

Online Supplementary Material

Life cycle-based environmental impacts of ambitious energy system transformation strategies for Germany

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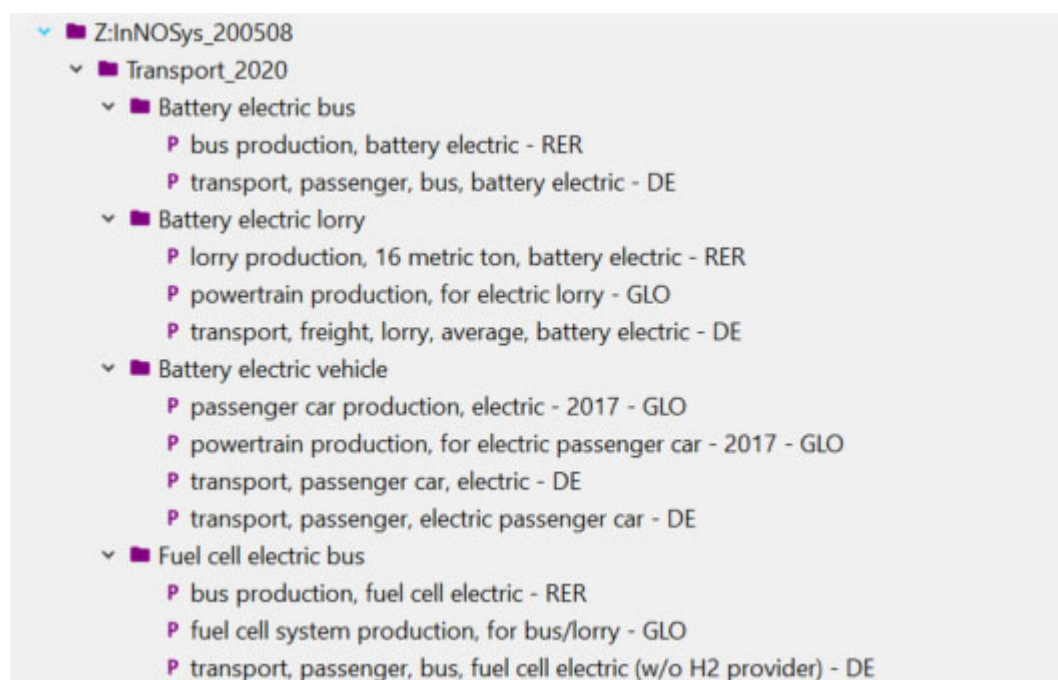
LCI datasets for passenger and freight transport with internal combustion engines, battery electric, fuel cell electric and plug-in hybrid drive trains.

This supplementary document gives an overview over the life-cycle inventory (LCI) datasets which can be found in the separate zip file and an explanation how to use them.

The production datasets refer to European or global conditions whereas the transport datasets refer to German conditions. The reference unit for freight transport is ton kilometer (tkm), for passenger transport person kilometer (pkm).

The following sources were used: Ceuster et al., 2009; Simons and Bauer, 2015; Miotti et al., 2017; Cox, 2018; Spielmann et al., 2007; Öko-Institut e.V. and DLR-Institut für Verkehrsforschung, 2009; Knörr et al., 2011; Mottschall and Bergmann, 2013; infas Institut für angewandte Sozialwissenschaft GmbH, 2018; Notter et al., 2019. Background processes were taken from ecoinvent v.3.3, allocation, cut-off by classification.

The following screenshots display the processes included in the zip file. The zip file is an export in JSON-LD format from openLCA, which is a free LCA software. Importing the datasets in an empty database makes it possible to trace the underlying data. Only by importing them to an ecoinvent v3.3 database an impact assessment becomes possible. An import to higher versions of ecoinvent might be erroneous due to differences in flow names and waste modelling.



- ▼ ■ Fuel cell electric lorry
 - P lorry production, 16 metric ton, fuel cell electric - RER
 - P transport, freight, lorry, average, fuel cell electric (w/o H2 provider) - DE
- ▼ ■ Fuel cell electric vehicle
 - ▼ ■ Cox
 - P disposal, fuel cell system - GLO
 - P passenger car production, fuel cell electric - GLO
 - P powertrain production, for fuel cell electric passenger car - 2017 - GLO
 - P transport, passenger car, fuel cell electric (w/o H2 provider) - DE
 - P transport, passenger, fuel cell electric passenger car (w/o H2 provider) - DE
 - ▼ ■ components
 - P balance of plant production, for fuel cell passenger car - GLO
 - P bipolar plates production, for fuel cell stack - GLO
 - P carbon fiber tank (187kWh) production, for fuel cell passenger car - GLO
 - P catalyst production, for fuel cell stack - GLO
 - P fuel cell stack production, for fuel cell system - GLO
 - P fuel cell system production, for passenger car - GLO
 - P gas diffusion layer production, for fuel cell stack - GLO
 - P membrane electrode assembly, for fuel cell stack - GLO
 - P membrane production, for fuel cell stack - GLO
 - P other and assembly, for fuel cell stack - GLO
- ▼ ■ Internal combustion engine
 - P transport, freight, lorry, average, CNG - DE
 - P transport, freight, lorry, average, diesel, EURO 6 - DE
 - P transport, passenger car, average, CNG, EURO 6 - DE
 - P transport, passenger car, average, diesel, EURO 6d - DE
 - P transport, passenger car, average, petrol, EURO 6d - DE
 - P transport, passenger, passenger car, CNG, average, EURO 6 - DE
 - P transport, passenger, passenger car, diesel, average, EURO 6d - DE
 - P transport, passenger, passenger car, petrol, average, EURO 6d - DE
 - P transport, regular bus, CNG, EURO 6 - DE
 - P transport, regular bus, diesel, EURO 6 - DE
- ▼ ■ Plug-in hybrid bus
 - P bus production, plug-in hybrid - RER
 - P transport, passenger, bus, plug-in hybrid - DE
- ▼ ■ Plug-in hybrid lorry
 - P lorry production, 16 metric ton, plug-in hybrid - RER
 - P transport, freight, lorry, plug-in hybrid - DE
- ▼ ■ Plug-in hybrid vehicle
 - P passenger car production, plug-in hybrid - GLO
 - P transport, passenger car, plug-in hybrid (petrol) - DE
 - P transport, passenger, plug-in hybrid (petrol) passenger car - DE
 - P transport, freight - DE
 - P transport, passenger - DE

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