**Intermodal network design: a mixed-integer nonlinear model for costs and emissions minimization**

Freight transport has particularly grown in the last decades, with the internationalization of business activities. Even if the transport of goods is positive for the economic development, it also leads to negative impacts on the environment.

The promotion of intermodal transport, i.e. the transport of goods using two or more modes of transport, in the same loading unit, without handling of the goods themselves, is one way to reduce these undesirable effects. Intermodal transport development is in line with the objective of the European Commission to transfer 30% of road freight over 300 km to more environmentally friendly modes, by 2030.

Intermodal transport requires the use of intermodal terminals, where the transfer of goods between modes can occur. The location of these terminals is of strategic importance for ensuring intermodal competiveness.

We develop a bi-objective model which tackles the economic and environmental issues of transport, by focusing on costs and CO2 emissions minimization, and by taking into account three modes: road, intermodal rail and intermodal inland waterways transport. Economies of scale of intermodal transport are considered using nonlinear costs and emissions functions of the weight. Piecewise linear approximations of these functions are used for solving the problem. The Pareto optimal solutions of the bi-objective model are found using the epsilon-constraint method. The model is applied to the Belgian case study.