EcoTransIT World

Emission calculation of road freight transports based on an energy-based bottom-up approach

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IVE mbH

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Introduction

Why calculating greenhouse emissions in freight transport?

- Company strategy/vision, SBTI commitments, etc.
- Demands from customers (reporting, net-zero goals)
- Regulations (local and global)
- Decision making

You can’t control what you can’t measure!

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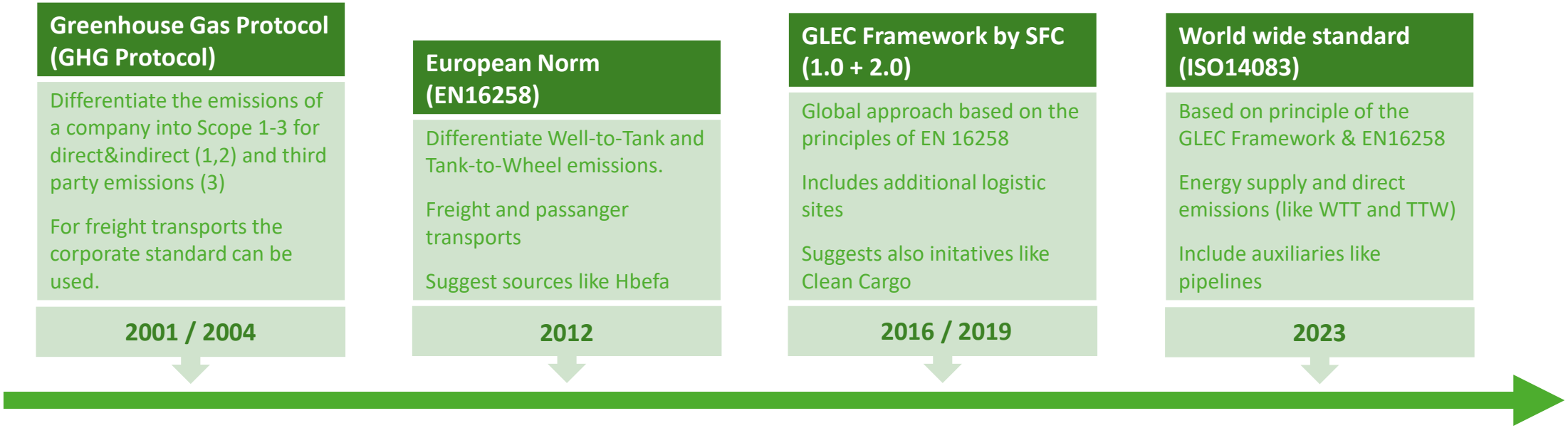
What do you need? Methodology

Norms and Frameworks regarding GHG emission calculation



EcoTransIT World (est 1998) is compliant to all standards and GLEC Framework and supports the ISO 14083 process.

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What do you need? Data

Calculation parameter with high result influence

- Truck: truck type, load factor (truck load), fuel type (bio)
- Train: train type, train weight, load factor
- Ocean vessel: ship category, carrier code, trade lane
- Aviation: carrier, flight number
- Inland vessel: ship category, ship size

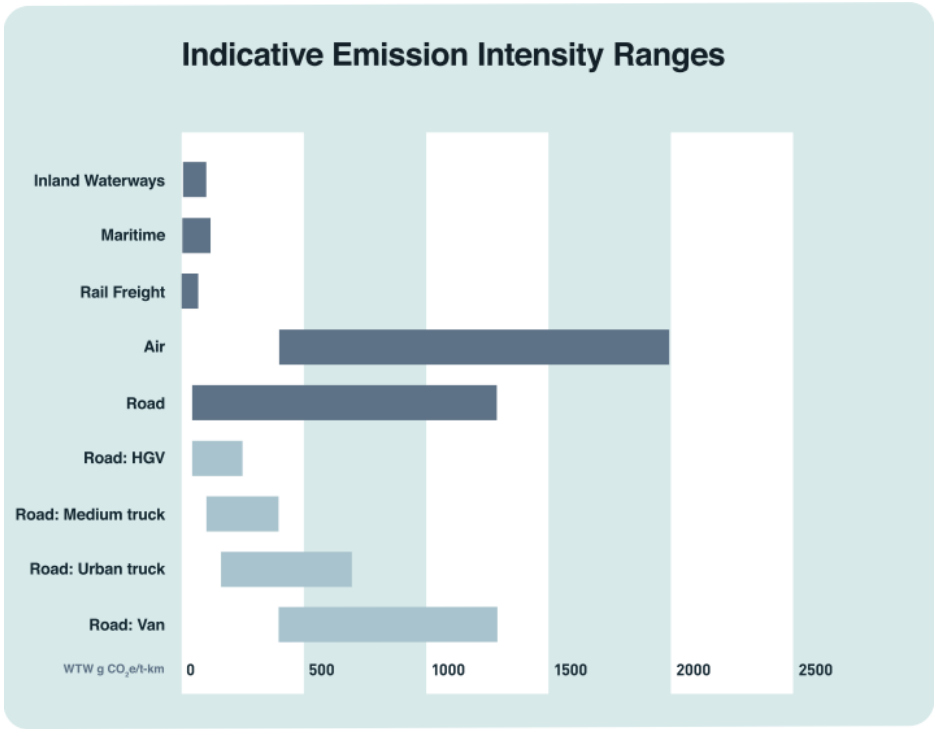

Figure 21. Examples of WTW emission intensity values for different types of freight transport, based on 2019 GLEC default factors.

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WHO WE ARE

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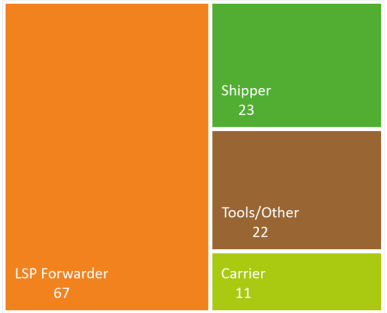
Partners and history

EcoTransIT World Initiative

Platform for ETW users

- Webinars & web meetings
- Methodology, Marketing
- Initiatives and norms like SFC (GLEC), ISO 14083
- Working groups



Further developments

- Joined decisions making
- Standard feature implementation for all users
- Financed via the EWI budget (non-profit)

Scientific support

ifeu INFRAS — Calculation Methodology

Fraunhofer IML — Energy and Emissions Data

Product Owner

IVE mbH

Single point of contract
Development
Coordination & IT

Provider

ALPHALINER, skailark, GEOFABRIK, FleetMon, OAG, Clean Cargo, GeoPostcodes

Implementation History

1998	**Start of work**
2003	First version for European freight transports
2006	Usage of GIS-based routing
2008	First Business Solution
2010	**Launch of EcoTransIT World**
2012	EcoTransIT World Initiative (EWI)
2014	Clean Cargo and OAG flight data
2017	CNG, LNG and electrified trucks
2019	Logistic Sites, Electricity Mixes
2020	External Cost, Air network
2021	Biofuels / feedstocks, AIS-based sea calculation
2022	ISO 14083 adjustments, H2 trucks, update train energy consumption
2023	Satellite-based aviation calculation

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METHODOLOGY AND EMISSION CALCULATION

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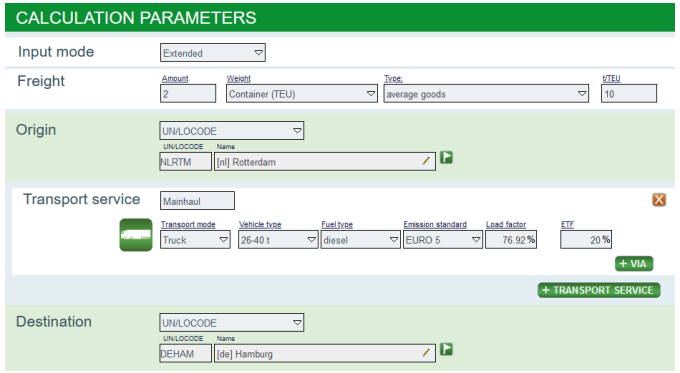
Input and output

Input

Freight	**Gross weight** as tons, TEU, FEU, pallets
Locations	**Origin / Destination** as postal code, UN-/Locode, station code, IATA code, coordinates, city name
Transport	**Transport mode** optional vehicle type, load factor, fuel type, biofuel type + feedstock, emission classes …



Output

Route information	Detailed routing per TM inclusive automatic via points
Energy consumption	Based on bottom-up approach
Green-House Gases	GHG as CO_2 / CO_2 equivalent
Air pollutants	NO_X SO_X NMHC PM_{10}
External Cost	Caused by climate change, air pollutants, accidents, noise

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Intensity-based top-down approach

Total emissions = intensity · freight weight · distance

Total CO2e = gCO2e / tkm · tonnes · kilometer

Emission intensities can be taken f
like GLEC Framework, Def

Everything is in the int
Vehicle, Allocation, Fuel type, Route information, …

Every new scenario or technique needs many new intensities values

Not in EcoTransIT World

ation needs to be done by the user or tool.
erentiation like country-wide parameters

tensity obliged to be aligned with the distance calculation (GCD, SFD, DAF)

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Energy-based bottom-up approach

1. **Routing from origin to destination**
2. **Determination of energy consumption**
3. **Emission calculation**
4. **Summation of all section emissions**

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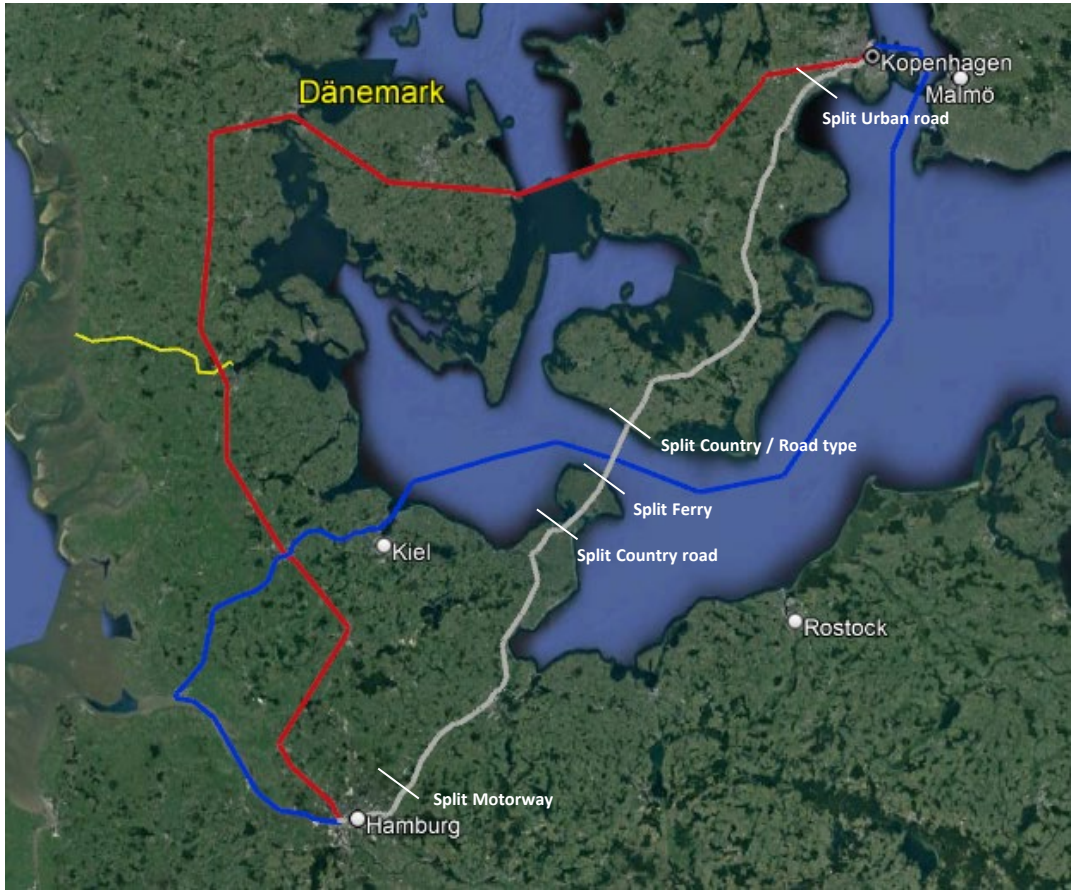

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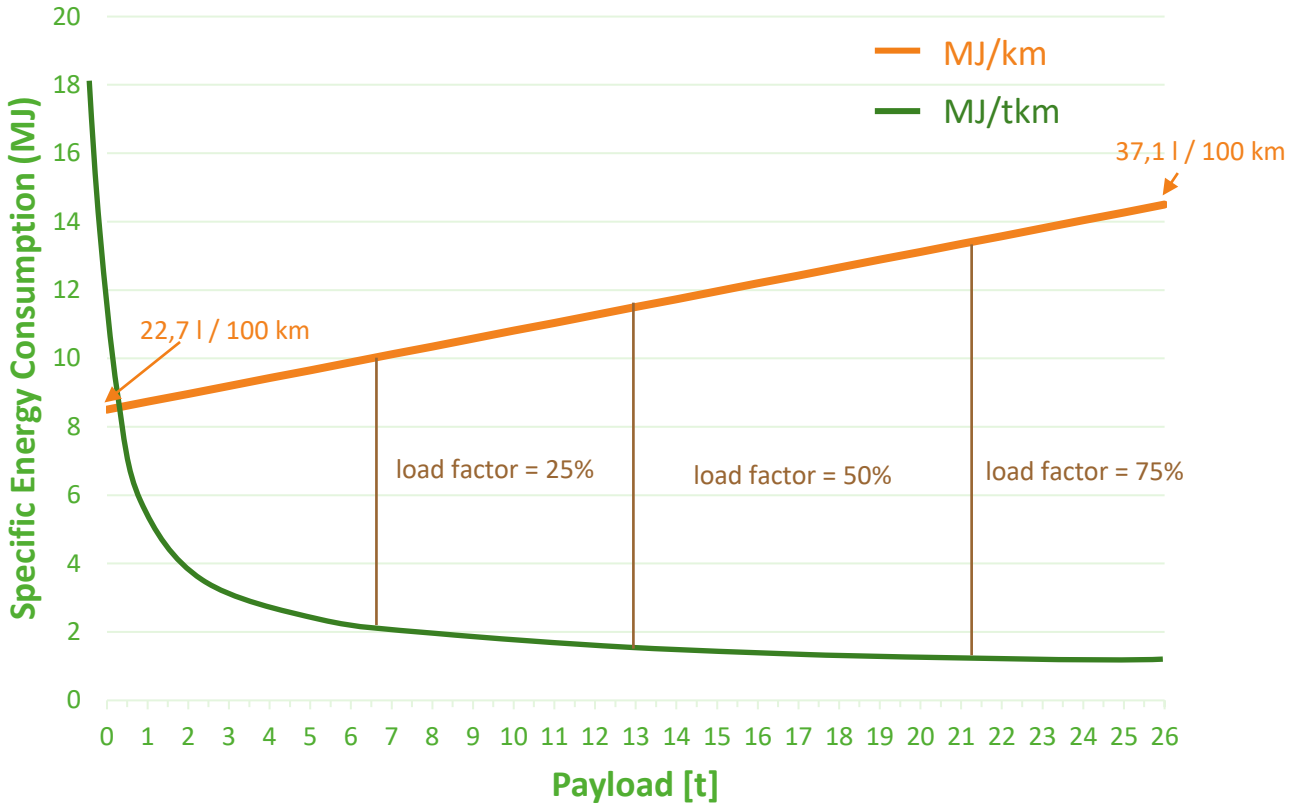

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Vehicle parameters

Energy consumption curves exist for each:

- truck class
- emission standard
- street category

Different truck vehicles can be modelled with the respective parameters:

- truck body: type and weight
- truck appliance: load factor, loads (FTL, FCL, LTL)
- cooled transports
- fuel types

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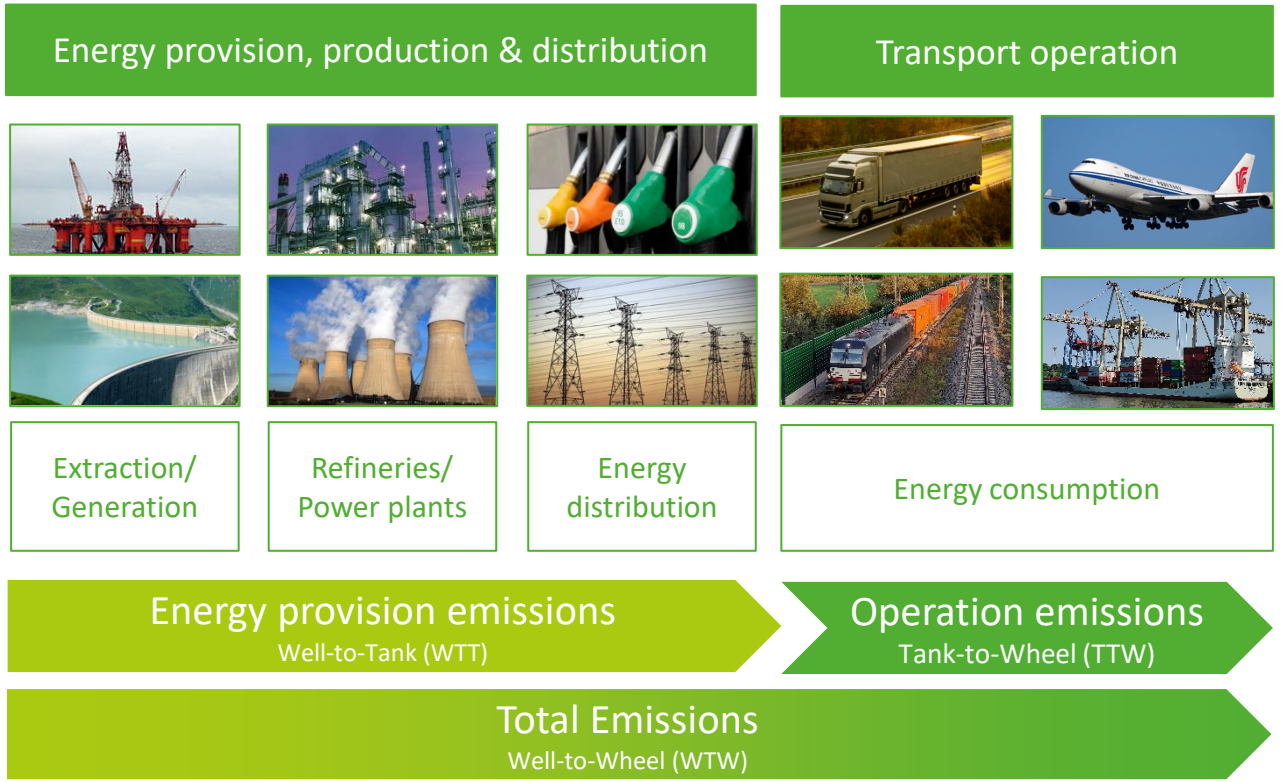

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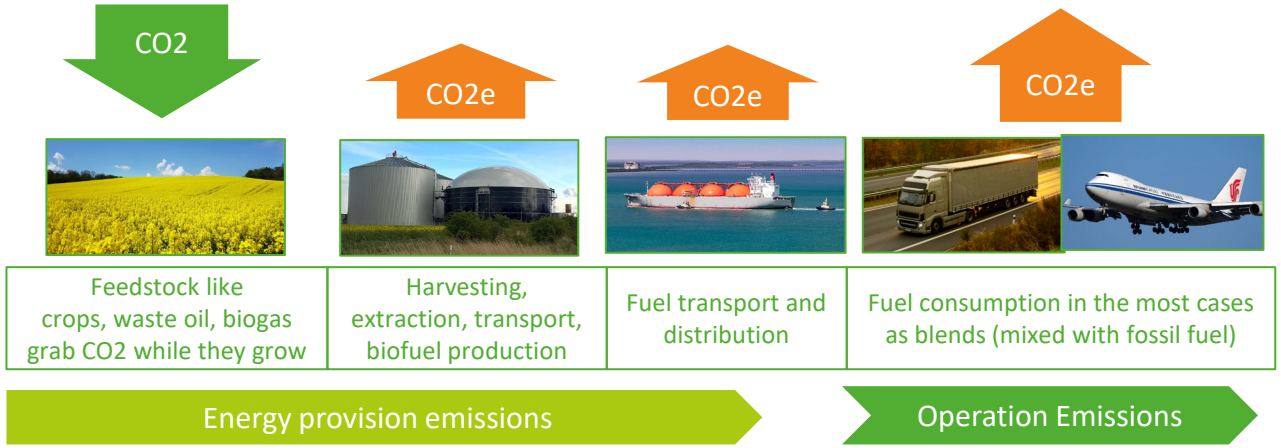
Energy carriers

Petrol, Diesel, LNG, CNG, Electricity, Hydrogen (grey, green, yellow)

Biofuels with different feedstocks

- Biodiesel
- HVO/Hefa
- Bio ethanol
- Bio methane CNG
- Bio methane LNG



Primary data: Input of own fuel consumption or own certified energy factors (book & claim contingents)

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Practical example

Truck: class40, EuEuro5, 60% load factor

Freight weight: 1 ton

Scenario 1: 500 km in China → (a) diesel, (b) BEV
Scenario 2: 500 km in Sweden → (a) diesel, (b) BEV

	Diesel	BEV	Diesel - BEV
China	0,0375 t CO2e WTW	0,0570 t CO2e WTW	**+ 52%**
Sweden	0,0323 t CO2e WTW	0,0022 t CO2e WTW	**- 93%**

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CONCLUSION

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Benefits – why companies are using the tool

Global	Provides energy consumption, greenhouse gas, exhaust emissions and external cost of any global transport chain
Intermodal	Includes all transport modes in a consistent way (truck, rail, air, sea, barge)
GIS-based	Supports ex-ante assessment through energy-based bottom-up approach incl. automatic routing function and GIS based networks and destinations
Reliable	Proven public methodology developed and regularly updated by independent scientific institutions including a certified integration process (ISAE 3402)
Flexible	Possibility to integrate individual data (e.g. fuel consumptions, emissions per MJ, etc.) realized by double calculation
Compliant	Compliant with international standards (e.g. ISO 14083 & GLEC accredited)
Ready	Standard Interfaces of the 'Business Solutions' enables instant emission calculation for interested customers
Together	From the industry for the industry. Joint approach realized by the EcoTransIT World Initiative.

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