EU Transport GHG: Routes to 2050?
Modal shift and decoupling transport growth from GDP growth for freight transport

Huib van Essen, CE Delft
Focus group meeting 2a
7 July 2009, European Commission

www.eutransportghg2050.eu
Overview of presentation

1. Modal shift freight transport
   • Trends
   • Drivers
   • Modal comparison
   • Potential of modal shift
   • Policy options

2. Decoupling freight transport from GDP growth
   • Trends
   • Drivers
   • Policy and barriers options

3. Conclusions/discussion/questions
Projected development freight modal split

Source: DG TREN
Drivers behind trends in modal split

- Road took more advantage of the dismantling of trade barriers
- The road sector is liberalised to a great extent; liberalisation rail resulted in close of some tracks and higher rates due to charges.
- Increasing demand for ‘just-in-time’ delivery, speed and flexibility, usually better served by road.
- Share of perishable and high value goods is rising, usually better served by road.
- Changing spatial planning and infrastructure development: many destinations can only be reached by road.
- Large share of road is short distance, for which rail or inland waterways can hardly compete.
- Lack of standardisation of convenient and fast connections between inland waterways and rail.
Modal comparisons (1) – EU averages

CO₂ emissions per tonkm in 2030

- Light duty truck
- Heavy duty truck 3.5-7.5t
- Heavy duty truck 7.5-16t
- Heavy duty truck 16-32t
- Heavy duty truck >32t
- Freight train
- Inland ship

Source: Tremove
Modal comparisons (2) – NL specific markets

CO2 (g/tonne-km); Bulk; Short Range; 2020

Heavy duty truck >20 ton
Articulated lorry
Train (electric)
Train (diesel)
Inland ship (350 ton)
Inland ship (550 ton)

Source: STREAM
Modal comparisons (3) – NL specific markets

![CO2 (g/tonne-km); Bulk; Long Range; 2020](image)

Source: STREAM
Modal comparisons (4) – NL specific markets

**CO2 (g/tonne-km); Containers; Long Range; 2020**

- Heavy duty truck >20 ton
- Articulated lorry
- Train (electric)
- Train (diesel)
- Inland ship (200 TEU)
- Inland ship (470 TEU)
- Sea freight (150 TEU)
- Sea freight (580 TEU)
- Sea freight (1900 TEU)

Source: STREAM
Conclusion from modal comparisons

- Comparisons depend on assumptions:
  - Comparing modes or complete transport chains
  - Vehicle capacity and utilisation
  - Long term emissions trends
- Higher capacity vehicles have relatively lower emissions per tkm
- Rail and the higher capacity ships have lowest emissions per tkm
- Road transport emissions per tkm are on average the highest (except air freight), logistic characteristics are decisive.
- Vehicle utilisation rail and inland shipping higher than road: modal shift may reduce their vehicle utilisation => lower reductions
- The emissions from air freight are an order of magnitude greater than surface bound modes
- Modal comparison at the long term uncertain.
## Potential modal shift freight transport

<table>
<thead>
<tr>
<th></th>
<th>Reduction CO$_2$ emission</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STREAM</td>
</tr>
<tr>
<td>Heavy duty truck to rail</td>
<td>55%</td>
</tr>
<tr>
<td>Articulated lorry to rail</td>
<td>35%</td>
</tr>
<tr>
<td>Air to Articulated lorry</td>
<td>89%</td>
</tr>
<tr>
<td>Air to rail</td>
<td>93%</td>
</tr>
</tbody>
</table>

• Potential shift in tkm found in literature: 9% of road volume
• Potential CO2 reduction of modal shift road to rail found in literature: about 4% in 2050.
• No agreement on the overall potential CO2 reduction of modal shift freight:
  • some: very limited potential against high cost
  • others: up to 23% CO2 reduction potential
• Various co-benefits
Policy that can contribute to modal shift

- Infrastructure policy
- Spatial policy
- Improving interconnectivity of intermodal networks
- Transport pricing
Decoupling

- Demand growth is the main driver behind the growth in GHG emissions from freight transport
- Contents:
  - Trends
  - Drivers
  - Policy options and barriers
Current trend: no decoupling
GDP growth vs transport growth


Note: The figure shows the correlation between growth in the economy and growth in freight transport. The correlation is visible from the distribution, but it is also clear the there is a relatively broad range of different economic growth rates that can lead to the same growth in freight transport.

Main drivers behind freight transport growth

- Each tonne of final product is moved more often in the production chain.
- The concentration of production and inventories has resulted in an increase in the average haul distance.
- The increased purchasing power increases consumer choice and demand for goods that are increasingly sourced globally.
- Western economies are characterized by a move from production economies to knowledge service based economies.
- Firms minimize their total production costs by searching for economies of scale in production and distribution, locational advantages and reduced costs for warehousing.
- If transport costs decrease companies will use more transport in the optimum thereby save money on warehousing and production costs.
Policies and barriers

- **Urban planning**, e.g. compact cities to avoid urban sprawl and spatial optimization of the location of industries and distribution centres.
- **Transport pricing**, e.g. infrastructure pricing: higher (variable) prices tend to curb down transport growth (elasticity about -0.8).
- **Infrastructure policy**: infrastructure investments have the risk to increase transport growth.
- **Speed policy**: reduction of travel speed, e.g. by lower speed limits, decrease transport demand.
- **Other policies**, e.g. all types of regulation that prevent or discourage local production.
- **Main barrier for curbing freight transport demand growth**: the risk of adverse economic impacts.
Conclusions

- No modal shift to rail and water expected.
- Significant differences in average GHG intensity of modes.
- Impact of modal shift depends also on logistical parameters.
- Estimates for modal shift potential ranges from 4 to 23%.
- Demand growth main driver behind GHG.
- Globalisation, GDP growth and low cost of transport main drivers behind freight transport growth

Main policy options:
- Spatial and urban planning
- Infrastructure policy
- Transport pricing
Questions

• How much freight modal shift is possible till 2050?

• What do see as GHG reduction potential of freight modal shift?

• What would be needed for a substantial freight modal shift?

• Do you agree that freight transport growth is the main driver for freight transport GHG emissions?

• What do you regard as the main options for decoupling freight transport growth from GDP growth?