



Product Stewardship

Sphera® Managed LCA Content

(MLC) Duty Vehicles LCI Modeling
2025

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General Description of Processes

This documentation describes transportation processes for utility vehicles for the transportation of cargo in mass. The processes comprise the use stage with fuel demand and emissions released; production and end-of-life of this vehicle class is of small relevance, hence not considered. The default functional unit is the transportation of 1 kg of cargo over the distance of 100 km. The following parameters are variable: distance, utilization (=load/payload), share of road categories (urban/rural/motorway) and, if required, sulphur content in fuel, biogenic C content in fuel and total payload. Emissions of the vehicles are based on the HBEFA 4.2 and HBEFA 4.2.2 values [11, 23]. Figure 1 shows how the transport processes are used in the Managed LCA Content (MLC) in the LCA for Experts (LCA EF) software.

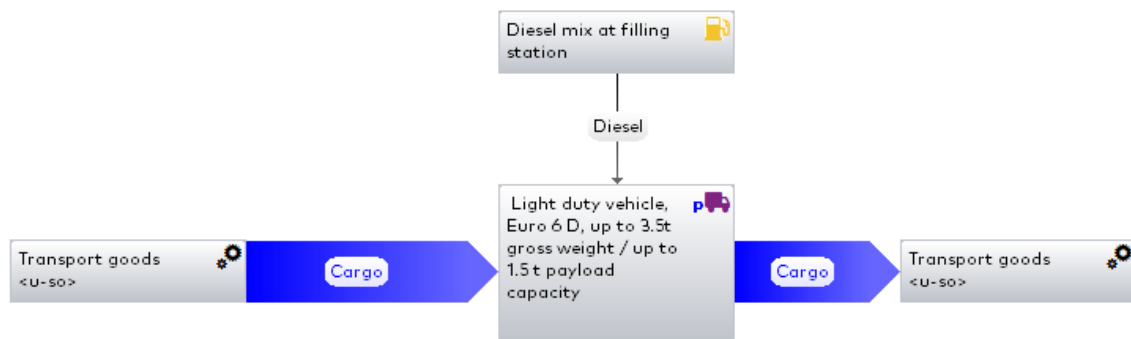


Figure 1: Use of duty vehicles for transport

Note: The “Cargo” flow instance name can be locally overwritten with the actual name of the good, by setting the respective flow as dominant when connecting to the transport process.

Process Characterization/Abbreviations/Naming

In general, processes are named according to the following system:

Vehicle class, (Propulsion system), Emission standard, gross weight

An example for the nomenclature is:

Truck, Diesel, Euro 5, 28 - 32t gross weight

Frequently used terms are:

Truck	=	single truck without trailer
Truck-trailer	=	truck and trailer combination incl. Semitrailer
Light duty vehicle	=	Commercial transport vehicle of size class N1 I-III
Gross weight	=	total weight of the vehicle
Payload	=	maximum vehicle load capacity
Utilization	=	actual load divided by maximum load

A list of all available processes is appended at the end of this documentation.

Classification

Size Categories (see [8], [9], [11]) – Europe/IN/GLO

- Light duty vehicle < 3.5 t
- Truck < 7.5 t
- Truck 7.5-12 t
- Truck 12-14 t
- Truck 14-20 t
- Truck 20-26 t
- Truck 26-28 t
- Truck 28-32 t
- Truck > 32 t
- Truck-trailer 20-28 t
- Truck-trailer 28-34 t
- Truck-trailer 34-40 t
- Truck-trailer 50-60 t
- Bulk waste truck 20-26 t

Emission Categories (see [4], [11], [13], [11]) – Europe/IN**/GLO

- Average 1980s (pre-Euro)
- Euro I
- Euro 2
- Euro 3
- Euro 4 EGR
- Euro 5 EGR
- Euro 5 SCR (non-tampered)
- Euro 6 A-C
- Euro 6 D-E
- Mix Euro 0-6

For the emission categories values for SCR technology, tampered options are available in HBEFA (marked with *). This tampering on the vehicles hard and/or software (e.g. removing the particle filter or filling water instead of AdBlue in the SCR tank) leads to advantages for the vehicle owner but result in a massive deterioration of the emission behavior. For the emission of these processes, it is assumed that the vehicle has not been tampered with.

** For Indian datasets, Euro emission standards are directly equated with Bharat Stage (BS) standards. Euro 5 does not exist in BS standards and Euro 6 A-C is equated to BS 6.

Road Categories (see [11])

- Average Motorway (MW)
- Average Rural (RU)
- Average Urban (UR)

The default distribution between road categories stated in the MLC processes is based on the values for the traffic situations in HBEFA 4.2 and HBEFA 4.2.2 for the year 2022 [11, 23].

Size Categories (see [20], [21], [22]) – USA

- Class 2b
- Class 3
- Class 4
- Class 5
- Class 6
- Class 7
- Class 8a
- Class 8b

Types (see [20], [21], [22]) – USA

- Light heavy duty
- Medium heavy duty
- Heavy heavy duty
- Basic enclosed
- Flatbed
- Lowboy
- Curtainside
- Insulated refrigerated
- Beverage
- Livestock
- Mobile home toter
- Automobile carrier
- Pole logging
- Tank, open top
- Tank, liquid or gas
- Tank, dry bulk
- Dump truck

Different types of trucks are available for USA across different size classes as given above. All data is based on US Census Bureau Vehicle Inventory Use Survey (VIUS) [20], US EPA's SmartWay program [21] and EPA Moves model [22].

Emissions Calculation

The emission calculations are derived from emission factors from literature (HBEFA 4.2 and HBEFA 4.2.2) [11, 23] which are based on measurements. Additional calculation principles are explained below.

General Emissions Calculation

With the assumption that the utilization rate influences the emissions linearly [2], the emission factors (EF) [g/km] are referenced to 1 kg of cargo via the following equation:

$$Emission = \frac{EF_{empty} + (EF_{loaded} - EF_{empty}) \cdot utilisation}{payload \cdot 1\,000 \cdot utilisation} \quad \left[\frac{g}{km \cdot kg} \right] \quad (1)$$

EF_{empty} Emission factor for empty run [g/km]

EF_{loaded} Emission factor for loaded run [g/km]

$Utilization$ Utilization referred to mass [-]

$Payload$ Maximum payload capacity [t]

The variable parameters *payload* and *utilization* can be specified within the process and set individually by the user.

For light duty vehicles (<3.5t) it is not differentiated between emission factors for the empty and the loaded run.

The total emissions for each pollutant refer to 1 kg cargo and the transportation distance is to be calculated based on the driving share (Motorway = MW_{share} , Rural = RU_{share} , Urban = UR_{share}) [-], the specific emissions (Motorway = MW_{Em} , Rural = RU_{Em} , Urban = UR_{Em}) in [g/(km*kg)] and the distance [km].

$$Total - Emission_x = ((MW_{share} \times MW_{Em}) + (RU_{share} \times RU_{Em}) + UR_{share} \times UR_{Em}) \times distance \quad (2)$$

x Index for a specific pollutant [-]

MW_{share} Driving share on motorway [%]

MW_{Em} Motorway specific emissions [g/(km*kg)]

RU_{share} Driving share on rural road [%]

RU_{Em} Rural specific emissions [g/(km*kg)]

UR_{share} Driving share on urban road [%]

UR_{Em} Urban road specific emissions [g/(km*kg)]

Calculation of CO₂

The calculations for carbon dioxide emissions are based on the emission factors according to equations (1)[1], and [2], whereas a constant relation of 3.18 kg CO₂/kg Diesel for the fuel consumption is assumed. With a medium density of 0.83 kg/l (diesel) this is equal to a ratio of 2.64 kg CO₂/l Diesel.

Calculation of SO₂

For sulphur dioxide, a complete stoichiometric conversion of the sulphur contained in the fuel and of oxygen into SO₂ is assumed. The sulphur content in the fuel is a variable parameter, which can be set individually by the user.

$$EF_{SO_2} = x_{ppm_S} * \frac{64 \text{ kg}_{SO_2}}{32 \text{ kg}_S} * fuel_{consumption} \left[\frac{m_{SO_2}}{m_{Cargo}} \right] \quad (3)$$

EF_{SO_2} Emission factor for SO₂

x_{ppm_S} Mass share of sulphur in fuel in $\frac{m_S}{m_{fuel}}$

$fuel_{consumption}$ Fuel consumption in $\frac{m_{fuel}}{m_{cargo}}$

Particle emissions from tires and brakes

Notable addition to truck transport datasets is a switch for non-exhaust particle emissions (such as from brakes, tires, ...). The default setting is zero (i.e., no such emissions), as the uncertainty for this is very large. However, the user has the possibility to see what potential impact those emissions could have in their model.

Variable Parameters

Table 1: Variable Parameters

Parameter Name	Comment	Unit
share_MW	Driving share on motorway (MW)	-
share_RU	Driving share rural (RU)	-
share_UR	Driving share urban (UR)	-
utilization	Utilization ratio based on mass	-
distance	Distance from start to end	km
payload	Maximum payload capacity	t
ppm_sulfur	Mass share of sulphur in fuel	ppm
share_CO2_bio	Share of biogenic C in fuel	-
switch_part_NE	Switch for non-exhaust particulate matter	-

Inputs

Table 2: Valuable Substances (with diesel as an example)

Flow	Flow Group	Unit
Diesel	Crude Oil Products	kg
Cargo	Others	kg

Outputs

Table 3: Valuable Substances

Flow	Flow Group	Unit
Cargo	Others	kg

Emissions

Table 4: Emissions

Flow	Flow Group	Unit
Ammonia	Inorganic Emissions to Air	kg
Benzene	Group NMVOC to Air	kg
Carbon Dioxide	Inorganic Emissions to Air	kg
Carbon Dioxide (biotic)	Inorganic Emissions to Air	kg
Carbon Monoxide	Inorganic Emissions to Air	kg
Dust (PM2.5)	Particles to Air	kg
Methane	Organic Emissions to Air (Group VOC)	kg
Nitrogen Dioxide	Inorganic Emissions to Air	kg
Nitrogen Monoxide	Inorganic Emissions to Air	kg
Nitrous Oxide (Laughing Gas)	Inorganic Emissions to Air	kg
NMVOC (unspecific)	Group NMVOC to Air	kg
Sulphur Dioxide	Inorganic Emissions to Air	kg

Systems and Emissions that are not considered

The datasets only include the emissions from the combustion of the fuel. The following aspects are not considered. They are jointly contributing little and can hence be disregarded without affecting decision support in studies that use these datasets as background data for transport:

- Vehicle production, repair, maintenance
- Vehicle recycling
- Infrastructure (roads etc.)
- Noise
- Diurnal losses and refueling losses (see [15])
- Hot-Soak-Emissions
- Oil use
- Cold-Start Emissions
- Emissions from air conditioning (relevance < 1 %, see [12])
- Antifreeze and detergent use and emissions from window washers

Application

Input Parameters

The vehicle processes can be adapted to specific conditions by changing the variable parameters.

Distance

The distance represents the real driven distance of the vehicle from start to end. This should be modified by the user.

Load based on Mass (parameter: utilization)

The utilization factor represents the relation of transported cargo to payload capacity. The former value of 0.85 (= 85 %) [1] used until the 2017 Edition, has been adapted to size-specific utilization factors ranging from 0.50 to 0.61 based on statistics provided by the German Federal Motor Transport Authority [10].

If the capacity is not fully used, including if cargo with low density is transported (e.g. expanded polystyrene or foam materials), the parameter utilization should be adapted (reduced) accordingly. Only utilization values between 0 and 1 are permitted. See also chapter 2.6.

Minimum value: "utilization" = 1/"payload" [kg] (equal to empty run)

Maximum value: "utilization" = 1 (equal to full load).

Table 5: Load Based on Mass

Size Category	Utilization (default value) [-]
Light duty vehicle < 3.5 t	0.53
Truck < 7.5 t	0.53
Truck 7.5-12 t	0.51
Truck 12-14 t	0.51
Truck 14-20 t	0.53
Truck 20-26 t	0.55
Truck 26-28 t	0.55
Truck 28-32 t	0.61
Truck > 32 t	0.61
Truck-trailer < 28 t	0.53
Truck-trailer 28-34 t	0.61
Truck-trailer 34-40 t	0.61

Size Category	Utilization (default value) [-]
Truck-trailer 50-60 t	0.50
Bulk waste truck 20-26 t	0.375

Payload

The payload of a vehicle is the total weight minus the actual weight of the vehicle and is equal to the vehicle load capacity [t]. The predefined standard value represents the typical situation in each case, in accordance with the transportation process name. In special cases, trucks with superstructures that are particularly heavy (e.g. a refrigeration unit) or particularly light (e.g. a simple platform) can be represented by adjusting this parameter.

Sulphur Content of Fuel (parameter: “ppm_sulfur”)

The sulphur content in diesel fuel varies significantly worldwide; the transport processes can be adapted accordingly. The following table shows possible values [16], [17], [18], [19]. When modeling transport in specific countries please refer to primary sources as this table only gives an indication and may be outdated.

Table 6: Sulphur Content of Fuel

Country	Sulphur Content by mass [ppm]
EU	10 ppm
Japan	10 ppm
China	up to 800 ppm
India	up to 350 ppm
Australia	10 ppm
Brazil	Dominant fuel for transport 10 ppm, 500 ppm available in some areas.
USA	15 ppm
Canada	800 ppm
South Africa	500 ppm
Saudi Arabia	500 ppm

Driving Shares for Motorway, Rural, Urban (respective parameters: “share_mw”, “share_ru”, “share_ur”)

The driving shares for Motorway (MW), Rural (RU), Urban (UR) can be adapted to specific boundary conditions. The predefined standard values represent the shares for Germany for the respective vehicle. The shares must add up to 1 in total.

Table 7: Driving Shares for Motorway (MW), Rural (RU), Urban (UR)

Example	Truck, Euro 6 A-C, 28 - 32t gross weight
share_mw	0.561
share_ru	0.284
share_ur	0.155
Sum of shares	1

Empty Run of a Whole Truck

When considering an empty run, the process provides emissions according to the empty run Emission Factors EF_{empty} [g/km] without carrying cargo. In a MLC model, this situation can be modelled with a fixed and non-connected transport process in the transport chain. The following conditions must be applied:

- Scaling factor = 1
- Process is not connected to other processes
- Utilization = 1/payload in kg

A utilization = 0 is an invalid value, as it leads to a division by 0.

Example: empty run for “Truck, Diesel, Euro 4, 7.5 t - 12t gross weight” fixing to scaling factor = 1

- payload = 5 t = 5000 kg → utilization = $1/5000 = 2 \cdot 10^{-4}$.

Forward and Return Trips with Different Utilization Factors

If the forward trip and return trip are driven with different utilization factors this is to be modelled in MLC with two consecutive transport processes of the same vehicle. The diesel consumption (and correspondingly the other emissions) are higher for the trip with a lower utilization as the emissions are allocated to less cargo. The suggested modeling in MLC can be seen in Figure 2.

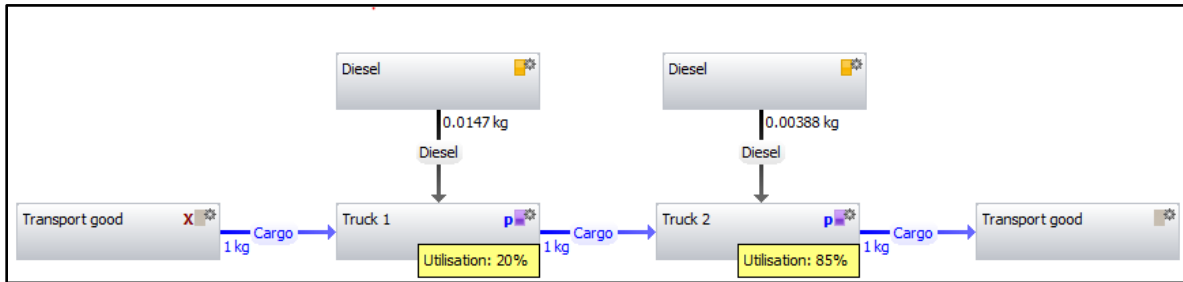


Figure 2: Modeling of transports with different utilizations for forward and return trip in the MLC

This modeling approach is not valid for empty return runs. Empty return runs are modelled as described in the following section.

Empty Return Trip

Empty return trips (with the same distance for both the forward and return trip) can be modelled with a single transport process with following utilization:

$$utilisation_{empty\ return} = \frac{utilisation_{forward\ trip}}{2} \quad (4)$$

Note: The distance must be set to the one-way distance.

Transport of Specifically Lightweight Goods

In case of transportation of specifically lightweight goods, the standard utilization ratio should be reduced.

Example: transport of expanded polystyrene (EPS), density 20 kg/m³, with “Truck-trailer, Euro 4, 34 - 40t gross weight” and 90 m³ volume capacity

- goods should be identified as specifically lightweight goods (low density, high air content)
- max load 1.8 t < payload 27 t; volume capacity reached before weight capacity; utilization ratio should be reduced
- new utilization factor (here: 7%), calculated as:

$$\frac{load}{payload\ capacity} = \frac{1.8t}{27t} \approx 0.07 \quad (5)$$

Choice of Correct Vehicle

To choose the correct vehicle the following aspects should be considered:

- the total weight of the vehicle

Total weight

Comment

Light duty
vehicle



Van for commercial activities

< 3.5 t

Truck < 7.5 t



Big van or very small truck

Truck 7.5-12 t



Small truck for short-haul and distribution transport

Truck 12-14 t



Medium truck for short-haul and distribution transport

Truck 14-20 t



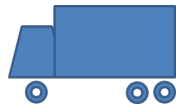
Medium truck for short-haul and distribution transport

Truck 20-26 t



Heavy-duty national and international long-haul transport

Truck 26-28 t



Heavy-duty national and international long-haul transport

Truck 28-32 t



Heavy duty truck for construction works

Truck > 32 t



Heavy duty truck for construction works

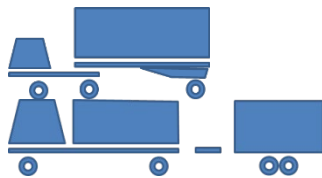

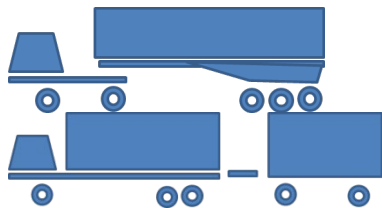
Truck-trailer < 28 t		Medium to heavy-duty national and international long-haul transport
Truck-trailer 28-34 t		Heavy-duty national and international long-haul transport
Truck-trailer 34-40 t		Heavy duty long-haul transports, tanks

Table 8: The EURO standard:

Emission standard	Year
1980s	before 1992
Euro 1	01.01.1992
Euro 2	01.10.1998
Euro 3	01.10.2000
Euro 4	01.10.2005
Euro 5	01.10.2008
Euro 6	01.01.2013
Euro 0-6 Mix	average mix of trucks in operation in 2022 (Germany)

Representativeness

Technological

The emission classes from 'pre-Euro' to 'Euro 6' are covered. The technologies are representative Europe-wide and can be adapted for worldwide locations with some minor restrictions. There is a need to identify the corresponding emission classes.

Spatial

The reference locations are Germany, Austria and Switzerland. However due to the similarity of the vehicle structures and the same emissions limit values, the models are representative for the entire EU. The model can be transferred to conditions in other countries worldwide with minimal uncertainty. Note: uncertainty increases with the increase of deviation of the vehicle structure, the road categories and the utilization behavior – these can be adapted by modifying the driving share (MW/RU/UR) as well as the utilization ratio and Sulphur content in the fuel for individual conditions.

Temporal

The reference year of the data sets is 2022; representativeness may be assumed for the period of 2022 to 2025.

Modification of the age structure of vehicles for each emission class leads to changes in the emission profile. The validity of the data set is given for approximately 3 years (until 2025). Findings in HBEFA [11] based on comprehensive time series (1994-2022) report that there is no change in emission profiles within a certain size class, emissions class or road category. Only a different composition of a total vehicle fleet results in changes over time.

Parameter Variations – Examples

The following section shows some examples to highlight the influence of the single parameters.

Variation of Utilization Ratio

Figure 3 shows the specific carbon dioxide emission in $[g\ CO_2/(kg\ Cargo \cdot km)]$ for different truck sizes from HBEFA 4.2 and HBEFA 4.2.2 each driven on motorway if the utilization ratio is varied in equation [1]

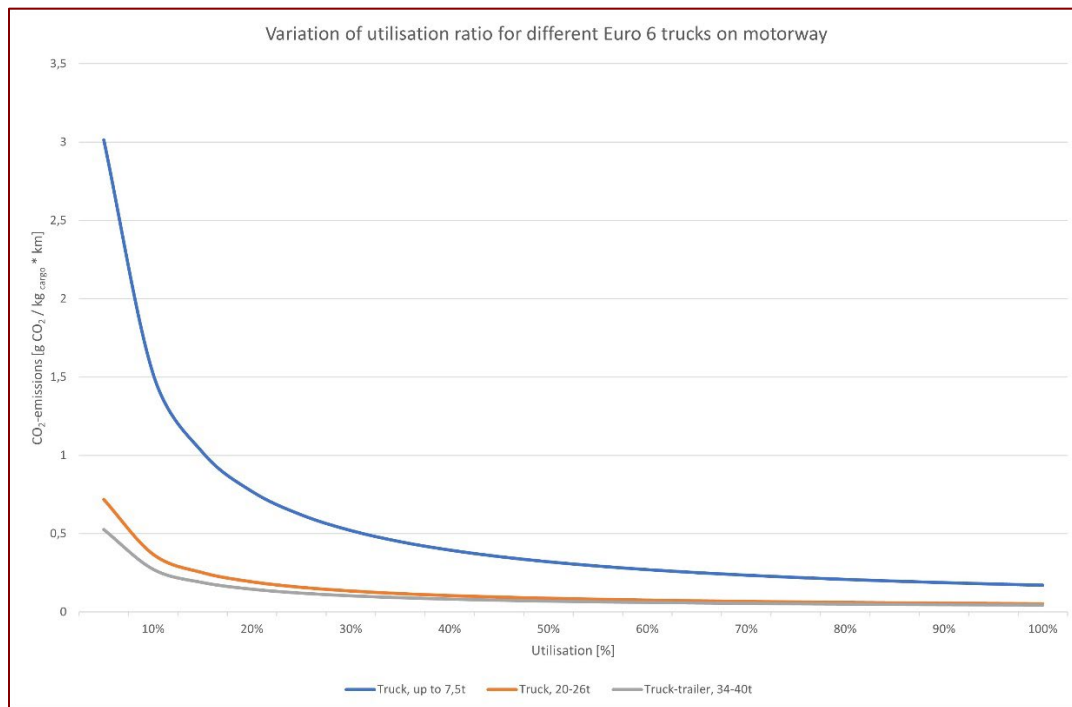


Figure 3: Variation of utilization ratio between 5% and 100 %

With convergence to 0 % utilization ratio, the specific emissions increase according to the mathematical function towards infinity (division by zero). The minimal utilization ratio (empty run) is the reciprocal value of the payload in [kg]. For high utilization ratios the specific emissions change only slightly.

Variation of Payload

Figure 4 shows the specific carbon dioxide emission in $[gCO_2/(kgCargo \cdot km)]$ for different truck sizes from HBEFA 4.2 and HBEFA 4.2.2 each driven on a motorway if the payload is varied in equation [1].

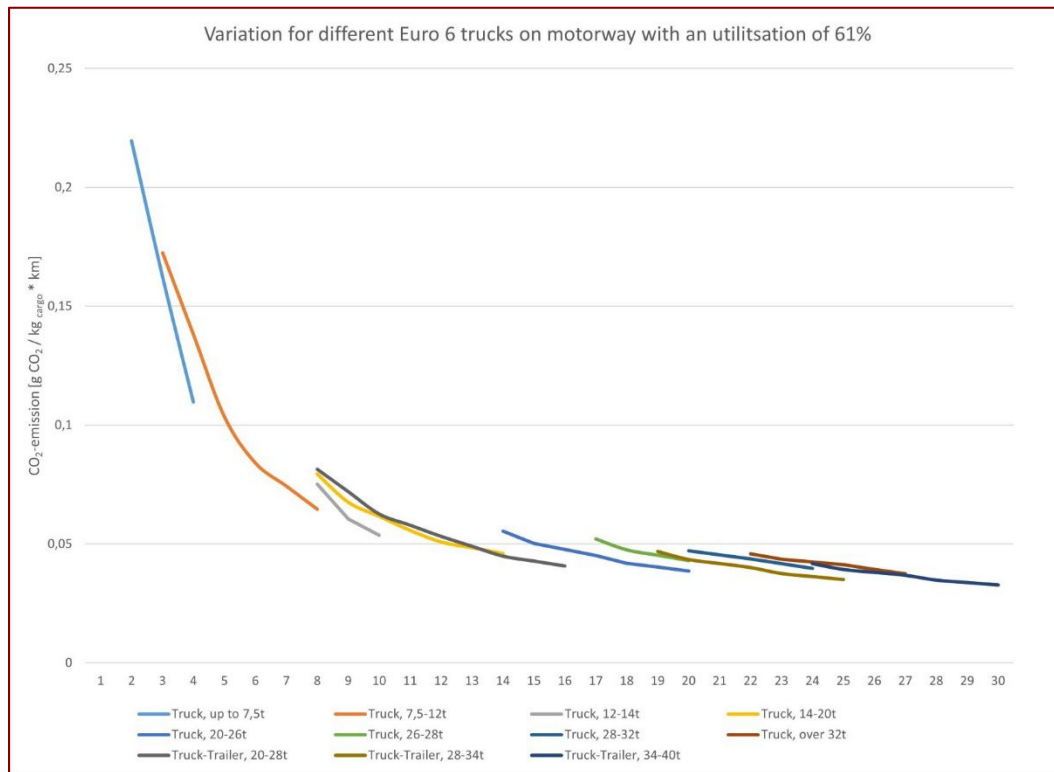


Figure 4: Variation of payload (Euro 6 trucks)

Particularly for smaller trucks, a clear influence of variations in payload on CO₂-emissions, and hence the fuel consumption, can be identified. If the truck has a lower payload caused by a heavy superstructure (e.g. a refrigeration unit), the specific emissions per kg of cargo increase.

Variation of shares on different Road Categories

Heavy trucks are optimized for rural and motorway travels (RU/MW) (see Figure 6), and therefore have the lowest specific emissions on motorway travel and clearly higher specific emissions in urban travel (see Figure 5 and Figure 7).

Small trucks have their lowest specific emissions in rural travel; the overall level of specific emissions is higher than for heavy trucks (see Figure 5, Figure 6 and Figure 7).

Figures 5, 6 and 7 depict the concept based on numbers from HBEFA 4.2.

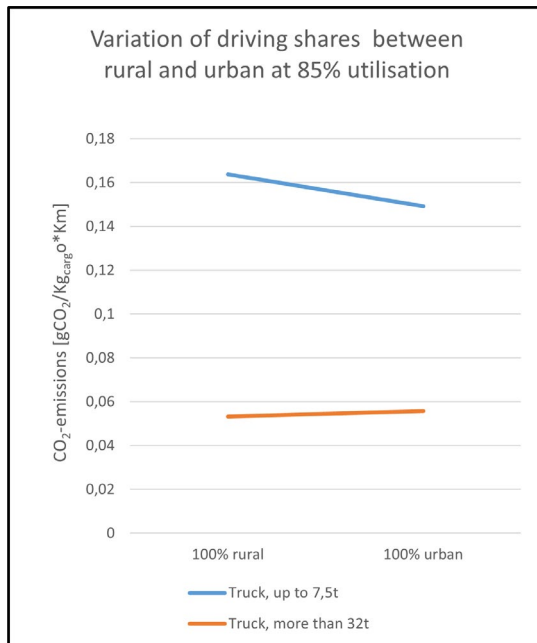


Figure 5: Specific fuel consumption: rural - urban

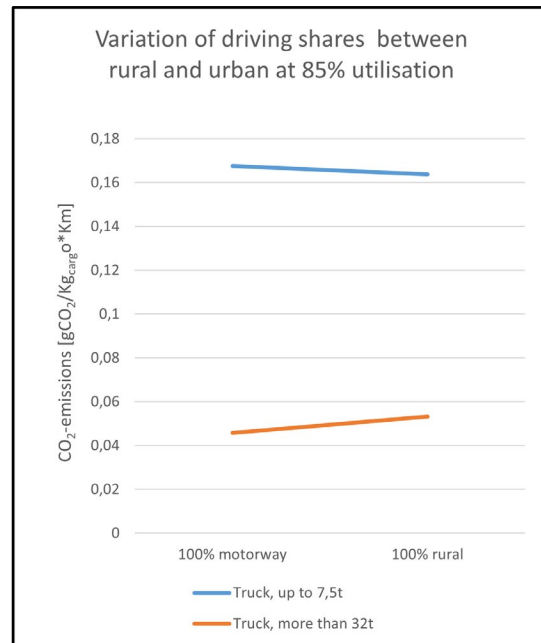


Figure 6: Specific fuel consumption: motorway - rural

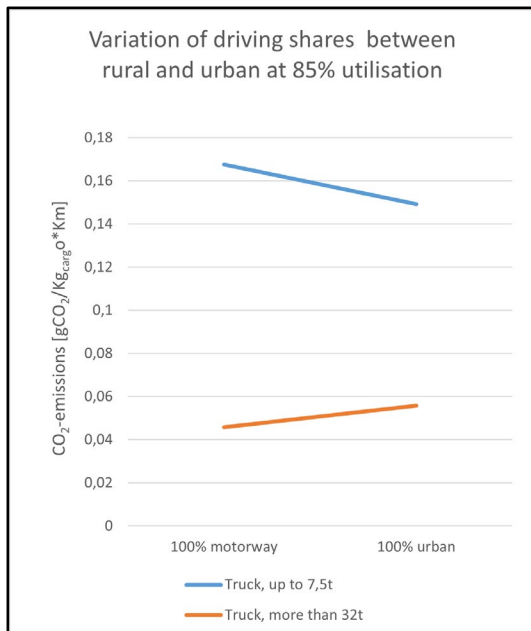


Figure 7: Specific fuel consumption: motorway - urban

Literature

- [1] BAITZ, Martin: Erstellung eines Modells zur Simulierung umweltrelevanter Auswirkungen von Transportprozessen unter Einfluss des Vertriebssystems, des Bedarfs und des Transportmittels, Stuttgart, Universität Stuttgart – Institut für Kunststoffprüfung und Kunststoffkunde (IKP), 1995.
- [2] BORKEN, Jens; PATYK, Andreas; Reinhardt, Guido A: Basisdaten für ökologische Bilanzierungen – Einsatz von Nutzfahrzeugen in Transport, Landwirtschaft und Bergbau, Braunschweig: Vieweg, 1999.
- [3] BRÜCK, R. et al.: Die Vision eines motornahen Nutzfahrzeug Katalysatorsystems; Emissionsminimierung unter allen Betriebsbedingungen, 2014
- [4] BUNDESAMT GÜTERKRAFTVERKEHR LOGISTIK UND ENTSORGUNG (BGL) e.V.: Daten und Fakten.
http://www.bgl-ev.de/web/daten/emissionen_grenzwerte.htm (08/2006).
- [5] EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION: Directive 1999/96/EC of the European Parliament and of the Council of 13 December 1999 on the approximation of the laws of the Member States relating to measures to be taken against the emission of gaseous and particulate pollutants from compression ignition engines for use in vehicles, and the emission of gaseous pollutants from positive ignition engines fueled with natural gas or liquefied petroleum gas for use in vehicles and amending Council Directive 88/77/EEC. Brussels, Official Journal L 044, 16/02/2000 P. 0001 – 0155.
- [6] EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION: Directive 2003/17/EC of the European Parliament and of the Council of 3 March 2003 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels. Brussels, Official Journal of the European Union L76/10, 22/03/2003.
- [7] EUROPEAN UNION: EUROPE – Environment – Auto-Oil II Programme,
<http://ec.europa.eu/environment/archives/autooil/index.htm%20>, (08/2006).
- [8] HAUSBERGER, Dr. Stefan, et al.: Emission functions for Heavy Duty Vehicles – Update of the Emission Functions for Heavy Duty Vehicles in the Handbook Emission Factors for Road Traffic, Wien: Umweltbundesamt GmbH, 2003.
- [9] KRAFTFAHRT-BUNDESAMT: Statistische Mitteilungen, Reihe 2: Kraftfahrzeuge. Flensburg, 2003.
- [10] KRAFTFAHRT-BUNDESAMT: Verkehr deutscher Lastkraftfahrzeuge (VD), Gesamtverkehr. Dezember, 2014.
- [11] INFRAS, Switzerland: HBEFA Version 4.2 – Background documentation, 2022a) SCHWARZ, Dr. Winfried; LEISEWITZ, Dr. André: Emissionen und Minderungspotential von HFKW, FKW und SF6 in Deutschland, Im Auftrag des Umweltbundesamtes, Forschungsbericht 29841256, Frankfurt, 1999.
- [12] Transport & Mobility Leuven: TREMOVE 2.7 / EMISSIONS, European Commission, DG Environment, <http://www.tremove.org>, Leuven / Belgium, 2007
- [13] Umweltbundesamt Berlin; BUWAL / OFEFP Bern; Umweltbundesamt Wien: Handbuch Emissionsfaktoren des Straßenverkehrs, Version 4.2, <http://www.hbefa.net>, Berlin, Bern, Vienna / Germany, Switzerland, Austria, 2022
- [14] Umweltlexikon: Betankungsverlust, Umweltlexikon, <http://www.umweltlexikon-online.de/RUBluft/Betankungsverlust.php> Köln / Germany, 2006

- [15] UNEP (United Nations Environment Programme) Partnership for Clean Fuels and Vehicles: Report of the Sulphur Working Group of the Partnership for Clean Fuels and Vehicles (PCFV), 2014
- [16] US EPA (United States Environmental Protection Agency): Report to Congress on Black Carbon, 2010
- [17] Informação Rápida e Confiável: Resolução ANP Nº 50 DE 23/12/2013, Regulamenta as especificações do óleo diesel de uso rodoviário, contidas no Regulamento Técnico ANP nº 4/2013, 2013.
- [18] CEDARE (Centre for Environment and Development in the Arab Region and Europe): Fuel Quality Roadmap for Arab States, 2015.
- [20] US Census Bureau Vehicle Inventory and Use Survey (VIUS), 2002
- [21] SmartWayTruck Carrier Partner Tool: Technical Documentation, U.S. Environmental Protection Agency, U.S. Version 2.0.20, EPA 420 F 21 001
- [22] EPA's Motor Vehicle Emission Simulator (MOVES3)
- [23] INFRAS, Switzerland : HBEFA Version 4.2.2, 2022

Process List (Managed LCA Content)

Global processes (284 processes)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck	Truck, CNG, Euro mix, gross weight 14-20 t	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 14-20 t, cooled	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 14-20 t, refrigerated	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 20-26 t	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 20-26 t, cooled	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 20-26 t, refrigerated	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 28-32 t	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 28-32 t, cooled	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 28-32 t, refrigerated	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 7.5-12 t	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 7.5-12 t, cooled	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight 7.5-12 t, refrigerated	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight more than 32 t	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight more than 32 t, cooled	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight more than 32 t, refrigerated	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight up to 7.5 t	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight up to 7.5 t, cooled	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro mix, gross weight up to 7.5 t, refrigerated	CNG	Technology and consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 14-20 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 14-20 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 14-20 t, refrigerated	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 20-26 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 20-26 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 20-26 t, refrigerated	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 7.5-12 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 7.5-12 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight 7.5-12 t, refrigerated	CNG	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck	Truck, CNG, Euro V, gross weight more than 32 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight more than 32 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight more than 32 t, refrigerated	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight up to 7.5 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight up to 7.5 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro V, gross weight up to 7.5 t, refrigerated	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 14-20 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 14-20 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 14-20 t, refrigerated	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 20-26 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 20-26 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 20-26 t, refrigerated	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 7.5-12 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 7.5-12 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight 7.5-12 t, refrigerated	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight more than 32 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight more than 32 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight more than 32 t, refrigerated	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight up to 7.5 t	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight up to 7.5 t, cooled	CNG	Consumption mix
GLO	Truck	Truck, CNG, Euro VI, gross weight up to 7.5 t, refrigerated	CNG	Consumption mix
GLO	Bulk waste truck	Bulk waste truck, Euro V, 20-26t gross weight / 10t payload capacity (rural area)	Diesel	Consumption mix
GLO	Bulk waste truck	Bulk waste truck, Euro V, 20-26t gross weight / 10t payload capacity (urban area)	Diesel	Consumption mix
GLO	Bulk waste truck	Bulk waste truck, Euro VI, 20-26t gross weight / 10t payload capacity (rural area)	Diesel	Consumption mix
GLO	Bulk waste truck	Bulk waste truck, Euro VI, 20-26t gross weight / 10t payload capacity (urban area)	Diesel	Consumption mix
GLO	Light duty vehicle	Light duty vehicle, Diesel, 1980s, up to 3.5t gross weight	Diesel	Consumption mix
GLO	Light duty vehicle	Light duty vehicle, Diesel, Euro 1, up to 3.5t gross weight	Diesel	Consumption mix
GLO	Light duty vehicle	Light duty vehicle, Diesel, Euro 2, up to 3.5t gross weight	Diesel	Consumption mix
GLO	Light duty vehicle	Light duty vehicle, Diesel, Euro 3, up to 3.5t gross weight	Diesel	Consumption mix
GLO	Light duty vehicle	Light duty vehicle, Diesel, Euro 4, up to 3.5t gross weight	Diesel	Consumption mix
GLO	Light duty vehicle	Light duty vehicle, Diesel, Euro 5, up to 3.5t gross weight	Diesel	Consumption mix
GLO	Light duty vehicle	Light duty vehicle, Diesel, Euro 6 A-C, up to 3.5t gross weight	Diesel	Consumption mix
GLO	Light duty vehicle	Light duty vehicle, Diesel, Euro 6 D, up to 3.5t gross weight	Diesel	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck	Truck, Diesel, 1980s, 12-14t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, 1980s, 14 - 20t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, 1980s, 20 - 26t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, 1980s, 26 - 28t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, 1980s, 28 - 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, 1980s, 7.5-12t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, 1980s, more than 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, 1980s, up to 7.5t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro I, 12 - 14t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro I, 14 - 20t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro I, 20 - 26t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro I, 26 - 28t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro I, 28 - 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro I, 7.5 t - 12t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro I, more than 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro I, up to 7.5t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro II, 12 - 14t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro II, 14 - 20t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro II, 20 - 26t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro II, 26 - 28t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro II, 28 - 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro II, 7.5 t - 12t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro II, more than 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro II, up to 7.5t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro III, 12 - 14t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro III, 14 - 20t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro III, 20 - 26t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro III, 26 - 28t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro III, 28 - 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro III, 7.5 t - 12t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro III, more than 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro III, up to 7.5t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 12 - 14t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 12 - 14t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 14 - 20t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 14 - 20t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 20 - 26t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 20 - 26t gross weight (with SCR)	Diesel	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck	Truck, Diesel, Euro IV, 26 - 28t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 26 - 28t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 28 - 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 28 - 32t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 7.5 t - 12t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, 7.5 t - 12t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, more than 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, more than 32t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, up to 7.5t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro IV, up to 7.5t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 12 - 14t gross weight	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 12 - 14t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 12 - 14t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 14 - 20t gross weight	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 14 - 20t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 14 - 20t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 20 - 26t gross weight	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 20 - 26t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 20 - 26t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 26 - 28t gross weight	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 26 - 28t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 26 - 28t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 28 - 32t gross weight	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 28 - 32t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 28 - 32t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 7.5 - 12t gross weight	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 7.5 - 12t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, 7.5 - 12t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, more than 32t gross weight	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, more than 32t gross weight, cooled	Diesel	Technology and consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck	Truck, Diesel, Euro mix, more than 32t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, up to 7.5t gross weight	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, up to 7.5t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro mix, up to 7.5t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck	Truck, Diesel, Euro V, 12 - 14t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 12 - 14t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 14 - 20t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 14 - 20t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 20 - 26t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 20 - 26t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 26 - 28t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 26 - 28t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 28 - 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 28 - 32t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 7.5 t - 12t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, 7.5 t - 12t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, more than 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, more than 32t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, up to 7.5t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro V, up to 7.5t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI A-C, 12 - 14t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI A-C, 14 - 20t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI A-C, 20 - 26t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI A-C, 26 - 28t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI A-C, 28 - 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI A-C, 7.5 t - 12t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI A-C, more than 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI A-C, up to 7.5t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI D-E, 12 - 14t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI D-E, 14 - 20t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI D-E, 20 - 26t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI D-E, 26 - 28t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI D-E, 28 - 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI D-E, 7.5 t - 12t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI D-E, more than 32t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, Diesel, Euro VI D-E, up to 7.5t gross weight	Diesel	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck-trailer	Truck-trailer, Diesel, 1980s, 20 - 28t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, 1980s, 28 - 34t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, 1980s, 34 - 40t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro I, 20 - 28t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro I, 28 - 34t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro I, 34 - 40t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro II, 20 - 28t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro II, 28 - 34t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro II, 34 - 40t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro III, 20 - 28t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro III, 28 - 34t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro III, 34 - 40t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro IV, 20 - 28t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro IV, 20 - 28t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro IV, 28 - 34t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro IV, 28 - 34t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro IV, 34 - 40t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro IV, 34 - 40t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro IV, 50 - 60t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro IV, 50 - 60t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 20 - 28t gross weight	Diesel	Technology and consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 20 - 28t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 20 - 28t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 28 - 34t gross weight	Diesel	Technology and consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 28 - 34t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 28 - 34t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 34 - 40t gross weight	Diesel	Technology and consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 34 - 40t gross weight, cooled	Diesel	Technology and consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro mix, 34 - 40t gross weight, refrigerated	Diesel	Technology and consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro V, 20 - 28t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro V, 20 - 28t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro V, 28 - 34t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro V, 28 - 34t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro V, 34 - 40t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro V, 34 - 40t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro V, 50 - 60t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro V, 50 - 60t gross weight (with SCR)	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro VI A-C, 20 - 28t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro VI A-C, 28 - 34t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro VI A-C, 34 - 40t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro VI A-C, 50 - 60t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro VI D-E, 20 - 28t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro VI D-E, 28 - 34t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro VI D-E, 34 - 40t gross weight	Diesel	Consumption mix
GLO	Truck-trailer	Truck-trailer, Diesel, Euro VI D-E, 50 - 60t gross weight	Diesel	Consumption mix
GLO	Truck	Truck, BEV, 14-20t gross weight	Electric	Consumption mix
GLO	Truck	Truck, BEV, 14-20t gross weight, cooled	Electric	Consumption mix
GLO	Truck	Truck, BEV, 14-20t gross weight, refrigerated	Electric	Consumption mix
GLO	Truck	Truck, BEV, 20-26t gross weight	Electric	Consumption mix
GLO	Truck	Truck, BEV, 20-26t gross weight, cooled	Electric	Consumption mix
GLO	Truck	Truck, BEV, 20-26t gross weight, refrigerated	Electric	Consumption mix
GLO	Truck	Truck, BEV, 7.5-12t gross weight	Electric	Consumption mix
GLO	Truck	Truck, BEV, 7.5-12t gross weight, cooled	Electric	Consumption mix
GLO	Truck	Truck, BEV, 7.5-12t gross weight, refrigerated	Electric	Consumption mix
GLO	Truck	Truck, BEV, more than 32t gross weight	Electric	Consumption mix
GLO	Truck	Truck, BEV, more than 32t gross weight, cooled	Electric	Consumption mix
GLO	Truck	Truck, BEV, more than 32t gross weight, refrigerated	Electric	Consumption mix
GLO	Truck	Truck, BEV, up to 7.5t gross weight	Electric	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck	Truck, BEV, up to 7.5t gross weight, cooled	Electric	Consumption mix
GLO	Truck	Truck, BEV, up to 7.5t gross weight, refrigerated	Electric	Consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 14-20 t	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 14-20 t, cooled	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 14-20 t, refrigerated	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 20-26 t	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 20-26 t, cooled	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 20-26 t, refrigerated	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 7.5-12 t	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 7.5-12 t, cooled	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight 7.5-12 t, refrigerated	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight more than 32 t	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight more than 32 t, cooled	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight more than 32 t, refrigerated	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight up to 7.5 t	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight up to 7.5 t, cooled	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro mix, gross weight up to 7.5 t, refrigerated	LNG	Technology and consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 14-20 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 14-20 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 14-20 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 20-26 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 20-26 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 20-26 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 7.5-12 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 7.5-12 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight 7.5-12 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight more than 32 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight more than 32 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight more than 32 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight up to 7.5 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight up to 7.5 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro V, gross weight up to 7.5 t, refrigerated	LNG	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
GLO	Truck	Truck, LNG, Euro VI, gross weight 14-20 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight 14-20 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight 14-20 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight 20-26 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight 20-26 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight 20-26 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight 7.5-12 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight 7.5-12 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight 7.5-12 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight more than 32 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight more than 32 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight more than 32 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight up to 7.5 t	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight up to 7.5 t, cooled	LNG	Consumption mix
GLO	Truck	Truck, LNG, Euro VI, gross weight up to 7.5 t, refrigerated	LNG	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 14-20 t	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 14-20 t, cooled	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 14-20 t, refrigerated	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 20-26 t	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 20-26 t, cooled	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 20-26 t, refrigerated	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 7.5-12 t	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 7.5-12 t, cooled	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight 7.5-12 t, refrigerated	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight more than 32 t	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight more than 32 t, cooled	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight more than 32 t, refrigerated	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight up to 7.5 t	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight up to 7.5 t, cooled	Fuel Cell	Consumption mix
GLO	Truck	Truck, FCEV, gross weight up to 7.5 t, refrigerated	Fuel Cell	Consumption mix

Indian processes (48 processes)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
IN	Light duty vehicle	Light duty vehicle, Diesel, Bharat stage II, up to 3.5t gross weight	Diesel	Consumption mix
IN	Light duty vehicle	Light duty vehicle, Diesel, Bharat stage III, up to 3.5t gross weight	Diesel	Consumption mix
IN	Light duty vehicle	Light duty vehicle, Diesel, Bharat stage IV, up to 3.5t gross weight	Diesel	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
IN	Light duty vehicle	Light duty vehicle, Diesel, Bharat stage VI, up to 3.5t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage II, 12-14t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage II, 14 - 20t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage II, 20 - 26t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage II, 26 - 28t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage II, 28 - 32t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage II, 7.5 t - 12t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage II, more than 32t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage II, up to 7.5t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage III, 12-14t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage III, 14 - 20t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage III, 20 - 26t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage III, 26 - 28t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage III, 28 - 32t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage III, 7.5 t - 12t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage III, more than 32t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage III, up to 7.5t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage IV, 12-14t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage IV, 14 - 20t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage IV, 20 - 26t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage IV, 26 - 28t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage IV, 28 - 32t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage IV, 7.5 t - 12t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage IV, more than 32t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage IV, up to 7.5t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage VI, 12 - 14t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage VI, 14 - 20t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage VI, 20 - 26t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage VI, 26 - 28t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage VI, 28 - 32t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage VI, 7.5 t - 12t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage VI, more than 32t gross weight	Diesel	Consumption mix
IN	Truck	Truck, Diesel, Bharat stage VI, up to 7.5t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage II, 20 - 28t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage II, 28 - 34t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage II, 34 - 40t gross weight	Diesel	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage III, 20 - 28t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage III, 28 - 34t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage III, 34 - 40t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage IV, 20 - 28t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage IV, 28 - 34t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat stage IV, 34 - 40t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat Stage VI, 20 - 28t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat Stage VI, 28 - 34t gross weight	Diesel	Consumption mix
IN	Truck-trailer	Truck-trailer, Diesel, Bharat Stage VI, 34 - 40t gross weight	Diesel	Consumption mix

USA processes (45 processes)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
RNA	Transport	Transport, combination truck, diesel powered	Diesel	Consumption mix
RNA	Transport	Transport, single unit truck, diesel powered	Diesel	Consumption mix
RNA	Transport	Transport, single unit truck, gasoline powered	Diesel	Consumption mix
US	Transport	Transport, combination truck, average fuel mix	Diesel	Consumption mix
US	Transport	Transport, combination truck, gasoline powered	Diesel	Consumption mix
US	Truck	Truck - auto carrier (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - Automobile Carrier / 40,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - Beverage / 37,000 lb payload - 8a	Diesel	Consumption mix
US	Truck	Truck - Curtainside / 48,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - dray (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - Dump Truck / 52,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - expedited (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - flatbed (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - Flatbed, platform, etc. / 14,000 lb payload - 7	Diesel	Consumption mix
US	Truck	Truck - Flatbed, platform, etc. / 34,000 lb payload - 8a	Diesel	Consumption mix
US	Truck	Truck - Flatbed, platform, etc. / 4,000 lb payload - 3	Diesel	Consumption mix
US	Truck	Truck - Flatbed, platform, etc. / 49,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - Flatbed, platform, etc. / 5,000 lb payload - 4	Diesel	Consumption mix
US	Truck	Truck - Heavy Heavy-duty Diesel Truck / 50,000 lb payload -8a	Diesel	Consumption mix
US	Truck	Truck - Heavy Heavy-duty Diesel Truck / 53,333 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - heavy/bulk (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - Insulated Refrigerated / 13,000 lb payload - 7	Diesel	Consumption mix
US	Truck	Truck - Insulated Refrigerated / 32,000 lb payload - 8a	Diesel	Consumption mix
US	Truck	Truck - Insulated Refrigerated / 47,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - Light Heavy-duty Diesel Truck / 6,667 lb payload - 2b	Diesel	Consumption mix
US	Truck	Truck - Livestock / 50,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - Lowboy / 45,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - LTL/dry van (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - Medium Heavy-duty Diesel Truck / 10,667 lb payload - 4	Diesel	Consumption mix
US	Truck	Truck - Medium Heavy-duty Diesel Truck / 13,000 lb payload - 5	Diesel	Consumption mix
US	Truck	Truck - Medium Heavy-duty Diesel Truck / 17,333 lb payload - 6	Diesel	Consumption mix
US	Truck	Truck - Medium Heavy-duty Diesel Truck / 22,000 lb payload - 7	Diesel	Consumption mix
US	Truck	Truck - Medium Heavy-duty Diesel Truck / 9,333 lb payload - 3	Diesel	Consumption mix
US	Truck	Truck - Mobile Home Toter / 38,000 lb payload - 8a	Diesel	Consumption mix
US	Truck	Truck - moving (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - package (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - Pole, logging, pulpwood, or pipe / 50,000 lb payload - 8b	Diesel	Consumption mix

Process List (Managed LCA Content)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
US	Truck	Truck - refrigerated (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - specialized (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - Tank, dry bulk / 50,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - Tank, liquid or gas / 50,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - Tank, Open Top / 50,000 lb payload - 8b	Diesel	Consumption mix
US	Truck	Truck - tanker (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - TL/dry van (EPA SmartWay)	Diesel	Consumption mix
US	Truck	Truck - Trailer, basic enclosed / 45,000 lb payload - 8b	Diesel	Consumption mix

European processes (3 processes)

Region	Category	Name (Category, Standard, weight)	Fuel	Type
RER	Articulated truck transport incl. fuel	Articulated truck transport incl. fuel, Diesel, Euro mix, 40 t total weight	Diesel	Technology and consumption mix
RER	Small truck transport incl. fuel	Small truck transport incl. fuel, Diesel, Euro mix, 7.5 t total weight	Diesel	Technology and consumption mix
RER	Truck transport incl. fuel	Truck transport incl. fuel, Diesel, Euro mix, 22 t total weight	Diesel	Technology and consumption mix

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