

Introduction

Intermodal freight transport consists in the shifting of road freight transport in long distances to others modes of transport with improved environmental performance such as rail freight transport and inland waterways transport. At the intermodal terminal, the goods are transferred between modes of transport.

Firstly, we have carried out the Life Cycle Assessment (LCA) of rail freight transport, inland waterways transport and road transport independently. Then, we have studied the environmental impacts related to intermodal freight transport.

LCA of freight transport in Belgium

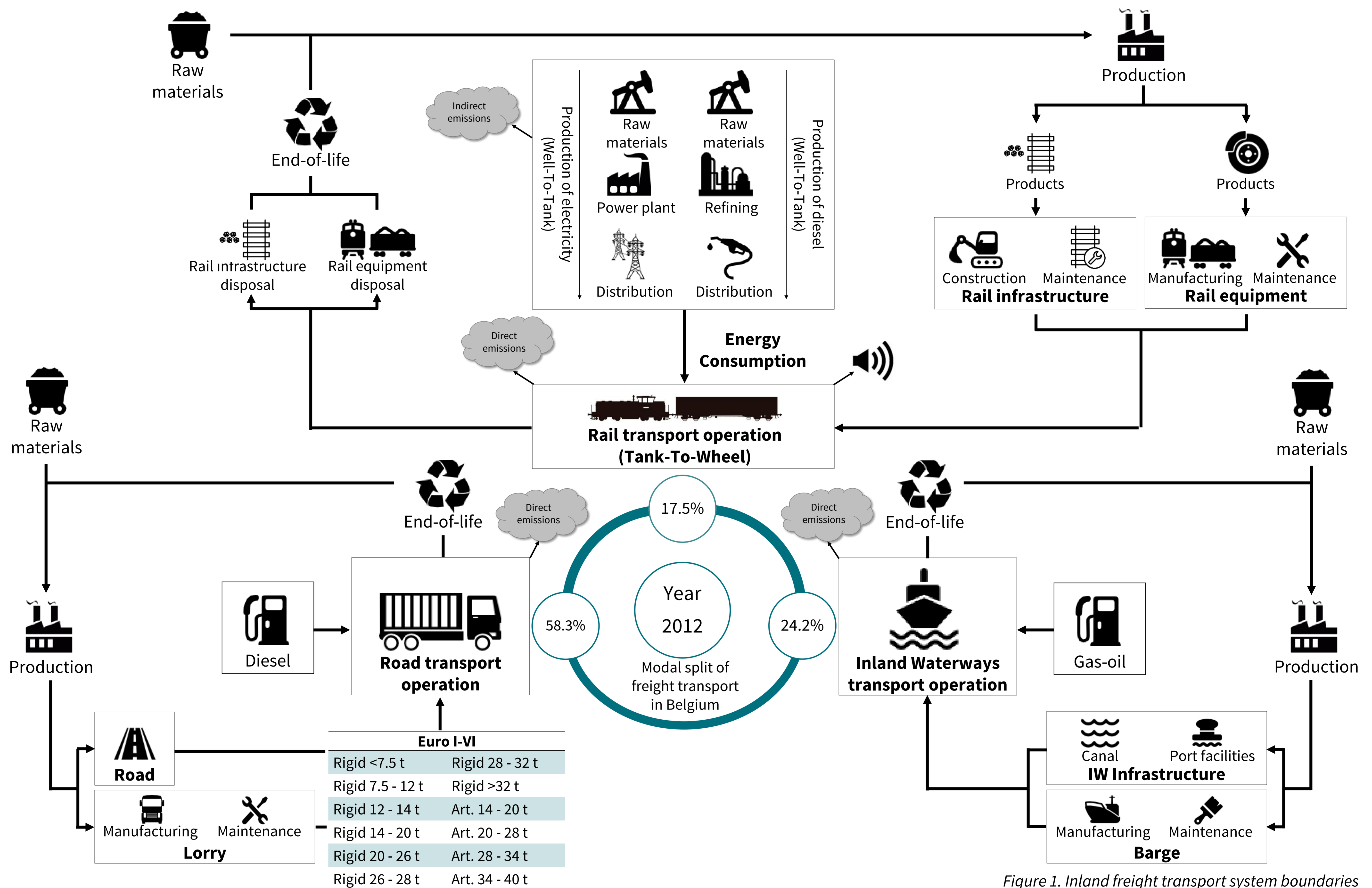


Figure 1. Inland freight transport system boundaries

LCA of an intermodal transport route

- In collaboration with Terminal Container Athus (Belgium), we have collected data in both the intermodal route "Port of Antwerp - Terminal Container Athus" and the handling of containers in the intermodal terminal.
- We have considered a consumption of 16 560 kJ/TEU [1] for the transshipment in Port of Antwerp, a gross weight of 14.3 t/TEU [2] and a capacity of 70.3 TEU/train and 2 TEU/lorry.

Road transport is the shortest possible route, but is it worth from an environmental point of view?

- Diesel trains reach the maximum impact in 4 indicators mainly as a result of the exhaust emissions. Electric trains show the maximum impact in 3 indicators, being 2 of them related with the radiation due to the use of nuclear power in the electricity production.
- The art. lorry of 34-40 t Euro VI presents the maximum impact in 6 indicators. For the indicators photochemical ozone formation, acidification and terrestrial eutrophication, it has a lower impact than diesel trains due to the lower exhaust emissions on NMVOC and NO_x of the Euro VI engine technology.

Main characteristics of the intermodal route "Port of Antwerp - Terminal Container Athus"		Main haulage by train	Main haulage by road
1. Transshipment in the Port of Antwerp (kJ)		1 164 030	
2. Main haulage	Load factor [2]	75%	85%
	Tonnage (t)	754	854
	Distance (km)	307	245
3. Transshipment in Terminal Container Athus		231 441	209 327
4. Post-haulage	Electricity (kJ)	365 831	
	Diesel (MJ)	3 188	
	Load factor [2]	60%	
	Tonnage (t)	603	
		50	
		30 155	

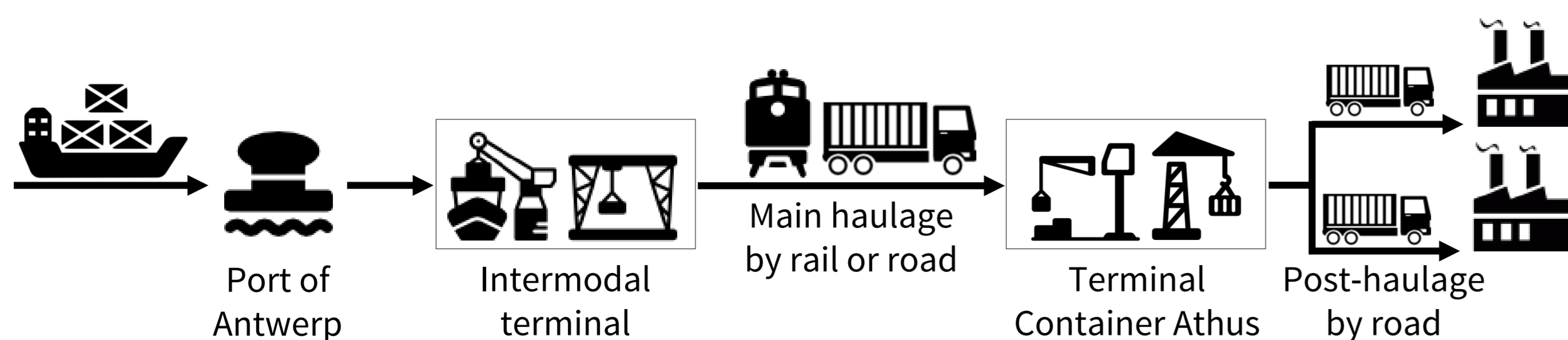
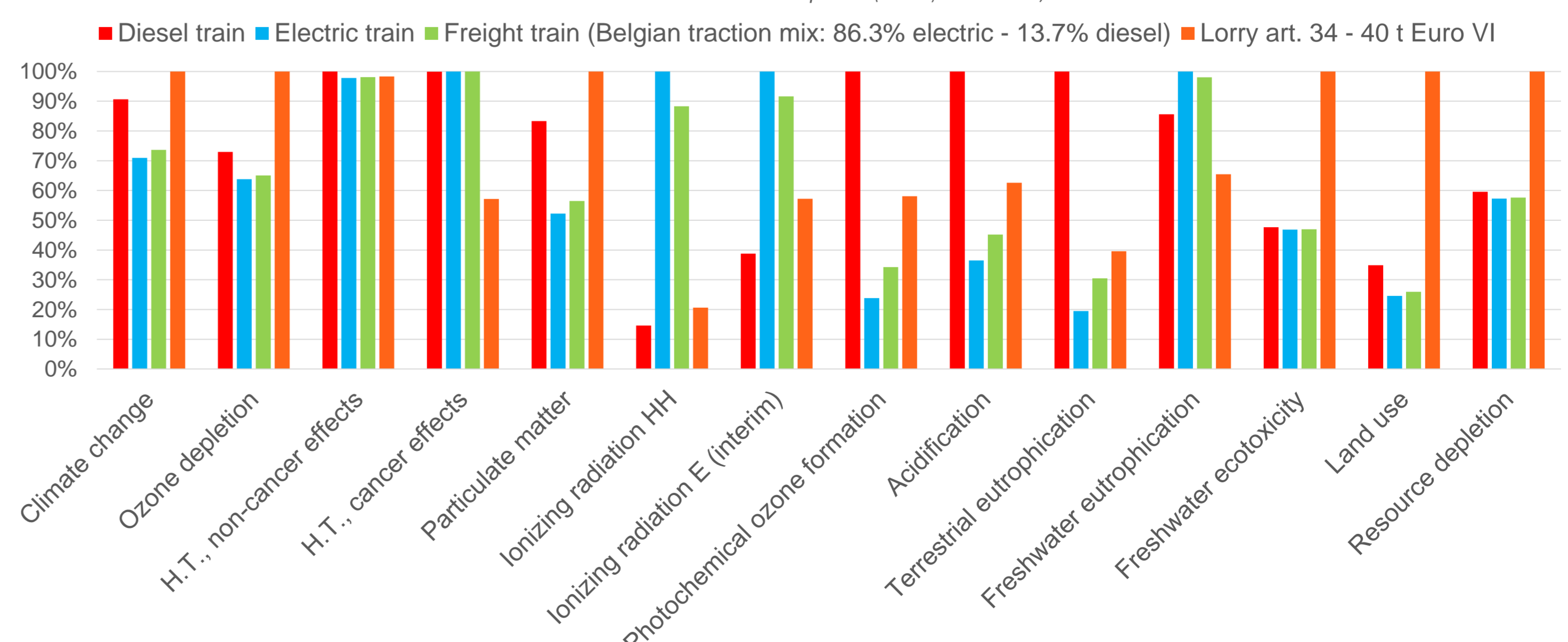


Figure 2. Intermodal route "Port of Antwerp - Terminal Container Athus (Belgium)"

LCA of the intermodal route "Port of Antwerp - Terminal Container Athus" - SimaPro 8.0.5 - ILCD 2011 Midpoint+ (v1.06 / EU27 2010) -



Conclusions and perspectives

- Intermodal freight transport represents an opportunity to attain a more environmentally and health friendly, energy-efficient and competitive transport system.
- Study of how the possible increase of rail freight transport in the modal split affects the environmental impact of inland freight transport in Belgium.