Nykänen Lasse

NORFREN - NORDIC COMPARISON ON THE FUTURE OF ROAD FREIGHT ENERGY EFFICIENCY AND CO₂ EMISSIONS

6. February / Stockholm
NORFREN

- **Project participants:** Transport Research Centre Verne, Tampere University of Technology, Finland; Department of Transport, Technical University of Denmark, Denmark; Institute of Transport Economics, Norway; Department of Business Administration, University of Gothenburg, Sweden

- **Schedule:** May 2012 – May 2013

- **The purpose:** To compare and to forecast the development of energy efficiency and CO₂ emissions of road freight transport in Denmark, Finland, Norway and Sweden.

- **The Data:** The national goods transport by road statistics (GTRS) and fuel consumption data from LIPASTO (2010) and NTM (2008).

- **Methods:** literature review, trend analysis, online haulier survey, Delphi survey and workshops
Trend analysis

Energy efficiency

CO₂ emissions
Online haulier survey

Energy efficiency index (EEI)

- The EEI consists of three aspects related to the energy efficiency of hauliers: monitoring, energy efficiency actions and future prospects.
- The two best hauliers achieved 81 points out of the maximum 100 points.
- The more lorries the company operates, the higher the average EEI is.
- EEI is also affected by the customer interest and the type of cargo the company primarily transports.

Monitoring

- Typical monitoring is done manually when filling the tank and data is then kept on a computer.
- In terms of target setting there are significant differences between countries
  - 89% of Norwegian hauliers have set targets for reducing fuel consumption, but only 55% of Danish hauliers have done the same.

Energy efficiency actions

- The total average is dominated by Finland, but Finland has fairly low levels of utilization in many actions.
- Norway has high levels of utilization in many actions.
  - e.g. ecodriving training and monitoring and low consumption lorries.

Future

- Hauliers have similar opinions on ecodriving monitoring and bonus schemes.
- Swedish hauliers see energy efficiency reporting more likely than others.
- In terms of the use of hybrid vehicles there are big difference between countries.
  - In Finland 4% consider it likely, while in Sweden 31% consider it very likely and 7% likely.
## Delphi survey

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Finland 2010</th>
<th>2030</th>
<th>Norway 2010</th>
<th>2030</th>
<th>Sweden 2010</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP [billion €]</td>
<td>142</td>
<td>200</td>
<td>179</td>
<td>259</td>
<td>283</td>
<td>330</td>
</tr>
<tr>
<td>Value density [€/t]</td>
<td>323</td>
<td>480</td>
<td>563</td>
<td>897</td>
<td>767</td>
<td>900</td>
</tr>
<tr>
<td>Total goods moved [million t]</td>
<td>441</td>
<td>417</td>
<td>318</td>
<td>289</td>
<td>369</td>
<td>367</td>
</tr>
<tr>
<td>Road’s share of goods moved [% of total]</td>
<td>90%</td>
<td>88%</td>
<td>88%</td>
<td>92%</td>
<td>86%</td>
<td>80%</td>
</tr>
<tr>
<td>Goods moved by road [million t]</td>
<td>397</td>
<td>367</td>
<td>261</td>
<td>266</td>
<td>316</td>
<td>293</td>
</tr>
<tr>
<td>Average length of haul [km]</td>
<td>59</td>
<td>62</td>
<td>62</td>
<td>96</td>
<td>82</td>
<td>85</td>
</tr>
<tr>
<td>Total haulage [billion tkm]</td>
<td>26.0</td>
<td>25.2</td>
<td>17.2</td>
<td>25.6</td>
<td>32.7</td>
<td>27.7</td>
</tr>
<tr>
<td>Average load on laden trips [t]</td>
<td>13.9</td>
<td>14.5</td>
<td>12.8</td>
<td>13.7</td>
<td>12.9</td>
<td>15.0</td>
</tr>
<tr>
<td>Mileage on laden trips [billion km]</td>
<td>1.69</td>
<td>1.57</td>
<td>1.37</td>
<td>1.87</td>
<td>2.01</td>
<td>1.66</td>
</tr>
<tr>
<td>Empty running [% of total mileage]</td>
<td>27%</td>
<td>21%</td>
<td>27%</td>
<td>27%</td>
<td>19%</td>
<td>17%</td>
</tr>
<tr>
<td>Total mileage [billion km]</td>
<td>2.32</td>
<td>1.97</td>
<td>1.76</td>
<td>2.57</td>
<td>2.48</td>
<td>1.98</td>
</tr>
<tr>
<td>Average fuel consumption [l/100km]</td>
<td>35.7</td>
<td>32.1</td>
<td>32.3</td>
<td>30.1</td>
<td>34.4</td>
<td>30.0</td>
</tr>
<tr>
<td>Total energy consumption [GWh]</td>
<td>8378</td>
<td>6380</td>
<td>5732</td>
<td>7807</td>
<td>8614</td>
<td>6013</td>
</tr>
<tr>
<td>Fuel CO₂ content [kg/l]</td>
<td>2.66</td>
<td>2.48</td>
<td>2.62</td>
<td>2.56</td>
<td>2.66</td>
<td>2.53</td>
</tr>
<tr>
<td>Total CO₂ emissions [million t]</td>
<td>2.21</td>
<td>1.57</td>
<td>1.57</td>
<td>1.98</td>
<td>2.27</td>
<td>1.51</td>
</tr>
</tbody>
</table>

### CO₂ intensity [g/€]
- Finland: 15.5 (2010), 6.8 (2030)
- Norway: 7.6 (2010), 8.7 (2030)
- Sweden: 8.0 (2010), 4.6 (2030)

### Transport intensity [tkm/€]
- Finland: 0.18 (2010), 0.12 (2030)
- Norway: 0.09 (2010), 0.10 (2030)
- Sweden: 0.12 (2010), 0.08 (2030)

### Energy efficiency [tkm/kWh]
- Finland: 3.10 (2010), 3.96 (2030)
- Norway: 3.00 (2010), 3.28 (2030)
- Sweden: 3.80 (2010), 4.60 (2030)

### 1st round
- Forecast for 8 indicators

### 2nd round
- List of statements
- 3 supplementary questions for indicators

### Participants:
- Fin: 24/20 experts (2011)
- Nor: 11/7 experts (2013)
- Swe: 11/11 experts (2013)
- Den: only 1 expert (2013)
Workshops (FIN, NOR, SWE)

- **Identified the low carbon road freight transport obstacles.**
  - Lack of knowledge and best practices of energy efficiency within logistics service providers.
  - Inadequate environmental consideration by industry and trade in purchasing logistics services.
  - Lack of coordination of urban logistics.
  - There is generally little willingness to pay for environmentally friendly practices.
  - Lack of incentives to use more biofuels than the statutory 7% blend in diesel.
  - Lack of communication between shipper and haulier.
  - Weak profitability of hauliers.
  - Lack of optimization.
  - Low knowledge in public decision-making.

- **Identified measures to improve the low carbon road freight transport**
  - Marketing of energy efficiency agreement for freight transport and logistics and related communication and education activities.
  - Producing and communicating benchmarking information.
  - Investment grant for hauliers.
  - Including energy efficiency criteria in the transport service purchases by state and municipalities.
  - Including energy efficiency information into the sectoral energy efficiency agreements.
  - Improving the communication between shippers and hauliers.
  - Improving the city logistics.
  - Facilitating the wider distribution of biofuels.
  - Economic stimulus.
  - Focus on other alternative energy sources in addition to electricity.
  - Increased understanding for the function and drivers of the transport system amongst decision makers.
  - CO₂ tax or road tax.
  - Regulations to promote transport with the right performance.
Online tool

Haulier’s energy efficiency index (EEI)

- Energy efficiency index was developed to provide a simple metric for international comparison.
- The EEI covers various aspects of energy efficiency to provide a comprehensive outlook into the issue.

- The energy efficiency index of the respondents is currently:
  - on average 38.5 points
  - with 25% of hauliers having less than 24 points and
  - 25% having more than 51.5 points.

http://www.tut.fi/verne/norfren/energy-efficiency-index/