# Optimization of Trailer Transport

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20% of Europe's total GHG emission comes from road transportation, up 40% since 1995. Freight transport energy consumption, and thus emission levels, is tightly coupled to GDP. So if Europe seeks to dramatically reduce GHG emissions without sacrificing economic growth, it is crucial to address the issue of energy efficiency within the road transportation sector. Today, empty journeys comprise 25%-40% of all road haulage. This means that road transportation energy efficiency per goods delivered can potentially be increased by one-third by optimizing routing plans. In this project, it will be investigated how such an optimization can be carried through to illustrate the possible efficiency gain. The strength of logistic optimization opposed to energy technology innovations are the simple facts that there is no long process of refitting the fleet of vehicles and no resource consumption associated with realizing the reductions. Emissions can be cut immediately and costless.

The problem instance considered is that of container transportation. Moving a container over long distances from one point to another can be done as a sequence of moves using some intermediate points. The first truck is picking up the container at its origin and moving it to the first intermediate point, where it is dropped off. Later, an empty second truck arrives to pick it up and drive it to the next drop off point. The last truck finally delivers the container at its destination.

The optimal route for a network of trucks and containers, minimizing total distance travelled, will be sought using the tools of integer programming. The aim is thus to describe and solve the problem instance and consider the scalability of the chosen solution approach. If a solution approach for large scale problems of this type can be found, it will allow haulers, and hauler-alliances, to reduce their amount of empty journeys, benefiting their profit margin and the environment.