Project overview
Corridor selection and benchmarking

by

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Background

Freight Transport Logistics Action Plan (2007)

- Green transport corridors for freight.
- Green Corridors should in all ways be environmentally friendly, safe and efficient.
- Emissions, internal as well as external costs should be considered.

What is a ‘green’ corridor?

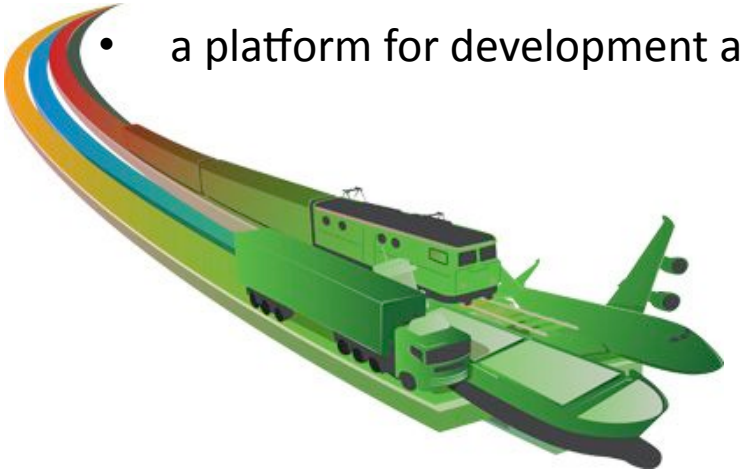
EU definition (2007):

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.

What is a ‘green’ corridor?

Definition by the Swedish Logistics Forum (2011):

- national/international goods traffic on long transport stretches
- sustainable logistic solutions
- integrated logistic concepts with utilisation of co-modality
- a harmonised system of rules
- effective and strategically placed transhipment points and infrastructure
- a platform for development and demonstration of innovative logistic solutions



Project identity

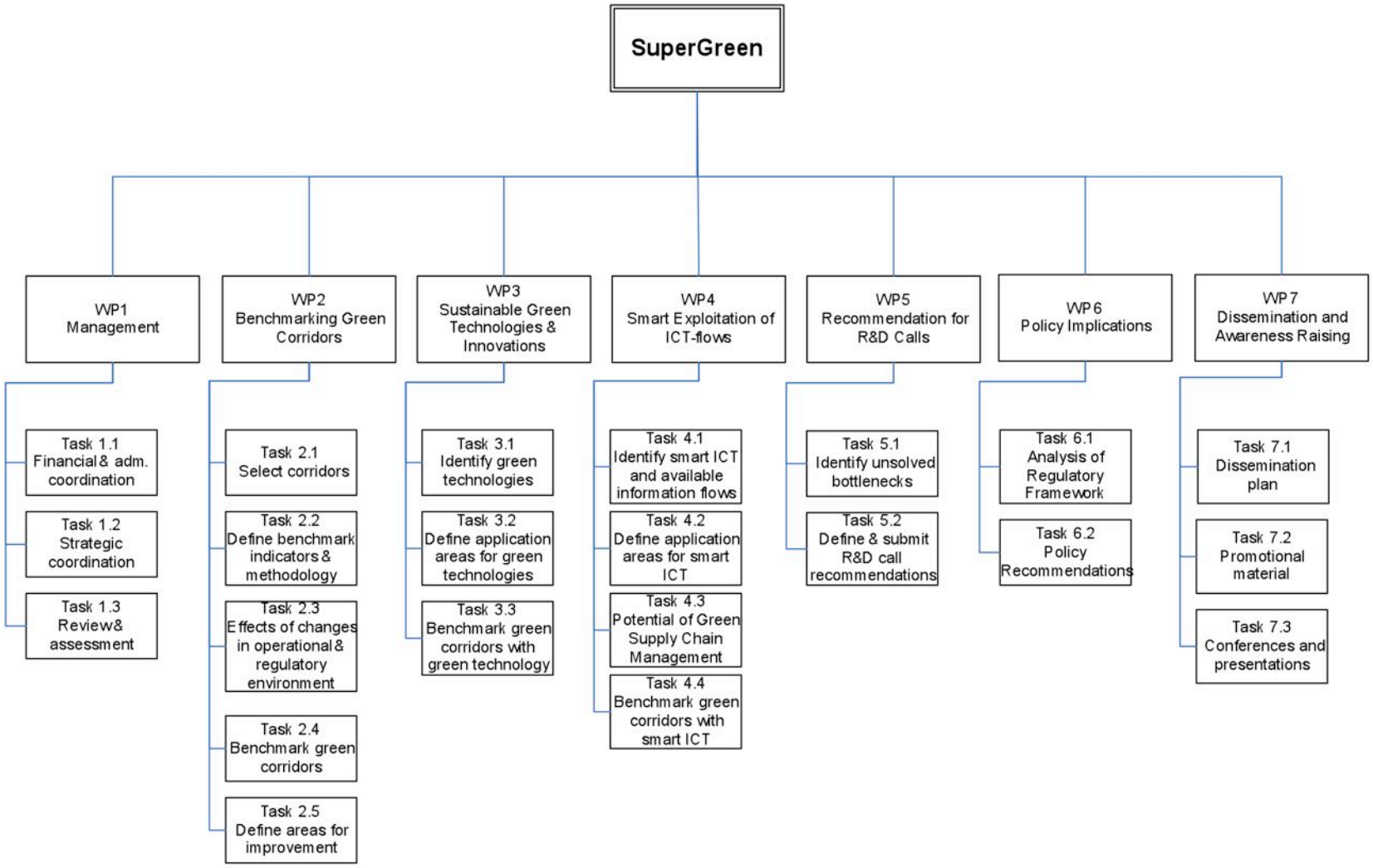
- Project full title: Supporting EU's Freight Transport Logistics Action Plan on Green Corridors Issues
- Type of project: Coordination and Support Action
- Financed through: 7th Framework Programme
- Duration: 3 years
- Official start: 15 Jan. 2010
- Consortium: 22 partners from 13 countries
- Leader: National Technical University of Athens
- Total budget: 3,453,747 EUR
- EC contribution: 2,634,698 EUR

Project objectives

- Give overall ***support and recommendations*** on green corridors to EU's Freight Transport Logistics Action Plan
- ***Encourage co-modality*** for sustainable solutions
- ***Benchmark*** green corridors based on selected KPIs covering all aspects of transport operations and infrastructure (emissions, internal and external costs)
- Conduct a programme of ***networking activities between stakeholders*** (public and private)
- ***Deliver policy recommendations*** at a European level for the further development of green corridors
- Provide ***recommendations concerning new calls for R&D*** proposals to support development of green corridors

The consortium

Project structure

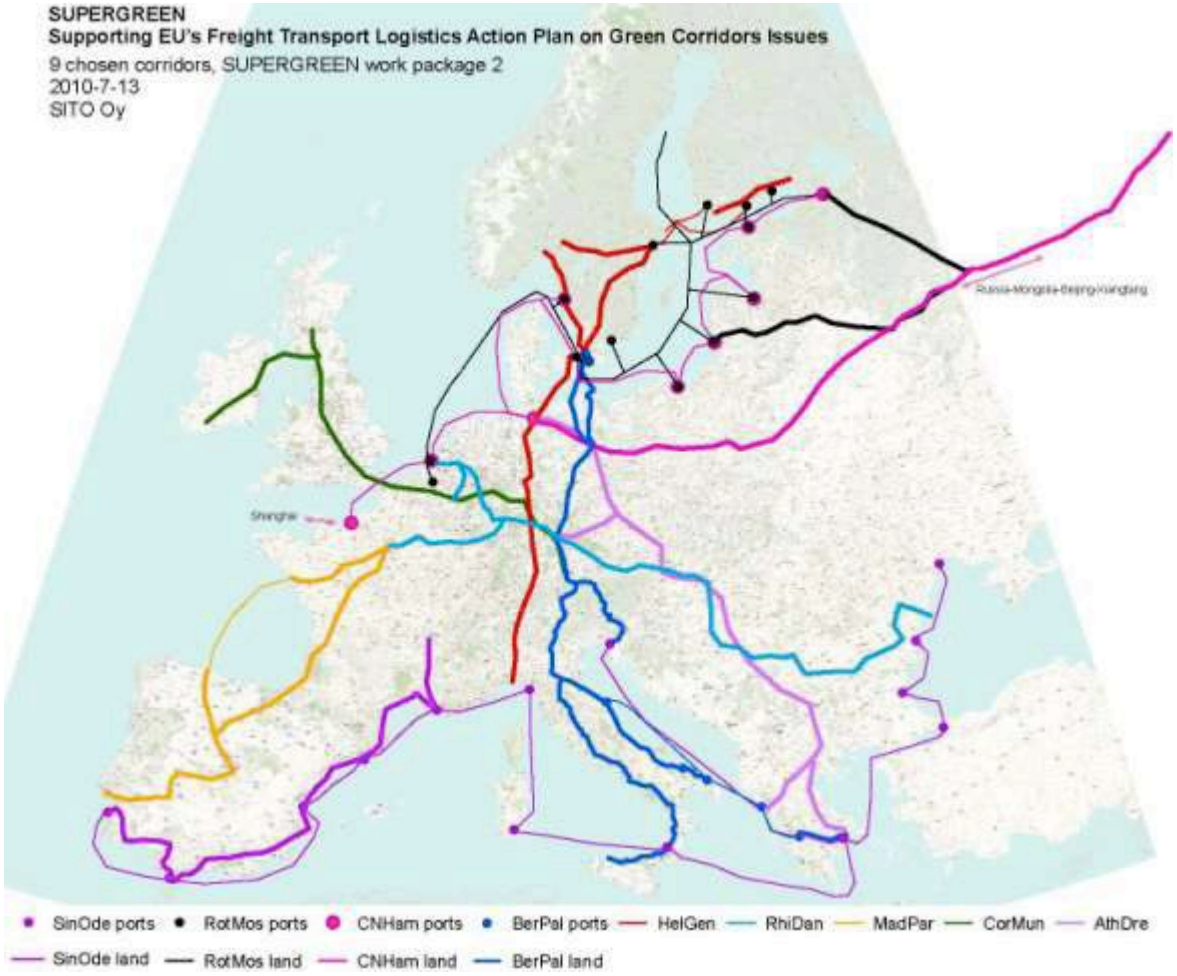


Selection of corridors

- Initial list of 60 potential corridors
- Two rounds of consolidation reduced number to 30
- Gathered information on corridor length, population affected, freight volume, types of goods and multimodality, number and seriousness of bottlenecks, geographical preconditions, transport and information technology used, and assessment of the supply chain management
- Pre-selection of 15 corridors ensuring geographic and modal balance
- Deeper analysis of these 15 corridors taking into consideration land use aspects
- 9 corridors were recommended for final selection
- Modifications resulting from a specially organised stakeholder workshop
- The resulting set combined environmentally advanced corridors with those exhibiting a high "greening potential"

The selection was made only for the purposes of the SuperGreen project and by no means this implies any endorsement of these corridors vis-à-vis any other corridor

9 SuperGreen Corridors (2010)



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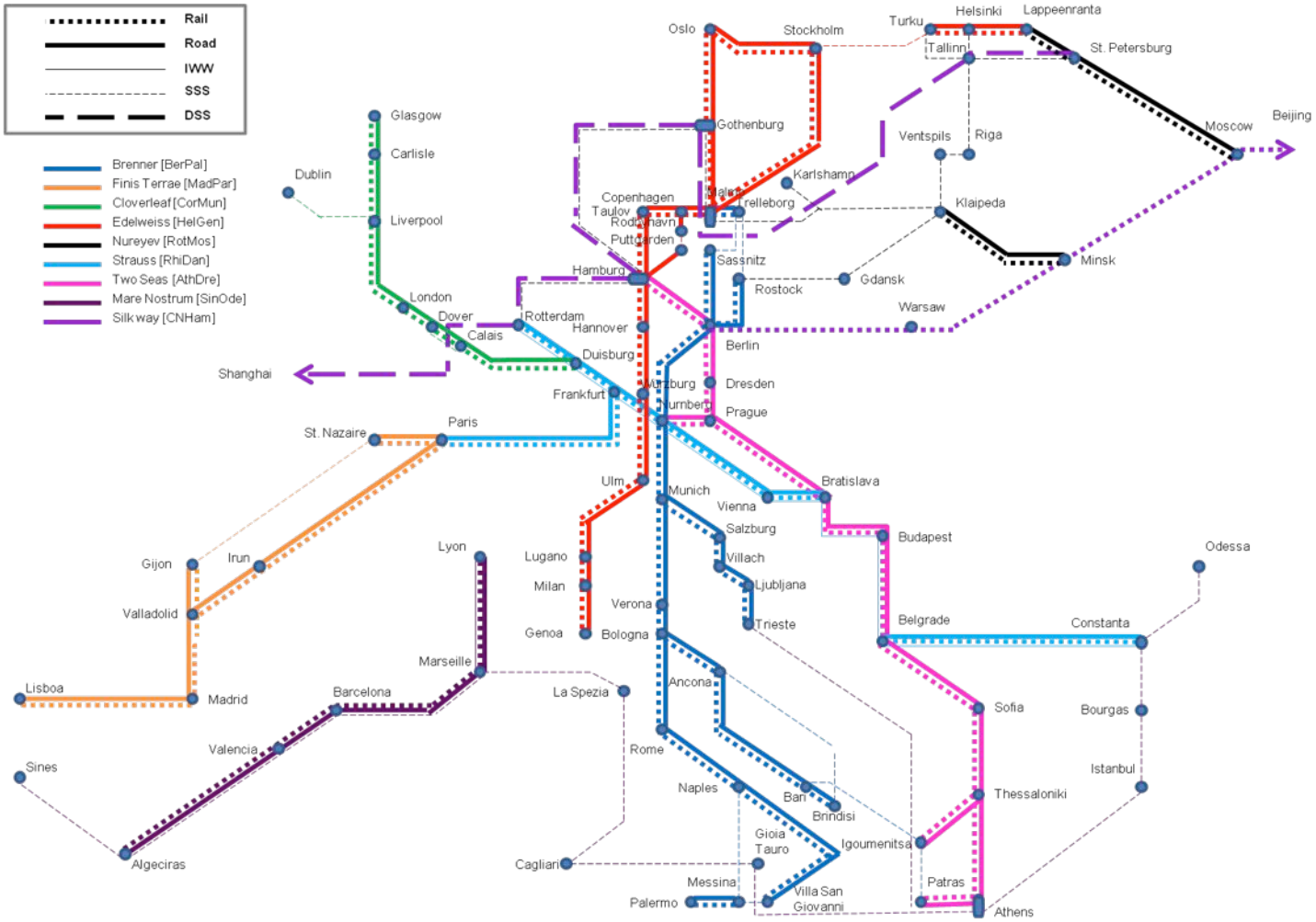

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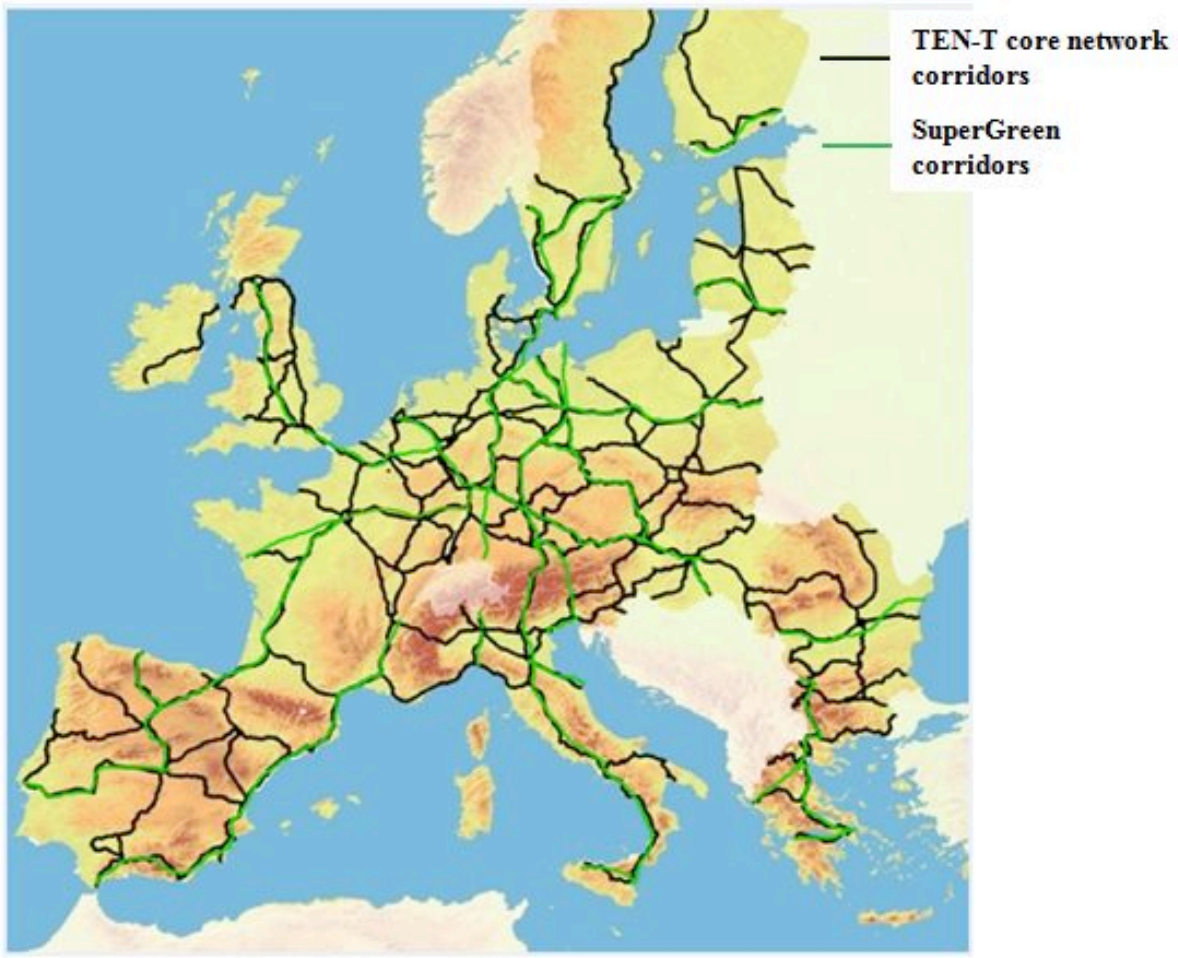
TEN-T core network (2011)

TEN-T Core network corridors (2011) vs SuperGreen corridors (2010)



Key performance indicators (KPIs)

- One of the central activities of the project
- What are some reasonable KPIs?
- What is an appropriate approach?
- How is stakeholder input taken on board?

Approach

- Initial selection of KPIs
- Development of (20-step) methodology
- Extensive solicitation of feedback from stakeholders on both KPIs and methodology
- Application to selected corridors

20-step KPI methodology

Step 1: Review past studies and research projects assessing transport operations. Emphasis should be placed on methodological issues and indicators used. Identify critical factors affecting the outcome (success/failure) of these works. The literature review foreseen under ongoing Task 2.3 (Effects of changes in operational & regulatory environment) can provide additional input in this regard.

Step 2: Identify success factors of transport chains and corridors considered as "best practice" cases. Check whether the indicators found in Step 1 can reflect these success factors.

Step 3: List experiences of KPIs in other sectors of the society. Emphasis should be placed on the work of international organisations addressing the current environmental challenges.

Step 4: Based on the findings of the previous three steps, compile an initial list of indicators. Make sure that the environmental, technical, economical, social and spatial planning aspects of intermodal freight transport are covered.

Step 5: Group indicators in a few main areas based on their nature.

Step 6: Select a small number of representative indicators from each group. They will comprise the initial list of KPIs. An internal workshop is the preferred method for this activity.

Step 7: For each KPI of the above list, describe the input values needed for its calculation and the exact formula to be used. Qualitative indicators should be kept to a minimum.

Step 8: Solicit feedback on the initial list of KPIs from stakeholders and the project's Advisory Committee.

Step 9: Revise the initial list to incorporate input received.

Step 10: Select one of the 9 SuperGreen corridors to be used as pilot case for testing the methodology. The corridor with the best coverage in terms of data availability and studies done should be selected.

Step 11: Analyze the corridor in terms of flows:

- origin/destination
- types of cargoes moved
- modes used
- routes taken
- trade imbalances (empties), etc.

The segment of the corridor with the highest freight volume is the most important part of it.

Step 12: Select 4-5 typical cargoes being transported along the axis. Part load break bulk should be one of them due to the special logistics requirements that this cargo imposes. Most probably, a dry bulk and a liquid bulk commodity should also be selected due to their high volume and different supply chain organization. For each cargo selected, identify a typical combination of modes/routes used. Identify also useful details like the types of vehicles used, technologies applied etc.

Step 13: Add to the typical cases selected above, the "best practice" cases identified for this corridor.

Step 14: Locate the proper data sources for estimating the KPIs defined under Step 9.

Step 15: Estimate one set of KPIs for each case selected under Steps 12 and 13. Due to the length of the selected SuperGreen corridors, it is very much probable to have segments with different "green" qualities along a single corridor. It is thus preferable to do the analysis in segments to the extent possible.

Step 16: Identify obstacles in KPI estimation. They can follow in one of the following categories:

(a) those that can be solved easily,
(b) those that require a new approach to solve them, and
(c) those that need to be defined as not solvable.

A KPI re-engineering process is to be followed for obstacles of categories (a) and (b). KPIs running into obstacles of category (c) should be dropped altogether.

It is conceivable at this stage that segments of the corridor for which sufficient data is not available can be dropped from further examination.

Step 17: Suggest a way to transform the KPI values estimated at the route level to a single set of KPI values at the corridor level. Most probably weighted averages would have to be employed, using respective cargo volumes as weights. It is thus important to come up with reliable and comparable cargo volumes moving along the links of the corridor under examination.

Step 18: Suggest a way to express the set of KPI values derived under Step 17 above for the corridor level with a single numerical value, the ultimate corridor KPI. Relative weights should be assigned to each KPI. It is expected that different stakeholders would propose different weights for this calculation. The flexible approach of user specified weights followed by the BE Logic project should be considered as an alternative. The use of minimum (or maximum depending on the KPI definition) acceptable limits for each KPI should also be considered.

Step 19: Once the methodology suggested above has passed the applicability test successfully, it can be applied for the other 8 SuperGreen corridors as well (repeat Steps 11 to 18 for each of the 8 corridors).

Step 20: Perform a comparative analysis of the 9 SuperGreen corridors and draw conclusions on developing the "green corridor" concept.

Stakeholder input

- Industry participation in stakeholder workshops
  - 1st plenary w/s: **Helsinki, 28 Jun. 2010**
  - 1st regional w/s: **Napoli, 19 Oct. 2010**
  - 2nd regional w/s: **Antwerp, 1 Feb. 2011**
  - 3rd regional w/s: **Malmö, 10 Mar. 2011**
  - 4th regional w/s: **Sines, 24 Mar. 2011**
  - 2nd plenary w/s: **Genoa, 12 Sep. 2011**
- Through Advisory Committee
- Link with other projects and related activities

Napoli w/s, 19 Oct. 2010

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AC meeting, 26 Oct. 2010, Brussels

Malmö w/s, 10 March 2011

Initial vs final KPIs

KPI	Input unit	Output unit	Grading of importance for Supergreen
Efficiency			
Absolute costs	ton, €	€/ton	3 Can manage without
Relative costs	ton, €, km	€/ton-km	1 Must have
Service quality			
Transport time	hours	hours	1 Must have
Reliability	Total number of shipments, On-time deliveries	%	1 Must have
ICT appl.	Availability, integration & functionality of cargo tracking & other services	graded scale	2 Prefer to have
Frequency	Services per week	number	1 Must have
Cargo security	Total number of shipments, Security incidents	%	2 Prefer to have
Cargo safety	Total number of shipments, Cargo safety incidents	%	2 Prefer to have
Environmental sustainability			
CO_2 emissions	ton, km	g/ton-km	1 Must have
NO_x emissions	kg, km	g/1,000 ton-km	2 Prefer to have
SO_x emissions	kg, km	g/1,000 ton-km	1 Must have
PM emissions	kg, km	g/1,000 ton-km	2 Prefer to have
Infrastructural sufficiency			
Congestion	ton, km, Average delay	hours/ton-km	2 Prefer to have
Bottlenecks	number & category	graded scale	2 Prefer to have
Social			
Corridor land use	Share of distance per area type	percent	2 Prefer to have
Traffic safety	Traffic safety incidents	percent	2 Prefer to have
Noise	Share of distance above level	percent	2 Prefer to have

KPI values for the Brenner corridor (pilot case)

KPIs	Intermodal	Road	Rail	SSS
Cost (€/tkm)	0.03-0.09	0.05-0.07	0.05-0.80	0.04
Av. speed (km/h)	9-41	19-40	44-98	23
Reliability (%)	95-99	50-99	50-100	100
Frequency (no/year)	26-624	104-2600	208-572	52
CO_2 (g/tkm)	10.62-42.11	46.51-71.86	9.49-17.61	16.99
SOx (g/tkm)	0.02-0.14	0.05-0.08	0.04-0.09	0.12

- No aggregation from chain-level to corridor-level KPIs
- No aggregation of corridor level KPIs to a single corridor rating
- Wide range of values

Benchmarking results (all corridors)

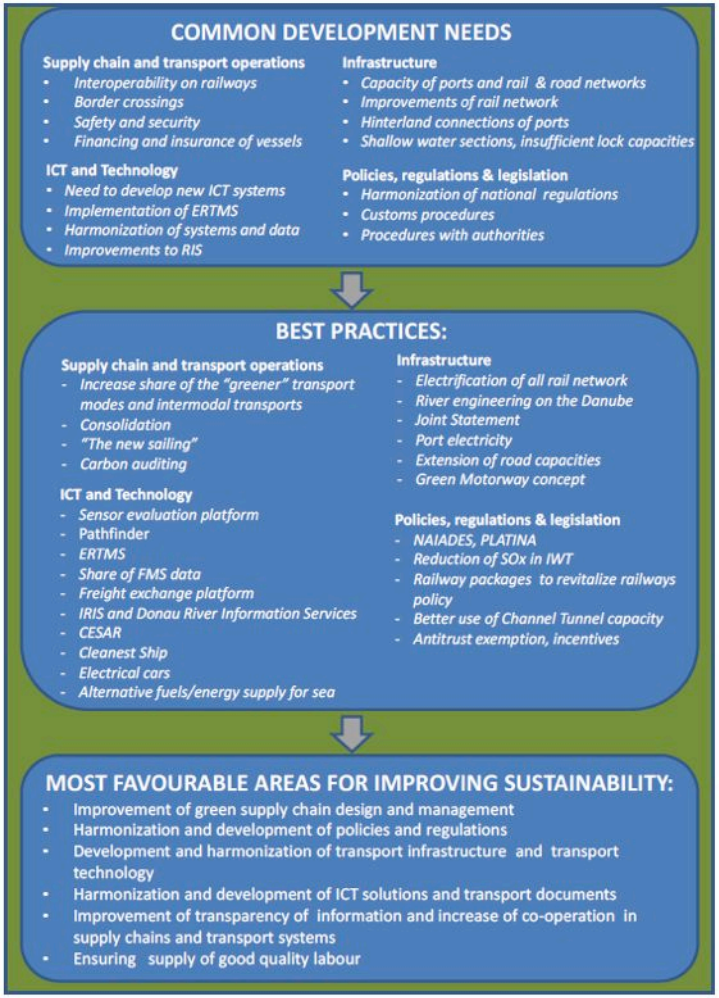
Corridor	Mode	Cost (€/tkm)	Av. speed (km/h)	Reliability (%)	Frequency (no/year)	CO_2 (g/tkm)	SOx (g/tkm)
Brenner	Intermodal	0.03-0.09	9-41	95-99	26-624	10.62-42.11	0.02-0.14
	Road	0.05-0.07	19-40	50-99	104-2.600	46.51-71.86	0.05-0.08
	Rail	0.05-0.80	44-98	50-100	208-572	9.49-17.61	0.04-0.09
	SSS	0.04	23	100	52	16.99	0.12
Cloverleaf	Road	0.06	40-60	80-90	4.680	68.81	0.09
	Rail	0.05-0.09	45-65	90-98	156-364	13.14-18.46	0.01-0.02
Nureyev	Intermodal	0.10-0.18	13-42	80-90	156-360	13.43-33.36	0.03-0.15
	SSS	0.05-0.06	15-28	90-99	52-360	5.65-15.60	0.07-0.14
Strauss	IWT	0.02-0.44	-	-	-	9.86-22.80	0.01-0.03
Mare Nostrum	SSS	0.003-0.20	17	90-95	52-416	6.44-27.26	0.09-0.40
	DSS	-	-	-	-	15.22	0.22
Silk Way	Rail	0.05	26	-	-	41.00	-
	DSS	0.004	20-23	-	-	12.50	-

- 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

Corridor benchmarking conclusions

- Corridor benchmarking is possible but we need to standardise the measurement and allocation of emissions
- Defining acceptable limits for KPI values requires due consideration of corridor specific conditions
- Method best for monitoring performance of the same corridor over time
- Data collection proves to be a serious problem; the formation of corridor specific stakeholder groups and the use of automated ICT applications can be helpful
- Aggregating chain-level KPIs to corridor-level ones is possible provided that an adequate sample of transport chains is examined under the same conditions. Otherwise, the use of value ranges is suggested.
- Aggregating corridor-level KPIs to an overall corridor rating should be omitted because of problems associated with the necessary weights and because it is a political issue best left for policy makers to decide.

Definition of improvement areas



The project identified:

- major bottlenecks;
- common development areas; and
- good practices for sustainability improvements.

Based on these, the most favourable areas for sustainability improvements are:

- improvement of green supply chain design and management;
- harmonisation of policies and regulations;
- development and harmonisation of transport infrastructure and technology;
- harmonisation and development of ICT solutions and transport documents;
- improvement of information transparency;
- increased cooperation in supply chains and transport systems; and
- ensuring supply of good quality labour.

Web site

- www.supergreenproject.eu
- All deliverables
- PPTs
- Links
- Other info
- Green Corridors Handbook

Green Corridors Handbook

- Vol. I: progress on project
- Vol. II: guide for external users

What's next today

1030-1100	Coffee break
1100-1120	Green technologies for road transport *Anders Johnson, Scania, Sweden*
1120-1140	Results of green technologies benchmarking *Sara Fozza, D'Appolonia, Italy*
1140-1200	Discussion
1200-1300	Lunch
1300-1320	Role of ICT in green logistics *Rod Franklin, Kuehne+Nagel, Switzerland*
1320-1340	Results of green ICT benchmarking *Harilaos Psaraftis, NTUA*
1340-1400	Discussion
1400-1430	Coffee
1430-1450	Swedish innovation activities on green corridors *Rein Jüriado, Vinnova, Sweden*
1450-1510	Recommendations for future R&D *Even Ambros Holte, Marintek, Norway*
1510-1530	Policy recommendations *Humberto Moyano, Port Authority of Gijon, Spain* *George Panagakos, NTUA*
1530-1630	Panel discussion *Moderator: Harilaos Psaraftis, NTUA* *Panelists include (alphabetically):* *Sergio Barbarino, Procter and Gamble* *Herman de Meester, European Community Shipowners Association (ret.)* *Pawel Mickiewicz, General Directorate for Roads and Motorways, Poland* *Jürgen Neumüller, Scandria project, Germany* *Mathias Roos, Region Blekinge, Sweden* *Jerker Sjögren, Closer, Sweden* *Wiktor Szydarowski, BSR TransGovernance project, Sweden*
1630-1650	Closing speech SuperGreen and the greening of the TEN-Ts *Gudrun Schulze, European Commission, DG-MOVE*
1650-1700	Closing remarks

THANK YOU

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