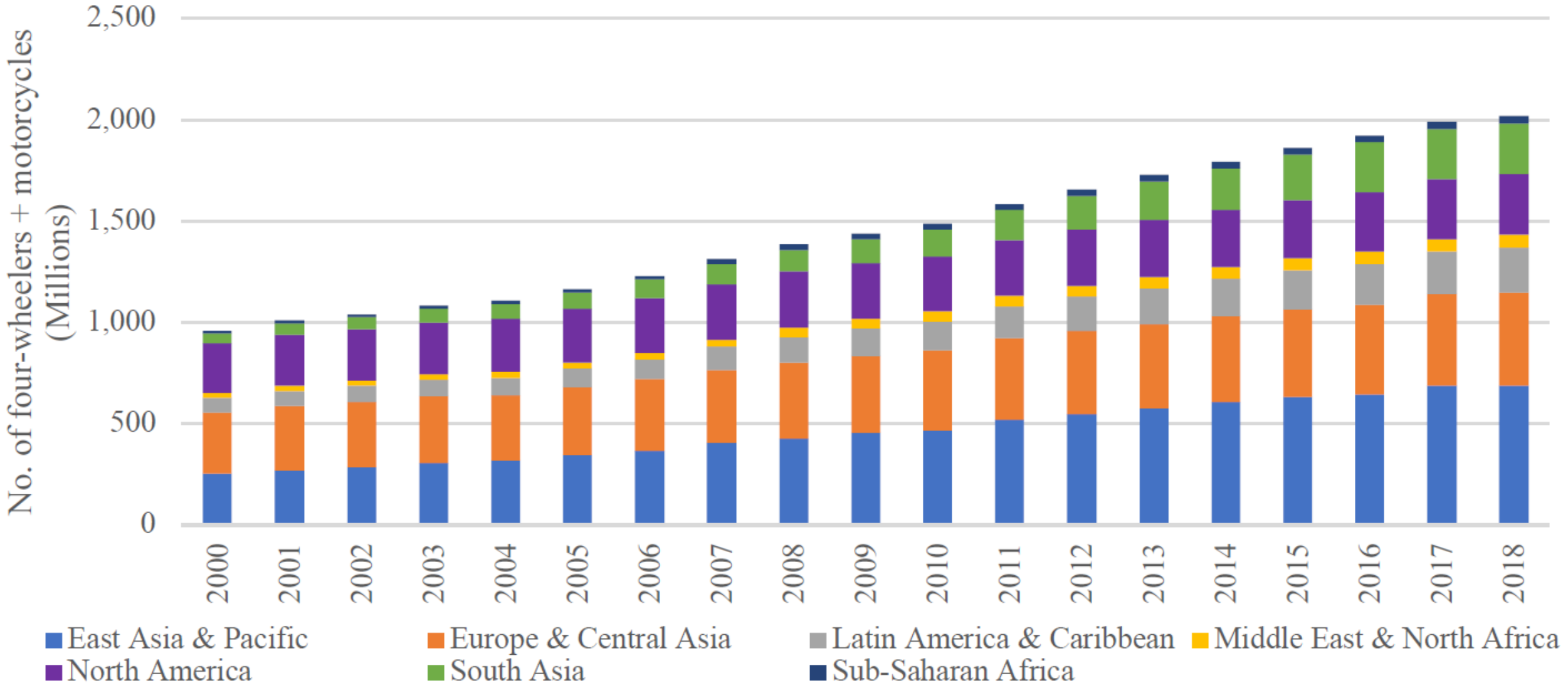
Overview of road transportation in developing countries

By the end of this session, you will know more about :

1. Different contexts of road transportation data in developing countries
2. Constraints and difficulties for data collection from road transportation
3. Data needs to improve GHG emission estimates from road transportation

Learning objectives

Trend of vehicles in use by region between 2000 - 2018



Source: World Road Statistics

History of data development for road vehicles

- Vehicle manufacturer (safety and environmental regulations, compliance)
- Legal framework developpment
- Civil society (Pressure groups) and governance
- Traffic management and road infrastructure investment
- Air quality control and health protection
- Environmental protection awarness

Different contexts of road transportation data

- Activity Data (Fuels, Vehicle stock)
- Unit Emission Factors (Fuel, Vehicle)
- Vehicle fleet characterization
- Driving conditions and parameters

* **Developed countries:** vehicle manufacturer, regulations (implementation of emission standards), fleet and traffic observatories, professional associations, scientific research, etc.
* **Developing countries:** importer (new, used), vehicle assembler, absence of standards, absence of observatories, weak scientific research, etc.

Lack of data in developing countries 1/2

Vehicle fleet composition, annual mileage and traffic characteristics

- **Weak Vehicle Registration Systems:** fragmented, decentralized with gaps or inaccuracies in recorded data
- **Limited Institutional Capacity:** lack of resources, expertise, and technology to maintain accurate and comprehensive records (updating)
- **Lack of Data Collection Infrastructure and management:** requires investment which is not prioritized over issues such as poverty reduction, health, and education
- **Limited Financial and human Resources for Surveys and Studies:** collecting accurate vehicle mileage and other road vehicle driving parameters data require extensive surveys.

Lack of data in developing countries 2/2

Vehicle fleet composition, annual mileage and traffic characteristics

- **Infrequent Vehicle Inspections:** I/M is poorly enforced, or absent, data collected is not always centralized or properly utilized.
- **Adoption of Emission Standards with Inconsistent Implementation:** Several countries adopted pollutant emission standards (Euro, US standards or equivalents) but not fully implemented, Fuel quality regulations to reduce the sulfur content for enabling vehicles to meet emission standards but partially implemented and fuel composition data not collected.
- **Challenges with Imported Used Vehicles:** incomplete or inadequate data recorded

Challenges for data collection 1/2

1. **Vehicle Fleet Data**: Lack, limited or outdated records of vehicle fleets (Data on vehicle types, fuel types, age, technology, emission standards and usage patterns are often incomplete or unavailable).
2. **Fuel Consumption Data and characteristics**: Lack of accurate data on fuel sales, fuel usage and fuel quality (fuel composition).
3. **Traffic and Road Use Patterns data**: Lack or poor data on vehicle road traffic (speed and mileage per vehicle category and road type).

Challenges for data collection 2/2

4. **Emission Factors**: Lack of country specific emission factors, use of default EFs which may not be appropriate for the vehicle technologies and national driving conditions.
5. **Vehicle Types**: Lack of data on aging and maintenance per vehicle category.
6. **Low technical Expertise**: Lack trained personnel and institutions to develop comprehensive GHG inventories.

Session 3

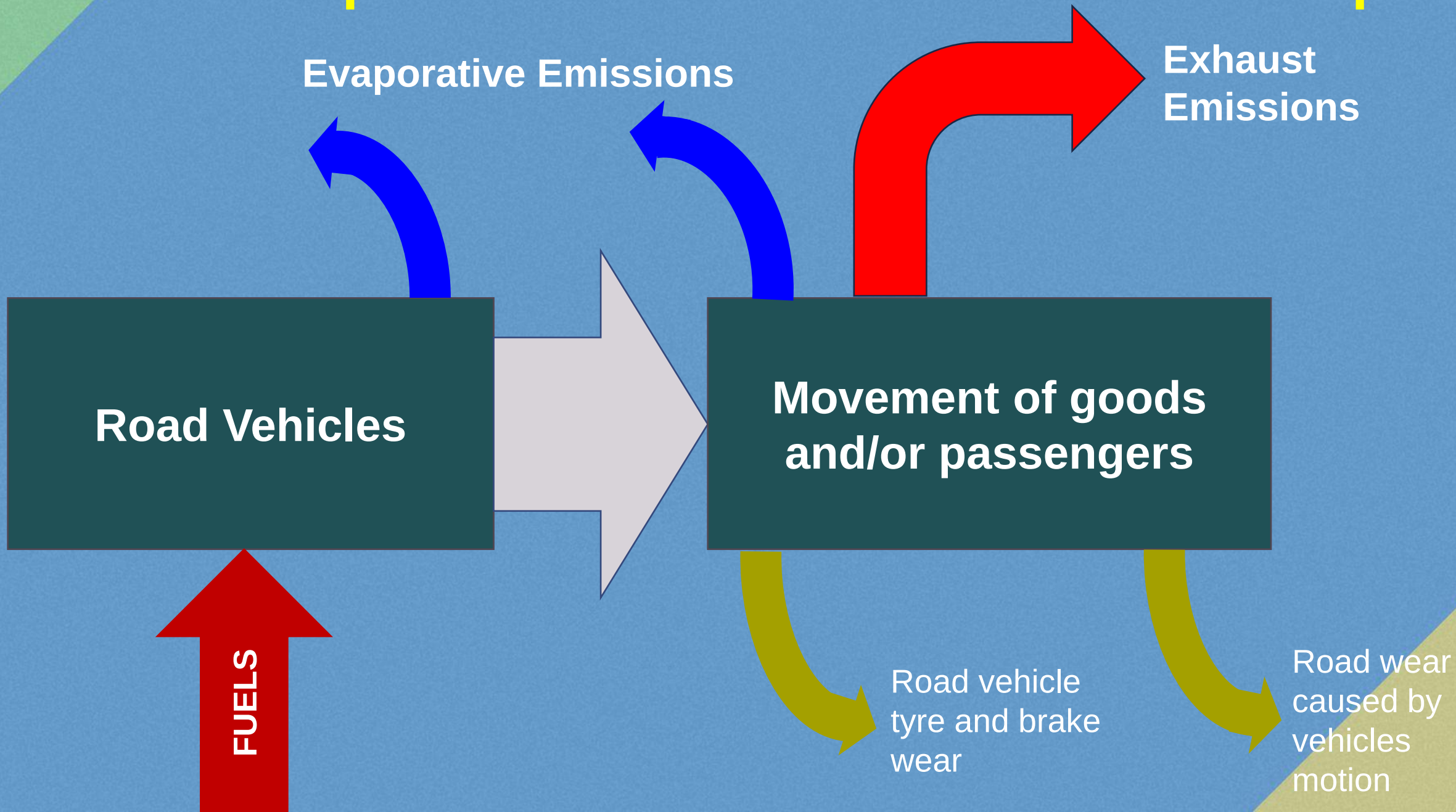
2006 IPCC GLs for estimating GHG emissions from road transportation

By the end of this session, you will :

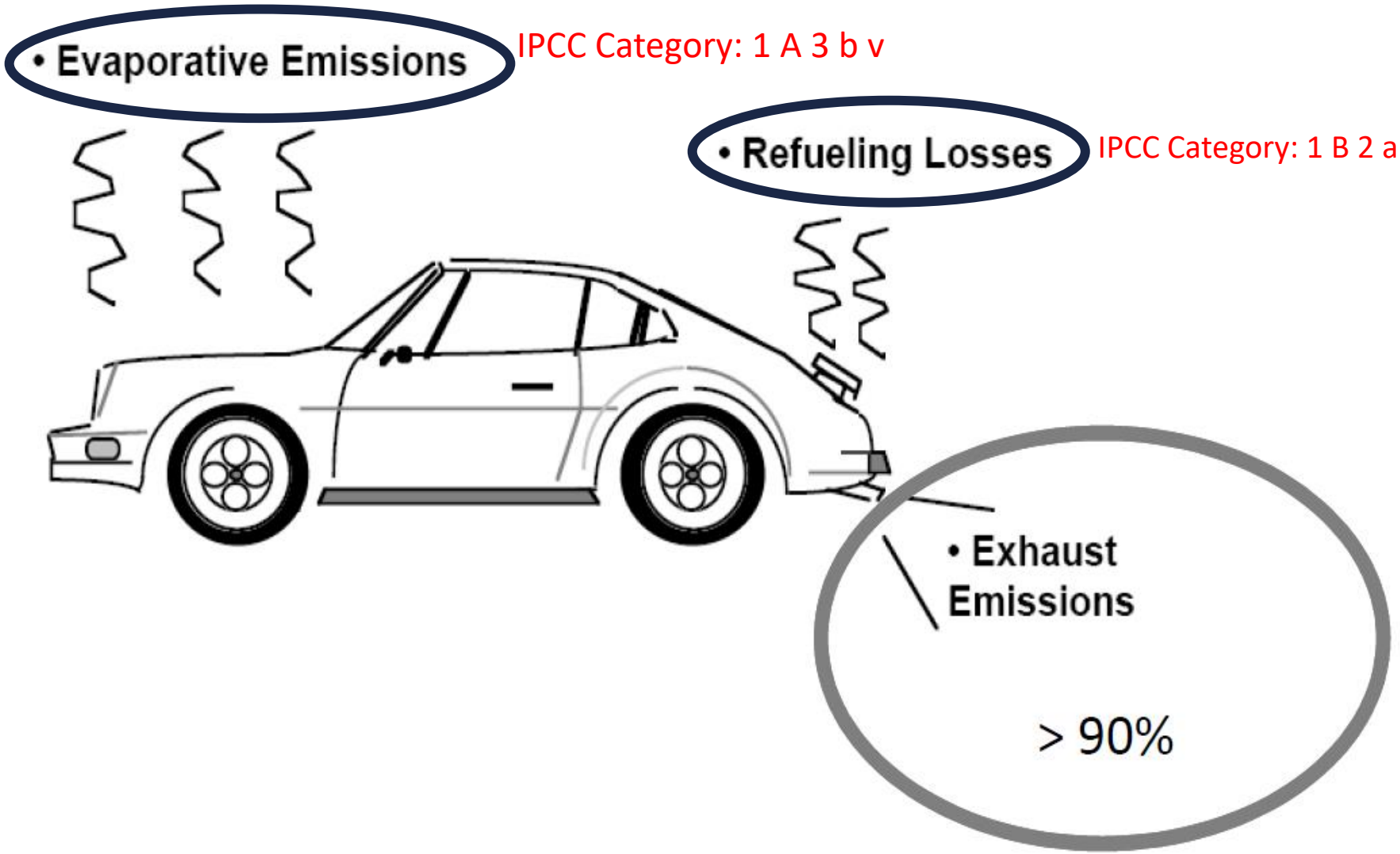
1. Know all about the IPCC methodologies to estimate GHG emissions from road transportation
2. Understand the different tiers (T1, T2, T3)
3. Identify the needed data to move to higher tier to estimate GHG emissions

Learning objectives

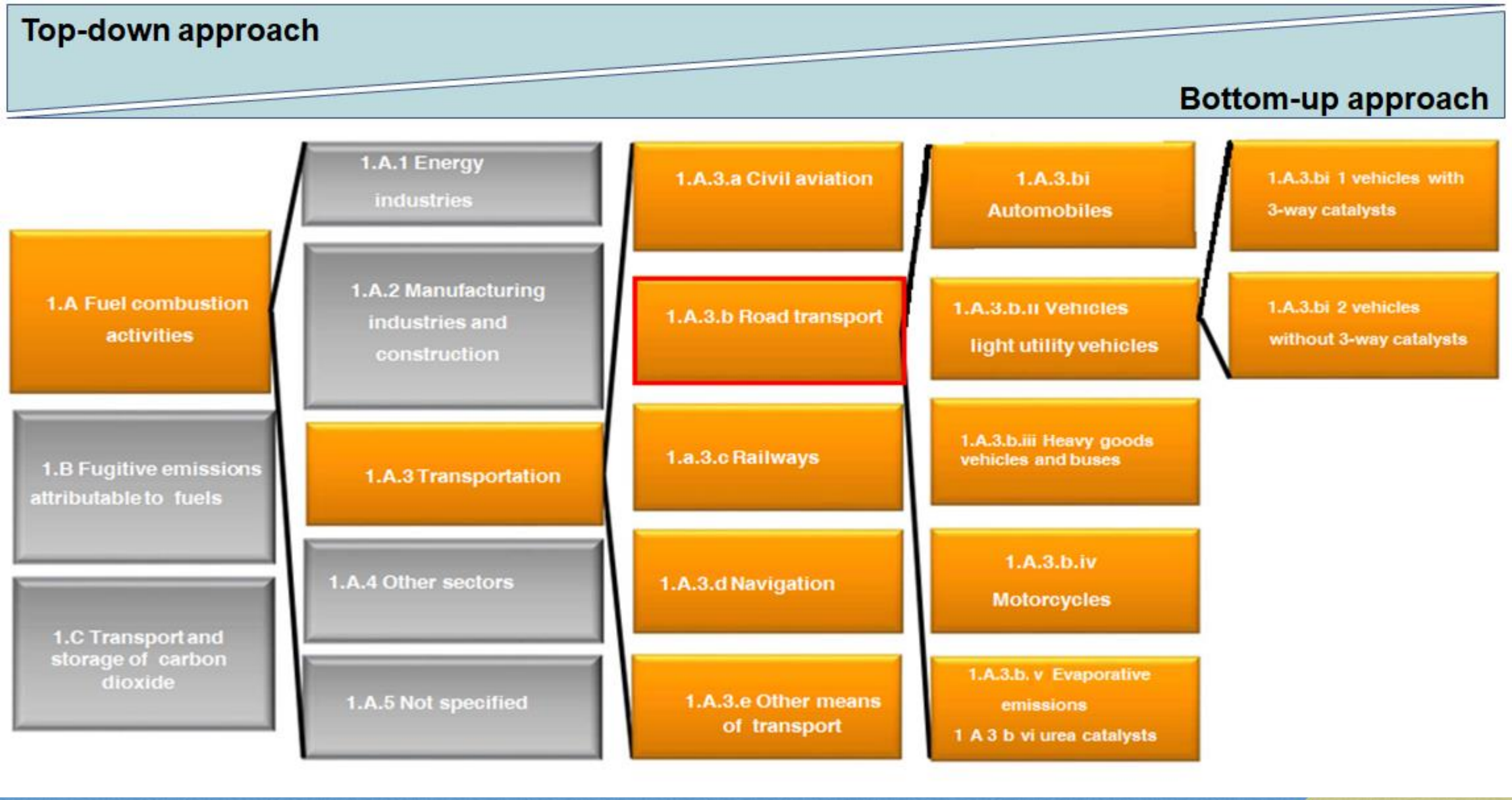
Sources of pollutant emissions from road transport



Sources of pollutant emissions from road transport



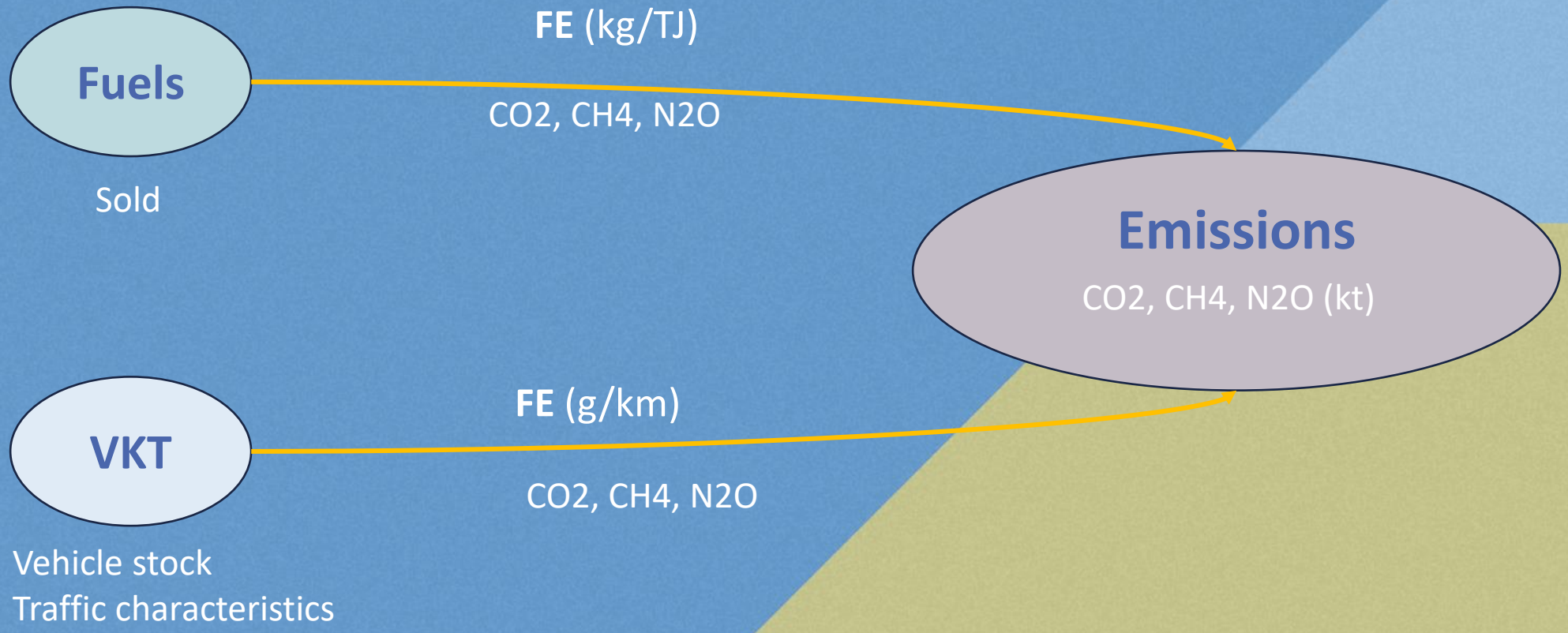
IPCC 2006 Classification: Fuel combustion



IPCC 2006 (Refinement 2019) : Classification of fugitive emissions of fuels

Fundamental Concept of GHG Emission Estimation

Emission = Activity Data (AD) X Emission Factor (EF)



Activity Data required

1- Statistics on Fuel consumption:

- Fuel type, composition
- Vehicle category
- Vehicle technology

2- Statistics on traffic characteristics

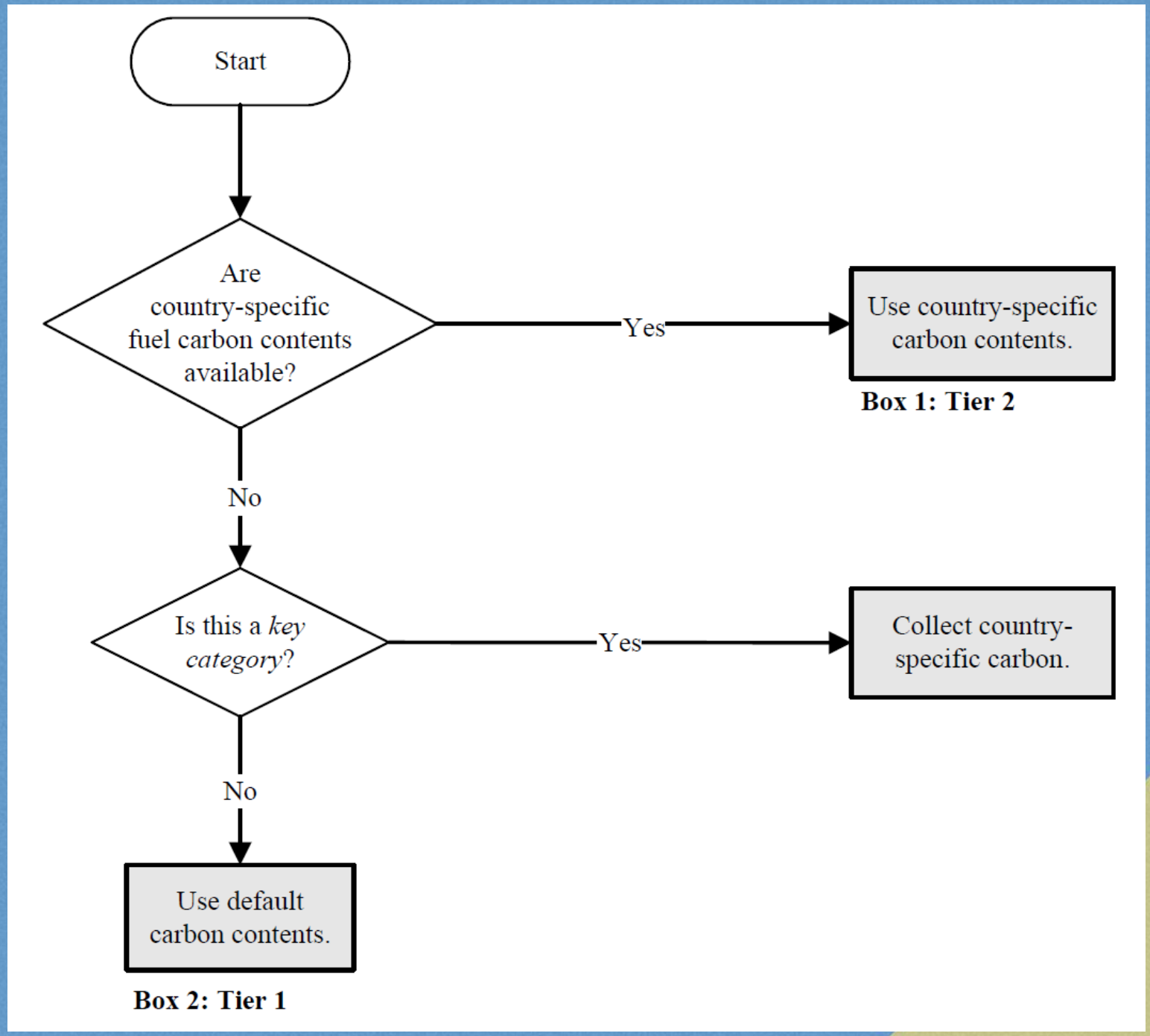
- Total annual mileage
- Average Speed
- Road type

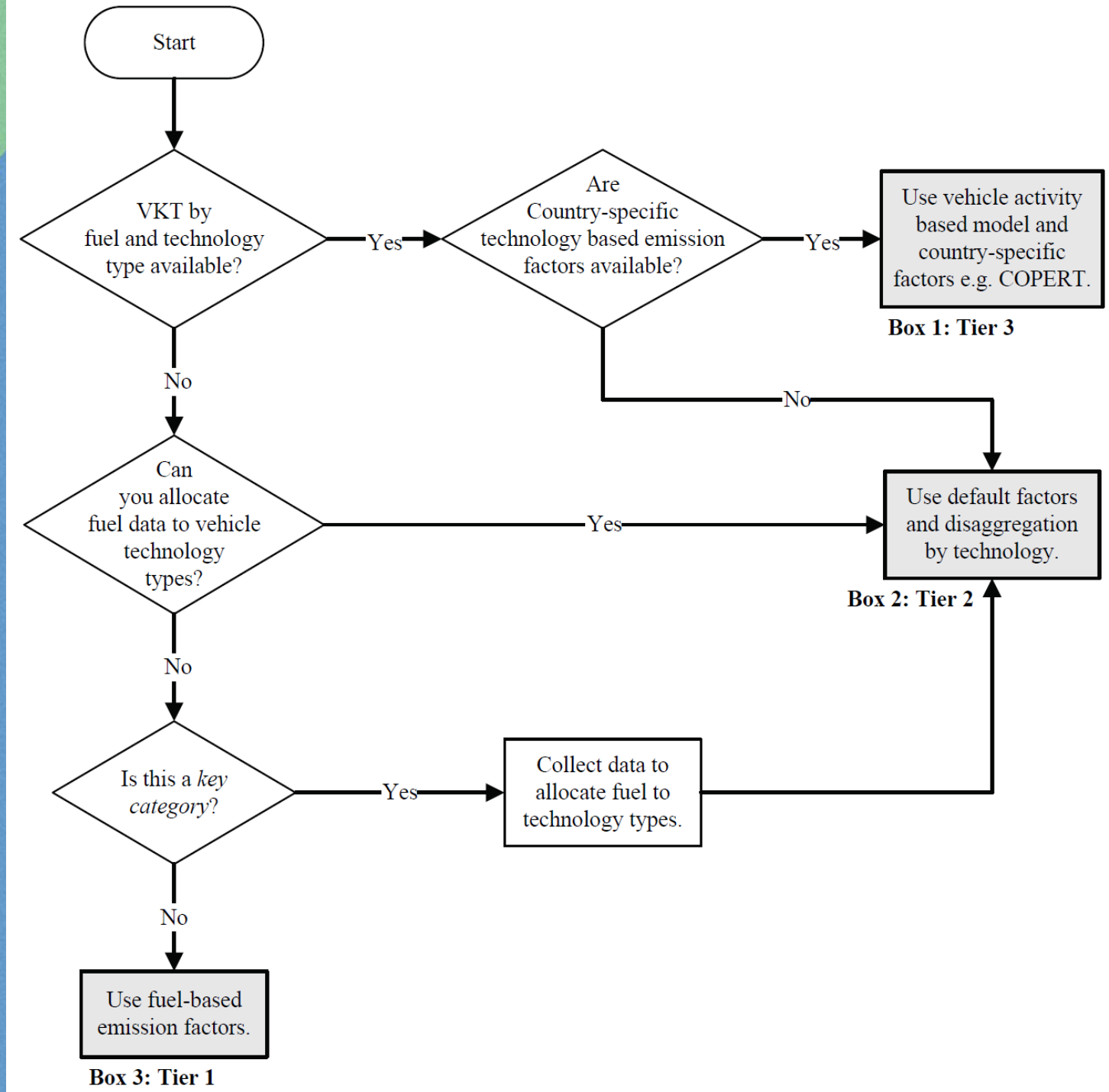
3- Statistics on vehicle stock

- Vehicle category (fuel type)
- Vehicle technology

Decision tree for CO2 emissions from fuel combustion in road vehicles

IPCC 2006, Vol. 2, Chap. 3, Fig. 3.2.2





IPCC 2006 decision tree for estimating CO2, CH4 and N2O emissions from road vehicles

IPCC 2006, Vol. 2, Chap. 3, Fig. 3.2.3

Tier 1: CO2 emission

EQUATION 3.2.1
CO_2 FROM ROAD TRANSPORT

$$Emission = \sum_a [Fuel_a \bullet EF_a]$$

IPCC 2006, Vol. 2, Chap. 3, Eq. 3.2.1

Where:

Emission = Emissions of CO2 (kg)

$Fuel_a$ = Fuel sold (TJ)

EF_a = **Default EF** (kg/TJ). This is equal to the carbon content of the fuel multiplied by 44/12

a = type of fuel (e.g. petrol, diesel, natural gas, LPG, etc.)

Tier 2: CO2 emission

EQUATION 3.2.1

CO_2 FROM ROAD TRANSPORT

$$Emission = \sum_a [Fuel_a \bullet EF_a]$$

IPCC 2006, Vol. 2, Chap. 3, Eq. 3.2.1

Where:

Emission = Emissions of CO2 (kg)

$Fuel_a$ = fuel sold (TJ)

EF_a = **Country specific EF** (kg/TJ). This is equal to the **CS** carbon content of the fuel multiplied by 44/12.

a = type of fuel (e.g. petrol, diesel, natural gas, LPG etc)

Tier 1: Emission of CH4 and N2O

EQUATION 3.2.3
TIER 1 EMISSIONS OF CH_4 AND N_2O

$$Emission = \sum_a [Fuel_a \bullet EF_a]$$

IPCC 2006, Vol. 2, Chap. 3, Eq. 3.2.3

Where:

Emissions = Emission in kg

EF_a = Default emission factor (kg/TJ)

$Fuel_a$ = Fuel consumed (TJ) (represented by fuel sold)

a = Fuel type a (e.g., diesel, gasoline, natural gas, LPG)

Tier 2: Emission of CH4 and N2O

EQUATION 3.2.4
TIER 2 EMISSIONS OF CH_4 AND N_2O

$$Emission = \sum_{a,b,c} [Fuel_{a,b,c} \bullet EF_{a,b,c}]$$

IPCC 2006, Vol. 2, Chap. 3, Eq. 3.2.4

Where:

Emission = emission in kg

$EF_{a,b,c}$ = emission factor (kg/TJ) (Tier 2, USA)

$Fuel_{a,b,c}$ = fuel consumed (TJ) (represented by fuel sold) for a given mobile source activity

a = fuel type (e.g., diesel, gasoline, natural gas, LPG)

b = vehicle type

c = emission control technology (such as uncontrolled, catalytic converter, etc)

Tier 3: Emission of CH4 and N2O

EQUATION 3.2.5

TIER 3 EMISSIONS OF CH_4 AND N_2O

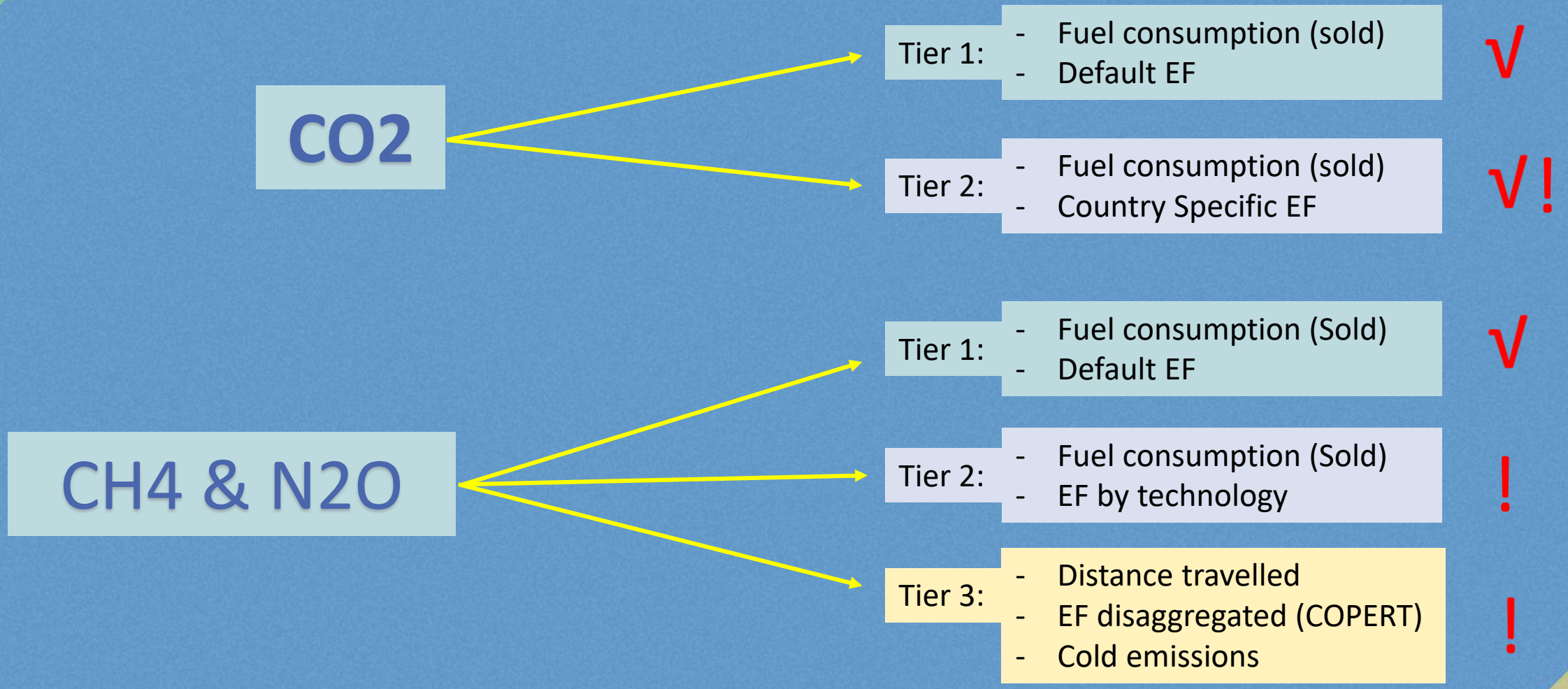
$$Emission = \sum_{a,b,c,d}[Distance_{a,b,c,d} \bullet EF_{a,b,c,d}] + \sum_{a,b,c,d} C_{a,b,c,d}$$

IPCC 2006, Vol. 2, Chap. 3, Eq. 3.2.5

Where:

Emission	= emission or CH4 or N2O (kg)
$EF_{a,b,c,d}$	= emission factor (kg/km) (Tier 3, COPERT model)
$Distance_{a,b,c,d}$	= distance travelled (VKT) during thermally stabilized engine (km)
$C_{a,b,c,d}$	= emissions during warm-up phase (cold start) (kg)
a	= fuel type (e.g., diesel, gasoline, natural gas, LPG)
b	= vehicle type
c	= emission control technology (such as uncontrolled, catalytic converter, etc.)
d	= operating conditions (e.g., urban or rural road type, climate, or other environmental factors)

Conclusions from 2006 IPCC GLs



Day 2

Tuesday 24 September 2024

15:00 – 17:00 (Bonn Time)

Session 4

Higher tier methods for estimating GHG emissions from road transportation

COPERT model: interface and functions

By the end of this session, you will:

1. Know more on Copert model features, requirements and installation
2. Discover the Copert Interface,
3. Identify the different functionalities
4. Understand the different modules & menus
5. Know more on the data needed to run it

Learning objectives

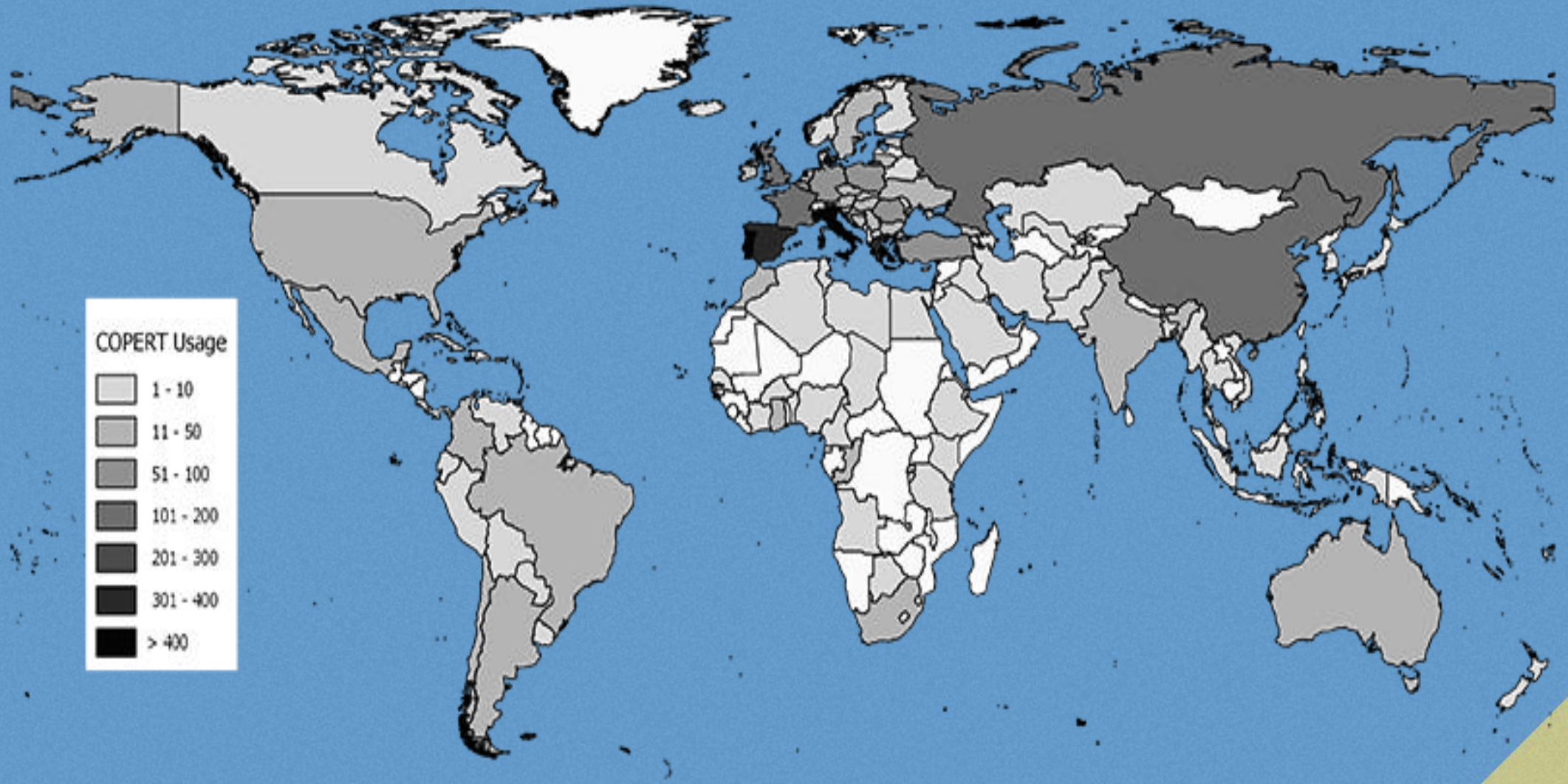
COPERT: Description

- **COPERT**: **CO**mputer **P**rogram to calculate **E**missions from **R**oad **T**ransport
- COPERT version **5.7.3** (latest version)
- European tool for the calculation of emissions from the road transport sector (EEA & JRC funded)
- Scientifically and technically supported by Emisia and the Laboratory of Applied Thermodynamics, University of Thessaloniki, Greece
- **COPERT methodology is consistent with the 2006 guidelines for the calculation of GHG Emissions**

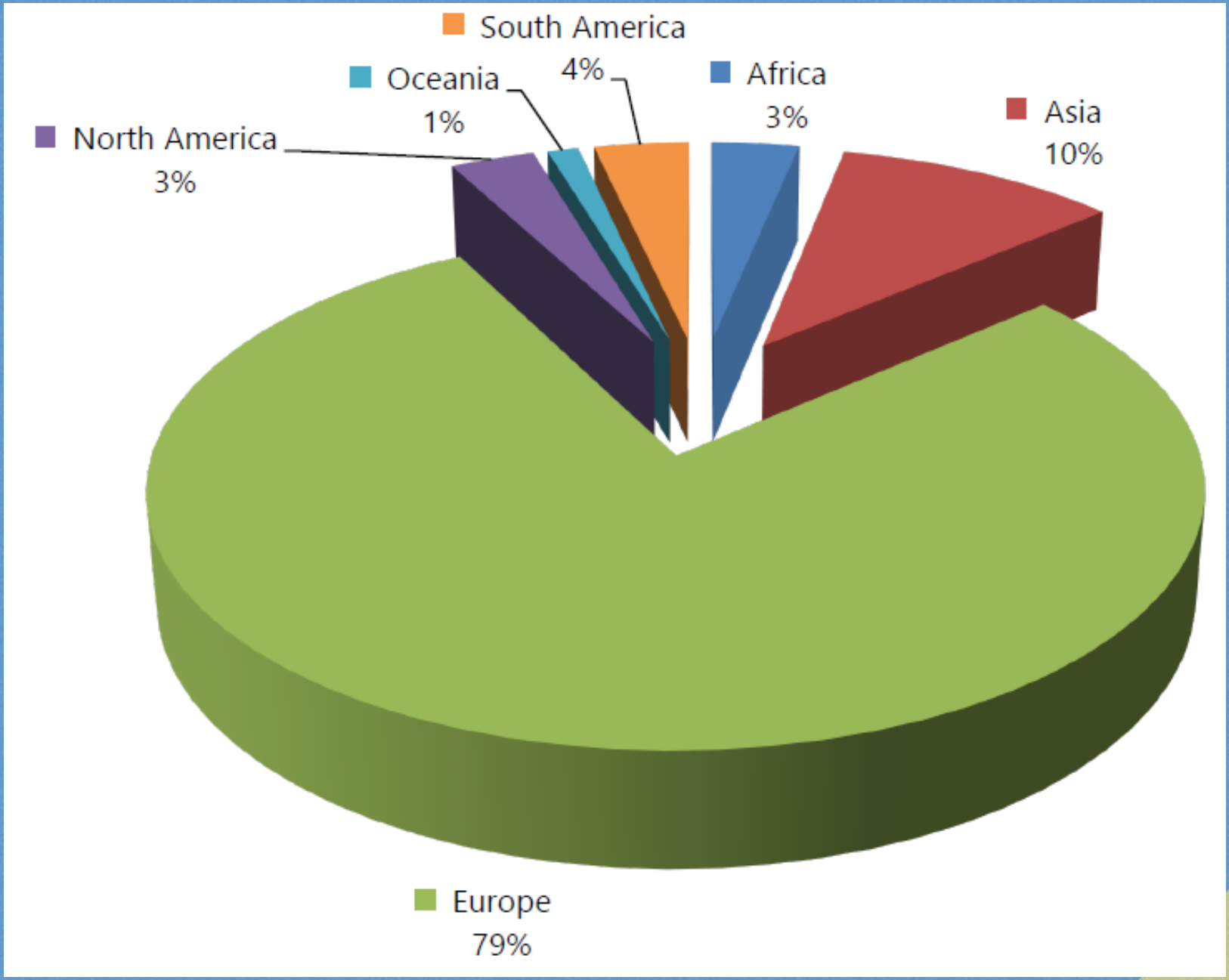
COPERT: Uses & application

- It uses vehicle stock, mileage, speed and other data such as ambient temperature and calculates emissions and energy consumption for a specific country or region.
- Covers all classes of road vehicles
- Calculates emissions of all pollutants from road transport
  - regulated pollutants: CO, NOx, VOC, PM) and CO2,
  - unregulated pollutants (N2O, NH3, SO2, NMVOC, etc.)
- Calculates fuel consumption
- Applicable in all countries of the world

COPERT usage in the world (2021)

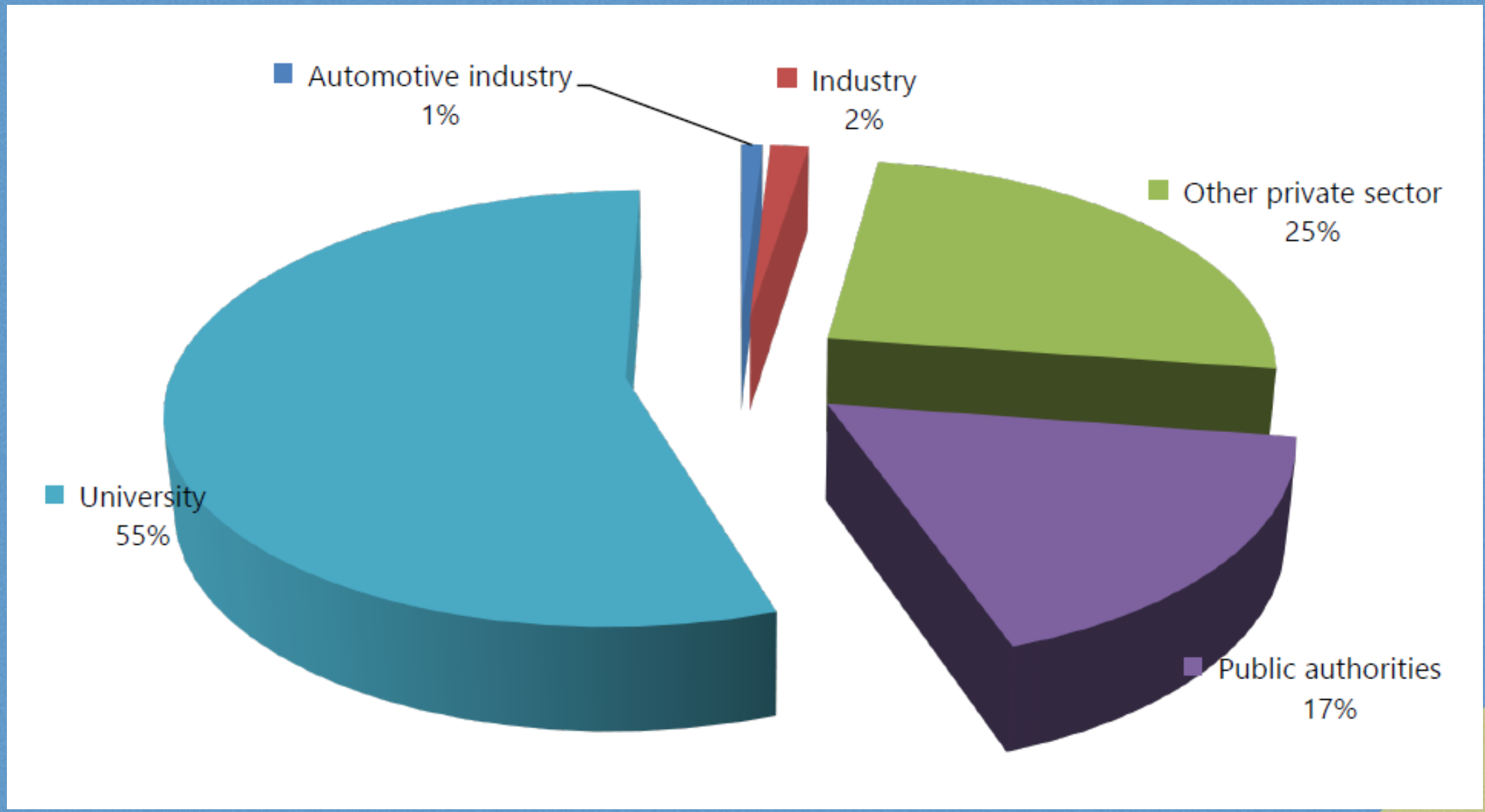


Copert Users: Continent Distribution (2021)

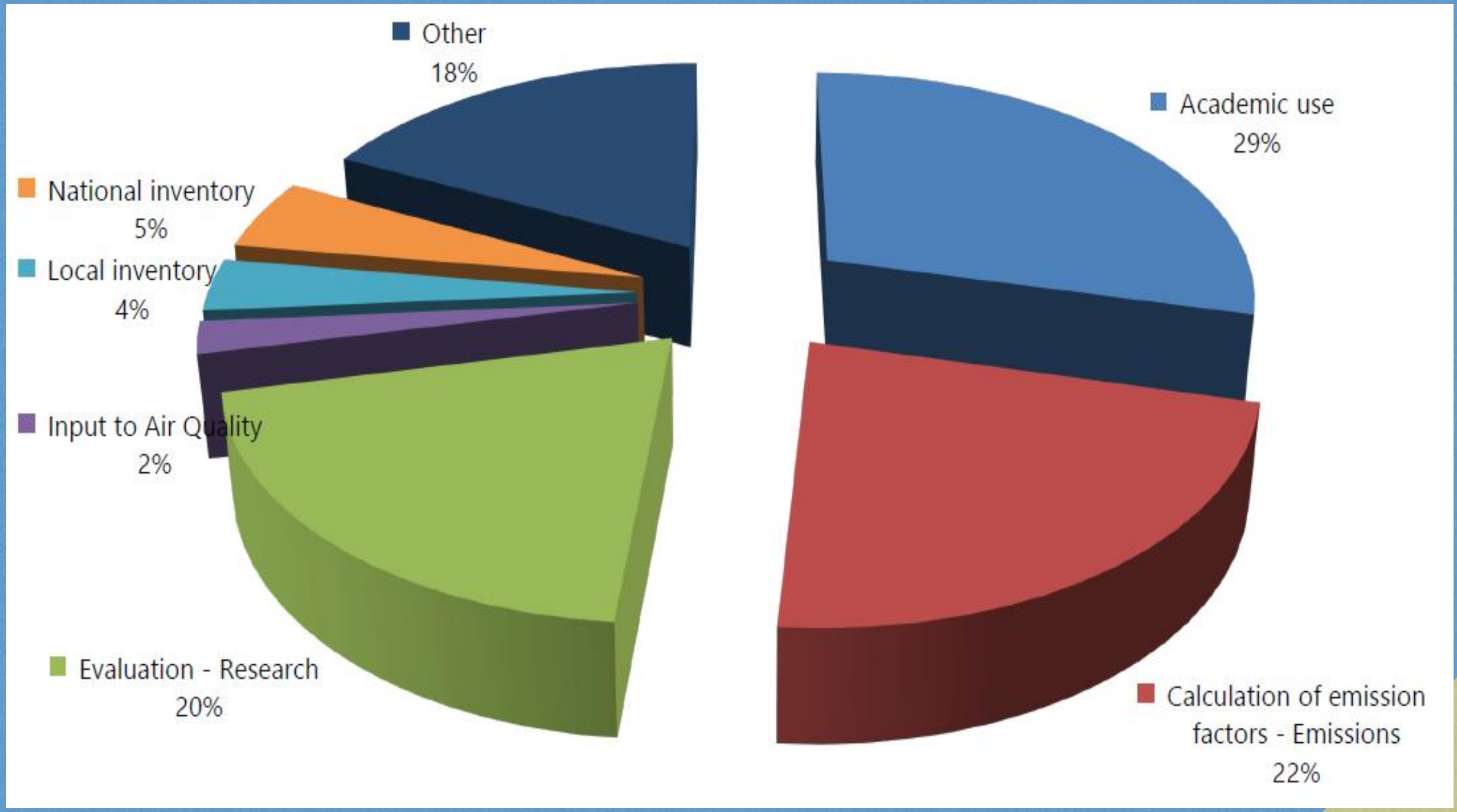


Based on ~800 unique downloads/year

COPERT Users (2021): Distribution by activity



COPERT Applications (2021)



COPERT installation Requirements

COPERT is a 32-bit application and requires a 32-bit/64-bit Microsoft Windows operating system.

Minimum software requirements:

1. Microsoft® Windows XP SP3 or newer Windows version
2. Microsoft .NET Framework v4.0 Clinet Profile or later

Minimum hardware requirements

1. 1 GHz, 32-bit(x86) processor
2. 1 GB RAM
3. 30 MB for installation, 100 MB for full run
4. Screen Resolution: 1024x768 pixels

Note that a higher frequency processor based computer and/or more on RAM memory are recommended if frequent use of the program is expected.

Download and install Copert Model

copert

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COPERT
https://copert.emisia.com · Traduire cette page

COPERT | Calculations of Emissions from Road Transport

Support. **COPERT** is the EU standard vehicle emissions calculator. It uses vehicle population, mileage, speed and other data such as ambient temperature and ...

Versions
COPERT version 5.5.1 – Sep 2021 Methodological Updated PM ...

COPERT Australia
The COPERT Australia software includes algorithms that are ...

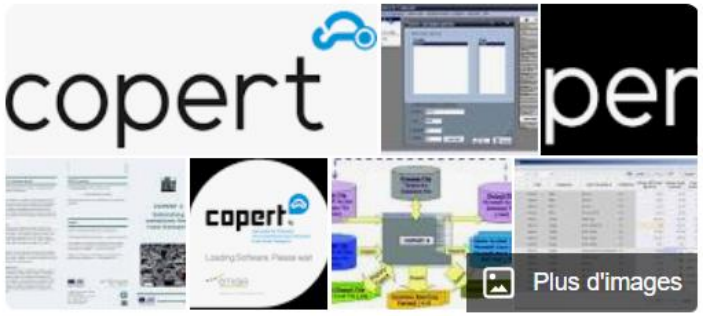
Download
COPERT Download Form · First Name * · Last Name * · Email ...

COPERT Data
EMISIA actively maintains reliable and up-to-date vehicle fleet and ...

Methodology
This is the EMEP/CORINAIR Atmospheric Emissions ...

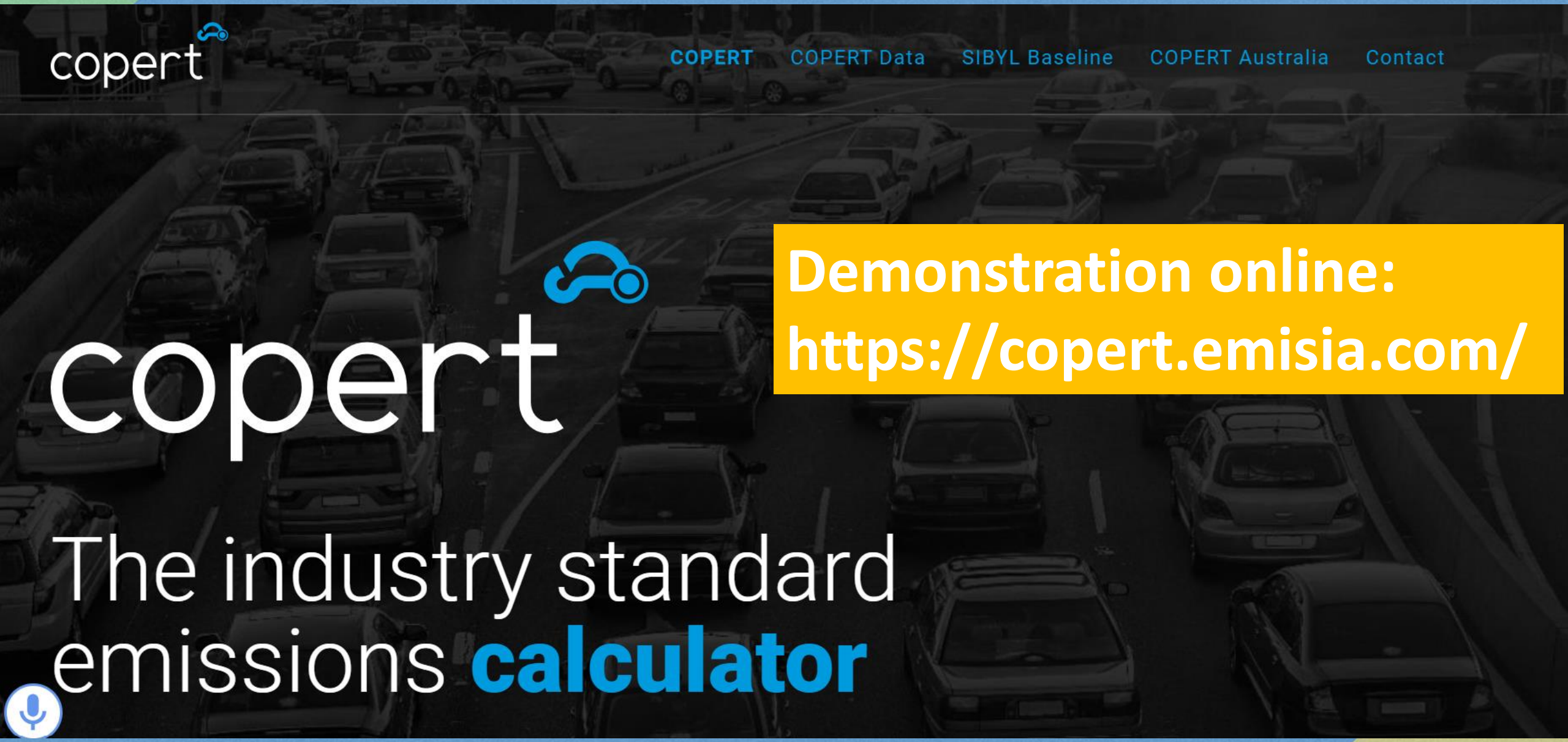
Computer Program to Calculate Emissions from Road Transport

Logiciel

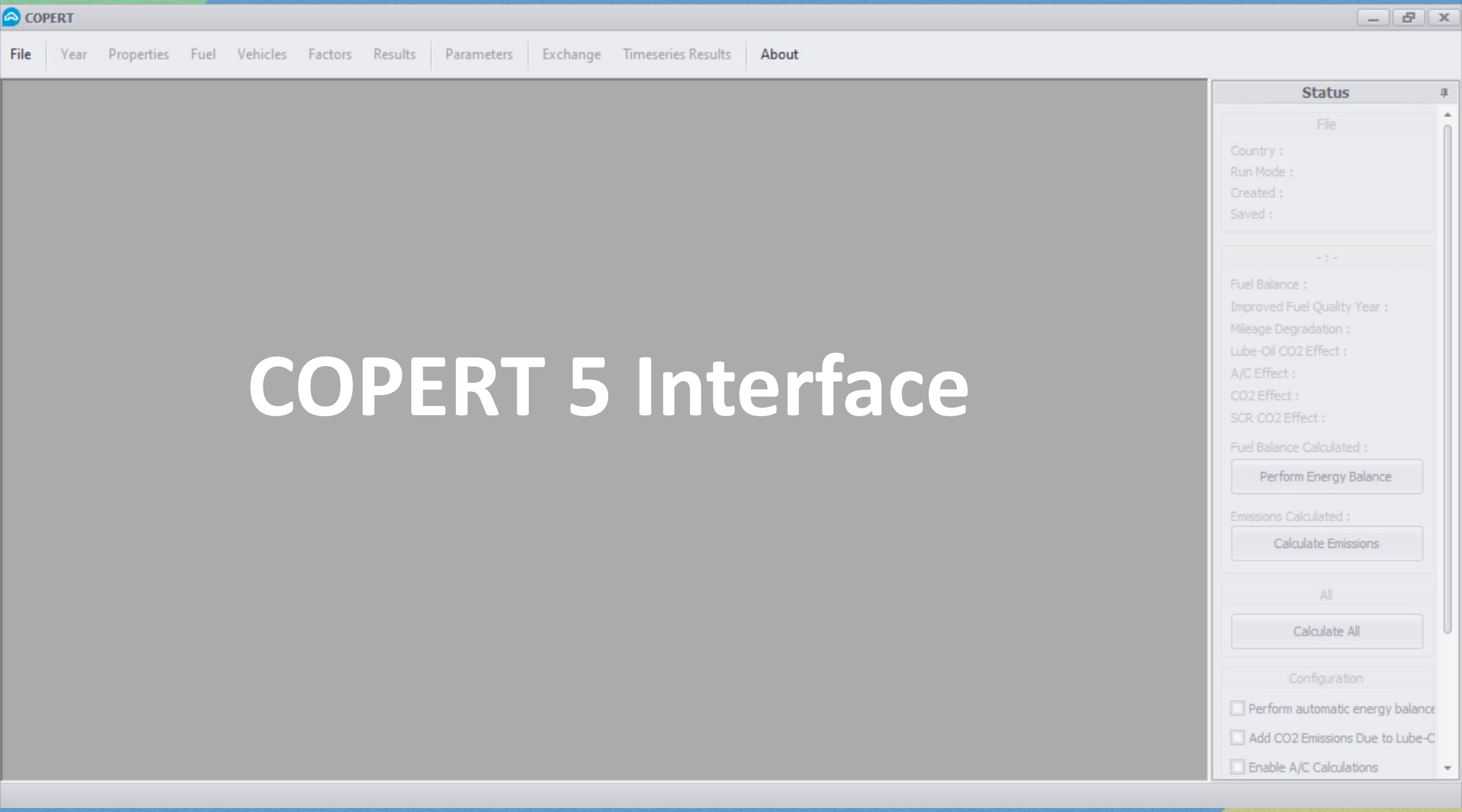


COPERT Computer Program to calculate Emissions from Road Transport est à la fois un logiciel et une méthode. COPERT est un logiciel qui fonctionne sous MS Windows.
Wikipédia

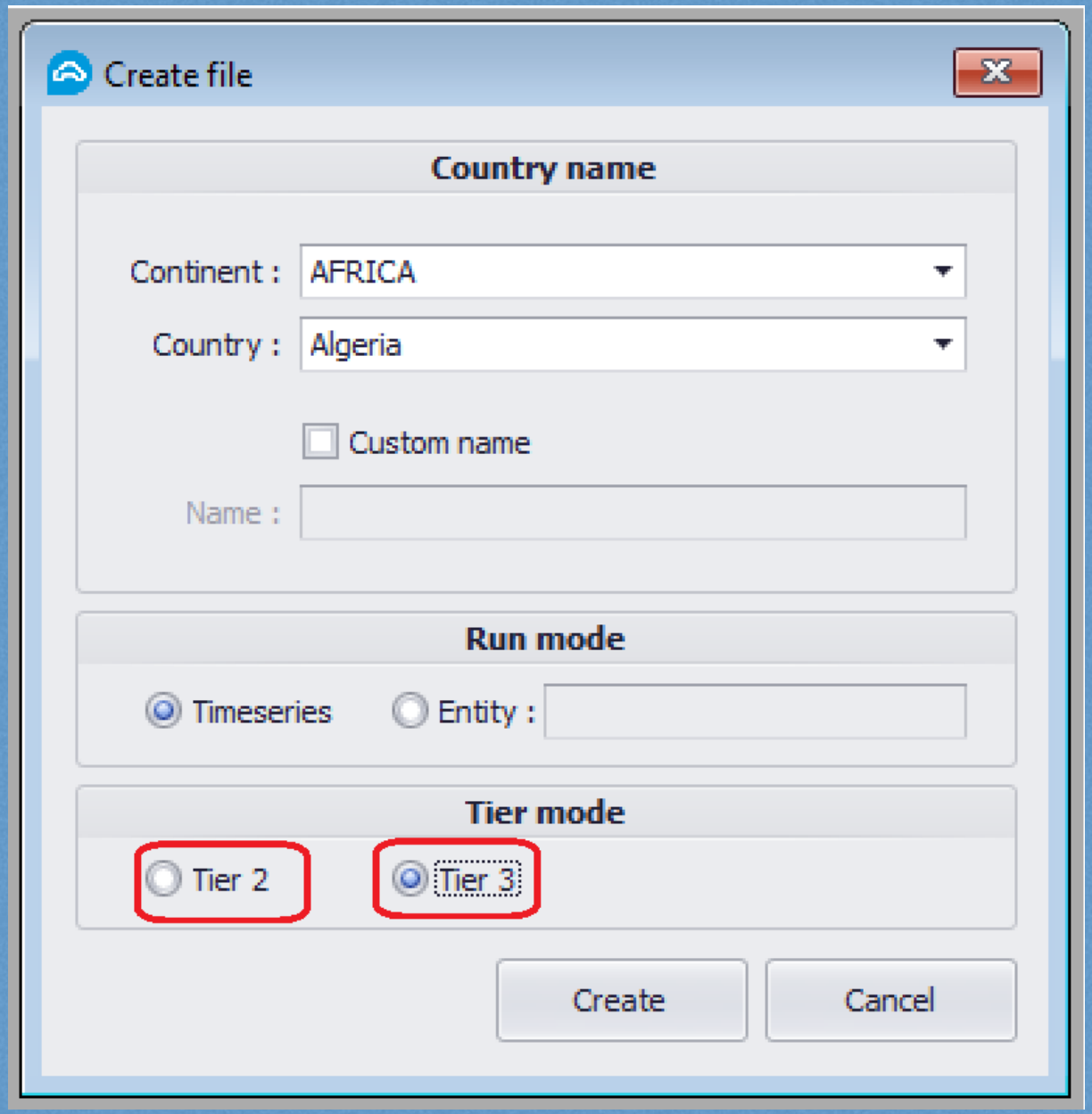
Download and install Copert Model



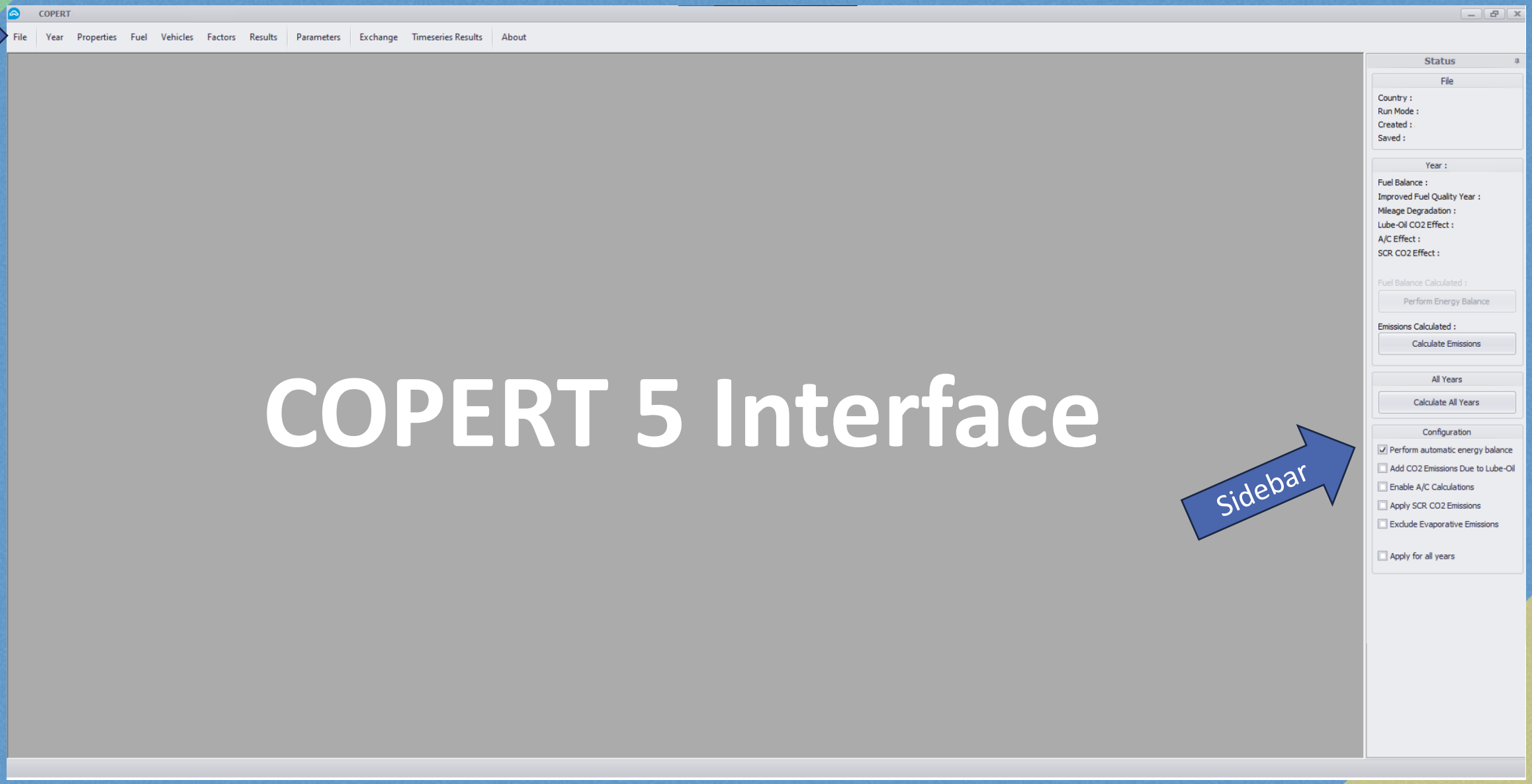
Launching Copert for the first time


COPERT
File
Year
Properties
Fuel
Vehicles
Factors
Results
Parameters
Exchange
Timeseries Results
About
Status
File
Country :
Run Mode :
Created :
Saved :
- : -
Fuel Balance :
Improved Fuel Quality Year :
Mileage Degradation :
Lube-Oil CO2 Effect :
A/C Effect :
CO2 Effect :
SCR CO2 Effect :
Fuel Balance Calculated :
Perform Energy Balance
Emissions Calculated :
Calculate Emissions
All
Calculate All
Configuration
Perform automatic energy balance
Add CO2 Emissions Due to Lube-C
Enable A/C Calculations
COPERT 5 Interface

Selection of the Tier mode: Tier 2 or Tier 3

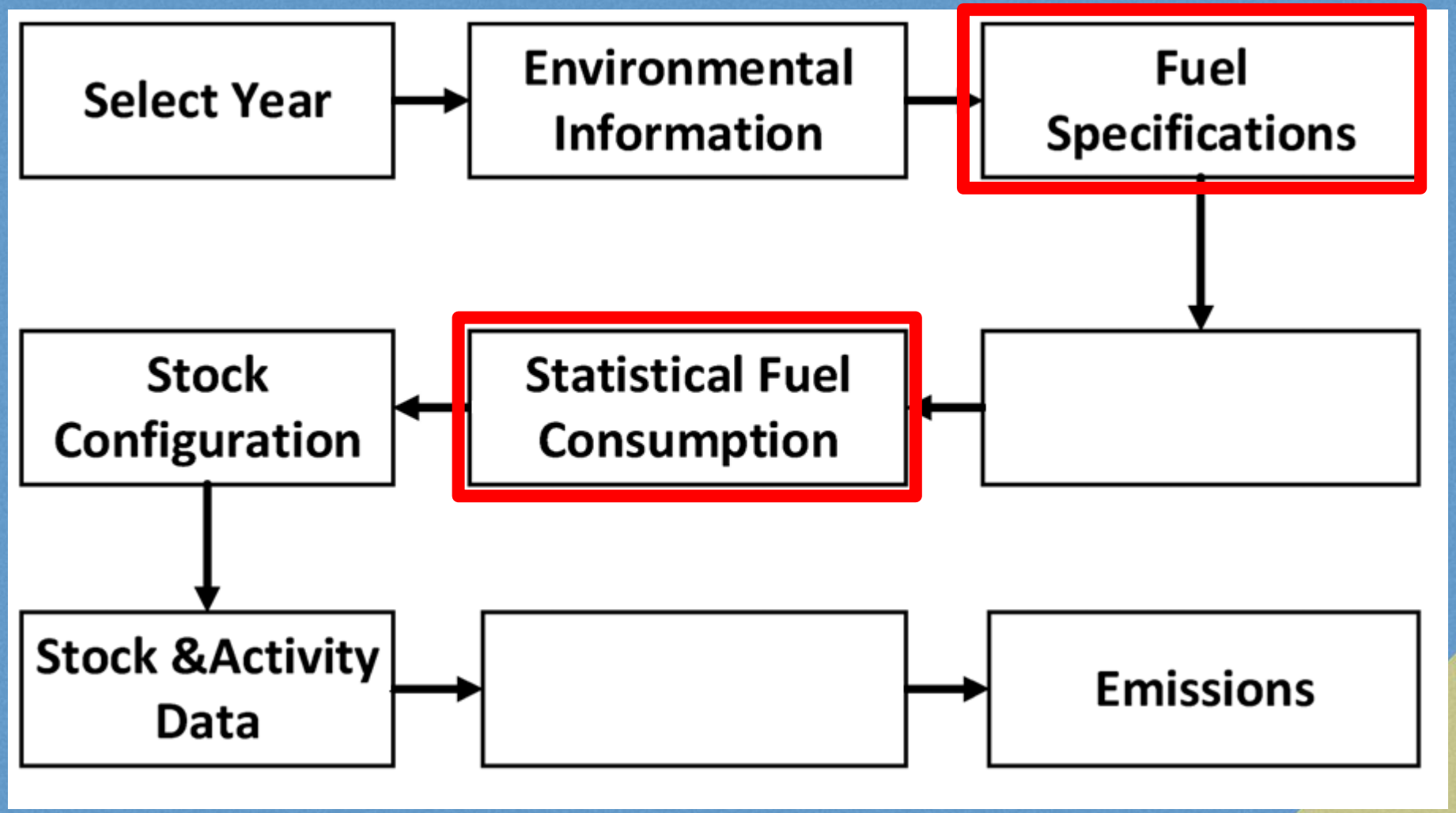


Interface COPERT 5.7.3



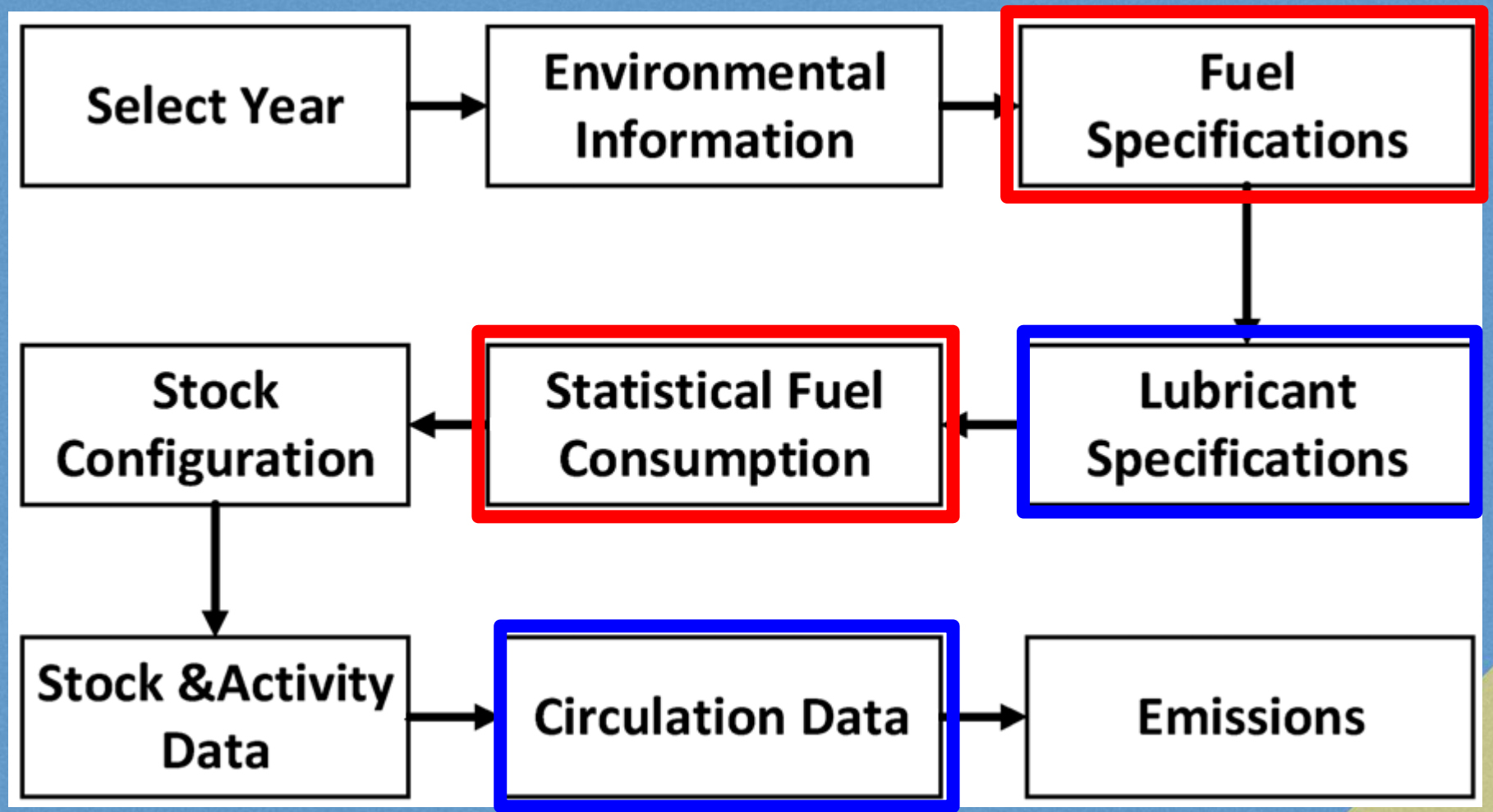
COPERT model estimation procedure Tier 2

The COPERT model was developed to calculate the amount of pollutant emissions per vehicle or fleet for a year



COPERT model estimation procedure Tier 3

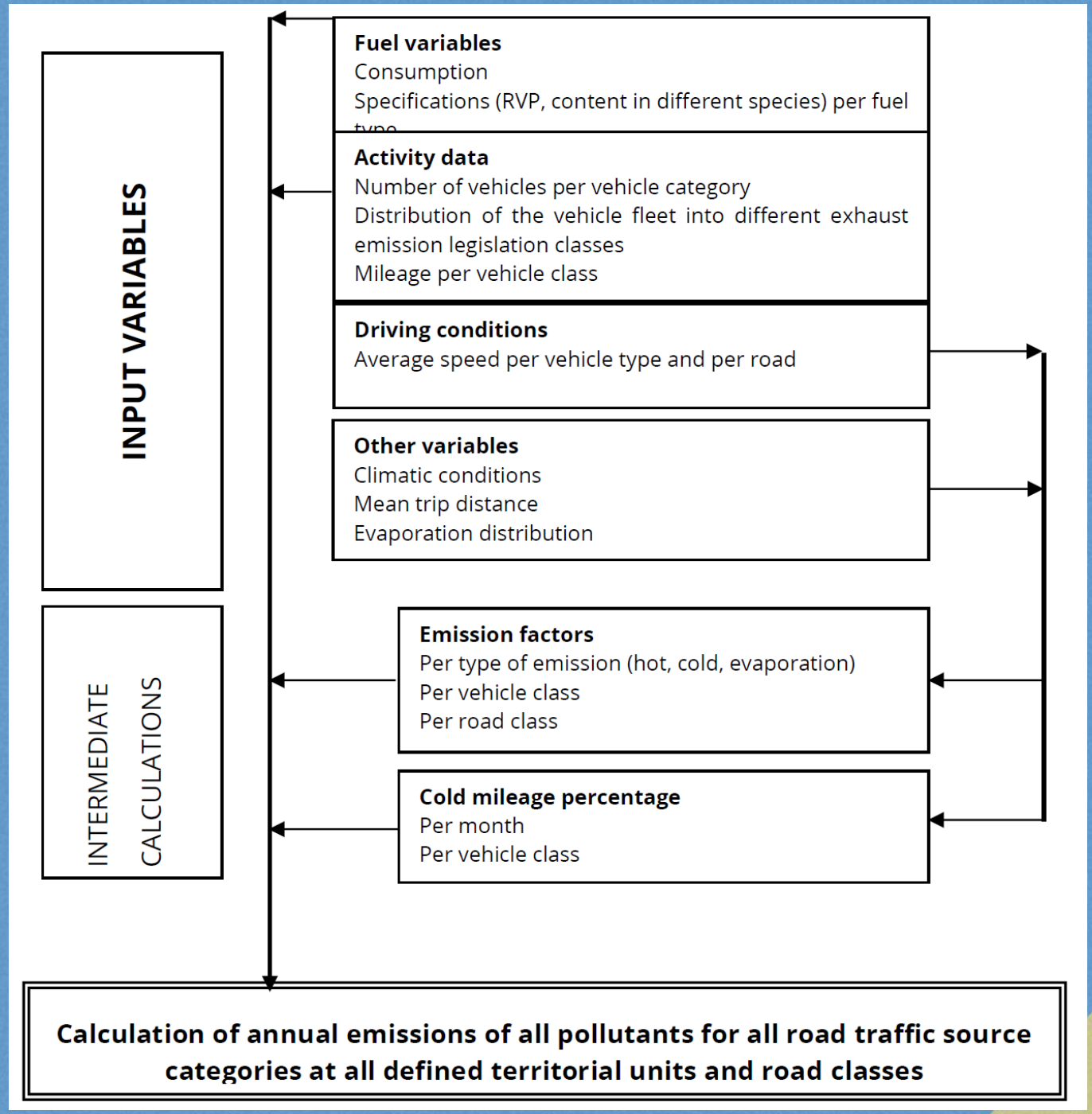
The COPERT model was developed to calculate the amount of pollutant emissions per vehicle or fleet for a year



Comparison of Copert data input between Tier 2 vs Tier 3

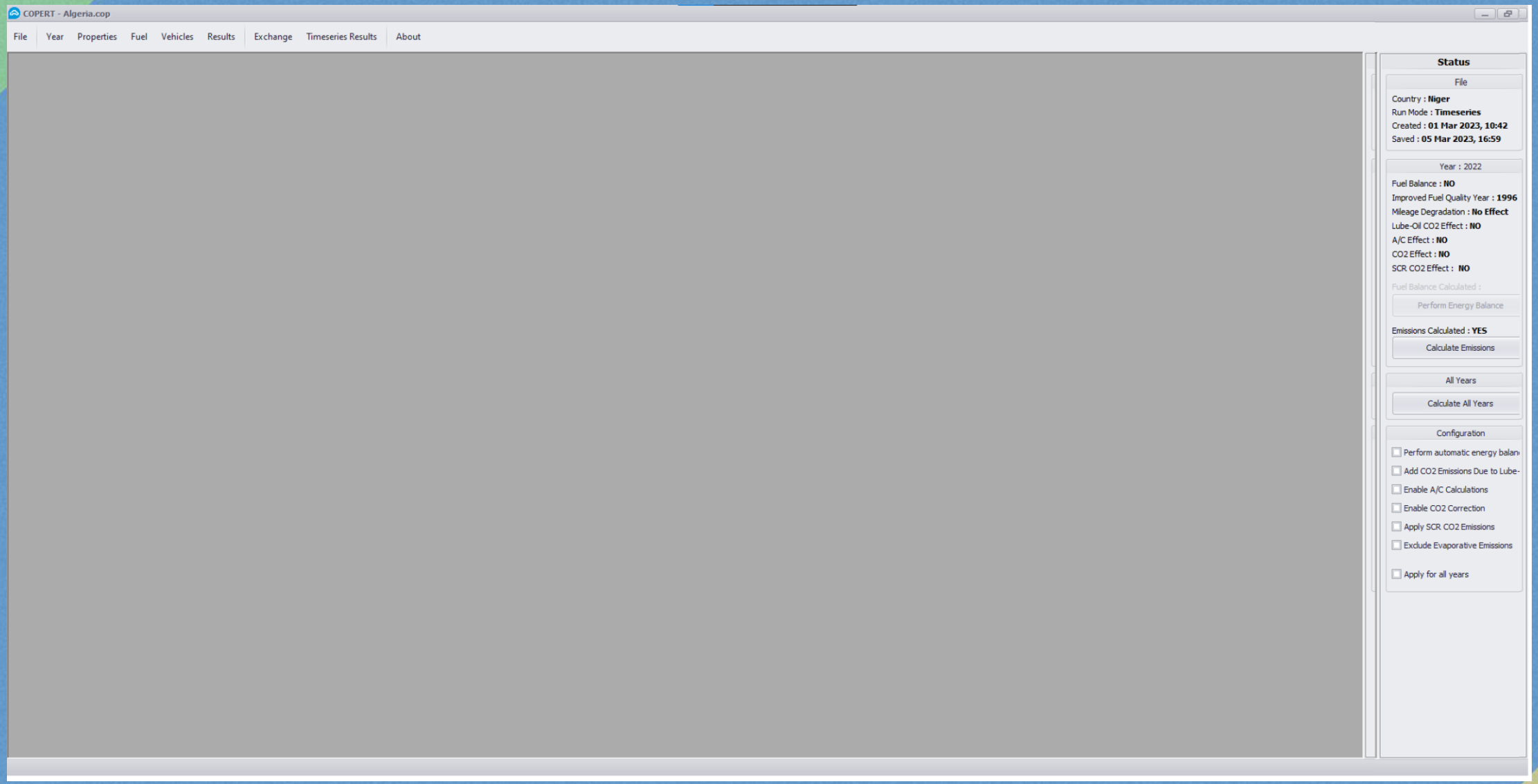
Tier 2	Tier 3
File > Create	File > Create
Year > Add Year	Year > Add Year
Properties > Environmental Information	Properties > Environmental Information
	Fuel > Advanced Specifications
	Fuel > RVP
Vehicles > Stock Configuration	Vehicles > Stock Configuration
Vehicles > Stock & Activity Data	Vehicles > Stock & Activity Data
	Vehicles > Circulation Data
Calculate Emissions (Factors, Results, Timeseries Results)	
Energy Balance (optional) Fuel > Statistical Consumption	

Flow chart of the application of the COPERT baseline methodology



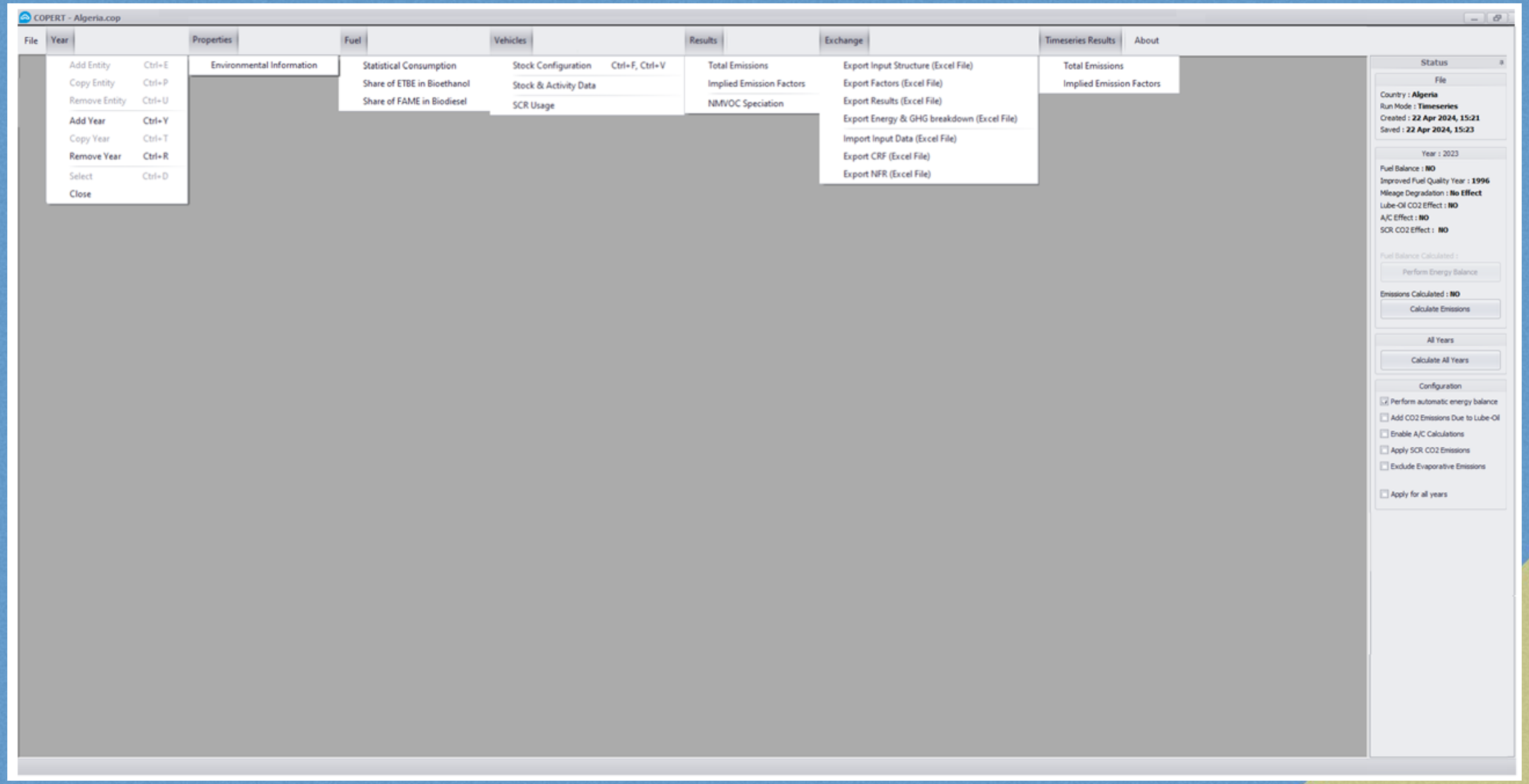
RVP: Reid Vapor Pressure (tension de vapeur)

Interface COPERT 5.7.3 (Tier 2)

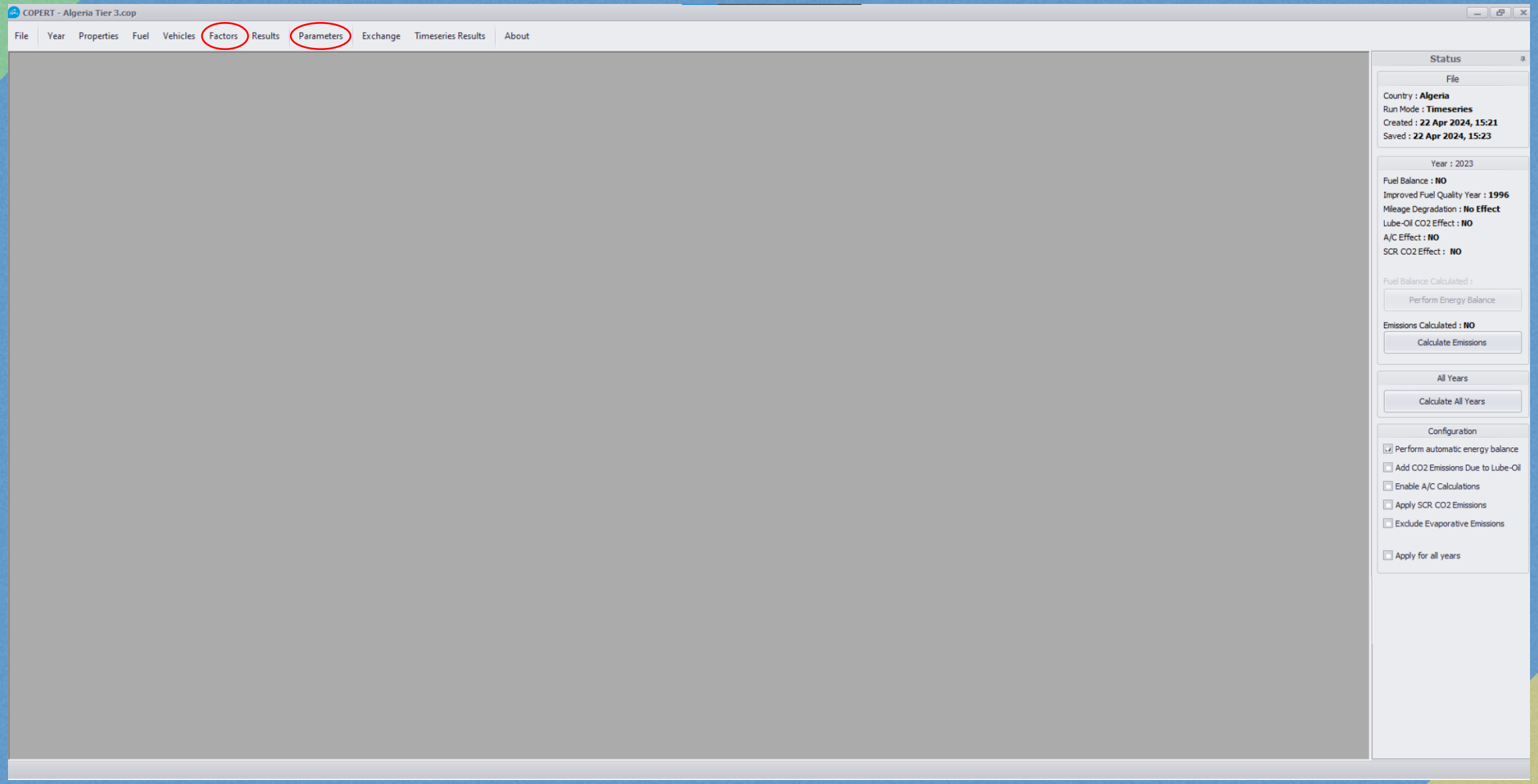


COPERT 5.7.3 interface

Detailed Menu of Tier 2

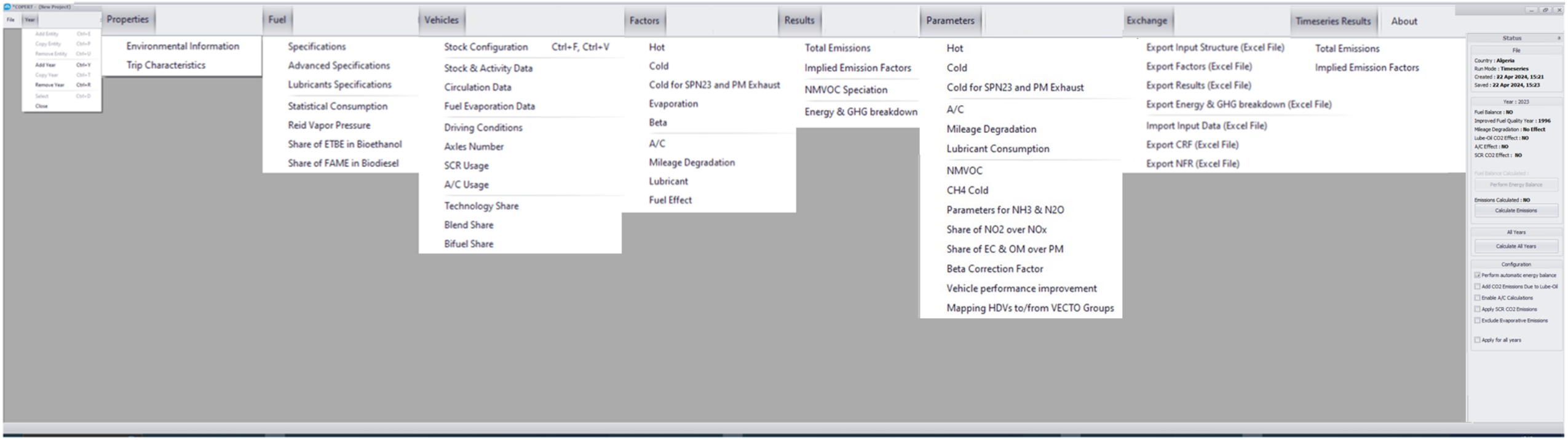


COPERT 5.7.3 (Tier 3)



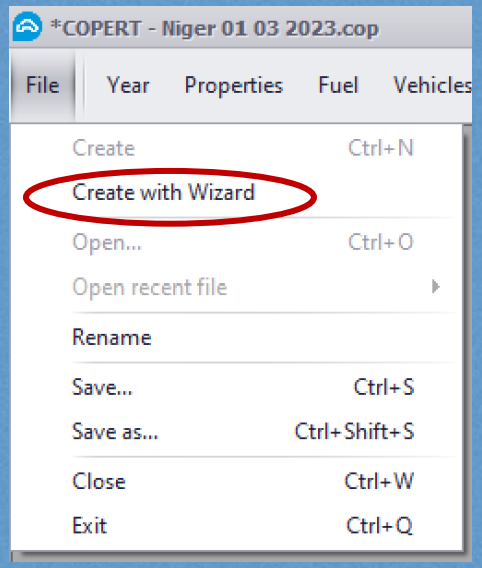
COPERT 5.7.3 Interface

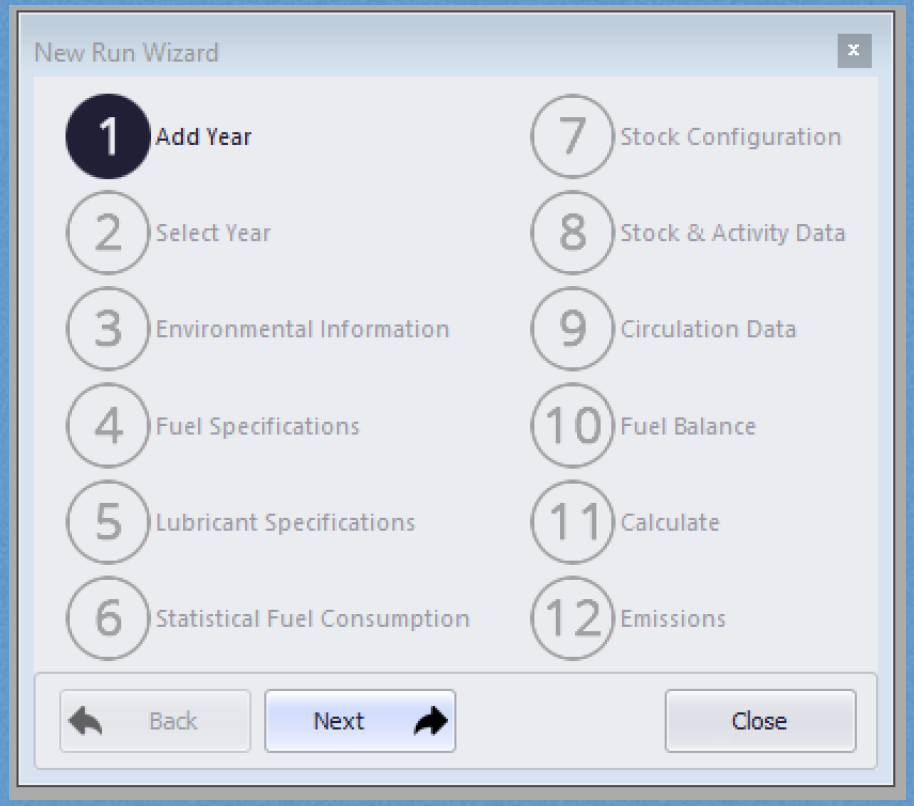
Detailed menu of Tier 3

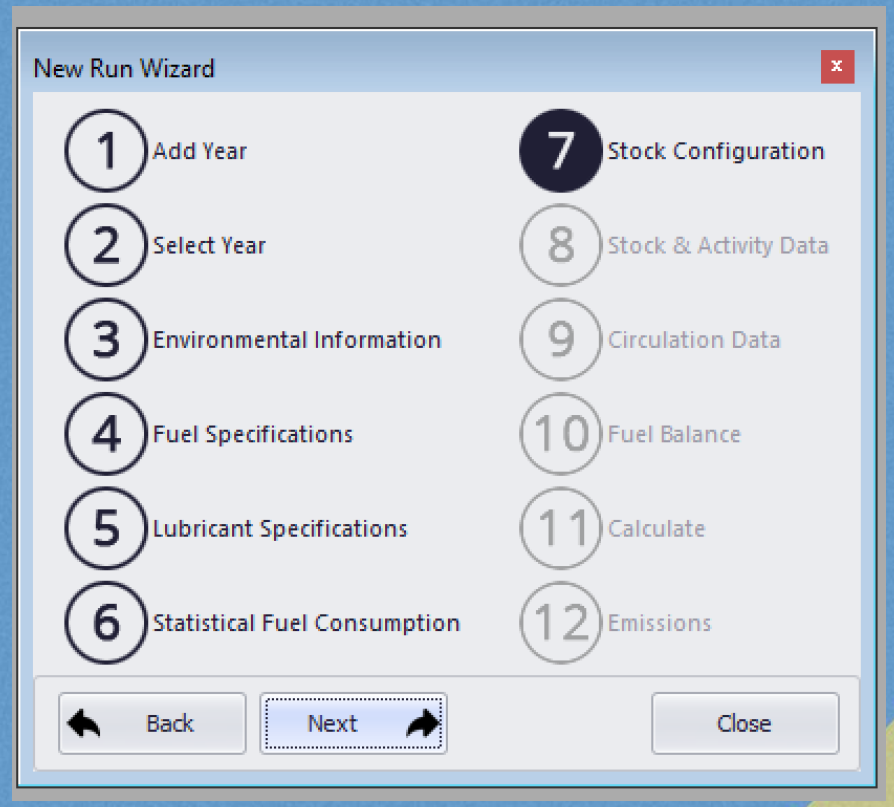


Wizard execution

After creating or opening an inventory file, one can use a wizard, which performs the basic steps in order to produce and calculate a complete run.





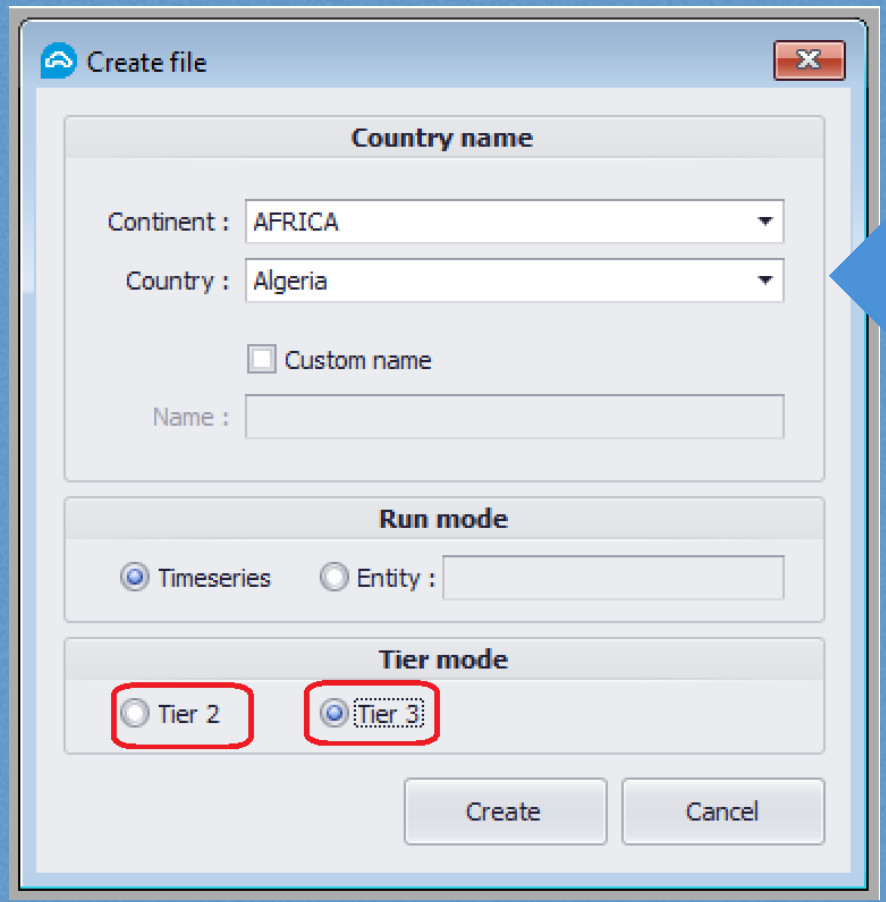


Just press 'Next' and follow the instructions

File > Create

Country > add country

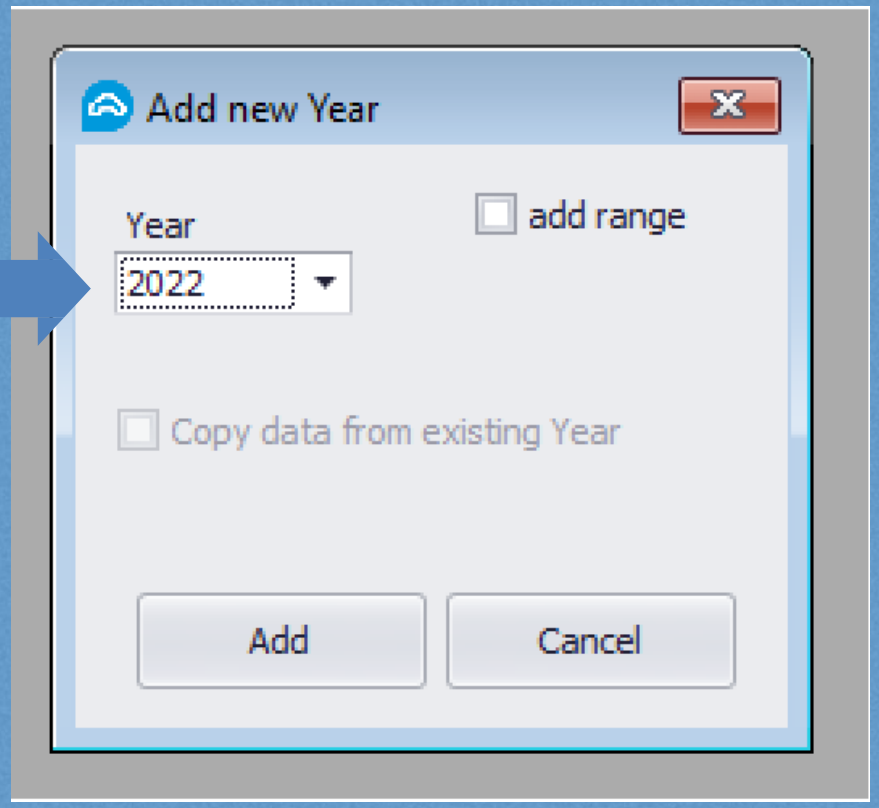
The methodology for the calculation of exhaust emissions may follow Tier 2 or Tier 3. In Tier 2 methodology, the calculations take into account the amount of fleet and the vehicle kilometers per technology while in Tier 3, emission factors are mode detailed and they depend also on temperature profile, driving pattern, parking pattern, and other activity parameters.

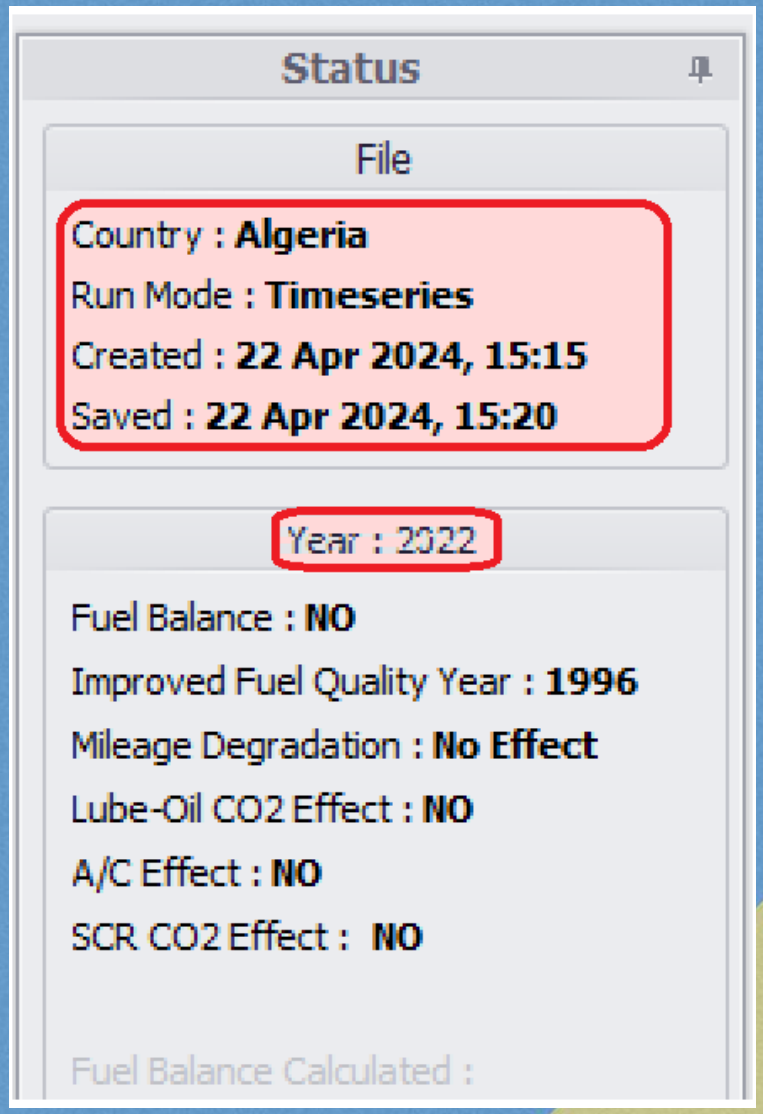


Label only, does not affect calculations

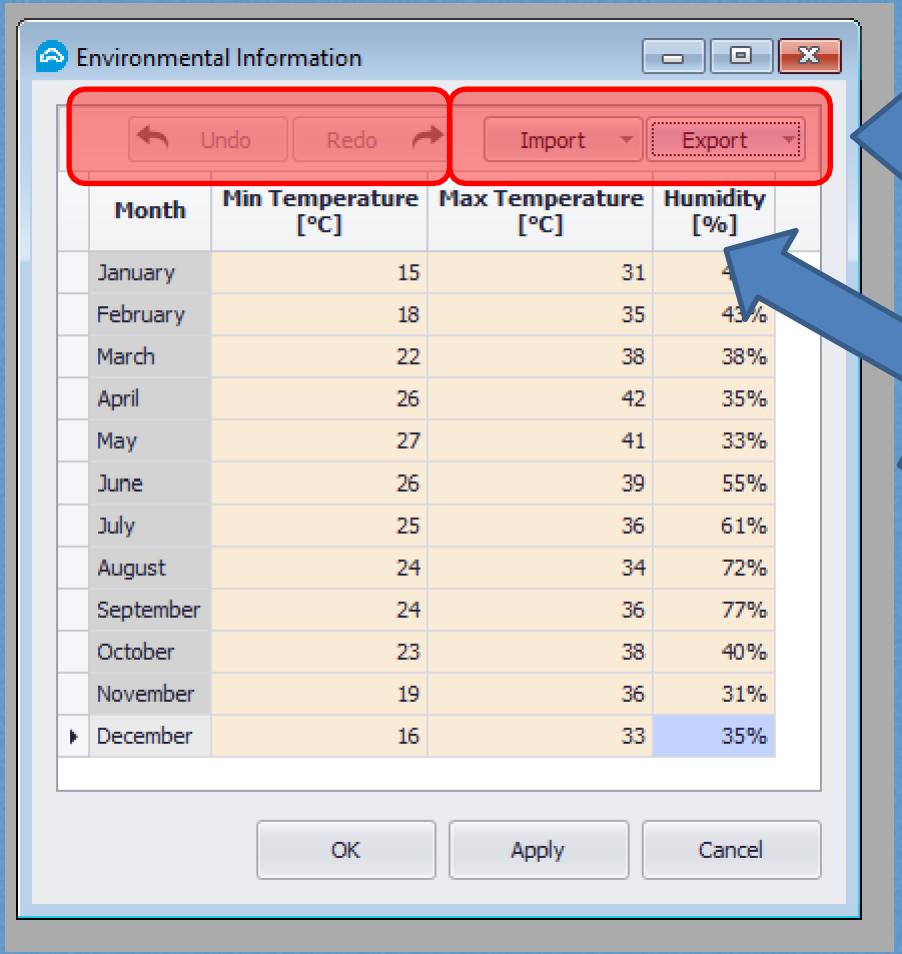
Year > Add Year

Label only, does not affect calculations





Properties > Environmental Information



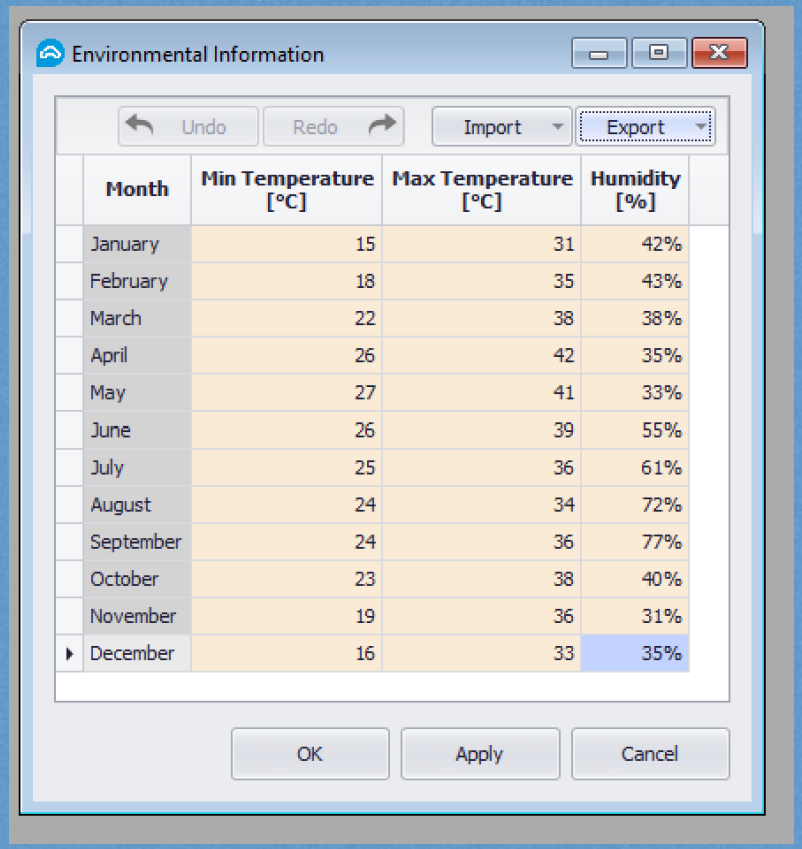
Import to and from Excel (functionality exists in all forms)

Not required for a basic run

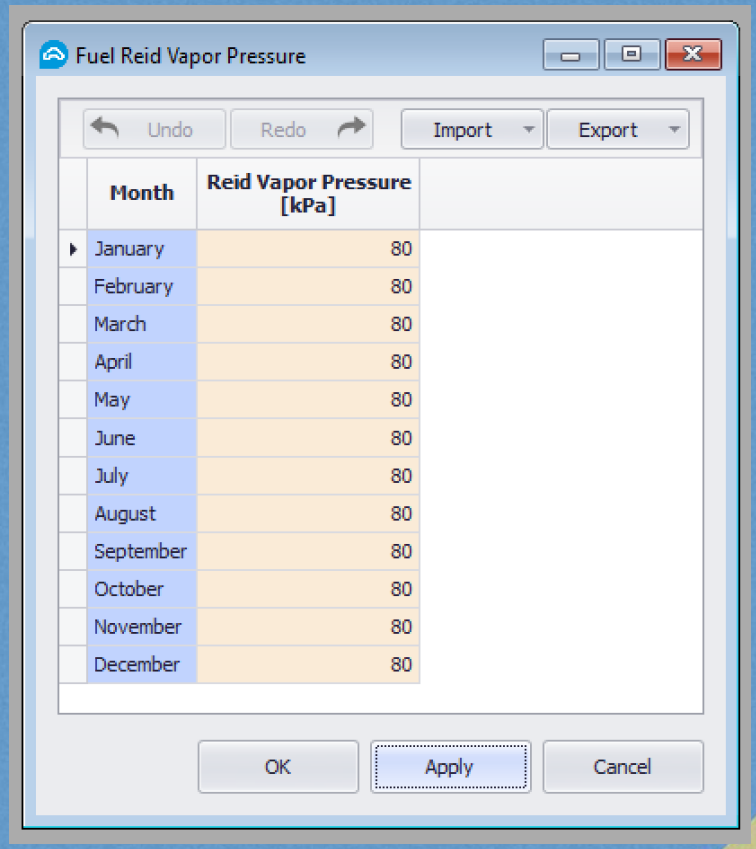
Properties > min et max temperatures et RVP

The user may provide values for monthly average minimum and maximum temperatures. These values may be different for every year.

The user may provide the relative humidity per month. This is required to calculate the load of air-conditioning (A/C) and the fuel evaporation. A high value denotes high humidity and a higher load for the A/C that increases consumption.



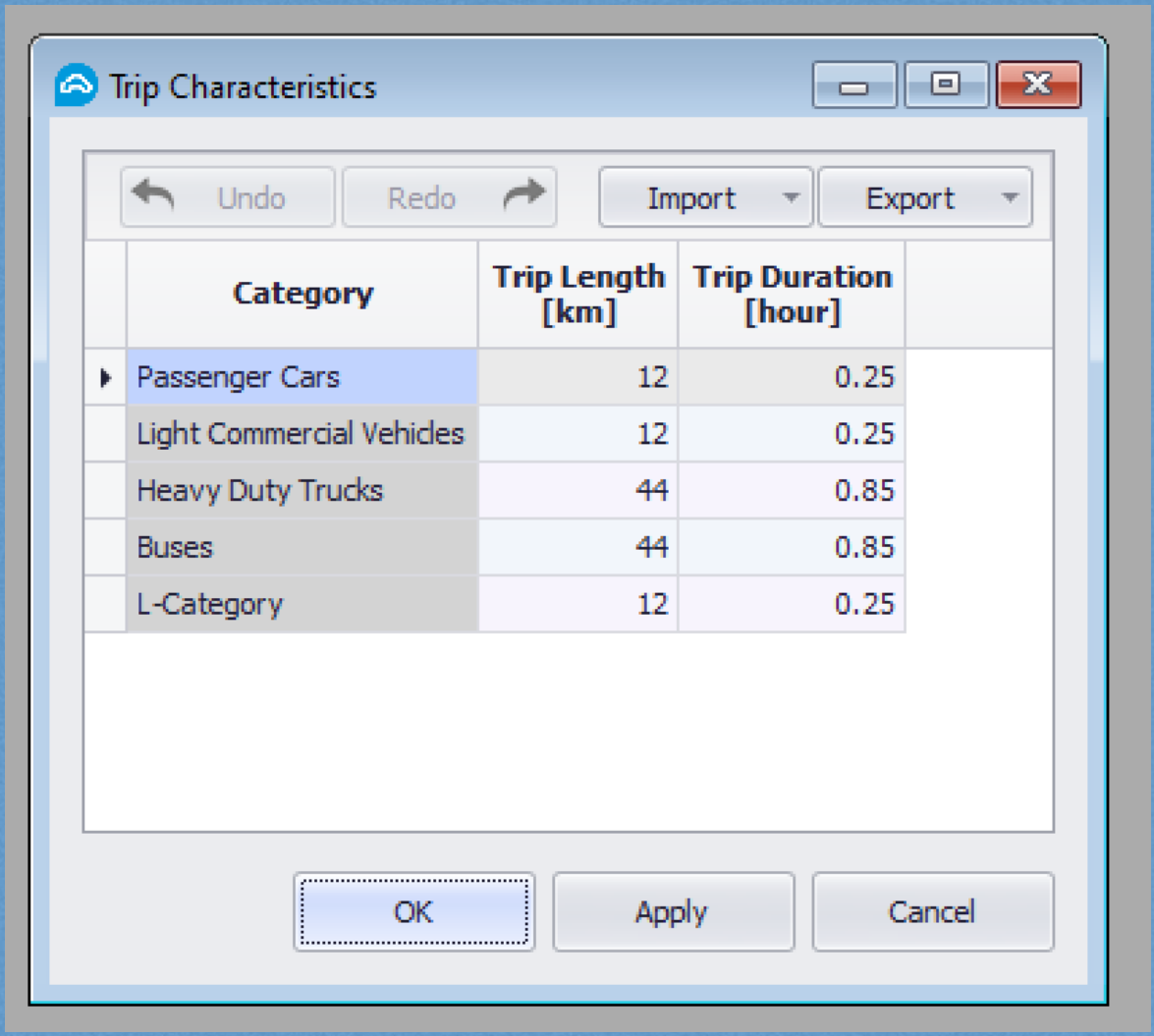
Month	Min Temperature [°C]	Max Temperature [°C]	Humidity [%]
January	15	31	42%
February	18	35	43%
March	22	38	38%
April	26	42	35%
May	27	41	33%
June	26	39	55%
July	25	36	61%
August	24	34	72%
September	24	36	77%
October	23	38	40%
November	19	36	31%
December	16	33	35%



Month	Reid Vapor Pressure [kPa]
January	80
February	80
March	80
April	80
May	80
June	80
July	80
August	80
September	80
October	80
November	80
December	80

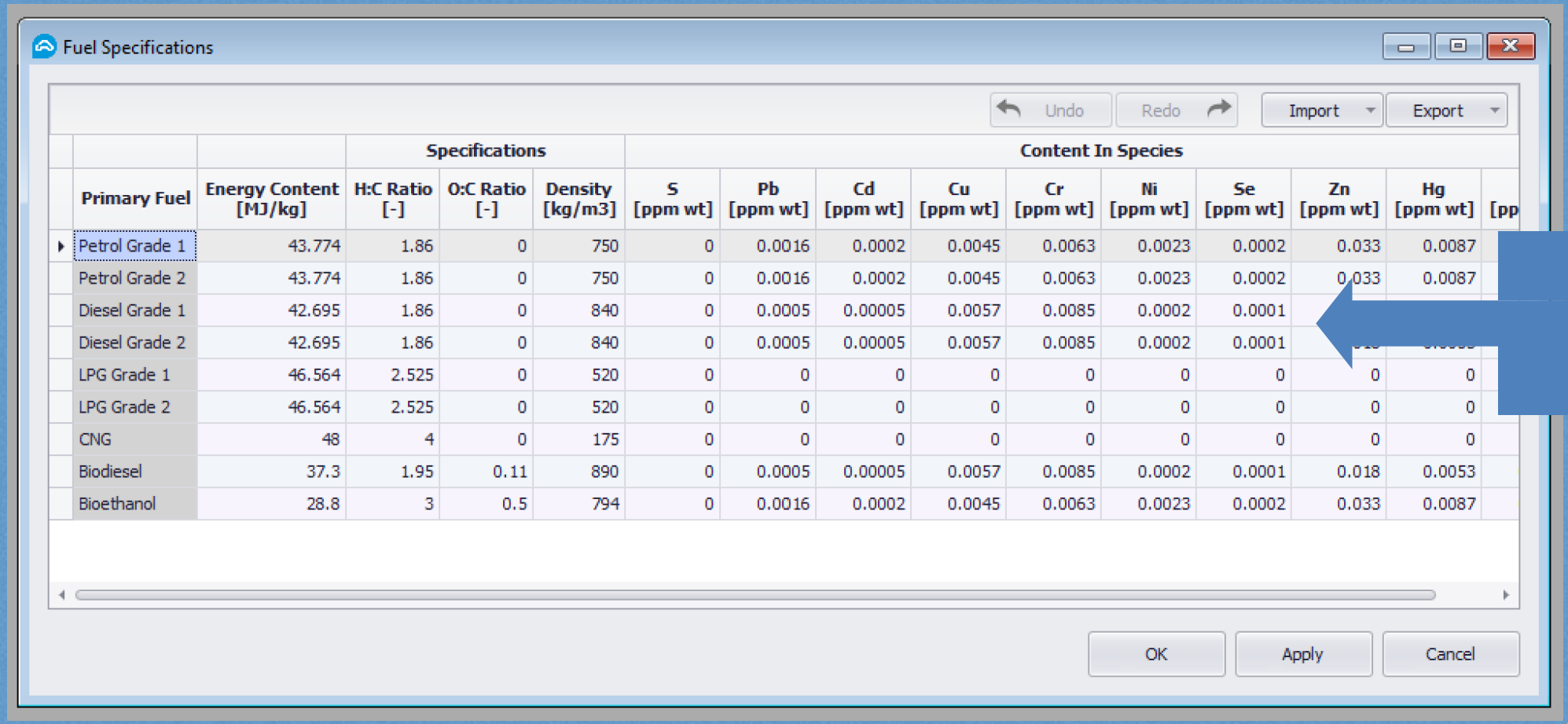
Properties > Trip Characteristics

The user may change the country's average Trip Length in km and Trip Duration in hours for each vehicle category or keep the default values.



Fuel > Specifications

The user may provide data for the Fuel specifications (energy content and fuel density) or keep the default values and Values for several heavy metal content and O:C ratio are also proposed.
Those values may change if more accurate figures are available. These data can be different every year.



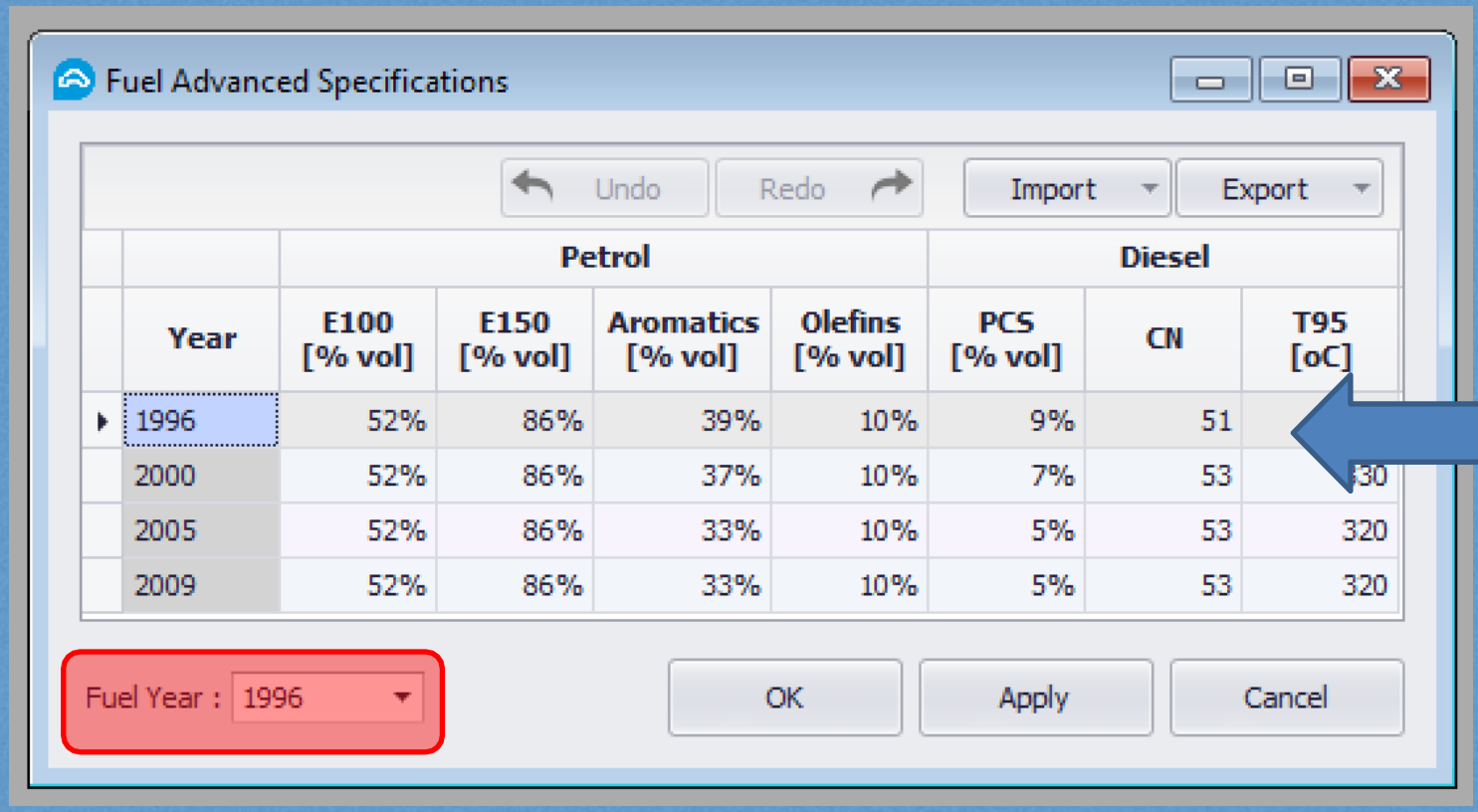
Primary Fuel	Energy Content [MJ/kg]	H:C Ratio [-]	O:C Ratio [-]	Density [kg/m3]	S [ppm wt]	Pb [ppm wt]	Cd [ppm wt]	Cu [ppm wt]	Cr [ppm wt]	Ni [ppm wt]	Se [ppm wt]	Zn [ppm wt]	Hg [ppm wt]	[pp
Petrol Grade 1	43.774	1.86	0	750	0	0.0016	0.0002	0.0045	0.0063	0.0023	0.0002	0.033	0.0087	
Petrol Grade 2	43.774	1.86	0	750	0	0.0016	0.0002	0.0045	0.0063	0.0023	0.0002	0.033	0.0087	
Diesel Grade 1	42.695	1.86	0	840	0	0.0005	0.00005	0.0057	0.0085	0.0002	0.0001			
Diesel Grade 2	42.695	1.86	0	840	0	0.0005	0.00005	0.0057	0.0085	0.0002	0.0001			
LPG Grade 1	46.564	2.525	0	520	0	0	0	0	0	0	0	0	0	
LPG Grade 2	46.564	2.525	0	520	0	0	0	0	0	0	0	0	0	
CNG	48	4	0	175	0	0	0	0	0	0	0	0	0	
Biodiesel	37.3	1.95	0.11	890	0	0.0005	0.00005	0.0057	0.0085	0.0002	0.0001	0.018	0.0053	
Bioethanol	28.8	3	0.5	794	0	0.0016	0.0002	0.0045	0.0063	0.0023	0.0002	0.033	0.0087	

COPERT default values

Fuel > Advanced Specifications

The user may provide data the Advanced Fuel Quality Specifications and choose between four fuel types: 1996 (Base Fuel), 2000 (Stage 2000) and 2005 (Stage 2005), 2009 (Stage 2009) from the Fuel Year drop-down list.

The default value is 1996. If this option is selected then all vehicles are assumed to operate on a conventional – Base – fuel (corresponding to 1996 EU15 market average).



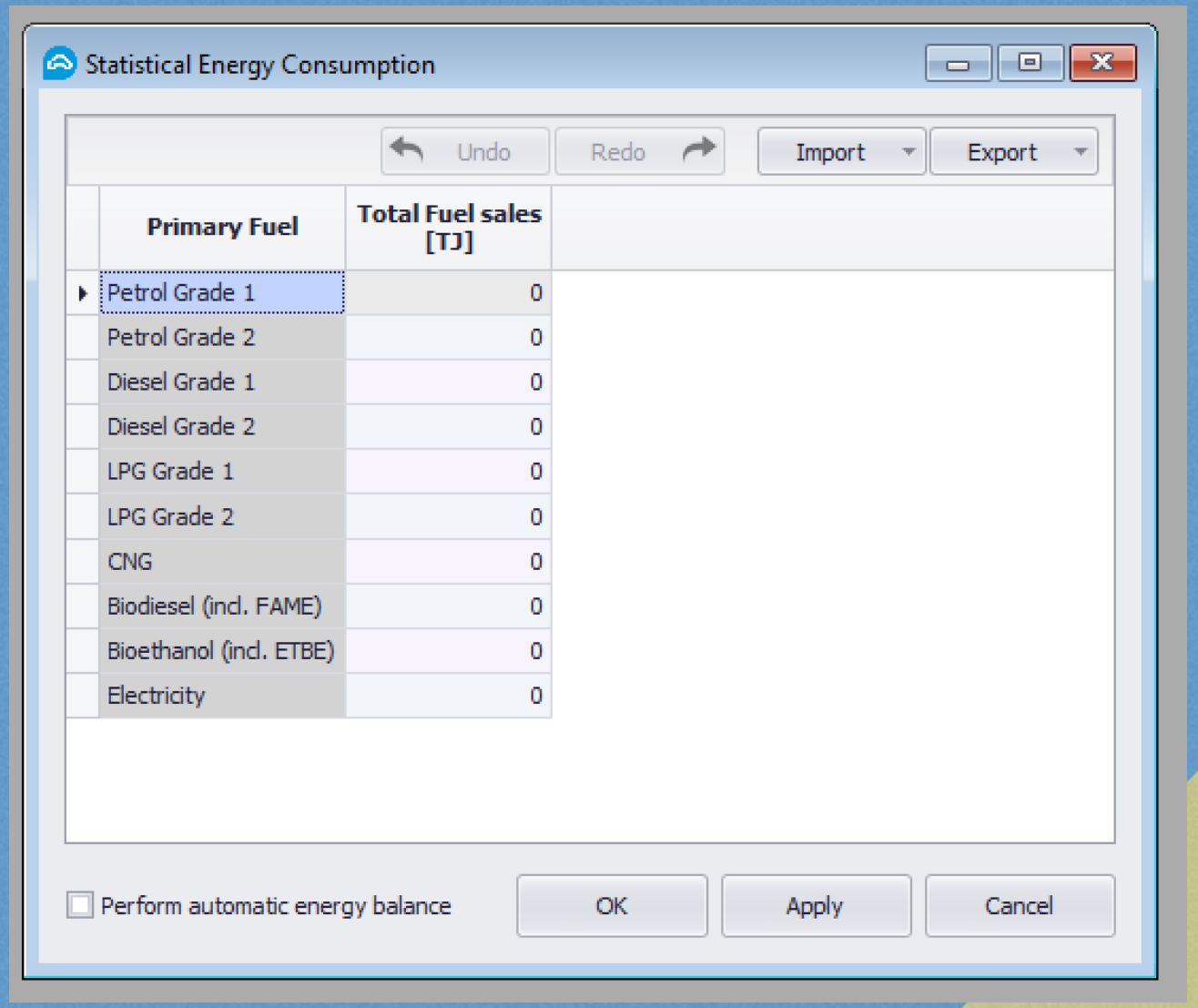
COPERT default values

Fuel > Statistical energy consumption

The user may provide the statistical energy consumption in case he/she wants COPERT to perform an energy balance. Providing values is not enough for taking into account statistical energy consumption, the user also has to select to "perform automatic energy balance".

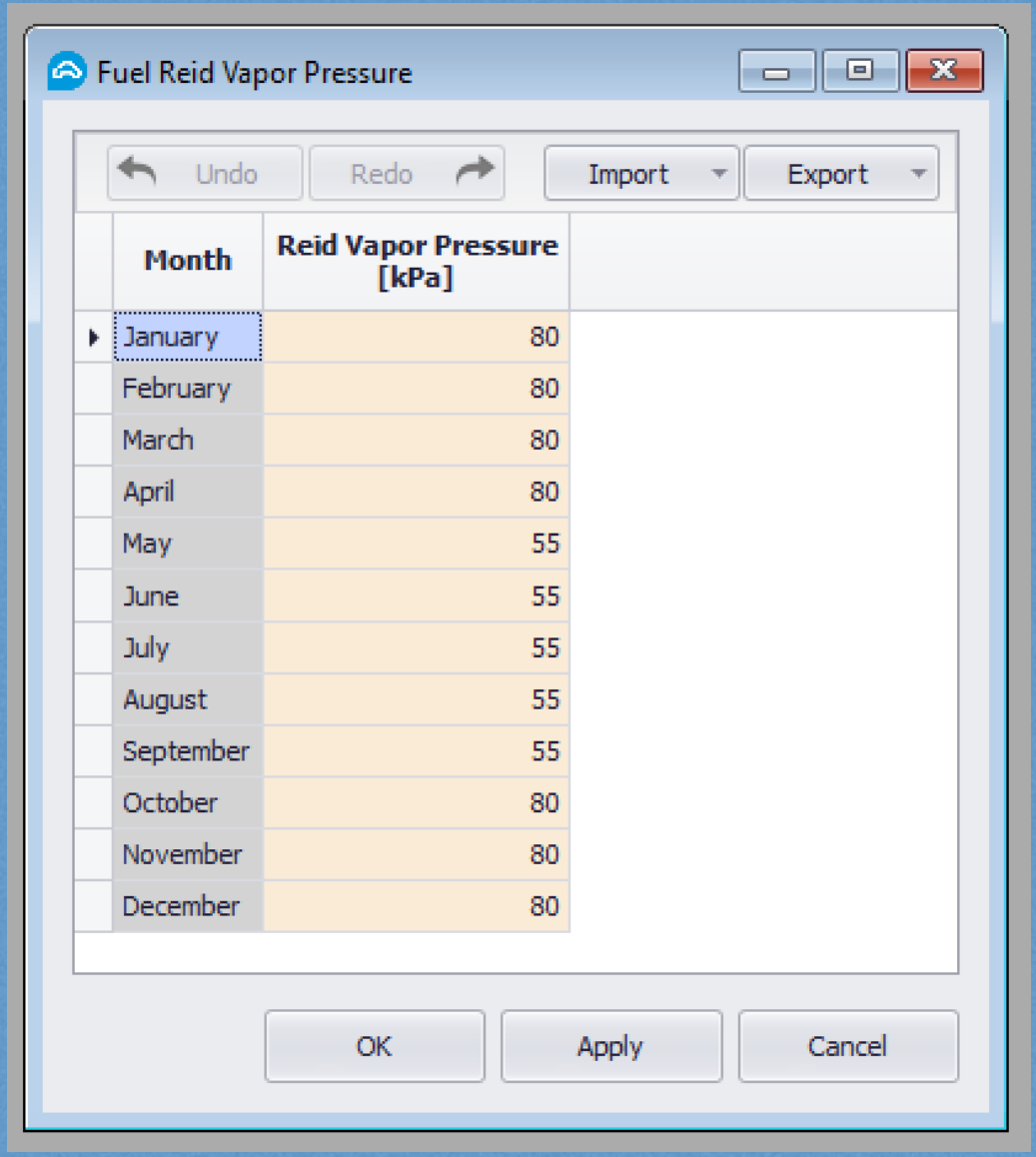
Data provided here are for primary fuels only, and there is an option to provide 2 different Petrol, Diesel, and LPG energy consumption values if such information exists.

Different values denote that in the Fuel>Specifications form different fuel characteristics have been provided by the user.



Fuel > RVP (Reid Vapor Pressure)

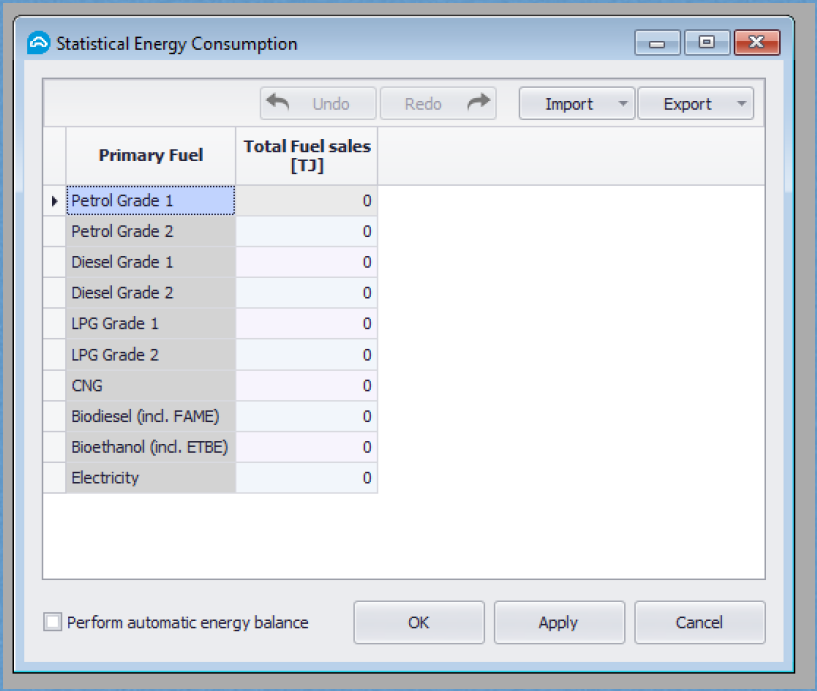
The user may provide the Reid Vapor Pressure for each month in kPa.

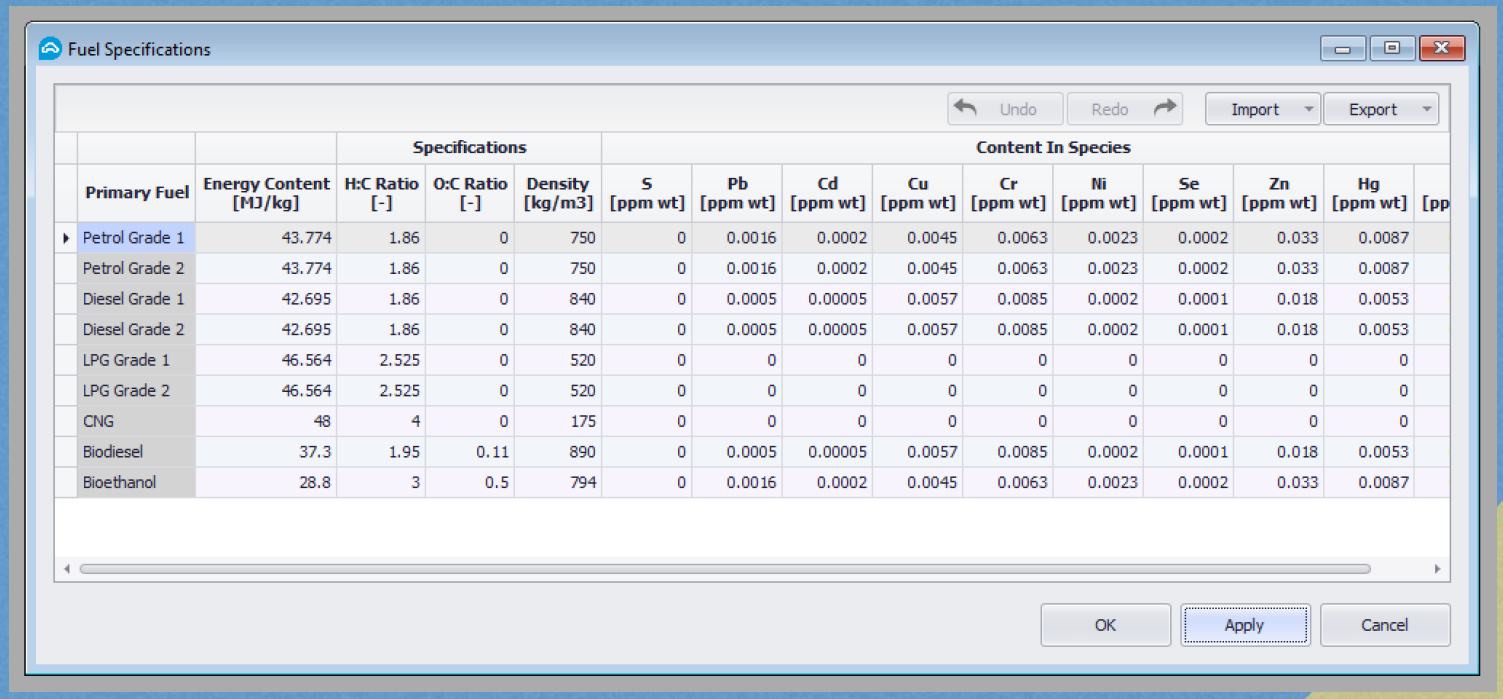


Fuel information

The user may provide the statistical energy consumption in case he/she wants COPERT to perform an energy balance
The user also has to select to "perform automatic energy balance"

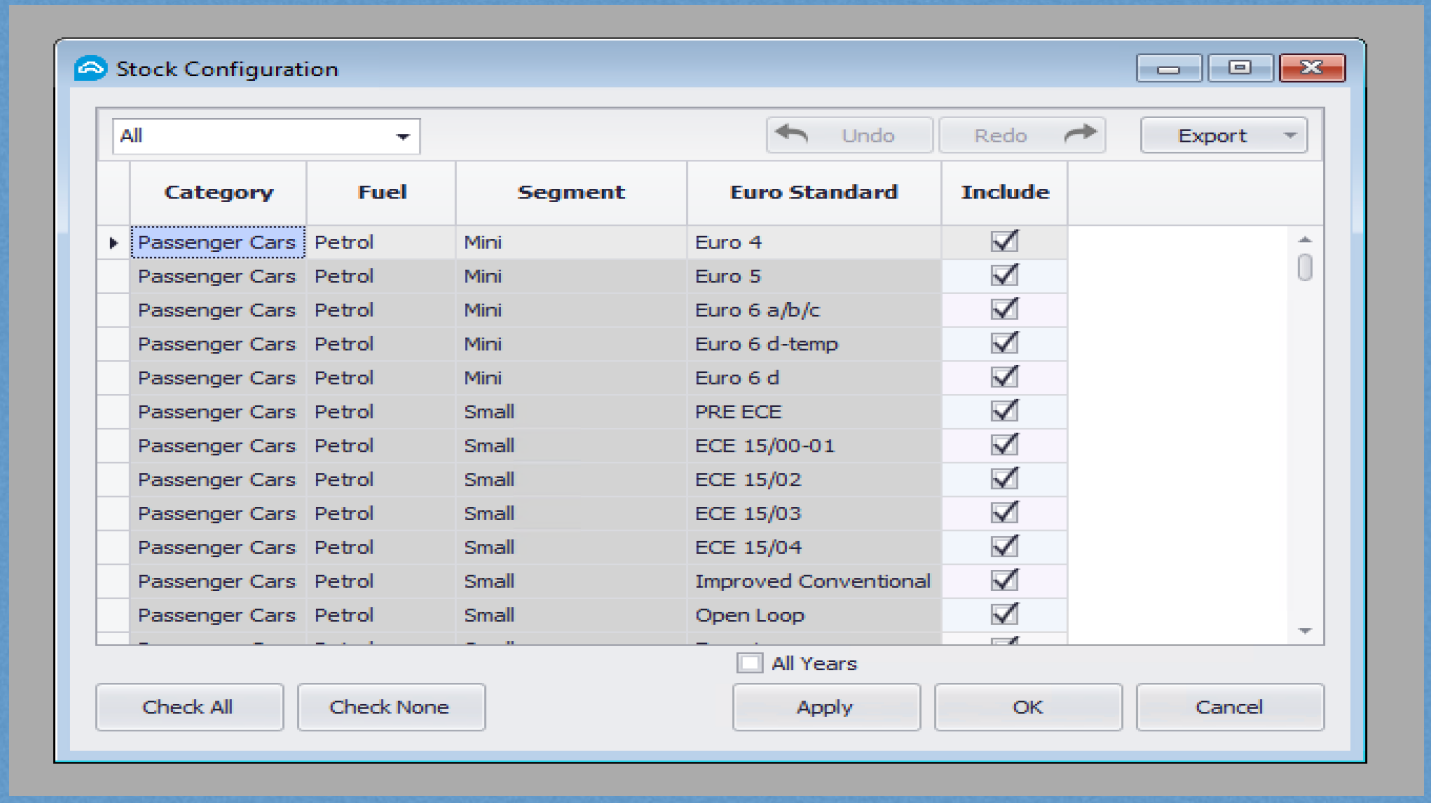
The user may provide data for the Fuel specifications such as energy content and fuel density or keep the default values, also the hydrogen to carbon atom ratio (H:C ratio)





Vehicles > Stock Configuration

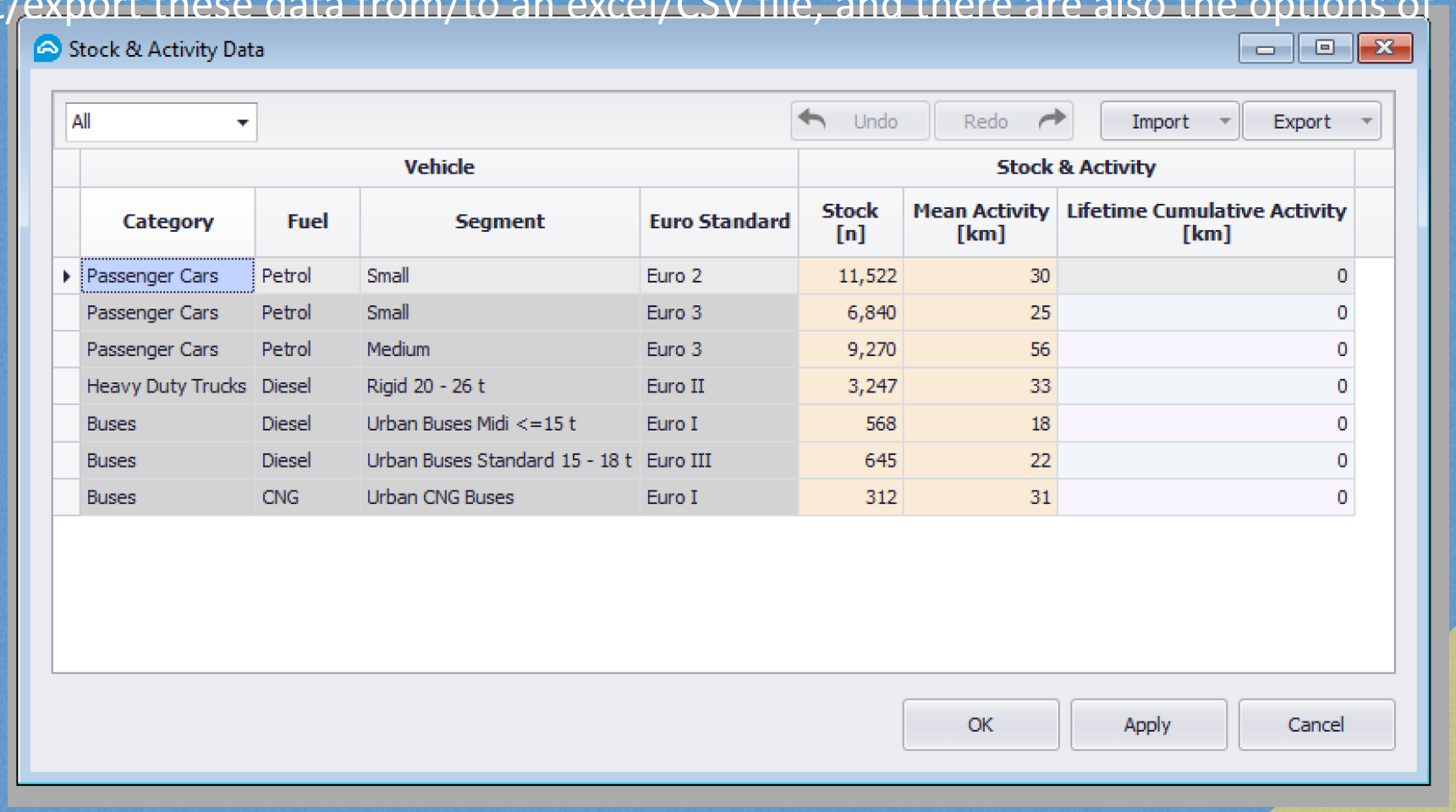
This window represents one of the necessary inputs
the user selects which types of vehicles will be in the fleet of the selected year
The user may also apply the fleet configuration to other years of the selected run by checking the "All years" option at the bottom of the form
The user may also export the categories to an excel/CSV file. When the configuration is complete press OK and the appropriate data will be updated



Vehicles > Stock & Activity Data

This window represents one of the necessary inputs
The user types (or imports) input data for Stock, Mean Activity (km/year), and Lifetime Cumulative Activity (km)
The user is able to import/export these data from/to an excel/CSV file, and there are also the options of undo/redo available

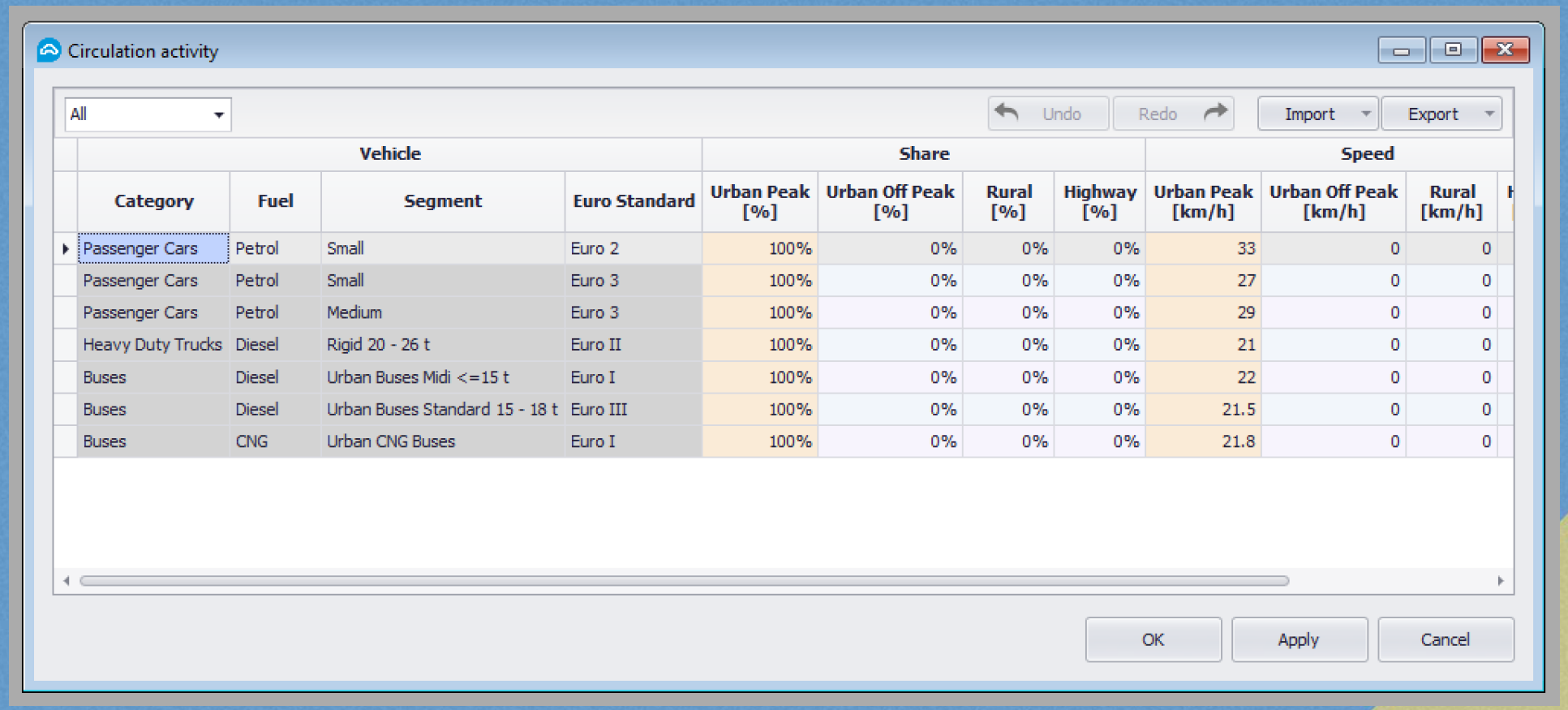
Exercise data



Vehicles > Circulation Data

This window represents one of the necessary inputs
The user types (or import) the average speed(which should be within the given range in the last column) and the mileage percentage (sum should always be 100%) driven by each vehicle technology per driving mode
To filter vehicle sectors use the Sector drop-down list in the top left corner of the form

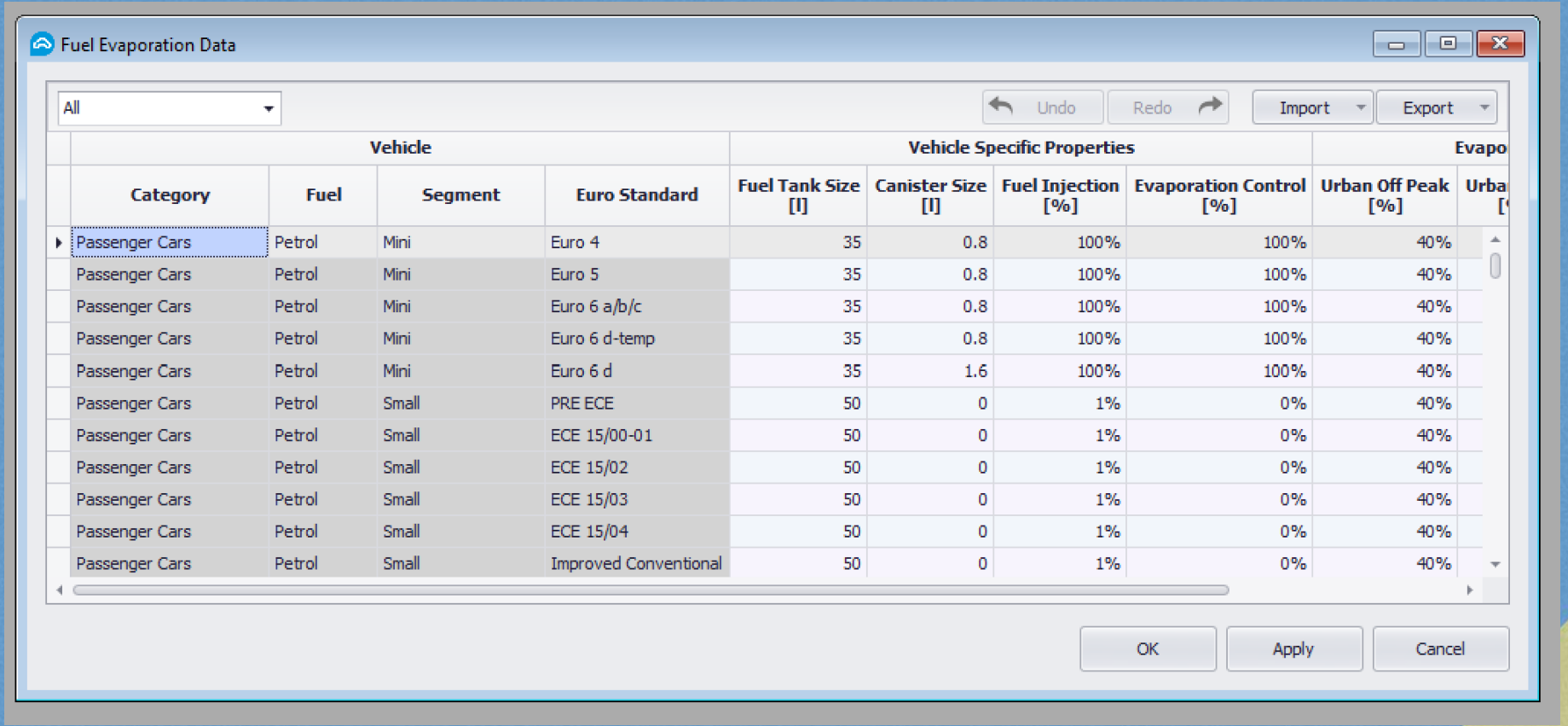
Exercise data



Vehicles > Fuel Evaporation Data

We can find input data for Fuel Tank Size (l), Canister size (l), percentage of vehicles equipped with Fuel Injection (%), percentage of vehicles equipped with Evaporation Control (%), and the distribution of evaporative emissions to different driving modes (%)

To enter your own values, simply replace the proposed value by typing in the corresponding cell

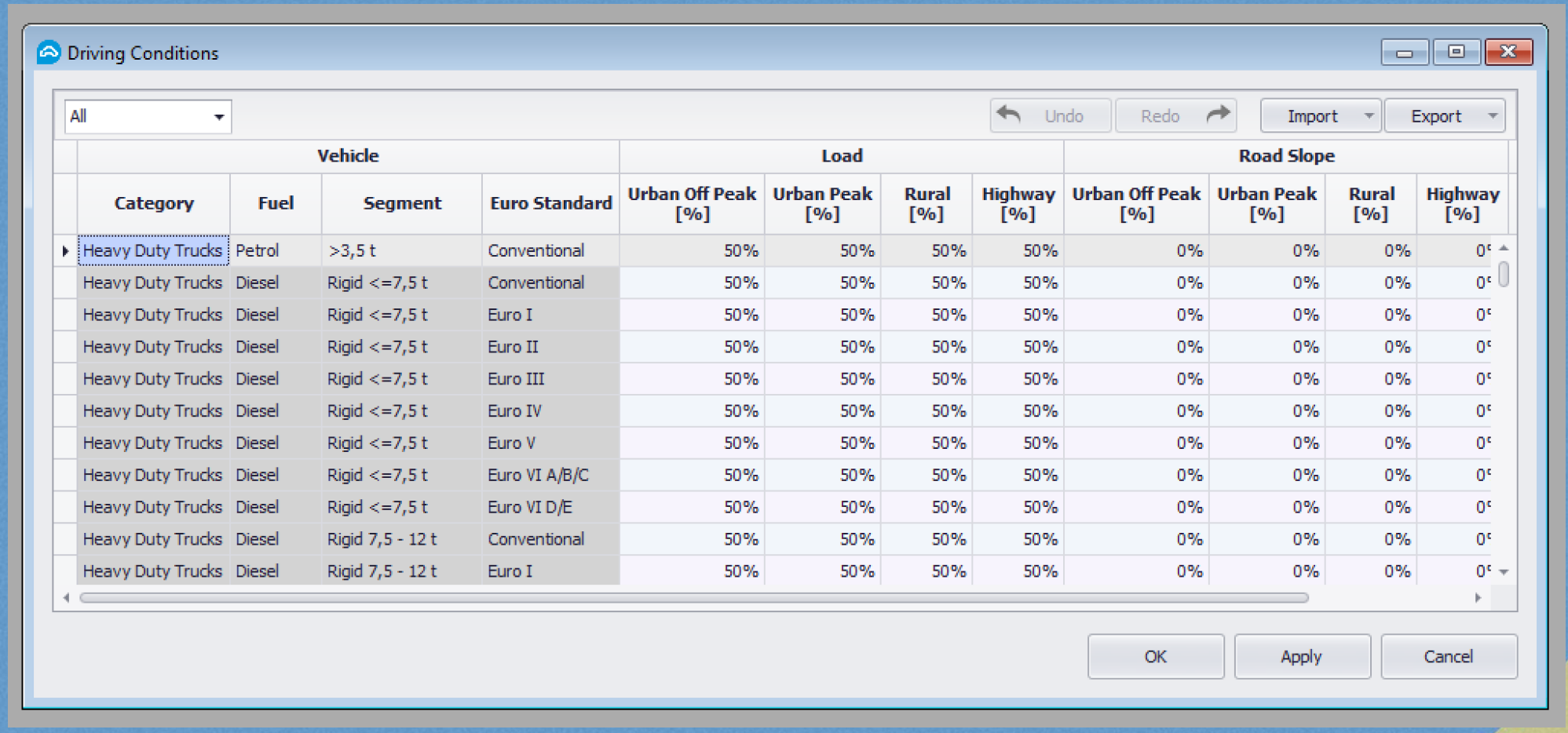


Vehicles > Driving Conditions

Window representing the driving conditions (loads of heavy vehicles and buses and road slopes) of the different traffic modes

A default value of 50% is given and this corresponds to the baseline emission factors of COPERT

The slope factors are calculated and applied during the calculation of the hot emission factors



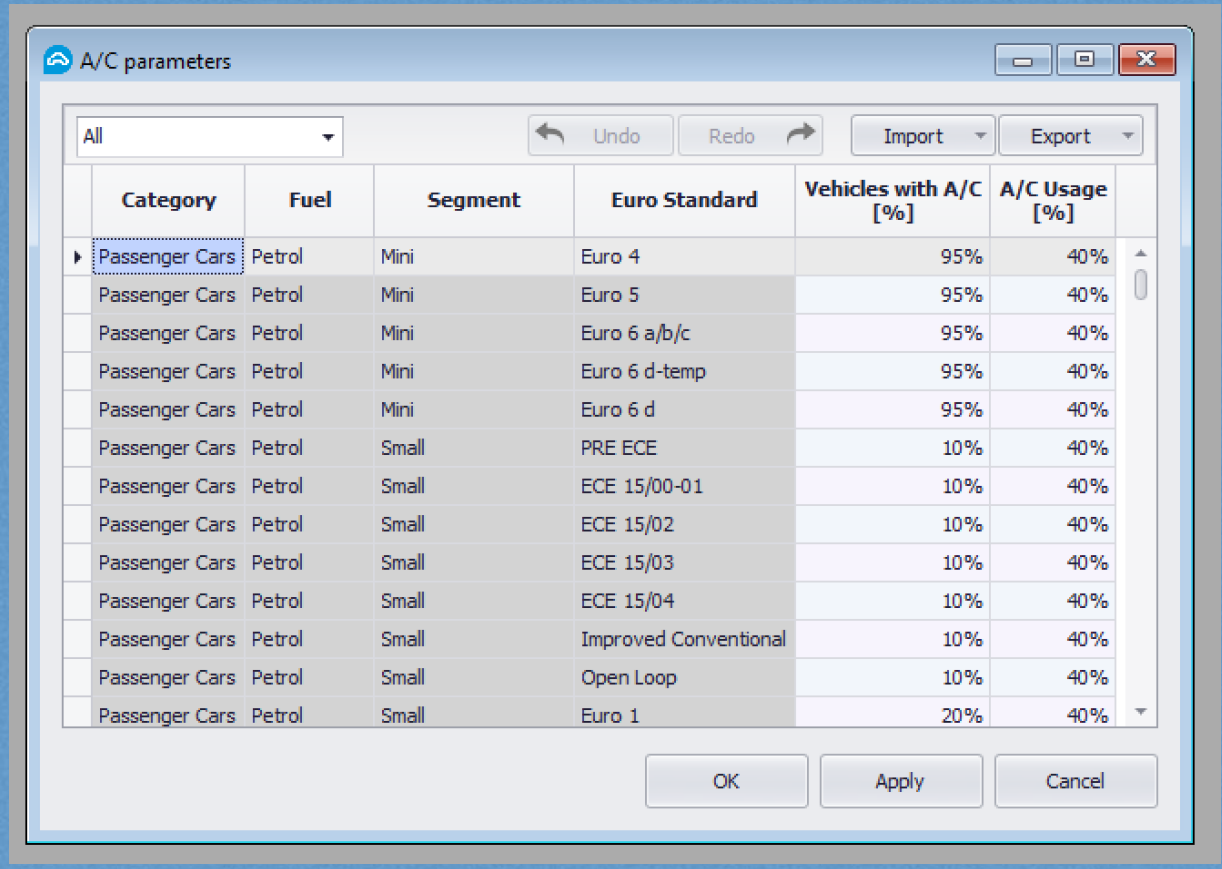
Vehicles > A/C Prametres

The user may provide the vehicles equipped with air-conditioning system (Vehicles equipped with A/C(%). Some 'default' values are proposed which are rough estimates only

For simplicity, one single usage factor is proposed regardless of urban, rural, or highway driving

This usage factor is uniformly applied to all driving conditions

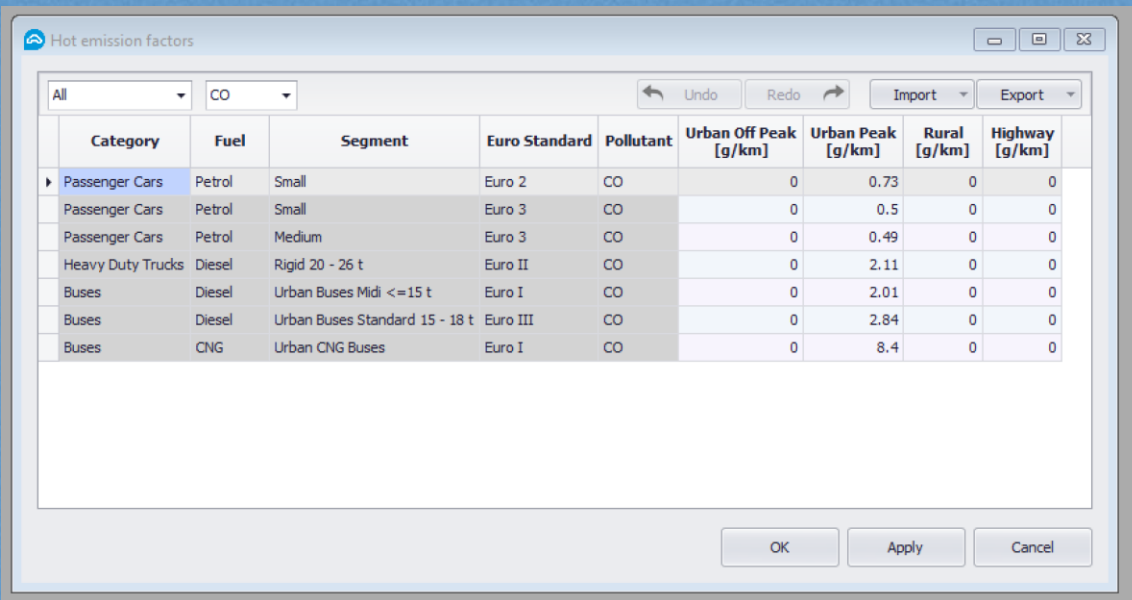
This usage factor should be integrated over the year, i.e. there is no seasonal differentiation

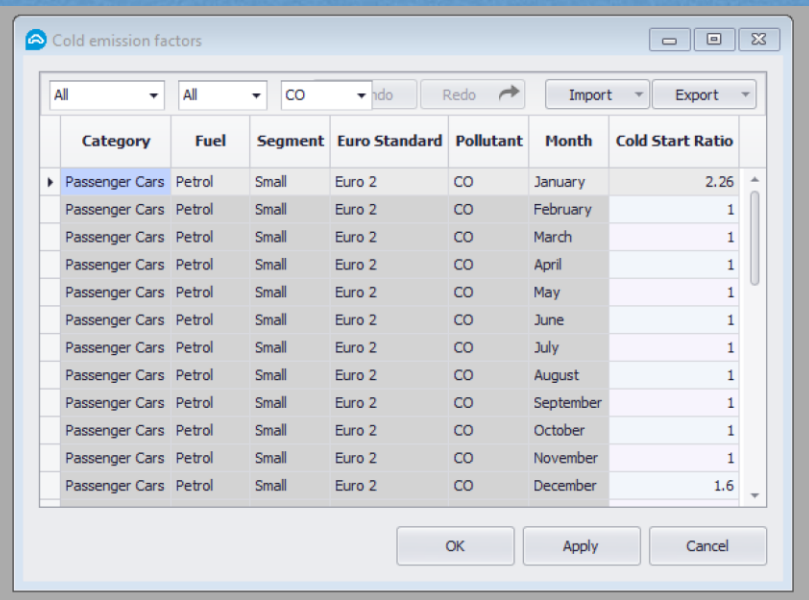


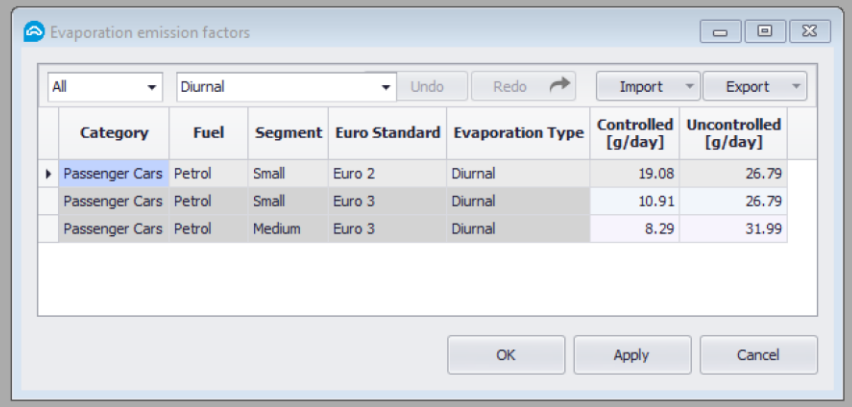
Category	Fuel	Segment	Euro Standard	Vehicles with A/C [%]	A/C Usage [%]
Passenger Cars	Petrol	Mini	Euro 4	95%	40%
Passenger Cars	Petrol	Mini	Euro 5	95%	40%
Passenger Cars	Petrol	Mini	Euro 6 a/b/c	95%	40%
Passenger Cars	Petrol	Mini	Euro 6 d-temp	95%	40%
Passenger Cars	Petrol	Mini	Euro 6 d	95%	40%
Passenger Cars	Petrol	Small	PRE ECE	10%	40%
Passenger Cars	Petrol	Small	ECE 15/00-01	10%	40%
Passenger Cars	Petrol	Small	ECE 15/02	10%	40%
Passenger Cars	Petrol	Small	ECE 15/03	10%	40%
Passenger Cars	Petrol	Small	ECE 15/04	10%	40%
Passenger Cars	Petrol	Small	Improved Conventional	10%	40%
Passenger Cars	Petrol	Small	Open Loop	10%	40%
Passenger Cars	Petrol	Small	Euro 1	20%	40%

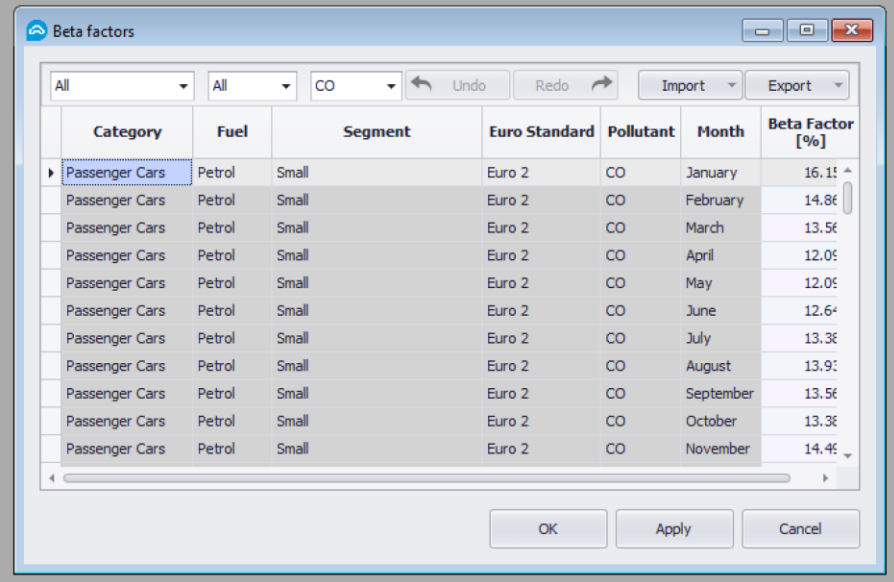
Factors > Hot, Cold and evaporation emission factors and Beta factors

Exercise data







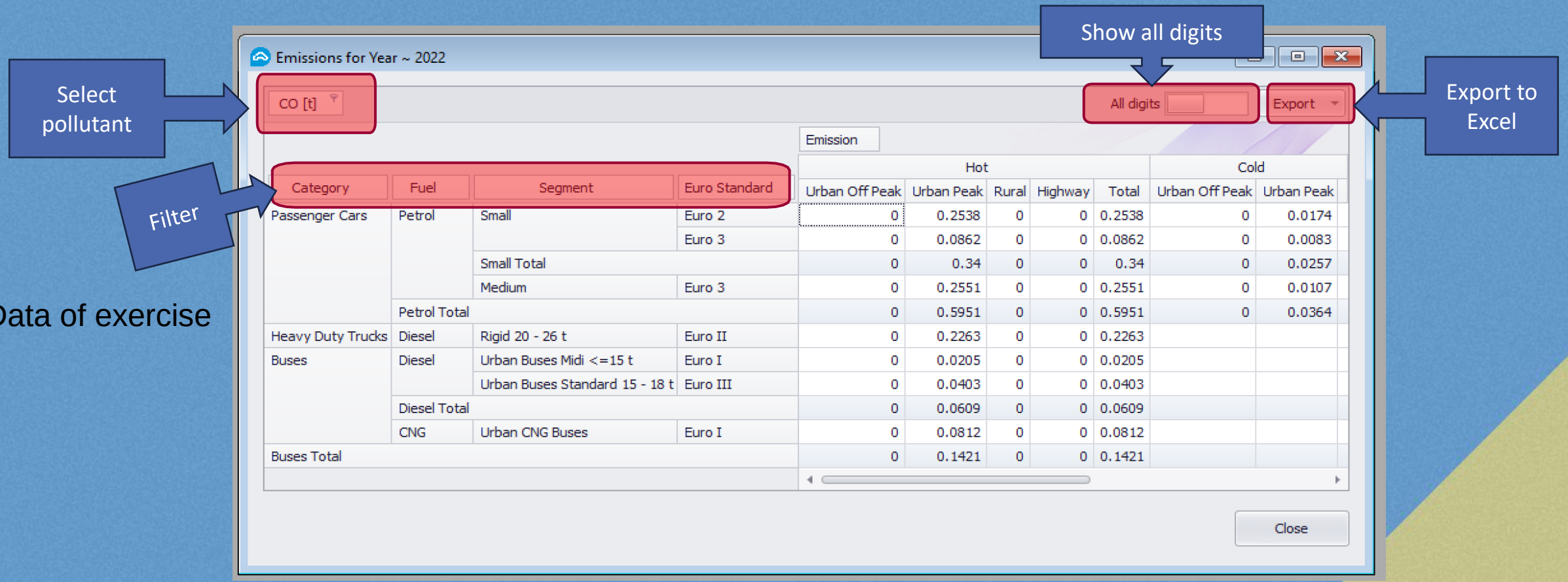


Results > Total Emissions

The results for all pollutants, vehicle types, driving modes and emission types (hot, cold, evaporation, A/C, Lubricant, Tyre, Brake Wear, Road abrasion) are calculated by COPERT and cannot be modified by the user

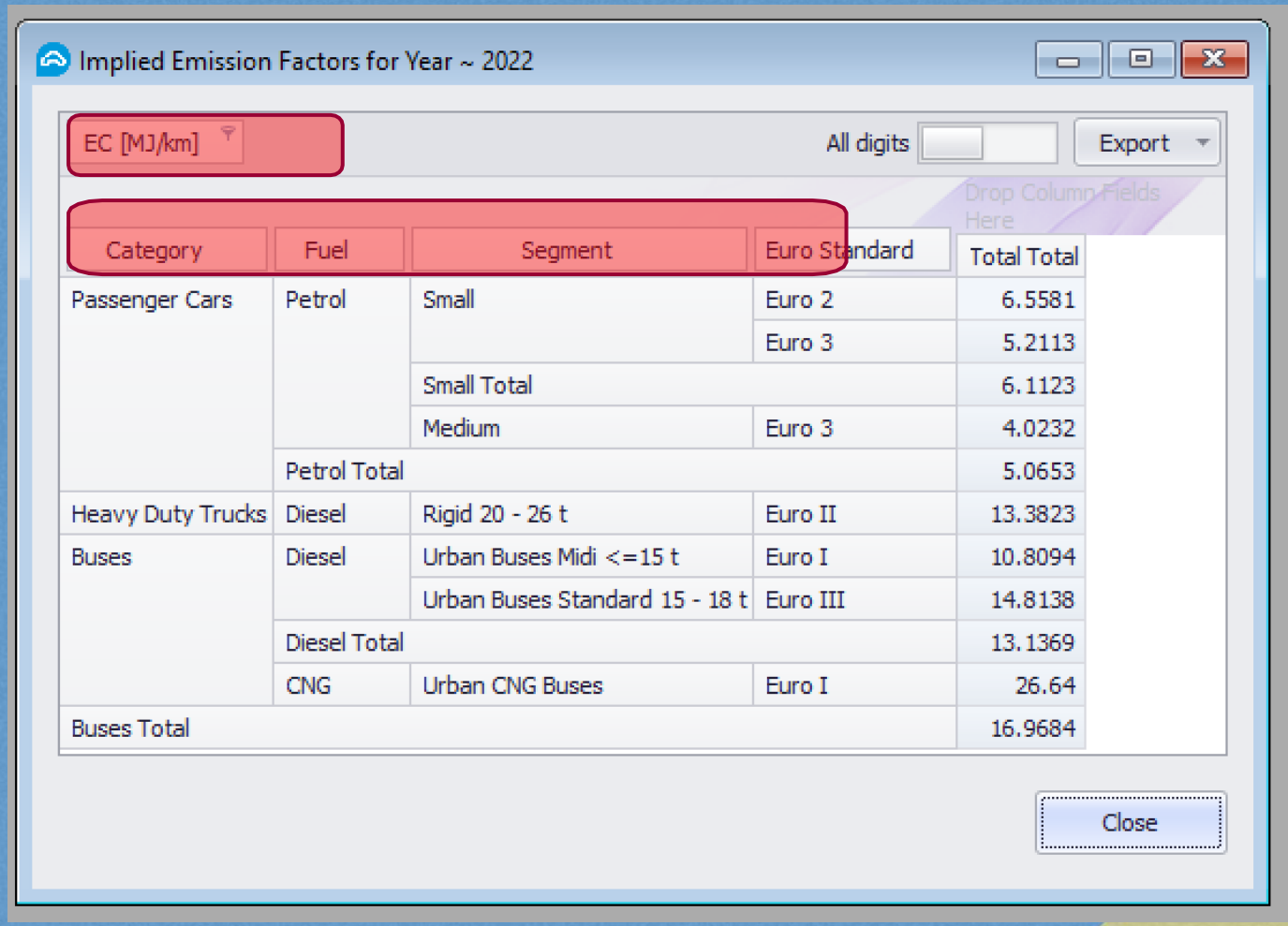
The user can by appropriately placing the drop-down lists to group and filter the available information
The user can make export directly from the form to and from an Excel or csv file

Data of exercise



Results > Implied Emission factors

This pivot table form indicates the implied emission factors for all pollutants and energy consumption in g/km or MJ/km
Please note that these are implied emission factors, which means that they are dependent not only on the traveling speed but also on the fleet configuration and input data (eg temperatures) of each run
Data are not updatable



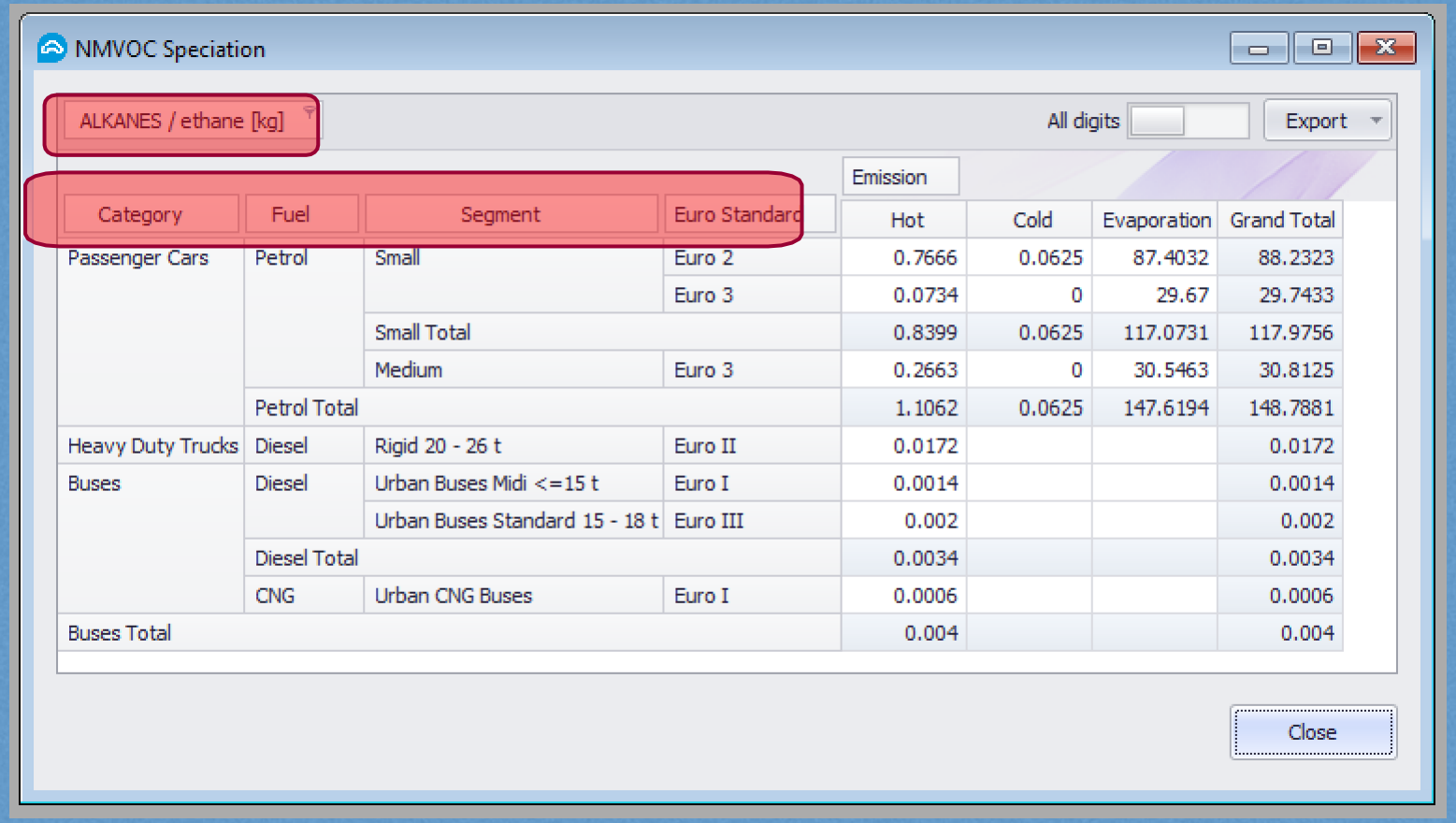
Category	Fuel	Segment	Euro Standard	Total Total
Passenger Cars	Petrol	Small	Euro 2	6.5581
			Euro 3	5.2113
		Small Total		6.1123
		Medium	Euro 3	4.0232
	Petrol Total			5.0653
Heavy Duty Trucks	Diesel	Rigid 20 - 26 t	Euro II	13.3823
Buses	Diesel	Urban Buses Midi <=15 t	Euro I	10.8094
		Urban Buses Standard 15 - 18 t	Euro III	14.8138
	Diesel Total			13.1369
	CNG	Urban CNG Buses	Euro I	26.64
Buses Total				16.9684

Exercise Data

Results > Specification of NMVOC Emissions

In this Pivot table form, the Non-methane volatile organic compounds (NMVOCs) are displayed for all vehicle types and emission types (hot, cold, evaporation) and cannot be modified by the user
The user can by appropriately placing the drop-down lists to group and filter the available information

Exercise data



Results > Energy & GHG breakdown

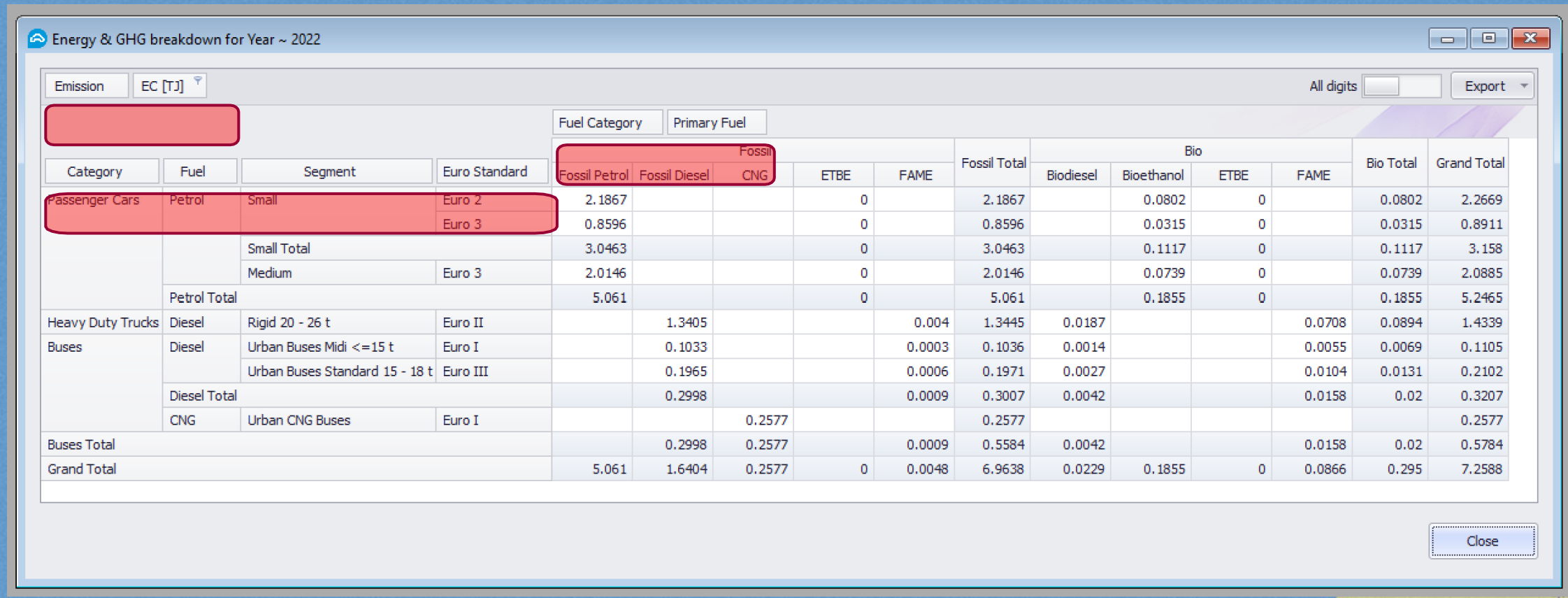
This is a new feature in COPERT

In this pivot table form, there is an extra level of information for the results regarding the origin of each primary fuel (bio/fossil) for Energy Consumption (EC) and GHG (CO2, CH4, N2O) for all vehicle types

The user can by appropriately placing the drop-down lists to group and filter the available information

The user can make export directly from the form to and from an Excel or csv file

Exercise Data



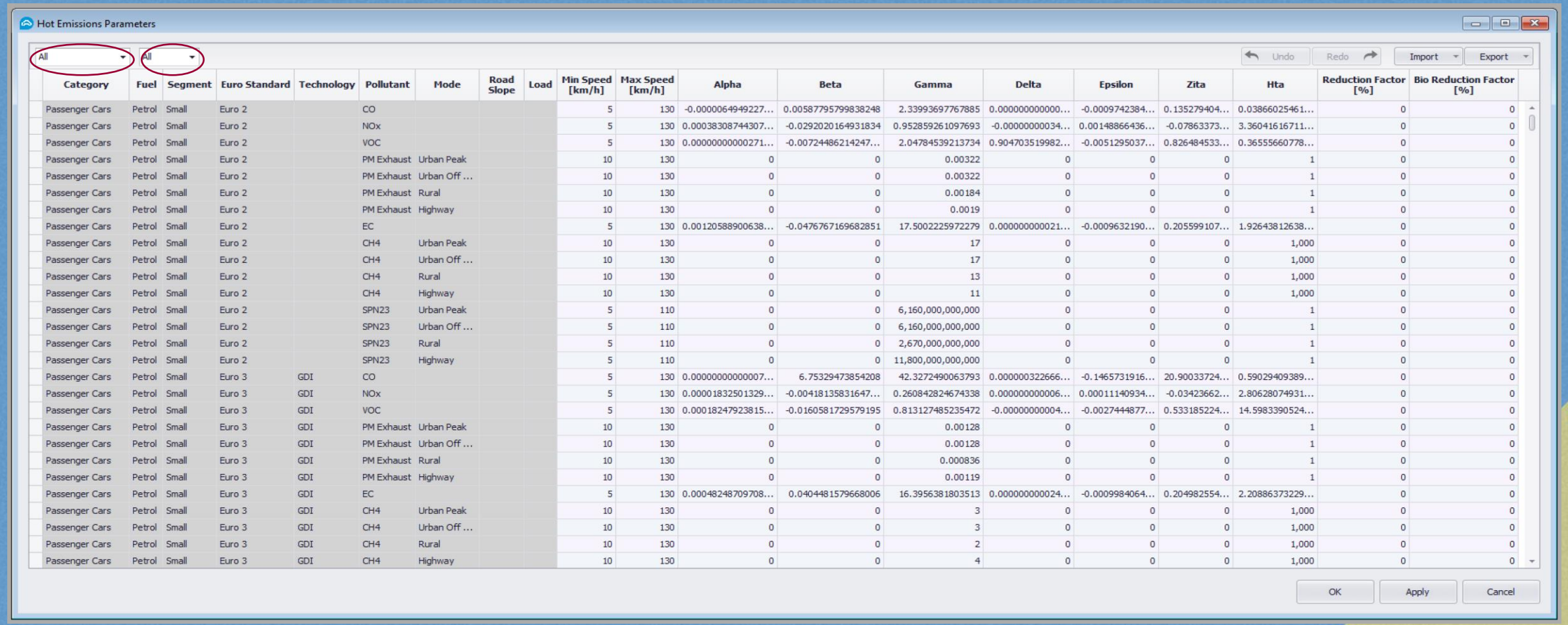
Category	Fuel	Segment	Euro Standard	Fossil Petrol	Fossil Diesel	Fossil CNG	ETBE	FAME	Fossil Total	Biodiesel	Bioethanol	ETBE	FAME	Bio Total	Grand Total
Passenger Cars	Petrol	Small	Euro 2	2.1867			0		2.1867		0.0802	0		0.0802	2.2669
			Euro 3	0.8596			0		0.8596		0.0315	0		0.0315	0.8911
		Small Total		3.0463			0		3.0463		0.1117	0		0.1117	3.158
		Medium	Euro 3	2.0146			0		2.0146		0.0739	0		0.0739	2.0885
	Petrol Total			5.061			0		5.061		0.1855	0		0.1855	5.2465
Heavy Duty Trucks	Diesel	Rigid 20 - 26 t	Euro II		1.3405			0.004	1.3445	0.0187			0.0708	0.0894	1.4339
Buses	Diesel	Urban Buses Midi <=15 t	Euro I		0.1033			0.0003	0.1036	0.0014			0.0055	0.0069	0.1105
		Urban Buses Standard 15 - 18 t	Euro III		0.1965			0.0006	0.1971	0.0027			0.0104	0.0131	0.2102
	Diesel Total				0.2998			0.0009	0.3007	0.0042			0.0158	0.02	0.3207
	CNG	Urban CNG Buses	Euro I			0.2577			0.2577						0.2577
Buses Total					0.2998	0.2577		0.0009	0.5584	0.0042			0.0158	0.02	0.5784
Grand Total				5.061	1.6404	0.2577	0	0.0048	6.9638	0.0229	0.1855	0	0.0866	0.295	7.2588

Parameters > Hot parameters

The user can view and edit the hot emission parameters that are used for the calculation of the hot emission factors in the Factors>Hot

The parameters are displayed for each pollutant and vehicle type

Different parameters may also apply in the case of different driving modes



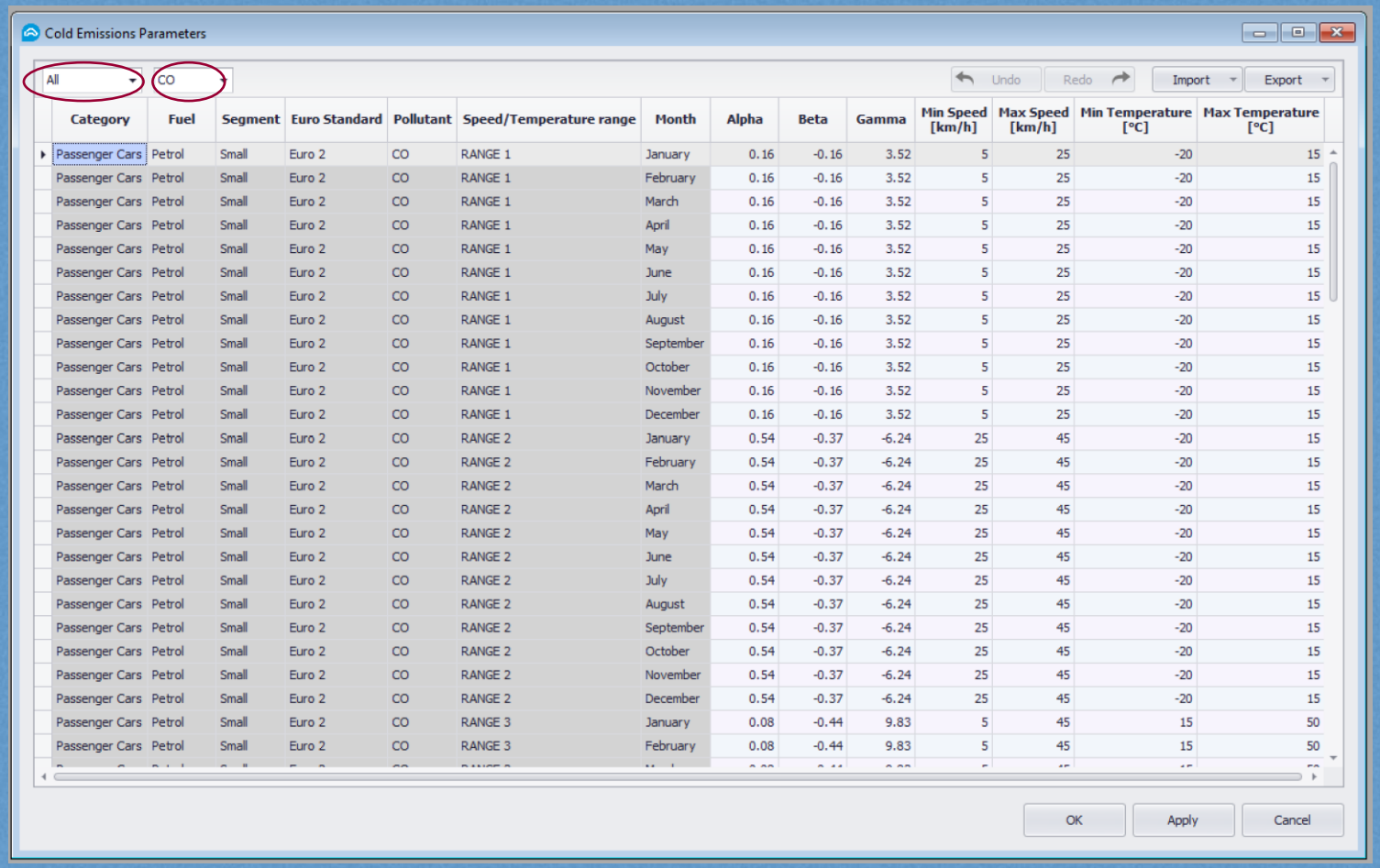
Category	Fuel	Segment	Euro Standard	Technology	Pollutant	Mode	Road Slope	Load	Min Speed [km/h]	Max Speed [km/h]	Alpha	Beta	Gamma	Delta	Epsilon	Zita	Hta	Reduction Factor [%]	Bio Reduction Factor [%]
Passenger Cars	Petrol	Small	Euro 2		CO				5	130	-0.0000064949227...	0.00587795799838248	2.33993697767885	0.000000000000...	-0.0009742384...	0.135279404...	0.03866025461...	0	0
Passenger Cars	Petrol	Small	Euro 2		NOx				5	130	0.00038308744307...	-0.0292020164931834	0.952859261097693	-0.00000000034...	0.00148866436...	-0.07863373...	3.36041616711...	0	0
Passenger Cars	Petrol	Small	Euro 2		VOC				5	130	0.00000000000271...	-0.00724486214247...	2.04784539213734	0.904703519982...	-0.0051295037...	0.826484533...	0.36555660778...	0	0
Passenger Cars	Petrol	Small	Euro 2		PM Exhaust	Urban Peak			10	130	0	0	0.00322	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 2		PM Exhaust	Urban Off ...			10	130	0	0	0.00322	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 2		PM Exhaust	Rural			10	130	0	0	0.00184	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 2		PM Exhaust	Highway			10	130	0	0	0.0019	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 2		EC				5	130	0.00120588900638...	-0.0476767169682851	17.5002225972279	0.000000000021...	-0.0009632190...	0.205599107...	1.92643812638...	0	0
Passenger Cars	Petrol	Small	Euro 2		CH4	Urban Peak			10	130	0	0	17	0	0	0	1,000	0	0
Passenger Cars	Petrol	Small	Euro 2		CH4	Urban Off ...			10	130	0	0	17	0	0	0	1,000	0	0
Passenger Cars	Petrol	Small	Euro 2		CH4	Rural			10	130	0	0	13	0	0	0	1,000	0	0
Passenger Cars	Petrol	Small	Euro 2		CH4	Highway			10	130	0	0	11	0	0	0	1,000	0	0
Passenger Cars	Petrol	Small	Euro 2		SPN23	Urban Peak			5	110	0	0	6,160,000,000,000	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 2		SPN23	Urban Off ...			5	110	0	0	6,160,000,000,000	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 2		SPN23	Rural			5	110	0	0	2,670,000,000,000	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 2		SPN23	Highway			5	110	0	0	11,800,000,000,000	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	CO				5	130	0.00000000000007...	6.75329473854208	42.3272490063793	0.000000322666...	-0.1465731916...	20.90033724...	0.59029409389...	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	NOx				5	130	0.00001832501329...	-0.00418135831647...	0.260842824674338	0.000000000006...	0.00011140934...	-0.03423662...	2.80628074931...	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	VOC				5	130	0.00018247923815...	-0.0160581729579195	0.813127485235472	-0.00000000004...	-0.0027444877...	0.533185224...	14.5983390524...	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	PM Exhaust	Urban Peak			10	130	0	0	0.00128	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	PM Exhaust	Urban Off ...			10	130	0	0	0.00128	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	PM Exhaust	Rural			10	130	0	0	0.000836	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	PM Exhaust	Highway			10	130	0	0	0.00119	0	0	0	1	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	EC				5	130	0.00048248709708...	0.0404481579668006	16.3956381803513	0.000000000024...	-0.0009984064...	0.204982554...	2.20886373229...	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	CH4	Urban Peak			10	130	0	0	3	0	0	0	1,000	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	CH4	Urban Off ...			10	130	0	0	3	0	0	0	1,000	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	CH4	Rural			10	130	0	0	2	0	0	0	1,000	0	0
Passenger Cars	Petrol	Small	Euro 3	GDI	CH4	Highway			10	130	0	0	4	0	0	0	1,000	0	0

Parameters > Cold parameters

The user can view and edit the cold emission parameters that are used for the calculation of the cold over-emission factors in the Factors>Cold

The parameters are indicated for each pollutant and vehicle type

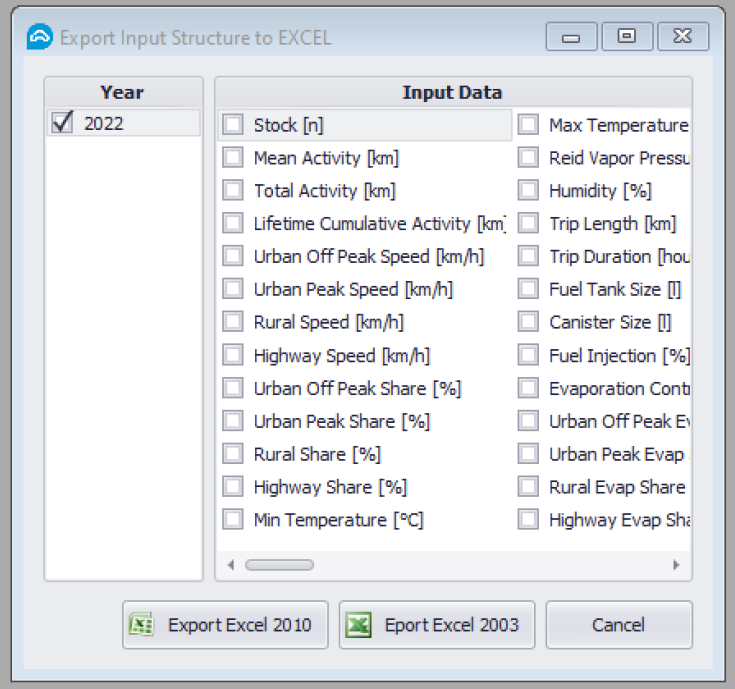
Different parameters may also apply in the case of different driving modes

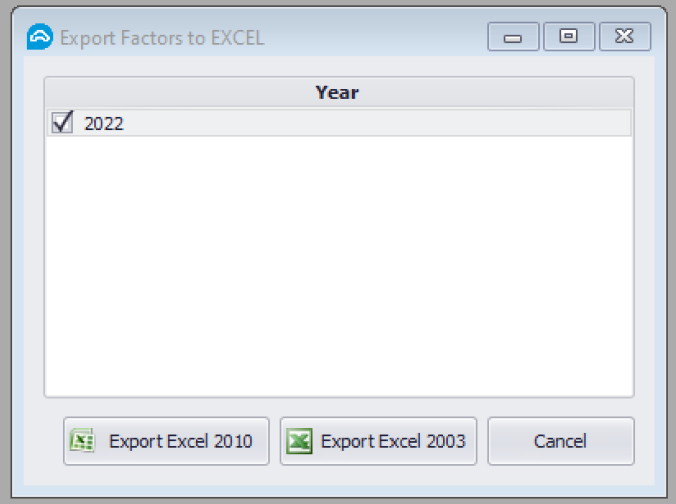


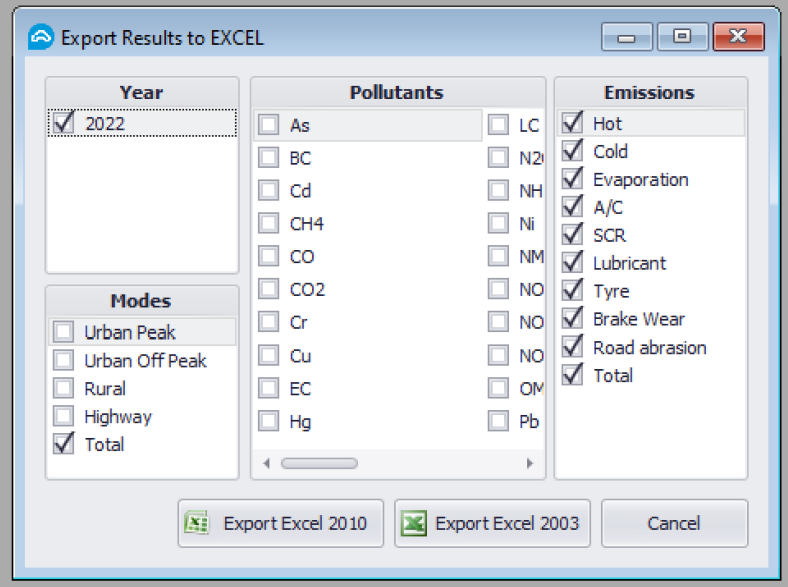
Category	Fuel	Segment	Euro Standard	Pollutant	Speed/Temperature range	Month	Alpha	Beta	Gamma	Min Speed [km/h]	Max Speed [km/h]	Min Temperature [°C]	Max Temperature [°C]
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	January	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	February	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	March	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	April	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	May	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	June	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	July	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	August	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	September	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	October	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	November	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 1	December	0.16	-0.16	3.52	5	25	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	January	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	February	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	March	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	April	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	May	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	June	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	July	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	August	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	September	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	October	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	November	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 2	December	0.54	-0.37	-6.24	25	45	-20	15
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 3	January	0.08	-0.44	9.83	5	45	15	50
Passenger Cars	Petrol	Small	Euro 2	CO	RANGE 3	February	0.08	-0.44	9.83	5	45	15	50

Exchange > Export Input Structure, Factors and Results in Excel

This form indicates a list of years included in the inventory and another list of the required input data
By clicking on the corresponding check box the user can select which information he/she wants to export to an Excel file
For compatibility reasons both Excel 2010 and Excel 2003 formats can be selected



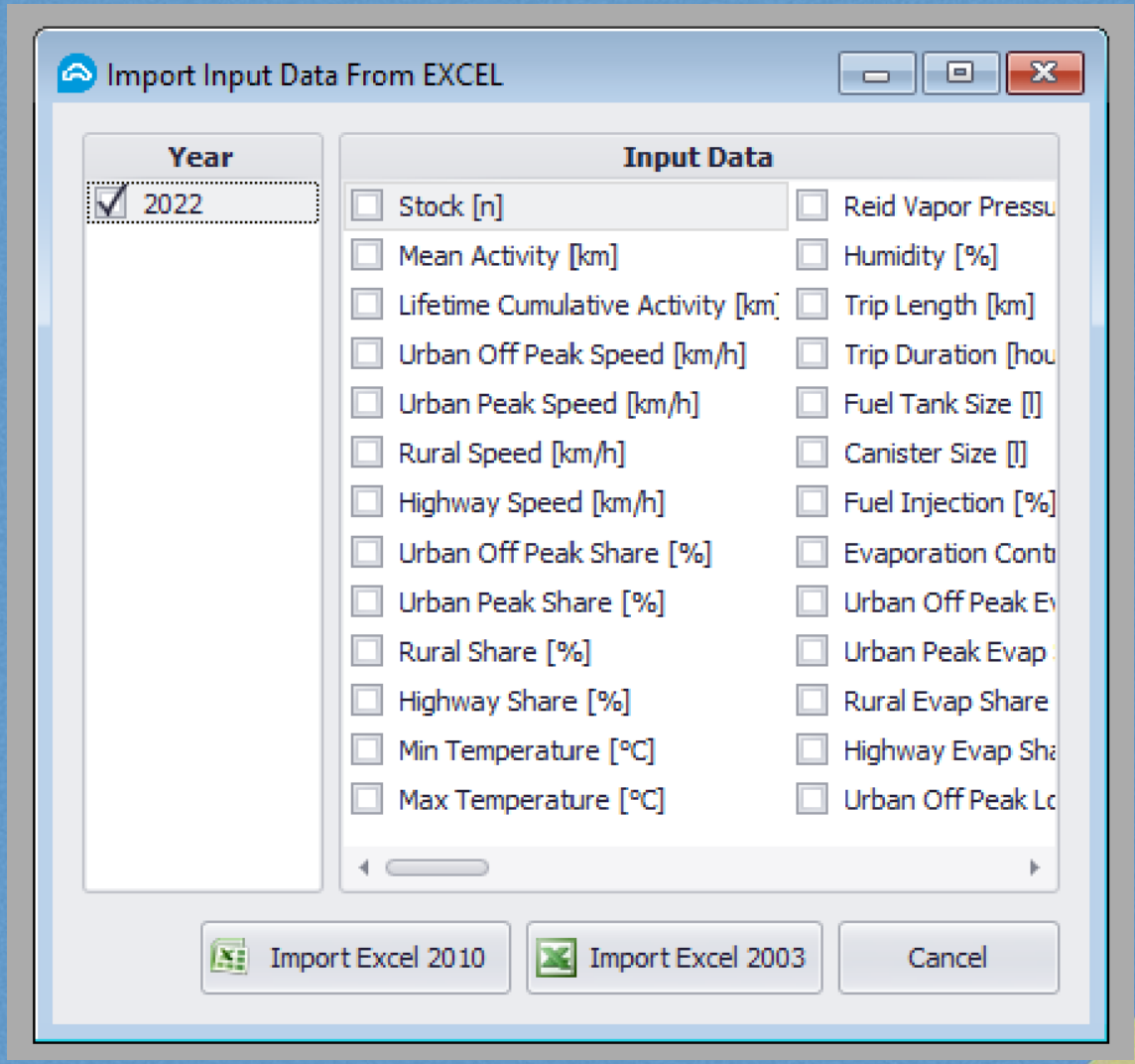




Exchange > Import Input Data (Excel File)

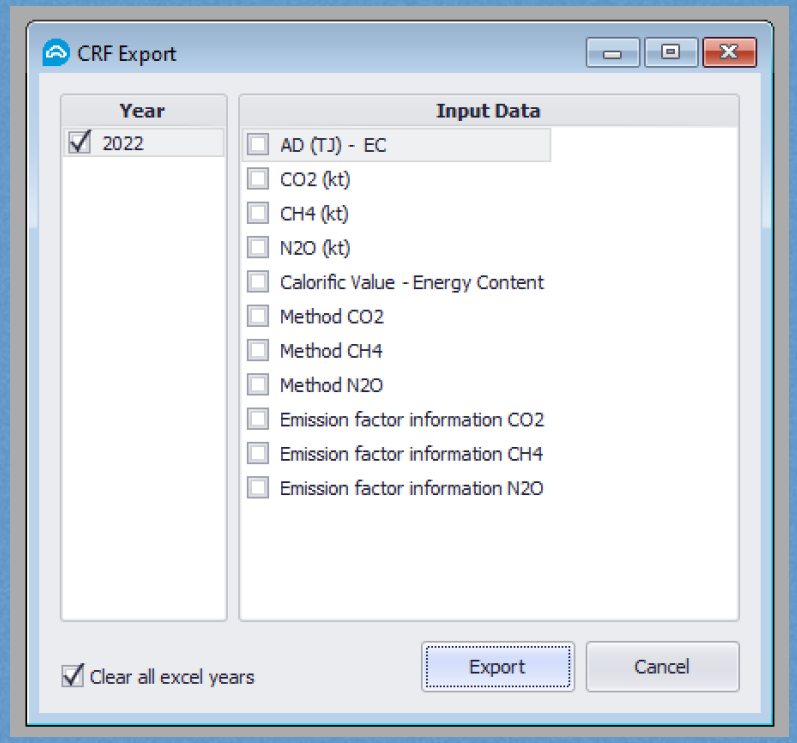
By clicking on the corresponding check box the user can select which input information he/she wants to import from an Excel file and for which years

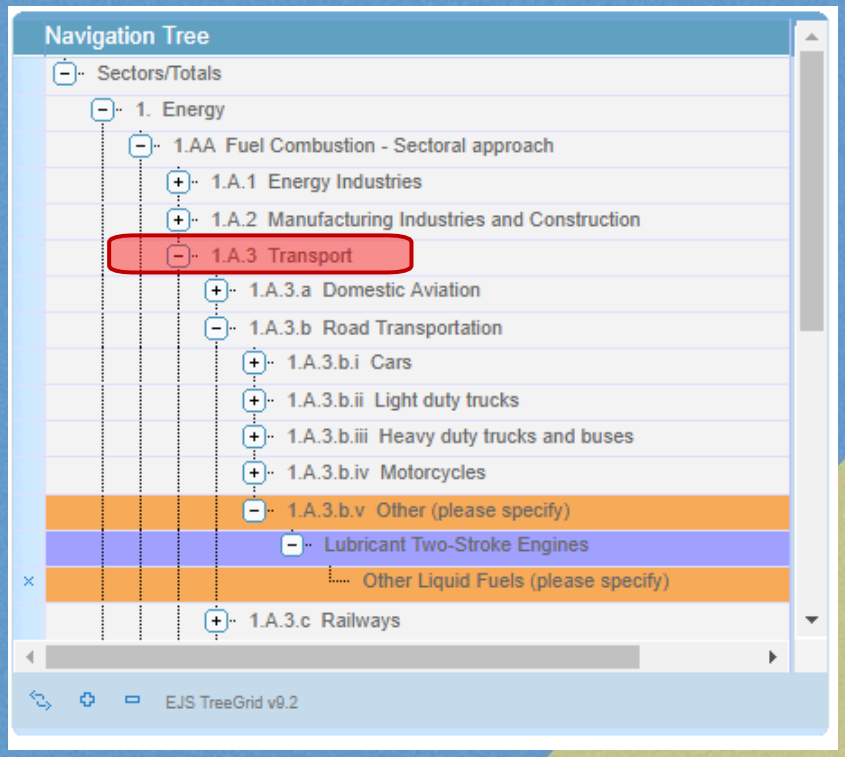
For compatibility reasons, both Excel 2010 and Excel 2003 formats can be selected



Exchange > CRF Export (CRT MPGs/Accord Paris)

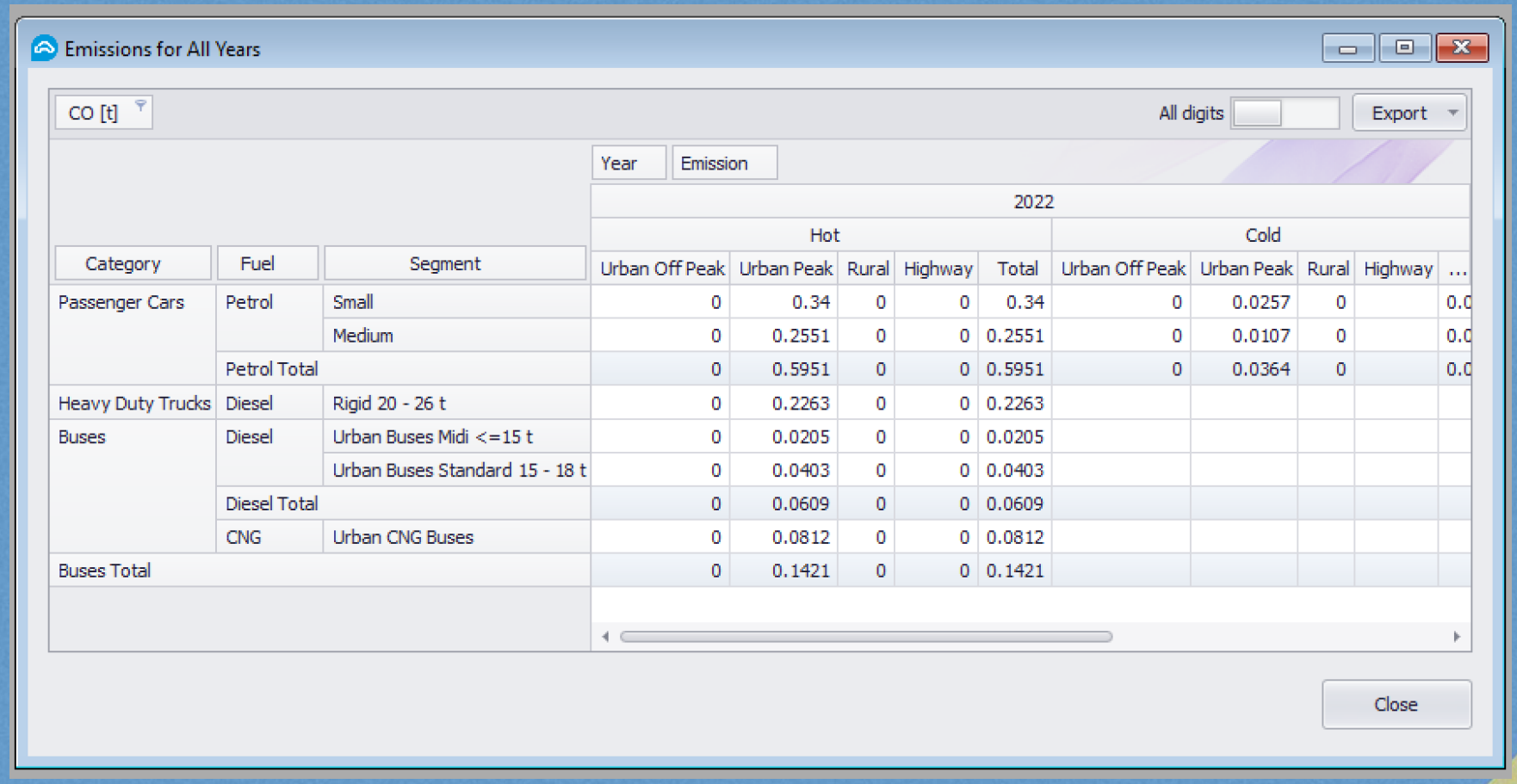
Export data to the CRF file after calculating emissions from all years
Before performing any export, the user should export the corresponding excel template (including the structure/nodes and the years) from the CRF reporter
Select the year(s) and the relevant information (i.e. activity data, emissions etc) that he/she wishes to export
By clicking the option “Clear all excel years” all information included in the file (as exported by the CRF reporter) will be erased
In order to upload the exported data to the CRF Reporter, this empty file should be imported in the CRF Reporter





Timeseries Results > Total Emissions - Timeseries

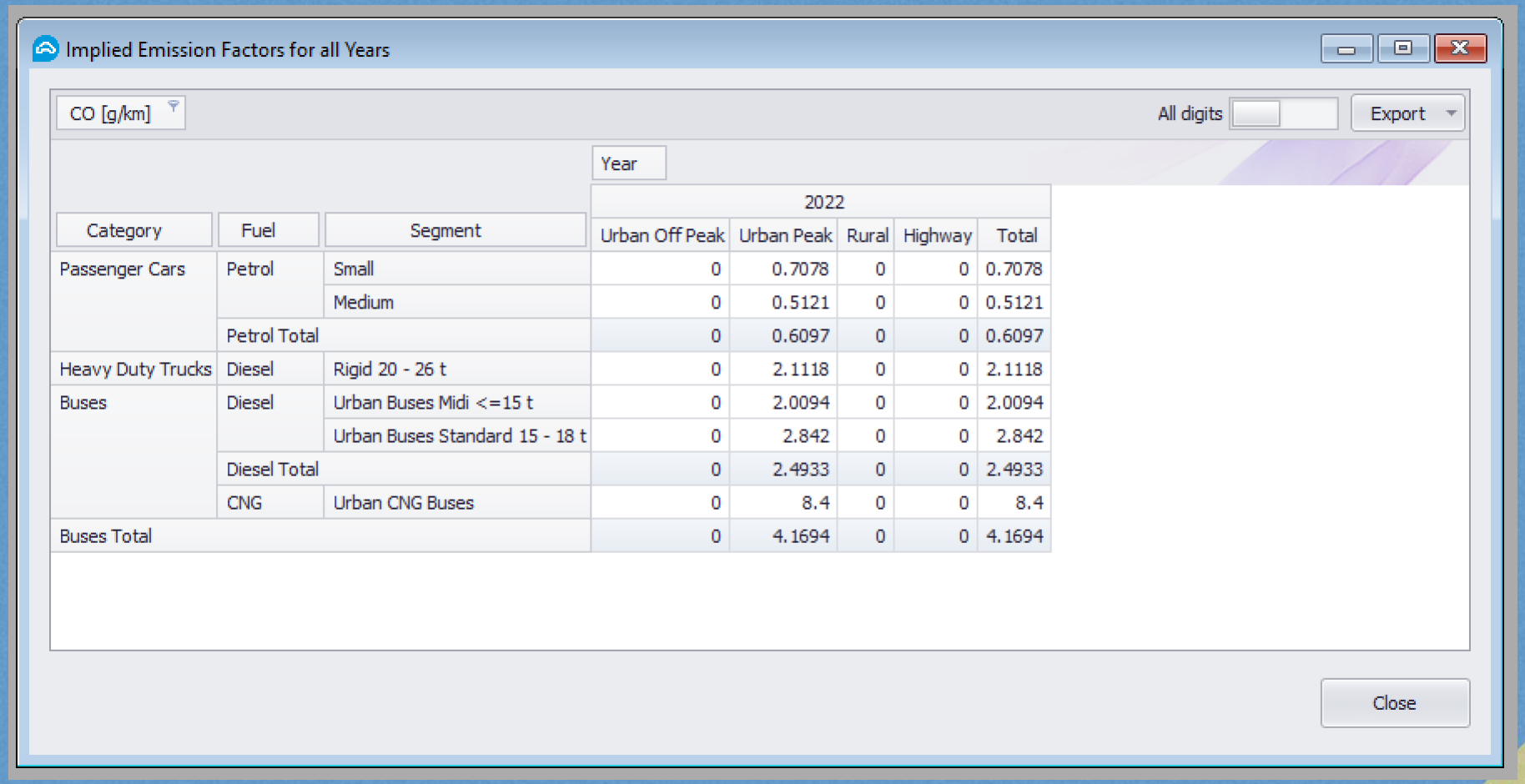
This is the same pivot form as the Results>Total Emissions form with the difference that the user can have an overview of all results for the complete timeseries, if exists in the file



Category	Fuel	Segment	Urban Off Peak	Urban Peak	Rural	Highway	Total	Urban Off Peak	Urban Peak	Rural	Highway	...
Passenger Cars	Petrol	Small	0	0.34	0	0	0.34	0	0.0257	0		0.0
		Medium	0	0.2551	0	0	0.2551	0	0.0107	0		0.0
	Petrol Total		0	0.5951	0	0	0.5951	0	0.0364	0		0.0
Heavy Duty Trucks	Diesel	Rigid 20 - 26 t	0	0.2263	0	0	0.2263					
Buses	Diesel	Urban Buses Midi <=15 t	0	0.0205	0	0	0.0205					
		Urban Buses Standard 15 - 18 t	0	0.0403	0	0	0.0403					
	Diesel Total		0	0.0609	0	0	0.0609					
	CNG	Urban CNG Buses	0	0.0812	0	0	0.0812					
Buses Total			0	0.1421	0	0	0.1421					

Timeseries Results > Implied Emission Factors - Timeseries

This is the same pivot form as the Results>Implied Emission Factors with the difference that the user can have an overview of all results for the complete timeseries, if exists in file



Conclusions

COPERT interface and functions :

- Can be utilized by all countries
- Calculating emissions of all pollutants from road transportation (GHG, Precursors, NMVOCs)
- All categories of road vehicles covered
- Fuel consumption calculated (energy balance)

Day 3

Wednesday 25 September 2024

15:00 – 17:00 (Bonn Time)

Session 5

Higher tier methods for estimating GHG emissions from road transportation

COPERT model: input data and database construction

By the end of this session, you will:

1. Get familiar with the different menus, buttons and options
2. Data entry and use of different structure of databases
3. Identify difficulties while using Copert features

Learning objectives

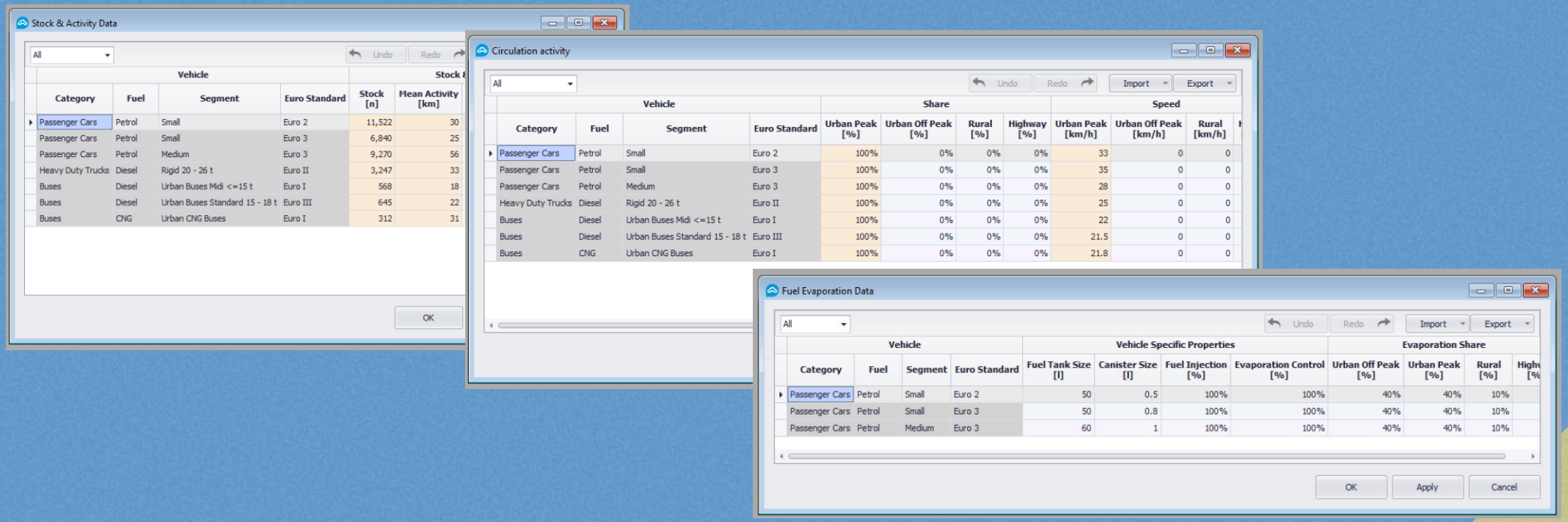
Entry of activity data

- Data input of all activity data (fleet, circulation and evaporation data) can be done in 3 ways:
  A. Direct data entry Input (Manually): with and without Wizard
  B. Imported from Microsoft Excel
  C. Imported from COPERT

Direct data Input 1/3

- Enter activity data directly via the forms under the ‘Vehicles’ menu:
  - ✓ Stock & Activity Data
  - ✓ Circulation Data
  - ✓ Fuel Evaporation Data

- Open each form; fill the desired values for every vehicle category

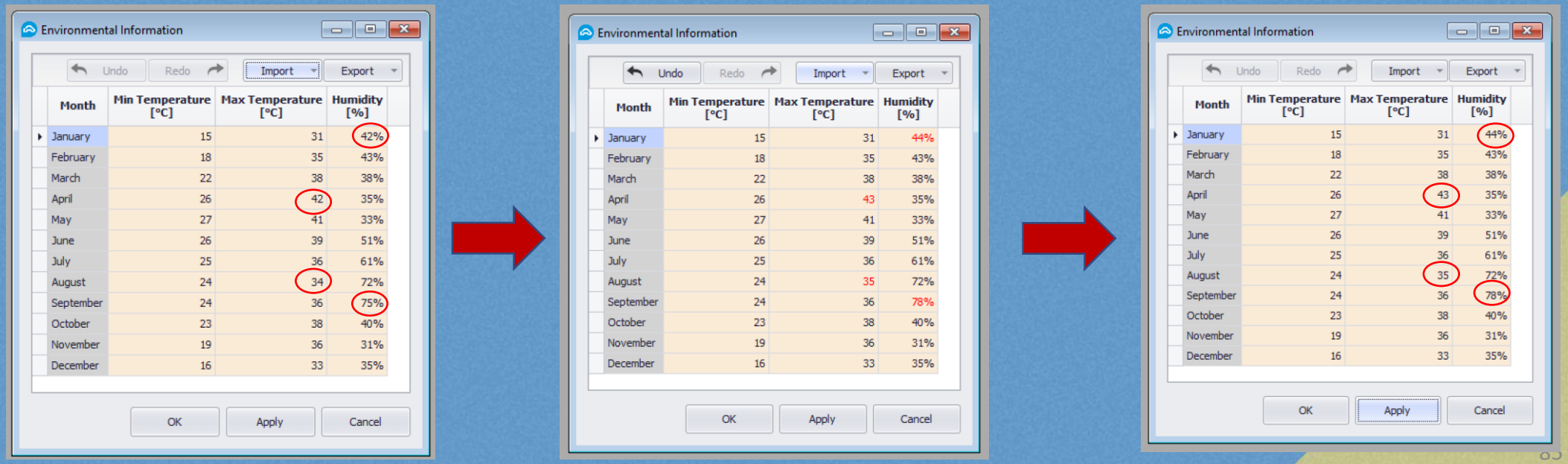


Direct data Input 2/3

The information is provided by the user or calculated by COPERT and can be modified by the user

A modified value will be displayed in red color, and if the "Apply" button is pressed, this color changes to the default color, which is black

All forms are equipped with "Undo" and "Redo" buttons and import and export buttons directly from the form to and from an Excel or csv file

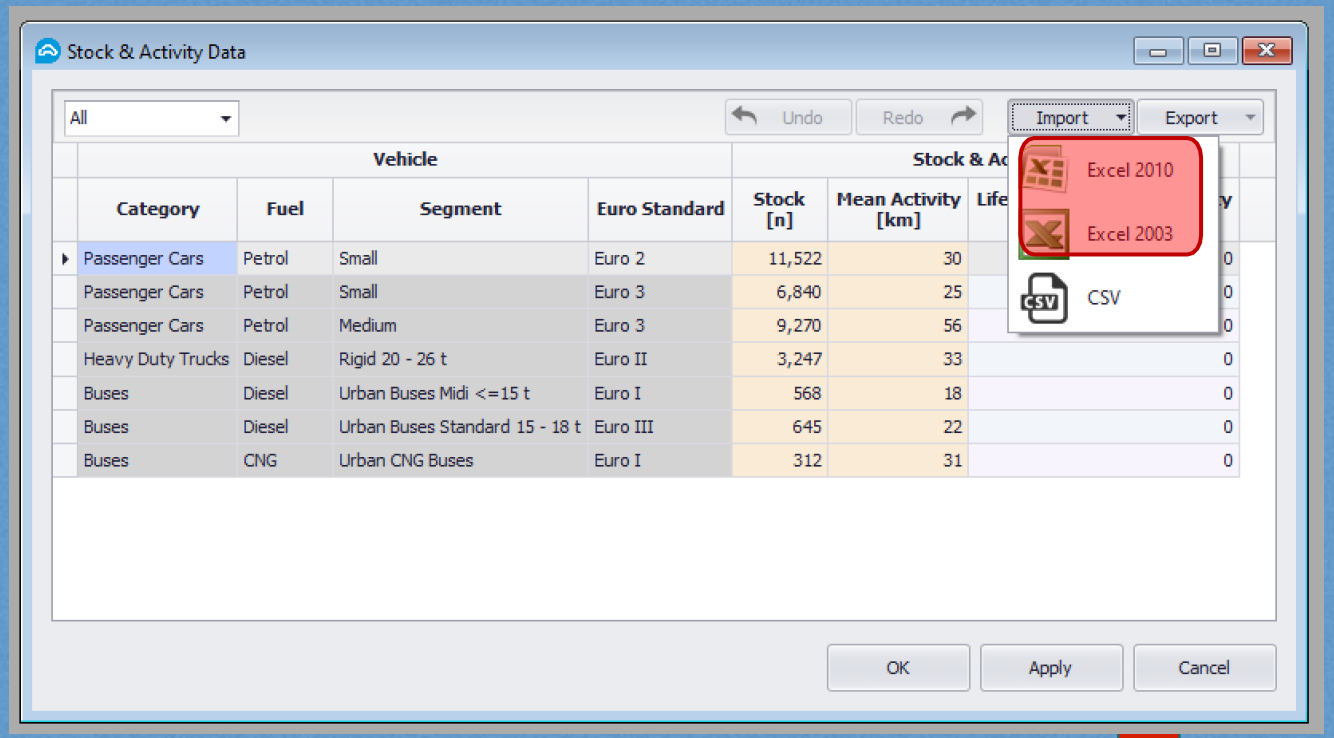


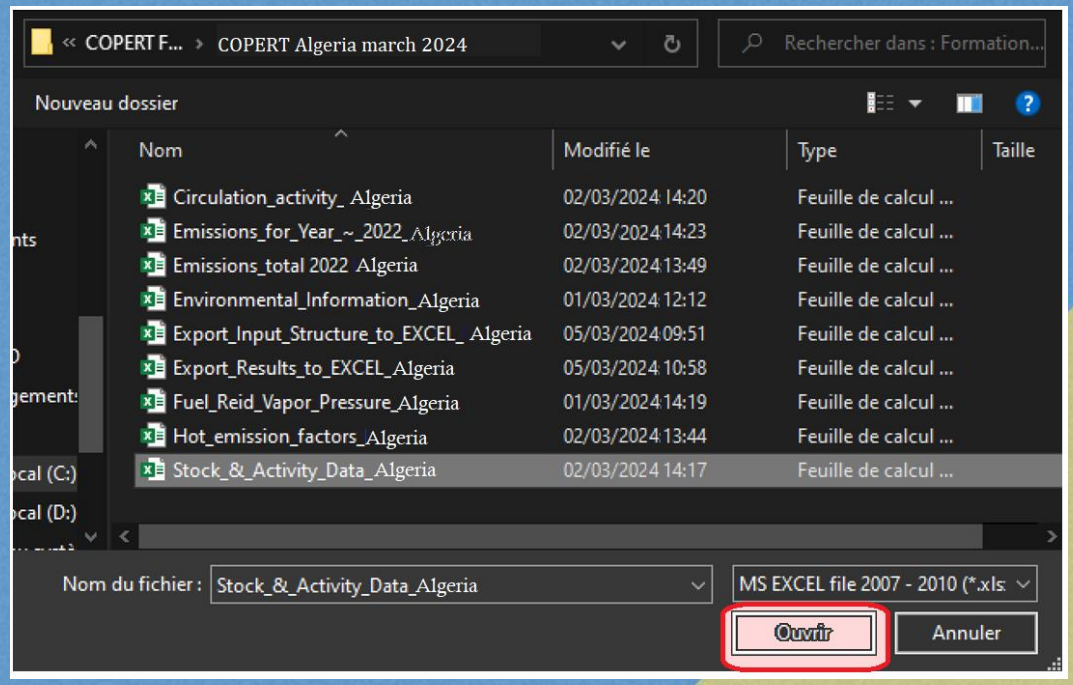
Direct data Input 3/3

1. Data entry on COPERT interface (Tier 2 & Tier 3)
2. Export of data entered on COPERT (Tier 2 & Tier 2) to Excel file
3. Modification of data (Tier 2 & Tier 3) in Excel file
4. Import modified (Tier 2 & Tier 3) Excel data file to COPERT

Import Data from Microsoft Excel file (1/4)

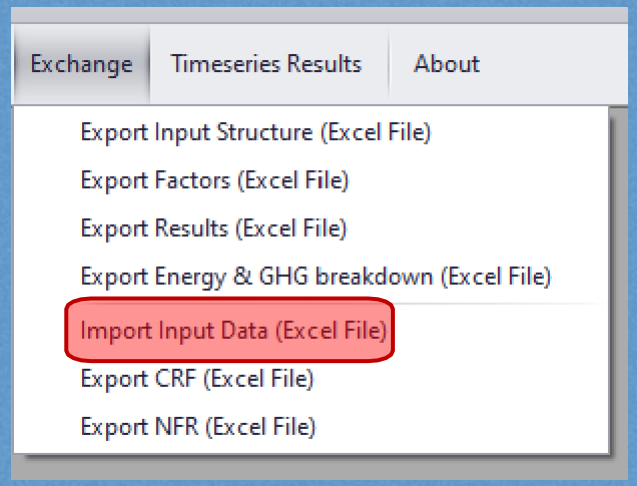
- Import data from Excel file
- Open the form ‘Vehicle’>Stock & Activity Data'> 'Import (Format Excel File)'

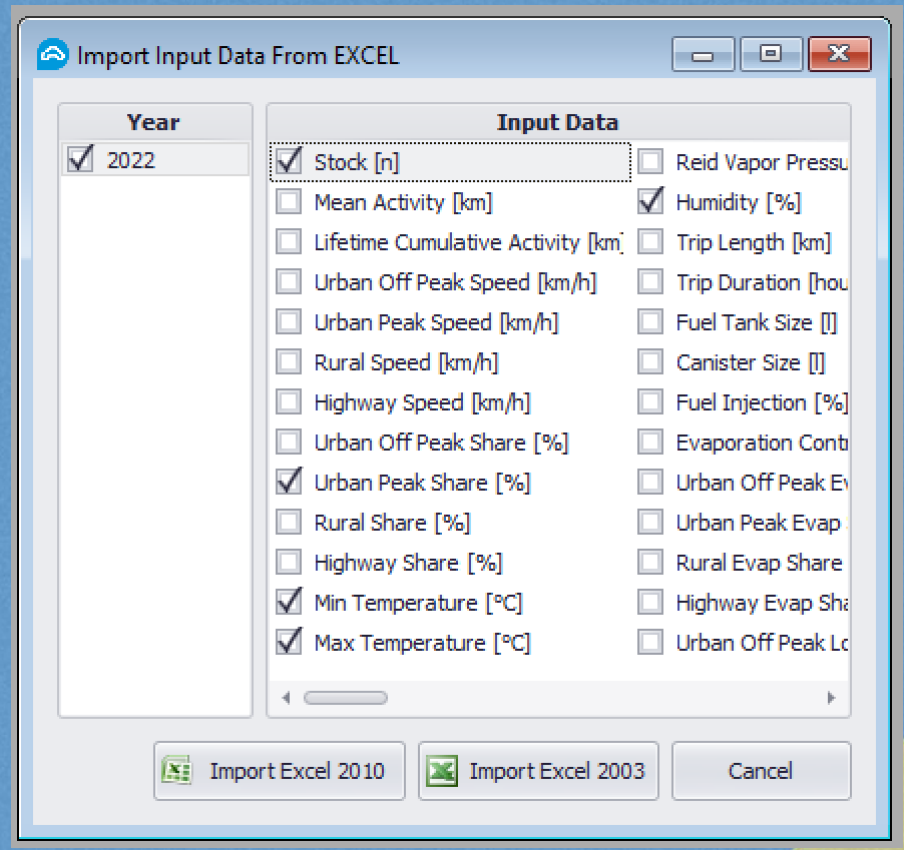




Import Data from Microsoft Excel file (2/4)

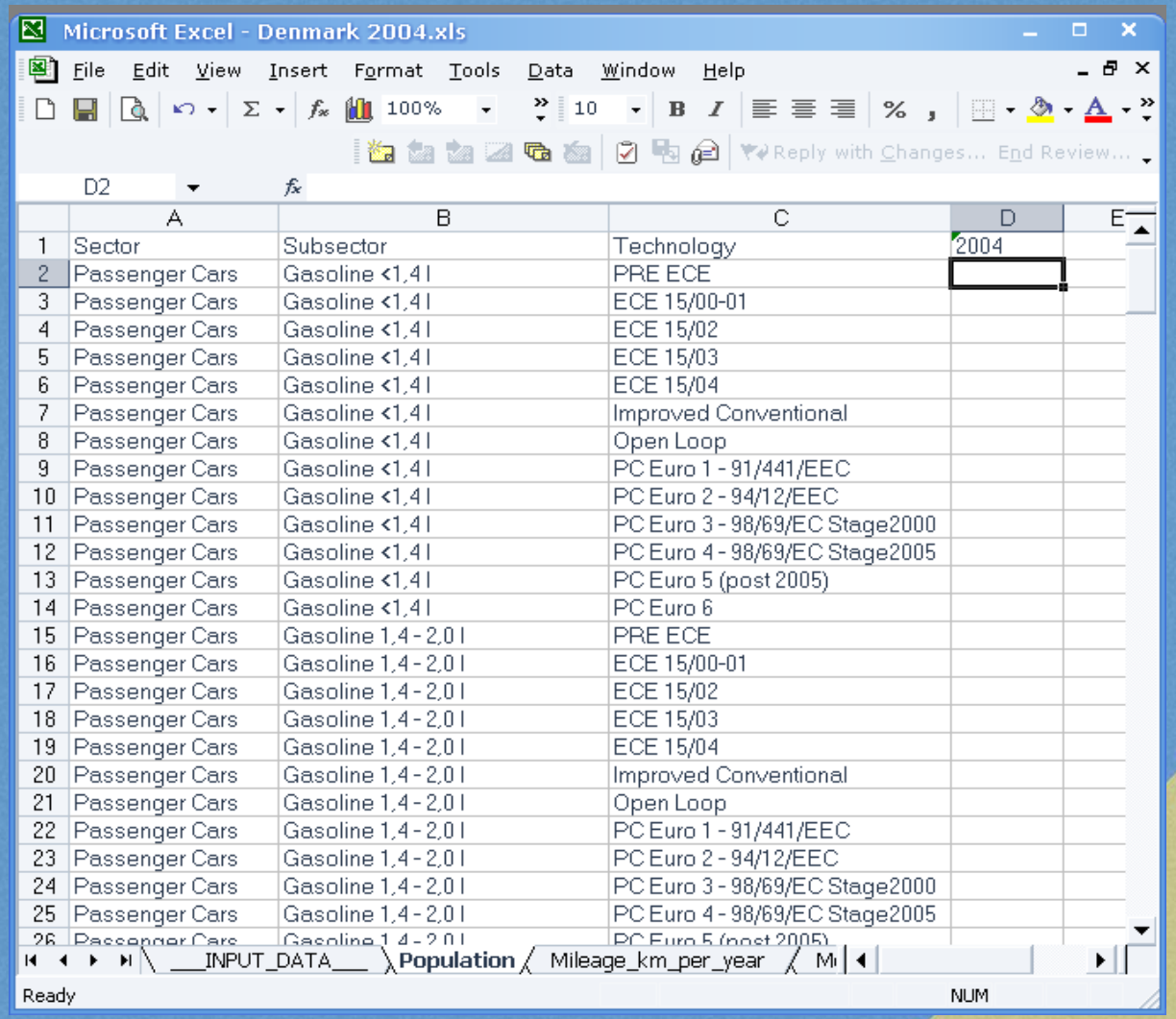
1. Select Exchange > Import Input Data (Excel file)'
2. Select the year or years (if there are several)
3. Select the data you wish to import (list of 'Input Data') by checking the corresponding boxes





Import Data from Microsoft Excel file (3/4)

- Open the Excel file created
- Every selected data type is a different sheet in the Excel file
- Every selected vehicle category is a row
- Every selected year is a column

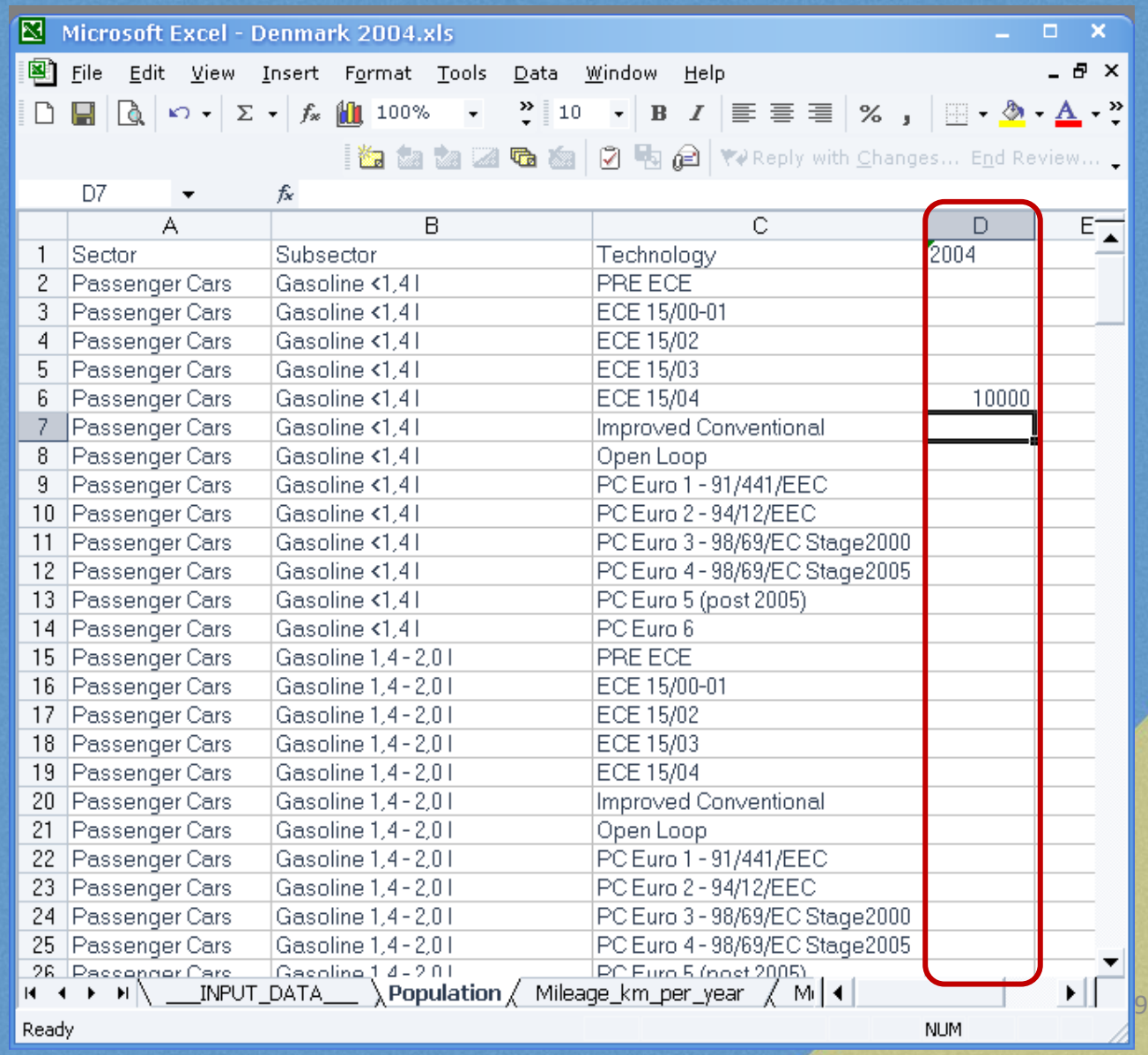


Import Data from Microsoft Excel file (4/4)

- Fill the cells of the year columns with the desired values
- For example, the mileage for the year '2004' of a vehicle category is 10,000 km
- Leave a cell empty if you want the database data value not to be changed

Note:
If a vehicle category does not exist in a fleet configuration of a specific year then the cell of the Excel file will have the value 'not exists'. You should not change that value

After you fill the desired values save and close the Excel file



	A	B	C	D
1	Sector	Subsector	Technology	2004
2	Passenger Cars	Gasoline <1,4 l	PRE ECE	
3	Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	
4	Passenger Cars	Gasoline <1,4 l	ECE 15/02	
5	Passenger Cars	Gasoline <1,4 l	ECE 15/03	
6	Passenger Cars	Gasoline <1,4 l	ECE 15/04	10000
7	Passenger Cars	Gasoline <1,4 l	Improved Conventional	
8	Passenger Cars	Gasoline <1,4 l	Open Loop	
9	Passenger Cars	Gasoline <1,4 l	PC Euro 1 - 91/441/EEC	
10	Passenger Cars	Gasoline <1,4 l	PC Euro 2 - 94/12/EEC	
11	Passenger Cars	Gasoline <1,4 l	PC Euro 3 - 98/69/EC Stage2000	
12	Passenger Cars	Gasoline <1,4 l	PC Euro 4 - 98/69/EC Stage2005	
13	Passenger Cars	Gasoline <1,4 l	PC Euro 5 (post 2005)	
14	Passenger Cars	Gasoline <1,4 l	PC Euro 6	
15	Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	
16	Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	
17	Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	
18	Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	
19	Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	
20	Passenger Cars	Gasoline 1,4 - 2,0 l	Improved Conventional	
21	Passenger Cars	Gasoline 1,4 - 2,0 l	Open Loop	
22	Passenger Cars	Gasoline 1,4 - 2,0 l	PC Euro 1 - 91/441/EEC	
23	Passenger Cars	Gasoline 1,4 - 2,0 l	PC Euro 2 - 94/12/EEC	
24	Passenger Cars	Gasoline 1,4 - 2,0 l	PC Euro 3 - 98/69/EC Stage2000	
25	Passenger Cars	Gasoline 1,4 - 2,0 l	PC Euro 4 - 98/69/EC Stage2005	
26	Passenger Cars	Gasoline 1,4 - 2,0 l	PC Euro 5 (post 2005)	

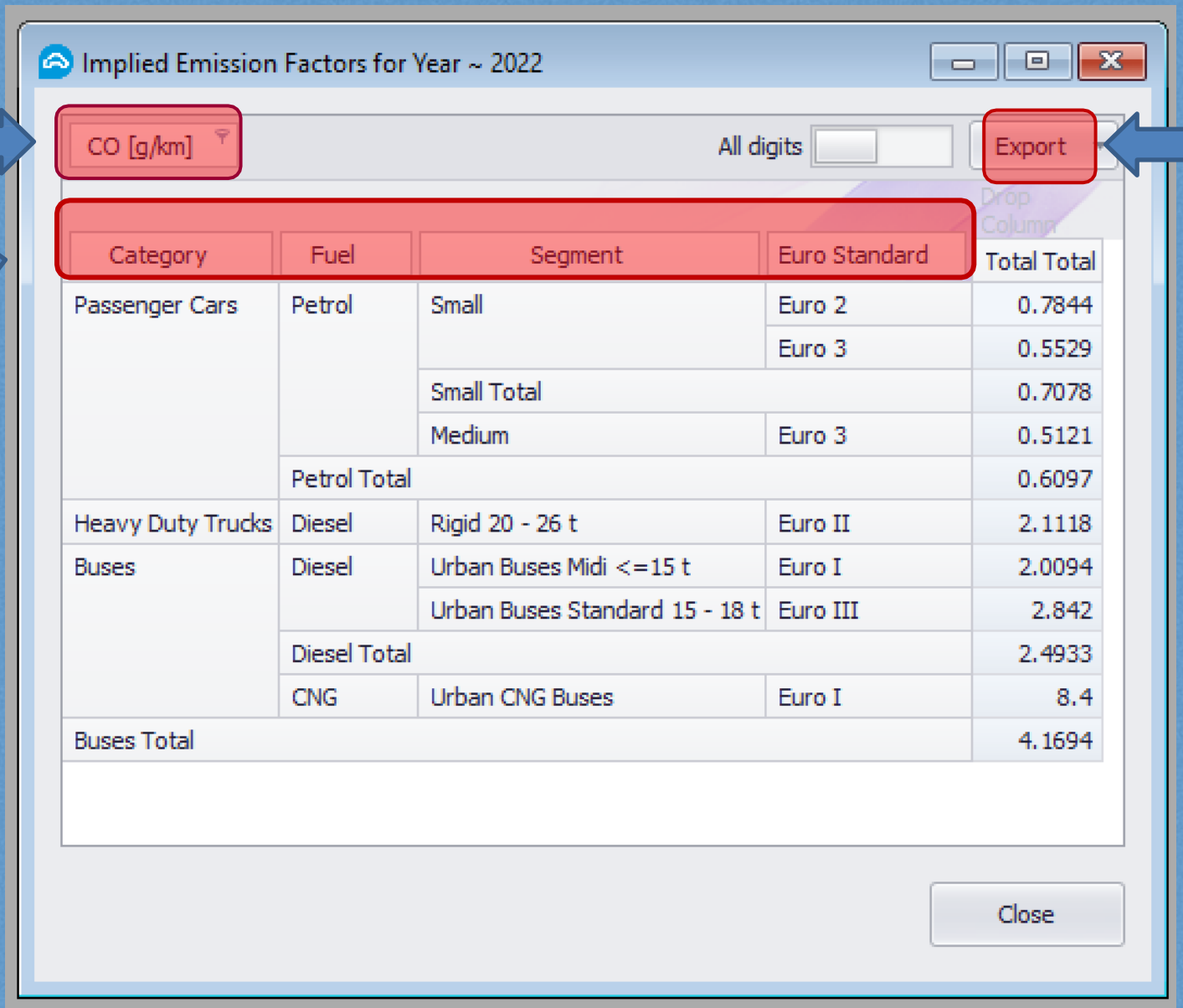
Results > Implicit emissions factors

Show all numbers

Select Pollutant

Filter

Export to Excel

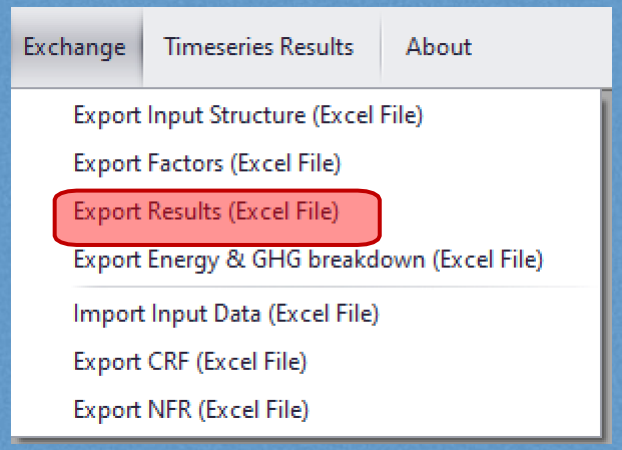


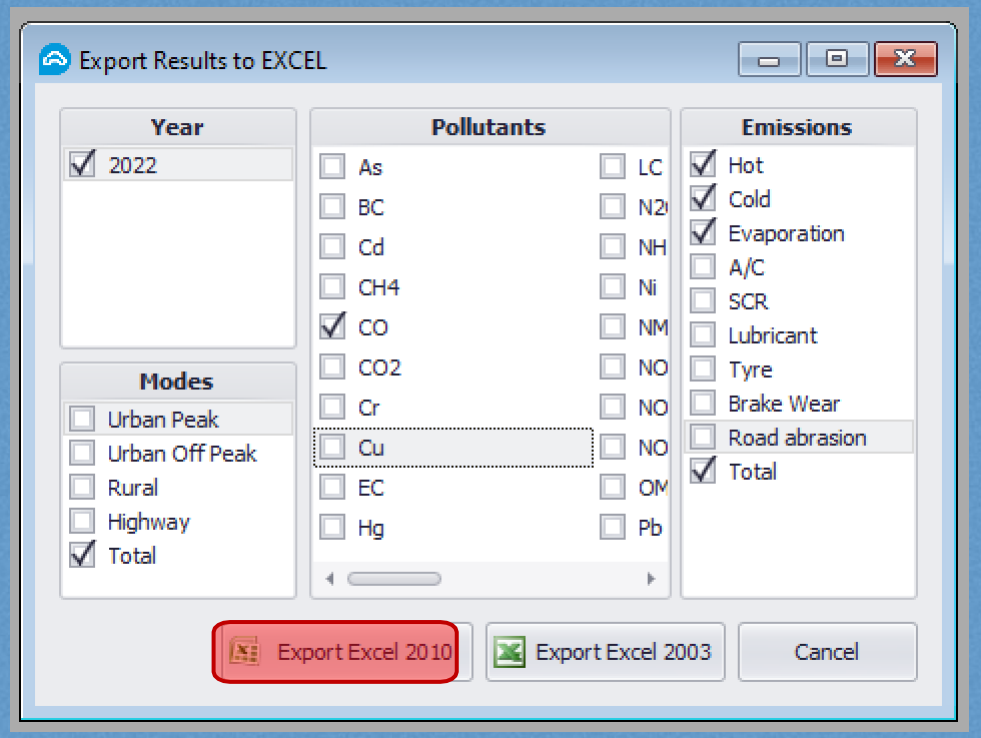
Category	Fuel	Segment	Euro Standard	Total Total
Passenger Cars	Petrol	Small	Euro 2	0.7844
			Euro 3	0.5529
		Small Total		0.7078
		Medium	Euro 3	0.5121
	Petrol Total			0.6097
Heavy Duty Trucks	Diesel	Rigid 20 - 26 t	Euro II	2.1118
Buses	Diesel	Urban Buses Midi <=15 t	Euro I	2.0094
		Urban Buses Standard 15 - 18 t	Euro III	2.842
	Diesel Total			2.4933
	CNG	Urban CNG Buses	Euro I	8.4
Buses Total				4.1694

Export Data to Microsoft Excel file

The final step is to export all the emissions

Open the 'File > Import/Export > Create Import Format Excel File' form





Hands-on exercises to enter, select and modify data

Online demonstration using COPERT

Input data needed

1. **Fleet** (vehicle fleet in operation per category)
   A. Passenger transport (passenger cars, buses, L-category vehicles)
   B. Freight transport (light commercial vehicles, heavy duty trucks)
   C. Split per fuel (energy) type, segment subcategories, and technologies/Euro standards
2. **Mileage:** Average annual distance driven [km/vehicle]
3. **Speeds:** Average travelling speeds in urban, rural, highway modes [km/h]
4. **Activity shares**: Share of activity in urban, rural, highway modes [%]
5. **Temperatures:** Country average [˚C]
6. **Fuel consumption**: sales (Statistics) [TJ]
   - Energy content of primary fuels [MJ/kg]
   - Fuel mixture(s) used
   - Energy share of fuel mixtures [%]

Conclusions

- Practical use of COPERT features
- Calculation of GHG and other pollutants (precursors, fugitives) emissions
- Import/export of input data with Excel
- Export of emissions results to Excel

Day 4

Thursday 26 September 2024

15:00 – 17:00 Bonn Time

Session 6

Higher tier methods for estimating GHG emissions from road transportation
COPERT model: implementation of Tier 2 and Tier 3 methods to estimate GHG emissions

Demonstration using COPERT interface with hands-on exercice

By the end of this session, you will:

1. Build the vehicle database with all categories
2. Understand how to enter data for T1 and T2
3. Know how extracting and exporting the results in XLS format
4. Know how exploring and using T1 and T2 results

Learning objectives

Hands-on Exercise to estimate GHG emission with Tier 2

1. - Calculation of road transport emissions with Tier 2
2. - Use of data set from the Niger vehicle stock (2016 – 2020)
3. - Use of average annual mileage travelled by each category of vehicles in Niger

Online Demonstration using COPERT

Hands-on Exercise to estimate emission with Tier 3

1. Calculation of GHG road transportation emissions with Tier 3
2. Use of data set from the Niger vehicle stock (2016 – 2020)
3. Use of average annual mileage travelled by each category of vehicles in Niger
4. Use of traffic activity data (average urban speeds) for the different categories of vehicles running in Niger

Online Demonstration using COPERT

Hands-on exercice

Estimation of GHG, precursors and fugitive emissions

Conclusions

- COPERT does not use Tier 1
- COPERT applies only higher tiers (Tier 2 and Tier 3)
- Accuracy of calculation results and large range of pollutants covered
- Required input data and calculation steps for Tier 2 and Tier 3
- Need of development of practical skills to use COPERT

Day 5

Friday 27 September 2024

15:00 – 17:00 Bonn Time

Session 7

Other key functions of the COPERT model: Energy balance of road transportation, GHG emission and fuel consumption projections (NDC)

By the end of this session, you will:

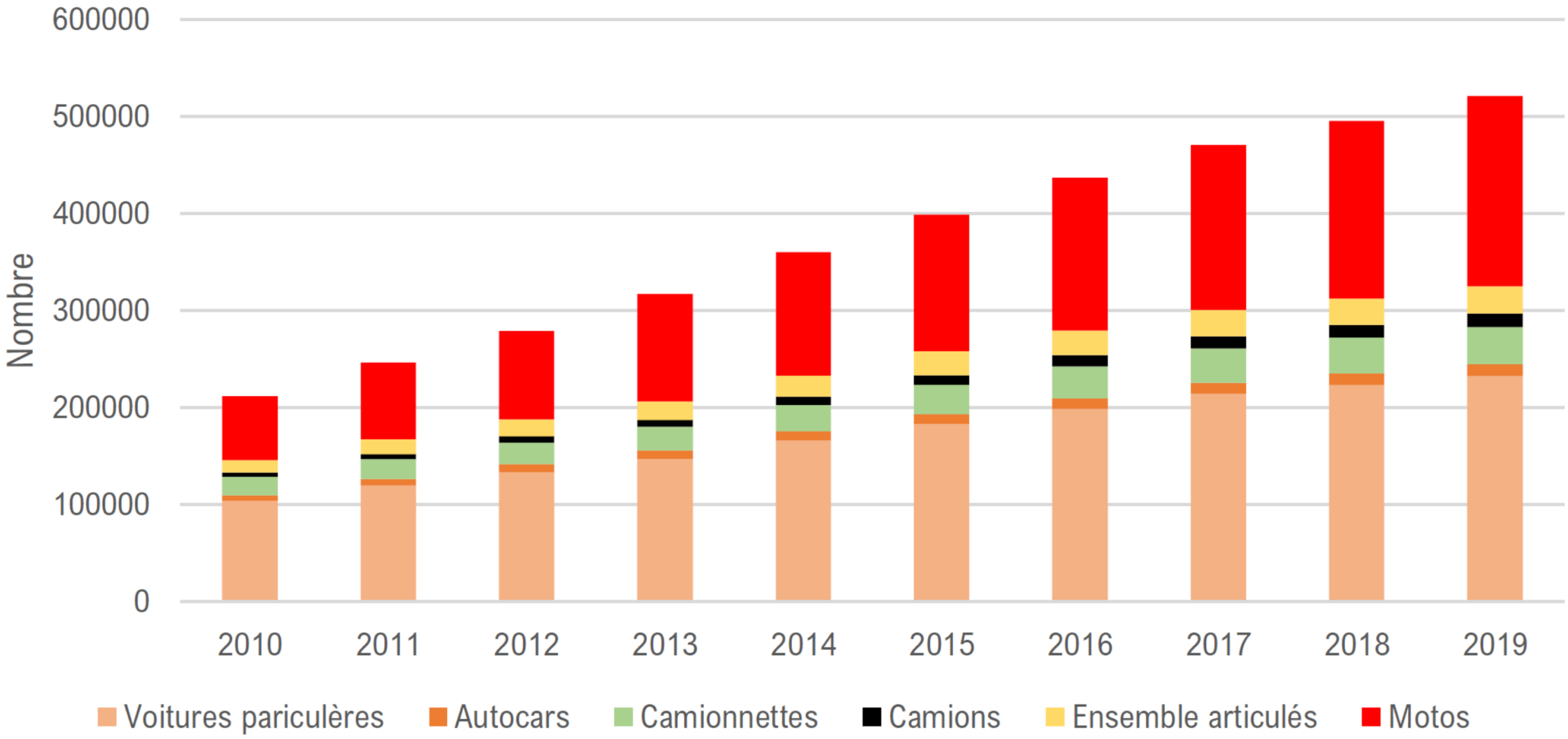
1. Know how COPERT estimates the fuel consumption of the vehicle stock
2. Understand how to set assumptions to build scenarios for emission projections
3. Understand how to use COPERT to estimate GHG emission projections based on different scenarios

Learning objectives

Hands-on exercises

Estimation of fuel balance from road transportation

Vehicle stock of NIGER



Assumptions on annual mileage in NIGER

Vehicles	Fuels	Assumptions Average annual mileage (km/y)
Passenger Cars	Petrol	8 000
	Diesel	8 000
Light Commercial Vehicles	Petrol	10 000
	Diesel	10 000
Heavy Duty Trucks Rigid	Diesel	13 000
Heavy Duty Trucks – Articulated	Diesel	13 000
Buses - Coaches Standard	Diesel	15 000
Mopeds 2-stroke	Petrol	3 000

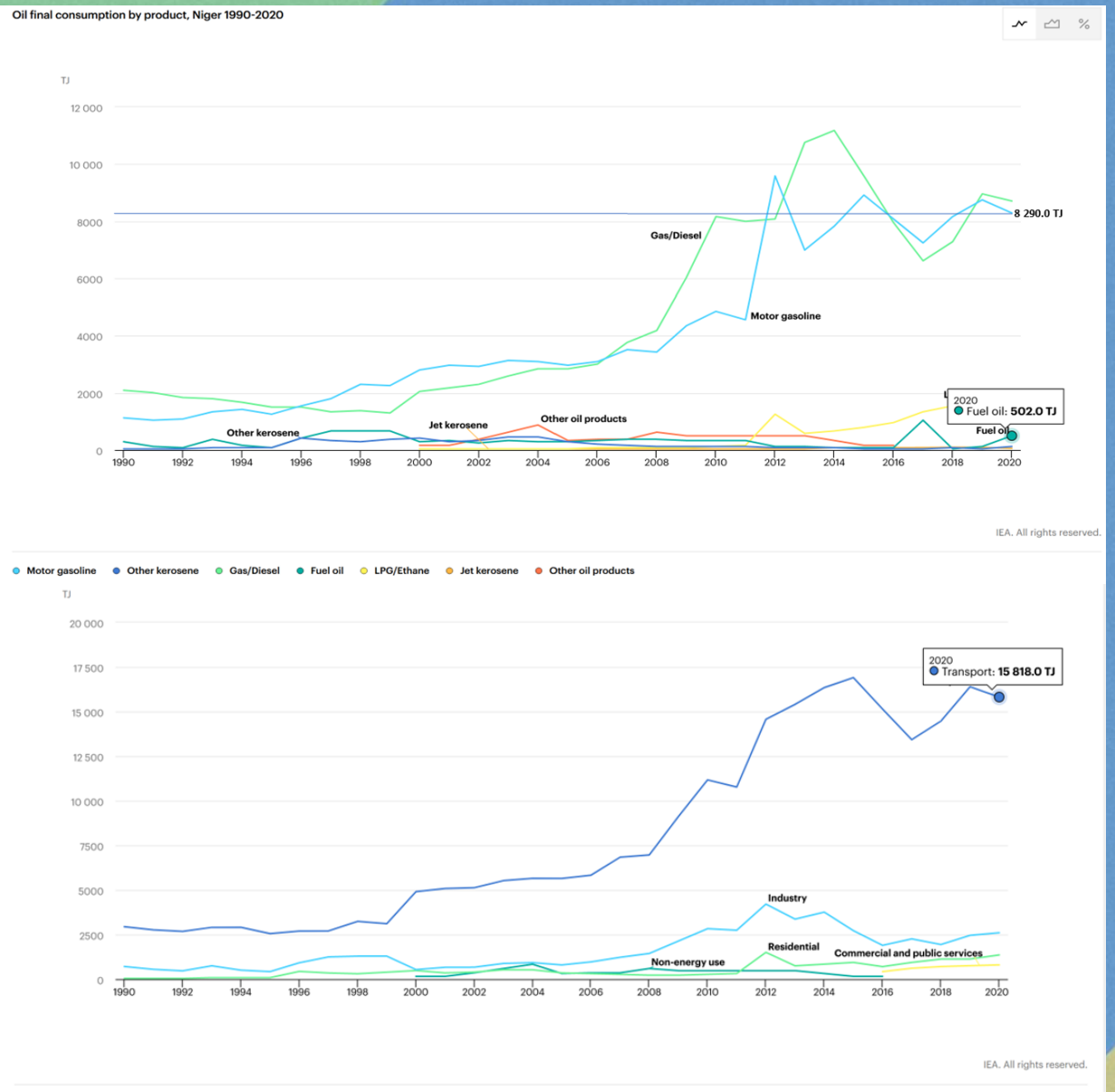
Fuel consumption estimation by COPERT using vehicle stock data and assumptions on mileage for NIGER

Years	2016	2017	2018	2019	2020
Passenger Cars	**4 128**	**3 952**	**3 666**	**4 391**	**4 693**
Petrol	**2 014**	**1 929**	**1 789**	**2 143**	**2 290**
Small	2 014	1 929	1 789	2 143	2 290
Diesel	**2 113**	**2 023**	**1 877**	**2 248**	**2 403**
Small	2 113	2 023	1 877	2 248	2 403
Light Commercial Vehicles	**930**	**895**	**836**	**996**	**1 050**
Petrol	**371**	**357**	**334**	**395**	**419**
N1-I	371	357	334	395	419
Diesel	**559**	**538**	**503**	**602**	**631**
N1-I	559	538	503	602	631
Heavy Duty Trucks	**4 249**	**4 101**	**3 750**	**4 449**	**4 787**
Diesel	**4 249**	**4 101**	**3 750**	**4 449**	**4 787**
Rigid 7,5 - 12 t	1 384	1 298	1 204	1 491	1 614
Articulated 34 - 40 t	2 865	2 803	2 546	2 958	3 174
Buses	**2 296**	**2 219**	**2 083**	**2 435**	**2 532**
Diesel	**2 296**	**2 219**	**2 083**	**2 435**	**2 532**
Coaches Standard <=18 t	2 296	2 219	2 083	2 435	2 532
L-Category	**582**	**559**	**516**	**624**	**666**
Petrol	**582**	**559**	**516**	**624**	**666**
Mopeds 2-stroke <50 cm^3	582	559	516	624	666
Total	12 185	11 726	10 852	12 895	13 729

NIGER: Energy balance

2016								Unités : Milliers de tonnes équivalent pétrole
	Charbon	Pétrole brut	Produits pétroliers	Gaz naturel	Géothermique/ Solaire/ etc.	Biomasse, Biocarburant et déchets	Electricité	TOTAL
Production	117,81	767,05	-	19,43	0,85	1 764,65	-	2 669,79
Importations	-	-	123,48	-	-	-	66,99	190,47
Dont importations illicites	-	-	69,49	-	-	-	-	69,49
Exportations	-	-	- 262,73	-	-	-	-	- 262,73
Variation de stocks	1,46	6,75	- 14,72	-	-	-	-	- 6,51
Approvisionnement totale en énergie primaire (ATEP)	**119,27**	**773,79**	**- 153,97**	**19,43**	**0,85**	**1 764,65**	**66,99**	**2 591,01**
Transferts	-	-	-	-	-	-	-	-
Ecarts statistiques	- 2,21	0,01	3,40	- 19,43	-	0,00	- 0,33	- 18,56
Secteur Transformation	**- 112,24**	**- 773,80**	**636,76**	**-**	**- 0,85**	**38,29**	**52,83**	**- 159,01**
Centrales électriques	- 111,08	-	- 59,49	-	- 0,85	-	40,34	- 131,09
Centrales autoproductrices d'électricité	-	-	- 77,10	-	-	-	12,50	- 64,60
Fabriques de briquettes de lignite et de tourbe	- 1,16	-	-	-	-	-	-	- 1,16
Raffineries de pétrole	-	- 773,80	773,35	-	-	-	-	- 0,45
Unité de production de charbon de bois	-	-	-	-	-	38,29	-	38,29
Secteur Energie	**-**	**-**	**-**	**-**	**-**	**-**	**- 8,88**	**- 8,88**
Autres utilisations du secteur Energie	-	-	-	-	-	-	- 8,88	- 8,88
Pertes de distribution	- 4,40	-	- 2,69	-	-	-	- 19,77	- 26,85
Consommation finale totale (CFT)	**0,42**	**-**	**483,50**	**-**	**-**	**1 802,94**	**90,85**	**2 377,71**
Secteur industrie	**-**	**-**	**48,85**	**-**	**-**	**-**	**19,49**	**68,34**
Non spécifié ci-dessus	-	-	48,85	-	-	-	19,49	68,34
Secteur transport	**-**	**-**	**406,96**	**-**	**-**	**-**	**-**	**406,96**
Aérien	-	-	47,56	-	-	-	-	47,56
Routier	-	-	359,40	-	-	-	-	359,40
Transports non spécifié	-	-	-	-	-	-	-	-
Autres secteurs	**0,42**	**-**	**27,68**	**-**	**-**	**1 802,94**	**71,36**	**1 902,40**
Résidentiel	0,13	-	17,03	-	-	1 762,75	48,20	1 828,11
Commerce et Services publics	0,29	-	10,65	-	-	40,19	22,43	73,56
Autres	-	-	-	-	-	-	-	-

International Data sources of fuel consumption



Niger

Terajoules

	Primary coal and peat	Coal and peat products	Primary Oil	Oil Products	Natural Gas	Biofuels and waste	Nuclear	Electricity	Heat	Total energy	of which: renewables
2019											
Primary production	3619	..	38271	..	1334	*70118	..	118	..	*113460	*70235
Imports	..	..	..	2333	..	..	..	3806	..	6139	..
Exports	..	..	..	-4382	..	..	..	..	..	-4382	..
International marine bunkers	..	..	..	..	..	..	..	..	..	..	..
International aviation bunkers	..	..	..	*-2046	..	..	..	..	..	*-2046	..
Stock changes	..	..	-6332	..	..	..	..	..	..	-6332	..
Total energy supply	3619	..	31939	-4095	1334	*70118	..	3924	..	*106839	*70235
Statistical difference	31	0	2	714	34	0	..	67	..	*848	*118
Transfers	..	..	..	..	..	..	..	..	..	..	..
Transformation	-3300	*95	-31937	23789	-1300	-3393	..	2136	..	-13910	-3393
Electricity plants	-3214	..	..	-3912	-1300	..	..	2136	..	-6290	..
CHP plants	..	..	..	..	..	..	..	..	..	..	..
Heat plants	..	..	..	..	..	..	..	..	..	..	..
Coke ovens	..	..	..	..	..	..	..	..	..	..	..
Briquetting plants	-87	*95	..	..	..	..	..	..	..	*9	..
Liquefaction plants	..	..	..	..	..	..	..	..	..	..	..
Gas works	..	..	..	..	..	..	..	..	..	..	..
Blast furnaces	..	..	..	..	..	..	..	..	..	..	..
NGL plants & gas blending	..	..	..	..	..	..	..	..	..	..	..
Oil refineries	..	..	-31937	27701	..	..	..	..	..	-4236	..
Other transformation	..	..	..	..	..	-3393	..	..	..	-3393	-3393
Energy industries own use	-144	..	..	..	..	..	..	*-404	..	*-548	..
Losses	-144	..	..	..	..	..	..	-1126	..	-1270	..
Final consumption	..	*95	..	*18980	..	*66725	..	4462	..	*90262	*66725
Final energy consumption	..	*95	..	*18980	..	*66725	..	4462	..	*90262	*66725
Manufacturing, const., mining	..	..	..	*2520	..	..	..	789	..	*3309	..
Iron and steel	..	..	..	..	..	..	..	..	..	..	..
Chemical and petrochemical	..	..	..	..	..	..	..	..	..	..	..
Non-ferrous metals	..	..	..	..	..	..	..	..	..	..	..
Non-metallic minerals	..	..	..	..	..	..	..	..	..	..	..
Transport equipment	..	..	..	..	..	..	..	..	..	..	..
Machinery	..	..	..	..	..	..	..	..	..	..	..
Mining and quarrying	..	..	..	..	..	..	..	..	..	..	..
Food and tobacco	..	..	..	..	..	..	..	..	..	..	..
Paper, pulp and printing	..	..	..	..	..	..	..	..	..	..	..
Wood and wood products	..	..	..	..	..	..	..	..	..	..	..
Textile and leather	..	..	..	..	..	..	..	..	..	..	..
Construction	..	..	..	..	..	..	..	..	..	..	..
Industries n.e.s	..	..	..	*2520	..	..	..	789	..	*3309	..
Transport	..	..	..	*14583	..	..	..	..	..	*14583	..
Road	..	..	..	*14583	..	..	..	..	..	*14583	..
Rail	..	..	..	..	..	..	..	..	..	..	..
Domestic aviation	..	..	..	..	..	..	..	..	..	..	..
Domestic navigation	..	..	..	..	..	..	..	..	..	..	..
Pipeline transport	..	..	..	..	..	..	..	..	..	..	..
Transport, n.e.s	..	..	..	..	..	..	..	..	..	..	..

Data Comparison: COPERT and Statistics

Results of COPERT calculation

Years	Fuels	2016 (TJ)	2019 (TJ)	2020 (TJ)	Assumptions on Average Annual Mileage (km/y)
Passenger Cars	Petrol	2 014	2 143	2 290	8 000
	Diesel	2 113	2 248	2 403	8 000
Light Commercial Vehicles	Petrol	371	395	419	10 000
	Diesel	559	602	631	10 000
Heavy Duty Trucks Rigid	Diesel	1 384	1 491	1 614	13 000
Heavy Duty Trucks – Articulated	Diesel	2 865	2 958	3 174	13 000
Buses - Coaches Standard	Diesel	2 296	2 435	2 532	15 000
Mopeds 2-stroke	Petrol	582	624	666	3 000
Road Transportation	**Totals**	COPERT	**12 185**	**12 895**	**13 729**
		AIE data	**15 144**	**16 394**	**15 818**
		UN statistics		**14 583**	**14 669**
		National Statistics	**15 047**	**16 287**	**15 742**
	Difference = National - Copert	TJ	***2 863***	***3 391***	***2 014***
		ktep	***68***	***81***	***48***

Source 1: IEA, website

Source 2: UNSD, website

Source 3: Energy Balance, Niger, 2021, MPEER website

Hands-on exercises

Estimation of emission projections for different scenarios of road transportation

Assumptions for road transportation scenarios

- **Vehicle stock**: number of vehicles registered (new, used) per category, fuel , age, technology (new transportation policy, vehicle emission regulations , vehicle incentives, etc.)
- **Vehicle use**: public transportation policy, fuel pricing, regulations, inspection & maintenance,
- **Road traffic characteristics** : road type, speed mileage, hot and cold start (infrastructure, traffic managment plan, etc.),

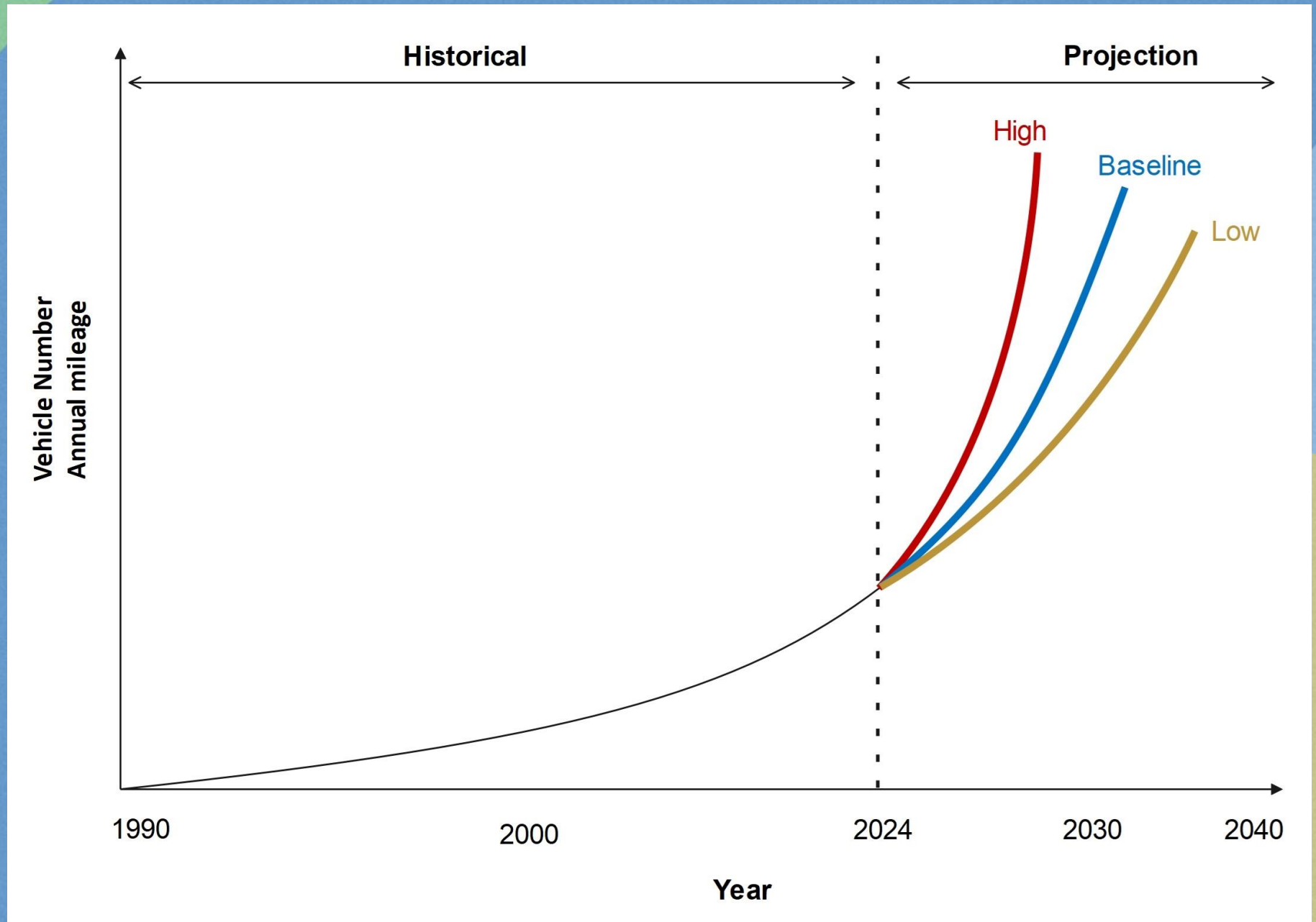
Current vehicle stock

Category	Fuel	Segment	Euro Standard	1990	1995	2000	2005	2010	2015	2020	2024	2030	2035	2040
Passenger Cars	Petrol	Small	Euro 1	X	X	X	X	X	X	X	X	?	?	?
Passenger Cars	Petrol	Medium	Euro 1	X	X	X	X	X	X	X	X	?	?	?
Passenger Cars	Petrol	Large-SUV-Executive	Euro 1	X	X	X	X	X	X	X	X	?	?	?
Passenger Cars	Diesel	Small	Euro 1	X	X	X	X	X	X	X	X	?	?	?
Passenger Cars	Diesel	Medium	Euro 1	X	X	X	X	X	X	X	X	?	?	?
Passenger Cars	Diesel	Large-SUV-Executive	Euro 1	X	X	X	X	X	X	X	X	?	?	?
Light Commercial Vehicles	Petrol	N1-I	Euro 1	X	X	X	X	X	X	X	X	?	?	?
Light Commercial Vehicles	Diesel	N1-I	Euro 1	X	X	X	X	X	X	X	X	?	?	?
Buses	Diesel	Urban Buses Midi <=15 t	Euro I	X	X	X	X	X	X	X	X	?	?	?
Buses	Diesel	Urban Buses Standard 15 - 18 t	Euro I	X	X	X	X	X	X	X	X	?	?	?

Vehicle stock evolution

Category	Fuel	Segment	Euro Standard	1990	1995	2000	2005	2010	2015	2020	2024	2030	2035	2040
Passenger Cars	Petrol	Small	Euro 1	X	X	X	X	X	X	X	X	XX	XXX	XXX
Passenger Cars	Petrol	Medium	Euro 1	X	X	X	X	X	X	X	X	X	XXX	XXX
Passenger Cars	Petrol	Large-SUV-Executive	Euro 1	X	X	X	X	X	X	X	X	x	x	x
Passenger Cars	Diesel	Small	Euro 1	X	X	X	X	X	X	X	X	XX	XXX	XXX
Passenger Cars	Diesel	Medium	Euro 1	X	X	X	X	X	X	X	X	X	XXX	XXX
Passenger Cars	Diesel	Large-SUV-Executive	Euro 1	X	X	X	X	X	X	X	X	x	x	x
Light Commercial Vehicles	Petrol	N1-I	Euro 1	X	X	X	X	X	X	X	X	X	X	X
Light Commercial Vehicles	Diesel	N1-I	Euro 1	X	X	X	X	X	X	X	X	X	X	X
Buses	Diesel	Urban Buses Midi <=15 t	Euro I	X	X	X	X	X	X	X	X	XXX	XXXX	XXXX
Buses	Diesel	Urban Buses Standard 15 - 18 t	Euro I	X	X	X	X	X	X	X	X	XXX	XXXX	XXXX

Development of road transportation scenarios



Vehicle Stock evolution without new technology (standard)
Scenario 1

Category	Fuel	Segment	Euro Standard	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Passenger Cars	Petrol	Small	Euro 1	100	101	101	102	102	103	103	104	104	105	105	106	106	107	107	108	108	109	109	110	110	111	112	112	113	113	114	114	115	116	116	117	117	118	118	120	121	122	123	125	126	127	128	130	131	132	134	135	136	138	139
Passenger Cars	Petrol	Medium	Euro 1	120	121	121	122	123	124	124	125	126	127	127	128	129	130	130	131	132	133	134	134	135	136	137	138	139	139	140	141	142	143	144	144	145	146	147	149	150	152	153	155	156	158	159	161	162	164	166	167	169	171	172
Passenger Cars	Petrol	Large-SUV-Executive	Euro 1	10	10	10	10	10	10	10	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Passenger Cars	Diesel	Small	Euro 1	30	30	30	30	31	31	31	31	31	31	32	32	32	32	32	32	32	33	33	33	33	33	33	34	34	34	34	34	34	35	35	35	35	35	36	36	36	37	37	37	38	38	38	39	39	40	40	40	41	41	42
Passenger Cars	Diesel	Medium	Euro 1	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	183	184	185	186	187	188	189	190	191	193	194	195	196	198	200	202	204	206	208	210	212	214	217	219	221	223	225	228	230
Passenger Cars	Diesel	Large-SUV-Executive	Euro 1	90	90	91	91	91	92	92	93	93	93	94	94	94	95	95	96	96	96	97	97	97	98	98	99	99	99	100	100	101	101	101	102	102	103	103	103	103	103	103	104	104	104	104	104	104	104	104	104	105	105	105
Light Commercial Vehicles	Petrol	N1-I	Euro 1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	12	12	12	12	12	12
Light Commercial Vehicles	Diesel	N1-I	Euro 1	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	97	98	98	99	99	100	100	101	101	102	102	103	103	104	105	105	106	106	107	107	108	108	109	109	110	110	111	112	112	113	113	114	114	115	115
Buses	Diesel	Urban Buses Midi <=15 t	Euro I	30	30	30	30	30	31	31	31	31	31	31	31	31	32	32	32	32	32	32	32	32	33	33	33	33	33	33	33	34	34	34	34	34	34	34	35	35	35	36	36	36	37	37	38	38	38	39	39	39	40	40
Buses	Diesel	Urban Buses Standard 15 - 18 t	Euro I	50	50	50	51	51	51	51	51	52	52	52	52	52	53	53	53	53	54	54	54	54	54	55	55	55	55	55	56	56	56	56	57	57	57	57	58	58	59	60	60	61	61	62	63	63	64	65	65	66	66	67

Vehicle stock evolution with new technology (Standard)

Scenario 2

Category	Fuel	Segment	Euro Standard	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Passenger Cars	Petrol	Small	Euro 1	100	101	101	102	102	103	103	104	104	105	105	106	106	107	107	108	108	109	109	110	110	111	112	112	113	113	114	114	115	116	116	117	117	118	118	118	117	117	116	116	115	114	114	113	113	112	112	111	110	110	109
Passenger Cars	Petrol	Small	Euro 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	101	101	102	102	103	103	104	104	105	105	106	106	107	107	108
Passenger Cars	Petrol	Medium	Euro 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Petrol	Medium	Euro 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Petrol	Large-SUV-Executive	Euro 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Petrol	Large-SUV-Executive	Euro 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Diesel	Small	Euro 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Diesel	Small	Euro 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Diesel	Medium	Euro 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Diesel	Medium	Euro 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Diesel	Large-SUV-Executive	Euro 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Diesel	Large-SUV-Executive	Euro 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Battery electric	Small	Euro 6 a/b/c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Battery electric	Medium	Euro 6 a/b/c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Cars	Battery electric	Large-SUV-Executive	Euro 6 a/b/c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Light Commercial Vehicles	Petrol	N1-I	Euro 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Light Commercial Vehicles	Petrol	N1-I	Euro 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	Diesel	Urban Buses Midi <=15 t	Euro I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	Diesel	Urban Buses Midi <=15 t	Euro V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	Diesel	Urban Buses Standard 15 - 18 t	Euro I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	Diesel	Urban Buses Standard 15 - 18 t	Euro V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Vehicle Mileage evolution

Scenario 1 & 2

Category	Fuel	Segment	ıro Standa	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Passenger	Petrol	Small	Euro 1	1 000,0	1 010,0	1 020,1	1 030,3	1 040,6	1 051,0	1 061,5	1 072,1	1 082,9	1 093,7	1 104,6	1 115,7	1 126,8	1 138,1	1 149,5	1 161,0	1 172,6	1 184,3	1 196,1	1 208,1	1 220,2	1 232,4	1 244,7	1 257,2	1 269,7	1 282,4	1 295,3	1 308,2	1 321,3	1 334,5	1 347,8	1 361,3	1 374,9	1 388,7	1 402,6	1 332,4	1 265,8	1 202,5	1 142,4	1 085,3	1 031,0	979,5	930,5	884,0	839,8	797,8	757,9	720,0	684,0	649,8	617,3
Passenger	Petrol	Small	Euro 5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1 500,0	1 507,5	1 515,0	1 522,6	1 530,2	1 537,9	1 545,6	1 553,3	1 561,1	1 568,9	1 576,7	1 584,6	1 592,5	1 600,5	1 608,5	1 616,5
Passenger	Petrol	Medium	Euro 1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Petrol	Medium	Euro 5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Petrol	Large-SUV	Euro 1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Petrol	Large-SUV	Euro 5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Diesel	Small	Euro 1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Diesel	Small	Euro 5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Diesel	Medium	Euro 1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Diesel	Medium	Euro 5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Diesel	Large-SUV	Euro 1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Diesel	Large-SUV	Euro 5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Battery el	Small	Euro 6 a/b	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Battery el	Medium	Euro 6 a/b	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Passenger	Battery el	Large-SUV	Euro 6 a/b	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Light Com	Petrol	N1-I	Euro 1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Light Com	Petrol	N1-I	Euro 5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Buses	Diesel	Urban Bus	Euro I	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Buses	Diesel	Urban Bus	Euro V	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Buses	Diesel	Urban Bus	Euro I	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Buses	Diesel	Urban Bus	Euro V	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Projection of GHG, Precusrsors and Fugitives emissions for road transportation

Online Demonstration with COPERT

Session 8

Closing session

- Lessons learnt from the Webinar
- Next steps
- Closing remarks by the UNFCCC Secretariat

Thanks for your participation and interest in COPERT