An overview of implementing Green Corridors in Europe

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Presentation topics

1. The ‘green corridor’ concept and examples
2. The SuperGreen project: Basic results
3. The corridor benchmarking methodology
4. The European TEN-T core network corridors
5. The GreCOR application
Transport corridors are not new
The corridor approach in EU policy

- Jan. 2003: MoU on Corridor A (NL, DE, CH, IT)
- Mar. 2005: MoU on 6 ERTMS corridors (EC, CER, UIC, UNIFE, EIM)

The ‘blue banana’ corridor
The ‘green corridor’ concept

Green Corridors are a European concept denoting long-distance freight transport corridors where advanced technology and co-modality are used to achieve energy efficiency and reduce environmental impact.

The ‘green corridor’ features

1. Concentration of freight traffic
2. Co-modality and advanced technology
3. Adequate transhipment facilities
4. Green propulsion
5. Demonstration of innovative transport solutions
6. Fair and non-discriminatory access
The ‘green corridor’ benefits

• Shift of cargoes away from roads
• Improved competitiveness of rail and waterborne transport
• Optimisation in terms of energy use and emissions
• Effective consideration of interoperability problems (international character of corridors)
• Enhanced cooperation
• Improved chances of identifying workable solutions (focus on a subset of the network)
• Reduced requirements for expansion of network capacity (co-modality)
Green corridor initiatives

East-West Transport Corridor (2006-2012)
Green corridor initiatives

Swedish Green Corridors Initiative (2008-2012)

Green corridor initiatives

STRING corridor (2011-2014)
Green corridor initiatives

Midnordic corridor (2010-2013)
SuperGreen identity

Type of project: Coordination and Support Action
Financed through: 7th Framework Programme
Duration: 3 years (Jan. 2010 – Jan. 2013)
Consortium: 22 partners from 13 countries
Leader: National Technical University of Athens
Total budget: ~ 3.5 mio EUR
Objectives:
- Support the EC on green corridor issues
- Benchmark green corridors (through KPIs)
- Deliver policy and R&D recommendations
- Undertake stakeholder networking activities
Selection of corridors
# The initial list of KPIs

<table>
<thead>
<tr>
<th>Category</th>
<th>KPI</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>Absolute cost</td>
<td>€/tonne</td>
</tr>
<tr>
<td></td>
<td>Relative cost</td>
<td>€/ton-km</td>
</tr>
<tr>
<td>Service quality</td>
<td>Transport time</td>
<td>hours</td>
</tr>
<tr>
<td></td>
<td>Reliability (time precision)</td>
<td>% of shipments on time</td>
</tr>
<tr>
<td></td>
<td>Frequency of service</td>
<td>number per week</td>
</tr>
<tr>
<td></td>
<td>ICT applications (availability and</td>
<td>scale 1-5</td>
</tr>
<tr>
<td></td>
<td>integration of cargo tracking and other ICT services)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cargo security</td>
<td>incidents/shipments</td>
</tr>
<tr>
<td></td>
<td>Cargo safety</td>
<td>incidents/shipments</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>CO₂-eq</td>
<td>g/ton-km</td>
</tr>
<tr>
<td></td>
<td>SOx</td>
<td>g/ton-km</td>
</tr>
<tr>
<td></td>
<td>NOx</td>
<td>g/ton-km</td>
</tr>
<tr>
<td></td>
<td>PM₁₀</td>
<td>g/ton-km</td>
</tr>
<tr>
<td>Infrastructural sufficiency</td>
<td>Congestion</td>
<td>average delay/ton-km</td>
</tr>
<tr>
<td></td>
<td>Bottlenecks (incl. geography, infrastructure capacity &amp; condition,</td>
<td>scale 1-5</td>
</tr>
<tr>
<td></td>
<td>administration)</td>
<td></td>
</tr>
<tr>
<td>Social issues</td>
<td>Land use (urban &amp; sensitive areas)</td>
<td>% of buffer zone</td>
</tr>
<tr>
<td></td>
<td>Traffic safety</td>
<td>fatal. &amp; ser.injur./mio ton-km</td>
</tr>
<tr>
<td></td>
<td>Noise</td>
<td>% of length &gt;50/55 dB</td>
</tr>
</tbody>
</table>
The final list of KPIs

<table>
<thead>
<tr>
<th>KPI</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative transport cost (to the user)</td>
<td>€/ton-km</td>
</tr>
<tr>
<td>Transport time (or speed)</td>
<td>hours (or km/h)</td>
</tr>
<tr>
<td>Reliability (on-time delivery)</td>
<td>% of shipments</td>
</tr>
<tr>
<td>Frequency of service</td>
<td>number per year</td>
</tr>
<tr>
<td>(\text{CO}_2)-eq emissions</td>
<td>g/ton-km</td>
</tr>
<tr>
<td>SOx emissions</td>
<td>g/ton-km</td>
</tr>
</tbody>
</table>

But

KPIs should be selected by the corridor management on the basis of the objectives being pursued
The initial methodology

1. Decompose the corridor into a set of typical transport chains
2. Calculate KPIs for each chain
3. Aggregate chain-to-corridor-level KPIs
4. Aggregate corridor-level KPIs into a single corridor indicator
Benchmarking results

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Mode</th>
<th>Cost (€/tkm)</th>
<th>Av. speed (km/h)</th>
<th>Reliability (%)</th>
<th>Frequency (no/year)</th>
<th>CO₂ (g/tkm)</th>
<th>SOₓ (g/tkm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brenner</td>
<td>Intermodal</td>
<td>0.03-0.09</td>
<td>9-41</td>
<td>95-99</td>
<td>26-624</td>
<td>10.62-42.11</td>
<td>0.02-0.14</td>
</tr>
<tr>
<td></td>
<td>Road</td>
<td>0.05-0.07</td>
<td>19-40</td>
<td>50-99</td>
<td>104-2.600</td>
<td>46.51-71.86</td>
<td>0.05-0.08</td>
</tr>
<tr>
<td></td>
<td>Rail</td>
<td>0.05-0.80</td>
<td>44-98</td>
<td>50-100</td>
<td>208-572</td>
<td>9.49-17.61</td>
<td>0.04-0.09</td>
</tr>
<tr>
<td></td>
<td>SSS</td>
<td>0.04</td>
<td>23</td>
<td>100</td>
<td>52</td>
<td>16.99</td>
<td>0.12</td>
</tr>
<tr>
<td>Cloverleaf</td>
<td>Road</td>
<td>0.06</td>
<td>40-60</td>
<td>80-90</td>
<td>4.680</td>
<td>68.81</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Rail</td>
<td>0.05-0.09</td>
<td>45-65</td>
<td>90-98</td>
<td>156-364</td>
<td>13.14-18.46</td>
<td>0.01-0.02</td>
</tr>
<tr>
<td>Nureyev</td>
<td>Intermodal</td>
<td>0.10-0.18</td>
<td>13-42</td>
<td>80-90</td>
<td>156-360</td>
<td>13.43-33.36</td>
<td>0.03-0.15</td>
</tr>
<tr>
<td></td>
<td>SSS</td>
<td>0.05-0.06</td>
<td>15-28</td>
<td>90-99</td>
<td>52-360</td>
<td>5.65-15.60</td>
<td>0.07-0.14</td>
</tr>
<tr>
<td>Strauss</td>
<td>IWT</td>
<td>0.02-0.44</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9.86-22.80</td>
<td>0.01-0.03</td>
</tr>
<tr>
<td>Mare Nostrum</td>
<td>SSS</td>
<td>0.003-0.20</td>
<td>17</td>
<td>90-95</td>
<td>52-416</td>
<td>6.44-27.26</td>
<td>0.09-0.40</td>
</tr>
<tr>
<td></td>
<td>DSS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>15.22</td>
<td></td>
</tr>
<tr>
<td>Silk Way</td>
<td>Rail</td>
<td>0.05</td>
<td>26</td>
<td>-</td>
<td>-</td>
<td>41.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>DSS</td>
<td>0.004</td>
<td>20-23</td>
<td>-</td>
<td>-</td>
<td>12.50</td>
<td>-</td>
</tr>
</tbody>
</table>

- Very low speed for road transport (probably due to delays in terminals)
- Very high variance of intermodal transport attributes (due to different characteristics)
- The EcoTransIT World emission calculator was used for estimating emissions
The final methodology

- **Step 1:** Disaggregate corridor into typical transport chains according to the transport market study

- **Step 2:** Estimate KPI values for each and every chain of the corridor

- **Step 3:** Aggregate these values into corridor level KPIs by using weights and methods specified in the transport market study

- **Step 4:** Use the same sample to monitor performance in subsequent years (equivalent to the basket of goods/services used for calculating and reporting CPI)
The new EU infrastructure policy (2013)

- **Comprehensive network (2050)**
  - directly reflects the relevant existing and planned infrastructure in Member States
  - involves updating and adjustment of the current TEN-T

- **Core network (2030)**
  - overlays the comprehensive network
  - consists of its strategically most important parts
  - constitutes the backbone of the multimodal mobility network
  - concentrates on the components of TEN-T with the highest European added value: cross border missing links, key bottlenecks and multimodal nodes
The TEN-T core network corridors

- comprise the instrument for the coordinated implementation of the core network
- consist of parts of the core network
- involve at least three transport modes
- cross at least three Member States
- cover the most important cross-border long-distance flows in the core network
- include at least one maritime port and its accesses
Green vs. TEN-T core network corridors

Geographical considerations
Green characteristics

• Reliance on co-modality
  ✔ adequate transhipment facilities
  ✔ integrated logistics concepts
• Reliance on advanced technology
  ✔ energy efficiency
  ✔ use of alternative clean fuels
• Development/demonstration of environmentally-friendly and innovative transport solutions, including ICT applications
• Collaborative business models

A green corridor is efficient.
An efficient corridor is not necessarily green.
Green vs. TEN-T core network corridors

Conceptual considerations

All characteristics that make a corridor green are more or less met by the concept of TEN-T core network corridor

The new TEN-T policy has established a network of green corridors in Europe (freight dimension)
The GreCOR application
Revised methodology

- Use transport model results (Danish National Traffic Model) to construct the sample of typical transport chains
- Exploit GreCOR data as much as possible for estimating the KPI values
- Address potential gaps in information through well focused interviews with stakeholders
- Use transport model results to calculate the weights needed to aggregate KPIs from chain- to corridor-level
Data structure

- Base year = 2010
- 351 zones
- 23 commodities
- 3 modes
- 14 vehicle types
- 25 types of transport chains
- 2,934,717 entries (~ 507 mio tonnes)
- Entry = transport chain (<=3 legs)
Sample construction

Criteria for selection:

- Relative importance
- Degree of homogeneity
- Sensitivity to external influences
- Stability
- Adequate definition

"Land border" road chains of Commodity group 22 (fertilizers)
Conclusions

The method permits monitoring of the performance of a single corridor over time. It is not suitable for comparisons between corridors.
For more information

- [http://supergreenproject.eu/](http://supergreenproject.eu/)
- [http://www.grecor.eu/](http://www.grecor.eu/)

THANK YOU for your attention