

## Introduction

**Intermodal freight transport** represents an opportunity to achieve a more environmentally and health friendly, energy-efficient and competitive transport system. It 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. The use of road transport is limited to the shortest possible initial and final parts of the transport chain. At the intermodal terminal, the goods are transferred between modes of transport.

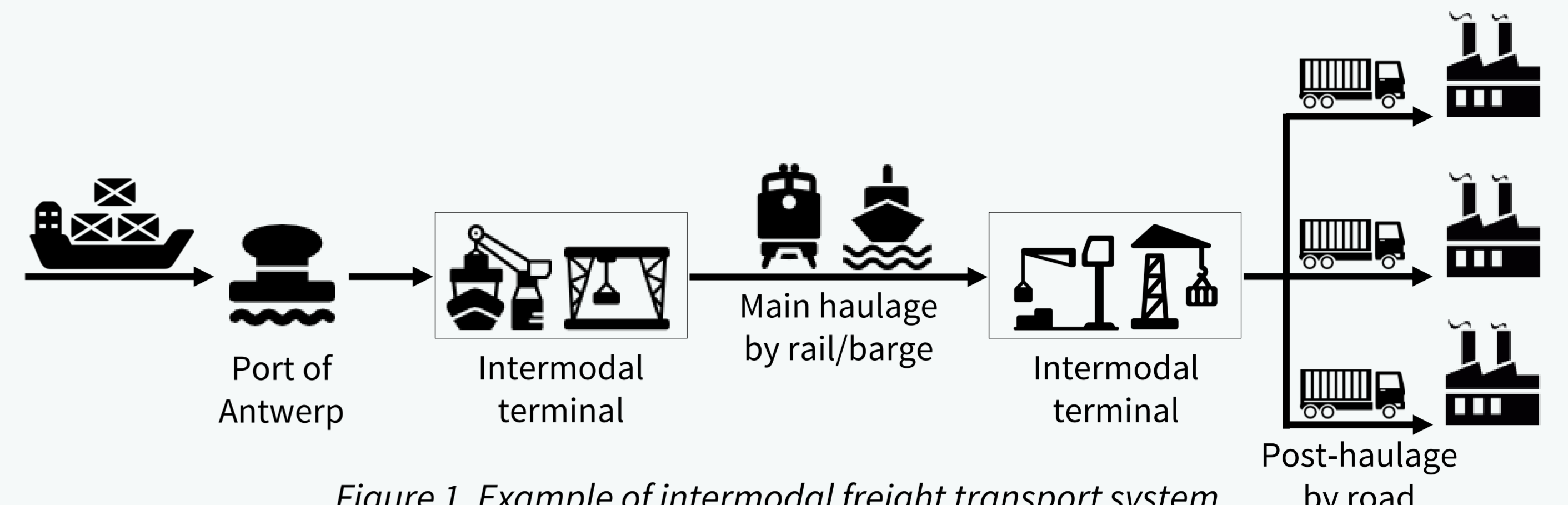


Figure 1. Example of intermodal freight transport system

## Life Cycle Assessment of freight transport in Belgium

Life Cycle Assessment (LCA) methodology has been chosen to analyse the environmental impact of freight transport in Belgium.

In a first stage we have carried out the LCA of rail freight transport, inland waterways transport and road freight transport independently.

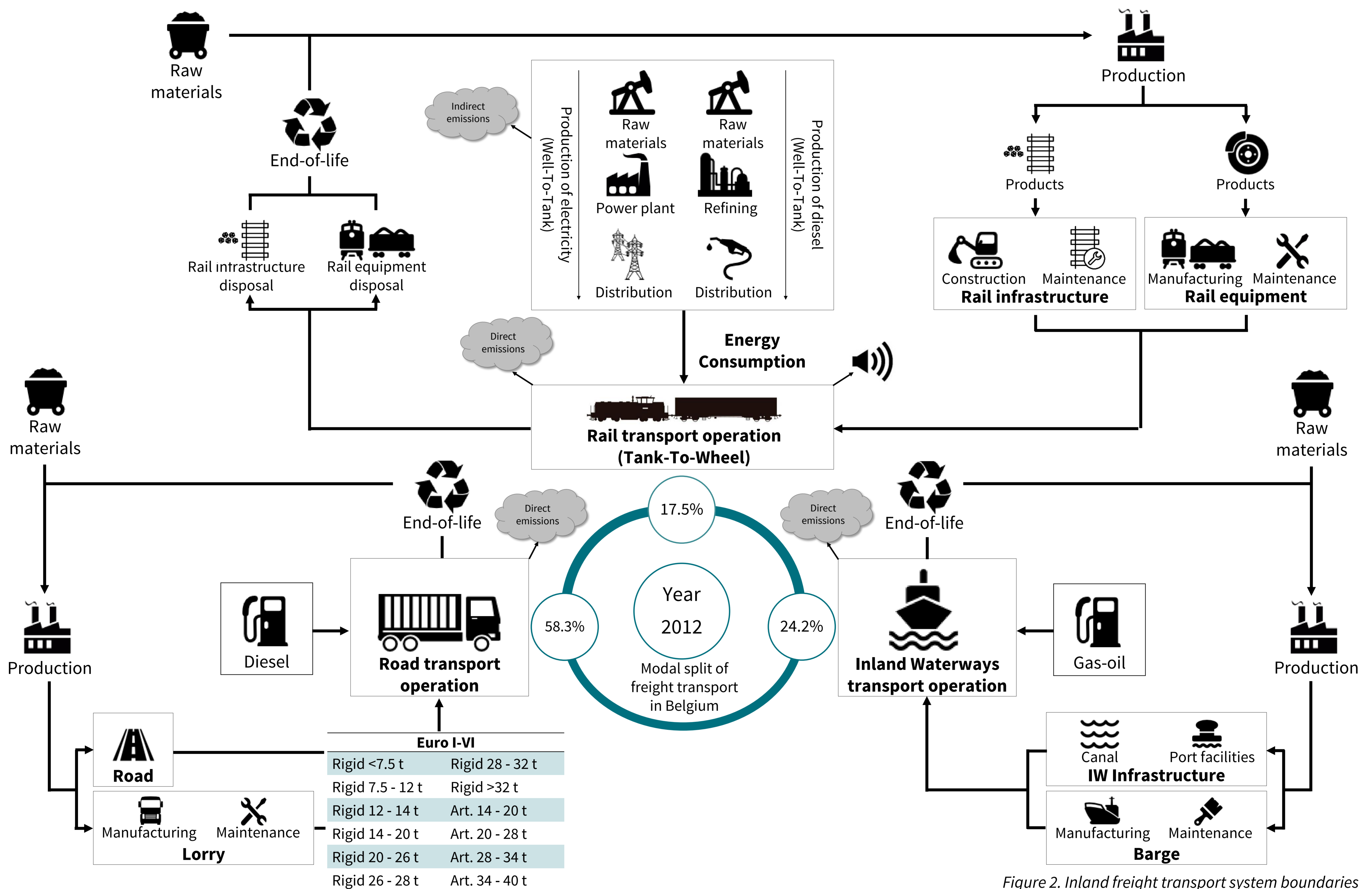
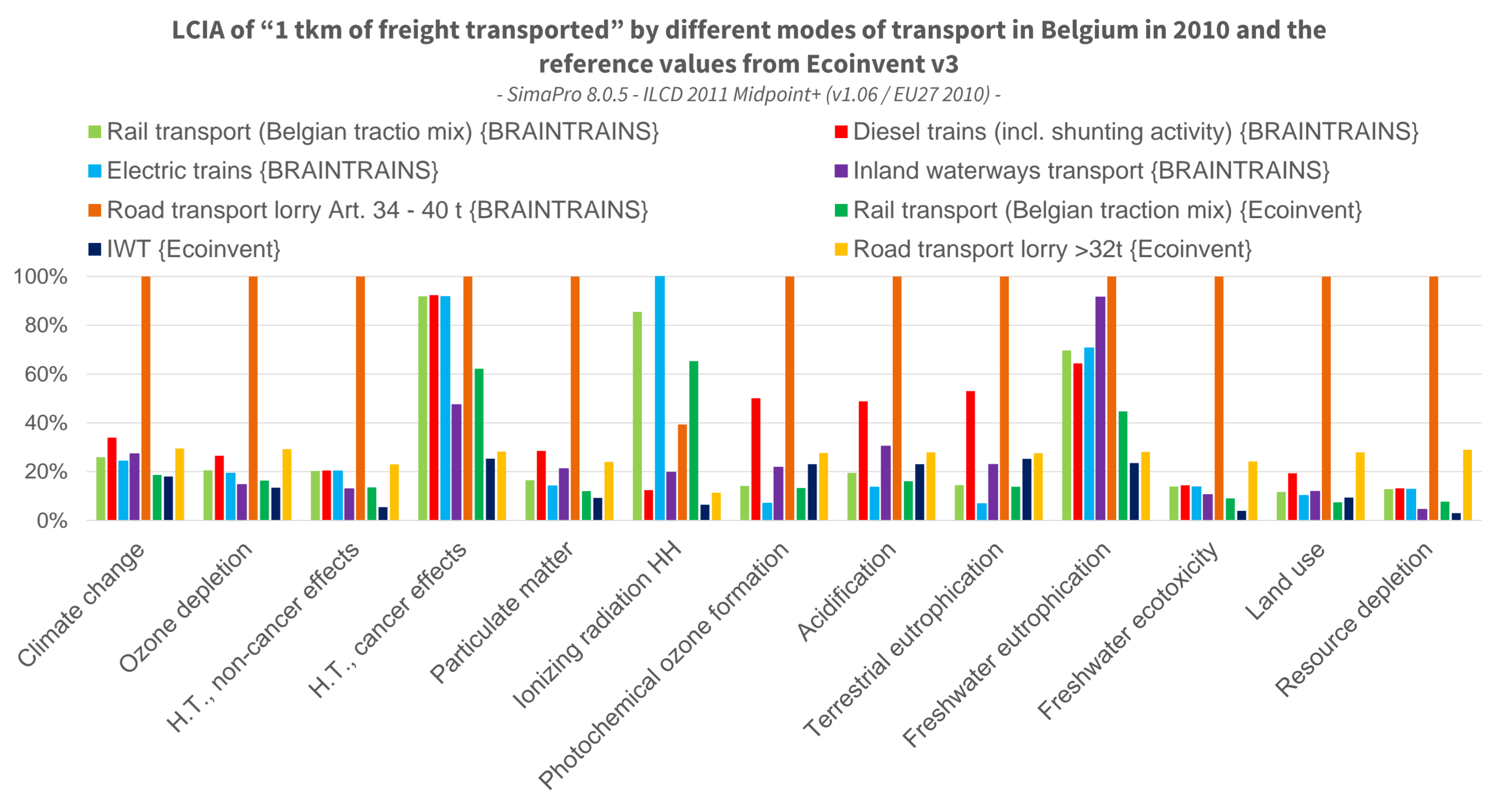


Figure 2. Inland freight transport system boundaries

## Life Cycle Impact Assessment

- Road transport shows the maximum impact in most of the indicators due to the highest exhaust emissions calculated. Road transport presents an elevated fuel consumption and this, together with the low load factor considered [1], has caused the high exhaust emissions.
- Electric trains present the maximum impact in the indicator related with the radiation due to the use of a 42% of nuclear power in the electricity production in Belgium in 2012 [2]. The use of a 22% of natural gas in the electricity generation [2] is responsible for the main GHG emissions.
- Inland waterways transport is the most energy-efficient mode of inland freight transport. Within rail freight transport, electric traction has the lowest energy consumption, while diesel traction has the highest. The Belgian traction mix, which includes a combination of electric (86.3%) and diesel traction (13.7%), achieves an intermediate consumption.



## Conclusions and perspectives

- Improvement of the methodology with the inclusion in the model of information relative to the Belgian railway infrastructure and the rail equipment used in Belgium. Information has been collected from Infrabel (the Belgian railway infrastructure manager) and B-Logistics, which is the main rail freight operator in Belgium.
- Improvement of the results of our study through the collection of data on load factors from road freight operators involved in intermodal transport and use of sensitivity analysis.
- Study of the environmental impacts related to existing intermodal freight transport routes, collecting data from intermodal freight operators.