Environmental impact assessment of rail freight intermodality

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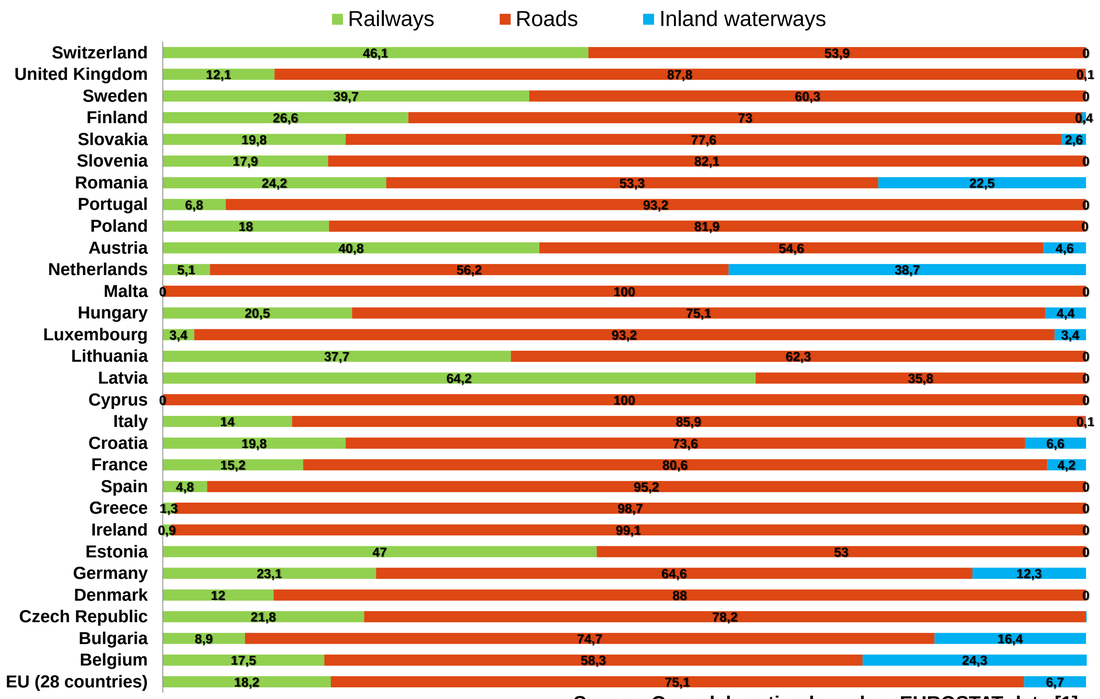
Introduction

The project BRAIN-TRAINS deals with rail freight intermodality from an interdisciplinary perspective (macro-economic, logistic, environmental and legislative), determining for several Belgian scenarios the environmental impact using the Life Cycle Assessment methodology.

« To develop a blue print establishing the detailed criteria and conditions for ***developing an innovative intermodal network in and through Belgium*** *as part of the Trans-European Transport Network (TEN-T) »*

Rail freight transport

Modal split of freight transport in 2012 (% in total inland freight ton-km)

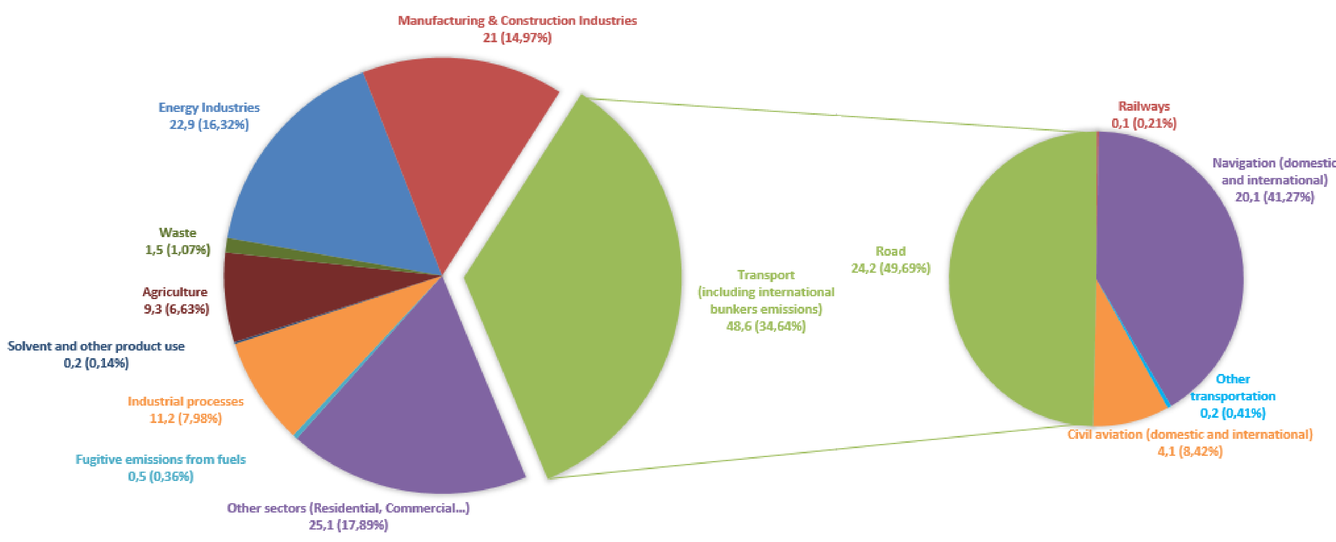


Source: Own elaboration based on EUROSTAT data [1]

Environmental impact studies on intermodality transport show that rail freight transport is the land-based transport that has a higher environmental performance compared to intermodal road-rail and all-road transport [2], especially when electrified railway is used [3].

Belgium meets the conditions for improving the development of the rail freight transport, such as presenting a high density of rail network and having the 2nd freight traffic EU seaport (Port of Antwerp) [1].

GHG emissions by sector Belgium 2012 (million tonnes CO_2 equivalent)



Source: Own elaboration based on EUROSTAT data [1]

	Freight 2012 (billion tkm)	Passengers 2012 (billion pkm)	GHG emissions 2012 (million tonnes CO_2 equiv)
Road transport	32.1	133.8*	24.2
Rail transport	7.3	12.41**	0.1
Road / Rail	4.4 times more	10.8 times more	242 times more

*Passenger cars, bus and coach ** Railway, Tram, metro and High speed rail

Rail freight transport could replace road transport in journeys longer than 300 km, but despite the fact that rail transport is more energy efficient, road transport is more flexible, causing its dominant use [4].

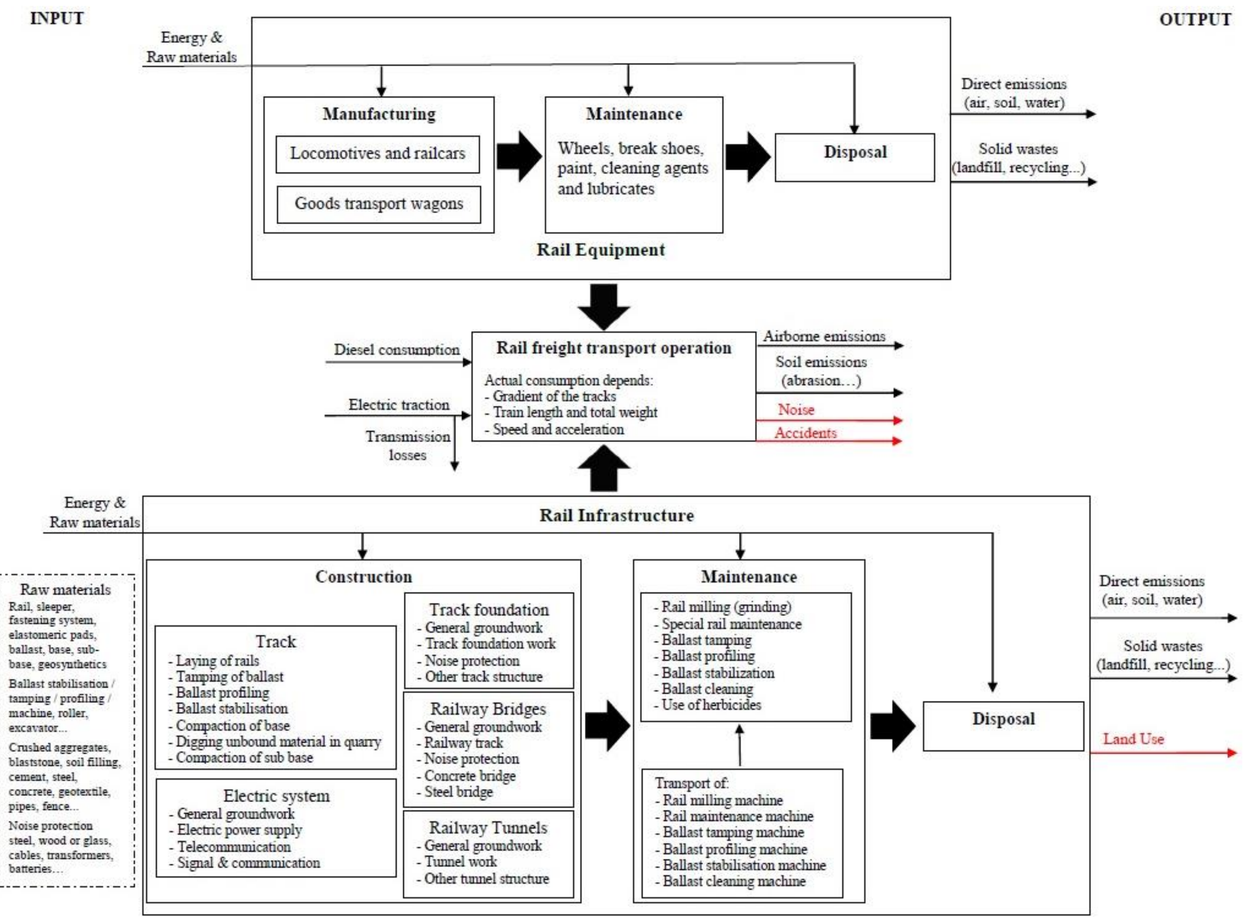
Life Cycle Asessment

More reliable sources of information will be identified and we will proceed to collect information through interviews with transport sector members and freight operators.

LCA studies demonstrate that all life-cycle phases of transport and not only the modelling of energy consumption and direct emissions are determinant for the environmental impact.

The rail freight transport system is divided as follows:

- **Life Cycle Inventory for rail operation:** the change of diesel engines for electric power is one of the key factors for sustainable rail transport.
- **Life Cycle Inventory for rail equipment**: locomotives and goods transport wagons.
- **Life Cycle Inventory for rail infrastructure**: allocation between passenger and goods transportation.



Source: Own elaboration based on Spielmann et al., 2007 [5]; The SMARTrail project and Stripple and Uppenberg, 2010 [6]

Conclusions and perspectives

1. It is required to improve the current methodology with the development and harmonization of new impact categories relative to **accidents damages**, **noise impact** and **land use** planning.

2. A study of external costs will be considered to complete the environmental impact assessment.

3. The results of this study could help in making optimised policy decisions relative to the development of intermodal transportation in Belgium including environmental aspects and allowing the pollution reduction.

4. A transportation database specific to Belgium will be developed. The results also improve the accuracy of current transport databases.

Bibliographie: [1] EUROSTAT (2015) Eurostat Statistics, retrieved from http://ec.europa.eu/eurostat/data/database. [2] Facanha, C. and Horvath, A. (2006) *Environmental assessment of freight transportation in the U.S*. The International Journal of LCA, Volume 11, Issue 4, pp. 229-239. [3] Spielmann, M. and Scholz, R.W. (2005) *Life Cycle Inventories of Transport Services. Background data for freight transport*. The International Journal of LCA, Volume 10, Issue 1, pp. 85-94. [4] Demir, E., Huang, Y., Scholts, S., Van Woensel, T. (2015) *A selected review on the negative externalities of the freight transportation: Modelling and pricing*. Transportation Research Part E: Logistics and Transportation Review, Volume 77, pp. 95-114. [5] Spielmann, M., Bauer, C., Dones, R., Tuchschmid, M. (2007) *Transport Services. Ecoinvent report No. 14*. Swiss Centre for Life Cycle Inventories, Dübendorf, 2007. [6] Stripple, H. and Uppenberg, S. (2010) *Life cycle assessment of railways and rail transports. Application in environmental product declarations (EPDs) for the Bothnia Line*. IVL Swedish Environmental Research Institute.