North Sea-Mediterranean Core Network Corridor Study

Final Report

December 2014

Preface:

This document is the final report as submitted on the 5th December 2014 by the NSMED study team (Panteia, MDS-Transmodal, Egis, Stratec, BG/Nestear, and PwC) to the European Commission (DG-MOVE).

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.

Abbreviations

BE	Belgium
CEF	Connecting Europe Facility
CNC	Core Network Corridor
CO	Confidential
COMEXT	Intra- and extra-European trade database
Compr.	Comprehensive
cp.	Compared to
DG-MOVE	European Commission – Directorate General for Mobility and Transport
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
ESTAT	Eurostat
ETIS	European Transport policy Information System
EU	European Union
FR	France
GDP	Gross Domestic Product
GIS	Geographic information systems
GVA	Gross Value Added
IE	Ireland
IM	Infrastructure Manager
ITS	Intelligent Transportation System
IWT	Inland Waterway Transport
KPI	Key Performance Indicator
km	Kilometres
km^2	Square kilometres
LGV	Ligne à Grande Vitesse
LNG	Liquefied Natural Gas
LU	Luxembourg
m	Metres
Nat	national
NB	Nota bene
NL	The Netherlands
NS-MED	North-Sea Mediterranean
NSTR	Nomenclature uniforme des marchandises pour les Statistiques de Transport, Revisée (break-down of commodities for all transport modes)
NUTS	Nomenclature of territorial units for statistics
O/D	Origin / Destination
OMCGIS	Open Method of Co-ordination of Geographic information systems
PP	Priority Project
PU	Public
RE	Restricted
RIS	River Information System
RFC	Rail Freight Corridor
RRT	Rail–Road Terminal
SESAR	Single European Sky ATM Research Programme
SMSR	Saône-Moselle, Saône-Rhine (waterway connections)
TEN-T	Trans-European Transport Network
TEU	Twenty-foot equivalent unit (container)
TMS	Transport Market Study
UIC	International Union of Railways
UK	United Kingdom
UNECE	United Nations Economic Commission for Europe
WP	Work Package
ZARA	Zeebrugge, Antwerp, Rotterdam, Amsterdam

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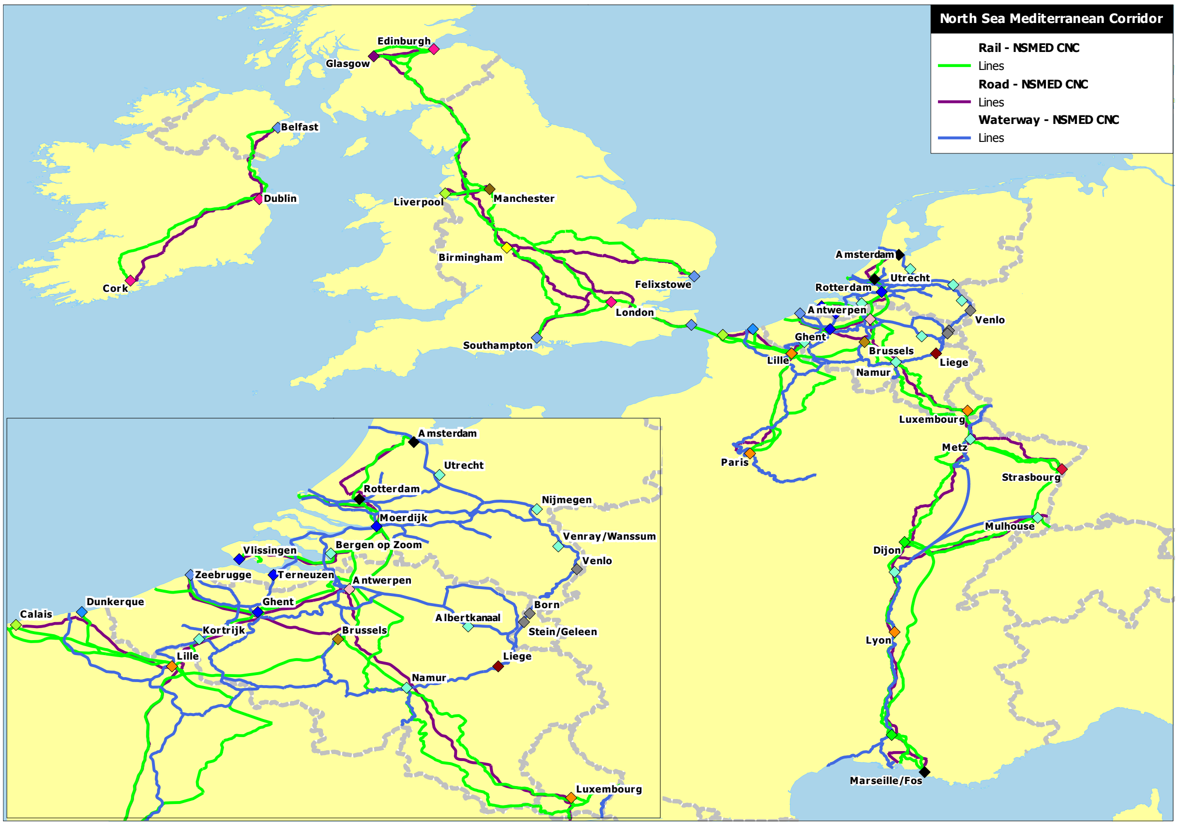
Executive Summary

This study aims to support the European Commission (DG-MOVE) in developing the work plan for the North Sea Mediterranean Core Network Corridor (NSMED CNC), as provided for by Regulation 1315/2013. NSMED is a complex, multimodal transport system stretching from Glasgow, Edinburgh and Belfast in the North to Cork in the west, to Paris and Lille in the centre, to Marseille in the south, and extending north and east through Luxembourg, Belgium and the Netherlands towards Amsterdam. It covers six Member States, namely Belgium, Ireland, France, Luxembourg, Netherlands and the UK, as well as leading to the Swiss and German borders in Basel. It is closely aligned with Rail Freight Corridor 2.

Figure 1: North Sea Mediterranean Corridor



An important document that supports a part of the implementation of the inland waterway connections in the North Sea-Mediterranean corridor is the Declaration of Tallinn. On the 17th October 2013, the European Commissioner for Transport and the Transport Ministers of France, the Netherlands, Flanders and Wallonia signed the Declaration of Tallinn recognising the importance of inland waterway transport within the North-Sea Mediterranean corridor. The declaration commits the parties to take the appropriate measures to develop the inland waterway sections of the North Sea-Mediterranean Core network corridor by 2030 through the Trans-European Transport Network and to strengthening co-operation in the development of inland waterway transport and related multimodal transport, and maximising the co-financing possibilities up to 40%, for listed sections of the waterway network shared by the three signatory countries.

During 2014, the study, running in parallel with eight other core network corridor studies has undertaken a series of fact finding and analytical tasks, the results of which have been presented, to date, at three meetings of the Corridor Forum, chaired by Professor Balázs, the European Coordinator for the NSMED corridor.

This close coordination with stakeholders in the Forum has resulted in this study report, which will be the basis for the European Coordinator's corridor work plan.

Key areas of the fact finding exercises have been (a) the gathering of technical information about the network, (b) the collection and analysis of market information, and (c) the identification of critical issues. Thus, the study has covered the supply side, transport demand, and the interaction of demand and supply.

Compliance with TEN-T Standards

One of the core tasks has been the use of technical information to determine the degree of compliance between the corridor networks and the official TEN-T standards. Overall, the level of compliance is high. However, ERTMS, which is not yet implemented for most of the rail network, stands out as the main compliance issue to be addressed. In the waterway network there are short but nevertheless important sections with gauge restrictions (below CEMT IV standard), and in both France and Belgium there are bridge height restrictions, under 5.25m.

Market Assessment

Market analysis indicates, above all, the high relative share of European traffic which passes through the corridor. From a socio-economic perspective, the corridor is characterised as having a marked central area with a high degree of economic clustering, contrasting with regions at the perimeter, where access to and isolation from the main markets are the main issue. Within the corridor, rail has a high share of cross-border passenger traffic, but for freight, both rail and waterway are relatively under-used on most branches of the corridor, the exception being the sections between the Flemish and Dutch seaports in the direction of the Rhine/Ruhr area of Germany. Forecasts, derived from studies covered in the literature review, show modest levels of traffic growth (around 1% to 1.5% growth per annum), but these need to be seen in the context of existing high volumes, indicating large absolute volume growth. In particular, unitised volumes (containers especially) in the seaport sector are forecast to increase significantly before 2030, as the market polarises towards the main international gateways, a large proportion of which belong to the corridor.

Critical Issues

Key critical issues in relation to the corridor are listed below. This is a list of issues that may be addressed in the future by Member States through national transport planning processes with the assistance, where appropriate, of CEF funding.

Table 1: Summary of Critical Issues

Mode	Country	Category	Examples of Key Critical Issues
Airports	BE	Missing Link	Completion of Diabolo project.
Airports	IE	Last Mile	Access to Dublin Airport
Airports	LU	Last Mile	Lack of rail connection
Inland Terminals	FR	Last Mile	Several e.g. Strasbourg access (north of Strasbourg) Bonneuil-sur-Marne.

Mode	Country	Category	Examples of Key Critical Issues
Inland Terminals	NL	Intermodality	Shortage of inland logistics hubs.
Inland Terminals	UK	Intermodality	Shortage of Strategic Rail Freight Interchanges in London/South East area (developed by the private sector, but through the local land use planning process as influenced by relevant policies at a national level)
Rail	BE	Bottlenecks Interoperability Last Mile	Severe congestion in Brussels. Train length restrictions during peak hours. Access (including last mile) to seaports. Speed between Brussels-Luxembourg-Strasbourg for Passenger trains
Rail	FR	Bottlenecks	Bottlenecks – Paris, Lyon, Metz, Strasbourg, Mulhouse, Lille
Rail	IE	Missing Link Bottleneck	Interconnections between stations in Dublin, affecting potential for interchange to cross-border Dublin-Belfast rail services. Lack of rail accessibility to Dublin city centre, limiting potential for modal shift. Bottlenecks – Dublin city centre, Greater Dublin Area for passenger and freight services.
Rail	LU	Bottleneck	Luxembourg City station, Bettembourg station Speed between Brussels-Luxembourg-Strasbourg for passenger trains Congestion in network
Rail	NL	Bottleneck	Caland bridge bottleneck in Rotterdam. Cross border connectivity on conventional line to Belgium.
Rail	UK	Bottleneck	Shortage of capacity on southern sections of WCML. Low market share for Channel Tunnel through rail
Road	BE	Bottleneck	Severe congestion in Antwerp and Brussels.
Road	FR	Bottleneck	Congestion – Paris, Strasbourg, Lille and Lyon.
Road	IE	Bottleneck Last Mile	Congestion in Dublin. Congestion/last mile access to Cork Seaport
Road	LU	Bottleneck	Parking areas – transit traffic. Congestion linked to transit traffic
Road	NL	Bottleneck Missing Links	Congestion in Amsterdam and Rotterdam areas. Missing motorway links eg. North-South Rotterdam.
Road	UK	Bottleneck	Congestion- London (M25), Birmingham, Manchester areas.
Seaports	BE	Bottlenecks	Lock capacities: Antwerp and Ghent. Antwerp railway connections.
Seaports	FR	Bottlenecks Last Mile	Calais seaport Dunkerque and Marseille access.
Seaports	IE	Last Mile Intermodality	Development of inland connections Dependence on efficient sea connections – trade.
Seaports	NL	Bottlenecks	Lock Amsterdam Lock Terneuzen
Seaports	UK	Bottlenecks	Capacity on hinterland connections.

Mode	Country	Category	Examples of Key Critical Issues
Waterways	BE	Interoperability Bottlenecks	Bridge height issues Lock capacity issues Gauge issues and reliability issues
Waterways	FR	Missing Link	Seine-Escaut – missing link
Waterways	LU	Bottleneck	Reliability issue - single locks on Moselle
Waterways	NL	Bottleneck	Lock capacity issues due to increase of traffic.

Work Plan Outline

The main task of the study since the second Forum in June 2014 has been to collect and present the information for the Work Plan, or implementation plan, containing a long list of projects related to solving the supply, demand, and critical issues, identified in the study. The work plan section provides a (micro-level) description of the corridor, including technical parameters, critical issues and market assessment. It then proposes strategic objectives, based on the designated TEN-T objectives of cohesion, efficiency, sustainability and user benefits.

Projects are listed per country and per mode of transport, and these are categorised into two sets; "Set 1" having more complete information and shorter term (before 2020) expected start dates; "Set 2" having incomplete information and/or longer term timescales. The analysis therefore focuses upon "Set 1" projects.

Based on the "Set 1" lists, the draft work plan consists of:

- 50 Belgian projects, amounting to €8 349m
- 94 French projects, amounting to €9 295m
- 10 Irish projects amounting to € 832m
- 6 Luxembourg projects amounting to €2 312m
- 30 Netherlands projects amounting to €10 264m
- 14 UK projects amounting to €5 070m

In total, there are, 204 "Set 1" projects, with combined budgets of €36 206 billion[1], across road, rail and water (including sea) networks.

Table 2: Number of Set 1 Work Plan projects per Country/Mode

	MULTI	RAIL	ROAD	WATER	Total
Belgium		9	6	35	50
France	9	22	2	61	94
Ireland		5	3	2	10
Luxembourg		6			6
Netherlands	1	7	9	13	30
United Kingdom	1	6	7		14
Total	**11**	**55**	**27**	**111**	**204**

[1] Some cross-border joint projects are counted in more than one project list.

Table 3: Work Plan Project Budgets per Country/Mode (mEur)

	MULTI	RAIL	ROAD	WATER	Total
Belgium		3 290	1397	3 662	8 349
France	275	1 591	206	7 222	9 295
Ireland		207	325	300	832
Luxembourg		2 312			2 311
Netherlands	75	2 099	5 456	2 718	10 348
United Kingdom	110	3 371	1 589		5 070
Grand Total	**460**	**12 870**	**8 973**	**13 903**	**36 206**

NSMED Work Plan Rationale – Invest for High Impact.
NSMED corridor investments are crucial because they address present-day issues which are closely linked with the long term development of the European economy, employment and trade with the rest of the world.

The corridor is characterised by high levels of activity today. There are high levels of transport volumes, there is high growth potential, and high potential impacts and user/non-user benefits, to be achieved in part by making more optimal use of the multimodal infrastructure.

The corridor has good infrastructure, developed over a long period of time, including some major success stories such as the Eurostar/Thalys high speed rail network, but high demand, and in certain cases, ageing infrastructure lead to persistent levels of congestion and a long list of bottlenecks. Renewal and modernisation are recurring themes.

Relative to other corridors there is under-utilisation of non-road transport, and therefore high potential for achieving greater balance across modalities. This aim relates closely to the need to develop long distance waterway and rail corridors, supported by new technology and the application of common technical standards.
Seaports as hubs are leading the development of multimodal distribution. This process needs to be supported by equivalent capacities in inland logistics hubs, and frequent multimodal services.

European Value Added
A key aim of the work plan is to indicate projects of common interest demonstrating European value added, i.e. projects in which the cross-border costs and benefits are distributed in such a way as to hinder their implementation. These are typically the cross-border projects tackling critical issues such as bottlenecks, missing links, and lack of interoperability.

The projects identified in the study address in particular, two major branches of the corridor, with the potential for improving modal shares for rail and waterway within the central part of the corridor.

- Amsterdam-Utrecht-Rotterdam-Antwerp-Ghent-Lille-Paris – creating a continuous waterway corridor with TEN-T (CEMT IV or higher) gauge.

- Rotterdam–Antwerp-Namur-Luxembourg-Strasbourg-Mulhouse-Basel – creating a TEN-T compliant rail corridor (ERTMS), within the rail freight corridor network.

In addition, measures are included to address accessibility from and within regions at the perimeter of the corridor, including the DART Underground project (and associated sub-projects) in Dublin and on the cross-border rail line between Cork, Dublin and Belfast, measures to to address the rail bottleneck in Lyon and projects to improve accessibility to the major seaports in Ireland.

1 Introduction – Information about the Study

New TEN-T Guidelines[2] identify, amongst other issues, that the development of cross-border transport infrastructure across different modes is fragmented, that the potential for multimodal transport is not fully exploited, and that there is a need to strengthen the role being played by multimodal transport nodes in terms of offering greater connectivity.

The central component within the revised TEN-T is the concept of the European core network, the "backbone of the multi-modal mobility network". This study aims to support the European Commission in developing a work plan for one core network corridor (CNC), stretching from Glasgow, Edinburgh and Belfast in the north to Cork in the west and to Paris and Lille in the centre, to Marseille in the south, and extending north-east through Luxembourg, Belgium and the Netherlands towards Amsterdam. It covers six Member States, namely Belgium, Ireland, France, Luxembourg, Netherlands and the UK, as well as leading to the Swiss and German borders in Basel.

All modes of transport are covered within the North-Sea Mediterranean corridor; air, sea, road, rail, inland waterway, and pipeline. Key infrastructure assets include the Channel Tunnel, three of Europe's top-five airports and four of Europe's top-ten seaports. Waterborne transport, inland and maritime, is strongly emphasised in the corridor.

An important document that supports a part of the implementation of the inland waterway connections in the North Sea-Mediterranean corridor is the Declaration of Tallinn. On the 17th October 2013, the European Commissioner for Transport and the Transport Ministers of France, the Netherlands, Flanders and Wallonia signed the Declaration of Tallinn recognising the importance of inland waterway transport within the North-Sea Mediterranean corridor. The declaration commits the parties to take the appropriate measures to develop the inland waterway sections of the North Sea-Mediterranean Core network corridor by 2030 through the Trans-European Transport Network and to strengthening co-operation in the development of inland waterway transport and related multimodal transport, and maximising the co-financing possibilities up to 40%, for listed sections of the waterway network shared by the three signatory countries.

This Corridor is defined as a series of interlinked sections, with implicit short-sea connections between the UK, Ireland and the Continent. It overlaps with the North Sea Baltic and Rhine-Alpine corridors in the Netherlands and Belgium, the Atlantic Corridor in Northern France and the Mediterranean Corridor in Southern France, and it is the only core network corridor reaching the UK and Ireland. It is therefore an extensive and complex corridor containing densely populated regions of long-standing economic importance and with a high degree of urbanisation, along with more peripheral and less densely populated regions in the west and north.

There are also contrasts in relation to cultures for infrastructure investment within the Corridor. The continental Member States and Ireland tend to invest in transport infrastructure using public sector resources, regarding the infrastructure as a "public good". In the UK, this is the case for road and rail infrastructure, but airports, sea ports and road-rail terminals are often owned by the private sector and so investment decisions are subject to commercial decision-making processes. This means that investments in road-rail terminals, airports and seaports are generally based on

[2] Regulation 1315/2013 and 1316/2013

analysis of market-based risks and rewards and details of investment projects are often not in the public domain.

The Terms of Reference of this study set out three specific corridor objectives:

Aims for North Sea Mediterranean Corridor	Better multimodal services between corridor ports.
	Better multimodal services along the Maas, Rhine, Scheldt, Seine, Saône and Rhône waterways.
	Better multimodal services interconnecting the UK, Ireland and continental Europe.

Regulation 1316/2013 (Annex I, Part I) defines sets of pre-identified projects for each corridor. The pre-identified projects allocated to the NSMED corridor, together with overlapping projects in overlapping corridors are listed for reference in Annex 11 of this document.

1.1 The Study Team

The study is being carried out by a consortium of four main partners, Panteia, MDS-Transmodal, EGIS, and Stratec, with two sub-contractors, Nestear (BG Group) and PwC.

Partner	Location	Role
Panteia	Netherlands	Co-ordinator
MDS-Transmodal	U.K.	Partner
EGIS	France	Partner
Stratec	Belgium	Partner
Nestear/BG Group	France	Sub-contractor
PwC	E.U.	Sub-contractor

1.2 Purpose of the Report

This report covers the work carried out by the study team during 2014, as the basis for the European Co-ordinator's work plan.

One of the central elements in the report is the list of potential projects of common interest. The projects listed in this final report are in many cases subject to high level governmental approval by the Member States.

During 2014, four progress reports have been published. The First Progress Report in April 2014 was presented as a preliminary analysis document, which provided a summary of the whole corridor, as the basis for the first discussions with Member States during the first Corridor Forum, including foundations such as the corridor alignment.

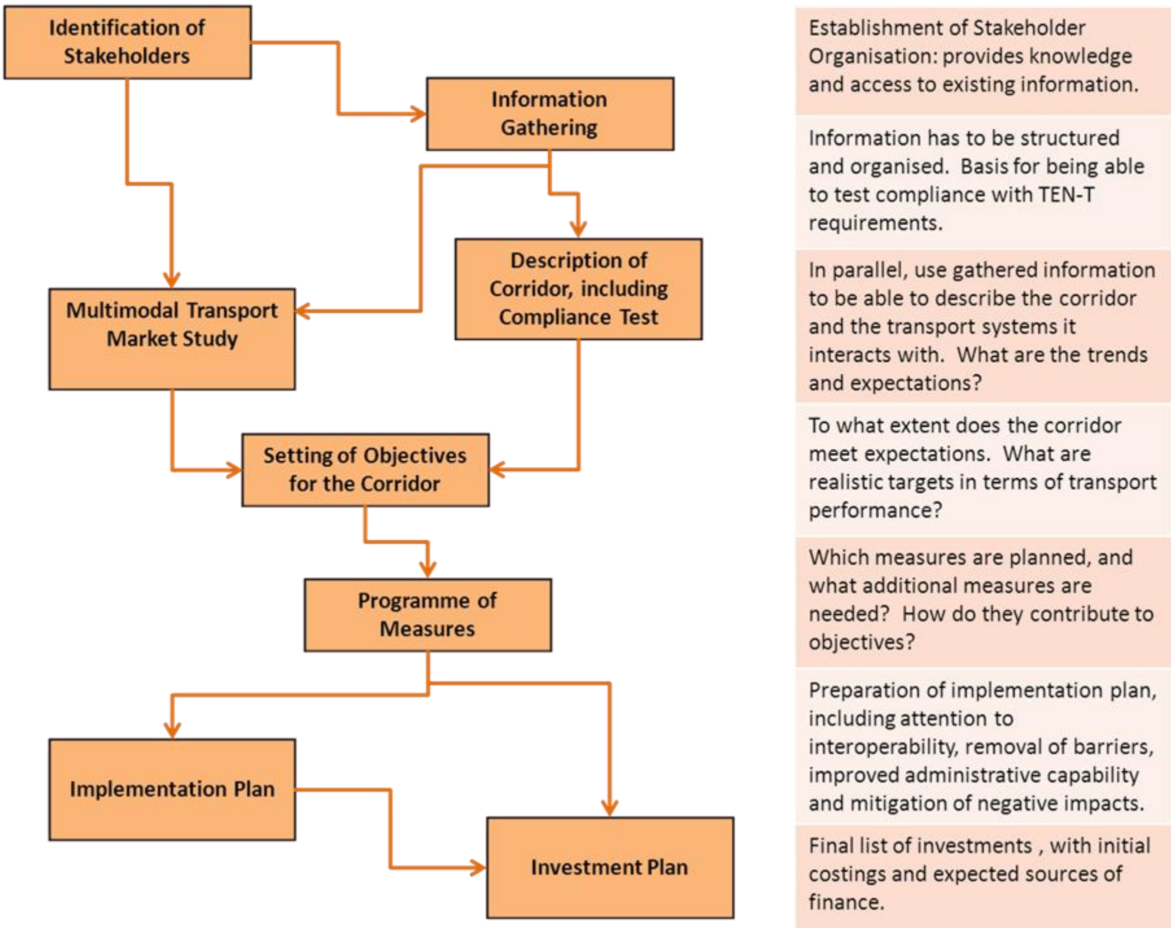
The Second Progress Report, completed in August 2014 started the process of developing the work plan, including market analysis, a preliminary analysis of corridor objectives, and a more detailed analysis of technical issues such as interoperability, and compliance with TEN-T requirements per mode.

The Third Progress report, issued in September 2014 outlined the first draft of the NSMED work plan, containing preliminary lists of projects. It further developed the market analysis by analysing key sectors and key nodes of the corridor in more depth.

The fourth report, issued in November 2014 for the final 2014 corridor forum was the first draft of the final report, informed by responses from stakeholders since the third forum.

An outline of the study methodology is shown below.

Figure 2: Overview of Study Methodology



Main components of the methodology required for the study are:

- TENtec Data Collection – within the information gathering task.
- Detailed Corridor Alignment – within the Corridor description task.
- Literature Review – including analysis of on-going corridor upgrades.

- Market study
- Definition of Corridor Objectives

- Programme of Measures, and
- Implementation/Investment Plan

1.3 Corridor Alignment

Both the European TEN-T core and comprehensive networks are defined explicitly with maps included in the annex of regulation 1315/2013.

The corridors, however, which have been introduced as co-ordinating mechanisms for developing the TEN-T networks across borders, were not defined explicitly in the forms of maps, but rather as lists of cities and nodes.

The North Sea Mediterranean Corridor is defined in the annex of the legal text as shown in the table below:

North Sea – Mediterranean
ALIGNMENT:
Belfast – Baile Átha Cliath/Dublin – Corcaigh/Cork
Glasgow/Edinburgh – Liverpool/Manchester – Birmingham
Birmingham – Felixstowe/London /Southampton
London – Lille – Brussels/Bruxelles
Amsterdam – Rotterdam – Antwerpen – Brussels/Bruxelles – Luxembourg
Luxembourg – Metz – Dijon – Macon – Lyon – Marseille
Luxembourg – Metz – Strasbourg – Basel
Antwerpen/Zeebrugge – Ghent – Dunkerque/Lille – Paris

Source: Regulation 1316/2013, p158

An outline map, based upon this list of corridor sections, is shown overleaf, providing a broad outline of the alignment of the corridor.

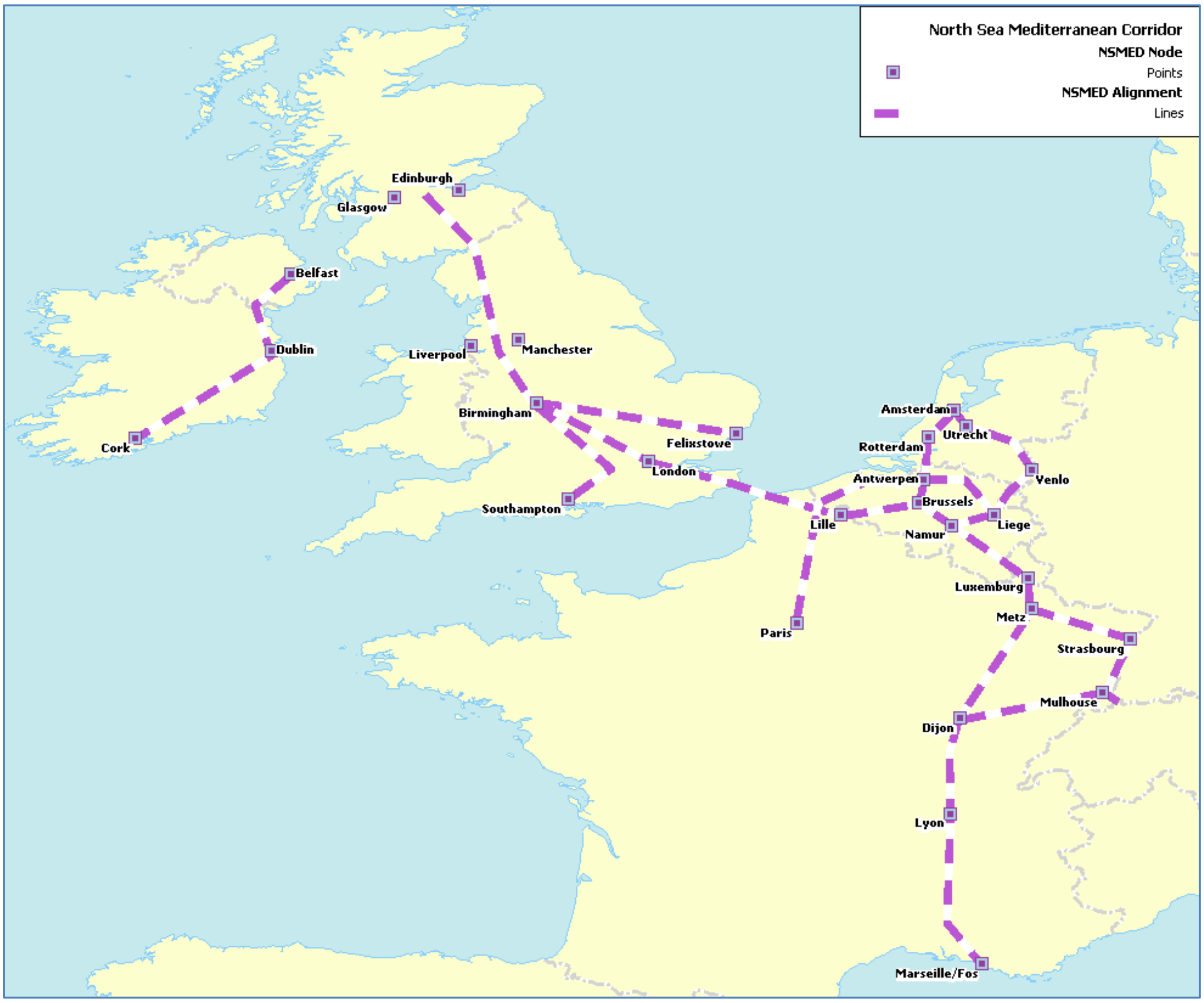
It describes a multimodal transport system of about 4,000km connecting urban centres, ports, airports, inland terminals, industrial and freight facilities, providing capacity for both passenger and freight flows.

It is only possible to provide an indicative broad outline of the corridor alignment, and not define the specific infrastructure included in the corridor. However, the tasks of the study, which include link-by-link data collection for TENtec, analyses of the infrastructure parameters, and identification of bottlenecks, do require a translation from this overview alignment to a specific set of links within each modal network. Making this detailed definition together with the Forum has been an important foundation for the study.

Nodes and their last mile connections also require further elaboration. In the regulation, the core network maps show the strategic national infrastructure connecting cities as nodes of the network. However, any given city may represent a large surface area (e.g. > 1000 square km) containing numerous transport facilities and complex networks of its own.

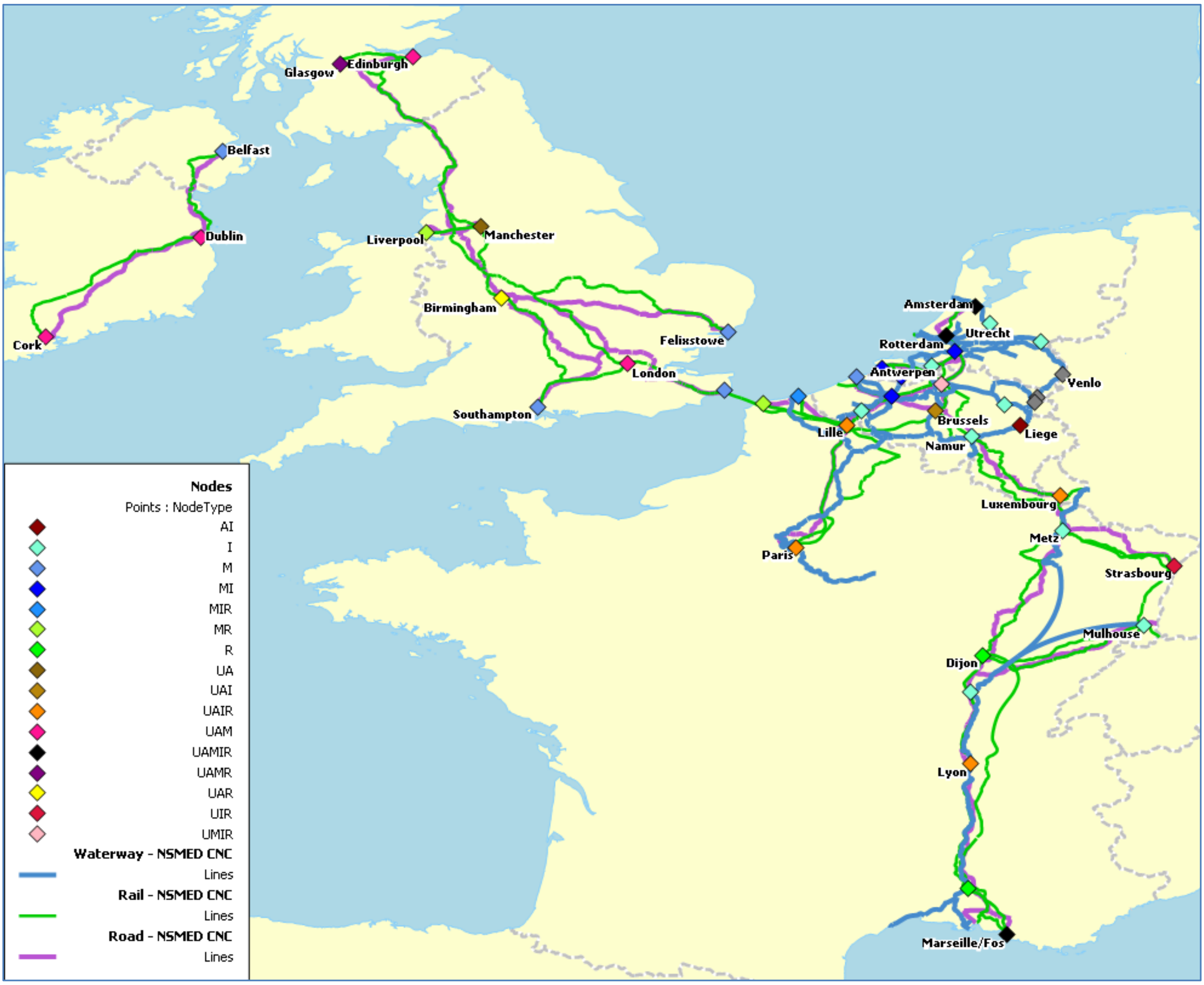
The ‘last mile’ connections are short hinterland connections between airports, ports and city nodes and the Core Network and the Corridor. If a corridor node is classified as a core airport, for example, the land connections between the airport and the Core Network Corridor road and rail networks might be considered relevant for the analysis and for the Work Plan, although they are not subject to TEN-T Network standards.

Figure 3: Overview Corridor Alignment



The alignment has been developed throughout the study, with the detailed version shown below in Figure 3. The nodes are classified according to their status in the Regulation, where (U=urban, A=air, M=maritime, I=Inland port, R=Road/rail terminal). The central part of the corridor is expanded in Figure 4. A detailed list of node classifications is shown in Annex 1, together with more detailed maps covering the whole network.

Figure 4: Corridor Alignment

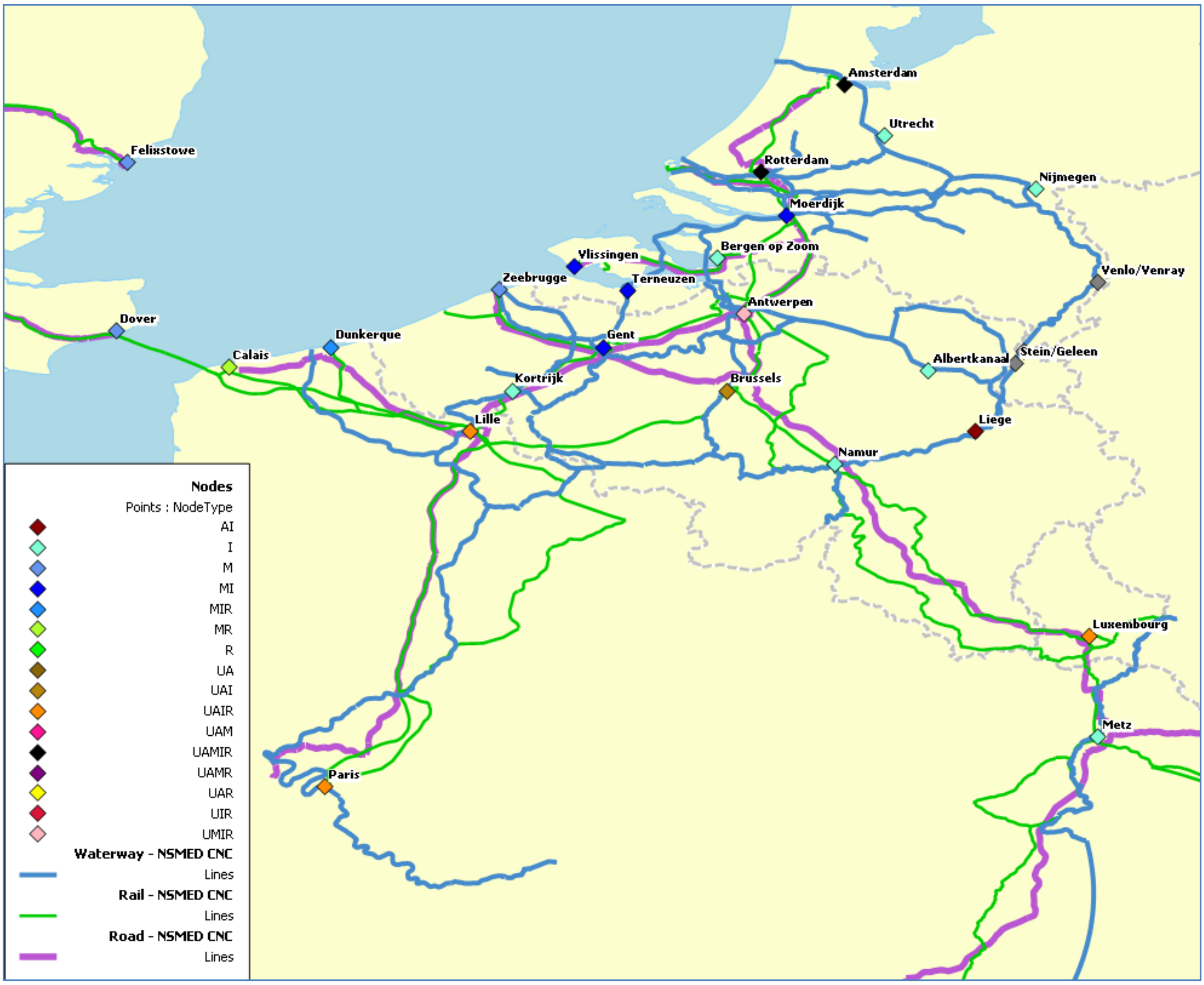


The key to the categorization of the nodes is shown below:

Key: Node Categorisation in TEN-T Regulation

Code	***Description***
A	Airport
I	Inland Port
M	Maritime (sea) Port
R	Road/Rail Terminal
U	Urban Node
AI/MI etc	Combinations of above

Figure 5: Corridor Alignment, Central area (enlarged)

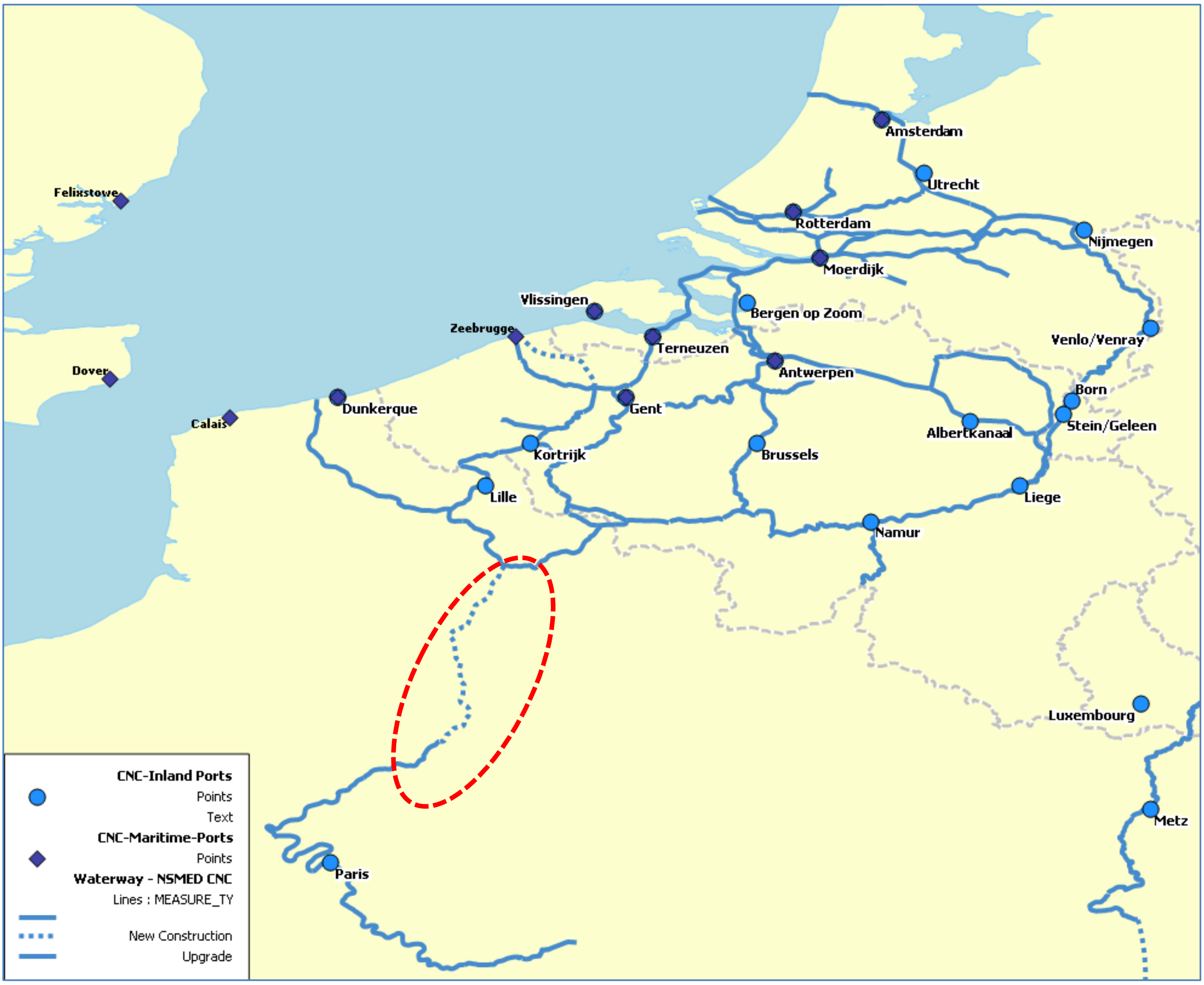


Note: Venlo and Wanssum/Venray are all shown as a single point.

The network is built up from nodes, which are defined according to their core or comprehensive status in the annex of Regulation 1315/2013. Their functions (e.g. seaport, urban node) are also defined in the annex, and these are colour-coded in the map. Certain comprehensive nodes are shown in the maps due to their importance in the transport system. These are coloured grey. Road, rail and waterway network alignments are shown (all core network), connecting the nodes.

A more detailed map showing the waterway network in the central area is shown below, with the Seine-Scheldt missing link highlighted. The Dutch and Belgian waterway network which links the major seaports to the inland corridor along the Rhine river is currently not connected at CEMT IV gauge (the minimum for TEN-T) with the French waterways around Paris. Adding this missing link potentially increases the reach of the network, creating a continuous waterway corridor: Amsterdam, Utrecht, Rotterdam, Terneuzen, Antwerp, Ghent, Lille and Paris. It would allow vessels to travel from the Seine basin via the Meuse/Maas to the German Rhine corridor.

Figure 6: Waterway Alignment, Central area



In this map, the core network waterway sections are more clearly visible, and the missing link between Paris and Lille is highlighted. Note that only the corridor sections are shown.

The southern sections of the waterway network are shown overleaf. Currently there are no CEMT IV (or higher) connections from the Rhône basin to either the Moselle (towards Metz and Luxembourg) or the Rhine (towards Mulhouse).

Figure 7: Waterway Alignment, Southern Sections

The full set of corridor nodes is shown below. See Annex 1 for a list showing the official categorisation of the nodes.

Table 4: List of Corridor Nodes

Country	Node
Belgium	Antwerp
	Brussels
	Ghent
	Albert Canal
	Kortrijk
	Liege
	Namur
	Zeebrugge
France	Avignon
	Calais
	Chalon sur Saône
	Dijon
	Dunkerque
	Lille
	Lyon
	Marseille/Fos
	Metz
	Mulhouse
	Paris
	Strasbourg
Ireland	Cork
	Dublin
Luxembourg	Luxembourg
Netherlands	Amsterdam
	Bergen op Zoom
	Born (compr.)[3]
	Moerdijk
	Utrecht
	Nijmegen
	Rotterdam
	Stein (compr.)[2]
	Terneuzen
	Venlo (compr.)
	Vlissingen
	Wanssum (compr.)[4]
UK	Belfast
	Birmingham
	Dover
	Edinburgh
	Felixstowe
	Glasgow
	Liverpool
	London
	Manchester
	Southampton

[3] Stein and Born belong to the same cluster, together with Geleen and Sittard.
[4] Wanssum is part of a cluster together with Venray (comprehensive network).

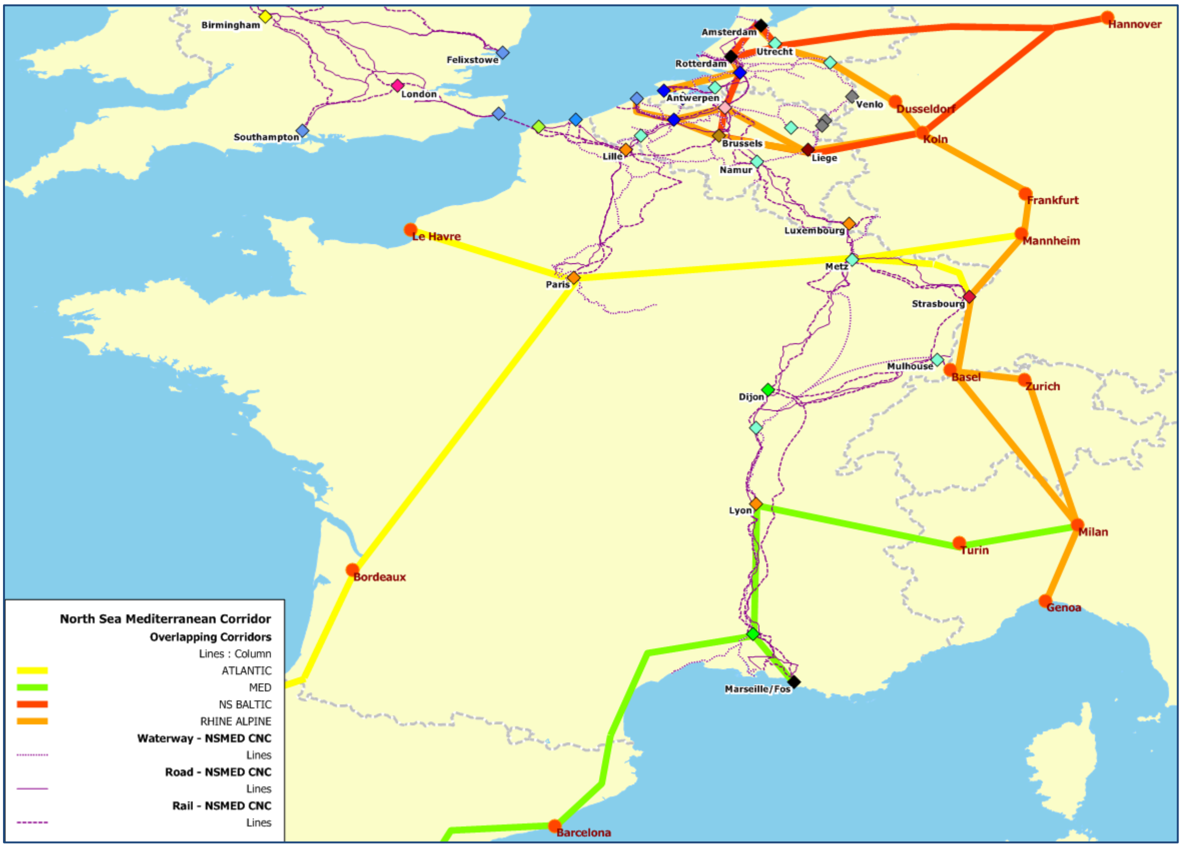
Although the focus of this study is on the corridor itself, in reality, the corridor network cannot be separated from its wider context within the core network. Together this collection of links and nodes should be seen as part of an integrated transport network with points of interconnection to adjacent corridors and intercontinental gateways (ports and airports).

1.4 Core Network Corridor Overlaps

By examining the interconnections and overlaps with adjacent corridors, the structure of the wider network can be seen. There is no restriction within TEN-T for a section of infrastructure or a node to belong to several corridors.

For NSMED, the main area of overlap is found in Belgium and the Netherlands where two other core network corridors, Rhine-Alpine (marked in Orange) and North-Sea Baltic (Red) cross over in order to connect with the seaports between Zeebrugge and Amsterdam. As a general rule, NSMED follows a North-East to South-West orientation from Amsterdam towards Paris, whereas Rhine-Alp and NS-Baltic corridors follow an East-West orientation towards Germany (Koln).

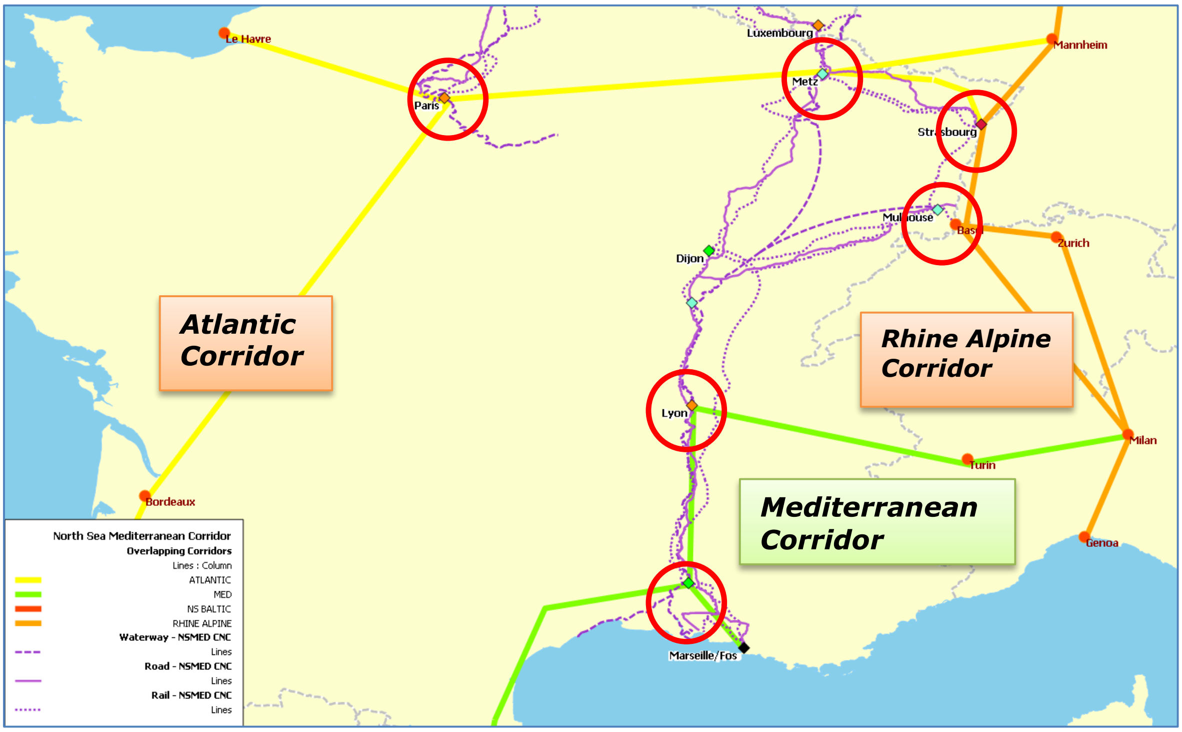
Figure 8: Overlapping Core Network Corridors



In the South West, the Atlantic corridor (yellow) connects NSMED in Paris, Metz and Strasbourg, and in the South, the Mediterranean corridor (green) overlaps between Marseille, Avignon and Lyon, crossing eastwards towards Turin at Lyon. Where the NSMED and Rhine-Alpine corridors run parallel, there are points of interconnection at Strasbourg and Basel/Mulhouse.

Paris is a key interconnecting node, linking NSMED to the port of Le Havre and in a South West direction towards Bordeaux and the Spanish border via the Atlantic corridor. The Atlantic corridor interconnects again in the East of France, first at Metz, where there is a branch towards Mannheim in Germany, and in Strasbourg where it also connects to the Rhine Alpine corridor.

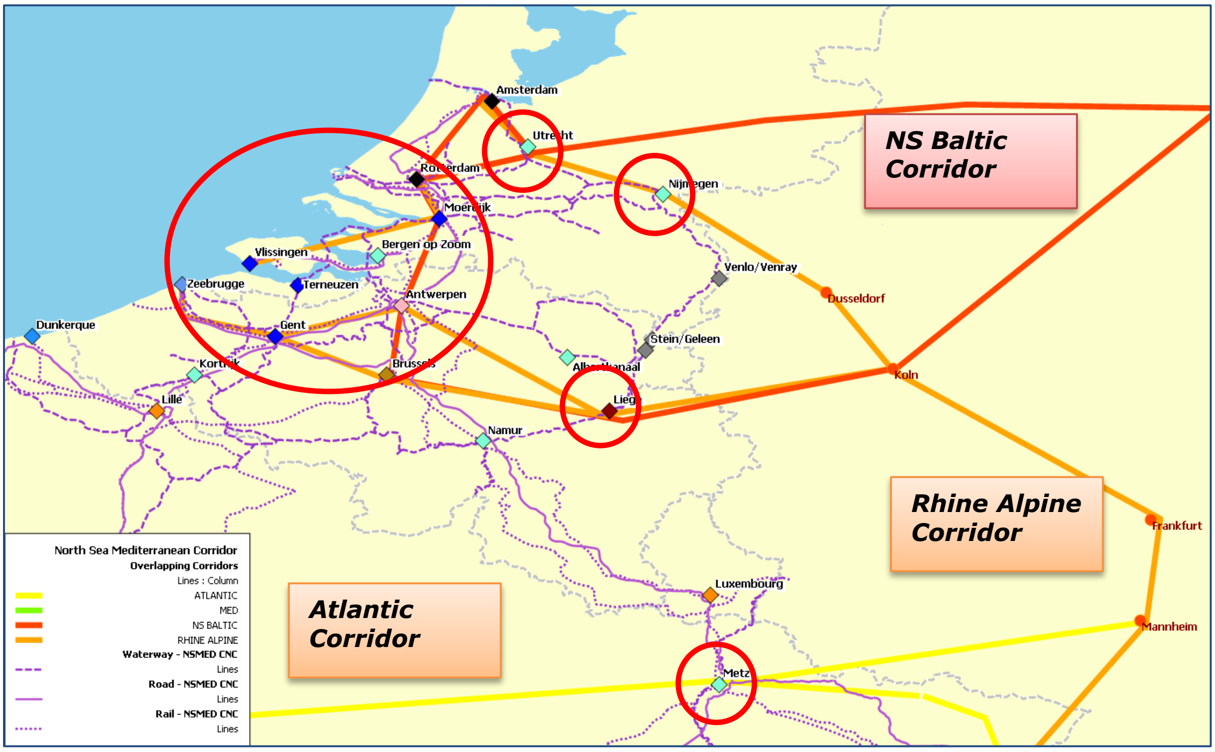
Figure 9: Corridor Overlaps, Southern Sections



At Mulhouse in Eastern France there is an important cross-border connection to Basel in Switzerland which opens up access to the Alpine crossing routes towards Italy, which is especially important within the railway network. Further south, NSMED intersects with the Mediterranean corridor, first near the Mediterranean coast at Marseille and then further north at Lyon where access is opened up eastwards towards Turin and Milan.

In the central part of the corridor, illustrated below, there is a high degree of overlap between the NSMED corridor and the Rhine Alpine and North Sea Baltic corridors. The North-Sea Baltic corridor stretches due east from the Utrecht towards Berlin, and north-east from Liège towards Koln. The Rhine Alpine corridor is aligned East-West in the Netherlands and Belgium before turning to the South at Koln, towards Switzerland and Italy.

Figure 10: Corridor Overlaps - Central Sections

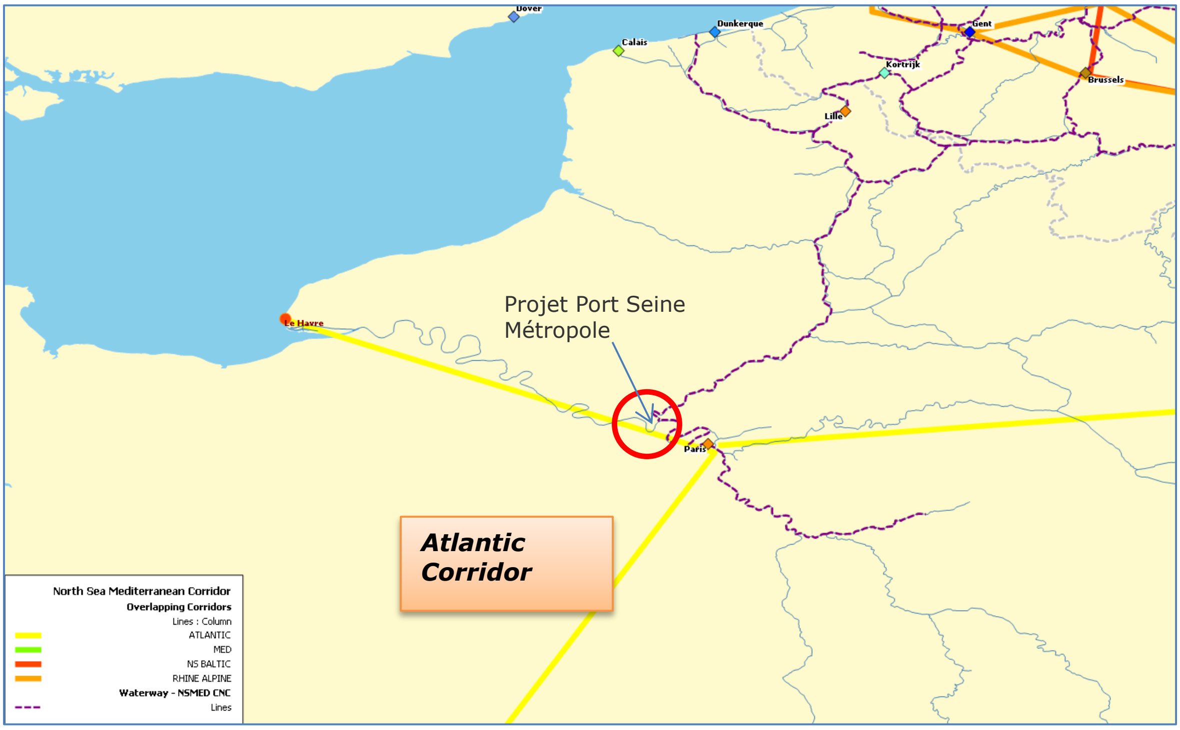


In the triangle-shaped region Zeebrugge-Amsterdam-Koln, there is a high degree of overlap, especially along the coastline, where all corridors access the main seaports. The main difference is that NSMED covers the waterway sections within the square-shaped region Antwerp-Rotterdam-Nijmegen-Liège. The other important difference is that NSMED includes the cross-border connections between Rotterdam-Terneuzen-Ghent. Key interconnecting nodes are Utrecht, Nijmegen, and Liège.

Around Paris, the overlap between the Atlantic and NSMED corridors is important, because the main part of the River Seine, between Le Havre and Paris, is part of the Atlantic corridor while the rest of the waterways in this basin are in NSMED. Thus, measures to improve navigability in one corridor section have an impact upon the traffic flows in the other corridor.

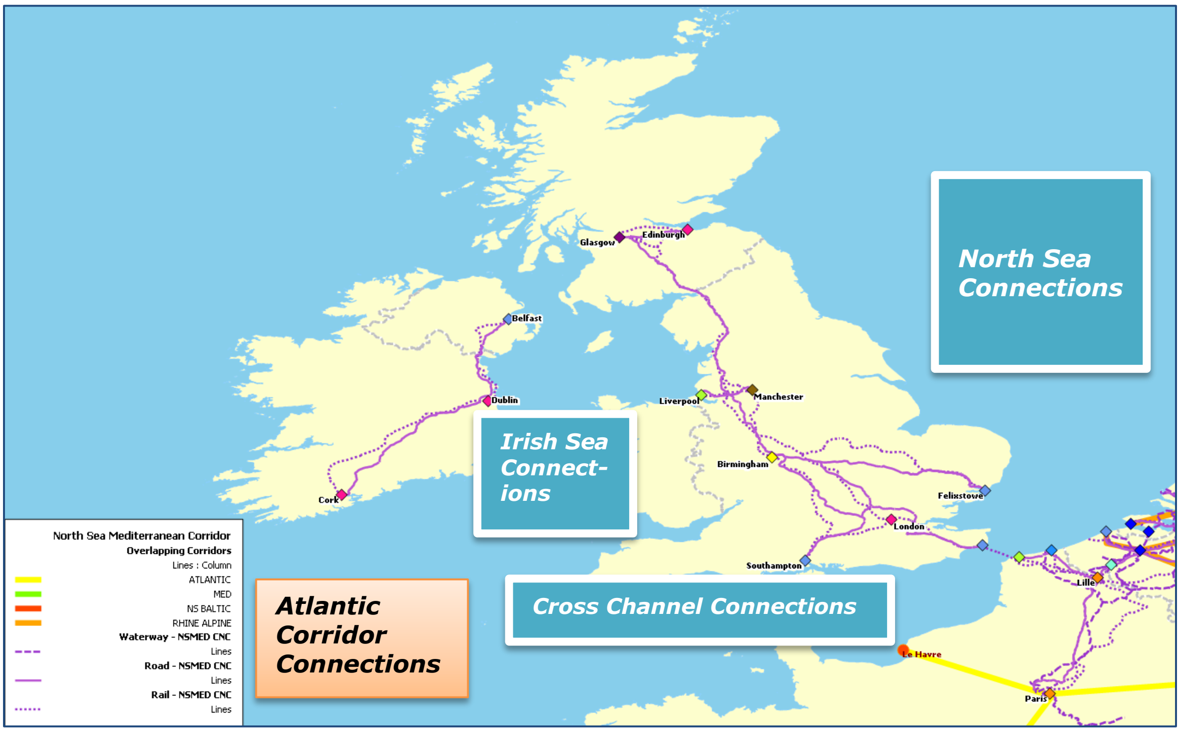
The point where the corridors connect coincides with the junction of the Seine and Oise rivers, as indicated below. There is a planned inland port development at this river junction, as part of the overall Seine-Scheldt scheme to connect Paris via the River Oise and (proposed) Seine-Nord canal towards Lille, and across the Belgian border towards the Netherlands and Germany. Such developments have consequences for both corridors.

Figure 11: Overlapping Corridors, Paris and Seine Basin (Waterways)



In the UK and Ireland, NSMED is the only TEN-T core network corridor, so there are no overlaps or points of interconnection to other corridors.

Figure 12: Overlapping Corridors, Northern Sections



There are however other major traffic routes, such as the East Coast route in the UK (London to Edinburgh), and East-West routes which are included in the core network, but not the corridor. Short sea routes connecting the UK mainland and Ireland, and to the Continent are also addressed within TEN-T, but not specifically included as links in the corridor. Maritime connections between the Iberian peninsula and the NSMED corridor can also be considered in this context, and there is an implicit overlap between NSMED and Atlantic for maritime routes.

1.5 Peripheral Regions in the UK and Ireland and Maritime Inter-Connections

Core and comprehensive networks were identified using a methodology which joins up core nodes based on traffic flows and population size. Core network corridors were put forward as a means of joining up main nodes within the core network. Using this methodology it was not possible to include many peripheral regions in the core network and transport infrastructure in these regions then became part of the comprehensive network.

TEN-T aims to address cohesion, as set out in Article 4(a) of Regulation 1315/2013, applying to the "accessibility and connectivity of all Regions of the Union including remote, outermost, insular, peripheral and mountainous regions as well as sparsely populated areas". Accessibility and connectivity are definitively critical issues within the NSMED corridor owing to the way in which the corridor is fragmented both in reaching and crossing the two main island regions. The first Working Group for regions of the NSMED corridor has highlighted the point that the UK and Ireland, which are included in only one core network corridor (NSMED corridor), contain more peripheral areas which are either outside the core network, or outside the corridor. From the UK standpoint, this includes Wales, Northern Scotland, South West Scotland, Western Northern Ireland, South West England, Yorkshire and North-East England. In terms of Ireland, this extends to the western and south eastern parts of the country.

In Great Britain, Wales has two road/rail branches of the core network along the north and south coastlines, linking to the ports of Holyhead in the North, and Newport, Cardiff, Milford Haven and Fishguard in the South but is not on the Corridor. Northern Scotland is only included in the comprehensive network, with no core network sections. However, South West Scotland includes a core road connection from Glasgow to the Loch Ryan ports (comprehensive seaports) which provide the shortest, sea connections to Northern Ireland. South west England is connected via the M4/Great Western Main Line as far as Bristol within the core network, meaning that the English South West peninsula including Devon and Cornwall is not covered. North East England and Yorkshire are included within the core network, focused upon the city of Leeds with branches to the port cities of Hull/Immingham/Grimsby, Tees/Hartlepool and Newcastle-upon-Tyne. However, those core network sections are not part of the NSMED corridor.

In Northern Ireland, the corridor connects Belfast via the Irish land border to Dublin, but to the North of Belfast, the core network road link to the port of Larne is not included in the corridor. Thus, although the core network covers the road/ferry connection from Belfast via Larne to Loch Ryan and Glasgow, the corridor stops in Belfast and Glasgow, so there is a critical disconnect in the corridor for this routeing. The eastern seaboard routing of the corridor within Northern Ireland means that the geographical majority of the region must connect to the corridor through comprehensive road links. Rail connections in comprehensive network terms are, again, limited to the eastern and northern areas of Northern Ireland.


Figure 13: Regions Adjacent to NSMED Corridor in the UK and Ireland.
Northern Scotland
Southwest Scotland
Northeast England
Western N. Ireland
Western Ireland
Southeast Ireland
Wales and Southwest England
Rail - NSMED Corridor
CNC Alignment
Road - NSMED Corridor
CNC Alignment
Railways TEN-T Network
Comprehensive
Core
Roads TEN-T Network
Comprehensive
Core

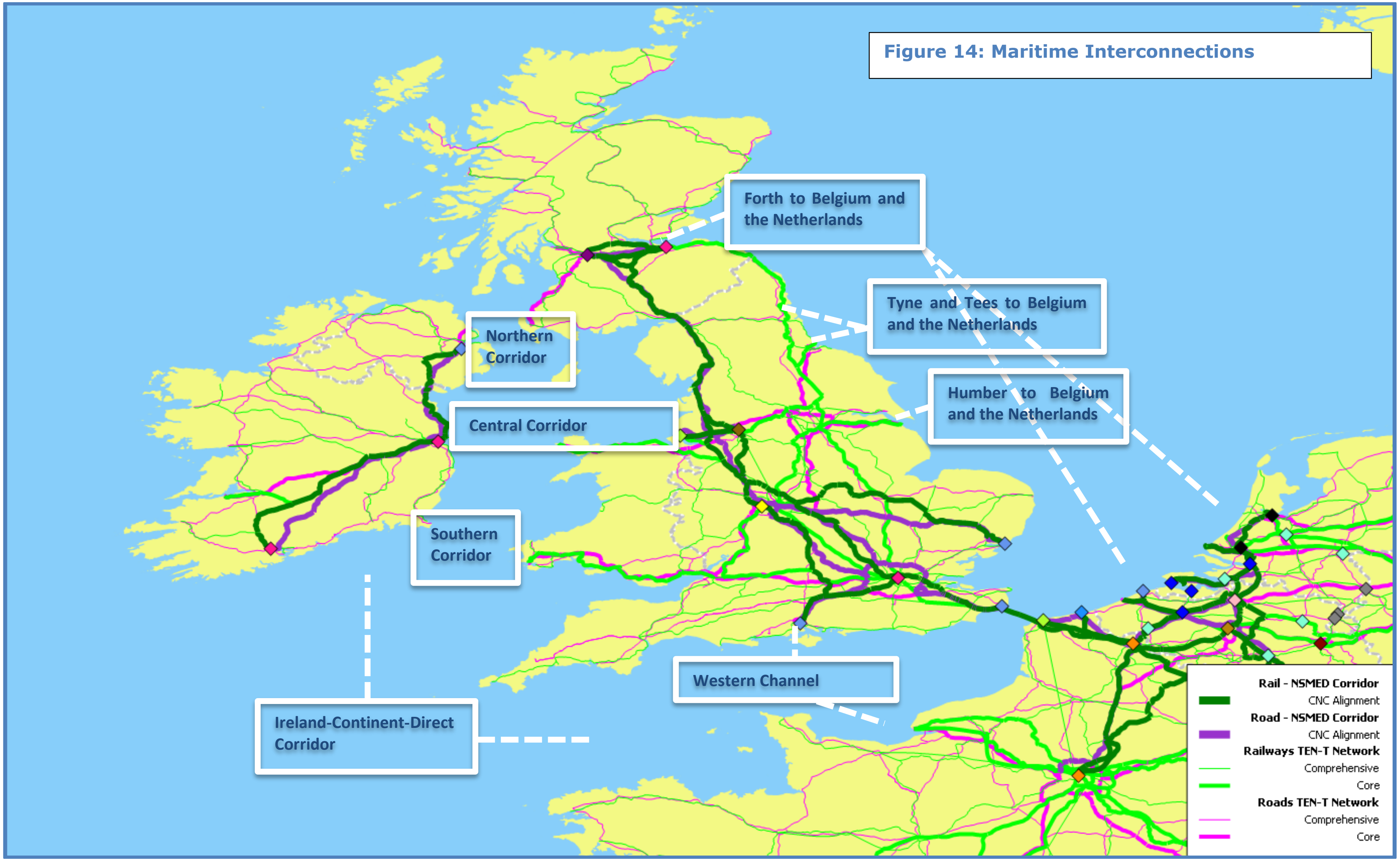


Figure 14: Maritime Interconnections
Forth to Belgium and the Netherlands
Tyne and Tees to Belgium and the Netherlands
Humber to Belgium and the Netherlands
Northern Corridor
Central Corridor
Southern Corridor
Western Channel
Ireland-Continent-Direct Corridor
Rail - NSMED Corridor
CNC Alignment
Road - NSMED Corridor
CNC Alignment
Railways TEN-T Network
Comprehensive
Core
Roads TEN-T Network
Comprehensive
Core

In Ireland, most of the western side is linked by comprehensive road and rail links in accordance with criteria for identifying the comprehenisive network.. The main exception is the Limerick/Shannon/Foynes area with its airport and seaport, which does have a core road connection (M7) to Portlaoise and a core rail freight connection towards Tipperary, linking to the main corridor route between Cork and Dublin. The core network sea port at Shannon Foynes, which is not located on the corridor, has an hinterland that overlaps with Cork and Dublin and has deep water capacity. The region of South East Ireland, with Waterford and the port of Rosslare, is also only reached via the comprehensive networks. Rosslare is a RORO port with important sea connections to West Wales and to Northern France, and therefore relevant for the interconnecting maritime routes that can potentially alleviate road traffic from the longer overland routes.

Thus, the UK and Irish regions which lie outside the corridor are relevant in the wider context, first, because there is a need for the TEN-T to address accessibility, and second, because there are important inter-connecting maritime links across the Irish Sea, between Ireland and the continental mainland and between the ports on the east coast of England and the continental mainland, which use non-corridor (both core and comprehensive) ports and parts of the core network which are not part of the corridor. These maritime links offer Motorways of the Sea services between the more peripheral regions of the NSMED corridor to the core of the EU in North West Europe while taking road traffic off relatively congested sections of the road network on the Core Network Corridor.

In considering the corridor work plan, the importance of periphereaility and the importance of linking the peripheral regions via the comprehensive and core network to the centre should be considered as a counterbalance. This means consideration should be given to traffic flows from the peripheral regions to the wider national and European transport network which originate in the comprehensive network and connect via the core.

1.6 Motorways of the Sea

As demonstrated, the inland sections of the nine core network corridors are overlapping. Motorways of the sea, as the "tenth corridor" provide a further dimension of overlap and connectivity. In NSMED, there are implied short sea links completing the corridor, and there are also connections across corridors, and in particular with the Atlantic corridor, the Mediterranean corridor and the NS-Baltic corridor.

As outlined in Regulation 1315/2013, article 21, motorways of the sea (MoS) provide the maritime dimension of the trans-European network, including both comprehensive and core ports, sea transport, and sea-river transport. The objective is to establish networks of viable, regular and reliable short-sea services integrated into logistics chains. The need to address issues of peripherality is a key consideration, also relevant for the corridor.

MoS may cover broader issues including shore side electricity, the optimisation of processes and procedures, including the human elements, ICT, traffic management and reporting.

In the corridor alignment maps, no specific sea (port to port) connections have been designated as corridor links. Instead it is understood that there is an existing network of competing maritime services operating to connect the land sections of the corridor and to provide links between corridors. These play an important role in linking the regions and providing alternatives to land transport. The aim is therefore to develop a holistic approach to improve network integration, and to encourage adoption of TEN-T initiatives such as clean fuels, improved information technology, and the development of logistics platforms in ports or associated with ports.

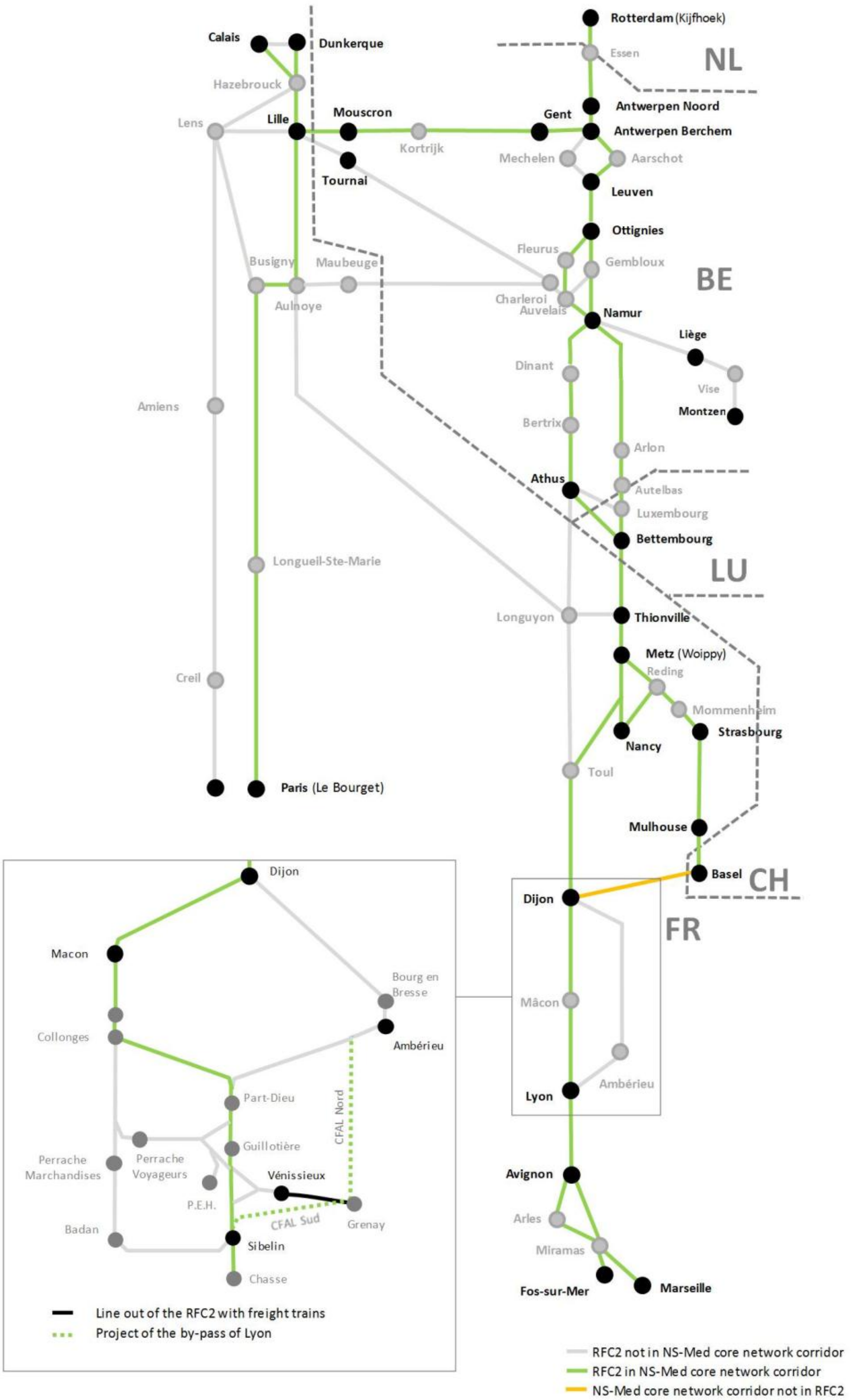
1.7 Comparison with RFC2

Regulation 1315/2013 states that the core network corridors should be in line with the rail freight corridors set up in accordance with Regulation (EU) No 913/2010. Currently, the NSMED core (rail) network includes many common sections with Rail Freight Corridor 2, but there are important differences. In the NSMED rail network, many passenger-only high speed links are included, which can be explained by the need for the core network corridor to address passenger as well as freight traffic. However, there are differences between the NSMED's network for rail freight and the RFC2 network which need to be resolved.

RFC2 covers a large part of the North-Sea – Mediterranean corridor, with the core including the main routes from Rotterdam and Antwerp to Lyon and Basel, branches to Dunkerque, Calais (connection to Great-Britain) and Paris, as well as an extension towards Marseille.

The following map of the RFC shows (in green) the lines which are defined in common with the NSMED core network corridor (CNC).

Figure 15: Comparison of RFC and CNC Network Alignments



The RFC2 network goes further by defining diversionary routes and connecting links – and it includes principal lines which are classified as comprehensive links inside the core network. Guidance for the core network corridor studies is to define the corridors using core links only. RFC2 includes, for example, the comprehensive network section that runs inside the French border between Lille and Metz, and the two freight lines that cross the French/Belgian border from the direction of Paris. Those cannot be added to the core network. In the UK, the HS1 line from the Channel Tunnel to London is included in the NSMED core network corridor, whereas the conventional line between London and the Channel Tunnel is expected to be assigned to the RFC2.

Given the objectives of the core network, with the need to use the full potential of the available networks to avoid bottlenecks, there is a clear case for ensuring close collaboration between the NSMED core network corridor and RFC2 to avoid duplication of effort or dual governance. The same approach can be taken towards aspects such as terminals, diversionary routes and connecting links. Potentially this can be solved by classifying the additional RFC2 lines as "lines of interest" for the core network corridor.

1.8 Summary

The Regulation, which follows a dual-layer approach, provides detailed maps showing: (1) core and (2) comprehensive networks. There is no definition of the core network corridor, but an indicative nap of the corridor has been developed to show the connections between the nodes listed iin the CEF Regulation. This was developed in response to NSMED stakeholders, who showed a clear preference for an approved and precise corridor definition and it was therefore important task of the study to develop and agree the correct alignment. The ability to include comprehensive links that would allow a proper alignment with RFC2, as required by the Regulation, is out of the scope of this study, but remains a problem to be solved.

2 Identification of stakeholders

2.1 Identification

There has been active stakeholder involvement throughout the study. As it has progressed, the Corridor Forum has expanded step by step. The list of stakeholders involved in the Forum, and a longer list of relevant organisations for consultation are provided in Annex 3.

2.2 Information Required from Stakeholders

Corridor stakeholders fall into four main categories:

- Member States (MS) – Transport Ministries
- Infrastructure Managers (IM) – for each mode of transport
- Corridor Regions (CR) – equivalent to either NUTS1[5] or NUTS2 regions.
- Infrastructure users and wider society (IU).

To date, three stakeholder forums have been organised for the corridor. The first was attended by the Member States, and the second was enlarged to include infrastructure managers from seaports, inland ports, inland waterways, and railways. The third and fourth forums include corridor regions and infrastructure managers from the road and airport sectors.

One of the goals of stakeholder involvement through the forum is the collection of information.

Table 5: Overview of Information Collection

	MS	IM	CR	IU
Precise Alignment of the Corridor	X			
Literature and Studies	X	X	X	X
Identification of Bottlenecks	X	X		X
Technical Infrastructure Data	X	X		
Network Traffic Data	X	X		
Identification of Projects	X	X	X	

At present, and until the third forum, the study is compiling a list of projects, using a standard structure for all corridors:

[5] NUTS 1 is equivalent to German Länder.

Table 6: Project List Structure

Transport mode	Location	Studies or Work	Description of project	Project promoter	Timing	Costs (EUR)	Financing sources

To arrive at the investment plan, further information has been sought for specific projects. A common structure has been used by adjacent corridors, since any given project may be relevant for more than one corridor.

Table 7: Information Sought for Projects

Measure Location	TEN-T Corridor	e.g. NSMED, NSBALTIC,..
	Member states involved	
	Transport Modes Affected	Road, Rail, IWW, sea port, airport, RRT etc.
	Section or node	Section, Station, terminal, border crossing, etc.

Measure Description	Short name / title	Short name or title to identify the measure
	Category	If measure is part of an identifiable group of measures e.g. Seine Scheldt.
	Implementation Body	Authority, institution or company responsible for implementing the project, e.g. infrastructure manager for building a rail line
	Description	Objectives and scope of measure e.g. introduction of RIS, ERTMS, rail line electrification, upgrade one to dual track
	Scope of work	Study Infrastructure works – rehabilitation Infrastructure works – upgrade Infrastructure works - new construction Maintenance equipment Rolling Stock, Vehicles, Barges Traffic Management System Administrative Procedures Other type of measure
	Reference date for information.	MM/YYYY

	Maturity by reference time	Latest status of measures: - works completed - works partially completed - works under construction - study finalised; - study in progress; - planned
	Envisaged finalisation	YYYY

Financing	Total costs	Amount in Million Euro
	Expenditures until reference time.	Amount in Million Euro
	Funding source "State" (Central Government)	Amount in Million Euro/ Funding source programme name
	Funding source "Regional/Local"	Amount in Million Euro/ Funding source programme name
	Funding source "EU"	Amount in Million Euro/ Funding source programme name e.g. TEN-T funding, ERDF, CEF,…
	Funding source "IFI"	Amount in Million Euro/ Funding source programme name
	Funding source "Private"	Amount in Million Euro/ Funding source programme name
	Funding source "Other"	Amount in Million Euro/ Funding source programme name

3 Review of studies

3.1 Literature Analysis

A task undertaken in the first phase of the study was to establish a review of available literature relating to the corridor, as a 'living library'. This has been followed up during the later phases via bilateral meetings in Member States.

What emerges is a long and varied list of reports, updated as the study has progressed, and it is therefore necessary to realize that no studies have been made, adopting the same geographical scope as the North Sea Mediterranean corridor, as this is a new entity. One of the consequences of this is that there was no pre-existing definition of the corridor alignment, or technical analysis. Relevant studies are either pan-European or relating to only parts of this corridor. Many studies are conducted on a national basis, or addressing a single mode of transport.

Three categories of available literature might be used:

- Corridor Studies which mirror the scale and geographical scope of the current study.
- Multi-country transport and socio-economic research.
- National documents listing and describing infrastructure investments, including detailed technical reports such as rail infrastructure managers' Network Management Statements.

Corridor Studies

Three studies stand out as reference points for the current work:

The first is the Report of the Rail Freight Corridor 2, consisting of two key documents, the "Transport Market Study Rail Freight Corridor 2", and the "Implementation Plan, Timetable 2015". These provide both demand and supply-side information relating to rail freight transport within four of the six countries. On the supply side, there is a large amount of technical data, an analysis of bottlenecks, and detailed lists of implementation measures. On the demand side, flow matrices have been estimated, and forecast scenarios are made for rail up to 2030.

The Rail Freight Corridor 2 studies do not yet cover the UK (Ireland as an isolated network is exempt). However, the rail freight corridor will be expanded to include a link via France and the Channel Tunnel to the UK.

The second is the TEN-T funded "Multimodal corridor Amsterdam Marseille: rail and water multimodal solutions for freight stakeholders". This study, being coordinated by Voies Navigables de France, will be completed by the end of 2015. It will focus on three sub-sections of the North Sea Mediterranean Corridor, the Maas/Scheldt/Seine, the Rhine/Moselle, and the Saône-Rhône. It will follow a multimodal approach, develop short and long-term scenarios, and define measures to optimise intermodal service solutions. A key element of the study will be the involvement of stakeholders.

The third one is the European study on the corridor Paris-Amsterdam. This study analyses the internalisation of external costs by the pricing of all freight transport modes. It is an in-depth analysis of the impacts of internalisation of external cost scenarios on a specific strategic and congested international freight corridor in the EU. It has been conducted at an international and multimodal level. Therefore the results are of high interest for the study area and also for freight transport policy in Europe in general.

Multi-Country Transport and Socio-economic Research

These are mainly European studies with high level economic analysis and forecasting, containing access to transport data, and modelling tools. In order to develop future scenarios, the projects iTren-2030 and HighTool (ongoing) were considered relevant. iTren-2030 developed a full transport-economy-energy-environment scenario for 2030 according to a broad range of indicators. HighTool is updating this work with a European reference scenario. Platina II has developed information packs specifically for the corridor studies, also containing further literature reviews. The 2011 study, "Medium and Long Term Perspectives of Inland Waterway Transport in the EU" is a key reference for market prospects in inland waterway transport. For corridor analysis and corridor benchmarking, the SuperGreen (FP7) handbooks were used.

National Transport Planning Documents

The study team have prepared summaries of a range of key documents per country. These are typically project investment overview documents such as the Dutch 2014 MIRT Projectenboek[6], the master plan for inland waterways in Flanders, Belgian railway multi-annual invest plan, Belgian master plan ETCS, Belgian strategic plan Level-crossing, Mobiliteitsplan Vlaanderen, the French Mobilité 21 plan for sustainable mobility, or the UK Network Rail's CP5 Enhancements Delivery Plan from March 2014. Each refers to lists of investments being planned.

In the annex of the second progress report (v3.9) all key documents are summarised in the form of one-page project fiches, showing maps if relevant, listing project and planning objectives, the measures being taken, and brief summaries of financing requirements and timescales.

Literature Analysis Conclusions

The literature review has identified a large number of documents relevant for the corridor analysis. However, since the corridor is a new entity, both in its geographical scope and as a European multimodal corridor for both passenger and freight transport, there are no studies which address the full scope. This core network corridor study is therefore the first attempt to define a North-Sea Mediterranean corridor in Europe. Multi-country studies such as those published by Rail Freight Corridor 2 and the ongoing Amsterdam-Marseille multimodal study provide a basis that can be built upon. However, they do not yet consider the UK and Irish sections of the corridor. Extending what have been Continental corridors to cover the UK and Ireland changes the overall context by bringing in issues of accessibility and cohesion.

[6] http://mirt2014.mirtprojectenboek.nl/

4 Elements of the Work Plan

4.1 Summary

Outline
Each core network corridor study is drafting its work plan according to a common structure:

a) Description of the characteristics of the corridor:

- a description of the technical parameters of the infrastructure for each transport mode
- the transport market study
- the identification of critical issues on the corridor (cross border sections, bottlenecks, interoperability, intermodality, operational and administrative barriers)

b) Objectives of the Core Network Corridor:

- in line with the objectives and priorities of the TEN-T regulation (four categories of Article 4)
- Measurable KPIs based on existing statistics[7],

and c) Implementation:

- A list of projects with an annex containing the standardised information per project, with the investment required and the envisaged sources of finance
- A deployment plan for traffic management systems (in particular ERTMS and RIS)
- A plan for the removal of physical, technical, operational and administrative barriers between and within transport modes and for the enhancement of efficient multimodal transport and services
- Elements as referred to in Art 47 paragraph 1[8].

This chapter follows the above structure, with additional information related to the developing list of projects (Annex 9), and the market study (Annex 4) attached. Annex 9 also shows linkages between the work plan measures and the general objectives of TEN-T (See 4.4.1 Process for identifying Projects and Measures). The goal has been to connect the critical issues, technical compliance, market developments and opportunities, and the objectives being sought.

Work Plan Summary
As indicated, the NSMED core network corridor is a new entity, covering a large area of Western Europe, containing contrasts. It is not a "text-book" transport corridor with a linear structure, and a single, dominant issue to be solved. Therefore a differentiated (multi-criteria) approach has been adopted.

The problem set consists of three principal influences:

- Issues connected with technical compliance to TEN-T requirements (supply).
- Market developments (demand).
- Critical issues, i.e. clear manifestations of barriers within the transport network and demand-supply mismatches.

[7] Second Forum has decided not to apply KPIs in the NSMED study.
[8] The work plan shall include, in particular, a description of the characteristics, cross-border sections and objectives of the core network corridor, applying the objectives and priorities set out in Articles 4 and 10

It has been demonstrated that the work plan needs to reflect all three. In particular it has been argued that technical compliance should not be singled out as the overriding objective, since there are important cases where either, technical compliance is hard to establish definitively, achieving technical compliance is not considered economically feasible, or where it is not sufficient to achieve genuine interoperability, or where there is already a higher de-facto standard being applied.

The main foundation of the work plan has therefore been to consider the TEN-T objectives, and to develop these into a set of more specific objectives, which cover the range of needs observed in the corridor, i.e. accessibility/cohesion in the more peripheral regions as well as developing attractive alternatives to road in the most congested areas. With this in mind, sets of issues and opportunities have been summarised for each part of the corridor, and the proposed lists of projects have been compared against the specific objectives, as the basis for short-listing measures in the final step of the study.

At present, with the report in draft form, leading up to the fourth forum, all measures are provisional.

4.2 Description of the characteristics of the corridor

There are three main areas to be described:

- Technical parameters of the corridor network
- Identification of critical issues, and
- Market analysis

These are set out in the following sub-sections.

4.2.1 Technical Parameters

Regulation 1315/2013 provides, inter alia, technical requirements for the core network infrastructure. These are summarised below.

Table 8: Technical Parameters

Rail: (non-isolated networks) Electrification ERTMS Track Gauge: 1435mm[9] *Freight:* Axle Load: 22.5t Line speed: Freight: 100kph Train Length: 740m	**Inland Waterways:** CEMT IV (1000-1500t vessel) Length: 80/85m Beam: 9.5m Draught: 2.5m Height: 5.25/7.00m
Road: Express road or Motorway Secure parking areas every 100km. Availability of clean fuels. Interoperable tolling.	**Ports/maritime**: Rail connection -where possible[10] Waterway connection – where possible[11] Availability of clean fuels Promoting MOS (short sea connections)
Airports: Availability of clean fuels Connection to rail network (heavy or urban)[12] Connection to road network	**Road/Rail Terminals:** Indication of capacity. **Inland ports** Indication of capacity. Availability of clean fuels

Source: DG-Move, working paper, 26-02-2014

The above technical requirements are subject to the following provisos:

The implementation of projects to upgrade the network "*depends on their degree of maturity, the compliance with Union and national legal procedures, and the availability of financial resources, without prejudging the financial commitment of a Member State or of the Union*[13]*.*"

Article 7 states:

1. *Projects of common interest shall contribute to the development of the trans-European transport network through the creation of new transport infrastructure, through the rehabilitation and upgrading of the existing transport infrastructure and through measures promoting the resource-efficient use of the network.*

[9] Except in cases where the new line is an extension on a network the track gauge of which is different and detached from the main rail lines in the Union.
[10] Article 41.2: by 2030 .. except where physical constraints prevent such connection.
[11] Article 41.2: by 2030 .. except where physical constraints prevent such connection.
[12] Article 41.3: by 2050 .. except where physical constraints prevent such connection.
[13] Regulation 1315/2013, Article 1.4

2. A project of common interest shall:

(a) contribute to the objectives falling within at least two of the four categories set out in Article 4;

(b) comply with Chapter II, and if it concerns the core network, comply in addition with Chapter III;

(c) be economically viable on the basis of a socio-economic cost-benefit analysis;

(d) demonstrate European added value.

Thus, projects should be mature and economically viable, they should contribute to at least two of the defined objectives (cohesion, efficiency, sustainability, and increasing user benefits), and they should be able to demonstrate European added value[14], meaning that they should contain actions to improve cross-border connectivity.

A more detailed analysis, is provided in Annex 5, with overview maps in Annex 2. The results are summarised here.

i) Road Infrastructure

Technical requirements for road refer mainly to safety and sustainability issues, as well as the implementation of interoperable tolling schemes.

1. **Road Standard** – Core links are required to be either motorways or express roads. In the NSMED corridor, virtually all of the core links comply with this standard, but there are certain last mile connections to seaports, including Zeebrugge and Cork, where current road standards are not adequate.
2. **Secure Parking Areas** – The availability of secure parking has been derived from the IRU TransPark map. Parking facilities have been classified according to the facilities they provide. Ireland, the UK, Netherlands and France have parking areas at the required distances along the Corridor, some of which have security guards, fencing, flood-lighting and security cameras. However, further work is likely to be required in the UK and Ireland to enhance provision for safe and secure parking for HGVs with, for example, security fencing and CCTV. In Belgium there are a large number of parking areas, but only two have been given IRU ratings. In Luxembourg, six parking areas are listed, but none have IRU ratings.
3. **Availability of Clean Fuels** - In Belgium there are currently two clean fuel stations; one in Wetteren (E40) and one in Minderhout (E19). There are also two LNG fuelling stations for trucks in Kallo and in Veurne (not in core network). Three more clean fuel stations are planned in Belgium; one in Gierle (E34), one in Kalken (E17) and one in Kruishouten (E17). France, Ireland, Netherlands and the UK all have LPG stations. In the UK there are six stations providing LNG between Glasgow and Dover[15].
4. **Use of Tolls** – France is the only corridor country where tolls are paid for the majority of corridor motorway links. In the UK, the Dartford Crossing on the M25 is also tolled, which is an important link for international traffic

[14] Whereas 13: .. in particular cross-border sections, missing links, multimodal connecting points and major bottlenecks serving the objective, set out in the White Paper, of reducing greenhouse gas emissions from transport by 60 % below 1990 levels by 2050.
[15] http://www.ngvaeurope.eu/get-directions

bypassing London towards Dover and there are also tolls on some sections of the motorway network in Ireland.

ii) Rail Infrastructure

Technical requirements for the railways within TEN-T go further in terms of setting precise specifications than they do for road. In principle, following adoption of the standards, it will be possible for a 740m electrified freight train to be operated across the corridor without having to change locomotive due to signalling or voltage differences.

1. **Train Length** – Currently France, the Netherlands and Luxembourg allow 740m trains along the NSMED corridor. In Belgium, the length of goods trains is limited in principle to 750m inclusive of traction units, but the Infrastructure Manager's agreement must always be sought for any train longer than 650m. In practice trains are frequently limited to 650m during peak (daytime) hours. In France, although train length is generally 750m, 850m trains are allowed to circulate on the corridor between Perpignan and Bettembourg as well as between Marseille and Paris. In the mainland UK, 775m trains are allowed on parts of the West Coast Main Line between London and the North West, and on HS1 between London and the Channel Tunnel. However, 50% of the UK corridor sections are below the 740m standard compared to 20% which are above the standard, whilst 30% are not known. In Northern Ireland (UK) and in the Republic of Ireland all sections are below 740m, but as they area 'isolated networks[16]' they are exempt from this requirement.

2. **Track Gauge** – all corridor sections use standard 1435mm gauge, with the exception of those in the Republic of Ireland and Northern Ireland where 1600mm broad gauge is used; as 'isolated networks' these sections are exempted from the requirement.

3. **Electrification** – the continental branches of the rail corridor are fully electrified, although interoperability issues still arise owing to the use of different voltages. France uses 25kV mainly in the North, and 1.5kV on most lines in the South. Luxembourg uses 25kV electrification. Belgium uses 3kV on some sections and 25 kV on others such as the HSL/line "Athus-Meuse" , the southern part of RFC2 connected to France and Luxembourg. In the next years a major part of the Brussels – Luxembourg axis will be equipped with 25kv. The Netherlands uses 1.5kV as standard, but most of the high speed (Thalys) line, and the Rotterdam port railway which are the backbone of the NSMED corridor in the Netherlands use 25kV. In the UK, around a third of the corridor network is not electrified, and a further 160km uses third rail electrification rather than an overhead power supply. In the Republic of Ireland and Northern Ireland, the railway network is not electrified, but they are exempt from this requirement as they are "isolated networks" .

4. **Line Speed** – all of the Member States allow line speeds of 100kph or more, for the majority of sections within the corridor. In the UK, 68% of the corridor

[16] Regulation 1315/2013, Article 39, paragraph 2.

has lines speeds over 100kph, and for the remainder, line speeds typically vary from 64 Km/Hour (40 Miles/Hour) to 170 Km/Hour.

5. **Axle Loads** – France, Belgium, Luxembourg, Netherlands and the UK, with minor exceptions do allow axle loads of 22.5 tonnes. In France, only the 16km link between Paris Nord and Gonnesse, for example, does not permit axle loads higher than 20t. In Ireland, the weight limit is 18.8 tonnes. This parameter only applies to links where freight trains are operated.

6. **Signalling -** The issue which stands out in the majority of countries is the extent to which ERTMS has been implemented on the corridor. (See Commission Decision 2012/88/EU[17]). Luxembourg, the Netherlands and Belgium have either implemented ERTMS in full (Luxembourg) or in part, but the UK, France and Ireland do not yet comply with ERTMS for the corridor sections. In the UK, ERTMS is being rolled-out nationally up to 2030, but the key corridor sections including HS1[18] and WCML[19], will be among the last to be converted, since they have been most recently modernised. In France, most of the rail signalling systems are not obsolete either, as they date from the 1990s. Since only minor safety gains would come from deploying ERTMS, the benefits would be limited to an increase in infrastructure capacity and interoperability. France is therefore currently drawing up a plan for ERTMS deployment taking into account system obsolescence. In Belgium, a program for the full deployment of ETCS on railway lines has been planned for Belgian railways up to 2022. Ireland is exempt from this requirement.

iii) Inland Waterway Infrastructure

The four continental countries within the NSMED corridor all contain core waterway networks. No core network waterway links are defined in in the TEN-T Regulation for either the UK or Ireland.

1. In the Netherlands, there is a high degree of compliance with the TEN-T (CEMT IV) standard which requires a draught of 2.5 metres, and a minimum bridge clearance of 5.25m. This height restriction applies to vessels with two layers of containers. National waterways are now designed (new waterways and upgrades) to CEMT Va specification, with 3.5 metres draught and clearance for four containers (9m). On international routes, CEMT Vb, and 7m air draft (three containers) are required[20] as the European standard. For CEMT Vb, the air draft in the Netherlands is 9.1m.

2. In Luxembourg the only core network connection is the CEMT V Moselle which connects to the Rhine at Koblenz, and for a short distance towards Metz in France.

[17] 2012/88/EU: COMMISSION DECISION of 25 January 2012 on the technical specification for interoperability relating to the control-command and signalling subsystems of the trans-European rail system
[18] High-Speed 1: between London and the Channel Tunnel.
[19] West Coast Main Line: between London and Glasgow.
[20] Waterway Guidelines, 2011, Rijkswaterstaat.

3. In Belgium, there are a few short stretches of waterway in the corridor which limit vessel size below CEMT IV. This applies for example to the Bossuit-Kortrijk Canal, where 25% of the total length does not yet meet the criteria and also to a part of the Bocholt-Herentals Canal. Moreover, in the Upper Sea Scheldt it is difficult to navigate with Class IV ships, due to the tide. The Brussels-Charleroi canal is listed as a Class IV waterway but its current profile is less than optimal for shipping with Class IV ships. National waterways are now designed to Class Vb. The upgrading of the Seine-Scheldt connection to Class Vb will take place along two main axes: (1) Class Vb[21] via the Borderlys and the Lys rivers between the French border and the town of Deinze, the diverting canal of the Lys, the canal from Ghent to Ostend and the Ring Canal around Ghent as far as the canal from Ghent to Terneuzen and (2) Class Va via the Upper Scheldt from the French border with Wallonia, the connection to the Ring Canal around Ghent and the Upper Sea Scheldt to Antwerp. This implies that some bridges on the axes have to be elevated and that the locks have to be modified. The heavily used Albert canal also faces gauge, capacity and reliability issues. Bridge heights constrain vessels to load only two layers of containers and the Wijnegem lock compound has insufficient capacity leading to reliability issues.

4. In France all currently defined inland waterways within the corridor are either CEMT class IV (8% of the total length) or V (92% of the total length), hence complying with TEN-T standards. However, the three main waterways, the Seine/Oise, the Rhône/Saône, and the Escaut are inter-connected with CEMT II or lower grade links[22]. Furthermore, only 64% of the corridor waterways satisfy the criterion for minimum height under bridges. In the Northern part of France, most links do have a 5.25m height under bridges. This is the case for the Dunkerque-Valenciennes canal, the Deûle, the Haut-Escaut. On the Oise, the height under bridges is also limited to 5.25 metres and in Paris, the Seine has a limited height of 5.15 meters. Much of the Saône waterway is limited to 4.40m.

Locks are an important limiting factor for inland waterway transport, both in terms of vessel sizes and the ability of the transport system to handle greater throughputs. There is however no common requirement or standard for locks.

iv) Airports

Core airports are required, subject to economic feasibility and lack of physical constraints, and the availability of financial resources, to have connections to both TEN-T road and rail networks by 2050, with links to the high speed rail network[23].

1. **Road Connections** – all airports in the corridor have high quality road connections.

2. **Rail Connections** – Airports without rail, tram or metro connections are Liège [BE], Lille [FR], Dublin [IE], Cork [IE], Luxembourg [LU], Rotterdam-The Hague [NL], London-Luton [UK], and Glasgow [UK]. London Luton, however, is

[21] Infrastructure is accessible to Class Vb vessels, but they can only pass each other in certain dedicated sections.
[22] The interconnecting CEMT II (or lower) links are not part of core network.
[23] Except in cases where physical constraints prevent such connection.

near a railway station (about 2km), and uses a bus service to connect airport to station. Glasgow is around 1 km away from a railway station with a bus service to connect airport to station. In Ireland the Fingal/North Dublin Transport Study is underway to assess the long-term rail transport requirements of the North Dublin/Fingal corridor, including Dublin Airport. This review is examining existing proposals as well as other options for a rail-based transport solution to meet the area's needs in the long-term.

v) Seaports

Seaports are required to offer rail connections by 2030[24], and if relevant, waterway connections. In addition they should offer clean fuels, and promote Motorways of the Sea (MoS).

1. **Rail Connections** – in Belgium, France, Ireland, and the Netherlands all seaports have direct rail connections. In the UK, there are two ports, Dover and Belfast without active rail connections. Dover faces physical constraints in bringing a rail connection to the main Eastern Docks. If intermodal rail services had to operate from the Port of Dover, the infrastructure enhancements that would be required are likely to be very costly. Also, Dover's existing unit load traffic is almost entirely fast-moving driver accompanied RORO traffic which would not transfer to rail. For through Channel Tunnel intermodal rail freight services, there is, in any case, spare capacity on the same geographic axis via the Channel Tunnel between Folkestone and Calais. Belfast has a railway line around its perimeter, but given the nature of the port's traffic and the port's inland distribution needs to serve a mainly regional hinterland, is unlikely to need to activate a direct rail link. The UK is therefore, in effect, also compliant. In Ireland the rail connection to Cork is not currently in use and would require investment to bring it back into use as a working rail freight line.
2. **Waterway Connections** – are only required for seaports in Continental countries. The Netherlands and Belgian ports all have waterway connections of CEMT IV or (usually) higher. In France, only Dunkerque and Fos-sur-Mer have waterway connections of CEMT IV or higher. Calais is accessed via the class 1 Calais-St-Omer canal. Marseille, which is the Eastern part of the Marseille/Fos core node does not have direct inland waterway access.
3. **Clean Fuels** - Several corridor ports in France, Belgium and the Netherlands are developing LNG bunkering facilities[25]. In the corridor ports these are at different stages of development. Bunkering by truck has been available at e.g. Antwerp and Rotterdam since 2011/12. Since 2013, LNG has been used for inland waterway barges at Rotterdam and Amsterdam, and a broader range of LNG bunkering facilities are available for maritime vessels from Rotterdam, Antwerp and Zeebrugge amongst others. Finally, the Port of Dunkerque is also developing LNG bunkering facilities in coordination with the port of Dover.

vi) Inland Ports and Road/Rail Terminals

Inland ports and road/rail terminals are not specifically defined within the legislation. Any given node may contain several freight facilities, offering road to rail, road to waterway, and/or tri-modal accessibility. Some are seaport terminals for barges or rail services, others are inland multimodal platforms, or logistics hubs, usually

[24] Except where physical constraints prevent such connection.
[25] See: Wang, Notteboom, 2014.

containing either industrial or warehousing facilities. They handle a range of traffic types, some being specialised for containers, and others handling conventional cargo.

Given the wide range of contexts and operational possibilities, and the lack of criteria for specifying precisely which facilities are covered by the corridor, it is not helpful to attempt to apply and compare crude quantifications of capacity or accessibility.

A detailed analysis has therefore been made per node of the main freight facilities in each Continental inland node, as a way to show present activity (see Annex 4 – Continental Inland Nodes). Analysis of future needs has been approached via national planning literature, so planned expansions of capacity in e.g. Venlo/Venray have been identified.

4.2.2 Identification of Critical Issues

While the compliance issues are relatively clear-cut, there are numerous critical issues, reflecting the scale of the corridor, the high degree of activity, and the reliance on, in many cases, pre-war or even nineteenth century infrastructure. In this section, critical issues are listed per mode and per country, and in the following section(4.2.3) they are summarised.

Road Bottlenecks, technical standards and interoperability issues

Belgium

Three main road bottlenecks exist on the Belgian road network of the NSMED Corridor. The Ring of Antwerp and the Ring of Brussels face severe congestion issues leading to loss of reliability and decreases in productivity. The Ring of Ghent also has high congestion but to a lesser extent than Antwerp and Brussels.

There is one important missing link in the network near Zeebrugge (A11). A project has started to connect the seaport to the European road network more efficiently.

Another issue is linked to road haulage regulations related to differences between the various countries of the corridor, in terms of the hours when vehicles can use the networks. This situation leads to parking areas congestion and saturation at the borders.

France

The main bottlenecks are located in and around dense urban areas:

- Between Luxembourg and Metz the A31 is congested due to a dense urban area and daily commuters to Luxembourg.
- In the Strasbourg area, between Illkirch and Vendenheim, the A35 is used by heavy traffic only a few hundred meters from the city centre. Since the introduction of the LKW Maut, the German toll system for lorries, the already congested urban section of the motorway is now frequently used as an alternative to the German motorways on the other side of the Rhine.
- In Lyon, the A6-A7 motorway crosses the city through the centre leaving the urban section heavily congested by both local and transit traffic and generating important negative externalities in terms of noise, air pollution and urbanism.
- Express and motorways around Lille (A22, N356, A25 and A1) face important congestion.
- Traffic on express and motorways around Paris,
- In the Marseille area with heavy congestion on the A7 motorway.

Ireland

The main road bottlenecks on the Irish road network that are relevant to the corridor are the N7 Naas Bypass to the west of Dublin, which is a four lane dual carriageway that links the M7 to the M50 Dublin orbital motorway and at the M8/N40 Dunkettle Interchange near Cork. While the Irish inter-urban motorway network generally has sufficient current capacity overall, there is however road congestion in and around Dublin and in the Cork area, particularly in peak commuting hours.

There is generally a need to encourage greater use of public transport in the Greater Dublin Area to help reduce road congestion in and around the city. The DART Underground Programme, including the associated sub-projects, is the key public transport project to reducing the congestion.

Luxembourg
Motorways in Luxembourg are heavily used by freight, as Luxembourg is a hub for international transit traffic. This situation creates important issues on the road network:

- The low level of capacity of the motorway E25 between Luxembourg and France is a major bottleneck. This section presents an important level of congestion due to the high intensity of daily commuter traffic and lorries transiting between the North and the South of Europe.
- Parking areas in Luxembourg are highly utilized and have saturation issues. As trucks are not allowed to drive during the weekend in some border countries, drivers have to use these parking areas. This situation leads to insufficient parking areas.

Netherlands
The road network in the Netherlands around the urban nodes of Amsterdam and Rotterdam is highly congested, including the A4 connecting Rotterdam and Amsterdam, the A9 leading to the Amsterdam port area, and the A15, A13, A20 and A16 around Rotterdam. Especially during peak hours a number of infrastructure sections are congested, including the last mile connections.

Truck parking is not a real bottleneck in the Dutch part of the corridor. Road charging and tolls are not yet relevant, except on a few new infrastructure sections, which are under study (e.g. Blankenburg tunnel). The cross border links to the neighbouring countries of Belgium and Luxembourg experience no border interoperability issues.

United Kingdom
On the corridor, the main areas of road congestion during peak hours are on the M6 and M62 near Manchester, on some sections of the M6 near Birmingham, on sections of the A14 between Felixstowe and the Midlands, on the M27 and M3 near Southampton, on the north-eastern sections of the M3 close to the M25 and on some sections of the M25, including the Dartford Crossing (based on outputs from the DfT's National Transport Model for 2010, published in 2013).

Central forecasts for traffic on the strategic road network in England suggest it will have increased by 42% by 2040 and this will lead to a 71% increase in road congestion by 2030.

These areas of peak time congestion near the major conurbations lead to reduced journey time reliability for strategic freight traffic between the continental mainland and Great Britain and for traffic between Great Britain and Ireland.

Rail Bottlenecks, technical standards and interoperability issues

To analyse the characteristics of the rail network on this corridor, we highlight the main issues per Member State.

Belgium

- The North-South Junction in Brussels constitutes the main bottleneck on the Belgian railway network. Around 1,200 trains of different types (HSL, IC, IR, L) use this section every working day. This situation leads the North-South Junction close to saturation. It has a negative EU cross-border impact on many high speed train services operated by railway undertakings from several member states (eg. UK, DE,FR, NL).
- The speed on the Brussels-Luxembourg-Strasbourg section constitutes a major bottleneck for passenger rail transport. This limitation reduces the competitiveness of rail in comparison with road and even air transport.
- The Belgian railway network currently encompasses 1,857 level crossings, 670 of which cross lines that are included within the TEN-T network. These level crossings generate problems linked to safety, capacity and punctuality.
- There is a long-term bottleneck for access to Antwerp because of restricted rail capacity. The Rechteroever access is possible via the L27A, which connects a series of lines to the port of Antwerp. This access point suffers in particular from cross-overs limiting capacity.
- There is a serious bottleneck between Ghent and Zeebrugge in terms of capacity. This section is highly used for both passengers and freight trains.
- The railway section of RFC2 between Leuven and the Luxembourg border must be adapted in order to increase the train speed and optimise the capacity of this axis, enabling 750m trains long to circulate. Technical limitations are implied by train length restrictions, of 650m, during day time. This restriction raises costs for operators and prevents the optimal use of network capacity. In addition, the high passenger traffic link between Namur and Ottignies must be bypassed via Fleurus and Auvelais for freight trains.
- In addition to these bottlenecks issues, interoperability constraints due to the difference of electrification systems between the countries of the corridor are noticed.
- The Belgian railway network is not yet fully equipped with the ERTMS, which leads to heterogeneity in the network. Belgium, in accordance with the European ERTMS deployment plan will equip the lines of the corridor C with ERTMS by 2015 as a priority.
- Today, high speed trains are delayed in Mechelen, as a result of the reduced speed and capacity of this major connecting station and the connecting track of the Diabolo with the traditional network to the south of Mechelen.

France

The corridor includes problematic rail nodes which need to be upgraded. This is the case for Lyon, Lille, Paris, Metz, Strasbourg, Mulhouse and Marseille.

The Lyon node is a main bottleneck for freight on the corridor both in terms of location and constraints. It is composed of several blocking points in terms of capacity and functionality. The main problem is the Part-Dieu station where capacity is very scarce. Several project aim at tackling this issue by upgrading the Lyon node and by creating a bypass for freight trains (CFAL project).

In Lille, heavy regional traffic hinders rail freight flows both on the North-West – South-East axis from Dunkerque and Calais to Valenciennes and on the North-East – South-West axis from Ghent to Lille. Nevertheless, alternative routes on the comprehensive network (not on the corridor) can allow freight flows to bypass the Lille node:

- Flows between Belgium and Paris can enter France though the Jeumont/Feignies border points;
- Flows from Dunkerque and Calais will be able to bypass Lille by using the NIFT (Nouvel Itinéraire Fret de Transit)

In the Paris area, the corridor is made of two lines, one for passenger and one for freight. For passenger trains, the corridor follows the high speed rail line up to Villiers-le-Bel-Gonesse and then the conventional line to Paris Nord on which capacity is scarce. For freight, the corridor reaches Paris by another line through Le Bourget where there is still capacity available for freight trains.

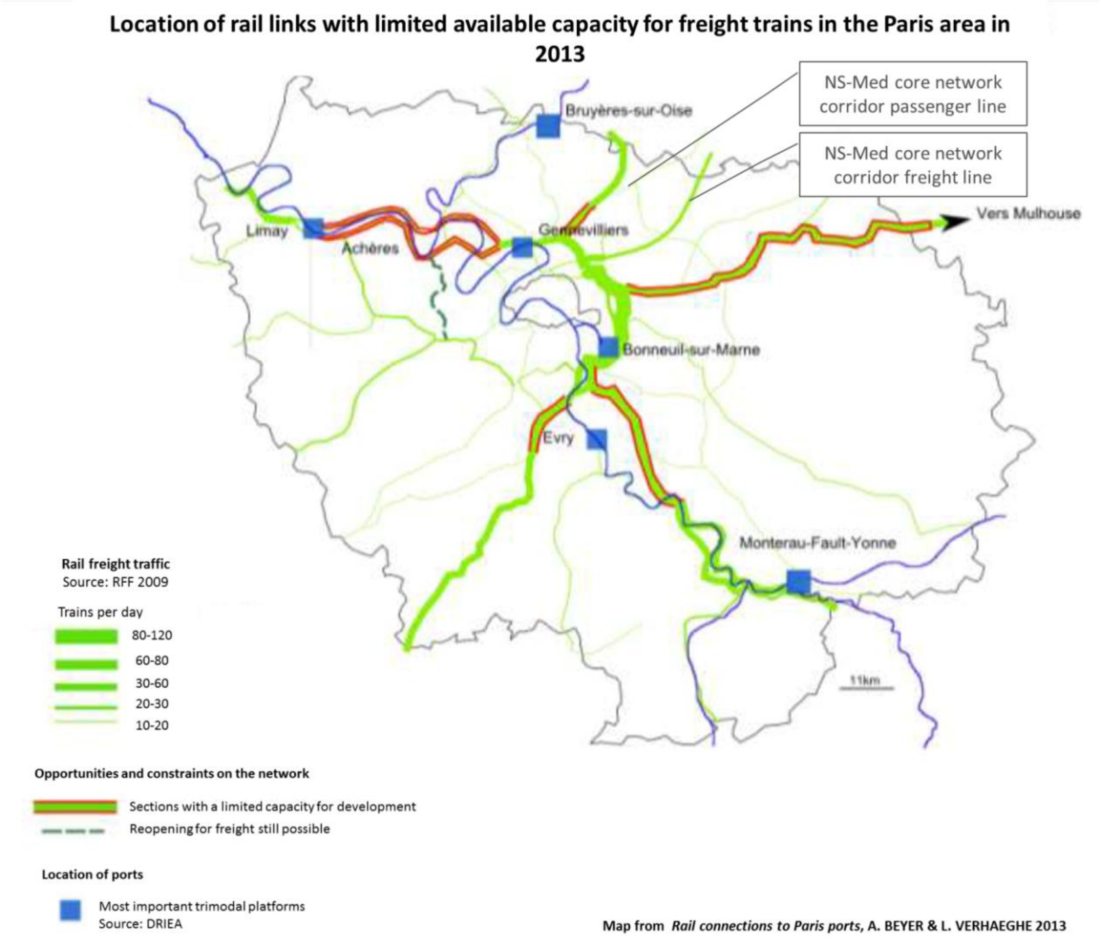
Although the corridor line still allows capacity for freight, there is a broader issue of freight capacity on lines of the Paris network. This impacts negatively multimodality on the corridor. The map below shows freight traffic on the network in the Paris area and highlights links were capacity is scarce.

Located at the South end of the corridor, the Marseille node is the only rail access from France to the densily populated cost on the Nice area (Côte d'Azur). It is also situated on one of the main rail connections between Italy and France. Hence, this node constitutes a bottleneck for rail traffic to Marseille and the Nice area further to the East but also for cross-border traffic between France and Italy through Ventimiglia.

The main technical and interoperability issues for France relate to loading gauge and ERTMS deployment. The loading gauge (determining the maximum height and width of the train) usually corresponds to the GB1 on main lines but are often more restrictive. On the corridor this is the case for the following sections:

- Reding-Momenheim, between Metz and Strasbourg: GB gauge;
- Mulhouse-Basel: GB gauge;
- The line between Mulhouse and Besançon is only compliant to conventional transport standards with a G1 loading gauge between Besançon and Belfort and an even lower gauge between Belfort and Mulhouse;
- In Lyon, the link between Collonges and Part-Dieu is only compliant to conventional transport standards;
- Miramas-Fos-sur-Mer: GB gauge;
- Miramas-Marseille: GB gauge.

Figure 16: Rail links with limited capacity for freight trains in Paris area



A full list of nodes with their classification is contained in Annex 1.

Ireland

Information for the Irish rail network has been provided for the sake of completeness, but it should be noted that the gauge is 1600mm and it is an isolated network under the TEN-T Guidelines. There is therefore no requirement for the Irish network (and the network in the UK in Northern Ireland) to be upgraded to meet the standards set out in the TEN-T Guidelines.

There is a need to address rail bottlenecks and allow for greater capacity in the Dublin area and a need for a greater focus in the future on improving the line speed on the Dublin-Cork and Dublin-Belfast routes and facilitating connections for passengers between stations in Dublin, so that the rail network is more likely to be able to compete with the inter-urban motorway network.

While the scope for rail freight services is more limited in Ireland than in other parts of the corridor because of the shorter distances that are available, there may be scope for the development of rail freight services in the future, particularly to and from the ports on the corridor. Dublin already has rail freight services operating to and from the port and the Port of Cork believes that a re-instated connection at the port could allow new rail freight services to be developed.

Luxembourg

- ERTMS will be fully deployed on the Luxembourg network before the end of 2014.
- Speed limitation to 90km/h in the lines : Petange – Esch/Alzette and LU Berchem JCT - Oetrange
- A lack of capacity exists on the national railway network which is due to high levels of passenger traffic during peak hours and competition between passenger trains (linking all parts of the country to the city of Luxembourg) and freight trains transiting across the country.
- Another capacity restriction exists in Luxembourg City station. It concerns both passenger and freight trains.
- The traffic speed on the Brussels-Luxembourg-Strasbourg section constitutes a major bottleneck for passenger rail transport.
- The Railway line Rodange-Esch/Alzette-Bettembourg/border needs some technical modifications to permit 750m trains to cross the border, to get rid of some level crossings and to renew passenger quays.
- A cross-border bottleneck exists in the Bettembourg station. This implies a need for a marshalling yard.
- In addition to these bottleneck issues, interoperability constraints due to the differences of electrification systems between the countries of the corridor are evident. Luxembourg uses 25kV electrification, but the line from Luxembourg to Kleinbettingen still uses 3kV.

Netherlands

The railway infrastructure around the port area of Rotterdam requires upgrades to meet the future demand. The Caland railway bridge on the Rotterdam port railway which allows access to the main container terminals, will not be able to cope with capacity around 2015. Life expectancy of this railway bridge will end around 2020. The railway demand between Rotterdam and Antwerp is nearing its capacity. This was indicated in a Ministry of Transport study as far back as 2003. In this study, railway noise and rail safety are also mentioned as issues.

Border crossing ETRMS is an another issue. ERTMS implementation is different per country. The Dutch corridor passenger line (HSL-zuid) has ERTMS deployed. The freight connection via the conventional line towards Antwerp, however, does not have full ERTMS. The Dutch government has decided to implement ERTMS in stages[26]. This is not at the same pace as the neighboring Belgian government but both infrastructure managers are co-operating within RFC2 to ensure that Rotterdam and Antwerp will be connected with ERTMS by 2020.

For border crossing electrification, the Dutch and Belgian railways use different voltages for electrified railways. However, there are locomotives in operation that allow multiple types of current.

United Kingdom

There are issues with a lack of capacity on the southern sections of the West Coast Main Line which is one of the main reasons why the UK is looking at building additional capacity with the development of HS2.

For routes to and from the Channel Tunnel, the HS1 route between the Tunnel and London St. Pancras is included on the corridor and is only likely to have capacity for freight services at night. The conventional route for freight through Kent to London

[26]http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2014/04/11/voorkeursbeslissing-ertms-european-rail-traffic-management-system-en-railmap-3-0-nota-alternatieven.html

and beyond (included on the TEN-T Rail Freight Corridor 2) has train paths which are allocated under the Treaty of Canterbury to through Channel Tunnel freight services.

This conventional rail route is included on the NSMED Rail Freight Corridor.

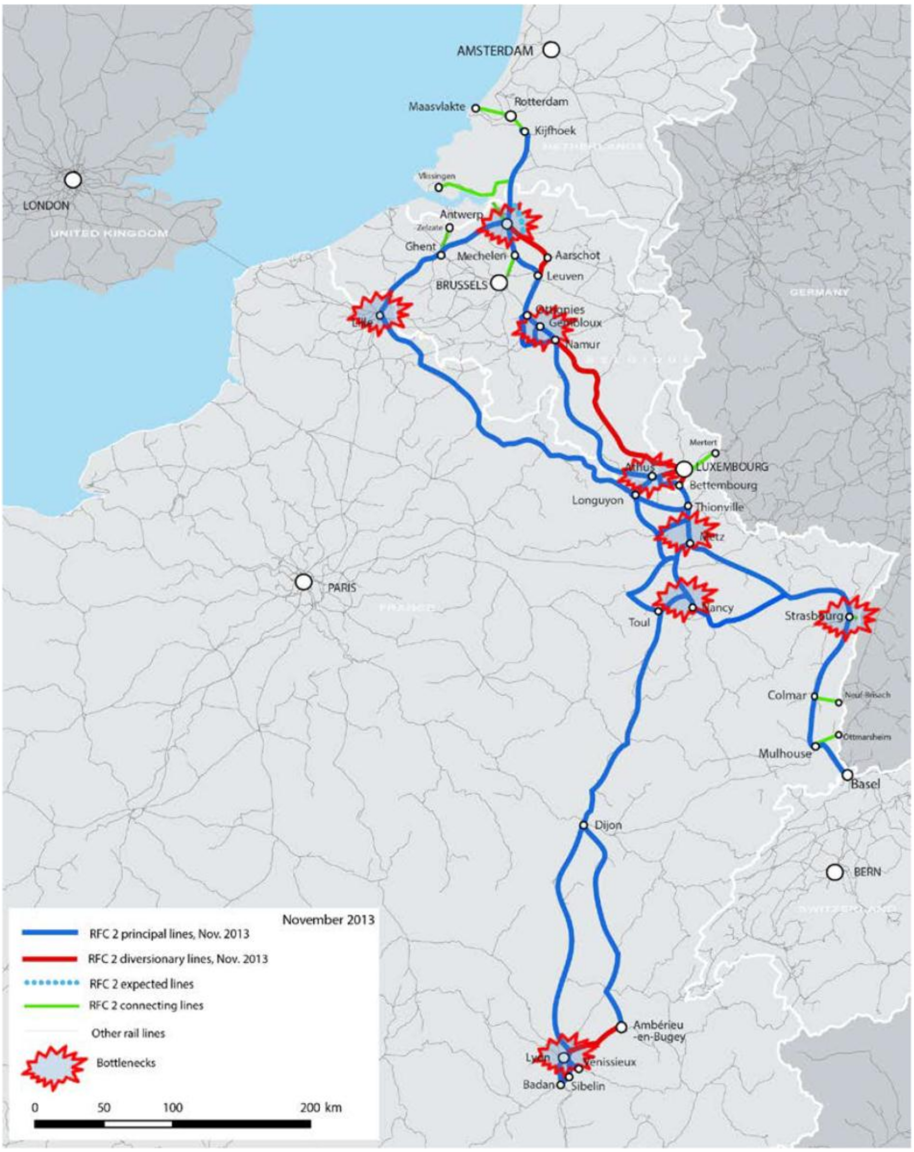
Plans for a physical link between the existing HS1 at London St Pancras and the London terminus of the proposed HS2 link at London Euston have been discarded by the UK Government, mainly due to the disruption the link would have caused to existing passenger and freight services and opposition from local residents. The UK Government intends to carry out a study of how to improve connections between the UK's high speed rail network and the continent that could be implemented once the initial stages of HS2 are complete.

While the loading gauge for Channel Tunnel freight trains on the conventional route through Kent is more restricted than that in France for intermodal units, the rail freight operators have adopted wagonload solutions to carry the relevant size of intermodal units, but face additional costs related to the lack of interoperability between the two main Channel Tunnel routes; track gauge and electrification.

Rail Freight Corridor (RFC2) Bottlenecks and Interoperability Issues

A summary of rail bottlenecks derived from the RFC2 corridor study (RFC has a different alignment to the core network corridor) is shown below.

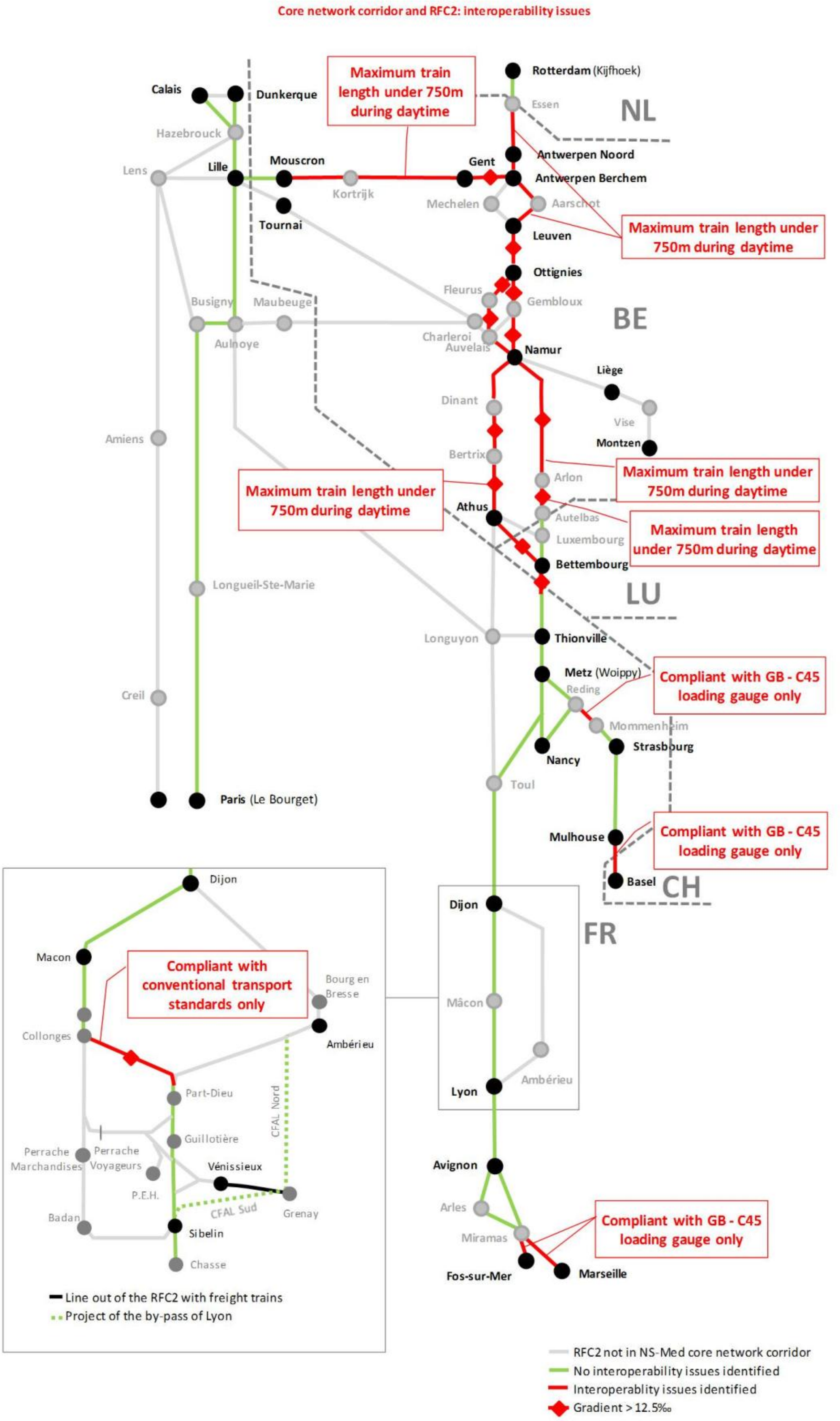
Figure 17: Bottlenecks on Rail Freight Corridor 2



Additional interoperability issues are shown in the map below. This map has been adapted so that non-CNC lines (e.g. freight routes between France and Belgium) are coloured grey.

As mentioned, the alignments of the rail freight corridor (2) and the core network corridor (NSMED) are not yet fully consistent. The rail freight corridor currently starts in Rotterdam rather than Amsterdam, and includes parts of the comprehensive TEN-T network. The last mile connections which link the ports of Rotterdam and Amsterdam to the main lines are considered to be part of the core network corridor.

Figure 18: Rail Freight Corridor 2



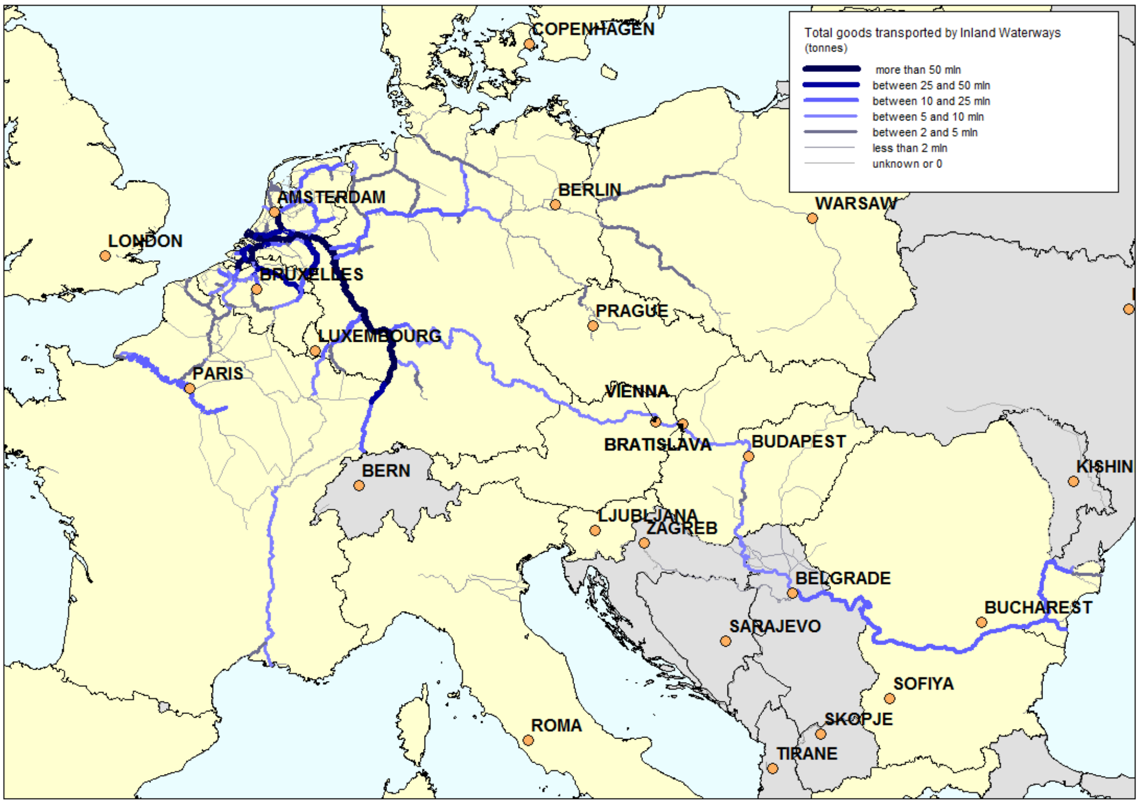
The map indicates sections where interoperability issues such as loading gauge and train length occur. Compliance with GB-C45 loading gauge (vertical clearance above the rail) is not required by the TEN-T Regulation, but it does affect the ability of the network to handle intermodal trains seamlessly.

Waterway Bottlenecks, technical standards and interoperability issues

Inland waterway connections within the NSMED corridor area are relatively good, by international standards, but the corridor lacks certain CEMT IV interconnections between basins, such as the Seine with Benelux networks, Saône with Rhine or Saône with Moselle. Some works have also to be done to enhance the inland waterway network to induce a competitive alternative to road by increasing the catchment areas of inland ports.

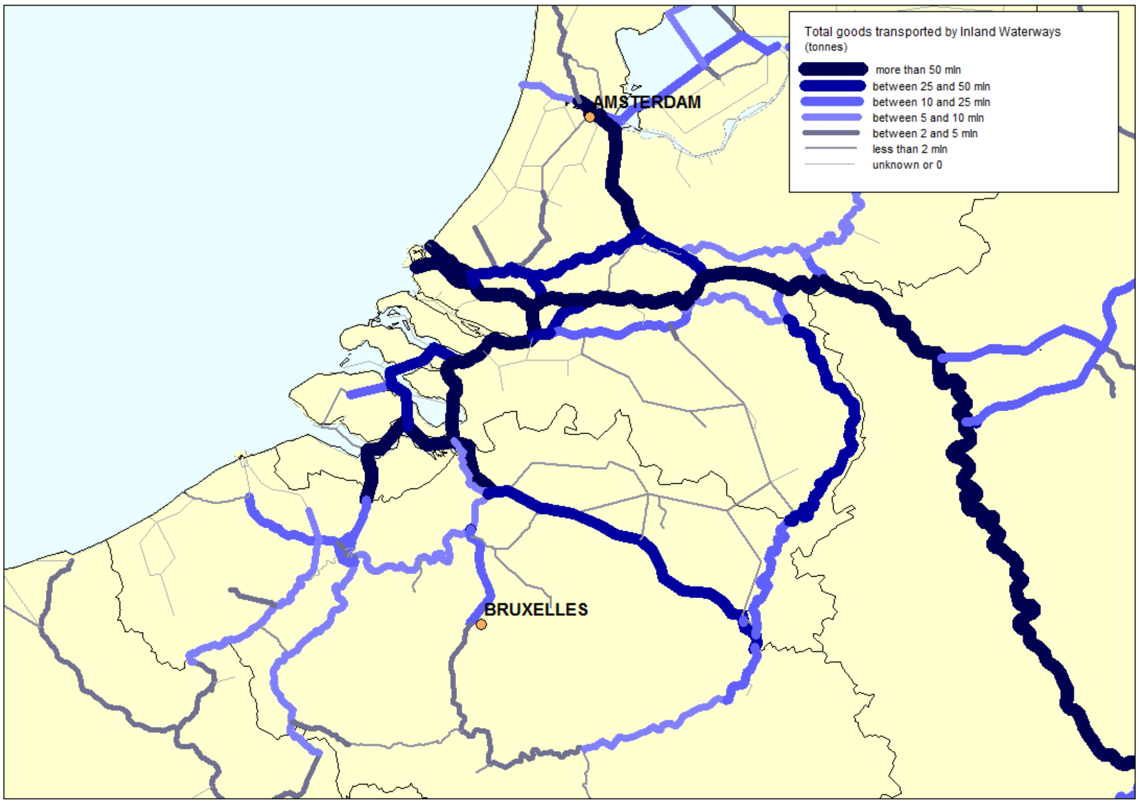
As can be seen from the traffic map, volumes in the region of the NSMED corridor are heavily concentrated on the parallel Rhine route, so at present, the waterway volumes within NSMED are mainly on the connections between the Flemish and Dutch seaports (see Figure 20). Two kinds of bottleneck exist therefore, the first involving cases where there are exceptionally high levels of demand (over 100 million tonnes on a single section per annum) on links with CEMT IV or higher, and the second being cases where the CEMT IV standards are not currently reached.

Figure 19: Freight volumes by inland waterway in Europe



Source: Panteia, using Platina (2007), TENtec (2013) data and Belgian (2013) data

Figure 20: Freight volumes by inland waterway – Netherlands and Belgium



Source: Panteia, using Platina (2007), TENtec (2013) data and Belgian (2013) data

Bottlenecks issues are identified here-under for the inland waterway network:

Belgium

- Capacity constraints exist in the Albert Canal: height under the bridges, lock capacity at Wijnegem and CEMT class gauge are limited. An improvement of these characteristics at a European scale is important to ensure a sustainable import and export of goods. Specific requirements are mandatory in order to cope with the traffic forecasts increase and to facilitate the modal shift from road to inland waterway for medium and long distance journeys.

- The Seine-Scheldt project addresses a range of bottlenecks that currently prevent or hinder navigation between the Seine river in France, and the Scheldt river which provides onward connectivity via Ghent and Terneuzen to the main Dutch waterways and the Rhine into Germany. With the opening of the Canal Seine Nord Europe in France, there is a need to enhance the reliability and navigability of Belgian waterways such as the Scheldt, the Upper Scheldt, the Upper Sea Scheldt, the Lys, the Dorsale-Wallone, the Bossuit-Kortrijk canal, the Roeselare-Lys canal, the Ghent ring canal and to remove the bottleneck at the Terneuzen locks. In addition there is a need to restore navigability on the Condé-Pommeroeul canal, which represents a missing link between France and Wallonia. Concerted action to remove all these bottlenecks will contribute to extending the network of viable waterway corridors in Western Europe.

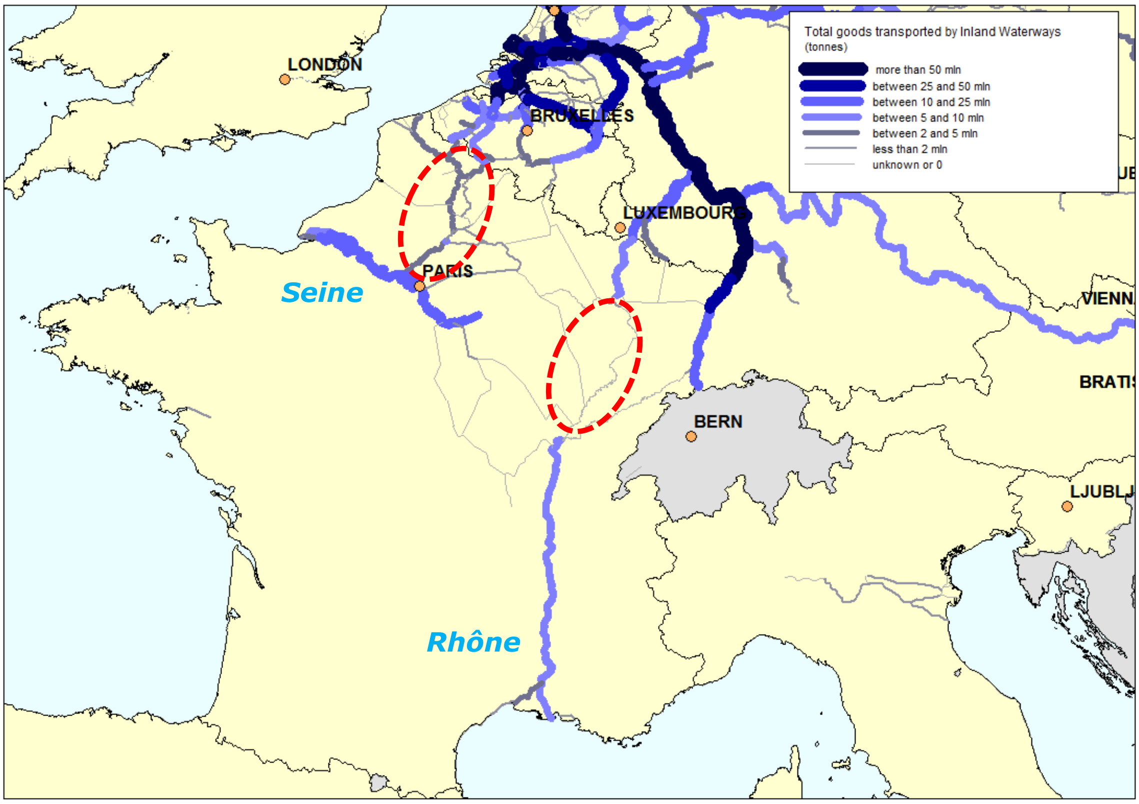
- Canal Ghent-Terneuzen represents a bottleneck both for sea and inland vessels as the Terneuzen lock compound faces capacity and reliability constraints.

- The port of Zeebrugge currently has a low inland modal share for IWW transport. The project Seine-Scheldt West includes the connection of Zeebrugge with the Inland Waterway network via a class Va canal. This project, now being studied, is undertaken to address the currently unsustainable process.
- The gauge of two locks (Ampsin-Neuville and Ivoz-Ramet) as well as deepening of the Meuse between Namur and Liège and the weir in Monsin are bottlenecks in the network. Their increase is necessary to meet forecasted traffics, to handle bigger vessels and to have a homogeneous network between Antwerpen and Namur.
- The cross-border (BE/NL) Lanaye lock is facing severe capacity issues.
- The Brussels canal between Charleroi and Vilvoorde has to be improved in several sections, as the height of the bridges in Brussels are too low (below 5.25m) and the section between Lembeek and Halle needs to be modernised.
- The Ghent-Ostend Canal, downstream from Schipdonk, represents a bottleneck as it is Class IV, unlike the rest of the network which is class Va.
- The sea canal from Antwerpen to Brussels presents a bottleneck in Willebroek-Bornem as this section does not allow class VIb vessels of 10000 tonnes or more to navigate.
- The Bocholt-Herentals canal needs upgrades on the "Lommel-Bocholt" in order to become compliant with European standards.
- Canal Roeselare-Lys has a limited gauge that needs to be improved.
- Upper Sea Scheldt faces depth, height under bridge and width constraints.
- The clearance under the bridges on the "Scheldt-Rupel" section of the Beneden - Nete canal is limited to 1 layer of containers. This represents an important constraint towards optimised traffic circulation on the canal.
- Higher technical standards also need to be reached. River Information Systems (RIS) need to be further developed in Belgium to ensure a good quality of management and communication on the network.
- In addition, LNG and other clean fuel projects are currently under study or under implementation to extend their availability in the Belgian inland waterway network.

France

In France the main waterway bottlenecks are related to the gauge of the connections between the three basins of the Seine, the Escaut (Scheldt) and the Rhône. The most advanced project is the Seine-Escaut, with its main component, the Canal Seine-Nord-Europe. Missing links are indicated below by the red ovals.

Figure 21: Freight volumes by inland waterway – France



Source: Panteia, using Platina (2007), TENtec (2013) data and Belgian (2013) data

As planned, the 106 km long canal from Compiegne to Aubencheul-au-Bac will include 7 locks (single chamber), 2 water storage reservoirs, 3 aqueducts, 4 multimodal platforms, 5 grain docks, 2 transhipment docks and 5 tourist boating centres. The Seine-Escaut project also includes complementary upgrading of the IWW network in the north of France as well as on the Seine and Oise.

Several elements of the river Oise are bottlenecks which must be removed to offer an optimal access to the coming Seine – Nord Europe canal:

- North of Paris, the Mours railway bridge must be raised from 5.83m to a 7m height;
- Although the Oise is officially classified as CEMT Vb, navigation of 180m long vessels is difficult due to river curves and a shortage of waiting areas;
- The river needs to be dredged downstream of Creil to reach a 4m depth (3m currently).

Removal of these bottlenecks within a 37km stretch of the Oise is planned under project MAGEO.

Many structures on the Seine downstream from Paris require modernisation or upgrade. The following aspects have been identified and were included in the Seine-Escaut project:

- Lengthening of the second lock at Méricourt and of the Amfreville lock;
- Modernising and rehabilitating dams on the downstream Seine including dams of Suresnes, Bougival, Méricourt, Andresy GC, Poses and Port Mort;
- Modernising and rehabilitating dams on the downstream Seine including dams of Suresnes, Bougival, Méricourt, Andresy GC, Poses and Port Mort;
- Improvment of reliability at other locks and dams;
- Rehabilitating of the rail bridge at Maisons Lafitte;
- Raising of the Poses-Amfreville footbridge.

In the region of Nord-Pas-de-Calais, to enhance the reliability and the capacity of waterways, some related projects are the following:

- Recalibration of Escaut river (Valenciennes-Mortagne-Trith)
- Restoration of the Condé-Pommeroeul canal (cross border section)
- Recalibration of Deûle river (Lille Deûlémont), lengthening and doubling of the Quesnoy-sur-Deûle lock on Deûle river
- Recalibration of Lys river (Deûlémont-Halluin)
- Raising of bridges on the Nord-Pas-de-Calais network (minimum height of 5.25m, 2 layers of containers)
- Restoration of locks and dams and implementing remote management of the locks on the Nord-Pas-de-Calais network
- Design studies concerning the creation of a multimodal transport system (IWW, rail, short-sea, and road) for the Port of Dunkerque are under the CAP 2020 framework program.

South of Paris, the Seine is characterised by a wide gauge up to Bray-sur-Seine, with the continuing 27 km section between Bray-sur-Seine and Nogent-sur-Seine being classified as CEMT II.

Although this part of the Seine is not located on any corridor, this section is still part of the core network and the bottleneck (CEMT II class) is an issue for North-Sea Mediterranean corridor as it hinders waterway traffic between Paris and its ports. The Nogent area exports mostly agricultural products and building material and is increasingly reliant on IWW. Waterway traffic on this part of the Seine has more than tripled between 2001 and 2010 in terms of tonnes-kilometres.

The Bray-Nogent project aims at upgrading this section of the Seine to CEMT Va.

The other main IWW project on the corridor aims at connecting the Saône-Rhône basin to the northern waterway network. As missing link to Benelux and Germany, the Saône-Moselle Saône-Rhine (SMSR) Canal will connect the basins of Saône and Rhône to 20 000 km of the European large-gauge waterway network. The SMSR canal therefore would potentially become an important part of the waterway and multimodal corridor between Mediterranean Sea and Rhine River, enhancing efficiency and ecological sustainability of transport along North-South axis. The project also aims to tapping the potential of waterway tourism market.

Figure 22: Saône-Moselle and Saône-Rhine Canal Links.

North of the SMSR project, the French part of the Moselle presents three smaller bottlenecks:

- The Clévant lock currently only allows access to the Nancy-Frouard port to vessels shorter than 110m despite the fact that many vessels on the Moselle are 135m long. Moreover, the development of a multisite multimodal platform in the Lorraine region , between the ports of Thionville, Metz and Frouard, and the opening of a new line of 135m long container-carrying vessels further increase the need for a lengthening of the Clévant lock.
- Guard gates at Metz and Pont-à-Mousson are narrower than the regulation allows with a 12m width instead of 18m. This forces vessels to slow down and increase the risk of accidents.
- Major renovation of the Liégeot dam which was constructed in 1958 presenting safety issues and significantly hinders traffic on the upstream part of the Moselle.

Moreover, VNF plans to upgrade locks to offer remote control and 24 hours a day on the Oise, the Seine, the main waterway network in northern France and the Moselle.

South of SMSR project, some bottlenecks occur on the Saône-Rhône axis, mainly because of limited capacity and limited multimodal connectivity of inland ports. New projects or upgrade works are undertaken in order to meet the requirements of core network corridors and to unblock bottlenecks.

- As a core inland port located on the Saône river, the Port of Chalon-sur-Saône need some infrastructure upgrade works, which include extension of the quay, development of a stocking platform on the quay, enlargement of the container platform, and extension of the port's rail network.

- The Port of Lyon (Édouard-Herriot) on the Rhône river assumes the important role of multimodal platform for all types of goods. As for the Port of Chalon-sur-Saône, some upgrade works are planned, including renewal of roads in the port with a new entry way for trucks, construction of a new dock to stock bulk commodities, and direct connection with the national rail network. In addition, a new multimodal platform Salaise-Sablons, with direct connections to the waterway, will be built in the south of Lyon, to increase the global capacity of the Lyon node.

- To enhance multimodal connectivity along the Rhône river, a tri-modal (IWW-rail-road) platform of Avignon Courtine will be created by upgrading and integrating existing port facilities on Courtine area and RRT of Champfleury.

- For the inland waterway links of Fos-sur-Mer Port, the major works are upgrading of the dock infrastructures, combined transport terminal, waiting berths for inland shipping, and the multi-client bulk platform.

- Capacity constraints exist in the Rhône-Sète canal: bridge clearance and CEMT class gauge are limited. The infrastructure upgrade works will improve the capability of the Rhône-Sète canal, including raising of 5 bridges, new zones of crossing in Gallician and Aigues-Mortes, and modification of a few curves with low values of radius of curvature.

Luxembourg

- At the German border, Mertert is connected to the Rhine via the Moselle River. However only single locks exist in the Moselle River, which constrains its maximum capacity and its reliability in case of a lock failure. The current capacity of the Moselle River represents a major issue of the local fluvial traffic. Because of the single locks, the current maximum capacity of the Luxembourg – Germany section is 10 million tons per year on the Moselle River, when the effective needs are 12 million tons per year. This restriction causes important delays in the ships transit on the Northern part of the Moselle River.
- In addition, the road accessibility of the port of Mertert should be improved.

Netherlands

The Volkerak locks are the largest and busiest inland locks in Europe. They form a link in the main Belgium-Netherlands and Belgium-Germany transport axes connecting the Scheldt ports to Rotterdam and to the Rhine. The Volkerak locks also constitute the biggest bottleneck in the waterways of the Scheldt area, as there is no realistic alternative route. Both capacity and shorter operations would improve the situation.

Two of the locks in the vicinity of the Volkerak locks are the Kreekaklock and Krammerlock. These locks have similar issues related to waiting times, but the most urgent problem is at Volkerak.

The existing Maas route is aiming to offer an alternative for sustainable transport. However, it has to be upgraded to meet the modern larger vessels in inland waterway shipping. Upgrading also presents an opportunity to improve the safety, flooding risk and ecological value of the Maas river.

The canal between Ghent (Belgium) and Terneuzen (Netherlands) is a major shipping connection for both maritime and inland navigation. The canal, with an overall length of 32 km, lies 15.4 km on Belgian territory and 16.6 km in the Netherlands. There is presently an issue linked to capacity at the lock compound in Terneuzen. Current delays, lack of scale and limited reliability underpin the need for the construction of a new lock. This applies both to inland and maritime vessels using the Terneuzen-Ghent canal. (See also seaport bottlenecks).

For Amsterdam, accessibility from the sea to the Noordzeekanaal and the hinterland waterway networks is limited by the dimensions of the locks at Amsterdam, which creates a bottleneck in terms of linking maritime and inland waterway services. Construction of a new lock is planned with dimension of 500 m by 65-70 m and its capacity increase from the current 95 mln to 125 mln tonnes per year. (See also seaport bottlenecks).

Sufficient mooring places (or berths) are important for IWW planning and rest regulation compliance. These locations also need to be safe locations. In the Dutch part of the corridor there is a future lack of mooring places on the Rhine-Scheldt connection.

An existing shortage is on:

i. The Merwede river between, Rotterdam – Tiel.
ii. The Lek river between Rotterdam – Utrecht.
iii. Tiel-German border. The location is mainly important for traffic related to the Rhine-alpine corridor, but this certainly influences the NS-MED traffic as well.

In the Netherlands the erosion of the Rhine river-bed is another issue. This erosion can lead to damages in locks and thus disturb operations. The controlled dredging to stabilise the river bed is resource consuming process, necessary equipment are limiting the capacity of the river infrastructure during operations.

RIS enabled management helps reliability and efficiency of IWT. When fully implemented, it is a success factor for being able to handle the expected growth in container transport in a sustainable manner.

Upgrade needed of traffic management system near Moerdijk (Hollandsch Diep-Dordtsche Kil) to improve safety on the busy waterway. This is under study.

There is a likelihood that the Prinses Beatrix Lock on the Lek Canal to the south of Utrecht will become a bottleneck due to increasing volumes of inland waterway traffic between Amsterdam and Rotterdam. The construction of a third lock would improve throughput capacity. This is a pre-identified project for the (overlapping) North Sea Baltic corridor.

LNG is available as IWT fuel at the nodes of Rotterdam and Amsterdam and more nodes are planned/expected in the future. An overlapping supply chain or fuel infrastructure is not present today. Also vessels need time and funding to convert to dual fuel engines.

United Kingdom

While there are no inland waterways in the UK that are included in the TEN-T, the Manchester Ship Canal provides an inland waterway link between the Port of Liverpool and Manchester and Port Salford, which is planned to be a rail-connected distribution park with container barge services to and from the Port of Liverpool. The Manchester Ship Canal has spare capacity to allow this container barge traffic to grow in the future.

Seaport Bottlenecks, technical standards and interoperability issues

The following bottlenecks issues are identified in the context of seaports:

Belgium

Antwerp Port

- Accessibility and connectivity to the left bank of Antwerp seaport are restricted, and this side of the port is currently growing at a fast pace. A lock is needed to connect the left bank to the Deurganckdok basin and a railway connection is needed to link the main railway network to the left bank via a railway tunnel (Liefkenshoek tunnel).
- A lack of capacity exists to connect the Antwerp port with the railway network. A second rail access connecting and giving capacity from the continental network to the port area is necessary to respond to this need.
- Royer lock in Antwerp cannot cope with the capacity needs. A local upgrade is needed to enable the operation of large barges.
- The connection between the Antwerp North marshalling yard and the interior requires construction of a branch line to replace Schijnpoort and ensure that freight trains can cross each other easily.

Ghent Port

- At the port of Ghent, a large share of incoming goods are processed in several industries: steel industry, paper industry, car industry. Via the canal Terneuzen-Ghent the port is located inland, with good hinterland waterway connections and an inland modal share of 50% for inland navigation. Ghent is well located as a multimodal port but it faces severe reliability problems concerning its accessibility and rail connections. The critical inland waterway issue concerns the capacity of the cross-border Terneuzen locks. It comprises three locks including one of 100 years old, handling 53,000 inland waterway and 9,000 seagoing vessels on a yearly basis. Two locks are dedicated to inland navigation. At present, both inland and seagoing vessels are affected by high congestion, gauge limitation and reliability problems.
- The other main bottleneck at the port of Ghent is the need for the rail connection to the left bank of the port to handle 750m trains and in this way to provide a multimodal platform at the existing container terminal. In the "Gent-vorming" marshalling yard, no investments are foreseen by the infrastructure managers at this moment, but there is a need to study the possibility of lengthening five of the current tracks to 750m to be ready for future developments. The marshalling yard is important for the connection to the right bank of the port as there is ample space, but this is the last point where the railway is fully electrified.

Zeebrugge Port

- The fast growing port of Zeebrugge is facing some critical issues concerning its bulk freight transport connections in terms of connectivity and capacity.
- One of the characteristics of Zeebrugge is that it is connected with the European waterway network via the estuary of the Scheldt by using estuary vessels. To improve connectivity the inland waterway connections from Zeebrugge to the hinterland need upgrading.
- Within the framework of the "Strategic Port Infrastructure Project" (SHIP), the Flemish government has decided to convert the port area near the current Visart lock and the old inner port into a limited open tidal zone. This implies that the existing Visart lock will be replaced with an open access channel and that a new lock will be built further inland. The lock constructed in 1907 has become obsolete and no longer responds to the demands of present-day maritime navigation.

France
Several French seaports and inland ports on the corridor need to improve their land access. This is the case for:

- Dunkerque needs a direct rail connection between the west port terminals and the main line to Calais and the Channel tunnel. The port of Dunkerque is also working on rationalising management of its port rail network to improve performance and reduce costs. It is improving the capacity and efficiency of its multimodal platforms to improve competitiveness of rail and IWW modes by reducing cost of shifting containers from ships to land modes.
- Rail access to the port of Marseille is carried on the Avignon-Mourepiane line which needs to be upgraded (loading gauge and signalling system). More generally, rail traffic to and from the port of Marseille suffers from congestion around the Lyon node. This bottleneck limits the capacity of the port to extend its hinterland.
- Rail access to Strasbourg needs to be upgraded.
- Bonneuil-sur-Marne is the second most important port of the Paris area and an important tri-modal platform. Its last mile road connection is carried through urban areas. The extension of road N406 to the port will provide it with direct access to the main road network.

The port of Dunkerque also aims at improving its sea access with a need to enlarge the turning circle of the West Port.

More generally, the issue is not only access to ports but also their location and connection with their hinterland.

Ireland
While the two Core Network Ports in Ireland, Dublin and Cork, have no significant maritime capacity constraints at present, there is likely to be a need to ensure the development of adequate and efficient infrastructure capacity in the future as the economy grows in response to, in particular, increasing ship size. Ireland has an open economy, with trade representing some 86% of its GDP and 70% of this trade is based on maritime transport via sea ports; maintaining Ireland's ability to provide high quality access for shipping is likely to require infrastructure improvements to allow access for larger vessels.

As Ireland's economy is based to such a great extent on trade, the efficiency of inland connections will need to be maintained and enhanced. Of the ports on the corridor, the ports of Dublin and Cork are most likely to be able to further develop rail freight services in the future.

Neither of the ports is able to provide LNG bunkering facilities at present although they are monitoring the emerging trends and are liaising with other ports and shipping service providers to determine how best to address likely future requirements.

Netherlands
Capacity and accessibility are both issues for the Dutch Core sea ports. Rotterdam has good multimodal connection with its hinterland but the limitation of the A15 motorway capacity is de facto leading to a need in capacity for the other modes.

For Amsterdam, the crucial issue concerns maritime accessibility. The locks at Amsterdam limit access to the whole port area. This is caused by the increase, globally, of vessel sizes and the handling of expected future demand.

There are improvements required in the organization of inland waterway transport and, to a lesser extent, railways. At times inland waterway vessels may have to load at different terminals in the port before they can start their journey. For example in Rotterdam, this might involve calls at up to 20 or 25 terminals. This is not only inefficient, but it also limits the capacity of IWT and it weakens the competitive position of IWW. A similar problem exists for rail transport (shunting) where trains may have to visit 3 to 5 terminals before assembling a full train load. This makes transport by train more expensive than necessary (compared to road transport) and has a negative effect on the capacity because of the lower frequency. It is expected that sea terminal capacity issues will be solved by the end of 2014 with the introduction of two new sea terminals (APMT and RWG) at Maasvlakte 2. The Container Logistics Maasvlakte projects offers a more long-term solution.

For Moerdijk, the capacity of the rail infrastructure is limited: the rail infrastructure consists of unsecured and single tracks. In addition, the load and unloading area is suitable for trains of 450 meters length while the European standard is 750 meters.

The canal between Ghent and Terneuzen is a major shipping connection for both maritime and inland navigation. The canal lies both in the Netherlands and Belgium and is relevant for Terneuzen and Ghent. There is presently a capacity problem, leading to delays and reduced reliability at the lock compound in Terneuzen.

United Kingdom

The eight Core Network Ports in the UK have no significant maritime capacity constraints at present, but there will be a need to ensure the sustainable development of ports to cater for long term growth in the volumes of imports and exports by sea based on commercial decisions by ports operating within a free market environment. Additional infrastructure is likely to be required to cater for increasing ship size, particularly in the container market, and to cater for new markets, such a renewables.

None of the eight ports is, at present, able to provide LNG bunkering facilities.

Hinterland congestion (as set out in the roads section above) has an an impact on port-related traffic for all the eight ports. Examples of areas of congestion include some sections of the A14 between Felixstowe and the Midlands and, in Northern Ireland, congestion at the York Street Interchange in Belfast. Work is also needed on rail links between UK deep sea container ports and their hinterlands, such as on the Felixstowe-Nuneaton rail route and the Southampton-Midlands route, to increase capacity and allow longer trains to operate.

Airports Bottlenecks, technical standards and interoperability issues

Belgium

The Diabolo railway project linking Brussels and Antwerp through the Brussels National Airport has been partly achieved. This new railway considerably improves possibilities for passengers to travel between the airport and cities in Northern Europe. It still needs some works to connect the airport more efficiently with rail lines to Mechelen and to Schaerbeek.

Ireland

There is no provision for public transport by rail between Dublin Airport and the city centre, but the Irish Government is currently considering the technical and economic feasibility of options for a heavy rail, light rail or Bus Rapid Transit link which would provide a more competitive alternative to road transport between Ireland's major population centre and its airport.

Road/Rail Terminal Bottlenecks, technical standards and interoperability issues

Ireland
There are no Road/Rail terminals in Ireland on the corridor outside the two sea ports and, due to the relatively short distances that are available for rail freight services in the country, there are only a few services that are operating. Of the ports on the corridor, the ports of Dublin and Cork are most likely to be able to further develop rail freight services in the future.

Luxembourg
In Luxembourg, the capacity and the connectivity of the Road/Rail terminal of Bettembourg/ Dudelange have to be improved to provide a higher quality of service.

Netherlands
Substantial growth in inland intermodal transport is expected for the future (around the year 2030) as a direct result of growing port volumes. This demands more capacity from container transhipment terminals. Bottlenecks at both rail and waterway terminals are expected to occur in many regions, and opportunities are seen for developing hinterland terminal capacity in corridor regions including Zeeland, Noord Brabant and Limburg.

United Kingdom
There is a general lack of Strategic Rail Freight Interchanges (SRFIs) (rail-connected distribution parks) in the London/South East area, but they have been developed successfully, mainly by private sector developers, on the corridor near Birmingham, Manchester, Liverpool and Glasgow. However, as well as the need for these facilities to support the development of domestic intermodal freight in competition with road freight transport, the UK Government believes there is a compelling need for a national network of SRFIs to allow for the efficient inland movement of freight to and from ports and to provide trading links with neighbouring European countries.

Two of the RRTs in Liverpool (at Garston and Ditton) are not linked to the core network because the line from Weaver Junction (on the West Coast Main Line) to the two RRTs is not included on the corridor, despite it being a TEN-T Core Freight route.

4.2.3 Conclusions of Critical Issues

Congestion, together with its cumulative effects upon freight and passengers traffic at certain points in the corridor is the basis for a loss of efficiency in the different countries of the corridor, currently leading to reduced journey time reliability for strategic freight in the corridor. Speed limitations, as well as capacity (for example, on the southern sections of the West Coast Main Line in the UK) and train length restrictions (especially in Belgium), represent a few of the main technical constraints for rail transport. Regarding inland waterways, major bottlenecks are to be found mainly in the insufficient capacity of certain waterways and in the lack of interconnections between basins. In terms of capacity, two cases can be distinguished, the first involving situations where there are very high levels of demand on links with CEMT IV or higher, and the second being cases where the CEMT IV standards are not currently reached.

One foremost missing link is to be mentioned: the canal Seine-Nord-Europe which could link the Seine Basin with the northern-western waterways of the Benelux countries via Terneuzen and Liège and encourage modal shift on the whole corridor. In terms of seaports, a lack of accessibility and connectivity to rail and inland ports, along with a lack of train paths inland, and insufficient lock capacity appear to constitute the major bottlenecks for maritime transport.

Interoperability constraints
In terms of rail transport, the difference of electrification systems between the countries of the corridor, in particular in the Benelux, constitutes a key issue. Belgium uses 3 kV and 25 kV on some lines (HSL, line "Athus-Meuse" - southern part of RFC2 connected to France and Luxembourg). In the next years a large part of the Brussels to Luxembourg axis will be equipped with 25 kV. 25 kV electrification is already in use for the major cross border lines between France, Belgium, Luxembourg and Netherlands:

- Rail freight corridor line "Athus-Meuse" connecting the south of the Belgian territory to France and Luxembourg;
- High Speed Line n°1 (Brussels –Lille – Paris);
- High Speed Line n°4 (Antwerp-Breda-Rotterdam).The harmonisation of the electrical systems have to be considered over a very long term.

The Netherlands uses 1,5kV as a standard. The French network uses two different standards: 1.5kV (mainly in the South) and 25kV (mostly in the north and on new lines).

Harmonising ERTMS standards to foster interoperability, capacity and improve safety and security are not yet fully implemented in the countries of the corridor. The pace of ERTMS implementation differs depending on the country, creating possible future ERTMS gaps.

Regarding road transport, differences in road haulage regulations between the various countries of the corridor (in terms of the hours when vehicles can use the networks) currently lead to parking areas congestion and saturation at the borders. Differences in tolling systems also significantly impact road transport in the countries of the corridor (for example on the A35 between Illkirch and Vendenheim).

Regarding Inland Waterways, it is important to highlight that the standardisation of infrastructure is also advantageous. This standardisation is needed for locks characteristics as well as at the nodes: inland ports and seaports.

Intermodality constraints
Improved connectivity of seaports, inland ports and airports to European rail and road networks is crucial to fully exploit the potential for multi-modal transport within the corridor. Substantial growth in inland intermodal transport is expected for the future (around the year 2030) as a direct result of growing port volumes, which will require enhanced capacities from container transhipment terminals. In the UK Strategic Rail Freight Interchanges (SRFIs) (rail-connected distribution parks) are crucial to allow for the efficient inland movement of freight to and from ports and to provide trading links with neighbouring European countries, but there is a lack of existing SRFI capacity in the London/South East area.

Cross-border issues
The above-mentioned bottlenecks call for cross-border projects to optimise interoperability and intermodality of European transport networks. In particular, several on-going IWW projects aim at improving inter-basin connections, in particular between the three basins of the Seine, the Escaut (Scheldt) and the Rhône. The most advanced project is the Seine-Escaut, with its main component, the canal Seine-Nord-Europe. These projects, together with the related actions in Terneuzen and along the Meuse/Maas waterway are essential in order to achieve a North-South multimodal sustainable corridor in Western Europe.

Cross-border rail focuses upon the cross-border routes between the Netherlands, Belgium, Luxembourg and France, creating a corridor from the Randstad via Brussels to Strasbourg and Basel. Towards this aim, the removal of bottlenecks such as the North-South link in Brussels, and the upgrade of the passenger line to Luxembourg (EuroCap Rail) are necessary.

Between the UK and France, since only the HS1 route is included on the corridor through Kent from the Channel Tunnel to London, it is most likely that capacity for freight services specifically on the corridor will be limited to night-time services. However, the conventional route through Kent, which has sufficient capacity for freight services, is expected to be included on Rail Freight Corridor 2.

Summary of Critical Issues

Examples of the most prominent critical issues per country and per mode are summarised below.

Table 9: Summary of Critical Issues, Belgium.

Mode	Examples of Critical Issues
Road	Severe congestion in Antwerp and Brussels.
Rail	Severe congestion in Brussels. Train length restrictions during peak hours. Access (including last mile) to seaports. Speed between Brussels-Luxembourg-Strasbourg for Passenger trains
Waterways	Bridge height issues Lock capacity issues Gauge issues and reliability issues
Airports	Completion of Diabolo project.
Seaports	Lock capacities: Antwerp and Ghent. Antwerp railway connections.
Inland Terminals	

Table 10: Summary of Critical Issues, France.

Mode	Examples of Critical Issues
Road	Congestion – Paris, Strasbourg, Lille, Lyon and Marseille
Rail	Bottlenecks – Paris, Lyon, Metz, Strasbourg, Mulhouse, Lille
Waterways	Seine-Escaut – missing link
Airports	
Seaports	Calais seaport Dunkerque and Marseille access.
Inland Terminals	Several e.g. Strasbourg access (north of Strasbourg) Bonneuil-sur-Marne.

Table 11: Summary of Critical Issues, Ireland.

Mode	Examples of Critical Issues
Road	Congestion in Dublin. Congestion/last mile access to Cork Seaport
Rail	Interconnections between stations and hinterlands along the Cork-Dublin-Belfast rail line Need to cater for modal switch from cars to rail in Dublin Long journey time on Cork-Dublin-Belfast line
Waterways	Not applicable.
Airports	Access to Dublin Airport Capacity contraints at Dublin Airport
Seaports	Development of inland connections Dependence on efficient sea connections – trade.
Inland Terminals	Not applicable.

Table 12: Summary of Critical Issues, Luxembourg.

Mode	Examples of Critical Issues
Road	Parking areas – transit traffic. Congestion linked to transit traffic
Rail	Luxembourg City station, Bettembourg station Speed between Brussels-Luxembourg-Strasbourg for passenger trains Congestion in network
Waterways	reliability issue - single locks on Moselle
Airports	Lack of rail connection
Seaports	Not applicable
Inland Terminals	

Table 13: Summary of Critical Issues, Netherlands.

Mode	Examples of Critical Issues
Road	Congestion in Amsterdam and Rotterdam areas. Missing motorway links eg. North-South Rotterdam.
Rail	Caland bridge bottleneck in Rotterdam. Cross border connectivity on conventional line to Belgium.
Waterways	Lock capacity issues due to increase of traffic.
Airports	
Seaports	Lock Amsterdam Lock Terneuzen
Inland Terminals	Shortage of inland logistics hubs.

Table 14: Summary of Critical Issues, UK.

Mode	Examples of Critical Issues
Road	Congestion- London (M25), Birmingham, Manchester areas.
Rail	Shortage of capacity on southern sections of WCML. Low market share for CT through rail
Waterways	Not applicable
Airports	
Seaports	Capacity on hinterland connections.
Inland Terminals	Shortage of Strategic Rail Freight Interchanges in London/South East area (developed by the private sector, but subject to local land use planning process which is influenced by relevant national policy).

4.2.4 Summary of Transport Market Study

The transport market study has been approached by using national studies and forecasts supplemented by data analysis in key market segments, and with reference to master plans and annual reports being published by infrastructure managers.

For further detail concerning the market analysis, see Annex 4.

The North Sea Mediterranean corridor covers a large number of the most economically active cities and regions in Europe, as well as being the location of many of Europe's largest gateway ports. It has a marked central area.

Base year data for the corridor shows high levels of activity, with intra-corridor freight flows of 1.029 billion tonnes. These are heavily concentrated within the central part of the corridor, meaning Southeast England, Northeast France, Belgium (especially Flemish region) and the Netherlands.

Volumes in the corridor represent a disproportionately high share of EU27 volumes. Total freight performance in the six corridor countries accounts for 26% of total EU27 road flows, 16% of rail, and 40% of inland waterways.

Table 15: NSMED Corridor Traffic Shares of EU27 Volumes, 2012

	2012 Volume	Share of EU27	Basis
Road (bn TKm)	464.0	26% of EU27	*6 NSMED MS*
Rail (bn TKm)	61.5	16% of EU27	*6 NSMED MS*
Inland Waterway (bn Tkm)	59.3	40% of EU27	*6 NSMED MS*
Total[27] Airports (m Tonnes)	7.5	56% of EU27	*6 NSMED MS*

[27] Total in six corridor countries.

	2012 Volume	Share of EU27	Basis
- Core Airports (m Tonnes)	6.9	52% of EU27	*Core Airports*
- Core Airports (m Pax)	380	46% of EU27	*Core Airports*
Total[28] Ports (m Tonnes)	1,629	44% of EU27	*6 NSMED MS*
- Core Ports (m Tonnes)	1,256	34% of EU27	*Core Seaports*
- Core Ports Containers (m TEU)	31.4	34% of EU27	*Core Seaports*
- Core Ports Passengers (m)	34.1	8% or EU27	*Core Seaports*

Source: Eurostat, and operators' websites.

Airports in the corridor countries handle 56% of EU27 air cargo, and the core airports alone handle 52% of freight and mail loaded and unloaded in EU27. These core airports account for 46% of passengers carried in Europe.

Total port throughput in corridor countries is 1.629 billion tonnes, more than 40% of the EU27 total. Corridor (core network) ports alone handle 1.256 billion tonnes of cargo, including short-sea and deep-sea traffics. These core ports in the corridor handle 31.468 million TEUs, and 34.1 million passengers.

The analysis of future flows has focused on examining demand-side issues for both passengers and freight, including available official forecasts that have been produced by or for the Member States. This has been extended in Annex 4 by analysing plans at a more local level for major transport facilities, including seaports and inland ports.

Market analysis indicates that although headline activity indicators such as population and economic growth are at modest levels for the EU as a whole, there is substantial growth expected within the North Sea - Mediterranean Corridor, linked to the attractiveness of the major cities, and the faster-than-average growth in long-distance traffic, especially inter-continental container traffic with East Asia which naturally feeds directly into the corridor's networks.

Economic and demographic data shows that there is essentially a clustering of economic activity within the centre of the corridor, creating population growth around the major cities, and transport growth, linked also to the establishment of global hubs at the major container ports and airports. Economies of scale associated with the use of large container ships result in maritime internal and external transport costs being much lower (per tonne-km) than inland costs, so shipping lines who face intense competitive pressures therefore focus their activities upon the ports that give them nearby access to these population centres. In this context it means shipping lines are bringing containers into the range of ports between Le Havre and Hamburg on the continental side, and between Southampton and Felixstowe on the UK side.

The degree to which demographic and economic clustering stimulates transport volume growth creates a high potential risk for the corridor, which is still highly dependent upon road transport for inland transport. However, all of the core continental seaports are actively developing facilities and programmes to develop multimodal hinterland networks, and there is sufficient critical mass of cargo to make this feasible. Such initiatives need to be helped by providing the necessary rail and

[28] Total in six corridor countries.

waterway networks to raise the shares of these inland modes to levels observed, for example in the parallel corridor between the Dutch and Flemish ports and the German Ruhr area.

Port forecasts within the corridor typically indicate expectations of throughput increasing by 50% or even 100% by 2030, with the container sector growing the fastest. Available national forecasts suggest that corridor port throughput has the potential to increase by an additional 1bn tonnes, of which around 60% would be distributed inland via the hinterland networks belonging to the corridor. If all ports can achieve waterway shares similar to Rotterdam, Amsterdam and Antwerp, and rail shares similar to Zeebrugge or Hamburg, much of the expected growth can be absorbed 'off-road'. Largely this depends upon solving bottlenecks inland, raising the performance of the inland rail and waterway networks south and west of the Rhine, where non-road modal shares are still low, and developing networks of inland multimodal platforms as logistics hubs.

In the continental part of the corridor, attention must therefore focus on improving rail and waterway transport. For waterways, market shares are low overall (around 7% of total transport) and falling. Moreover, volumes are heavily concentrated on the Rhine, so there is a need to develop other parts of the network. Routes on the Maas/Meuse, the Albert Canal, the Escaut/Scheldt, and Lys/Leie waterways still require upgrades to achieve CEMT IV or V, and the French waterway basins along the Seine, Oise, Marne, and Saône/Rhône are essentially cut off from the Dutch and Belgian networks.

In the case of rail freight, traffic shares for cross-border are also low inside the corridor, in comparison with either national traffics or on parallel routes e.g. from Germany or between the Alpine countries. There is a particular need to address rail bottlenecks in France e.g. Lyon, Lille, Metz, Strasbourg and Paris and to solve loading gauge problems in order to allow the two main axes (Paris-Amsterdam, and Marseille-Luxembourg-North Sea) to reach their full potential. Achieving the technically feasible 740m train length in Belgium for a greater number of train paths is also necessary.

In stark contrast to the situation on the Continent, the market issues in Ireland focus on peripherality, cohesion and accessibility. While there is a risk of Europe's economic centres crowding out development in more peripheral areas, there is a need to support the recovery of economies such as Ireland's which have borne the brunt of the Eurozone crises. Ireland depends to a great extent upon short-sea container services for trade with continental Europe and via hubs to the rest of the world, and upon ferry services for trade with Great Britain and the continent. The combination of depressed demand, and the potential impact of higher transport costs arising from the need to cross the SECA area, create the potential for fewer services, lower service frequencies and higher freight rates between the more peripheral areas and the core areas of the corridor. Unlike many regions in the corridor, Ireland depends on feeder container services to connect its ports to global container networks, so there is a need to offset this disadvantage. Improving inland (road) and maritime (including Motorways of the Sea) access to core ports is therefore a step towards achieving greater cohesion.

For the UK, issues of accessibility and cohesion are also important, but to a lesser degree because of the critical mass of economic activity especially around London and the South East. Traffic analysis shows that there has a been strong trend for transport flows with the continent to become concentrated on the NSMED corridor links via the Short Straits, strengthened by the construction of the Channel Tunnel. Apart from the notable exception of Eurostar passenger rail services, most of this growth has led to greater numbers of lorries and cars using long distance motorway connections, via the M25 around London and bottlenecks such as the Dartford Crossing, to reach the port of Dover and the Eurotunnel terminal (near Folkestone).

Both the Dover-Calais and Dover-Dunkerque route suffer from RORO capacity issues due to the growth of cross-Channel traffic, this also leads to road congestion in France between motorway A16 and Dunkerque RORO terminal. In the short term this puts additional pressure on RORO port capacity in Dover, Calais and Dunkerque, but it also signals the need for longer term solutions including boosting North Sea routes (UK East Coast to Netherlands and Belgium), increasing the amount of through-rail freight via the Channel Tunnel, and the consideration of measures to add capacity to the Thames road crossings.

In the container sector, which covers both global and European connections, growth has focused around the two main ports of Felixstowe and Southampton. In addition, a new new container port has been developed at London Gateway on the Thames. These factors have tended to draw traffic towards the south-east corner of Great Britain. However, the Port of Liverpool, with a more central location in Great Britain on the west coast, is developing a new container terminal on the River Mersey with the objective of securing additional traffic via a container port in the north of England.

So, therefore, while the UK is heavily dependent on corridor capacity to maintain the efficiency of its networks, it also the potential to develop parallel or East-West routes involving longer sea crossings and shorter inland road or rail hauls, as well as long distance rail freight through the Channel Tunnel.

Overview analysis in Annex 4 includes:

- Economic Geography
- Population and population growth
- Freight Transport Mode Shares
- National Forecasts of Transport Market
- Passenger Transport Mode Shares
- Cross-border freight flows – per corridor country
- Corridor Seaport Throughputs
- Corridor Airport Throughputs

Key segments analysed in more detail in Annex 4 include:

- Cross-Channel RORO freight
- UK Container sector
- Cross-Channel Through Freight
- Cross-Channel Passengers
- UK Air Passengers

- Irish Maritime Sector
- Irish Container Sector
- Irish RORO Sector
- Irish Sea Passenger Traffic

- Continental Inland Waterways
- Continental Rail Freight
- Continental Seaports –summaries of status and plans of each core port
- Continental Inland Nodes – identification of main multimodal platforms per node, with status.

4.3 Objectives of the Core Network Corridor

Leading on from the market study, this section introduces the objectives of the North Sea Mediterranean Corridor. It aims at establishing the basis for the programme of measures and projects to implement in the NSMED corridor.

The transformation of the European transport system in a coherent network requires a combination of initiatives at all levels and for each transport mode. As restricting mobility is not considered to be an option, the implementation of this network should increase the competitiveness of transport in Europe, through global reductions of external and internal costs and increasing use of more sustainable transport.

In principle, the outline of stated TEN-T objectives from Regulation 1315/2013 need to be applied to the context of the North Sea Mediterreanean Corridor, as a step towards defining and prioritising measures in the form of projects.

This regulation contains both high-level strategic objectives for the TEN-T network as a whole, as well as specific infrastructure-related requirements. On the one hand, therefore, the measures need to address functional objectives such as cohesion and sustainability, but on the other hand there are technical requirements for the physical capabilities of the corridor infrastructure, that underpin the goal of achieving greater interoperability in future.

From the perspective of physical infrastructure, a corridor (in abstract) can be presented as an essentially linear transport system, connecting main urban centres, consisting of routes, links, nodes, and gateways[29]. Corridors allow investments to be focused efficiently onto a designated alignment, so that they work together, rather than in a piecemeal fashion.

In this context corridor objectives may be defined according to input or output characteristics. Input characteristics include technical capabilities, whereas output characteristics relate to the resulting level of service for users. Both relate to the physical capabilities of the system.

Operational and technical objectives include :

- Removal of infrastructure bottlenecks and "filling" missing links as detailed under the critical issues above, especially the inland waterways of the corridor. Notably the Seine-Scheldt is paramount as well as bridge clearance for waterway vessels along the canals.

- Efficient use of infrastructure, in particular access routes to the major ports both of inland waterways, roads and rail.

- Further strengthening of the capacity of the ports supporting Motorways of the Sea, and the application of the logistics chain concept.

[29] John Arnold, 2005, World Bank, Best Practices in Corridor Management.

- Upgrading of infrastructure quality level, notably through interoperability deployment of ERTMS and other technical specifications for rail.

An alternative perspective is to regard the corridor in terms of its economic functions, such as promoting trade, development and sustainability through the provision of "better" services and by connecting centres of activity, i.e. territorial cohesion.

Development of transport infrastructure can provide economic gains if it is planned according to the economic and social environment. High capacity infrastructure, such as facilities related to water transport, can because of its ability to foster scale economies, enhance economic structure and development, and help industries to work at a European scale.

In the current context of the North Sea Mediterranean Corridor, developing common objectives in practice requires detailed consideration. NSMED does not follow the typical linear structure and both physical and functional objectives have been set.

It appears instead as a composite, containing and linking overlapping sub-corridors, built up from, for example, priority projects 2, 13, 28, 30, the ERTMS corridor C, and rail freight corridor 2.

Individual sub-corridor branches have entirely different characteristics and associated problems, and as demonstrated, there are long lists of critical issues, without any dominant or shared problem. There is therefore no single context in which to define a set of common problems or objectives for the whole corridor. This depends on viewpoint. Solving any specific bottleneck is unlikely to have more than a partial or indirect impact on the corridor as a whole. So whereas in more straightforward circumstances, attention can be focused upon a limited range of objectives, such as improving a cross-border bottleneck, it is necessary here to develop a more differentiated approach.

As a starting point it is necessary to re-examine the full range of TEN-T strategic objectives.

4.3.1 Qualitative objectives

The global objective of the project explains that "*the trans-European transport network shall strengthen the social, economic and territorial cohesion of the Union and contribute to the creation of a single European transport area*".

Four main topics provide structure to this process:

Territorial and structural cohesion
The Core network should enhance accessibility and connectivity of all regions of the Union, by implementing a reduction of infrastructure quality gaps between Member States and by providing a balanced coverage for all European regions reflecting their specific situations. The creation of new segments and the modernisation of restrictive links in the existing network are then needed to reach this objective.

In addition, for both passenger and freight traffic, interconnections between transport infrastructure for long-distance traffic and regional or local traffic must be created or improved.

Efficiency between different networks
The removal of bottlenecks or obstacles, the capacity improvement of saturated segments and the bridging of missing links within Member States' territories and between them must be a priority for the European network. The efficiency must be enhanced through easy interconnection and interoperability between national transport networks (concerning particularly the opening of national rail markets, especially for freight), and through the optimal integration of intermodality between all transport mode for passengers, as for logistic chains. The development of the capacity of multimodal platforms at specific nodes is fundamental to undertake this last point.

These measures must be accompanied by the promotion of economically efficient and high-quality transport, by efficient use of the potential of new and existing infrastructure, by a rationalisation of energy and resource use, and by a cost-efficient application of innovative technological and operational concepts.

Tools enabling improvements in traffic management, administrative procedures and information systems exist, for example ITS, SESAR, ERTMS, SafeSeaNet, RIS. Their use leads to a more effective management of the different networks by operators, to better projections about mobility requirements and to an optimisation of traffic flows.

Transport sustainability
All transport modes must be developed for the long term according to criteria of sustainability and economic efficiency. They must contribute to the reduction of greenhouse gas emissions, to the use of low-carbon and clean transport, to develop sustainable propulsion systems, to improve the fuel security, to reduce external costs (especially traffic incidents and accidents) and to protect the environment.

Increasing the benefits for the users
The European transport network must respond to the mobility and transport needs of its users. Its service has to ensure safety, security and high-quality standards for both passenger and freight transport. Quality, efficiency and sustainability must be included in the establishment of infrastructure requirements, particularly through high commercial speeds and reliable travel times.

In case of disasters or emergency, providing solutions to insure mobility needs and accessibility to rescue services shall be planned.

To finish, accessibility for elderly people, persons of reduced mobility and disabled passengers must also be taken into account.

Considering these objectives, the three main problem areas within the corridor are:

- **Lack of cohesion** – with a prominent central area, variable quality of access from the perimeter to the centre, and difficulty for long distance traffic to bypass the large urban nodes.

- **Lack of efficiency** – with multiple instances of bottlenecks, adding capacity where traffic is growing, bridging infrastructure gaps, and solving interoperability issues. Achieving improved connectivity and better use of existing infrastructure is also highly relevant, especially in terms of the roles to be fulfilled by multimodal platforms, and the increased use of intermodal transport such as unaccompanied combined transport. The use of routes such as sea corridors with direct links from Great Britain and Ireland to the continent and the Rhine-Moselle route from the Dutch and Flemish ports to Luxembourg and France also contribute to the better use of available infrastructure.

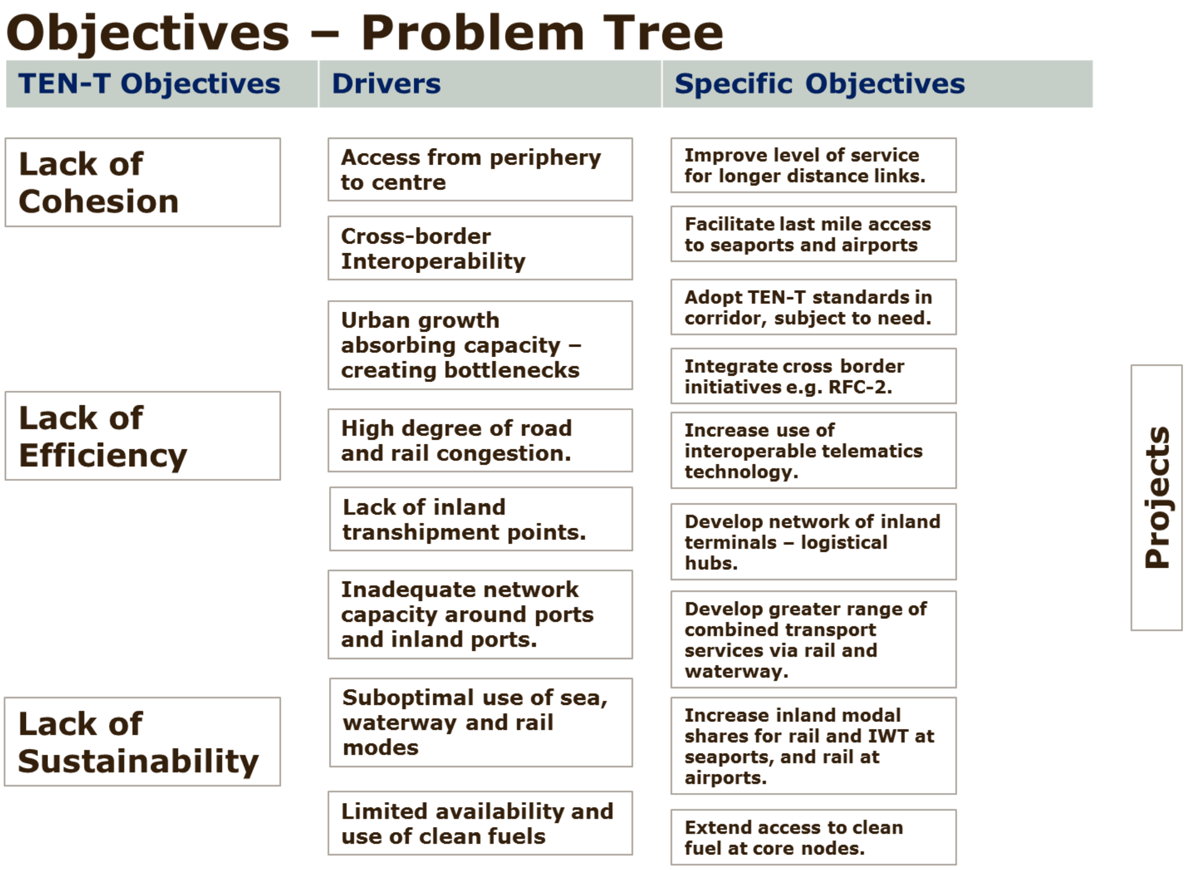
- **Lack of sustainability –** with road and air transport as the main passenger modes, and road as the main freight mode in many parts of the corridor. In these cases, actions to create modal shift, as well as the introduction or support for technological measures to reduce externalities within each mode. It should, however, be recognised that for the northern parts of the UK and the Republic of Ireland passengers often have no practical alternative but to travel by air.

User benefit objectives can be addressed also, but the items under this category, which include mobility in relation to third countries, safety and security, access to emergency services and accessibility for persons of reduced mobility are not typically the issues which have been identified as critical in relation to the core network corridor.

4.3.2 Specific Objectives

A problem-tree framework is shown below for relating problems, to their identified causes (or drivers) to more specific objectives which can be attributed to potential projects of common interest.

Figure 23: Problem Tree – Deriving Specific Corridor Objectives



It is envisaged that a structure such as that shown above may be used to select measures and to determine synergies between projects within the work plan.

Objectives are discussed below, in relation to market analysis, under the headings in the problem tree.

1. **Improve level of service for longer distance links –** analysis of European trade patterns shows a steep decay effect in trade with respect to distance. The Netherlands, for example exports 83 million tonnes to Belgium, 22 million tonnes to France, and only 5.7 million tonnes to Spain. More peripheral parts of the corridor such the Republic of Ireland, Northern Ireland and Scotland rely on longer distance passenger and freight services to reach the central part of the corridor, but there has been a trend for more traffic between Great Britain and the continental mainland to use the Short Straits ferry crossings rather than longer sea crossings across the North Sea and the Western Channel or long distance intermodal rail services through the Channel Tunnel. On the continent, road congestion within the central area reduces the efficiency of longer distance road freight transport. Greater emphasis on longer distance maritime services, such as Motorways of the Sea that link Ireland and the northern areas of Great Britain to the continent and to the Atlantic coast of Europe can help to reduce congestion on these sections of the road network.

2. **Facilitate last mile access to seaports and airports** – TEN-T investments can support air and sea links through improved last-mile access, allowing inland flows to enter the core network avoiding congested urban areas. Many of the corridor's ports and airports e.g. in Amsterdam, Rotterdam, Antwerp and London feed inland traffic into parts of the network which are already congested with mainly domestic and local traffic. This can be addressed with improved road connections (e.g. the Dublin Port Tunnel) and by improving access to rail and waterways[30], such as the Felixstowe-Nuneaton rail link avoiding trains having to pass via North London to access the West Coast Main Line, and the Betuwe line which created a dedicated rail freight link from Maasvlakte to the German border.

3. **Adopt TEN-T standards in corridor, subject to need** – these requirements are designed to combine capacity improvements, especially for rail and waterway transport, with interoperability. Important aspects for NSMED are: train lengths to be standardised at 740m, ERTMS signalling to be introduced on the corridor, further expansion of electrification, the raising of bridge heights on waterways to 7m, the upgrade of <CEMT IV links in the waterway networks and the implementation of River Information Systems (RIS)[31].

4. **Integrate cross-border initiatives (RFC2) –** there are important anomalies between TEN-T core network corridor planning and the rail freight corridor planning (RFC2). One issue concerns the need to align the NSMED rail network completely with the RFC2 network, which includes a greater number of parallel connections. The second is to adopt the full set of technical parameters set out by the RFC2, including electrical systems which are not harmonised, loading gauges (height above the rail), and gradients (which can be higher than the 12.5 per mill level). These need to be considered in a pragmatic way, over the longer term. In addition, in the UK for example, commercial considerations will be important as the government will seek to invest in the required infrastructure to meet the reasonable requirements of the logistics sector.

5. **Increase use of interoperable telematics technology** – especially ERTMS (ETCS train control system and GSM-R mobile communication system) for rail and RIS (River Information Systems) for waterways.

6. **Development orposals for network of inland terminals – logistical hubs –** in order to build inland multimodal networks, the capacities of inland hubs (rail-connected, water-connected or both) for handling containers have to be matched to

[30] Although it should be noted that there are no inland waterways included on the TEN-T in the UK.
[31] Subject to economic viability, Member State finances and physical constraints.

the potential volumes being handled in seaports. Inland hubs (logistical hot-spots) need to be working at a scale to allow frequent connections to be feasible. The RFC2 study shows that main terminals (e.g. in Rotterdam, Antwerp and Paris) have capacities of over 200,000 TEU, meaning more than 50 shuttles per week, but most are operating at around 100,000 TEU per year, with around ten connected cities each. These levels can be compared against seaport throughput of 31 million TEU in the NSMED corridor, with estimates of volumes doubling by 2030. Any developments of logistics hubs would need to be subject to national land use planning laws and regulations and in the UK they are usually developed by the private sector.

7. **Develop greater range of combined transport services via rail and waterway –** it is not sufficient to upgrade infrastructure but the development of market-led rail freight and waterborne freight services is also required; examples such as waterway transport in the Netherlands and rail transport between Germany and Italy show that market shares can be improved by offering a wide range of services that are closer substitutes for road transport. Alpine rail services include conventional wagon-loads, services for container transport, other forms of unaccompanied combined transport such as piggyback and swap-body (road trailers via rail), and accompanied rolling motorway, which only exists through the Channel Tunnel in NSMED. On the NSMED corridor the Perpignan-Bettembourg rolling motoroway already offers a cross-border long distance service since 2007. Whereas container trains and barges are needed for inland transport from seaports, other forms of intermodal transport, allowing road trailers to be carried, are more relevant for intra-European flows. This is most likely to be achieved in the rail freight sector by full liberalisation of the rail freight sector in all Member States, so that market operators will be able to develop such services.

8. **Increase inland modal shares for rail and IWT at seaports, and rail at airports** – as demonstrated in the study, road, sea and air transport dominate the corridor for the cross-border traffics under consideration in the NSMED core network corridor. Total cargo exchanges between corridor and neighbouring countries amount to 1 billion tonnes, and cargo handled within the corridor's core ports amounts to over 1.2 billion tonnes. Cross-border rail freight traffic in the RFC2 amounts to 21.8 million tonnes, and inland waterway traffic between corridor MS was estimated to be around 87 million tonnes, much of which (60%) was on the sections between Antwerp and Rotterdam. To allow waterway transport to expand significantly, it is necessary to upgrade parts of the waterway network in the Netherlands and in Belgium, and to create a CEMT V link between the Seine, the Lys and the Scheldt rivers in order to broaden the geographical area in which waterway transport is competing. All the corridor ports between Dunkerque and Amsterdam allow waterway connections to be made into this extended waterway corridor, and provide the critical mass of cargo to support services. Rail also offers potential for reducing dependence on road, especially on cross-border routes via France, and on the Brussels-Luxembourg-Metz route towards either Switzerland or towards Lyon. Levels of port-related road market share or below 50% are feasible in this corridor, with the remaining 50% accounted for by a combination of rail and waterway, depending upon the location.

9. **Extend access to clean fuels at core nodes**

With road and sea as the two main modes for freight transport in the corridor, one of the most direct ways to reduce greenhouse gas emissions is to promote the availability of cleaner fuels at seaports and motorway service stations respectively. For sea transport within the Sulphur Emission Control Areas (includes Channel and North Sea), there is a requirement by the 1st January 2015 to reduce SOx emissions from 1% to 0.1%, a measure that will require significant adjustments to be made by shipping lines, either in vessels or fuels or both, with ports needing to allow access to sources of cleaner fuels.

4.3.3 Work Plan Objectives

The Work Plan will contain projects of common interest. Projects of common interest should demonstrate European added value.

European added value' means the value of a project which, in addition to the potential value for the respective Member State alone, leads to a significant improvement of either transport connections or transport flows between the Member States which can be demonstrated by reference to improvements in efficiency, sustainability, competitiveness or cohesion, in line with the objectives set out in Article 4.

Projects for which Union funding is sought should be the subject of "socio-economic cost-benefit analysis based on a recognised methodology, taking into account the relevant social, economic, climate-related and environmental benefits and costs."

Article 7 (1315/2013) states that projects of common interest shall contribute to the development of the trans-European transport network through the creation of new transport infrastructure, through the rehabilitation and upgrading of the existing transport infrastructure and through measures promoting the resource-efficient use of the network.

Projects of common interest shall:

a) **Contribute to** at least two of the four **stated** TEN-T **objectives** (cohesion, efficiency, sustainability, benefits for users).
b) **Comply with Chapter 2** (comprehensive network) or if core network, also **Chapter 3** (core network) of the Regulation. In short this means that the projects must be according to the technical standards set within TEN-T.
c) **Be economically viable**, on the basis of a socio-economic cost benefit analysis, meaning a quantified ex-ante evaluation.
d) **Demonstrate European added value**, meaning that in addition to national benefits, the project should lead to a "significant improvement of either transport connections or transport flows between the Member States which can be demonstrated by references to improvements in efficiency, sustainability, competitiveness or cohesion", also in line with Article 4.

Starting from the literature analysis, and extending this through discussions with Member States and with INEA, it has been possible to develop a long list of potential actions. A summary of this analysis and a preliminary list of projects is provided in the next section.

4.4 Implementation

At this stage, lists of projects are being discussed between the corridor study consultants and the Member States and the preliminary lists presented here still need refinement. They are therefore only a few days old at time of publication in this document and therefore indicative rather than exhaustive.

During the second corridor forum, the request has been made that the NSMED work plan should be a flexible (and not legally binding) document. Regulation 1315/2013, Article 47[32] makes it possible for the Commission to adopt Implementing Acts for the

[32] Article 47, para 2. Subject to Article 1(4) and Article 54, and after approval by the Member States concerned, the Commission may adopt implementing acts for the cross-border and horizontal dimensions of the core network corridor work

cross-border[33] and horizontal dimensions of the work plan. In this legal context, cross-border refers to connections between the nearest urban nodes either side of a border e.g. Lille to Brussels, but not Paris to Lille. The EC has subsequently clarified that seaports and short-sea connections (and their air equivalents) are not considered as cross-border. Horizontal priorities[34] refer to actions such as telematics (ITS, ERTMS, RIS and VTMIS), core network ports, motorways of the sea (MoS) and airports, safe and secure infrastructure.

At this stage longer term (aspirational) projects are listed within the draft work plan lists because the main thrust of the TEN-T policy is to develop the core network up to 2030, with the corridor as a co-ordinating mechanism. Knowledge of current planning is therefore useful in its own right. In developing the corridor work plan there remains a need to separate short term plans from the longer term opportunities, where there are higher degrees of uncertainty, but greater possibilities for co-ordinated action through the corridor structure. At present, many listed projects have uncertain timescales and costs. Others contain technical options which still need to be decided. Others are studies, or early phases of projects which will be expanded.

Project lists from the UK are still under discussion, and are expected to be received by the consultants and approved for the draft work plan before the final report is submitted. In the UK there is a review being undertaken of existing transport projects, after which it is foreseen that the corridor Work Plan will be extended with UK projects. Concerns have been raised about the Work Plan becoming an Implementing Act, and this question is still under discussion.

4.4.1 Process for identifying Projects and Measures

The process for developing the work plan, which will essentially consist of a list of projects, is to bring together the elements from the previous progress reports, the critical issues, the compliance issues, the market developments and the set of specific objectives. It will be organised per country per mode. The intermediate outcome will be a set (a long list) of projects.

Critical issues and compliance issues define the problem set, market developments provide context and direction, and the objectives have been formulated to ensure that TEN-T general objectives of cohesion, efficiency, sustainability and user benefits have been covered.

plans. Once adopted, the Commission shall adapt those implementing acts, after approval by the Member States concerned, to take into account the progress made, delays encountered or updated national programmes.

[33] 'cross-border section' means the section which ensures the continuity of a project of common interest between the nearest urban nodes on both sides of the border of two Member States or between a Member State and a neighbouring country;

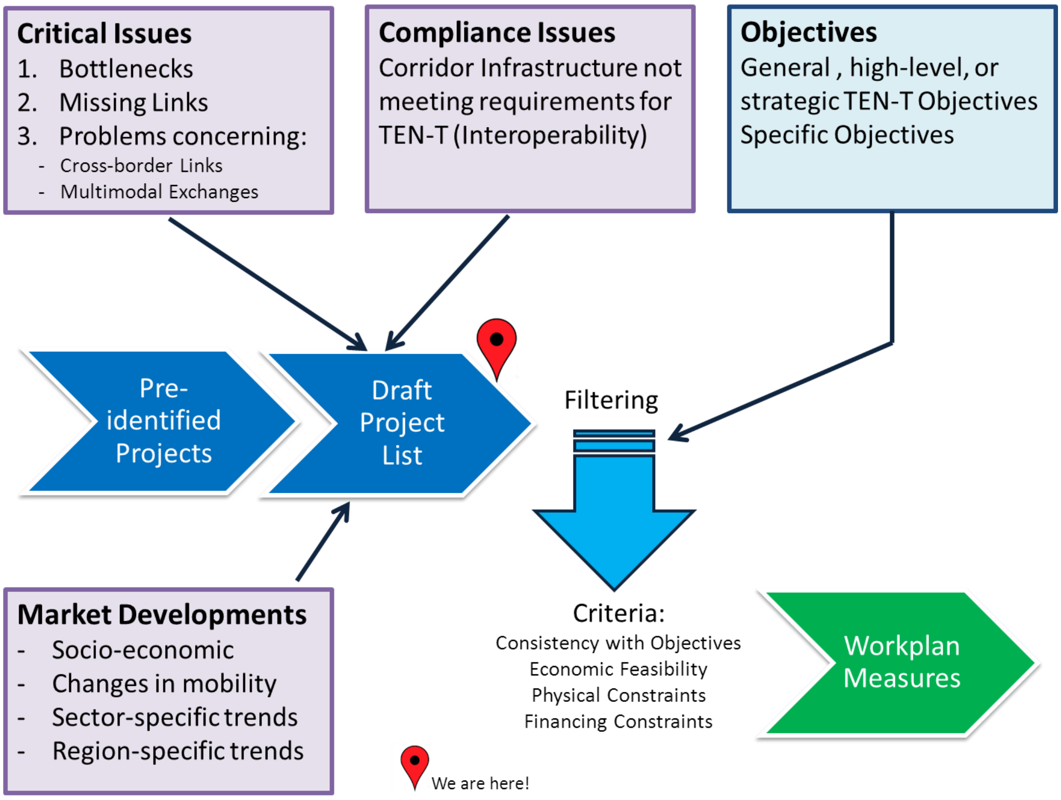
[34] Regulation 1316/2013, Annex 1.

The following icon is used to indicate the current stage of progress.

= We are here.

Details per country and per mode are listed in subsequent sections.

Figure 24: Process for Developing the Work Plan



4.4.2 Work Plan – Lists of Measures

The draft work plan is organized by country and by main mode.

The lists are separated into two sets for each country:

- Set 1: Projects with indicated timing and costs, and starting dates before 2020.
- Set 2: Projects with start dates expected after 2020, projects which are nearing completion, or projects with unknown timing and costs.

Based on the "Set 1" lists, the draft work plan consists of:

- 50 Belgian projects, amounting to €8 349m
- 94 French projects, amounting to €9 295m
- 10 Irish projects amounting to € 832m
- 6 Luxembourg projects amounting to €2 312m
- 30 Netherlands projects amounting to €10 348m
- 14 UK projects amounting to €5 070m

In total, there are, 204 "Set 1" projects, with combined budgets of €36 206 billion[35], across road, rail and water (including sea) networks.

Please note that the UK projects are subject to the agreement of UK Ministers following submission of the Work Plan in December 2014.

4.4.3 Overview - Belgium

Key strategic areas in Belgium relate to the need to handle increasing seaport volumes and to develop rail and waterway hinterland connections. Bottlenecks exist today, as do numerous technical interoperability issues. Belgian projects cover road, rail and water, including both sea and inland waterway transport. The road projects address issues of congestion, taking into consideration that urban growth and seaport growth are raising demands for limited capacity in the network. Rail projects address both capacity and interoperability, including ETCS deployment, and CEF pre-identified projects including Brussels Rail and EuroCap-Rail. Water projects include measures to increase ship-handling capacity (vessel size) and reliability at the main seaports, and a series of projects to help extend the CEMT IV network, increase bridge heights, and develop the Seine-Scheldt connections.

Table 16: Belgian Project Summary

			Number	Budget €m	Indicative Budget €m
Belgium	Set 1	Road	6	€1,397 m	
		Rail	9	€3,290 m	
		Water	35	€3,662 m	
		Total	50	€8,349 m	
	Set 2	Road	2		Unknown
		Rail	0		None Listed

[35] Some cross-border joint projects are counted in more than one project list.

		Water	4		>72.1
		Total	6		
Total			56	€8,349 m	

Set 1 Includes (inter alia)

- €935m: ETCS deployment on national core network – rail interoperability.
- €930m: Terneuzen Lock (joint BE and NL project)
- €788m: EuroCap-Rail – modernisation of Brussels-Luxembourg railway.
- €578m: Zeebrugge (A11) motorway link to port.
- €573m: N74 Bypass road between Hasselt and Eindhoven.
- €594m: Replacement of Visart Lock

Table 17: Belgian Projects by Type (Set 1)

	Road	Rail	Maritime and Waterway	Total
Project Type				
Studies	2	-	6	8
Works	4	9	20	33
Study & work	-	-	9	9
Total nr. of projects	*6*	*9*	*35*	*50*

Table 18: Belgian Project Characteristics (Set 1)

	Road	Rail	Maritime and Waterway	Total*
Characteristics*				
Bottleneck	5	6	26	37
Missing Link	1	1	4	6
Intermodality		8	28	36
Interoperability		3	8	11
Sustainability		2	5	7
Last mile connection		1	5	6
Cross-border	1	2	6	9

* one project can be assigned more than one characteristic

Taking a broader perspective, and comparing all the Set 1 projects to the specific corridor objectives, it can be seen (below) that measures to streamline the networks to improve long distance flows and access to ports figure strongly.

Table 19: Belgian Project and Work plan Objectives (Set 1)

Specific Objectives	Road	Rail	Water
Improve level of service for longer distance links.	5	8	21
Facilitate last mile access to seaports and airports.	5	4	10
Adopt or exceed TEN-T standards in corridor, subject to need.	1	3	17
Integrate cross-border initiatives e.g. RFC2.	-	3	16
Increase use of interoperable telematics technology.	-	1	3

Develop network of inland terminals – logistical hubs.	-	1	20
Develop greater range of combined transport services via rail and waterway.	-	3	13
Increase inland modal share for rail and IWT at seaports, and rail at airports.	-	6	16
Extend access to clean fuel at core nodes.	-	-	-

This shows that within Belgium, the work plan list is broad-based with measures mainly addressing bottlenecks and interoperability issues. Measures to improve waterway connections are also considered to help develop the network of terminals, but this may be a mix of direct and indirect effects.

Strengths are therefore:

- Good coverage across modes and geographically, within a dense and pivotal part of the core network.
- Port development measures present, helping to support trade and economic growth.
- Supporting measures to build up the scope of the waterway network in Flanders and Wallonia to open up Seine-Scheldt link, and to provide scope for developing inland logistical hotspots in the Meuse area.
- Key rail bottlenecks such as Brussels North-South and Euro Cap Rail are being addressed.

Possible gaps may be:

- Measures to promote use of clean fuels.
- Issues related to 24/7 use of 740m trains.
- Longer term electrification issues (different voltages).
- Strength of measures to help develop range of e.g. rail services inland.
- Short sea to UK

4.4.4 Overview - France

Key strategic areas in France include the need to further develop and connect the waterway network with the core ports and with the rest of Europe, to solve railway bottlenecks which are currently prohibiting growth, and to streamline cross-Channel connections to the UK. The French project list strongly emphasises waterway projects in the shorter term, with a combination of large "missing link" projects such as the Seine-Nord Europe Canal, and concerted action in smaller upgrade projects to solve various bottlenecks. However, there are large rail and water projects for the longer term. Cross-border flows by both rail and waterway are at a relatively low level, but the size of the flows overall indicate growth potential if mode shares similar to other corridors can be achieved. An important element here is the development of multimodal platforms both in the seaports and at inland nodes. For the cross-Channel border crossing, projects exist in Calais and Dunkerque to solve bottlenecks, including the Calais 2015 project.

Table 20: French Project Summary

			Number	Budget €m	Indicative Budget €m
France	Set 1	Road	2	€ 206 m	
		Rail	22	€1 591 m	
		Water	61	€7 222 m	
		Multimodal	9	€ 275 m	
			94	€ 9 295 m	
	Set 2	Road	2		> € 900 m
		Rail	16		> € 13 880 m
		Water	17		> € 18 210 m
		Multimodal	-		-
		Total	35		
Total			129		

Set 1 Includes:

- €4500m: Seine-Nord Europe Canal
- €800m: Calais 2015 Project (Seaport/road/rail)
- €580m: First package of upgrades at the Lyon node (rail)
- €233m: Oise upgrade between Creil and Compiègne (IWW)

Set 2 Includes:

- €5000m: Further treatment of Lyon node (low estimate is €2.5bn) (Rail)
- €3500m: Lyon (Rail) Bypass (CFAL)
- €1180m: Rhin-Rhône LGV (Rail) – Second phase of East Branch
- €17000m: Saône-Moselle/Saône-Rhine Canal (IWW) – Lower Estimate
- €2500m: Marseille Underground rail crossing (4 tracks)

Table 21: French Projects by Type (Set 1)

	Road	Rail	Maritime and IWW	Multi/Tri-modal	Total
Project Type					
Studies	-	2	4	1	7
Works	2	7	24	3	36
Study & work	-	13	33	5	51
Total nr. of projects	*2*	*22*	*61*	*9*	*94*

Below it can be seen that waterway projects are the most numerous, although this is related to the way that they have been enumerated. Smaller upgrade projects (e.g. bridges and locks) are mentioned individually, while the large Seine-Nord Europe canal project (missing link) is shown as a single project. In France there is a clear ambition to support network development with terminal (multimodal platform) development, in order to encourage modal shift by bringing freight facilities to the network. Tri-modal projects are shown separately since they do not fit perfectly under any specific mode.

Table 22: French Project Characteristics (Set 1)

	Road	Rail	Maritime and IWW	Multi/Tri-modal	Total*
Characteristics*					
Bottleneck	2	9	30		41
Missing Link	-	1	24		25
Intermodality	-	9	23	7	39
Interoperability	-	1		1	2
Sustainability	-	3	3		6
Last mile connection	-	3	4		7
Cross-border	-	2	5		7

Table 23: French Project and Work plan Objectives (Set 1)

	Road	Rail	Water	Multi
Improve level of service for longer distance links.	-	13	31	1
Facilitate last mile access to seaports and airports.	2	5	3	3
Adopt or exceed TEN-T standards in corridor, subject to need.	-	1	9	-
Integrate cross-border initiatives e.g. RFC2.	-	7	-	-
Increase use of interoperable telematics technology.	-	1	6	1
Develop network of inland terminals – logistical hubs.	-	-	13	6
Develop greater range of combined transport services via rail and waterway.	-	1	12	7
Increase inland modal share for rail and IWT at seaports, and rail at airports.	-	9	40	8
Extend access to clean fuel at core nodes.	-	-	1	-

The Set 1 list gives a broad coverage across objectives. It is also apparent how measures to use port development are supported by measures to increase inland modal shares for rail and waterway. Port market shares and non-road market shares in France can be considered as relative weaknesses today, compared to e.g. Netherlands/Germany.

Strengths are therefore:

- Focus upon waterway and rail, with heaviest shorter term investments indicated for North East, i.e. centrally within the corridor.
- Balance of investments in ports, networks and inland platforms.
- Seine-Scheldt canal project is present.
- Port development measures present, helping to support trade and economic growth.
- Short-sea (cross-Channel) measures are present, especially Calais and Dunkerque.
- Measures to improve access to and from Marseille/Fos are present.

Possible gaps may be:

- Measures to promote use of clean fuels.
- Certain key rail projects postponed e.g. Lyon bypass.
- Cross-border rail (FR-BE) prospects limited by CNC alignment.
- Lack of measures to address Channel Tunnel through rail.

4.4.5 Overview - Ireland

In Ireland, the key strategic areas are maintaining efficient trade and tourism connections with the rest of Europe (cohesion), solving road traffic congestion problems in the Dublin and Cork areas which inhibit longer distance transport, the need to improve journey times on the Cork-Dublin-Belfast rail route and solving last mile issues at seaports and airports. In the shorter term, road, rail and maritime or port related projects are included. This includes the DART Underground project (and other works on the Cork-Dublin-Belfast rail line) between Docklands and Inchicore, which will serve a number of key locations in the city centre with underground stations (still subject to high level approval by the Irish Government), and a series of associated works such as the Dublin city centre resignalling project and the Central Traffic Control Centre. The Phoenix Park Tunnel and upgrades of transport hubs (Cork Kent station and Pearse Station in Dublin). This programme of work wil extend and improve the urban rail network, significantly boosting public transport capacity in the Greater Dublin Area and addressing commuter rail bottlenecks on the corridor axis. The DART Underground project would also help to solve the current missing link on the Cork-Dublin-Belfast railway line, by facilitating interchange between lines in Dublin and hinterlands along the Cork-Dublin-Belfast rail line and therefore improving the link between the three main urban centres (core nodes) within the island of Ireland.

Table 24: Irish Project Summary

			Number	Budget €m	Indicative Budget €m
Ireland	Set 1	Road	3	€ 325 m	
		Rail	5	€ 207 m	
		Water	2	€ 300 m	
		Total	10	€ 832 m	
	Set 2	Road	2		> € 160 m
		Rail	7		> €4 000 m
		Water	3		> € 60 m
		Total	12		
Total			22	€ 4 832 m	

Set 1 Includes:

- €200m: Port Infrastructure Dublin
- €180m: N28 Cork to Ringaskiddy, Road Improvement Scheme
- €90 million Dunkettle Interchange upgrade, road improvement scheme
- €100m: Port (Master Plan) Infrastructure Cork
- €207m: various rail projects related to the Cork-Dublin-Belfast corridor

Set 2 Includes:

- €160m: M7 M50 Naas Motorway Upgrade (Road)
- €4000m: DART Underground project and other works on the Cork-Dublin-Belfast line (Rail), subject to Government approval

Table 25: Irish Projects by Type (Set 1)

	Road	Rail	Maritime	Total
Project Type				
Studies				
Works	3	5	2	10
Study & work				
Other				
Total nr. of projects	*3*	*5*	*2*	*10*

Table 26: Irish Project Characteristics (Set 1)

	Road	Rail	Maritime	Total *
Characteristics*				
Bottleneck	3	4	2	9
Missing Link		1		1
Intermodality		1		1
Interoperability		2		2
Sustainability		4		4
Last mile connection	1			1
Cross-border			2	2

Shorter term plans in Set 1 address seaport-related bottlenecks, and a number of road and rail projects. Additionally, but subject to Irish Government approval, is the €4bn DART underground project. This project addresses the shortage of public transport capacity in Dublin, and streamlines rail connections across the city, thereby bridging the gap between the Dublin-Cork and Dublin-Belfast lines. The upgrading of Cork Kent station would encourage the development of more sustainable transport and contribute towards a modal shift in favour of public transport.

In addition, traffic forecasts for Dublin Airport indicate that operational capacity constraints will emerge and need to be addressed. The Irish National Aviation Policy (to be finalised in December 2014) has prioritised increased capacity at Dublin Airport as a measure to address bottlenecks and ensure future connectivity, in the context of the strategic importance of the airport to Ireland as an island nation with a peripheral location. This will involve significant infrastructure investment, including for optimising existing infrastructure by way of additional stands and runway line-up points, as well as potential construction of a second runway.

Table 27: Irish Project and Work plan Objectives (Set 1 and Set 2)

	Road	Rail	Sea
Improve level of service for longer distance links.	3	4	2
Facilitate last mile access to seaports and airports.	1		
Adopt or exceed TEN-T standards in corridor, subject to need.	2		
Integrate cross-border initiatives e.g. RFC2.			
Increase use of interoperable telematics technology.			
Develop network of inland terminals – logistical hubs.			
Develop greater range of combined transport services via rail and waterway.			
Increase inland modal share for rail and IWT at seaports, and rail at airports.		2	
Extend access to clean fuel at core nodes.			

Due to its peripheral location in Europe, Ireland's objectives in relation to cohesion and accessibility are emphasised. Many technical interoperability issues related to rail do not apply because Ireland has an "isolated network" under the TEN-T legislation and there are no inland waterways on the TEN-T.

Strengths:

- Plan focuses on sea, road, and urban and inter-region transport.
- Addresses major bottlenecks on the road network on the corridor.
- Addresses peripherality, cohesion and accessibility from an infrastructure perspective with a particular focus on the two ports and the potential to further develop Motorways of the Sea direct to the continent.
- Facilitates economic development which is heavily dependent on sea-based trade.

Possible Gaps:

- Issue of clean fuels not addressed as yet, although the Irish Sea is outside the existing Sulphur Emission Control Area and the ports are monitoring how best to address the issue in the future.
- Connectivity with fixed rail links between Dublin Airport and the city centre not as yet resolved with a relevant infrastructure project, but the Irish Government is actively considering the feasibility of such a link.
- Need to provide enhanced provision for secure parking for HGVs

4.4.6 Overview - Luxembourg

Key strategic areas for Luxembourg relate to the long distance road and rail connections that link the northern and southern branches of the continental networks, and the possibilities therefore for developing intermodal terminals. The project lists focus upon rail projects, characterised as solving bottlenecks, improving interoperability across borders, and developing road/rail intermodality. One important CEF cross-border project with Belgium and France is the EuroCap-Rail project.

Table 28: Luxembourg Project Summary

			Number	Budget €m	Indicative Budget €m
Luxembourg	Set 1	Road	-	-	
		Rail	6	€ 2 312 m	
		Water	-	-	
		Total	6	€ 2 312 m	
	Set 2	Road	3		Not known
		Rail	-		
		Water	-		
		Total	3		
Total			9	€ 2 312 m	

Set 1 Includes:

- €554m: Luxembourg Railway Station
- €507m: Bettembourg Railway Station
- €602m: EuroCap-Rail

Set 2 budgets are not estimated.

Table 29: Luxembourg Projects by Type (Set 1)

	Road	Rail	Water	Total
Project Type				
Studies		1		1
Works		5		5
Study & work		-		
Total nr. of projects		*6*		*6*

Table 30: Luxembourg Project Characteristics (Set 1)

	Road	Rail	Water	Total
Characteristics*				
Bottleneck		2		2
Missing Link		-		
Intermodality		2		2
Interoperability		2		2
Sustainability		-		
Last mile connection		-		
Cross-border		6		6

In the TEN-T context, Luxembourg is a key node because most investments have important cross-border significance, and therefore a high degree of European value added. The first set of projects listed are all rail projects, addressing bottlenecks, interoperability and intermodality. However, certain road projects are listed in Set 2.

Table 31: Luxembourg Project and Work plan Objectives (Set 1)

	Road	Rail	Water
Improve level of service for longer distance links.	-	6	-
Facilitate last mile access to seaports and airports.	-	-	-
Adopt or exceed TEN-T standards in corridor, subject to need.	-	1	-
Integrate cross-border initiatives e.g. RFC2.	-	3	-
Increase use of interoperable telematics technology.	-	-	-
Develop network of inland terminals – logistical hubs.	-	1	-
Develop greater range of combined transport services via rail and waterway.	-	-	-
Increase inland modal share for rail and IWT at seaports, and rail at airports.	-	1	-
Extend access to clean fuel at core nodes.	-	-	-

Strengths:

- The measures being proposed help to streamline the flows of international trains through the network from Belgium to France.
- All projects have cross-border impacts.

Possible Gaps:

- Waterway issues not addressed.
- Airport rail/rapid transit connection not addressed.
- Issue of parking for HGVs transiting country not addressed.

4.4.7 Overview - Netherlands

In the Netherlands, the key strategic area is the management of port-related traffic growth, and how this interacts with national traffic, especially near the two major commercial centres of Rotterdam and Amsterdam. In general, technical interoperability with European standards is near-complete, so the project list is geared towards solving bottlenecks arising from traffic volume and extending the reach of the waterway network in the cross-border Maas/Meuse area. Important projects to add (currently missing) links to solve bottlenecks the road network are also included. Both Amsterdam and Terneuzen have lock projects, reacting to the need to solve bottlenecks associated with maritime access to the port areas and inland waterway networks.

Table 32: Netherlands Project Summary

			Number	Budget €m	Indicative Budget €m
Netherlands	Set 1	Road	9	€ 5 456 m	
		Rail	7	€ 2 099 m	
		Water	13	€ 2 718 m	
		Multi	1	€ 75 m	
		Total	30	€ 10 264 m	
	Set 2	Road	8		> € 5 933 m
		Rail	1		> € 431 m
		Water	13		> € 1 814 m
		Multi	2		> € 1.4 m
		Total	24		
Total			54	€ 10 264 m	

Set 1 Includes:
- €1120m: A12 Capacity Increase (Utrecht Road)
- €1154m: Blankenburg Tunnel (Rotterdam Road)
- €964m: A13/A16 Rotterdam Bypass (Rotterdam Road)
- €992m: Amsterdam Road Bottlenecks
- €994m: Amsterdam South Station (Rail)
- €930m: Terneuzen Lock (joint BE and NL project)
- €879m: Amsterdam Lock
- €233m: Prinses Beatrix Lock (and Lek Canal upgrade)

Set 2 Includes:
- €2196m: Coentunnel (Amsterdam, Road) – ending 2014.
- €2031m: Maasvlakte Vaanplein (including Botlek bridge), A15 Motorway upgrade, ending 2015.

Table 33: Netherlands Projects by Type (Set 1)

	Road	Rail	Maritime and IWW	Multi/Tri Modal	Total
Project Type					
Studies	4	1	3	-	8
Works	5	4	9	1	19
Study & work	-	2	1	-	3
Total nr. of projects	*9*	*7*	*13*	*1*	*30*

Table 34: Netherlands Project Characteristics (Set 1)

	Road	Rail	Maritime and IWW	Multi/ Tri Modal	Total*
Characteristics*					
Bottleneck	9	3	9	1	22
Missing Link	2	2			4
Intermodality			5		5
Interoperability		2			2
Sustainability			1		1
Last mile connection		2	1		3
Cross-border		4	5	1	10

The (Set 1) list contains mainly road and water (both sea and inland) measures. Most are addressing bottlenecks, although there are important missing links for the road network.

Table 35: Netherlands Project and Work plan Objectives (Set 1)

	Road	Rail	Water	Multi
Improve level of service for longer distance links.	4	1	8	
Facilitate last mile access to seaports and airports.	3	5	4	
Adopt or exceed TEN-T standards in corridor, subject to need.			3	
Integrate cross-border initiatives e.g. RFC2.		2	1	
Increase use of interoperable telematics technology.		2		
Develop network of inland terminals – logistical hubs.			3	1
Develop greater range of combined transport services via rail and waterway.		1	7	1
Increase inland modal share for rail and IWT at seaports, and rail at airports.		5	4	
Extend access to clean fuel at core nodes.				

Netherlands' objectives in relation to TEN-T deal mainly with efficiency, and making good use of existing infrastructure to handle inland flows from seaports. Water modes are prominent.

Strengths:

- Objectives geared towards solving current bottlenecks.
- Addresses issue of congestion where international gateway ports and urban centres are in close proximity.
- Addresses question of maritime access to seaports.
- Includes ICT elements.
- Most interoperability issues are met.

Possible Gaps:

- Lack of measures related to cross-border rail (NL/BE)
- Number/scale of inland terminal projects.
- Issue of rail electrification (voltage)
- Short sea to UK

4.4.8 Overview - UK

In the UK, the main strategic issues relate to network capacity in the South East, and accessibility from the North and West. The project list focuses on road and rail, since British waterways are not included in TEN-T, and the major issues related to ports are hinterland capacity, and the use of rail as an inland mode.

Table 36: UK Project Summary

			Number	Budget €m	Indicative Budget €m
UK	Set 1	Road	7	€1 589 m	
		Rail	6	€3 371 m	
		Water	0		
		Multi	1	€ 110 m	
		Total	14	€5 070 m	
	Set 2	Road			
		Rail			
		Water			
		Multi			
		Total	0		
Total			14	€5 070 m	

Set 1 Includes:

- €1580m: Northern Rail Hub.
- € 850m: Felixstowe-Nuneaton rail upgrades.
- € 631m: Central Scotland M8, M73, M74 motorway improvements.
- € 346m: Edinburgh-Glasgow electrification of railway.
- € 276m: Power supply upgrade on WCML, North Wembley to Great Strickland.
- € 265m: Stafford rail capacity increase.
- € 265m: Newry, A1 southern relief road.

Table 37: UK Projects by Type (Set 1)

	Road	Rail	Maritime and IWW	Multi/Tri Modal	Total
Project Type					
Studies					
Works	7	6	0	1	14
Study & work					
Total nr. of projects	*7*	*6*	*0*	*1*	*14*

Table 38: UK Project Characteristics (Set 1)

	Road	Rail	Maritime and IWW	Multi/ Tri Modal	Total*
Characteristics*					
Bottleneck	7	5		1	13
Missing Link					0
Intermodality				1	1
Interoperability		5			5
Sustainability		4			4
Last mile connection	2				2
Cross-border	1			1	2

Table 39: UK Project and Work plan Objectives (Set 1)

	Road	Rail	Water	Multi
Improve level of service for longer distance links.	7	4		1
Facilitate last mile access to seaports and airports.	1			
Adopt or exceed TEN-T standards in corridor, subject to need.		4		
Integrate cross-border initiatives e.g. RFC2.				
Increase use of interoperable telematics technology.	2			
Develop network of inland terminals – logistical hubs.				
Develop greater range of combined transport services via rail and waterway.				
Increase inland modal share for rail and IWT at seaports, and rail at airports.	1	2		
Extend access to clean fuel at core nodes.				

Rail interoperability, and achieving compliance with TEN-T standards requires heavy investment in the UK. A large part of the network is not electrified, and several different electrification systems are in operation. ERTMS is being rolled out, but around half of the corridor network in the UK will not be equipped by 2030. There are further restrictions on train length and train height (loading gauge) which affect the competitiveness of intermodal services. In Northern Ireland there is a need to improve accessibility, by land towards Dublin, and by short-sea to the rest of the UK, and the Continent.

Strengths of the UK project list include:

- Objectives geared towards solving current bottlenecks, for road and rail.
- Addresses a number of rail interoperability issues.
- Addresses rail access to the ports of Southampton and Felixstowe.
- Includes actions to remove bottlenecks between Belfast and the Irish border.
- Includes ICT elements, related to improving motorway capacity.

Possible Gaps:

- Lack of measures related to cross-border rail freight (UK/FR)
- Rail electrification, and use of 25kV overhead power supply as standard.
- Lack of measures related to short sea.

4.5 Seine-Scheldt Project

To prepare the framework for the 2014-2020 Connecting Europe Facility, a first draft of the European connection project was the subject of a joint statement, the Tallinn Declaration from the European Commission, Wallonia, Flanders, the Netherlands and France on October 17th 2013 during the TEN-T days in Tallinn. The declaration commits the parties to take the appropriate measures to develop the inland waterway sections of the North Sea-Mediterranean Core network corridor by 2030 through the Trans-European Transport Network and to strengthening co-operation in the development of inland waterway transport and related multimodal transport, and maximising the co-financing possibilities up to 40%, for listed sections of the waterway network shared by the three signatory countries.

At the waterway level, it specifies a network composed of:

- The River Maas (Meuse in French),
- The Albert canal,
- The Ghent-Terneuzen canal,
- The Bocholt-Herentals canal
- Locks located on the Seine and Schelde (Escaut in French) as well as the Haut-Escaut,
- The Terneuzen lock,
- The Seine-Nord Europe canal,
- Connections including the Roeselare-Lys and Bossuit-Kortrijk canals,
- The Dunkerque-Valenciennes and Lille-Douai axis,
- The Seine from Le Havre to Nogent-sur-Seine,
- The Antwerpen-Bruxelles-Charleroi canal,
- The waterways in Wallonia,
- Connection points to other transport modes including multimodal platforms and waterway links to maritime ports at Dunkerque, Ghent, Antwerpen and Zeebrugge and waterway projects contributing to a better accessibility to maritime ports including Le Havre and Amsterdam.

Thus, the prioritisation, and the need to strengthen co-operation applies to a large part of the waterway network connecting Paris, Lille, Flanders, Wallonia, and the Netherlands. Within this overall frame, the Seine-Escaut/Scheldt project is the largest individual component, and the one needed to bridge the gap in the network between the Seine/Oise valley and the Escaut.

Seine-Escaut/Scheldt and Seine–Nord Europe canal project

One of the recurring themes within the implementation list is work surrounding the Seine-Escaut[36] connection. The European Seine-Escaut project requires the construction of a new wide gauge inland waterway link between France, Belgium and the Netherlands to improve connections between maritime ports and inland ports in the north of France, Benelux and Europe. This project is located on two multimodal European corridors: the Atlantic corridor (Seine downstream from the Oise-Seine confluence) and the North Sea–Mediterranean corridor and is therefore identified in both corridors.

The Seine-Escaut link was originally registered in April 2004 among the 30 European Priority Projects and hence benefited from the financing decision in the TEN-T 2007-2013 programme for, amongst others, the Seine- Nord Europe canal and its Declaration of Public Utility in September 2008.

The overall project is being developed under the framework of the Intergovernmental Seine-Escaut Commission between France, Flanders and Wallonia put in place in September 2009 with the operational support of the EEIG Seine-Escaut bringing together IWW infrastructure managers: Voies Navigables de France (VNF), Waterwegen & Zeekanaal (W&Z) and the Service Public de Wallonie (SPW).

The main issue identified on the North Sea – Mediterranean corridor is the CEMT II connection (Canal du Nord) between the Seine and Oise basin (CEMT Vb) and the Nord-Pas-de-Calais (CEMT Va+) and Benelux (CEMT Vb) network. The overall project aims at completing the missing link with the Seine – Nord Europe canal and improving performance of the existing networks to the North and to the South.

The objectives of the Seine-Escaut waterway connection are to:

- Enhance the reliability of services offered and increase the value of the existing network to foster modal shift.
- Increase the network gauge to develop the maritime ports' hinterland by strengthening or creating multimodal platforms and container terminals at a regional, national and European level.
- Favour ecological and economic transition by reducing transport energy consumption.
- Increase industrial performance with more efficient logistics, more closely integrated to the needs of industries (agriculture, agro-industrial, building construction, chemicals, automotive…) with the implementation of recycling logistics (recycling materials, steel, glass, paper, cars etc.)
- Stimulate innovation in port logistics with the emergence of waterway/rail combined transport services,
- Favour investment of French, Belgian, European and international companies located along waterways in a new industrial corridor between the Greater Paris Area, the North of France, Benelux and Europe.
- Contribute to maritime ports' development strategies for high-volume modes of transport on the North Sea–Mediterranean corridor.
- Contribute to a reduction in road congestion in particular in North-West France (Paris, Lille) and Belgium (Brussels, Antwerp).
- Contribute to the deployment of urban logistics based on inland waterways in large urban areas along the corridor.

[36] Escaut (in French), Schelde (in Dutch), Scheldt (in English)

Figure 25: Seine-Escaut Project (French part)

Overall perimeter of the Seine-Escaut project in France
In France, the overall project for of the Seine-Escaut European link covers the following axis and network:

A. The Downstream Seine from the port of Le Havre to Suresnes with the connection to Conflans-Sainte-Honorine in the North (CEMT Vb),
B. The Upstream Seine from Bonneuil-sur-Marne to Nogent-sur-Seine (CEMT IV),
C. The Oise from Conflans-Sainte-Honorine to Compiègne (CEMT Vb),
D. The Canal Seine–Nord Europe missing link from Compiègne to Aubencheul-au-Bac,
E. The Nord-Pas-de-Calais network (CEMT Va+) composed of the Dunkerque-Valenciennes canal up to the Schelde (Escaut) and the Dorsale Wallone as well as the river Deûle and Lys to Ghent and Terneuzen.

The Seine-Nord Europe canal
The current link between the Oise valley and the Dunkerque-Valenciennes canal is the Canal du Nord, designed in the 19th century and opened in 1965. Vessels on this CEMT II link are limited to 700 tonnes whereas in the South lock on the CEMT Vb Oise can accept vessels carrying up to 4400 tonnes. The maximum dimensions of vessels on the Canal du Nord are 91m by 5.7m. The very high number of locks impact travel time and the canal includes little industrial equipment and no logistical equipment apart from silos dedicated to agriculture (in particular at Languevoisin). The Seine-Nord Europe canal aims at removing this bottleneck by improving movements of goods on inland waterways between France and its neighbouring countries and to create or

develop multimodal platforms and container terminals at a regional, national and European level in a gradual and long term perspective.

Works planned include the construction of a CEMT Vb canal between Compiègne and Aubencheul-au-bac, water storage facilities to supply the canal, quays for the future multimodal platforms and quays for grain silos and stopover points for leisure navigation. Following its redesign in 2013, the project now includes:

- 7 canal pounds[37] connected by 6 locks equipped to store water,
- 1 water storage basin to supply water during low flow periods,
- 3 navigable aqueducts, one of which is a 1300m long bridge over the Somme,
- 4 slots reserved to multimodal platforms as well as transhipment quays for intermodality (inland waterway to road or rail).

Figure 26: Infrastructure Planned for the Seine Nord Europe Project

Overall perimeter of the Seine-Escaut project in Wallonia

By 2025, Wallonia has two major objectives in the context of the European project Seine-Scheldt, covering both the Scheldt basin and the Meuse basin. First, to enhance and harmonise the capacity of the Walloon Dorsale link between the Scheldt and the Meuse to CEMT Class Va. This objective creates a continuous link, Seine-Scheldt Meuse-Rhine-Main-Danube and is therefore of major interest at European level. Secondly, to achieve CEMT class Vb on the cross-border Lys and Upper Scheldt, thus removing the bottlenecks for these axes of the network connecting the North of France to the ports of Ghent, Zeebrugge, Antwerp and the Netherlands.

In Wallonia the inland waterway network consists of 459.7 km of waterways accessible to freight navigation, of which 365.1 km are at European gauge (CEMT IV and above). By 2025, the Dorsale Wallone, which provides the link between the Scheldt upstream from Tournai and the Maas, should reach at least CEMT Va throughout. This upgrade

[37] Stretch of water impounded between two canal locks.

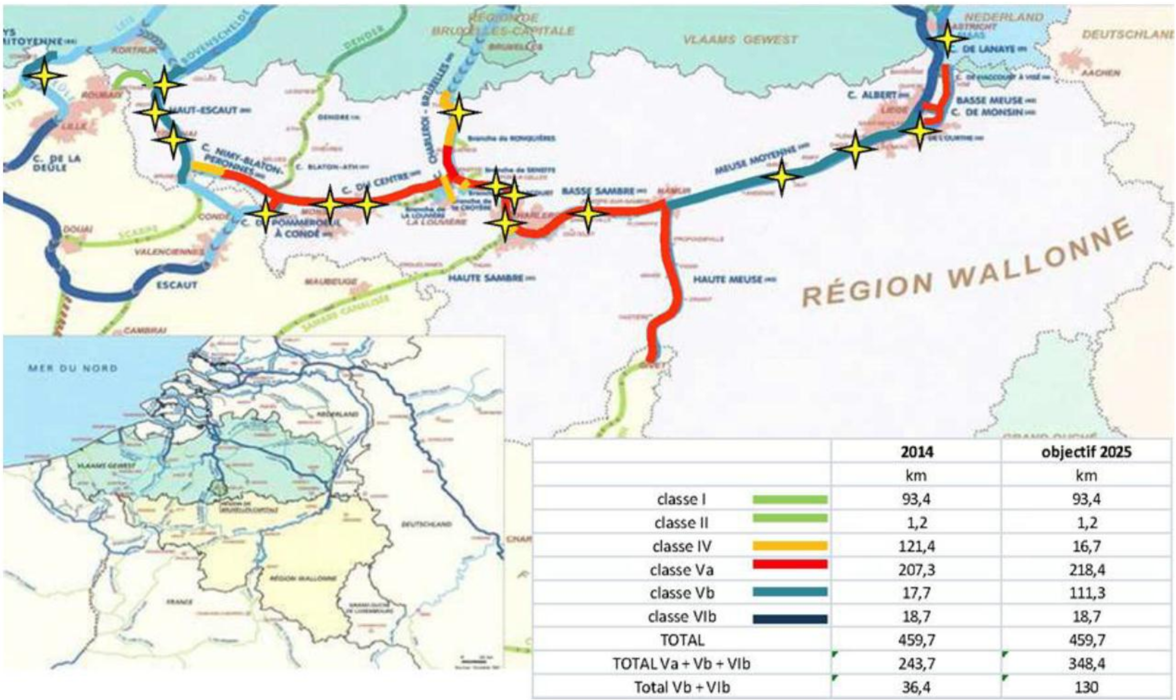
will connect the Seine-Escaut link to the Maas-Rhine-Main-Danube network and is therefore of wider European interest. With the opening of the Seine–Nord Europe canal, the Dorsale Wallone will link the Seine basin and the North of France to the entire waterway network in Northern and Eastern Europe.

The following work will be planned in the 2014-2020 programme:

- Work to upgrade the border part of the Lys at Comines to Vb,
- Completion of construction work of the new dam at Kain and construction of the new dam at Hérinnes,
- Upgrade of the navigable channel at the Tournai crossing,
- Re-opening of the cross-border Condé-Pommeroeul canal,
- Widening of the navigation rectangle and development of crossing and turning areas on certain parts of the Nimy-Blaton-Péronnes canal and on the Sambre,
- Studies on the construction of new CEMT Va locks on the Dorsale Wallone (Obourg, Marchienne, Gosselies and Viesville),
- Deepening of the Auvelais lock,
- Studies on the construction of CEMT Vb locks at Kain and Hérinnes,
- Work required to optimise navigation on the Scheldt as well as on the Dorsale Wallone: bridge heights, quays, deepening, crossing and turning areas, complementary equipment.

The investment plan, necessary for the completion of the North Sea – Mediterranean corridor in 2030, will be continued in the period, 2021-2027, with the construction of new CEMT Vb locks at Kain and Hérinnes, upgrades on the Schelde to allow Vb vessels and work to prepare the upgrade of the Ronquières inclined plane[38] to CEMT Va.

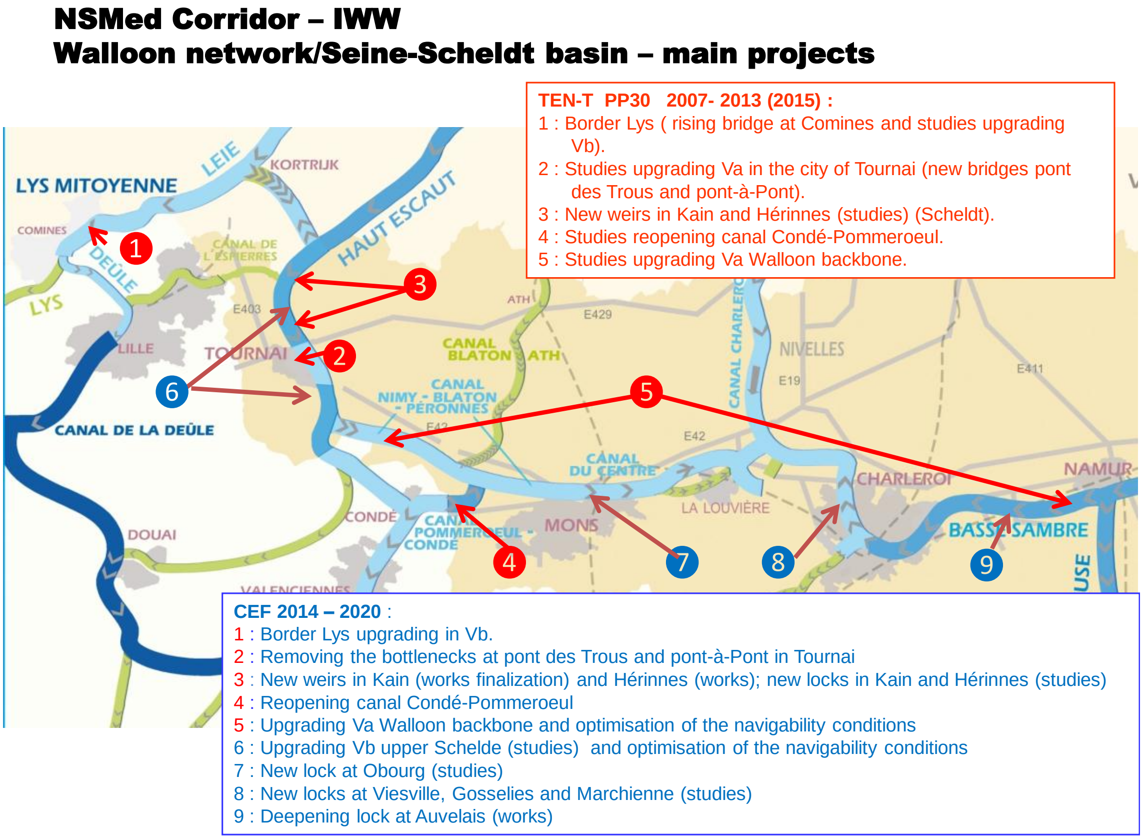
Figure 27: Seine-Escaut Upgrades in Wallonia



	2014	objectif 2025
	km	km
classe I	93,4	93,4
classe II	1,2	1,2
classe IV	121,4	16,7
classe Va	207,3	218,4
classe Vb	17,7	111,3
classe VIb	18,7	18,7
TOTAL	459,7	459,7
TOTAL Va + Vb + VIb	243,7	348,4
Total Vb + VIb	36,4	130

[38] A mechanical lift for raising vessels across different water levels.

Figure 28: Main Seine-Scheldt projects in Walloon Region



Overall perimeter of the Seine-Escaut project in Flanders

Flanders has 1'056 km of navigable waterways. These inland waterways are connected to the European waterway network, to the North Sea and to the most important European motorways. The Flemish waterway network's internal connection, and the extent to which this is integrated in the European waterway network (TEN-T waterways), is crucial in optimising its transport potential.

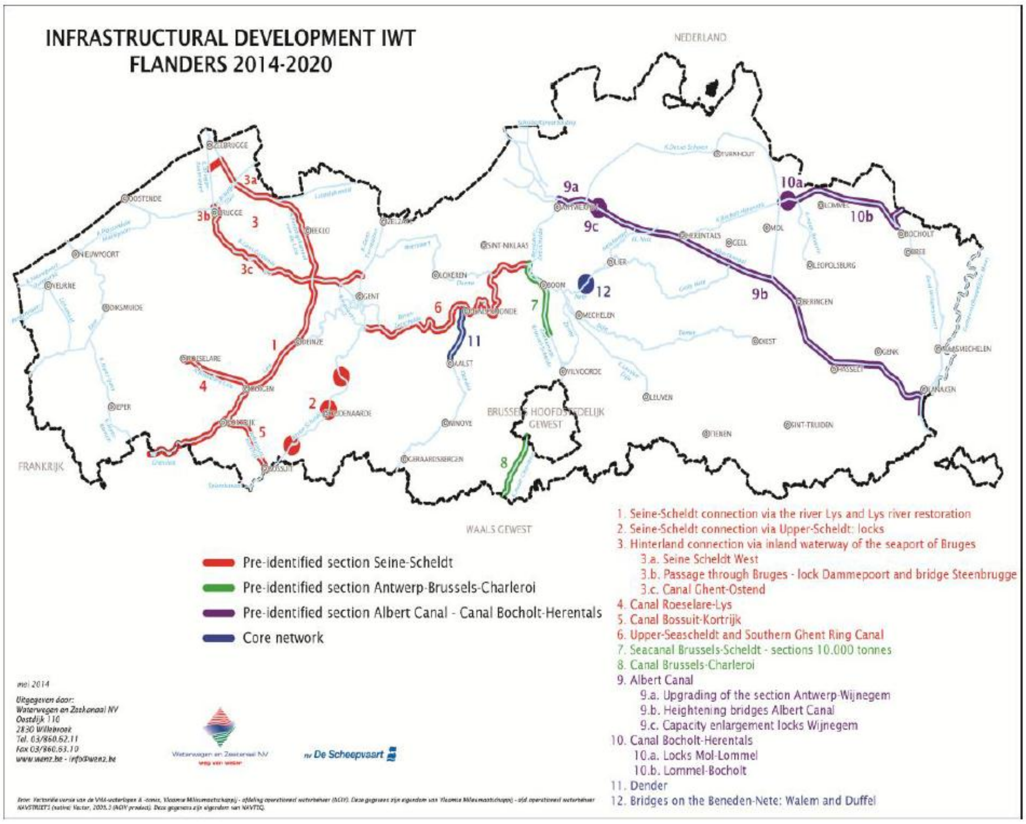
In order to fully develop this potential and to strengthen this central part of the corridor waterway network, the main objectives of the Flemish part of the Seine-Scheldt project are:

- The upgrading, over a length of 71 km, of the waterway connection between the French border and the Canal from Ghent to Terneuzen (via the Border Lys, the Lys itself, the Lys Diversion Canal, the Canal Ghent-Bruges and the Northern Section of the Ring Canal round Ghent) into a waterway of class Vb (one-way traffic between the French border and the Evergem lock), including three layer container traffic. This is the original European priority project PP30;
- The increase of the navigation capacity of the Upper Scheldt by replacing the old class IV locks and weirs with new complex class Vb ;
- The upgrading of the hinterland connection of the Flemish maritime ports through the Canal Ghent-Ostend (including the removal of the bottleneck in Bruges) to a waterway of class Va, including three layer container traffic;
- The upgrading of the canals Roeselare-Lys(Leie) and Bossuyt-Courtrai (Bossuit-Kortrijk) to class Va (removal of the bottleneck in Courtrai/Kortrijk);

- The improvement of navigation conditions for class Va ships on the Southern Section of the Ring Canal round Ghent and on the Upper Seascheldt, including three layer container traffic.

All the above waterways are situated on the NSMED CNC and are part of the pre-identified Seine-Scheldt sections.

Figure 29: Seine-Scheldt development in Flanders



4.5.1 Ghent-Terneuzen Canal

The Seine-Scheldt connection allows inland waterway vessels to travel from Paris to the Flemish ports, with access to the sea via Ghent (BE) and the lock complex at Terneuzen (NL). From this point, there are high capacity routes connecting to the Maas, Waal and Rhine River routes through the Netherlands to Germany. The CEMT VIb canal between Ghent and Terneuzen is a major shipping connection for both maritime and inland navigation. The canal is 32km long, of which 15,4 km is located on Flemish (Belgian) territory and 16,6 km on Dutch territory.

The canal is accessible through a lock complex situated in Terneuzen on Dutch territory, consisting of three locks: one lock large enough for maritime navigation and two inland navigation locks. The maritime lock is limited to lightened Panamax vessels with a maximum length of 265m. In 2011, 70 000 vessels passed through the locks in Terneuzen, the majority being inland vessels. Due to the increase of inland navigation traffic at the lock complex, the maritime lock is also used for inland vessels. Currently more than 60% of all vessels using the maritime lock are in fact inland vessels. By replacing one of the smaller locks with a new lock, the existing lock can be used for inland navigation, thereby increasing capacity for both types of vessel.

In particular for inland vessels, improved capacity at the lock compound in Terneuzen will be increasingly important, as the canal is part of the Seine - Scheldt corridor which is to connect the French inland waterway network with the Belgian, Dutch and German inland waterway networks. Capacity problems for inland navigation, due to the expected increase of traffic in the area as a result of the opening of the Seine-Nord canal in France in 2023, are expected if no action is undertaken now.

For maritime vessels, the dimensions of the lock compound in Terneuzen is the main bottleneck. The dimensions of the current maritime lock limit the size of the vessels that can enter the canal to lightened Panamax vessels with a maximum length of 265m. Apart from that, also availability, reliability and age (and thus also maintenance) of the existing lock compound have become bottlenecks for maritime traffic on the canal towards the port of Ghent.

The Netherlands and Flanders, under the Flemish-Dutch Scheldt Commission, are cooperating on the construction of the new lock in Terneuzen. It is expected that the construction of the new maritime lock in Terneuzen will also reduce the transportation cost for freight passing through the lock compound because of a decrease in waiting times and increase in scale. It will offer environmental benefits e.g. concerning reduction of emissions.

The project is ready for execution in 2015. Tendering of the construction works can only take place in a next phase, after a joint agreement between the Flemish and Dutch governments and the consequent decision by the Dutch minister of Infrastructure and the Environment. Flanders and The Netherlands will start formal negotiations on a Treaty concerning the construction of the lock. These negotiations should be concluded latest 2015.

4.6 Project List

Belgium – Set 1 – Projects Starting before 2020.

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
BE1	RAIL	Antwerp	Works	Capacity increase of the access to the port of Antwerp	INFRABEL	2014-2025	224.4	State funding, EU funding	Bottleneck Intermodality Last Mile	CEF Pre-identified
BE2	RAIL	Belgian railways	Works	ETCS deployment on Core Network (Budget is for entire core network in BE, infrastructure only)	INFRABEL	2014-2022	935.5	State funding, EU funding	Interoperability	CEF Pre-identified
BE3	RAIL	Belgian railways	Works	Removal of level crossings (Entire Belgian network)	INFRABEL	2014-2025	329.4	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified
BE4	RAIL	Brussels	Works	Diabolo project – rail connection of Brussels airport with the international railway axes Frankfurt – Liège – Brussels – Paris and Amsterdam – Antwerp – Brussels – Paris	INFRABEL	2014-2018	64.0	State funding, EU funding	Missing Link Intermodality	
BE5	RAIL	Brussels - Antwerp	Works	Upgrade of the Brussels - Antwerp axis	INFRABEL	2014-2024	144.4	State funding, EU funding	Bottleneck Intermodality	
BE6	RAIL	Brussels - LUX border	Works	EuroCap-Rail: modernisation of the Brussels-Luxembourg axis	INFRABEL	2014-…	788.7	State funding, EU funding	Bottleneck Intermodality Interoperability Sustainability Cross Border	CEF Pre-identified
BE7	RAIL	Brussels railways	Works	Capacity increase of the North-South Junction in Brussels	INFRABEL	2014-2025	288.9	State funding, EU funding	Bottleneck Intermodality Sustainability	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
BE8	RAIL	Ghent-Zeebrugge	Works	Capacity increase of Ghent-Zeebrugge railway line	INFRABEL	2014-2025	463.0	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified
BE9	RAIL	Leuven - Ottignies - LUX border	Works	Upgrade of Rail Freight Corridor 2 : Leuven - LUX border	INFRABEL	2014-…	52.1	State funding, EU funding	Intermodality Interoperability Cross Border	CEF Pre-identified
BE10	ROAD	Brussels Ring Road	Study	Upgrade of Ring of Brussels - Severe Congestion issues leading to loss of reliability and decreases in productivity.	Agentschap Wegen en Verkeer	2012-2017	10.0	State funding, EU funding	Bottleneck	
BE11	ROAD	Brussels Ring Road	Works	Upgrade of Ring of Brussels - Severe Congestion issues leading to loss of reliability and decreases in productivity.	Agentschap Wegen en Verkeer	2018-2021	172.6	State funding, EU funding	Bottleneck	
BE12	ROAD	Ghent	Study	Upgrade of the Ring-west of Ghent (west R4)	Agentschap Wegen en Verkeer	2015-2018	3.0	State funding, EU funding	Bottleneck	
BE13	ROAD	Ghent	Works	Upgrade of the Ring-west of Ghent (west R4)	Agentschap Wegen en Verkeer	2018-2022	60.0	State funding, EU funding	Bottleneck	
BE14	ROAD	Road Eindhoven-Hasselt, near Houthalen-Helchteren	Works	New 10km deviation road around the city centres on the existing N74, resulting in a better and faster connection for the transit traffic between Eindhoven and Hasselt to the E314 (core network)	Agentschap Wegen en Verkeer	2017-2020	573.0	State funding, EU funding (PPP)	Bottleneck Cross Border	
BE15	ROAD	Zeebrugge	Works	New 12km long A11 motorway link between Brugge and Westkapelle to connect the port of Zeebrugge and the European motorway network	Agentschap Wegen en Verkeer	2014-2017	578.0	Project bonds, pilot phase	Missing Link	CEF Pre-Identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
BE16	WATER	Belgian River Lys (part of Seine-Scheldt project) - interoperability, - cross border	Works	Enlargement of the Channel, augmentation of the bridges and enlargements of the locks of Sint-Baafs-Vijve and Harelbeke in order to have CEMT Vb	Waterwegen en zeekanaal	2015-2020	273.0	State funding, EU funding	Bottleneck Interoperability Cross Border	CEF Pre-identified
BE17	WATER	Belgian River Lys (part of Seine-Scheldt project) - sustainability	Works	River restauration: various interventions in environmental quality and scenic beauty of the river as well as of the valley area	Waterwegen en zeekanaal	2016-2020	28.0	State funding, EU funding	Sustainability	CEF Pre-identified
BE18	WATER	Canal Albert	Works	Lifting of bridges over the Canal Albert	De Scheepvaart	2009-2020	234.0	State funding, EU funding partially by PPP	Bottleneck Intermodality Interoperability	CEF Pre-identified
BE19	WATER	Canal Bocholt-Herentals	Works	Upgrade of the section Bocholt-Dessel (from CEMT class II to CEMT class IV)	De Scheepvaart	2016-2020	80.0	State funding, EU funding (possibly by PPP)	Bottleneck Intermodality Interoperability	CEF Pre-identified
BE20	WATER	Canal Bossuit-Kortrijk (part of Seine-Scheldt project)	Works	new lock (Va) in connection with Lys + adaptation canal depth	Waterwegen en zeekanaal	from 2018 on	69.9	State funding, EU funding	Bottleneck Missing Link Intermodality	CEF Pre-identified
BE21	WATER	Canal Bossuit-Kortrijk (part of Seine-Scheldt project)	Study	Study modernisation canal	Waterwegen en zeekanaal	2016-2019	7.3	State funding, EU funding	Bottleneck Missing Link Intermodality	CEF Pre-identified
BE22	WATER	Canal Brussels-Charleroi	Works	Modernisation of Brussels-Charleroi Canal	Waterwegen en zeekanaal	from 2016 on	29.5	State funding, EU funding	Bottleneck Intermodality Sustainability	CEF Pre-identified
BE23	WATER	Canal Brussels-Charleroi	Study	Modernisation of Brussels-Charleroi Canal between Lembeek and Halle.	Waterwegen en zeekanaal	from 2015 on	1.1	State funding, EU funding	Bottleneck Intermodality Sustainability	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
BE24	WATER	Canal Ghent-Oostende ,section Ghent-Brugge (part of Seine-Scheldt project) - interoperability, - cross border, - acces to seaport	Study + Works	Construction of a new Dammepoort lock and upgrade of the Steenbrugge bridge in the passage through Brugge	Waterwegen en zeekanaal	2019-2020	75.4	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified
BE25	WATER	Canal Ghent-Terneuzen	Works	New lock in Terneuzen	Vlaams Nederlandse Schelde Commissie (VNSC)	2015-2021	930.0	State funding (The Netherlands, Flanders region), EU funding	Bottleneck Intermodality Sustainability Cross Border	CEF Pre-identified
BE26	WATER	Canal Roeselare-Lys (part of Seine-Scheldt project)	Study	Studies modernisation Canal	Waterwegen en zeekanaal	2016-2019	3.8	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified
BE27	WATER	Canal Roeselare-Lys (part of Seine-Scheldt project)	Works	Upgrading of the Canal Roeselare-Lys to a class Va waterway	Waterwegen en zeekanaal	from 2019 on	37.3	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified
BE28	WATER	Canal Roeselare-Lys (part of Seine-Scheldt project)	Study + Works	Works on the bridge in Ingelmunster + study that supports the further implementation of the works on the bridge of Ingelmunster	Waterwegen en zeekanaal	2016-2018	19.1	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified
BE29	WATER	Flanders	Works	Implementation of River Information Services (RIS) in Flanders	De Scheepvaart/ Waterwegen en zeekanaal	2014-2020	15.0	State funding, EU funding	Intermodality Interoperability	CEF Pre-identified
BE30	WATER	Meuse basin	Works	Building of a trimodal platform in Liège including a rail link in Chertal	Port of Liège	2016-2018	2.5	State funding, EU funding	Intermodality Sustainability Last Mile	CEF Pre-identified
BE31	WATER	Meuse basin	Works	Increase of the vertical clearance under bridges over the Albert canal, in Haccourt, Lixhe and Lanaye. Upgrading	Service Public de Wallonie	2014-2015	0.6	State funding, EU funding	Intermodality Last Mile	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
				docks in Lixhe.						
BE32	WATER	Meuse basin	Works	Connection to the Meuse, the Rhine and the northern seaports : Gauge locks of Ampsin-Neuville and Ivoz-Ramet, New lock in Ampsin-Neuville Deepening of the Meuse Monsin Weir Upgrading of the bridge programme Navigability equipments Upgrading ports (Renory, Hermalle-sous-Huy)	Service Public de Wallonie	2014-2020	204.0	State funding, EU funding	Intermodality	CEF Pre-identified
BE33	WATER	Port of Antwerp	Works	Construction of a new dock at Noordlandbrug, in order to have sufficient waiting capacity for barges.	NV De Scheepvaart	2020	16.0	Member State funding, port authority, EU funding		
BE34	WATER	Port of Antwerp	Works	New Deurganckdok lock to upgrade access to Waasland Port (Antwerp)	Flemish Governement - Mobiliteit en Openbare Werken	2011-2016	382.0	Vlaamse Havens NV,EU (incl. EIB loans)	Bottleneck Intermodality Last Mile	CEF Pre-identified
BE35	WATER	Port of Antwerp	Study	Renovation of the Royers lock in port of Antwerp	Flemish Governement - Mobiliteit en Openbare Werken	2016-2019	140.0	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified
BE36	WATER	Port of Antwerp	Works	Upgrading shunting yards and junctions; freight transport services	Port of Antwerp	2014-2020	100.0	0	Bottleneck Intermodality Last Mile	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
BE37	WATER	Port of Ghent	Works	Development of a rail terminal in the left bank of Ghent port. It is an internal port rail infrastructure, to enhance port connection to inland network and interoperability between the modes (maritime-inland navigation-rail)	private - port authority	2014-2016	5.5	private & port authority	Bottleneck Intermodality Interoperability Last Mile	
BE38	WATER	Port of Zeebrugge - Ostend - Lys Diversion Canal	Study	'Seine-Schelde-West' project : Upgrade and socio-economic monitoring to detect the need for the long term solution	Waterwegen en zeekanaal	2014-2020	4.0	State funding, EU funding	Missing Link Intermodality	CEF Pre-identified
BE39	WATER	Port of Zeebrugge (SHIP project)	Study + Works	Replacement of the existing Visart lock with an open access channel and construction of a new lock	Flemish Governement - Mobiliteit en Openbare Werken	Studies: 2014-2015, Construction 2016-2021	594.0	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified
BE40	WATER	River Dender interoperability	Study	Upgrade of the Dender from CEMT class II to CEMT class IV in one way navigation from the mouth of the Scheldt in Dendermonde to Aalst	Waterwegen en zeekanaal	2015	0.5	State funding, EU funding		
BE41	WATER	River Upper-Scheldt (part of Seine-Scheldt project)	Works	Building of three new class Vb locks on the Upper-Scheldt (at Asper, Oudenaarde and Kerkhove)	Waterwegen en zeekanaal	from 2015 on	114.5	State funding, EU funding		CEF Pre-identified
BE42	WATER	Scheldt basin (part of Seine-Scheldt project)	Study + Works	Canal Pommeroeul-Condé : Pier at lock of Hensies Renovation locks in Hensies and Pommeroeul Deepening	Service Public de Wallonie	2015-2020	12,2	State funding, EU funding		CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
BE43	WATER	Scheldt basin (part of Seine-Scheldt project)	Study + Works	Dorsale wallonne : Canal Nimy-Blaton enlargement and modification of curves Basse Sambre - Lock of Auvelais Navigability optimisation: bridges, docks and equipements Navigability optimisation: deepening, crossing zones, turning points Building of four new locks of class Va - studies (Obourg, Marchienne, Gosselies and Viesville) Upgrade of four existing locks (Havré, Marchienne, Gosselies and Viesville)	Service Public de Wallonie	2014-2020	77,9	State funding, EU funding	Bottleneck Intermodality Cross Border	CEF Pre-identified
BE44	WATER	Scheldt basin (part of Seine-Scheldt project)	Study + Works	Lys capacity : Crossing of Comines	Service Public de Wallonie	2019-2020	15,4	State funding, EU funding	Bottleneck Intermodality Cross Border	CEF Pre-identified
BE45	WATER	Scheldt basin (part of Seine-Scheldt project)	Study + Works	Schelde capacity : Crossing of Tournai Kain and Hérinnes (dams, depth of locks, building new locks (studies)), navigability optimisation (docks)	Service Public de Wallonie	2014-2020	69,7	State funding, EU funding	Bottleneck Intermodality Cross Border	CEF Pre-identified
BE46	WATER	Sea Canal Brussels-Scheldt - bottleneck	Works	Dredging works and works on the banks of the Brussels-Scheldt Sea Canal and adaptation of bridges	Waterwegen en zeekanaal	mid-1960's-2020	24.2	State funding, EU funding	Bottleneck	CEF Pre-identified
BE47	WATER	Upper-Seascheldt and Southern Ghent Ring Canal (part of Seine-Scheldt	Study + Works	Enlargement of the channel of the Upper-Sea Scheldt and Southern Ghent Ring Canal in order to eliminate	Waterwegen en zeekanaal	from 2016 on	64.9	State funding, EU funding	Bottleneck Intermodality	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
		project)		bottlenecks hindering class V vessels						
BE48	WATER	Wallonia	Study + Works	RIS - RIS center in Wallonia	Service Public de Wallonie	2015-2020	6.0	State funding, EU funding	Intermodality Interoperability	CEF Pre-identified
BE49	WATER	Wijnegem	Works	Capacity extension of locks in Wijnegem	De Scheepvaart	-2020	100.0	State funding, EU funding (possibly by PPP)	Bottleneck Intermodality	CEF Pre-identified
BE50	WATER	Wijnegem-Antwerpen	Works	Upgrade of the section Wijnegem-Antwerpen on the Albert Canal	De Scheepvaart	2009-2020	100.0	State funding, EU funding	Bottleneck Intermodality Interoperability	CEF Pre-identified

Belgium – Set 2 - Post 2020 – or Missing Information

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
BE51	ROAD	Antwerp	Study	Upgrade of Ring of Antwerpen: Oosterweel connection	Beheersmaatschappij Antwerpen Mobiel (BAM)	2014-...	0.0	0	Bottleneck	
BE52	ROAD	Antwerp	Works	Upgrade of Ring of Antwerpen: Oosterweel connection	Beheersmaatschappij Antwerpen Mobiel (BAM)	Start before 2020	0.0	0	Bottleneck	
BE53	WATER	Beneden - Nete	Study	Upgrade of the vertical clearance to 7m on Beneden - Nete Canal	Waterwegen en zeekanaal	> 2020	5.5	State funding, EU funding	Bottleneck Intermodality	
BE54	WATER	Brussels	Study	Upgrade of the vertical clearance under some bridges in Brussels	Port of Brussels/Ministry of Brussels mobility	n.a.	50.6	State funding, EU funding	Intermodality	CEF Pre-identified
BE55	WATER	Part of Seine-Scheldt project	Study + Works	Dorsale wallonne : Canal Nimy-Blaton enlargement and modification of curves Basse Sambre - Lock of Auvelais Navigability optimisation: bridges, docks and equipements Navigability optimisation: deepening, crossing zones, turning points Building of four new locks of class Va works (Obourg, Marchienne, Gosselies and Viesville) Ronquiières plan incliné	Service Public de Wallonie	2021-2025	218.0	State funding, EU funding	Bottleneck Intermodality Cross Border	CEF Pre-identified
BE56	WATER	Part of the Seine-Scheldt project	Study + Works	Schelde capacity : Crossing of Tournai Kain and Hérinnes (building new locks (works)), curves rectification (CEMT Vb)	Service Public de Wallonie	2021-2025	90.0	State funding, EU funding	Bottleneck Intermodality Cross Border	CEF Pre-identified

France – Set 1 – Projects Starting before 2020

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR1	MULTI	Core network corridor Avignon node (RRT + IWW)	Studies and works (upgrade and new construction)	Creation of a trimodal platform IWW-rail-road by upgrading and intergating existing port facilities on Courtine area and RRT of Champfleury (development of multimodal logistics platforms with road, rail and IWW connections)	CNR, VNF, RFF, State, Provence Alpes Cote d'Azur Region	2016	110.0	to be defined		
FR2	MULTI	Core network corridor Lyon node (Salaise - Sablons)	Studies and works (New construction)	Construction of a multimodal platform and a 38 ha industrial zone (development of multimodal logistics platforms with road, rail and IWW connections)	CNR, VNF, RFF, local authorities	2016 - 2023	60.2	EU, State, Local authorities		
FR3	MULTI	Core network corridor Marseille node (RRT + Fos-sur-Mer port)	Studies and works (New infrastructure)	Fos combined transport terminal	Port of Marseille-Fos	2018	25.0	to be defined		CEF Pre-identified
FR4	MULTI	Core network corridor Marseille node (RRT + port)	Studies (New infrastructure)	Mourepiane combined transport terminal	Société MTTC (Mourepiane Terminal Transport Combiné)	2014-2015	1.4	to be defined	Intermodality	
FR5	MULTI	Core network corridor Marseille node (RRT + port)	Works (New infrastructure)	Mourepiane combined transport terminal	Société MTTC (Mourepiane Terminal Transport Combiné)	2015-2017	40.4	to be defined	Intermodality	
FR6	MULTI	Core network corridor Marseille node (RRT + port)	Studies and works (New infrastructure)	Rolling motorway terminal	Port of Marseille-Fos	2018-2020	5.0	to be defined	Intermodality	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR7	MULTI	Mulhouse	Works	Development of a new port area in Mulhouse urban area	Port of Mulhouse-Rhin	2015-2020	7.5	State budget TEN – CEF grants		
FR8	MULTI	Port of Ottmarsheim	Study + Works	Study and work on a new container terminal and a logistics zone in Ottmarsheim shared with Basel and Weil-am-Rhein	Port of Mulhouse-Rhin	2017-2020 (to be started)	25.0	VNF	Intermodality	
FR9	MULTI	Port of Strasbourg	Works	Development of a common and unique information system (Port Community System) to optimize the use of all existing tools with a slot booking system for loading and unloading	Port of Strasbourg	2015	1.0	Port Autonome Strasbourg/VNF (EU funding: 0.5 million)	Interoperability	
FR10	RAIL	Bettembourg-Basel	Study + Works	ERTMS deployment on the Longuyon- Basel line	RFF	2015-2018	181.0	EU funding	Interoperability Cross Border	CEF Pre-identified
FR11	RAIL	Core network corridor Avignon Centre <--> Lyon (existing line)	Works (Infrastructure upgrade)	Avignon-Lyon (right bank of the Rhône): Upgrading and Capacity improvement, Safety / Security, Capacity improvement, Maintenance of performance	RFF	2013 - 2020	63.0	RFF internal	Bottleneck Intermodality	CEF Pre-identified
FR12	RAIL	Creil node	Study + Works	Creil, located on the corridor between Lille and Paris is the main rail node north of Paris and as such it has a great influence on traffic of freight and conventional passenger trains in all the northern part of France. Creil was identified as a first priority in all scenarios of the so called Mobilité 21 - “Duron report”. Studies and first work are planned from 2014 to 2020	RFF	2014-2020	45.0	EU, State, region Picardie, RFF	Bottleneck	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR13	RAIL	Dijon-Mulhouse	Study	Optimisation of the Rhin-Rhone high speed rail line (LGV Rhin Rhône) 2d phase of the East branch	Alsace, Bourgogne, Franche-Comté regions	2015-2017	0.3	Alsace, Bourgogne, Franche-Comté regions, French State, EU funding	Missing Link	CEF Pre-identified
FR14	RAIL	Dunkirk - Calais	Study + Works	Direct rail connection between Dunkirk west port terminals and Calais/Tunnel main line	Port of Dunkirk	2018-2020	8.0	EU funding 20%	Intermodality	CEF Pre-identified
FR15	RAIL	Lille (Dourges)-Paris	Study + Works	Network improvements for rolling motorways	RFF	2015-2020	63.0	EU funding	Intermodality	
FR16	RAIL	Longuyon-Thionville	Study + Works	Reinforcement of electric supply on Longuyon-Thionville	RFF	2020	15.0	State - Lorraine Region Plan Contract for 2015-2020 (CPER), EU	Sustainability	
FR17	RAIL	Lyon	Study + Works	First treatment of Lyon node. Works on the existing network aiming to increase reliability, security and capacity of train operations (resolution of physical bottlenecks)	RFF	work to start before 2020	580.0	State - Rhône-Alpes Region Plan Contract for 2015-2020 (CPER), EU	Bottleneck	CEF Pre-identified
FR18	RAIL	Metz	Study + Works	Metz node upgrade	RFF	First priority in Mobility 21 report (before 2030) Work to begin before 2020	40.0	State - Lorraine Region Plan Contract for 2015-2020 (CPER), EU	Bottleneck	
FR19	RAIL	Metz	Study + Works	Reinforcement of electric supply in Metz	RFF	2020	20.0	State - Lorraine Region Plan Contract for 2015-2020 (CPER), EU	Sustainability	
FR20	RAIL	Metz-Réding	Study + Works	IPCS (permanent counterflow installations) deployment	RFF	2020	10.0		Bottleneck	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
				between Baudrecourt and Rémilly						
FR21	RAIL	Mulhouse	Study + Works	Mulhouse node upgrade	RFF	First priority in Mobility 21 report (before 2030) Work to begin before 2020	145.0	State - Alsace Region Plan Contract for 2015-2020 (CPER), EU	Bottleneck Cross Border	CEF Pre-identified
FR22	RAIL	Mulhouse-Basel	Study	Connection of the Mulhouse-Basel EuroAirport (comprehensive network) to the rail network (core-network). This project is supported by both French and Swiss authorities. The preliminary studies and the public consultation were finished in 2013. The projects studies and, at the same time, the beginning of the construction, are now ready to start.	EuroAirport and RFF	before 2020	15.0	State - Alsace Region Plan Contract for 2015-2020 (CPER), EU	Intermodality Last Mile	CEF Pre-identified
FR23	RAIL	Mulhouse-Belfort	Study + Works	IPCS (permanent counterflow installations) deployment between Mulhouse and Altkirch	RFF	2020	15.0	0	Bottleneck	
FR24	RAIL	Port of Dunkirk	Works	Dedicated multimodal platform for dangerous goods, including rail and road connection to the core network and will be connected to a maritime container terminal and inland	Port of Dunkerque and private promoters	2016-2020	200.0	Port of Dunkerque, private partners, EU funding Port of Dunkirk (own funds)	Intermodality	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
				waterways						
FR25	RAIL	Port of Dunkirk	Works	Improvement of the interoperability between the port of Dunkirk and the national railway network	Port of Dunkirk	2015-2017	13.0	EU funding 20%	Intermodality	CEF Pre-identified
FR26	RAIL	Port of Marseille-Fos east basins at Fos-sur-Mer	Works	Mourepiane (east bassin): rail connection to the port	RFF	2016	18.5	State (33%) PACA region (33%) département (17%) GPMM (17%)	Intermodality Last Mile	CEF Pre-identified
FR27	RAIL	Port of Marseille-Fos west basins at Fos-sur-Mer	Works	Increase in the west basins rail capacity in the Fos gulf (project planned on the CPER State-region contract)	Port of Marseille-Fos	2017	8.0	French State, PACA region, Bouches-du-Rhone departement, Port of Marseille-Fos at equal shares	Bottleneck Last Mile	CEF Pre-identified
FR28	RAIL	Port of Metz	Works	Extension of the siding to improve rail access to the port of Metz area	Port of Metz	2015	3.0	Port of Metz, local and regional authorities, EU (0.6 million)	Intermodality	
FR29	RAIL	Port of Strasbourg	Works	Strasbourg rail : Increasing capacity at the Port du Rhin station ; Upgrading rail access to the port; Upgrading signaling and points equipments; Rail access to the port from the German network	Port of Strasbourg	2015	17.0	Port Autonome Strasbourg/VNF (EU funding: 5.5 million)	Intermodality	
FR30	RAIL	Strasbourg	Study + Works	Reinforcement of electric supply in Strasbourg	RFF	2020	30.0	State - Alsace Region Plan Contract for 2015-2020 (CPER), EU	Sustainability	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR31	RAIL	Strasbourg	Study + Works	Strasbourg node upgrade (4th track between Strasbourg and Vendenheim)	RFF	First priority in Mobility 21 report (before 2030) Work to begin before 2020	120.0	State - Alsace Region Plan Contract for 2015-2020 (CPER), EU	Bottleneck	CEF Pre-identified
FR32	ROAD	Martigues - Port-de-Bouc	Works	Construction of the Martigues - Port-de-Bouc bypass	French State	2017 - 2020	145.0		Bottleneck	
FR33	ROAD	Miramas	Works	Miramas bypass, work in progress, end scheduled for 2016	French State	2014-2016	61.2		Bottleneck	
FR34	WATER	Condé-Pommeroeul canal	Study + Works	Restoration of the Condé-Pommeroeul canal (Seine-Scheldt inland waterway)	VNF	2007-2023	67.0	VNF, region NPDC, Wallonie, EU funding (40%)	Bottleneck Missing Link Cross Border	CEF Pre-identified
FR35	WATER	Core Network corridor Dijon<->Lyon Dijon node *intermodality	Study	Development of the multimodal plateform near Dijon (Pagny trimodal plateform)	VNF, Aproport	2015-2020	1.0	VNF, EU funding	Intermodality	
FR36	WATER	Core network corridor Marseille node (Fos-sur-Mer port)	Studies (New infrastructure)	Fos 4XL combined transport terminal (enlarging port container facilities)	Port of Marseille-Fos	2018	2.5	to be defined	Bottleneck Intermodality	CEF Pre-identified
FR37	WATER	Core network corridor Marseille node (Fos-sur-Mer port)	Studies and works (Infrastructure upgrade)	Fos Dock infrastructures : allowing call of bigger ships and improvement of terminal operations	Port of Marseille-Fos	2015-2018	40.0	to be defined	Bottleneck Intermodality	CEF Pre-identified
FR38	WATER	Core network corridor Marseille node (Fos-sur-Mer port)	Studies and works (New infrastructure)	Waterway link : create an IWW connection between Fos container terminal (second basin) and the Rhône	Port of Marseille-Fos	2019-2020	34.0	to be defined	Intermodality	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR39	WATER	Core network corridor Marseille node (Fos-sur-Mer port)	Works (New infrastructure)	Waterway link : Multiclient bulk platform	Port of Marseille-Fos	2017	3.5	to be defined	Bottleneck Intermodality	CEF Pre-identified
FR40	WATER	Core network corridor Marseille node (port)	Studies and works (New infrastructure)	Upgrade of Short Sea Shipping terminals	Port of Marseille-Fos	2015-2020	80.0	to be defined	Bottleneck Intermodality	CEF Pre-identified
FR41	WATER	Core network corridor Marseille node (port)	Works (Infrastructure upgrade)	Widening of the North Pass	Port of Marseille-Fos	2015-2017	32.7	to be defined	Bottleneck Intermodality	CEF Pre-identified
FR42	WATER	Couzon lock on the Saône, Core Network corridor Lyon Node *Bottleneck	Study + Works	Upgrading of the Couzon lock on the Saone by increasing length to 195 m and creating guiding wall for long vessels	VNF	2015-2016	7.0	VNF, EU funding		
FR43	WATER	Deûle river	Works	Recalibration of Deûle river (Lille Deûlémont) (Seine-Scheldt inland waterway)	VNF	2007-2020	45.0	French state, Region NPDC, EU funding (40%)	Bottleneck Missing Link Cross Border	CEF Pre-identified
FR44	WATER	Downstream Seine	Study + Works	Implementing remote control of locks on the downstrem Seine (Seine-Scheldt inland waterway)	VNF	2014-2020	8.0	Under study: VNF, regions, EU funding (40%)		CEF Pre-identified
FR45	WATER	Downstream Seine	Study + Works	Improvment of reliability at other locks and dams (Seine-Scheldt inland waterway)	VNF	2014-2020	8.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR46	WATER	Downstream Seine	Study + Works	Modernising and rehabilitating locks on the downstream Seine, including locks of Suresnes, Bougival, Méricourt and Notre Dame de la Garenne (Seine-Scheldt inland waterway)	VNF	2014 à 2025	28.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR47	WATER	Downstream Seine	Study + Works	Raising of the Poses-Amfreville footbridge (Seine-Scheldt inland waterway)	VNF	2014-2020	0.8	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR48	WATER	Downstream Seine	Study + Works	Rehabilitating of the rail bridge at Maisons Lafitte (Seine-Scheldt inland waterway)	VNF	2014-2022	2.5	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR49	WATER	Downstream Seine	Study + Works	Restoring the environmental continuity with the construction of fish passes (Seine-Scheldt inland waterway)	VNF	2014-2022	11.0	Under study: VNF, regions, EU funding (40%), water agencies	Bottleneck Missing Link	CEF Pre-identified
FR50	WATER	Downstream Seine	Study + Works	Services to users (Seine-Scheldt inland waterway)	VNF	2014-2020	5.8	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR51	WATER	Janville – Aubencheul-au-Bac	Works	Seine Nord Canal and mulimodal platforms (Seine-Scheldt inland waterway) * Missing Link * Bottleneck * Cross Border * Interoperability	VNF	2015-2023/2025	4,500.0	EU funding 40%, French state, local regional governments	Bottleneck Missing Link Cross Border	CEF Pre-identified
FR52	WATER	Lorraine	Works	Construction of an Information and waterway traffic management centre	VNF	2015-2017	2.5			
FR53	WATER	Lorraine	Study + Works	Extension of Clévant lock on the Moselle	VNF	2016-2022	13.0		Bottleneck	
FR54	WATER	Lorraine	Study + Works	Implementing remote control of locks on the wide-gauge Moselle	VNF	2014-2025	10.0			
FR55	WATER	Lorraine	Study + Works	Reconstruction and enlargement of the gate at Pont-à-Mousson	VNF	2016-2022	8.0		Bottleneck	
FR56	WATER	Lorraine	Works	Reconstruction of the Liégeot dam on the Moselle	VNF	2014-2018	14.0			
FR57	WATER	Lorraine	Works	Rehabilitation of broadband	VNF	2014-2017	5.0	VNF		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
				network along the Moselle river						
FR58	WATER	Lorraine	Works	The multimodal and multisite platform development in Lorraine, on the Moselle river	VNF/Port of Metz/Port of Frouard/Port of Thionville-Illange	2014-2016 (Tranche 1 Phase 1)	28.0		Intermodality	
FR59	WATER	Lys river	Study + Works	Recalibration of Lys river (Deûlémont-Halluin) (Seine-Scheldt inland waterway)	VNF	2007-2023	118.0	VNF, Wallonie, Flandres, region NPDC, EU funding (40%)	Bottleneck Missing Link Cross Border	CEF Pre-identified
FR60	WATER	Marseille node (IWW port connection) and Sète	Studies and works (Infrastructure upgrade)	Improvement of capability of the Rhône-Sète canal Compliance with class IV* requirements at least (waterway allows the passage of a vessel or a pushed train of craft 80 to 85 m long and 9.50 m wide): Works consist in : - raising of 5 bridges - Compliance with Core network standards concerning minimum height under bridges (Target:>5.25/7.00m) - new zones of crossing in Gallician and Aigues-Mortes - modification of a few curves with low values of radius of curvature Compliance with Core network standards concerning length of vessels and barges (Target: >80-85m) Compliance with Core network standards	VNF	2014 - 2020	75.0	State – Languedoc-Rousillon Region Plan Contract (CPER), EU funding	Missing Link	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
				concerning minimum draught (Target: >2.50m)						
FR61	WATER	Nord-Pas-de-Calais	Study + Works	Implementing remote management of the locks on the Nord-Pas-de-Calais network and upgrading the locks involved (Seine-Scheldt inland waterway)	VNF	2014-2020	49.0	Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR62	WATER	Nord-Pas-de-Calais	Study + Works	Increasing reliability of the Nord-Pas-de-Calais network, including shore protection at Goeulzin and Aire Neuffossé (Seine-Scheldt inland waterway)	VNF	2015-2020	38.0	Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR63	WATER	Nord-Pas-de-Calais	Study + Works	Services to users: turning basin and waiting areas (Seine-Scheldt inland waterway)	VNF	2014-2020	8.0	Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR64	WATER	Oise valley	Study + Works	Dredging dowtream of Creil (access to locks) (Seine-Scheldt inland waterway)	VNF	2014-2016	7.2	VNF, EU funding TEN-T 2007-2013		CEF Pre-identified
FR65	WATER	Oise valley	Study + Works	Implementing remote control of locks on the Oise (Seine-Scheldt inland waterway)	VNF	2014-2020	11.0	Under study: VNF, regions Ile-de-France and Picardie, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR66	WATER	Oise valley	Study + Works	Reconstruction of the Mours bridge to du pont de Mours to a height of 7 metres (Seine-Scheldt inland waterway)	VNF	2014 - 2025	36.0	Under study: VNF, regions Ile-de-France and Picardie, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR67	WATER	Oise valley	Study + Works	Services to users: turning basin (Seine-Scheldt inland waterway)	VNF	2014-2020	2.5	Under study: VNF, regions Ile-de-France and Picardie, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR68	WATER	Oise valley	Study + Works	Upgrade to European gauge of the Oise between Creil and Compiègne (MAGEO project) (Seine-Scheldt inland waterway)	VNF	2015-2027	233.0	Under study: VNF, regions Ile-de-France and Picardie, EU funding (40%)	Bottleneck Missing Link Intermodality	CEF Pre-identified
FR69	WATER	Paris	Study + Works	Development of multimodal urban logistic Centers (Beaugrenelle, La Chapelle International, etc.) inside Paris	Port of Paris	2017	110.0	Ports de Paris, Caisse des Dépôts et Consignations, Sogaris	Intermodality Sustainability Last Mile	
FR70	WATER	Paris	Study	Development of multimodal urban logistic Centers in Paris area (Vigneux, Vitry-sur-Seine, etc.)	Port of Paris	2018-2021	35.0	Port of Paris	Intermodality Sustainability Last Mile	
FR71	WATER	Port of Calais	Works	Calais 2015 project Creation of a new sea dock north of the existing port facilities to increase the current capacity of the port (Calais Port 2015 development scheme). This includes: - a new seawall and counter-pier, - building of a new port basin, - gradual carrying out of new earth platforms, - gradual construction of a new berth.	Nord-Pas-de-Calais Regional Council	2015-2020	800.0	To be carried out with a PPP: - Public funding: 300 million (Region, State and EU) - Equity: 100 million - Senior long-term debt: 400 million	Intermodality Cross Border	
FR72	WATER	Port of Chalon-sur-Saone	Works	Port of Chalon-sur-Saone: Enlargement of the container platform, development of the container terminal and extension of the port's rail network	CCI de Saône et Loire, port of Chalon-sur-Saone	2015-2016-2020	5.0	60 % CPER (State-Region contract) among which 30 % State and 30 % region 40 % other fonds (EU, local	Intermodality	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
								authorities, CCI Saône et Loire)		
FR73	WATER	Port of Chalon-sur-Saone	Works	Port of Chalon-sur-Saone: Extension of the quay, development of a stocking platform on the quay	CCI de Saône et Loire, port of Chalon-sur-Saone	2014-2015-2016	5.0	60 % CPER (State-Region contract) among which 30 % State and 30 % region 40 % other fonds (EU, local authorities, CCI Saône et Loire)	Intermodality	
FR74	WATER	Port of Dunkirk	Works	Bulk terminal revamp (Cap Port Ouest framework program). Development of transshipment operations for bulk material.	Port of Dunkirk	2015-2016	16.5	EU funding 20%	Intermodality	
FR75	WATER	Port of Dunkirk	Works	Container berth upgrade (Cap Port Ouest framework program). Development of transshipment to feeder or short-sea services and of inland multimodal transfer to rail and inland waterway services.	Port of Dunkirk	2015-2017	74.6	EU funding 20% Possible Project Bond Credit Enhancement scheme	Intermodality	CEF Pre-identified
FR76	WATER	Port of Dunkirk	Works	LNG bunkering infrastructure. Development of a small-scale LNG supply chain from the port of Dunkirk, not only or primarily for ship bunkering but also, potentially, for other markets such as road or waterway transport, or industry.	Port of Dunkirk	2014-2016	97.6	EU funding 30% Possible Project Bond Credit Enhancement scheme	Sustainability	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR77	WATER	Port of Dunkirk	Works	Maritime access adaptation (Cap Port Ouest framework program). Widening of the turning circle between the outer port and the basin called Atlantic.	Port of Dunkirk	2015-2016	18.7	EU funding 20%		
FR78	WATER	Port of Metz	Works	Extension of the container terminal inside the port (2nd phase of the multimodal and multisite platform development in Lorraine)	Port of Metz	2018-2020	15.0	Port of Metz, local and regional authorities, EU	Intermodality	
FR79	WATER	Port of Paris	Works	City port of Triel-sur-Seine	Port of Paris	2015-2017	32.0	EU funding 20-40%	Intermodality	
FR80	WATER	Port of Paris	Works	Extension of the Limay multimodal terminal	Port of Paris	2015-2019	30.0	EU funding 20-40%	Intermodality	
FR81	WATER	Port of Paris	Works	Multimodal access to platforms of the ports of Paris (including new road link N406)	Port de Paris / DRIEA	2015-2020	100.0	EU funding 20-40%	Intermodality Last Mile	
FR82	WATER	Port of Paris	study	Paris Seine Métropole phase 1 (western part). Development of aggregate products platform.	Port of Paris	2017-2030	110.0	EU funding 20-40%	Intermodality	
FR83	WATER	Port of Strasbourg	Works	Increasing the size of entry locks to the port	Port of Strasbourg	2020	7.0	Port Autonome Strasbourg/VNF (EU funding: 2.3 million)		
FR84	WATER	Port of Strasbourg	Works	North road access to the port	Port of Strasbourg	2015	10.0	Port Autonome Strasbourg/VNF (EU funding: 3 million)	Intermodality Last Mile	
FR85	WATER	Port of Strasbourg	Study + Works	Strasbourg inland port : development of a container terminal ; study and work on a new terminal for empty containers to be shared wuth Kehl port (Germany) / Lauterbourg inland port : development of the	Port of Strasbourg	2015	61.0	EU funding: 20.3 million	Intermodality	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
				Lauterbourg container terminal						
FR86	WATER	Provence-Alpes-Côte d'Azur Region	Works	Development of stops for passenger ships	VNF	2014-2020	13.0	State - Provence-Alpes-Côte d'Azur Region Plan Contract (CPER), EU funding		
FR87	WATER	Provence-Alpes-Côte d'Azur Region	Works	Standardisation of Slipway in Arles	VNF	2014-2020	6.7	State - PACA Region Plan Contract (CPER), EU funding		
FR88	WATER	Rhône-Alpes Region	Works	Development of quays and waiting areas for alternate traffic direction	VNF	2014-2020	3.3	State - Rhône-Alpes Region Plan Contract (CPER), EU funding		
FR89	WATER	Upstream Seine	Study + Works	Implementing remote control of locks on the upstream Seine (Seine-Scheldt inland waterway)	VNF	2016 petite Seine 2020 - 2022 haute seine	10.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR90	WATER	Upstream Seine	Study + Works	Improving reliability of other locks and dams (Seine-Scheldt inland waterway)	VNF	2014 - 2020	8.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR91	WATER	Upstream Seine	Study + Works	Renovation and modernisation of dams, including reconstruction of the Beaulieu dam and restoration of the Livon weir which holds the channel to the Nogent-sur-Seine nuclear power plant (Seine-Scheldt inland waterway)	VNF	2014 - 2025	18.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR92	WATER	Upstream Seine	Study + Works	Renovation and/or deepening of the small locks on the high Seine (Seine-Scheldt inland waterway)	VNF	2014 - 2025	81.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR93	WATER	Upstream Seine	Study + Works	Restoring the environmental continuity with the construction of fish passes including at Port à l'Anglais, Ablon/Vigneux, Evry, Marolles, seuil du Livon and Conflans/Seine (Seine-Scheldt inland waterway)	VNF	2014-2025	13.0	Port of Paris	Bottleneck Missing Link	CEF Pre-identified
FR94	WATER	Upstream Seine	Study + Works	Services to users: turning basin and waiting areas (Seine-Scheldt inland waterway)	VNF	2014-2020	6.7	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified

France – Set 2 – Projects Starting after 2020 or missing information or work completed

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR95	RAIL	Clesud RRT (Miramas)	Study + Works	Development of the Clesud RRT at Miramas	RFF		4.0		Intermodality	
FR96	RAIL	Core network corridor Avignon Centre <-> Lyon (existing line)	Studies and works (Infrastructure upgrade)	Avignon-Lyon (right bank of the Rhône): Upgrading and Capacity improvement, Safety / Security, Capacity improvement, Maintenance of performance	RFF	> 2020	500.0	RFF internal		CEF Pre-identified
FR97	RAIL	Core network corridor Lyon node / Lyon <-> Avignon	Studies and works (Infrastructure upgrade)	Upgrade of the Port of Lyon including : - renewal of roads in the port (modification of the circulation plan with a new entry way for trucks) - construction of a new dock to stock liquid bulk commodities - various upgrades enabling to increase the supply of containers transport (including the upgrade of the Terminal 1 and new equipments) - direct connection with the national rail network (creation of a new track and electrification works on the existing track)	CNR, RFF (rail part)	2023	20.8	EU, State, Rhône-Alpes Region, CNR (+ RFF for the rail connection)		
FR98	RAIL	Creil node	Works	Creil, located on the corridor between Lille and Paris is the main rail node north of Paris and as such it has a great influence on traffic of freight and conventional passenger trains in all the northern part of France. Creil was identified as a first priority in all scenarios of the so called Mobilité 21 - “Duron report”. After the first treatment of the Creil node, additional work will be held from 2020 to 2023.	RFF	2020-2023		to be defined		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR99	RAIL	Dijon-Mulhouse	Study + Works	Rhin-Rhone high speed rail line (LGV Rhin Rhône) 2d phase of the East branch	RFF	Second priority in Mobility 21 report (after 2030)	1,180.0	EU funding	Missing Link	CEF Pre-identified
FR100	RAIL	Lille - Valenciennes	Study + Works	Capacity increase on Lille - Valenciennes	RFF	2015 - 2020 (studies) 2020 - 2030 (works)	300.0	State - Nord-Pas-de-Calais Region Plan Contract for 2015-2020 (CPER), EU	Bottleneck	
FR101	RAIL	Lyon	Study + Works	Further treatment of the Lyon node. Technical studies for infrastructures allowing to mitigate problems of traffic overload : doubling of the lines on land or underground (resolution of physical bottelnecks)	RFF	work to start after 2020	5,000.0	EU, State, Rhône-Alpes Region, RFF	Bottleneck	CEF Pre-identified
FR102	RAIL	Lyon	Study + Works	Lyon area bypass (CFAL). New line of bypass of the agglomeration (resolution of physical bottlenecks)	RFF	Second priority in Mobility 21 report (after 2030), but some works could begin before 2030	3,500.0	EU, State, Rhône-Alpes Region, RFF	Bottleneck	CEF Pre-identified
FR103	RAIL	Marseille node	Works	Underground crossing of Marseille with a new 4 tracks underground station as well as a 4th track in the Huveaune valley	RFF	works starting before 2020	2,500.0	RFF, French State, PACA region and local authorities (departements and others), UE	Bottleneck	
FR104	RAIL	Metz -Strasbourg	Study + Works	Loading gauge enhancement (GB to GB1) between Metz -Strasbourg	RFF	before 2020		EU funding	Intermodality	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR105	RAIL	Mulhouse-Basel	Works	Connection of the Mulhouse-Basel EuroAirport (comprehensive network) to the rail network (core-network). This project is supported by both French and Swiss authorities. The preliminary studies and the public consultation were finished in 2013. The projects studies and, at the same time, the beginning of the construction, are now ready to start.	EuroAirport and RFF	after 2020	260.0	to be defined	Intermodality Last Mile	CEF Pre-identified
FR106	RAIL	Port of Marseille-Fos	Study + Works	Port industrial area at Fos-sur-Mer (west basins of the Marseille/Fos port): automation of rail acess and sidings, new connections	RFF	to be defined		to be defined	Last Mile	
FR107	RAIL	Port of Strasbourg-Lauterbourg	Works	Lauterbourg rail : Improving rail capacity of the Lauterbourg-Woerth line; rail connection to Lauterbourg station	Port of Strasbourg				Intermodality	
FR108	RAIL	Roissy-Picardie	Study + Works	Rail link Roissy-Picardie: this new 7km conventional rail link between Roissy CDG airport (core network) and the Creil-Paris line aims at improving access to the Roissy CDG airport and high speed rail network from Picardie region.	RFF	2004-2017 studies / 2018-2021 works	365.0	EU, State, regions Ile de France and Picardie	Missing Link Last Mile	
FR109	RAIL	Strasbourg	Study	Strasbourg node upgrade (Strasbourg station upgrade)	RFF	2025	0.0	State - Alsace Region Plan Contract for 2015-2020 (CPER), EU	Bottleneck	CEF Pre-identified
FR110	RAIL	Toul-Dijon	Study + Works	IPCS (permanent counterflow installations) deployment between Toul and Dijon	RFF	Studies before 2020, work after 2020	250.0	EU funding		
FR111	ROAD	Arles	Works	Arles road bypass (concession project), studies in progress, work to be carried between 2020 and 2024.	Provence Alpes Cote	2020-2024	600.0		Bottleneck	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
					d'Azur Region					
FR112	ROAD	Fos-Salon	Study + Works	Motorway link Fos-Salon, studies from 2015 onwards, work to be carried out after 2020.	French State	studies from 2015, work after 2020	300.0		Missing Link Last Mile	
FR113	WATER	Bray-sur-Seine – Nogent-sur-Seine	Study + Works	Upgrade of the upper Seine between Bray-sur-Seine and Nogent-sur-Seine (Seine-Scheldt inland waterway)	VNF	Before 2030	225.0	Ongoing study : French State, VNF, Regions Île-de-France and Champagne Ardennes, other local authorities, EU funding	Bottleneck Missing Link	CEF Pre-identified
FR114	WATER	Deûle river	Study + Works	Doubling of the Quesnoy-sur-Deûle lock (Seine-Scheldt inland waterway)	VNF	Avant 2030	60.0	Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR115	WATER	Deûle river	Study + Works	Lengthening of the Quesnoy-sur-Deûle lock (Seine-Scheldt inland waterway)	VNF	2025	34.0	Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR116	WATER	Downstream Seine	Study + Works	Lengthening of the second lock at Méricourt and of the Amfreville lock (Seine-Scheldt inland waterway)	VNF	Before 2030	39.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR117	WATER	Downstream Seine	Study + Works	Modernising and rehabilitating dams on the downstream Seine including dams of Suresnes, Bougival, Méricourt, Andresy GC, Poses and Port Mort (Seine-Scheldt inland waterway)	VNF	2014 à 2025	52.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR118	WATER	Lorraine	Study + Works	Heavy maintenance of structures on the wide-gauge Moselle	VNF	2030	67.0	Further implementation of 2008 the itinerary study		
FR119	WATER	Nord-Pas-de-Calais	Study + Works	Doubling of locks between Dunkerque and Cuinchy (Seine-Scheldt inland waterway)	VNF	2020-2040		Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified

ID	Transpor t mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR120	WATER	Nord-Pas-de-Calais	Study + Works	Doubling of the Fontinettes lock (Seine-Scheldt inland waterway)	VNF	Avant 2030		Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR121	WATER	Nord-Pas-de-Calais	Study + Works	Lengthing of the Douaisis locks, doubling of locks on the wide-gauge network (Seine-Scheldt inland waterway)	VNF	2020-2040		Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR122	WATER	Nord-Pas-de-Calais	Work completed	Raising of bridges on the Nord-Pas-de-Calais network (minimum height of 5.25m, 2 layers of containers) (Seine-Scheldt inland waterway)	VNF	2015 (5.25m bridges)			Bottleneck Missing Link	CEF Pre-identified
FR123	WATER	Nord-Pas-de-Calais	Study + Works	Restoration of locks and dams (Seine-Scheldt inland waterway)	VNF	2020-2040		Under study: VNF, region NPDC, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified
FR124	WATER	Pagny – Neuves-Maisons/ Mulhouse	Study	Saone-Moselle/Saone-Rhine Canal	VNF	Long term project. Active beyond 2030	200.0	Ongoing study	Missing Link Cross Border	CEF Pre-identified
FR125	WATER	Pagny – Neuves-Maisons/ Mulhouse	Works	Saone-Moselle/Saone-Rhine Canal	VNF	Long term project. Active beyond 2030	17,000.0	Ongoing study	Missing Link Cross Border	CEF Pre-identified
FR126	WATER	Port of Dunkirk	Works	The CAP 2020 project is a further step to the Cap Port Ouest program, it aims to strengthen the gateway network of the Med-NS corridor and its ability to address further growth of transport demand, especially to south Germany, North-East of France and the UK.	Port of Dunkirk	2020-2030	500.0	to be defined	Intermodality	CEF Pre-identified
FR127	WATER	Port of Paris	Study + Works	Paris Seine Métropole phase 2 (eastern part). Development of multimodal platform	Port of Paris	>2030			Intermodality	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
FR128	WATER	Scheldt river	Work completed	Recalibration of Escaut river (Valenciennes-Mortagne-Trith) (Seine-Scheldt inland waterway)	VNF	2015		French state, Region NPDC, EU funding 2007-2013	Bottleneck Missing Link Cross Border	CEF Pre-identified
FR129	WATER	Upstream Seine	Study + Works	Creating a second lock at Varennes-sur-Seine (Seine-Scheldt inland waterway)	VNF	Before 2030	33.0	Under study: VNF, regions, EU funding (40%)	Bottleneck Missing Link	CEF Pre-identified

Ireland – Set 1: Projects Starting before 2020.

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
IE1	RAIL	Dublin & national	Works	Dublin city centre re-signalling Phases 3 & 4 (sub-project of DU)	Irish Rail / National Transport Authority	Completion by 2017	55.0	Part-co-funding envisaged from TEN-T.	Bottleneck Interoperability Sustainability	CEF Pre-identified
IE2	RAIL	Dublin & national	Works	Central Traffic Control Centre (sub-project of DU)	Irish Rail	2018-20	40.0	Part-co-funding envisaged from TEN-T.	Bottleneck Missing Link Interoperability Sustainability	CEF Pre-identified
IE3	RAIL	Greater Dublin Area	Works	Electrification of the DART from Malahide to Balbriggan (sub-project of DU)	Irish Rail / National Transport Authority	Post 2018	80.0	Part-co-funding envisaged from TEN-T.		CEF Pre-identified
IE4	RAIL	Phoenix Park Tunnel, Dublin	Works	Allow some services on the Kildare line to bypass Heuston station and into the Central Business District	Irish Rail / National Transport Authority	Completion in 2016	12.0	Part-co-funding envisaged from TEN-T.	Bottleneck Sustainability	CEF Pre-identified
IE5	RAIL	Transport hubs in Cork & Dublin	Works	Works could include upgrading Cork Kent station, Pearse station roof and DART stations in Dublin	Irish Rail/ National Transport Authority	2014-20	20.0	Part-co-funding envisaged from TEN-T.	Intermodality	CEF Pre-identified
IE6	ROAD	Cork - Ringaskiddy (IE)	Works	N/M28 Cork to Ringaskiddy Improvement Scheme	National Roads Authority (NRA)	2015-2020	180.0	Part-co-funding envisaged from TEN-T.	Bottleneck Last Mile	
IE7	ROAD	Cork (IE)	Works	Dunkettle Interchange Upgrade	National Roads Authority (NRA)	2013-2017	90.0	Part-co-funding envisaged from TEN-T.	Bottleneck	
IE8	ROAD	Naas - Newbridge (IE)	Works	M7 Naas - Newbridge Motorway Widening Scheme	National Roads Authority (NRA)	2015-20	55.0	Part-co-funding envisaged from TEN-T.	Bottleneck	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
IE9	WATER	Cork (IE)	Works	Port infrastructure developments primarily at Ringaskiddy as part of the Port of Cork Masterplan	Port of Cork Company	2014-2020	100.0	Part-funding envisaged from TEN-T.	Bottleneck Cross Border	CEF Pre-identified
IE10	WATER	Dublin (IE)	Works	Alexandra Basin Redevelopment Project (part of the Port of Dublin Masterplan)	Port of Dublin	2014-2020	200.0	Part-funding envisaged from TEN-T.		CEF Pre-identified

Ireland – Set 2: Projects Starting after 2020, or missing information.

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
IE11	RAIL	Cork-Dublin-Northern Ireland border	Study + Works	Package of measures to benefit the rail corridor between Cork and Belfast via Dublin to help it compete with the motorway network e.g. improving line speeds (including for freight), interconnection with DART in Dublin.	Irish Government (DTTAS), Irish Rail / National Transport Authority	2015-20		Part-co-funding envisaged from TEN-T.	Sustainability Cross Border	CEF Pre-identified
IE12	RAIL	Dublin	Works	City centre link to Dublin Airport/Swords (could be rail or bus rapid transit)	Irish Rail / National Transport Authority	Post 2020		Part-co-funding envisaged from TEN-T.		
IE13	RAIL	Dublin & national	Works	DART Underground (DU) Programme consists of: 1) an underground tunnel between Docklands & Inchicore; 2) related sub-projects: City Centre Re-signalling; new Centralised Traffic Control Centre; electrification on Northern, Maynooth & Kildare lines, re-signalling and elimination of level crossings in Maynooth line; Kildare Route Project Phase 2; expoansion of DART fleet & depot facilities	Irish Government (DTTAS) Irish Rail/ National Transport Authority	Not known due to costs and requirement for approvals at highest levels of Government	4,000.0	Co-funding envisaged from TEN-T, EIB & PPP	Bottleneck Missing Link Interoperability Sustainability	CEF Pre-identified
IE14	RAIL	Dublin (Balbriggan)/cross-border	Study	Full electrification of the Dublin-Belfast line	Irish Government (DTTAS), Irish Rail / National Transport Authority	Post 2018		Part-co-funding envisaged from TEN-T.	Sustainability Cross Border	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
IE15	RAIL	Dublin (Balbriggan)/cross-border	Works	Full electrification of the Dublin-Belfast line	Irish Government (DTTAS), Irish Rail / National Transport Authority	Post 2020		Part-co-funding envisaged from TEN-T.		
IE16	RAIL	Greater Dublin Area/National	Works	Electrification of the DARTon the Kildare line (sub-project of DU)	Irish Rail / National Transport Authority	Post 2020		Part-co-funding envisaged from TEN-T.		CEF Pre-identified
IE17	RAIL	Maynooth Line	Study + Works	Removal of level crossings, resignalling & electrification (sub-project of DU)	Irish Rail / National Transport Authority	Some work underway, remainder post-2018		Part-co-funding envisaged from TEN-T.		CEF Pre-identified
IE18	ROAD	M7 - M50 Naas (IE)	Works	M7 M50 - Naas Motorway Upgrade	National Roads Authority (NRA)	-	160.0	Part-co-funding envisaged from TEN-T.	Bottleneck	
IE19	ROAD	National	IT system	ITS and SESAR	NRA, IAA,	Not known.		Part-co-funding envisaged from TEN-T.		
IE20	WATER	Cork (IE)	Works	Further development of Port of Cork Masterplan	Port of Cork Company	Post 2020	60.0	Part-funding envisaged from TEN-T.	Cross Border	CEF Pre-identified
IE21	WATER	Dublin (IE)	Works	New Deepwater Berthage	Port of Dublin	Studies underway		Part-funding envisaged from TEN-T.	Cross Border	CEF Pre-identified
IE22	WATER	Dublin (IE)	Works	New RoRo Facility	Port of Dublin	Studies starting in 2016		Part-funding envisaged from TEN-T.		CEF Pre-identified

Luxembourg – Set 1: Projects starting before 2020.

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
LU1	RAIL	Bettembourg railway station	Works	Bettembourg railway station - Modification of fixed installations - Construction of a new signal box - Modernisation of fixed installations of the marshalling yard Bettembourg-Dudelange	CFL	2013-2022	507.4	State funding, EU funding		
LU2	RAIL	Bettembourg/Dudelange intermodal terminal	Works	Construction of a new bimodal terminal (rail/road) in Bettembourg/Dudelange	CFL	2014-2017	220.0	State funding, EU funding		
LU3	RAIL	Howald	Works	Construction of a new peripheral railway station in Luxembourg-Howald	CFL	2014-2025	294.4	State funding, EU funding	Intermodality Cross Border	
LU4	RAIL	Luxembourg railway station	Works	Luxembourg railway station: - Modification of fixed installations. - Construction of a signal box - Construction of a new storage yard - Modernisation of the electric traction installations	CFL	2013-2020	554.3	State funding, EU funding	Cross Border	
LU5	RAIL	Luxembourg-Kleinbettingen/ Bettembourg rail axis	Study + Works	EuroCap-Rail : Phase 2 : Modernisation of the Luxembourg-Kleinbettingen railway line Re-electrification (25000 Volts) of the railway line : 49 400 000 € Re-electrification of the railway line : lifting of bridge at pk 17,030 in Kleinbettingen : 950 000 € Re-electrification of the railway line : lifting of bridge at pk 9,984 in Mamer : 7 100 000 € Re-electrification of the railway line : lifting of bridge at pk 8,913 in Mamer-Lycée : 3 350 000 € - Phase 3 : Modernisation of the Luxembourg-Kleinbettingen railway line, railway stations and rail structures	CFL	Phase 2 : 2013-2017 Phase 3 : 2019-... Bettembourg - Luxembourg : 2013-2020	602.1	State funding, EU funding	Bottleneck Interoperability Cross Border	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
				: 328 482 000 € - Construction of a new railway line between Bettembourg and Luxembourg : 212 804 000 € International passenger traffic will be affected to the new line.						
LU6	RAIL	Rodange-Esch/Alzette-Bettembourg rail axis	Works	Railway line Rodange-Esch/Alzette-Bettembourg/border : - Modernisation of Differdange station - Modernisation of fixed installations in Differdange station - Removal of level crossings - Reconstruction of the rail stop of Obercorn - Modernisation of fixed installations in Belval-Usines station - Modernisation of Schifflange station	CFL	2014-2020	133.5	State funding, EU funding		

Luxembourg – Set 2: Projects starting after 2020 or with missing information.

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
LU7	ROAD	A1 from Luxembourg to Germany	Study	Modernisation of a bridge on motorway A1 from Luxembourg to Germany	n.a.	n.a.		State funding, EU funding		
LU8	ROAD	A3/A31 between Luxembourg and Metz	Study	Construction of 2 more lanes on the motorway section between Luxembourg (LU) and Metz (F)	n.a.	2015		State funding, EU funding		
LU9	ROAD	Berchem highway station (A3/E25)	Study	Construction of a new parking for trucks with an Intelligent Parking System at the highway station of Berchem (A3/E25)	n.a.	n.a.		State funding, EU funding		

Netherlands – Set 1: projects starting before 2020.

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
NL1	MULTI	Venlo	Works	Increase of multimodal logistic platform Venlo (increase Railterminal and Barge Terminal)	Provincie Limburg/ gemeente Venlo/privat parties/Tradeport Nord	2016 (Barge terminal realisation) 2017 (Rail terminal realisation)	75.0	to be decided by national government and the region (12 November 2014)	Bottleneck Cross Border	
NL2	RAIL	Amsterdam	Works	Increase capacity of railway station Amsterdam South. Improve road and immediate junctions.	Rijkswaterstaat	2013 - 2028 (segments will be finished earlier)	994.0		Bottleneck	
NL3	RAIL	Rotterdam Port (europort) - Zwijndrecht	Study	Caland railway bridge, upgrade, new construction or diverting route	MoT & Port or Rotterdam	2015-2020	420.0	Reservation in national budget up to 157 million. Whether or not Port of Rotterdam contribution is dependent on which option is used.	Bottleneck Last Mile	CEF Pre-identified for RALP
NL4	RAIL	Rotterdam Port (europort) - Zwijndrecht	Works	Upgraded along port railway line (junctions and shunting yards).	MinIenM	2013- before 2020	280.0	MinIenM (MoT)	Bottleneck Last Mile	CEF Pre-identified for RALP
NL5	RAIL	Rotterdam-Antwerp; Amsterdam - Rotterdam	Works	ERTMS deployment plan. Infrastructure + Rolling stock	Prorail	2014-2020	50.0	MinIenM (MoT)	Interoperability Cross Border	CEF Pre-identified
NL6	RAIL	Terneuzen-Ghent	Study + Works	New rail infrastructure to improve hinterland rail connection	Zeeland Seaports	Study 2014/2015; Work after 2016	80.0	Work: Intention for Ten-T aid, no central government aid; Study: to be decided		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
NL7	RAIL	Vlissingen - Antwerpen	Study + Works	New rail infrastructure to improve hinterland rail connection	Province of Zeeland / Zeeland Seaports	Study 2014/2015; Work after 2020	200.0	Work: Intention for Ten-T aid, no central government aid; Study: to be decided		
NL8	RAIL	Vlissingen-Moerdijk; Utrecht-Geldermalsen;	Works	ERTMS deployment plan. Infrastructure + Rolling stock	Prorail	2014-2020	75.0	MinIenM (MoT)		
NL9	ROAD	A27 Houten-Hooipolder	Works	New infrastructure to relieve bottlenecks, or upgrading current infra on corridor from Breda to Utrecht.	Rijkswaterstaat	2019-2023/2025	787.0		Bottleneck	
NL10	ROAD	Amsterdam	Study	A10 Seperate local from long-distance traffic.	Rijkswaterstaat	2017-2028	332.0		Bottleneck	
NL11	ROAD	Amsterdam	Works	Traffic congestion (A9 junction).	Rijkswaterstaat	2013-2017	336.0		Bottleneck	
NL12	ROAD	Rotterdam	Study	A4 New infrastructure to relieve bottlenecks, or upgrading current infra.	Rijkswaterstaat	2017-2022	440.0			
NL13	ROAD	Rotterdam	Works	Blankenburg Tunnel	Rijkswaterstaat	2017-2022/2024	1,154.0			
NL14	ROAD	Rotterdam	Works	North eastern Rotterdam Bypass to connect the A13 and A16 motorways.	Rijkswaterstaat	2017-2021	964.0			
NL15	ROAD	Utrecht	study	Construction northern route (Noordelijke Randweg Utrecht)	Rijkswaterstaat	2018 - 2026	213.0		Bottleneck	
NL16	ROAD	Utrecht	study	Increase capacity A12. Different solutions under study (A27/A12 Ring Utrecht)	Rijkswaterstaat	2018 - 2024/2026	1,120.0		Bottleneck	
NL17	ROAD	Utrecht - Arnhem	Works	A12 One more lane (in both directions)	Rijkswaterstaat	2015 - 2016	110.0		Bottleneck	
NL18	WATER	Amsterdam - Utrecht - Rotterdam	Works	Projects regarding Lek canal: Increase capacity of Princess Beatrix Lock and Widen the Lek canal	Rijkswaterstaat	2016 - 2020	233.0	Intention for TEN-T aid	Bottleneck	Regarding Princess Beatrix Lock: CEF Pre-identified for NS Baltic

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
NL19	WATER	Dordrecht - Emmerich	Works	Future vision Waal. Short term dredging to extend the dimensions. Finding a long term geological solution. Finally increasing the number of mooring places.	Rijkswaterstaat	2006 - 2021 (segments will be finished earlier)	131.0	Intention for TEN-T aid crossbroder project Lobith) This part is not under construction yet!	Bottleneck Cross Border	CEF Pre-identified for RALP
NL20	WATER	Ijmuiden - Amsterdam	Works	Amsterdam lock: build of a new lock to increase port handling capacity and safety. Furthermore to comply with larger dimensions of vessels.	Rijkswaterstaat	2015-2019	891.0	Intention for TEN-T aid	Bottleneck Intermodality	CEF Pre-identified for NS Baltic
NL21	WATER	Ijmuiden - Amsterdam	Study	New location for transhipment; lock, Averijhavendepot.	Rijkswaterstaat	2014-2017	65.0		Intermodality	
NL22	WATER	Maasroute	Works	Maasroute phase 2	Rijkswaterstaat	2014-2018	80.0	Intention for TEN-T aid	Bottleneck Cross Border	Part of Maaswerken; CEF Pre-identified
NL23	WATER	Moerdijk	Study	Study to prepare the construction of a Rail Service Centre at Port of Moerdijk to improve interconnectivity between sea, rail and inland waterway transport	Port of Moerdijk	2014-2018	0.5	Intention for TEN-T aid	Intermodality Last Mile Cross Border	
NL24	WATER	Rotterdam	Works	Container Logistics Maasvlakte (CLM) - logistical solutions of combining cargo in order to create full trians and reduce turnaround times and nr of calls.	Port of Rotterdam	2015-2017	125.0	To be decided; decision will be made by end of Novermber 2014	Bottleneck	
NL25	WATER	Rotterdam	Works	Deepening of the Nieuwe Waterweg to ensure nautical accessibility	Port of Rotterdam	2016-2017	24.0	Port of Rotterdam		
NL26	WATER	Rotterdam-Gorinchem	Study	Increase the number of mooring locations	Rijkswaterstaat	2016 - 2017	29.0		Bottleneck	
NL27	WATER	Scheldt river	Study + Works	Improvement of nautical accessibility Port of Vlissingen	Zeeland Seaports	2014 – 2018	30.0	Work: Intention for Ten-T aid, no central government	Bottleneck	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
								aid; Study: to be decided		
NL28	WATER	Terneuzen	Works	New lock in Terneuzen	Vlaams Nederlandse Schelde Commissie (VNSC)	2015-2021	930.0	State funding (The Netherlands, Flanders region), EU funding	Bottleneck Intermodality Sustainability Cross Border	CEF Pre-identified
NL29	WATER	Tilburg	Works	Wilhelmina Canal phase 1.5	Municipality Tilburg and Province of Noord-Brabant	2015-2017	22.9	financed by the local authority, the province and private canal related companies.		
NL30	WATER	Volkerak	Works	Options for increasing traffic throughput in Volkeraklock, Kreekaklock, and Krammerlock.	Rijkswaterstaat	2014-2015 (quick wins option). 2024-2026, fourth lock chamber	157.0		Bottleneck Intermodality Cross Border	CEF Pre-identified

Netherlands – Set 2: projects starting after 2020, projects nearing completion, and projects with missing information.

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
NL31	MULTI	Born	Study	Rail connection VDL Nedcar with connection to bargeterminal Born: multimodale connection of VDL Nedcar	Gemeente Sittard-Geleen/provincie Limburg	2015 - study		Gemeente Sittard-Geleen/provincie Limburg		
NL32	MULTI	Venlo	Works	Planning study for Greenport Venlo Rail Terminal (Venlo, Holland)	Trade Port Noord CV	2013-2014	1.4	Co-financing from TEN-T		
NL33	RAIL	Amsterdam	Works	Increase capacity/reliability of railway station Amsterdam Central for both rail freight and rail passenger transport	MinIenM (MoT)	-	431.0	MinIenM (MoT)		
NL34	ROAD	A2 't Vonderen-Kerensheide	Works	New infrastructure to relieve bottlenecks, or upgrading current infra on corridor Eindhoven - Maastricht.	MinIenM	2022-2025/2027	256.0			
NL35	ROAD	Amsterdam	Works	Construct parallel tunnel, Coentunnel	Rijkswaterstaat	2013 - 2014	2,196.0			
NL36	ROAD	Eindhoven	Study	Increase capacity on A67	Rijkswaterstaat/ Provincie Noord Brabant/Provincie Limburg	not yet decided		not yet decided		
NL37	ROAD	InnovA58 (part St. Annabosch-Gelder and part Tilburg-Eindhoven)	Works	New infrastructure to relieve bottlenecks, or upgrading current infra on east-west corridor of A58.	MinIenM	2023-2026/2028	433.0		Bottleneck	
NL38	ROAD	Rotterdam	Works	Maasvlakte-Vaanplein. A15 motorway upgrade. Includes Botlek bridge.	Rijkswaterstaat	2011-2015	2,031.0		Bottleneck	
NL39	ROAD	Schiphol-Almere-Amsterdam (part A6 Almere, part A9 Amstelveen)	Works	New infrastructure to relieve bottlenecks, or upgrade current infra in Amsterdam region.	Rijkswaterstaat	2021-2024/2026	992.0		Bottleneck	
NL40	ROAD	Venlo	Study + Works	Increase parking capacity on A67	MinIenM/RWS	not yet decided		not yet decided		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
NL41	ROAD	Zaandam - Amsterdam	Works	Extra peak hour lane junction Coenplein	Rijkswaterstaat	2014 - 2015	25.0			
NL42	WATER	Amsterdam	Study	Phase 2 Implementation study to prepare the start of the PPP procurement to improve maritime access to the TEN-T network at Amsterdam	MinIenM	2013-2014	5.4	Co-financing from TEN-T		
NL43	WATER	Beatrix Locks on Lek Canal.	Study	Implementation study eliminating the major bottlenecks in the Amsterdam - Rotterdam - Antwerp corridor	Rijkswaterstaat	2012-2014	4.3	Co-financing from TEN-T		
NL44	WATER	Geheel Nederland	Works	Subsidieregeling Quick Wins Binnenhavens	MinIenM	2008-2015	162.0			
NL45	WATER	Geheel Nederland	Study + Works	Verbeterprogramma Waterkwaliteit	MinIenM	2009-2015	570.0			
NL46	WATER	Gouwe	Works	Construction of a second lock chamber lock Gouda	Provincie Zuid-Holland	2012-2014	50.0			
NL47	WATER	Ijmuiden - Amsterdam	Works	Upgrade traffic management system Noordzeekanaal	Rijkswaterstaat	2010 - 2014	26.0			
NL48	WATER	Maasroute	Works	Maasroute, Upgrade of Inland Waterways from class Va to class Vb specifications.	Rijkswaterstaat	2007-2014	373.0	Co-financing from TEN-T		Part of Maaswerken; CEF Pre-identified
NL49	WATER	Maas-Veghel	Works	Re-route and Upgrade Zuid-Willemsvaart	MinIenM	2010-2015	452.0			
NL50	WATER	Moerdijk	Study	Traffic management system Hollandsch Diep-Dordtsche Kil	Rijkswaterstaat	2025-2027	10.0			
NL51	WATER	NL	Study	LNG Masterplan for Rhine-Main-Danube 2012-EU-18067-S		2011 – ongoing	80.0	50% Co-financing from TEN-T		
NL52	WATER	NL	Study	Study on RIS enabled IWT corridor management		2013 - 2015	2.8	50% Co-financing from TEN-T		
NL53	WATER	Ternaaien	Works	Construction of a fourth lock chamber.		2011-2015		Financed in partnership between Belgium and Netherlands.		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
NL54	WATER	Tilburg	Works	Wilhelmina Canal Tilburg - phase 1	MinIenM (MoT)	2005 - 2016	79.0	financed by the government, the local authority, the province and private canal related companies.		

UK – Set 1: projects starting before 2020.

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
UK1	MULTI	Belfast	Works	Improvements in terms of capacity requirements for road and rail traffic , alleviation of bottlenecks and the promotion of cross-border connectivity.	Dept. for Regional Transport Northern Ireland	2016	110.0	State Funding	Bottleneck Intermodality Cross Border	CEF Pre-identified
UK2	RAIL	Edinburgh - Glasgow	Works	Electrification of the key routes to improve connectiions between key nodes, remove bottlenecks and reduce carbon emissions.	Network Rail	2012-2019	346.0	State Funding	Bottleneck Interoperability Sustainability	CEF Pre-identified
UK3	RAIL	Felixstowe-Nuneaton	Works	Improvements to increase the gauge and overall capacity of this important freight route. Will enhance capacity, remove bottlenecks and reduce C02 emissions.	Network Rail	2012-2019	850.0	State Funding	Bottleneck Interoperability Sustainability	CEF Pre-identified
UK4	RAIL	North West England	Works	Northern Hub: Installation of or improvements to electrification and capacity developments. Will remove bottlenecks and support economic growth.	Network Rail	2019	1,580.0	State Funding	Bottleneck Interoperability	CEF Pre-identified
UK5	RAIL	Stafford	Works	To address capacity and performance constraints in the Stafford area and remove bottlenecks.	Network Rail	2014-2017	265.0	State Funding	Bottleneck	
UK6	RAIL	West Coast Main Line: North Wembley to Great Strickland	Works	Power supply upgrade to increase capacity and reliability and reduce carbon emissions.	Network Rail	2014-2017	276.0	State Funding	Interoperability Sustainability	
UK7	RAIL	West coast main line: Southampton via Reading & Oxford.	Works	Major north-south rail electrification and capacity enhancement to imporve capacity and remove bottlenecks.	Network Rail	2016	54.0	State Funding	Bottleneck Interoperability Sustainability	CEF Pre-identified

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
UK8	ROAD	Belfast	Works	Improve accessibility between the Westlink and the M2 and M3 with a grade-separated junction in central Belfast and remove one of the last remaining bottlenecks on the Core Network/Corridor in Northern Ireland.	Dept. for Regional Transport Northern Ireland	2017	165.0	State Funding	Bottleneck Last Mile	
UK9	ROAD	Birmingham	Works	Improve the M6 by making it a "smart motorway" between junctions 10a and 13 to provide additional capacity via the hard shoulder.	Highways Agency	Underway – 2015/16	128.0	State Funding	Bottleneck	
UK10	ROAD	Central Scotland	Works	The M8 M73 M74 Motorway Improvements project involves constructing 10km of new M8 motorway and a new A8 trunk road, major improvements on the M74 and widening of sections of motorway to improve connectivity through the Central Scotland motorway network. The will reduce congestion and improve journey times and safety.	Transport Scotland	2013/14-2017/18	631.0	Non-Profit Distributing Model (State Funding, Private Funding, EIB)	Bottleneck	
UK11	ROAD	Chertsey to Farnborough	Works	Improvements to the M3 by making it a "smart motorway" between junctions 2 and 4a (13.4 miles / 21.6km). This will enhance capacity.	Highways Agency	Underway – 2015/16	218.0	State Funding	Bottleneck	
UK12	ROAD	Kettering	Works	Widening the A14 J7-9 Kettering bypass by providing an extra lane in each direction.	Highways Agency	Underway – 2015/16	53.0	State Funding	Bottleneck	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Costs in MEUR	Financing sources	Critical issue	CEF pre-identified section
UK13	ROAD	Newry	Works	A high standard southern relief road linking Warrenpoint Harbour to the A1 TEN-T Core Corridor to national and cross-border destinations such as Belfast, Warrenpoint Harbour and Dublin. Improve journey times and road safety and significantly reduce congestion.	Dept. for Regional Transport Northern Ireland	2016	265.0	State Funding	Bottleneck Last Mile Cross Border	
UK14	ROAD	North East London	Works	Improve capacity on M25 Junction 30 and in particular the A13 through Junction 30 and to the junction with the A126, to address capacity constraints on the development of the lower Thames Valley.	Highways Agency	2014/15 - 2017/18	129.0	State Funding	Bottleneck	

4.7 ERTMS

European Railway Traffic Management System (ERTMS) is one of the TEN-T horizontal priorities on the core network in the transport sector, and a requirement for deployment on the core rail core network by 2030. It addresses the harmonisation of railway signalling systems in Europe, improving interoperability across borders, for services ranging from high speed trains running at 300kph on dedicated routes to freight trains on conventional lines[39].

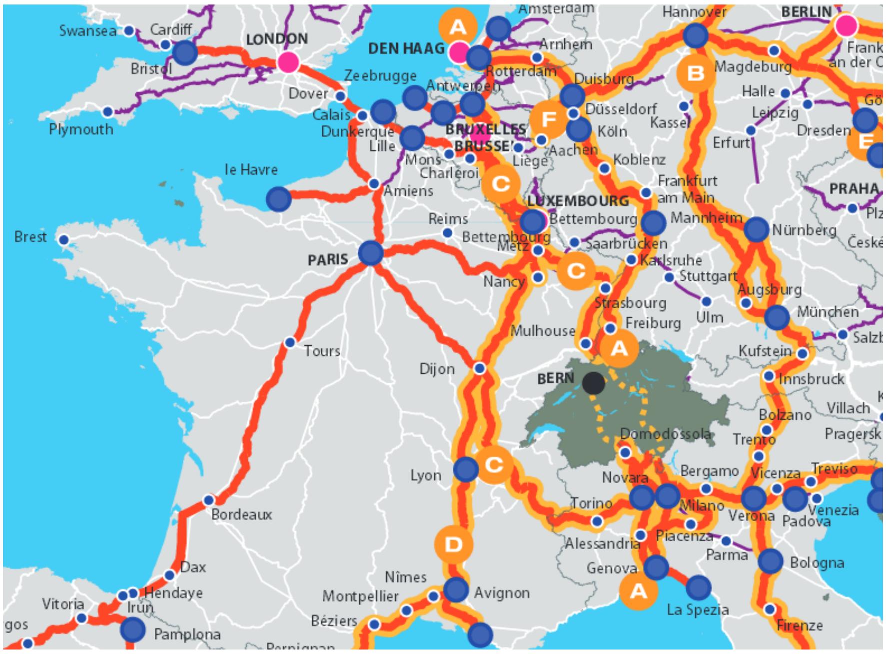
ERTMS consists of[40]:

- ETCS, the European Train Control System, an automatic train protection system (ATP).
- GSM-R, a radio system for providing voice and data communication between the track and the train, based on standard GSM using frequencies specifically reserved for rail application with certain specific and advanced functions.

Adopting the system offers improved capacity, allowing a higher number of available train paths at peak times, higher safety levels, and improved service reliability and punctuality. There are significant costs incurred in migration from older systems, but long-term it is expected to reduce costs. ERTMS requires upgrades of both the infrastructure and the locomotives, but if established it simplifies the operation of trains between national networks, also promoting competition.

The 2010 EU ERTMS Deployment Plan for ERTMS was organised into corridors, of which Corridor C follows a similar alignment as the NSMED core network corridor from the Netherlands to Belgium, and via Luxembourg to France and Switzerland. See below.

Figure 30: EU ERTMS Deployment Plan for 2020

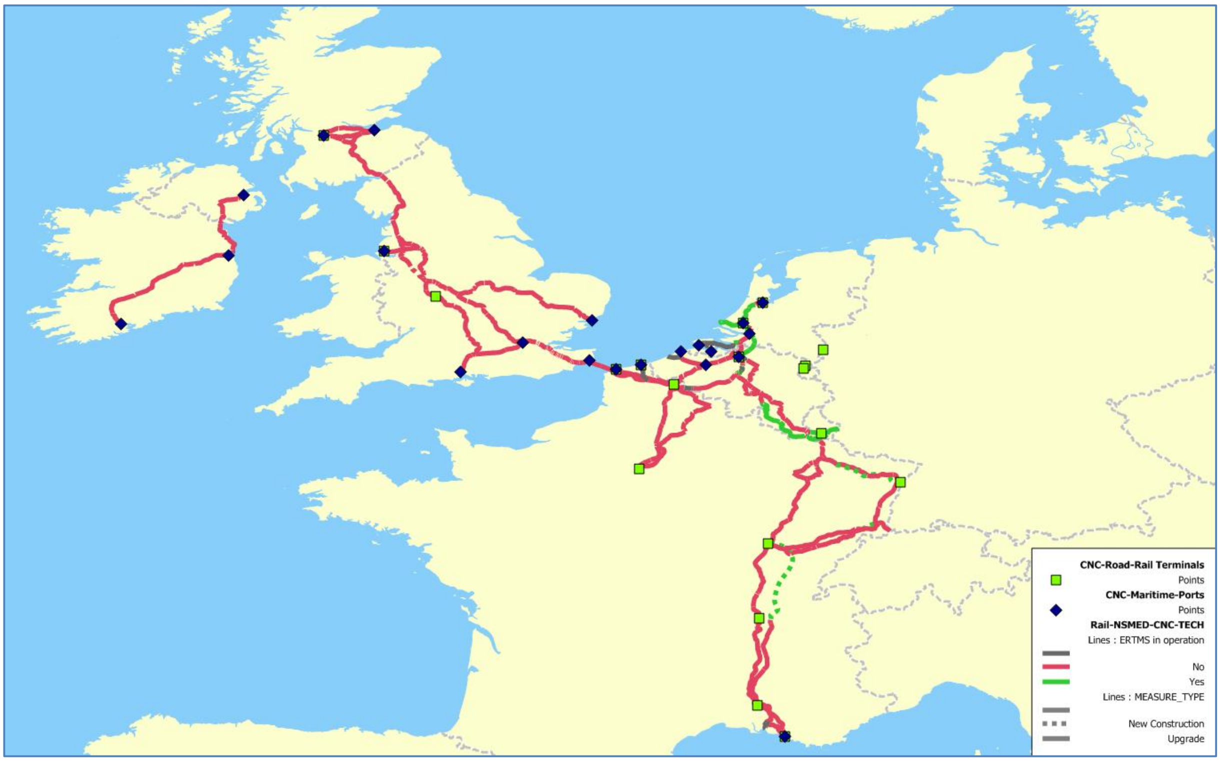


Source: DG MOVE, 2010.

[39] Commission Staff Working Document on the state of play of the implementation of the ERTMS Deployment Plan (14.2.2014)
[40] ERTMS.net

Deployment levels are increasing in Europe. Within the corridor, ERTMS has already been implemented in Luxembourg, and also on the high speed (Thalys) line connecting Belgium and the Netherlands, amongst others. Both Netherlands and Belgium will have achieved ERTMS compliance on corridor links by 2022. Nevertheless, as the image below shows, compliance on ERTMS for the corridor (indicated by green lines) as a whole is quite low. Ireland is exempt, as an isolated network, but deployment in the two largest national networks in the UK and France is foreseen by 2030 (subject to Member States having available funds and the economic viability of implementation).

Figure 31: ERTMS Deployment on NSMED corridor



Netherlands

In the Netherlands, all trains will be equipped with ERTMS by 2022 and the infrastructure to support the system will be rolled out across the busiest lines in the network by 2028, meaning that both the high speed passenger route and the conventional route between Rotterdam and Antwerp via Roosendaal which make up the NSMED rail corridor in the Netherlands, will be compliant.

Belgium

In Belgium, major improvement in the level of safety are being applied on the entire network. It is planned that the whole Belgian network will be equipped with ERTMS by 2022, and following decision 2012/88/EC, Belgium will give priority to ERTMS deployment on corridor C in 2015.

France

In France, most of the rail signalling systems are not obsolete yet as they date from the 1990s. France is therefore currently drawing up a plan for ERTMS deployment taking into account system obsolescence. On the conventional network, ERTMS is being deployed since 2013 on 2 pilot sites:

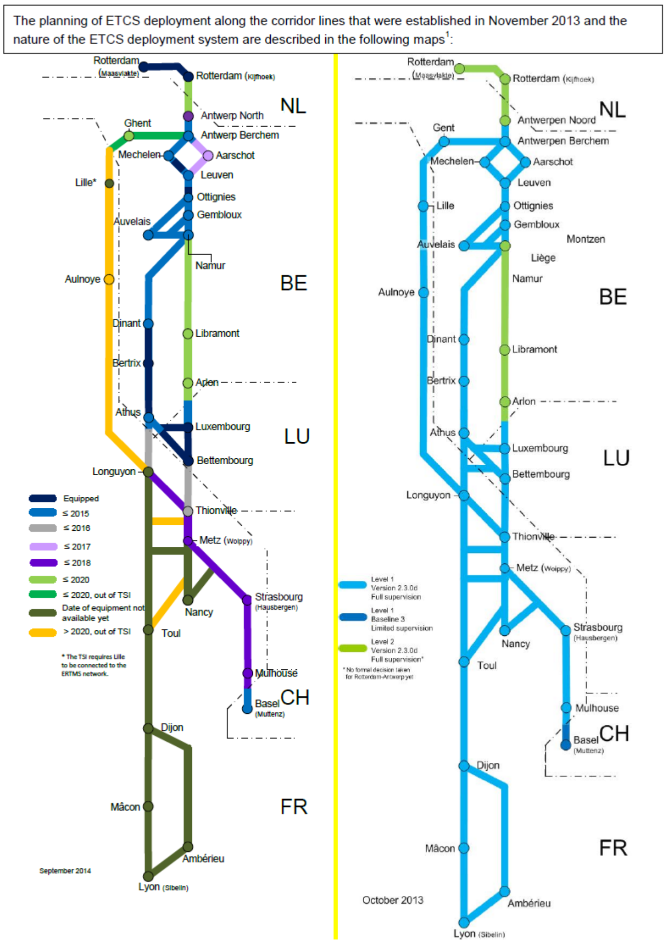
- Uckange to Zoufftgen on the French-Luxembourg border (20km),
- Longuyon to Mont-Saint-Martin on the French-Belgian border (20km).

Apart from those two short links, priority is being given to the Longuyon-Basel line on ERTMS corridor C with an objective for deployment by 2018. This line is located on the NSMED corridor apart from a short stretch between Longuyon and Uckange. Studies on this line started in 2013.

UK
In the UK, ERTMS is being implemented nationally on the main high speed and conventional lines. The roll-out programme will first address the Great Western Main Line and East Coast Main Line, with rolling stock fitment by 2022 and the majority of infrastructure fitment by 2025. The principal lines on the corridor in the UK are newly built or newly upgraded lines so these do not need further upgrade until beyond 2027. Network Rail planning currently indicates that around half (by length of track) of the NSMED rail corridor in the UK will have ERTMS in operation by 2030.

RFC2 has analysed ERTMS deployment for the majority of the continental corridor sections. A map is shown below, indicating plans for upgrading.

Figure 32: ERTMS Deployment in Rail Freight Corridor 2



Map 21: Timing of the ETCS deployment along the corridor lines that were established in Nov. 2013

Map 22: nature of the ETCS deployment system along the corridor lines that were established in Nov. 2013

Source: Rail Freight Corridor 2. (Includes lines not present in corridor)

This indicates that an important section of the NSMED rail network: Rotterdam-Antwerp-Leuven-Namur-Luxembourg-Metz-Strasbourg-Mulhouse-Basel will be ERTMS equipped by 2020.

4.8 Monitoring the Work Plan

Regulation 1315/2013, articles 45(5b) and 47 (1c) indicate that following the launch of the work plan, the implementation should be monitored. There are two important considerations:

- The need to monitor the achievement of the TEN-T interoperability requirements, as set out in the regulation.
- The use of TENtec as the information system for analyzing the state of implementation.

As such, an approach has been set out in which the indicators defined as TEN-T requirements are clearly marked, and where all indicators can be computed from the existing TENtec variables. The indicators are used to track the evolving status of the corridor, and therefore are not interpreted as targets, objectives or performance measures. The Regulation provides the quantitative targets, and as mentioned in this report, these TEN-T requirements are subject to caveats such as economic feasibility, and physical feasibility, isolated network status and so on.

Certain indicators such as the length of waterways with 9.1m bridge clearance are not based on the TEN-T requirements, but are included here as they have been mentioned as important criteria by stakeholders, and can be extracted from the TENtec data structures. Indicators which are not specific requirements as set out in the Regulation are marked as such.

In order to allow the monitoring process to be useful, it should be possible to extract information for specific branches of the corridor, and to be able to calculate the indicators for these pre-defined subsets: e.g.:

- ERTMS on the FRC2 sections between Rotterdam and Basel
- Waterways between Amsterdam and Paris

Adopting a methodology which can be adapted to be applied to certain branches helps to clarify situations where, for example, a short stretch of non-compliant infrastructure (perhaps only 1% of the corridor kms) is overlooked even though this may be the main barrier in ensuring full continuity of the branch.

A suggested approach is provided on the following pages. The structure is based upon the TEN-T criteria per mode, and the indicators related directly to the TEN-T criteria are marked. Additional indicators which are considered relevant for the work plan and for the performance of the corridor, but which go beyond the TEN-T criteria are therefore identifiable. Alternatively it allows sections which are exempt from the criteria (e.g. rail gauge in Ireland) to be separated.

Modal split, which can be defined in different ways, has been calculated as the tonne-kilometres on the defined corridor sections. As a general indicator, for the whole corridor, the absolute level of this indicator depends to a great extent on the way in which the corridor has been defined. For example, the corridor contains a high percentage of the important waterway links, but a lower number of road links relative to the wider network.

Some proposed indicators cannot be filled from existing data. These are shown as not available 'N/A'.

The status is shown overleaf for the whole corridor for 2014.

Table 40: Suggested Methodology for Monitoring Work plan

Mode	Bottleneck	Missing link	Cross-border	Interoperability	Intermodality	Last mile	Sustainability	TEN-T Requirement	Indicator for Monitoring Workplan	Type	2014	2015	2016
Rail				X				X	Electrified *(UK and IE included)*	Passenger/freight	82%		
				X				X	Electrified *(UK and IE not included)*	Passenger/freight	100%		
				X				X	1435 mm *(UK and IE included)*	Passenger/freight	93%		
				X				X	1435 mm *(UK and IE not included)*	Passenger/freight	100%		
	X			X			X	X	ERTMS	Passenger/freight	11%		
	X							X	Line speed > 100 KPH	Freight	90%		
	X							X	Axle load > 22.5T	Freight	84%		
	X							X	Train length > 740m	Freight	60%		
Inland waterways	X			X				X	CEMT class IV (or above)	Freight	96%		
	X			X					CEMT class V (or above)	Freight	82%		
	X			X					CEMT class VI (or above)	Freight	29%		
	X			X				X	Draught (min. 2,5m) *(links with tidal issues are not included)*	Freight	97%		
	X			X				X	Height (min. 5,25m)	Freight	87%		
	X			X					Height (min. 7,0m)	Freight	44%		
	X			X					Height (min. 9,1m)	Freight	36%		
	X								Share of multiple locks	Freight	32%		
	X							X	RIS implementation	Freight	90%		
Road	X							X	Express road or motorway	Passenger/freight	91%		
							X	X	Parking areas every 100km	Passenger/freight	N/A		
							X	X	Availability of clean fuels	Passenger/freight	N/A		
				X				X	Interoperability of tolling systems	Freight	N/A		
Airport		X			X	X		X	Connection to rail network	Passenger/freight	45%		
							X	X	Availability of clean fuels	Passenger/freight	N/A		

Mode	Corridor issue adressed								Indicator for Monitoring Workplan	Type	2014	2015	2016
	Bottleneck	Missing link	Cross-border	Interoperability	Intermodality	Last mile	Sustainability	TEN-T Requirement					
Seaports	X				X	X		X	Rail connection	Freight	84%		
	X				X	X		X	Waterway gauge IV connection	Freight	71%		
	X				X	X			Waterway gauge V connection	Freight	65%		
							X	X	Availability of clean fuels	Freight	N/A		
Inland ports	X				X	X		X	Waterway gauge IV connection	Freight	100%		
	X				X	X			Waterway gauge V connection	Freight	N/A		
	X				X	X		X	Rail connection	Freight	94%		
							X	X	Availability of clean fuels	Freight	N/A		
	X				X				Capacity	Freight	N/A		
RRT	X				X				Capacity	Freight	N/A		
Multimodality		X			X		X		Modal share of rail and IWW (TKm on Corridor Sections)	Freight	44%		
									Modal share of rail (passenger)	Passenger	N/A		
Multimodality									Pre-arranged paths on corridor *(2015)*	Freight	48/day		
Implementation plan									Workplan Projects Completed	Passenger/freight	0%		

TOTAL length rail (F)	**4942**
TOTAL length rail (P)	**6024**
TOTAL length rail (F or P)	**6433**
TOTAL length IWW	**3612**
TOTAL length road	**4111**

5 Conclusions

Purpose
The purpose of this report is to provide the basis for the NSMED Corridor Work Plan. The work has progressed by developing maps, databases and lists; critical issues, technical parameters, lists of studies, lists of stakeholders, and ultimately lists of projects.

Status of Work Plan
The work plan has been evolving. This final report contains project sets from all Member States. Section 4.4.1 sets out a methodology for building the work plan in relation to the corridor objectives. A key motivation is the need to apply a differentiated approach throughout the corridor to allow for the fact that the TEN-T objectives do not all apply in equal measure throughout the corridor. The NSMED corridor is a new entity, and is geographically and politically diverse so there is a need to underline that no single measure is going to have more than a partial or indirect impact on other corridor branches.

Analysis
Three main areas have been analysed. Technical parameters refer to the requirements set out in the Regulation for TEN-T infrastructure. The market study provides a broader context, concerning demand, trends and future expectations. Critical issues are problem areas, including transport bottlenecks, so-called missing links or perceived gaps in the networks, and barriers to interoperability and intermodality. Summaries of these areas of investigation are set out in sections 4.2.1, 4.2.2, 4.2.3 and 4.2.4. In a nutshell we see two key areas for attention, (1) issues related to cohesion and accessibility for the more peripheral areas, and, by contrast, (2) issues related to congestion in the centre.

Currently, the market relies heavily on road transport, sea transport and air transport for both freight and passenger flows across borders, with rail (led by high-speed rail) also competing effectively for longer-distance passenger traffic on the Continent and between London and Paris/Brussels. However, as can be seen on adjacent corridors, there is potential for expanding the role which can be played by rail freight and waterborne freight services. This applies especially to the central part of the corridor, where the major seaports are already developing strategies for enlarging the potential of multimodal hinterland networks in partnership with hinterland infrastructure providers, the Member States and mainly private sector transport operators, and where regions and, in the UK, private sector developers are developing logistical hot spots combining the activities of inland ports, rail terminals and warehousing activities into multimodal inland platforms. Technical analysis of the networks do indicate that progress in this direction is hampered by network issues and, in some cases, land use planning issues; congestion in rail networks around city areas, limits to train length, issues related to rail electrification, low bridges across waterways, and discontinuity in the CEMT IV (or higher) networks are the main infrastructure constraints.

There is also potential for infrastructure located off the corridor to contribute to resolving the issues of congestion along the corridor itself. For example, direct maritime links between Ireland and the Continental mainland, longer distance maritime services from the east coast ports of Great Britain to the Continent and North-South road and rail routes parallel to the West Coast Main Line in Great Britain can accommodate traffic that would otherwise be on the corridor itself. The development of infrastructure for freight traffic on these routes would be largely market-led, given that shipping and rail freight services are operated by the private sector.

Seaports in the corridor are forecast to have growth potential, and it is feasible for this additional traffic to be handled “off-road” if inland waterways and rail networks perform at levels seen within the Rhine/Alpine corridor, where there are long lock-free high-gauge waterways all the way from the Rhine/Schelde delta to Basel, and where a combination of good rail infrastructure and financial incentives (assisted by Swiss Government policies which favour modal shift to rail through the Alps) help to achieve high rail freight shares between Italy and Germany.

Economic and demographic data shows that there is essentially a clustering of economic activity within the centre of the corridor, creating faster than average population growth around the major cities, and transport growth, linked also to the establishment of global trade and business hubs at the major container ports and airports. Maritime internal and external transport costs are much lower (per tonne-km) than inland costs, so shipping lines who face intense competitive pressures have tended therefore to focus their activities within the Corridor upon the ports that give them nearby access to these population centres. In this context it means they are bringing their containers into the range of ports between Dunkerque and Amsterdam on the continental side, and between Southampton and Felixstowe on the UK side, in large volumes.

The degree to which one form of economic clustering affects the other creates a high potential risk for the corridor, which is still highly dependent upon road transport for inland transport to and from the seaports. However, all of the core continental and UK seaports are actively developing facilities and programmes in partnership with infrastructure providers and Member States to develop multimodal hinterland networks, and there is sufficient critical mass of cargo to make this feasible.

One foremost missing link is to be mentioned: the Canal Seine-Nord-Europe which could link the Seine Basin with the northern-western waterways of the Benelux countries and encourage modal shift on the whole corridor, also helping the expansion of inland shipping in the key Parisian market, as well as the development of the Seine route.

The more peripheral areas on the Corridor in the north of Great Britain, in the Republic of Ireland and Northern Ireland suffer from road and rail congestion around the major conurbations, but are also affected by the distances (and therefore costs) involved in transporting freight to the main markets in the centre of the corridor and beyond. Given the distances involved, passengers are much more reliant on aviation services, and therefore airport infrastructure, rather than on high speed rail. The Republic of Ireland, Northern Ireland and Great Britain are inevitably highly reliant on ferry/RORO services (and therefore relevant port infrastructure) for access to the continental mainland, particularly for freight but also for passengers travelling in their cars.

Observations

NSMED corridor investments are crucial and closely linked with the long term development of the European economy, employment and trade with the rest of the world.

The corridor is characterised by high level of activity today. There are high levels of transport volumes, there is high growth potential , and high potential impacts and user/non-user benefits.

The corridor networks have good infrastructure, developed over a long period of time, including some major success stories such as the Eurostar/Thalys high speed rail network, but high demand, and in certain cases, ageing infrastructure lead to persistent levels of congestion and a long list of bottlenecks. Renewal and modernisation are recurring themes.

Relative to other corridors there is under-utilisation of non-road transport, and therefore high potential for achieving greater balance across modalities. This aim relates closely to the need to develop long distance waterway and rail corridors, supported by new technology and the application of common technical standards.

Seaports as hubs are leading the development of multimodal distribution. This process needs to be supported by equivalent capacities in inland logistics hubs, and frequent multimodal services.

European Value Added

The aim of the work plan is to indicate projects of common interest demonstrating European value added, i.e. projects in which the cross-border costs and benefits are distributed in such a way as to hinder their implementation. These are typically the cross-border projects, tacking critical issues such as bottlenecks, missing links, and lack of interoperability.

One of the starting points for the study has been the list of CEF Pre-identified projects (listed in Annex 11), but as has been demonstrated this includes some completed actions, some postponed actions, and actions which are only mentioned as general groupings. Furthermore, there has been no link between these pre-identified projects and the Regulation requirements, the market assessments, the critical issues and the defined strategic objectives.

A consideration here is the overlap between corridors. Several projects are relevant for NSMED, but listed as CEF pre-identified projects in other corridors. These are also shown in Annex 11. Since these are assigned as priorities in other corridors, they are not considered in this section of the report, although they have been included in the full list of projects.

The projects listed below address two major branches of the corridor, with the potential for improving model shares for rail and waterway within the central part of the corridor.

- Amsterdam-Utrecht-Rotterdam-Antwerp-Ghent-Lille-Paris – creating a continuous waterway corridor with TEN-T (or higher) gauge.

- Rotterdam–Antwerp-Namur-Luxembourg-Strasbourg-Mulhouse-Basel – creating a TEN-T compliant rail corridor (ERTMS), within the rail freight corridor network.

In addition, measures are included to address accessibility from and within regions at the perimeter of the corridor, including the DART Underground project (and associated sub-projects) in Dublin and on the cross-border rail line between Cork, Dublin and Belfast, measures to to address the rail bottleneck in Lyon and projects to improve accessibility to the major seaports in Ireland.

Examples showing how the projects might be combined to achieve goals of European value added are shown below.

Goal 1: Create a continuous waterway network between Paris and Amsterdam with the seine-Escaut connection. In Northern France, the goal is to complete the waterway connection between Paris, Lille and the Belgian border, thus creating a continuous network at CEMT V standard.

Figure 33: Key projects connected to Seine-Escaut in France

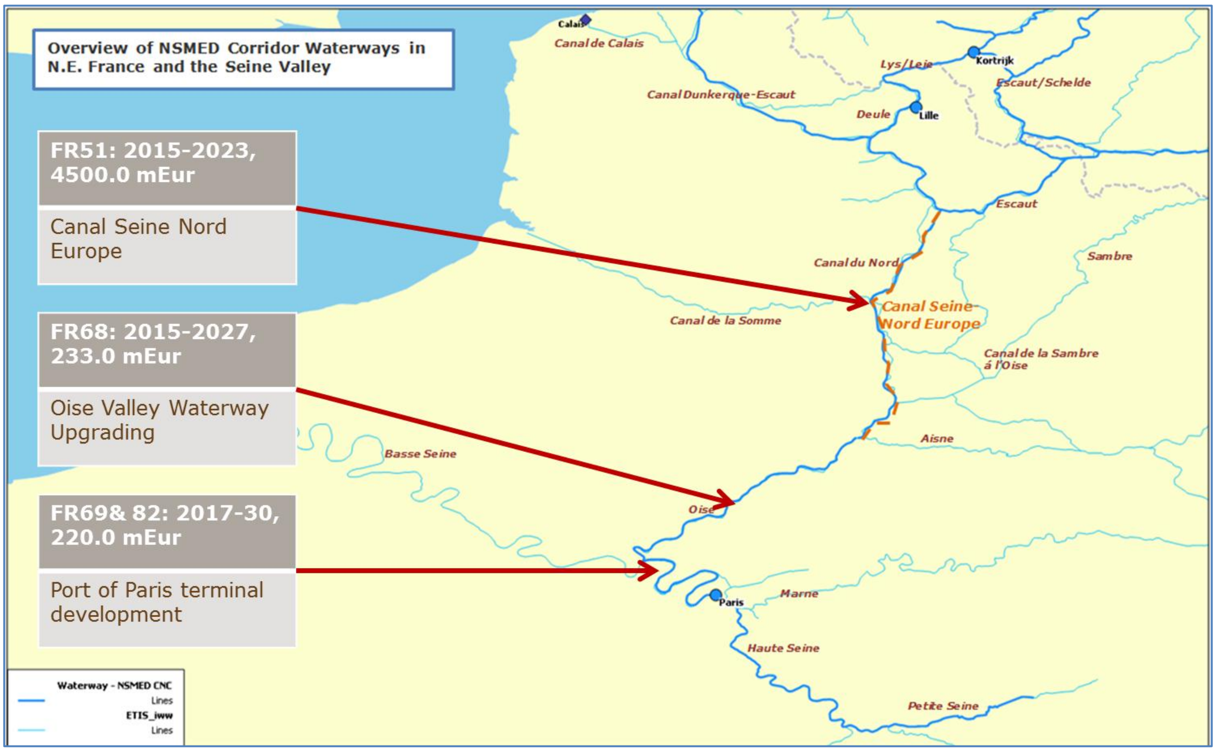


Figure 34: Key projects connected to Seine-Escaut in Belgium

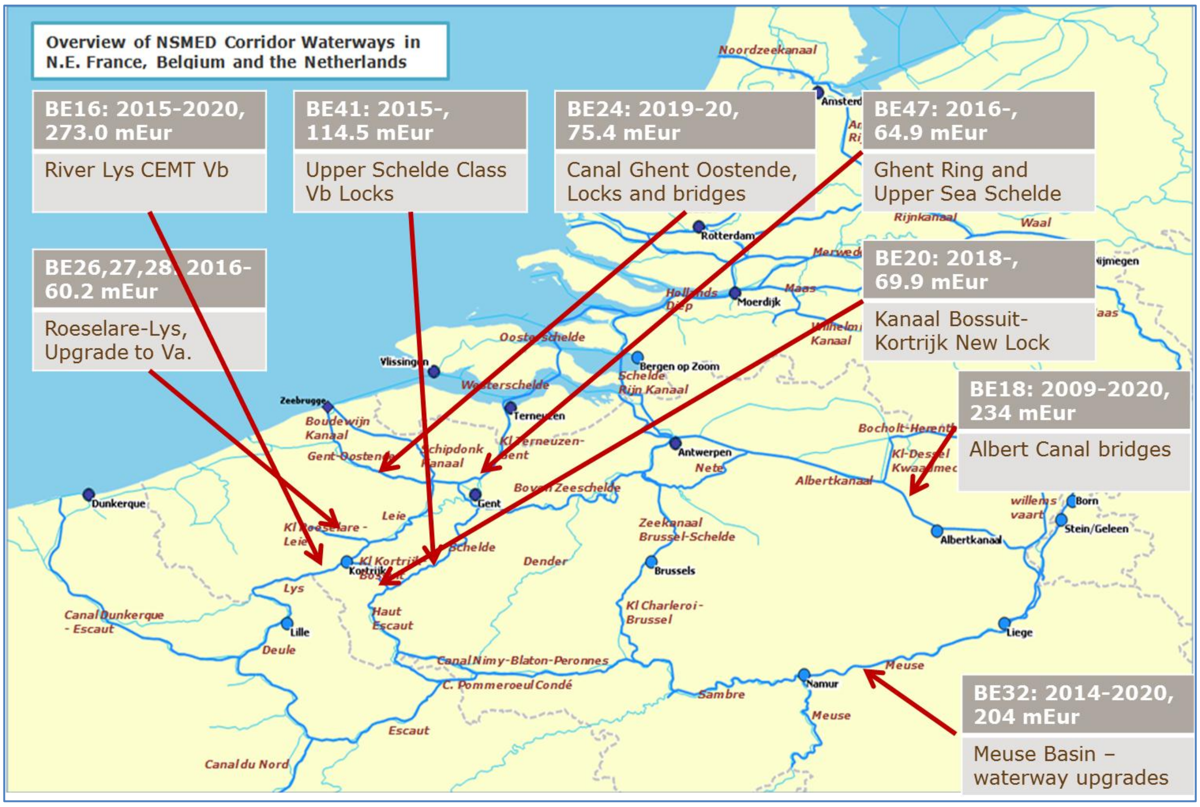
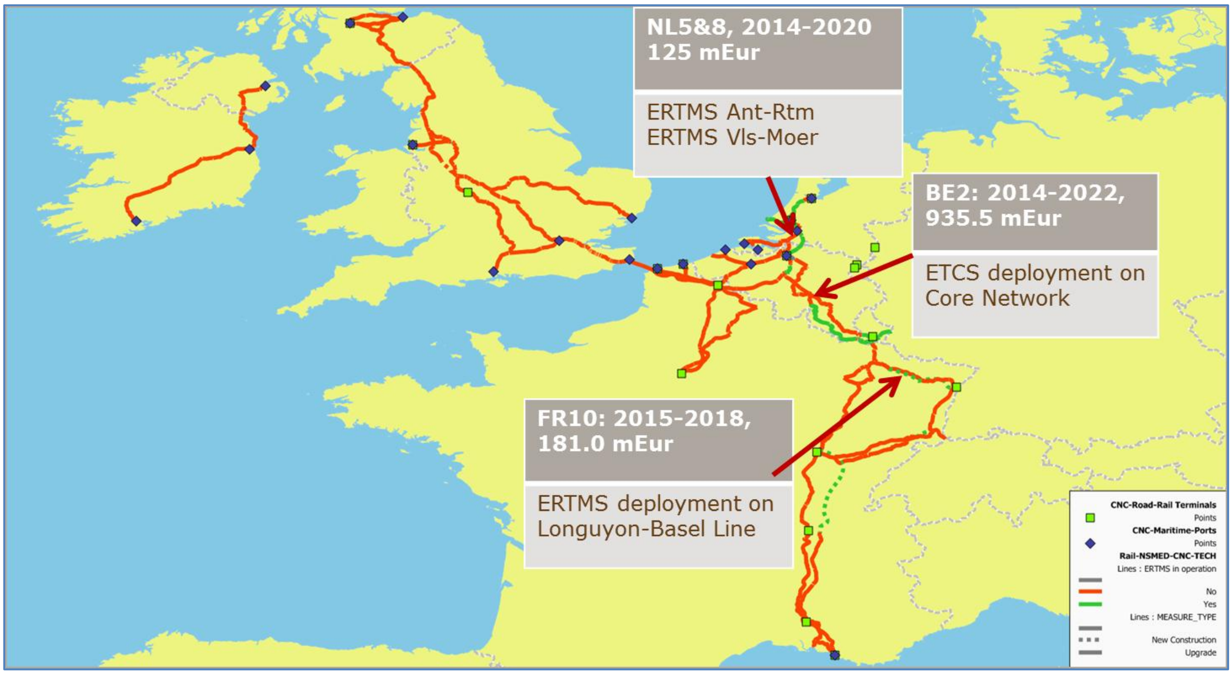


Figure 35: Key projects onnected to Seine-Escaut in the Netherlands

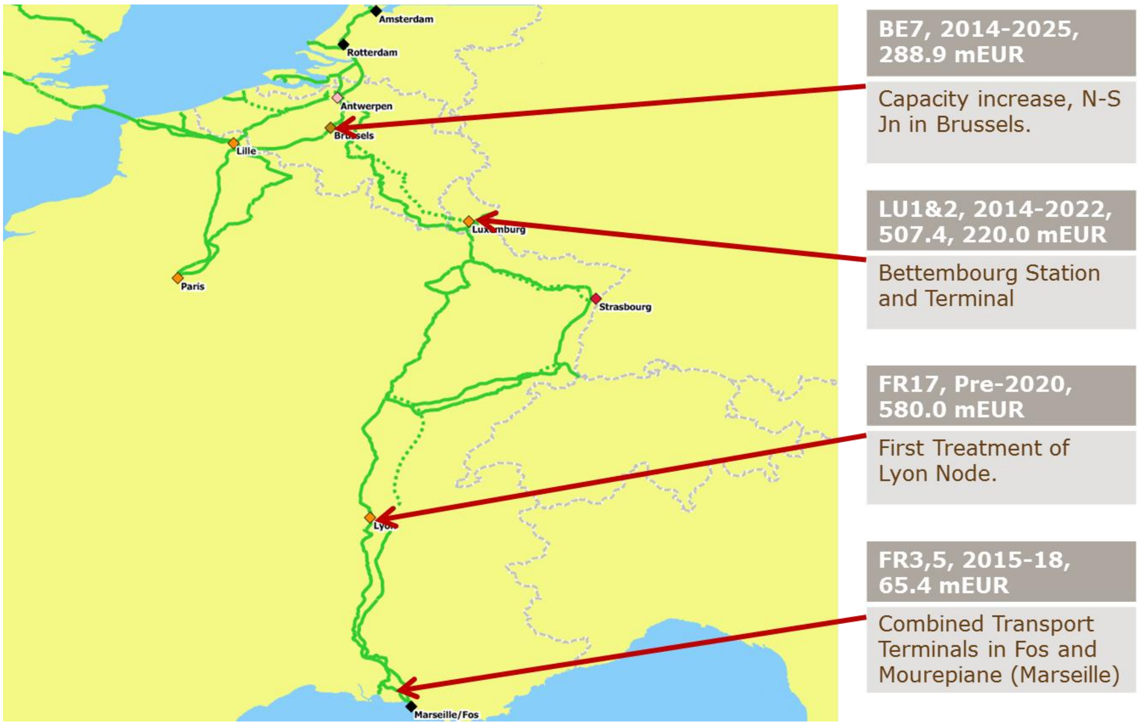
Goal 2: Create an ERTMS corridor on the international route between the Netherlands, Belgium, Luxembourg, France and Switzerland.

Figure 36: ERTMS deployment projects on Corridor "C"



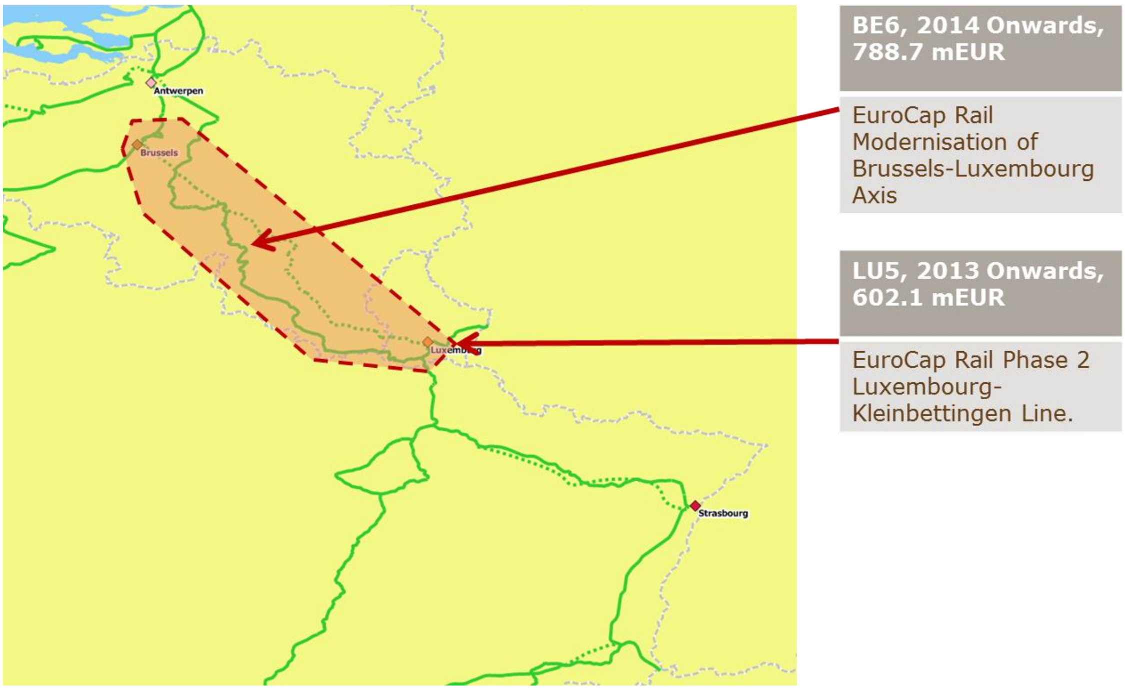
Goal 3: Solve railway bottlenecks in major cities to improve rail connectivity from Marseille/Fos towards Luxembourg and the north.

Figure 37: Solving Rail Bottlenecks in Belgium and France



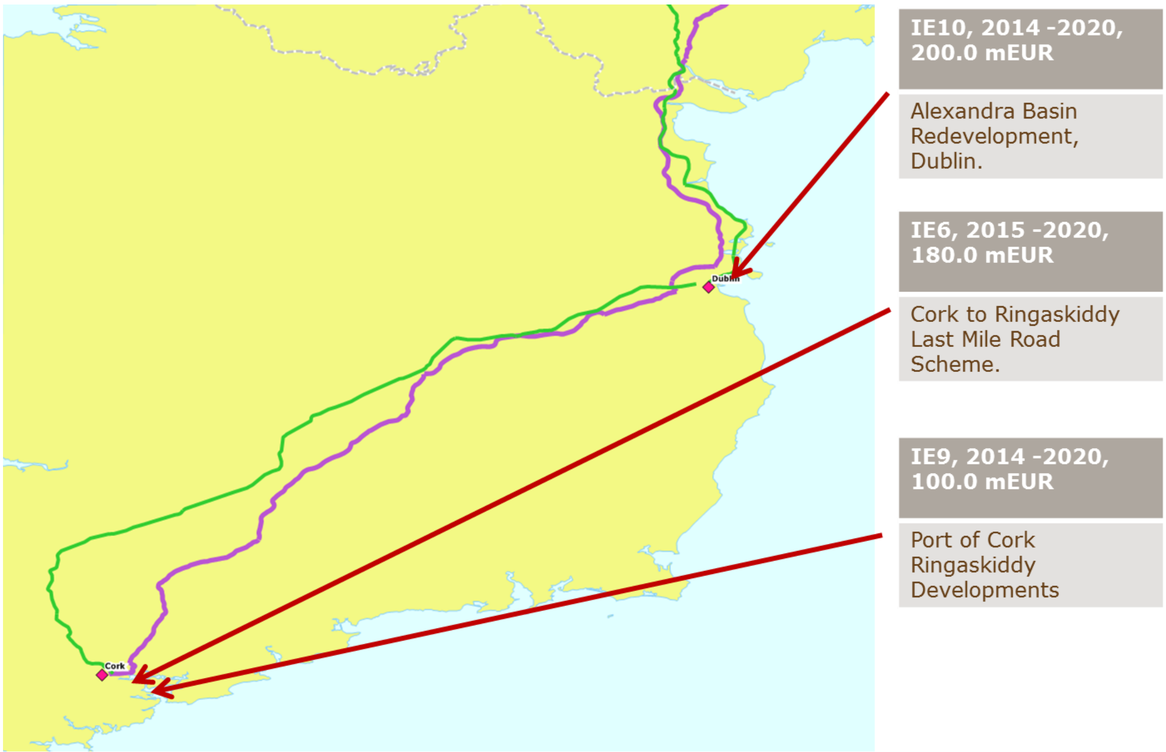
Goal 4: Extend the Eurostar/Thalys high speed passenger rail network by improving the link between Brussels, Luxembourg and Strasbourg.

Figure 38: Extending High Speed Passenger Rail network



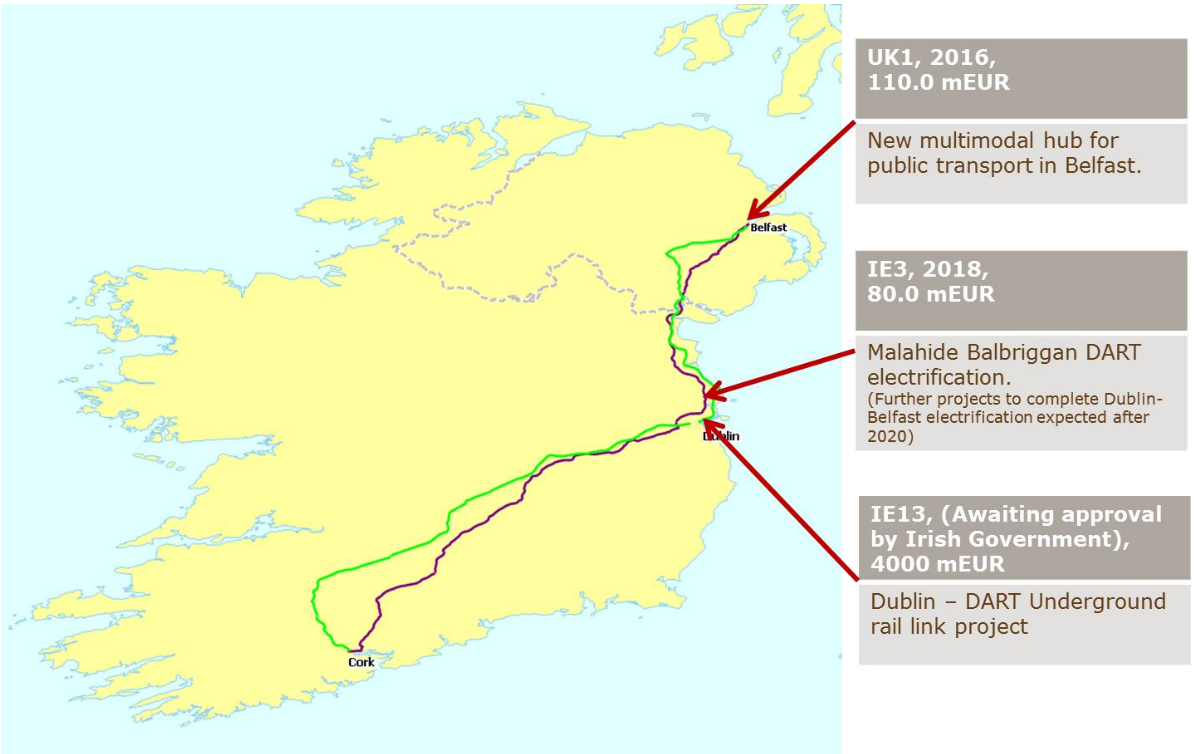
Goal 5: Improving accessibility between Ireland and the UK to the Continent via motorways of the sea.

Figure 39: Port Upgrades and Last Mile Connections in Ireland



Goal 6: Improving cross-border public transport between Belfast, Dublin and Cork.

Figure 40: Public transport projects between Belfast and Dublin



ANNEX 1: Corridor Maps

Each node within the corridor is listed below, as well as the mode categories used within the TEN-T regulation. A '1' under RRT, for example indicates that this node is classified as a core road to rail terminal. A '0' indicates that this node is not a core node for the category, and not that no road to rail facility exists in the node. Metz, for example is classified only as a core inland port in TEN-T (regulation 1315.2013, Annex II, Table 2, whereas in reality it is an important rail hub also. All Belgian, French and Dutch[41] inland port nodes have a rail connection.

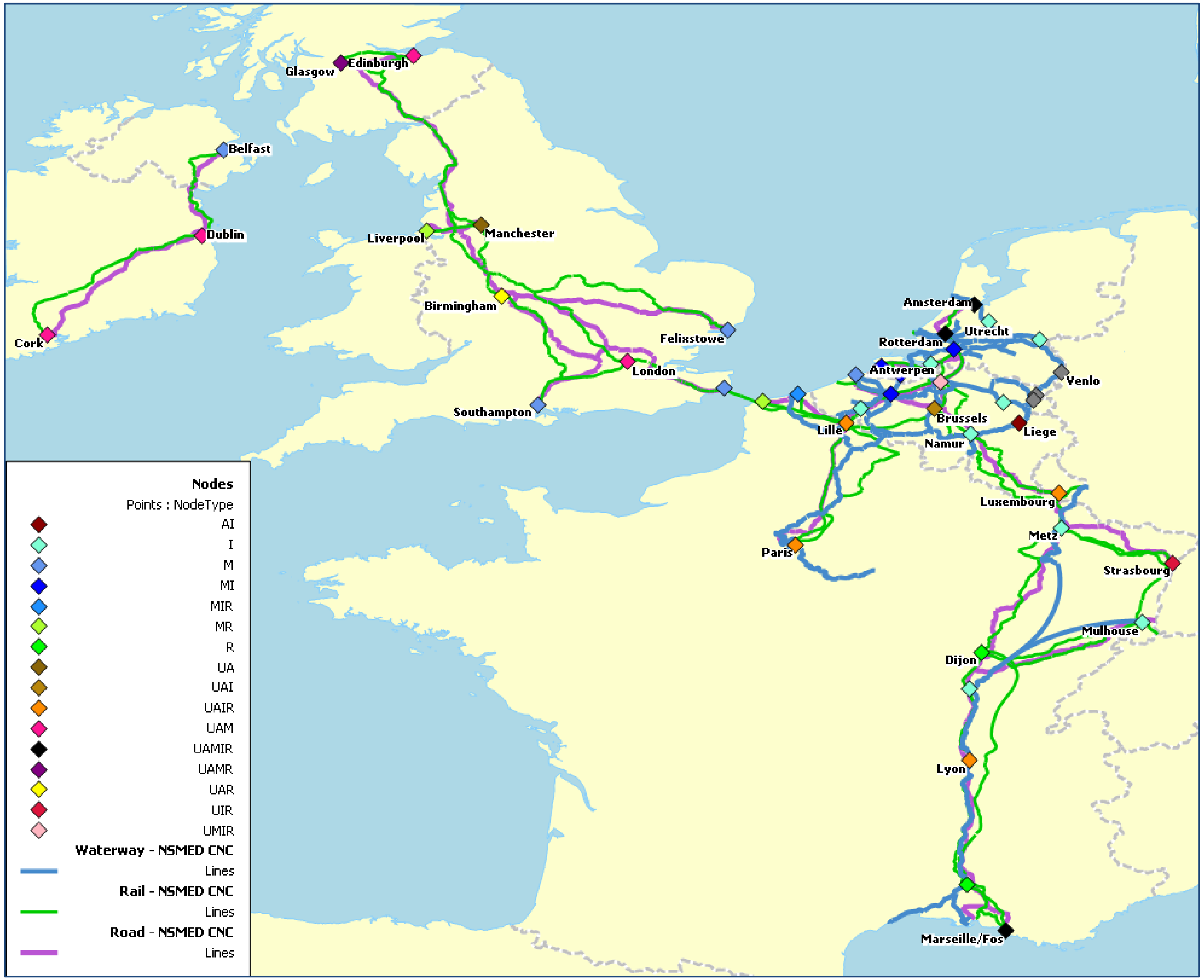
Table 41: List of Corridor Nodes – by Category (as defined in TEN-T regulation)

Country	Node	Urban	Airport	Maritime	Inland Port	RRT
Belgium	Antwerp	1	0	1	1	1
Belgium	Brussels	1	1	0	1	0
Belgium	Ghent	0	0	1	1	0
Belgium	Albert Canal	0	0	0	1	0
Belgium	Kortrijk	0	0	0	1	0
Belgium	Liege	0	1	0	1	0
Belgium	Namur	0	0	0	1	0
Belgium	Zeebrugge	0	0	1	0	0
France	Avignon	0	0	0	0	1
France	Calais	0	0	1	0	1
France	Chalon sur Saône	0	0	0	1	0
France	Dijon	0	0	0	0	1
France	Dunkerque	0	0	1	1	1
France	Lille	1	1	0	1	1
France	Lyon	1	1	0	1	1
France	Marseille/Fos	1	1	1	1	1
France	Metz	0	0	0	1	0
France	Mulhouse	0	0	0	1	0
France	Paris	1	1	0	1	1
France	Strasbourg	1	0	0	1	1
Ireland	Cork	1	1	1	0	0
Ireland	Dublin	1	1	1	0	0
Luxembourg	Luxembourg	1	1	0	1	1
Netherlands	Amsterdam	1	1	1	1	1
Netherlands	Bergen op Zoom	0	0	0	1	0
Netherlands	Born (compr)	0	0	0	1	1
Netherlands	Moerdijk	0	0	1	1	0
Netherlands	Utrecht	0	0	0	1	0
Netherlands	Nijmegen	0	0	0	1	0
Netherlands	Rotterdam	1	1	1	1	1
Netherlands	Stein/Sittard-Geleen (compr)	0	0	0	1	1
Netherlands	Terneuzen	0	0	1	1	0

[41] One exception for Dutch inland port node not connected rail is Bergen op Zoom.

Netherlands	Venlo	0	0	0	1	1
Netherlands	Vlissingen	0	0	1	1	0
Netherlands	Wanssum/Venray	0	0	0	1	1
UK	Belfast	0	0	1	0	0
UK	Birmingham	1	1	0	0	1
UK	Dover	0	0	1	0	0
UK	Edinburgh	1	1	1	0	0
UK	Felixstowe	0	0	1	0	0
UK	Glasgow	1	1	1	0	1
UK	Liverpool	0	0	1	0	1
UK	London	1	1	1	0	0
UK	Manchester	1	1	0	0	0
UK	Southampton	0	0	1	0	0

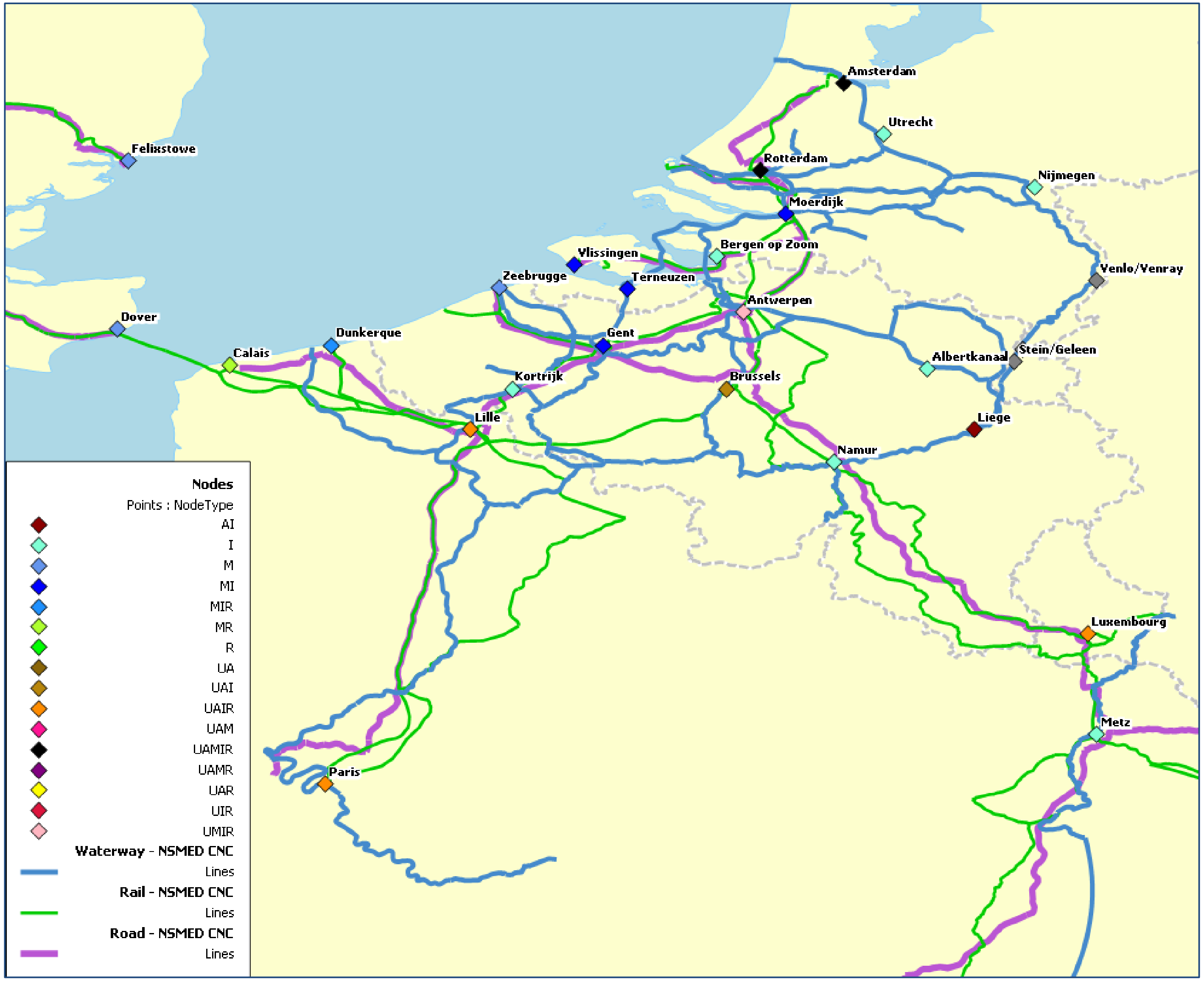
The maps which show all notified changes are shown in the following pages.



Classifcation of Nodes

A = Airport
I = Inland Port
M = Maritime Port
R = Road/rail Terminal
U = Urban Node

AI/MI etc = Combinations

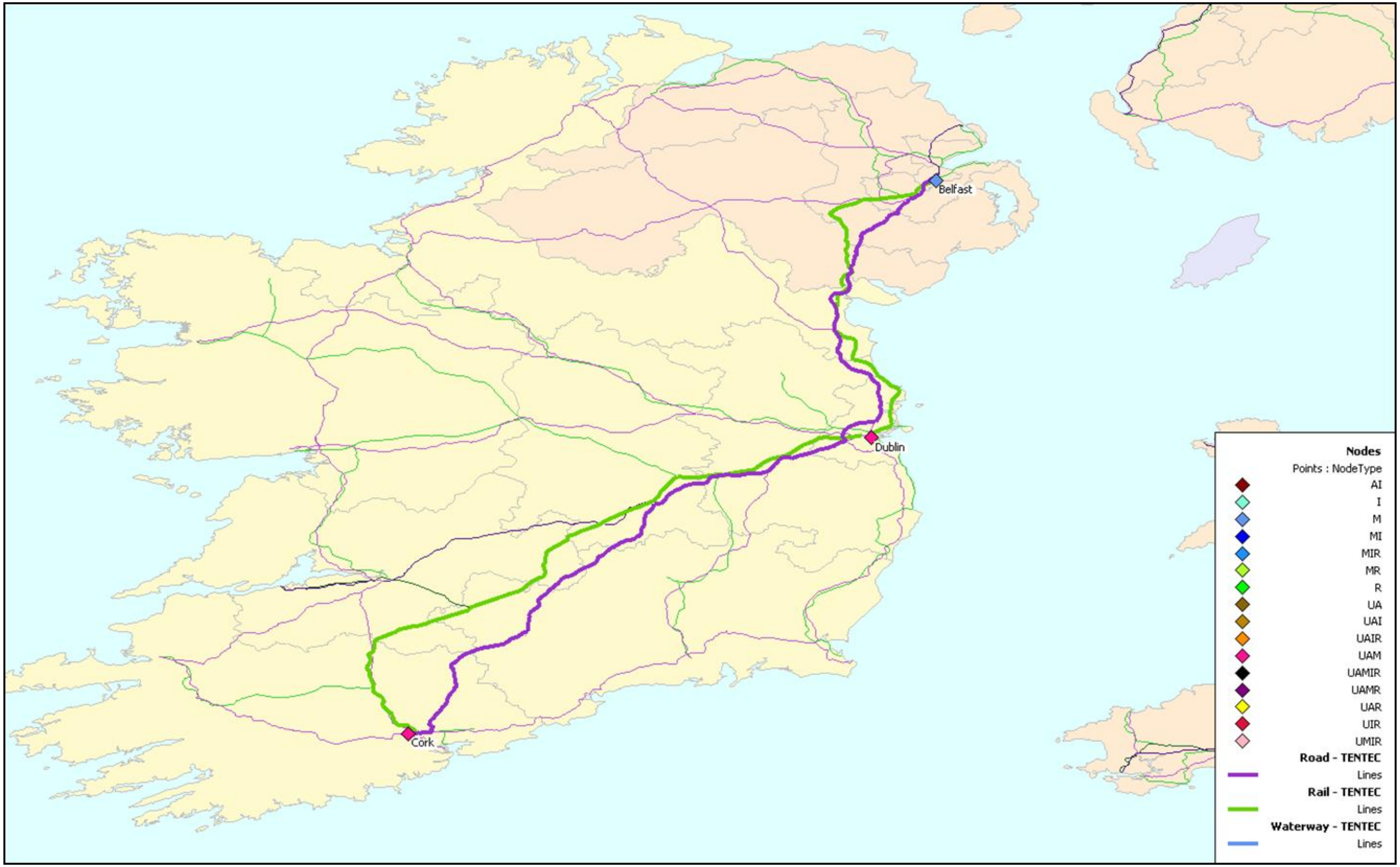


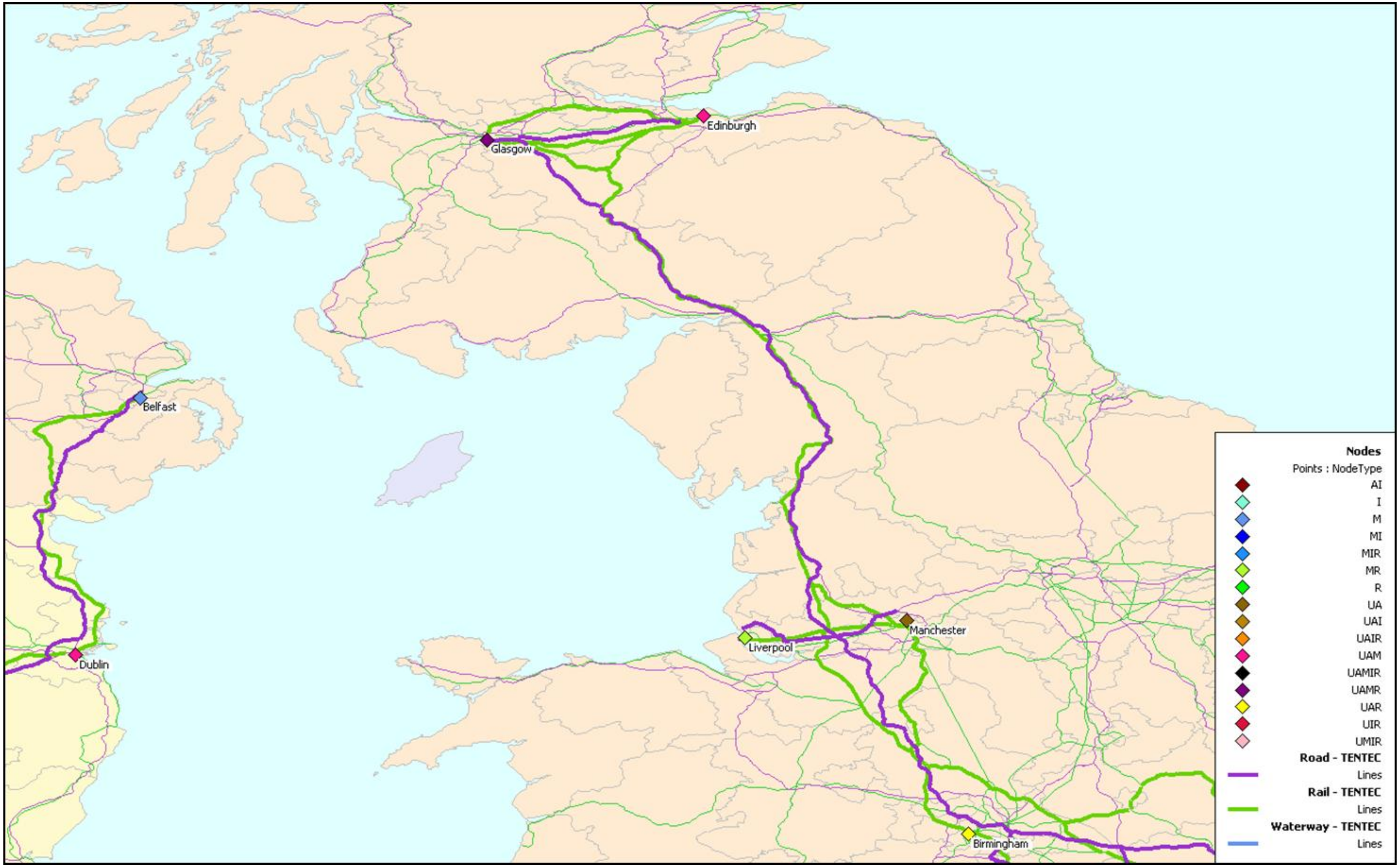
Classifcation of Nodes

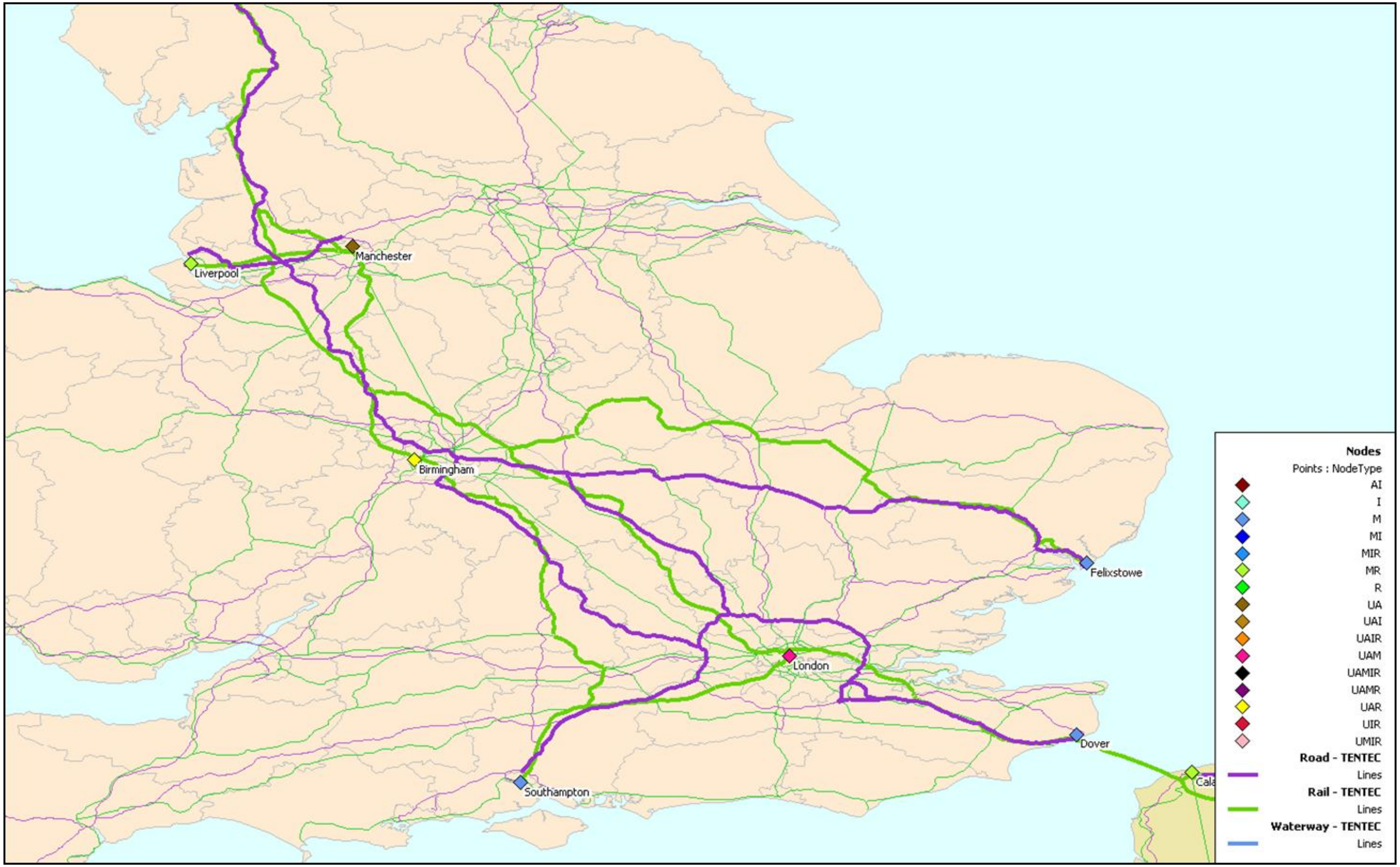
A = Airport
I = Inland Port
M = Maritime Port
R = Road/rail Terminal
U = Urban Node

AI/MI etc = Combinations

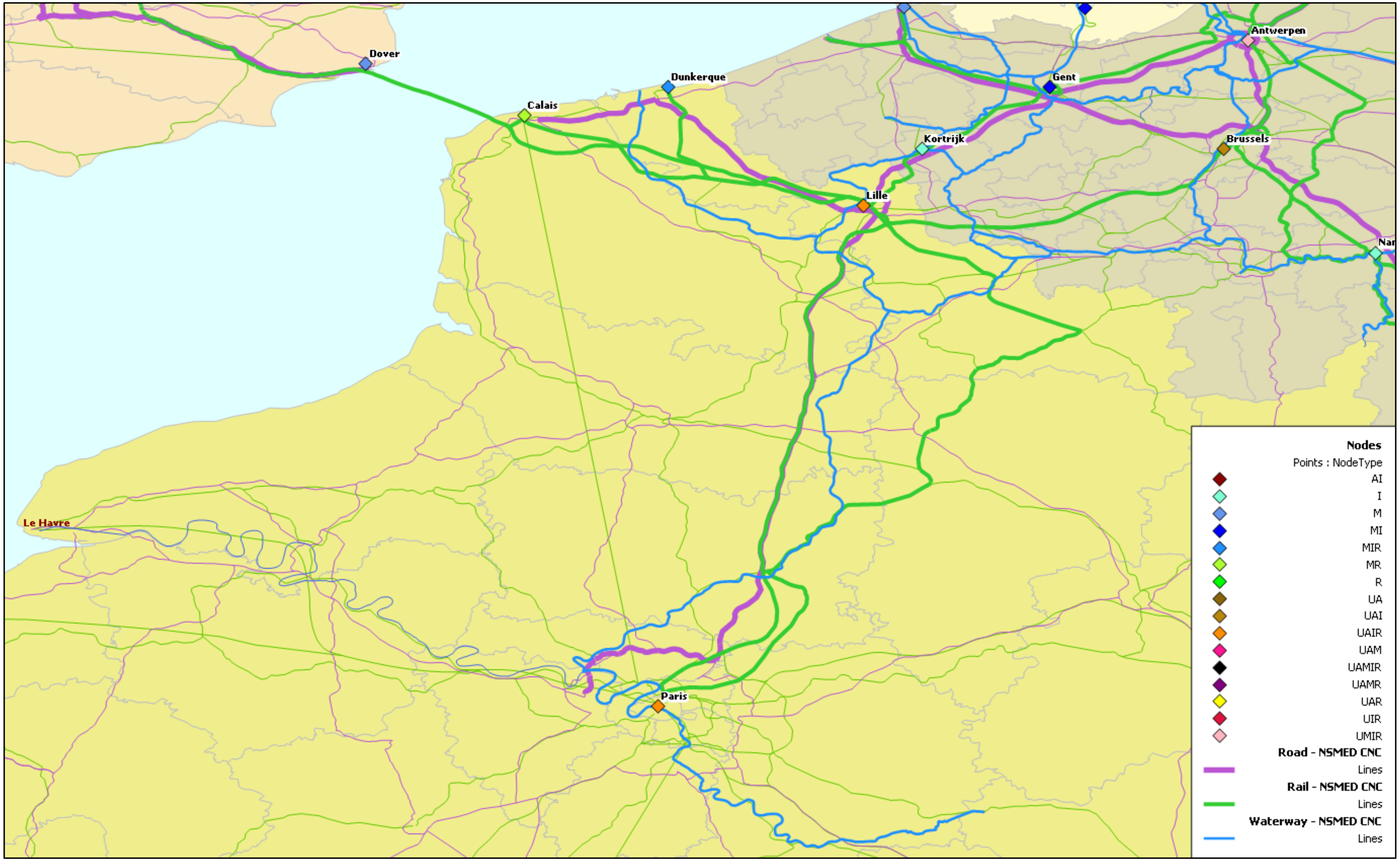
Venlo and Venray/Wanssum are shown as a single point in the map.

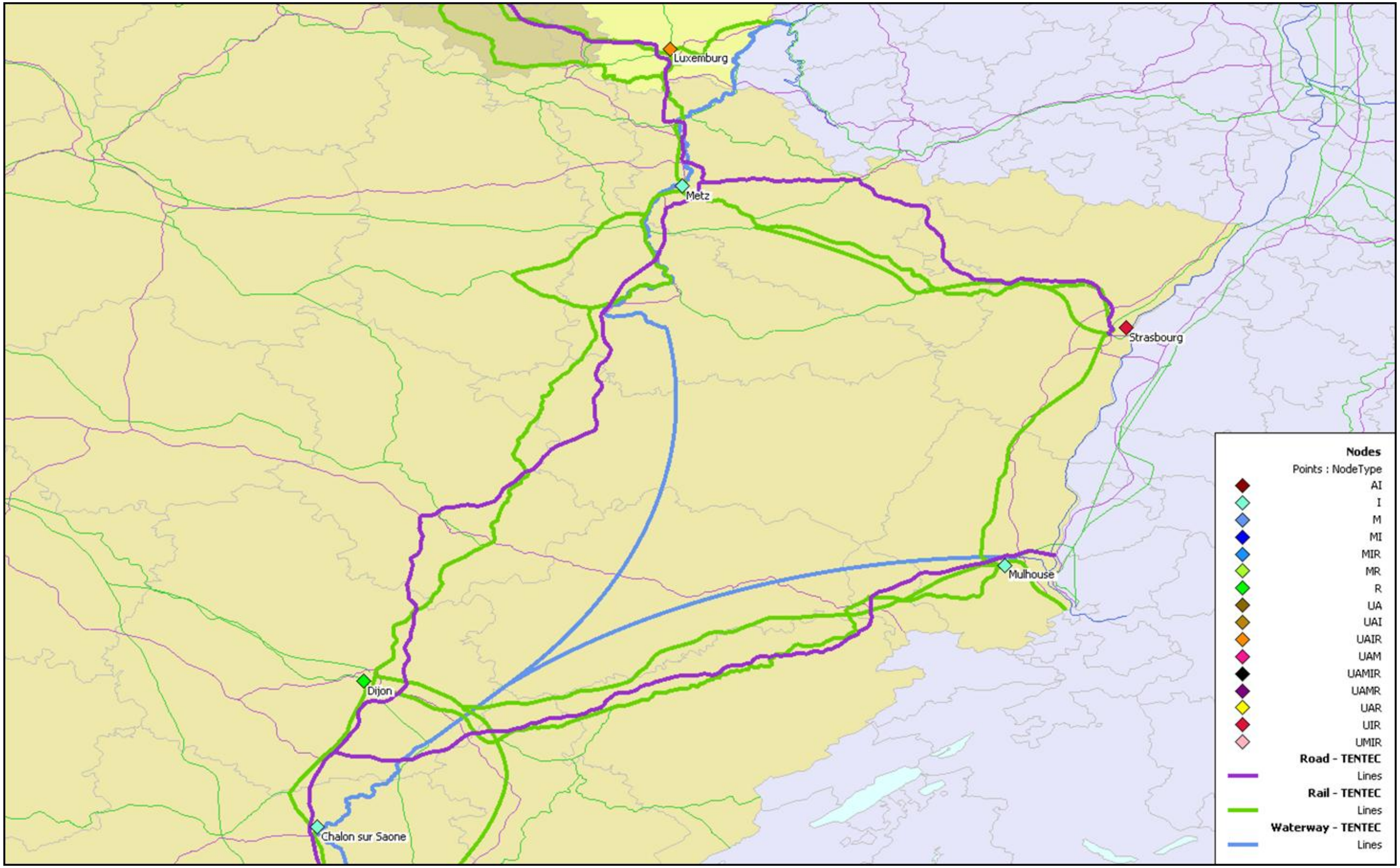

Belfast
Dublin
Cork
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - TENTEC
Lines
Rail - TENTEC
Lines
Waterway - TENTEC
Lines

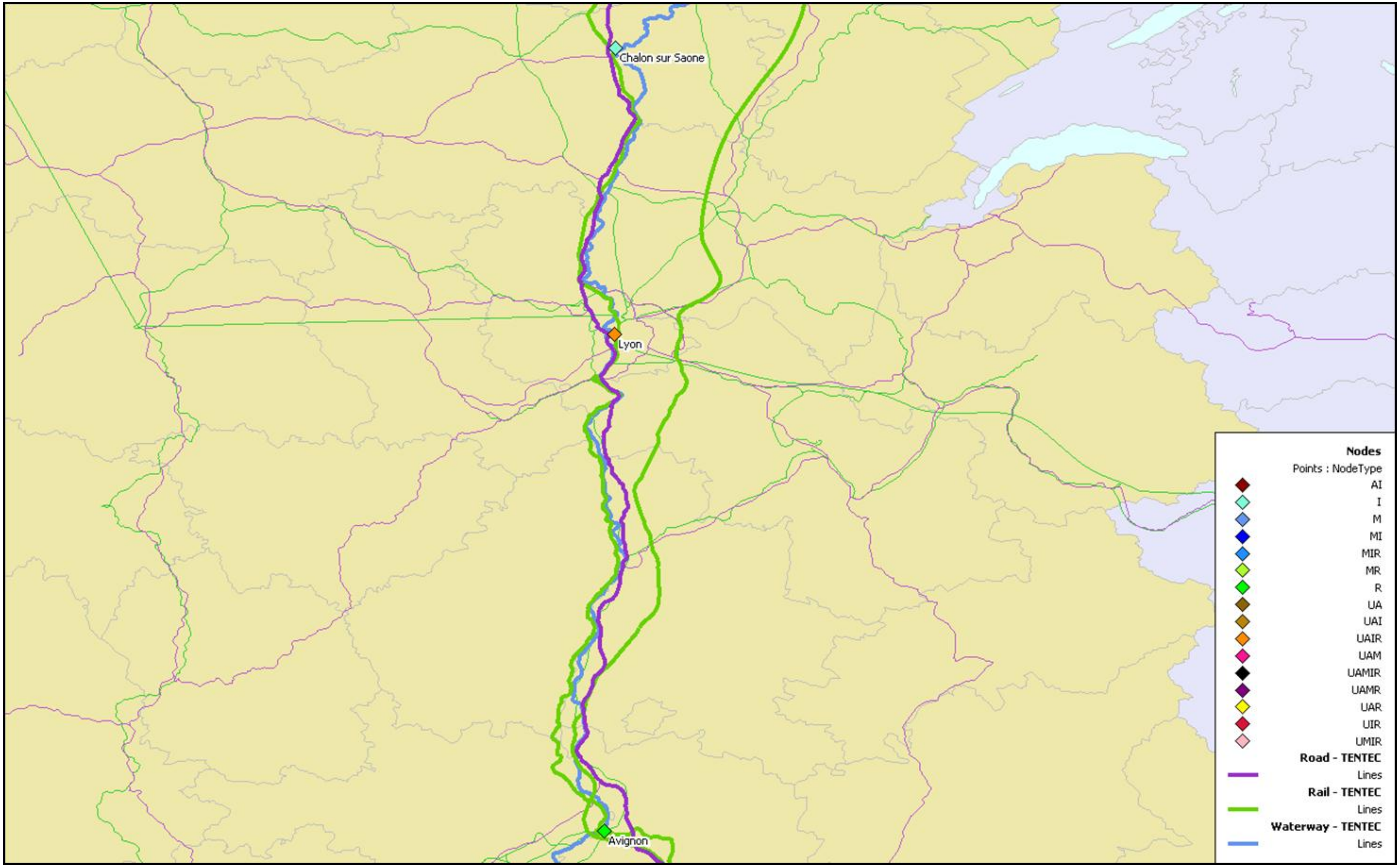

Edinburgh
Glasgow
Belfast
Dublin
Liverpool
Manchester
Birmingham
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - TENTEC
Lines
Rail - TENTEC
Lines
Waterway - TENTEC
Lines



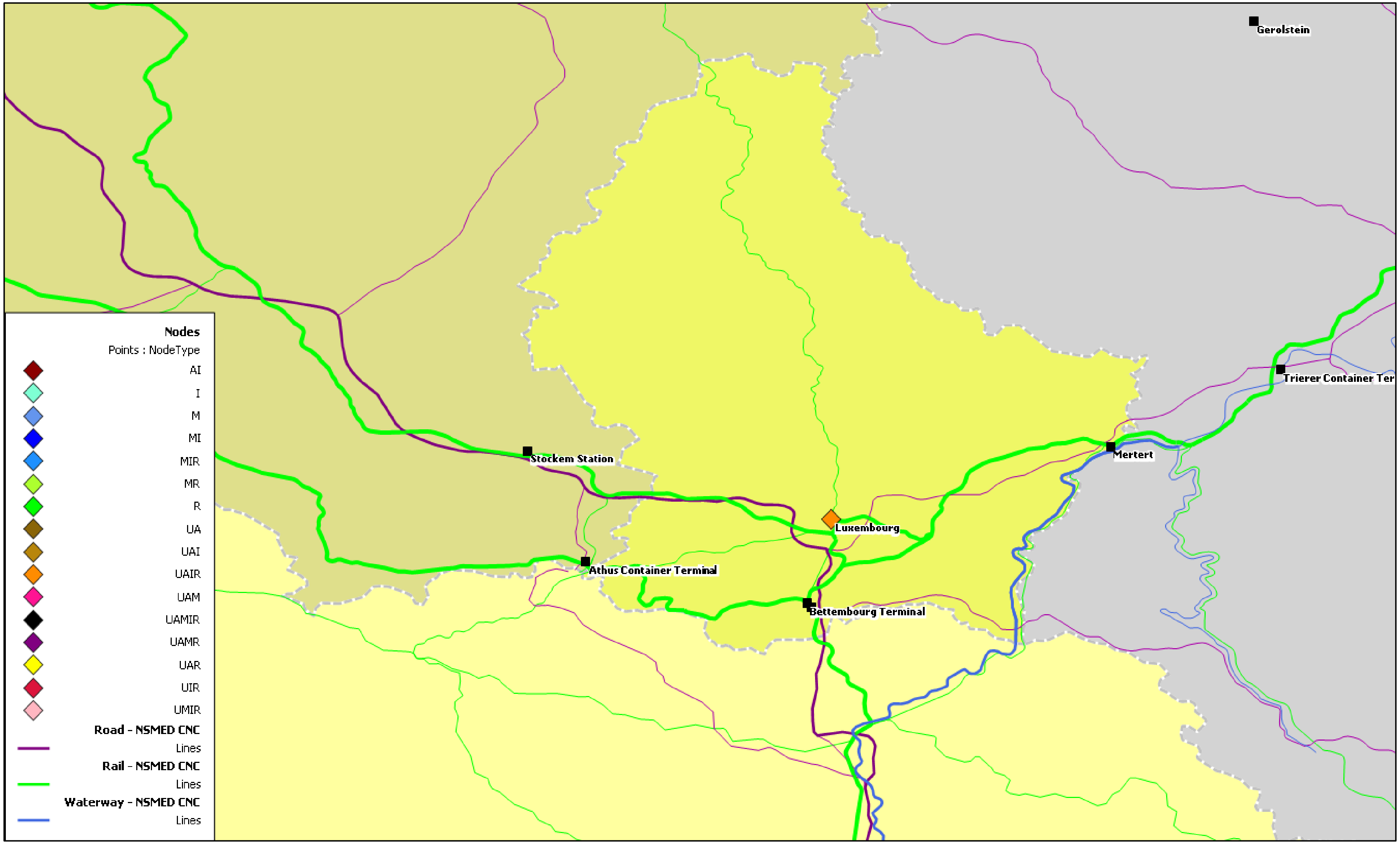
Manchester
Liverpool
Birmingham
Felixstowe
London
Dover
Southampton
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - TENTEC
Lines
Rail - TENTEC
Lines
Waterway - TENTEC
Lines

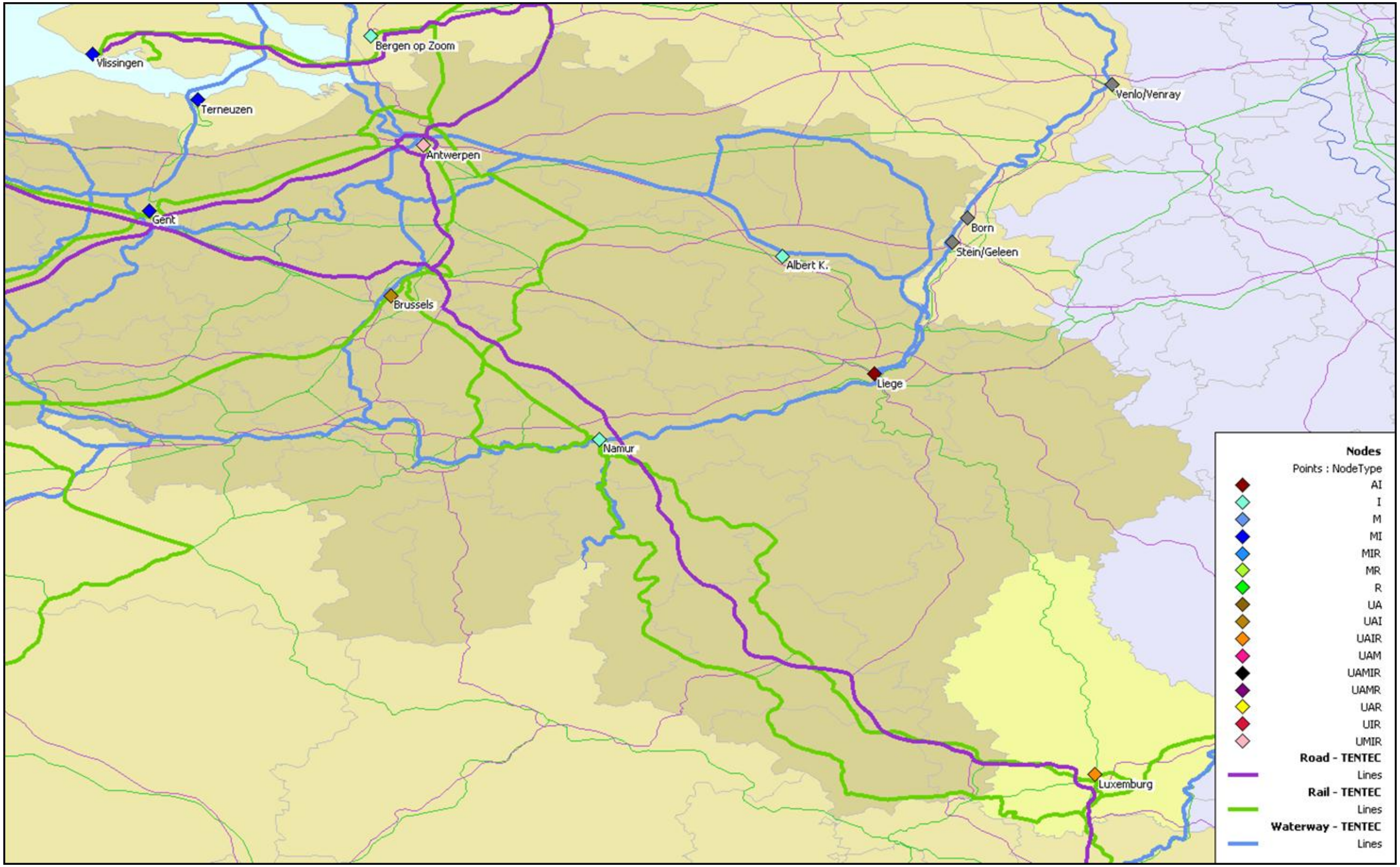

Dover
Dunkerque
Calais
Antwerpen
Gent
Kortrijk
Brussels
Lille
Le Havre
Paris
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - NSMED CNC
Lines
Rail - NSMED CNC
Lines
Waterway - NSMED CNC
Lines


Luxemburg
Metz
Strasbourg
Mulhouse
Dijon
Chalon sur Saone
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - TENTEC
Lines
Rail - TENTEC
Lines
Waterway - TENTEC
Lines

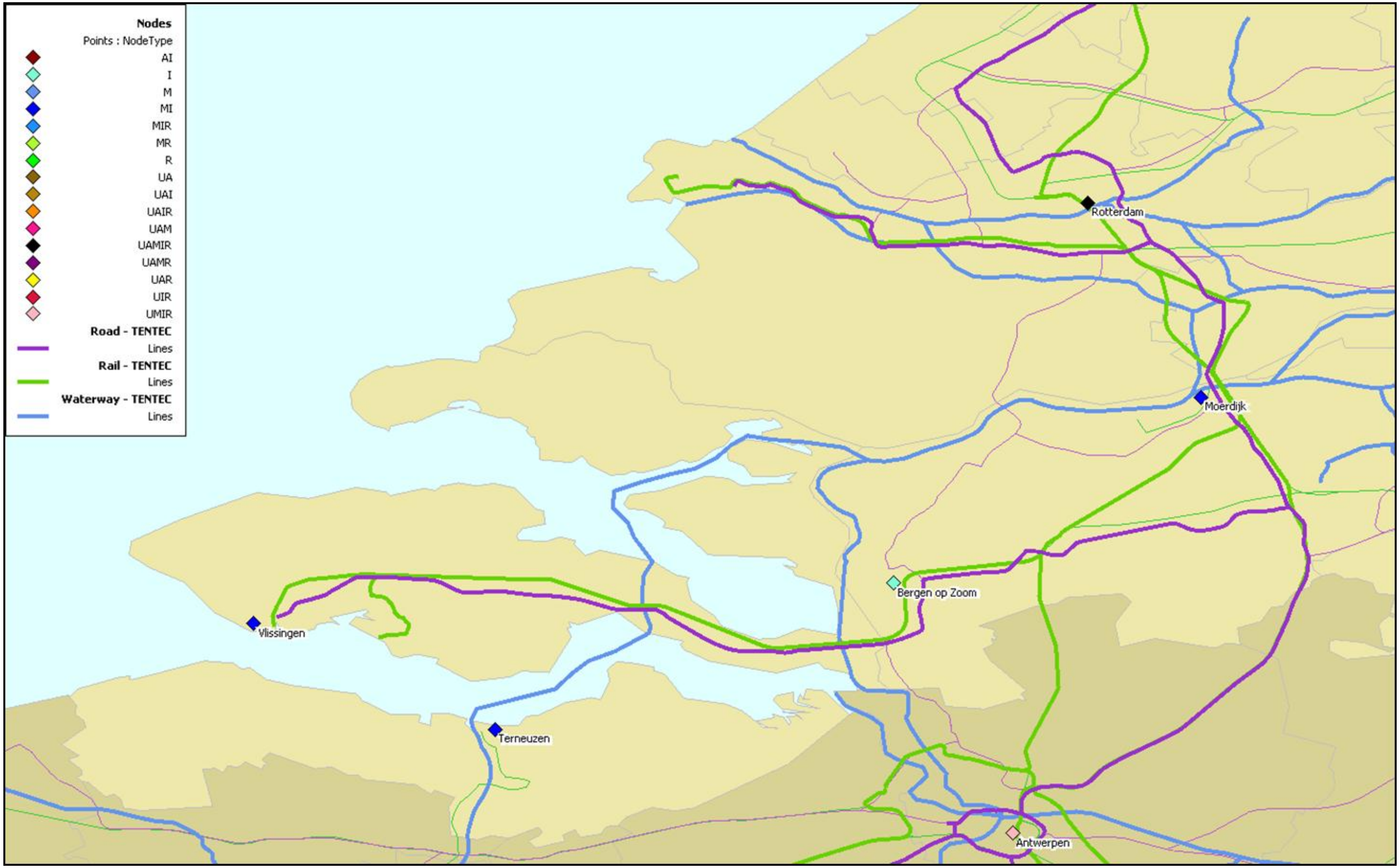

Chalon sur Saone
Lyon
Avignon
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - TENTEC
Lines
Rail - TENTEC
Lines
Waterway - TENTEC
Lines


Lyon
Avignon
Marseille/Fos
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - NSMED CNC
Lines
Rail - NSMED CNC
Lines
Waterway - NSMED CNC
Lines

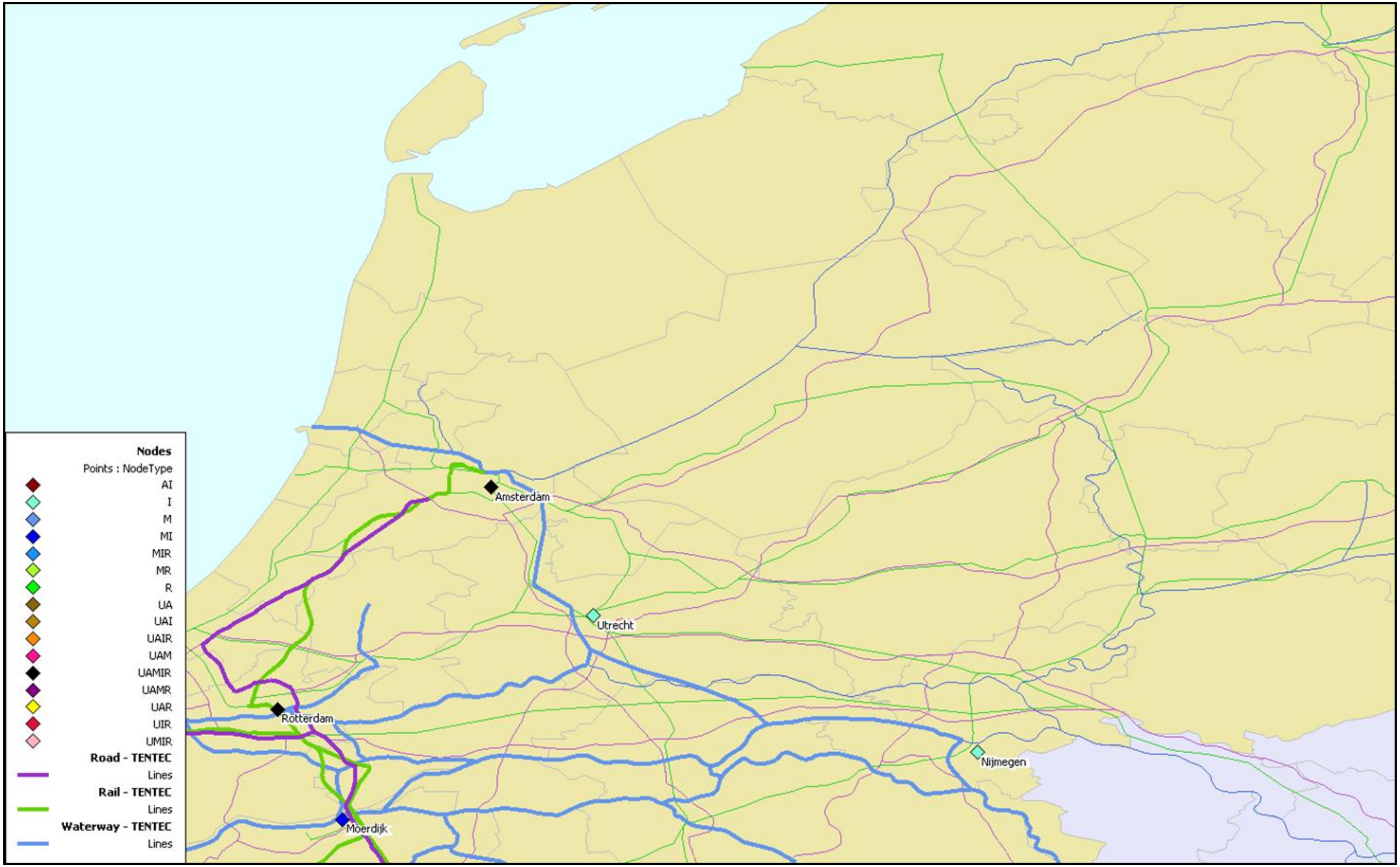

Gerolstein
Trierer Container Ter
Mertert
Stockem Station
Luxembourg
Athus Container Terminal
Bettembourg Terminal
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - NSMED CNC
Lines
Rail - NSMED CNC
Lines
Waterway - NSMED CNC
Lines



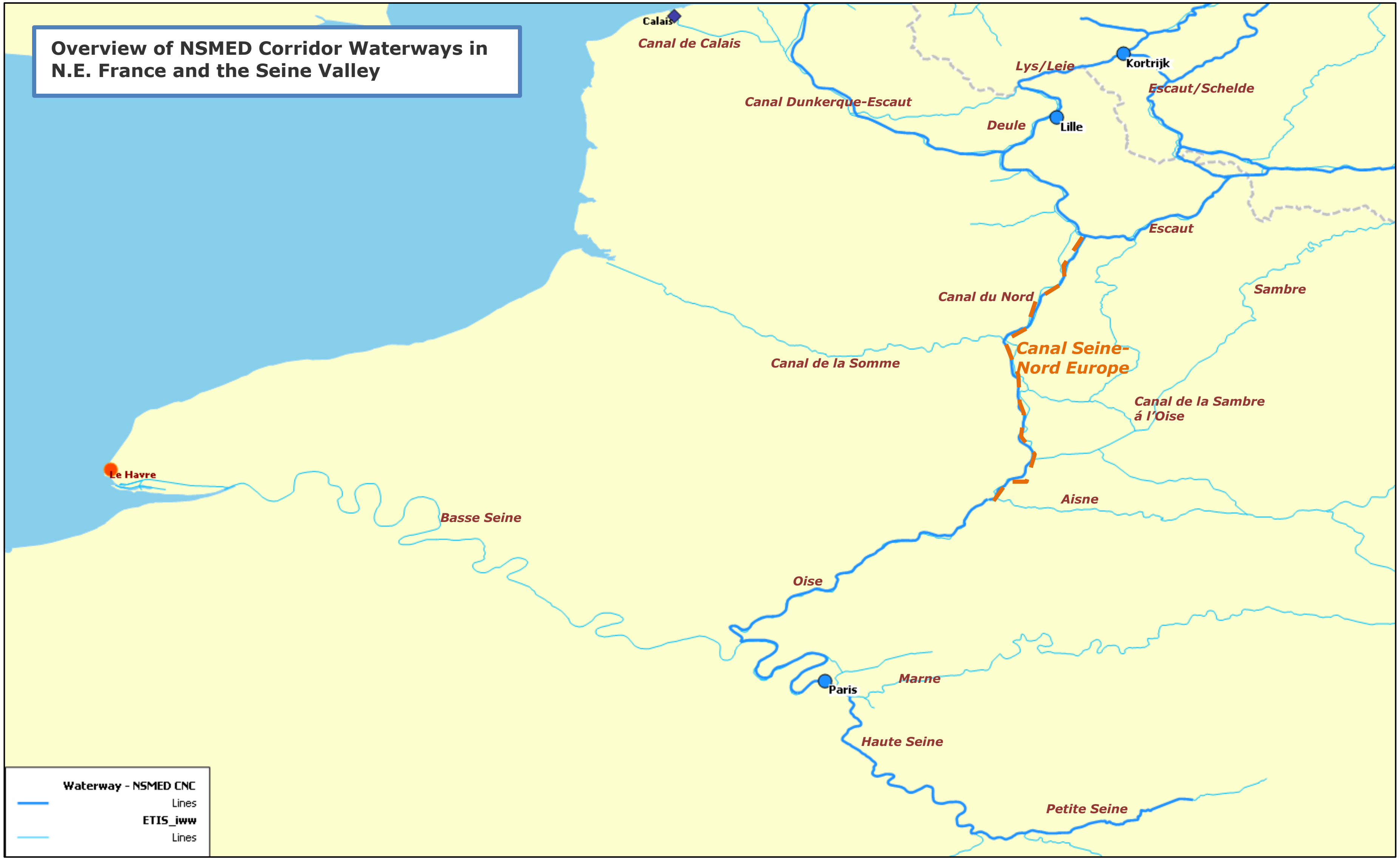
Venlo and Venray/Wanssum are shown as a single point in the map.


Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - TENTEC
Lines
Rail - TENTEC
Lines
Waterway - TENTEC
Lines
Rotterdam
Moerdijk
Bergen op Zoom
Vlissingen
Terneuzen
Antwerpen


Utrecht
Rotterdam
Nijmegen
Moerdijk
Bergen op Zoom
Venlo/Venray
Antwerpen
Born
Stein/Geleen
Albert K.
Brussels
Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - TENTEC
Lines
Rail - TENTEC
Lines
Waterway - TENTEC
Lines


Nodes
Points : NodeType
AI
I
M
MI
MIR
MR
R
UA
UAI
UAIR
UAM
UAMIR
UAMR
UAR
UIR
UMIR
Road - TENTEC
Lines
Rail - TENTEC
Lines
Waterway - TENTEC
Lines
Amsterdam
Utrecht
Rotterdam
Nijmegen
Moerdijk

* Venlo and Venray/Wanssum are shown as a single point in the map.


Overview of NSMED Corridor Waterways in N.E. France and the Seine Valley
Calais
Canal de Calais
Lys/Leie
Kortrijk
Escaut/Schelde
Canal Dunkerque-Escaut
Deule
Lille
Escaut
Canal du Nord
Sambre
Canal Seine-Nord Europe
Canal de la Somme
Canal de la Sambre á l'Oise
Le Havre
Aisne
Basse Seine
Oise
Paris
Marne
Haute Seine
Petite Seine
Waterway - NSMED CNC
Lines
ETIS_iww
Lines


Waterway - NSMED CNC
Lines : MEASURE_TY
New Construction
Upgrade
ETIS_iww
Lines
Luxembourg
Saar
Moselle
Metz
Mannheim
Rhine
Strasbourg
Canal des Vosges
Rhine
C. du Colmar
Saône/Moselle
Saône/Rhin Projet
Mulhouse
Basel
Zurich
Canal du Rhône au Rhin
Saône
Chalon sur Saone
Saône
Lyon
Rhône
Turin
Ge
C. du Rhône à Sète
Grd Rhône
Marseille/Fos
Overview of NSMED Corridor Waterways in Southern and Eastern France.

Definition of Cross-Border Sections

Definitions
Definitions of cross-border network sections are provided in the Regulation 1315/2013 (Article 3, Definitions).

Cross-border sections are defined in terms of being able to ensure continuity across a border between the nearest two urban nodes:

m) **'cross-border section'** means the section which ensures the continuity of a project of common interest between the nearest urban nodes on both sides of the border of two Member States or between a Member State and a neighbouring country;

Urban nodes are also defined, and a list is provided in the Regulation (Annex II (Regulation 1315/2013).

p) **'urban node'** means an urban area where the transport infrastructure of the trans-European transport network, such as ports including passenger terminals, airports, railway stations, logistic platforms and freight terminals located in and around an urban area, is connected with other parts of that infrastructure and with the infrastructure for regional and local traffic;

The approach is therefore to select cross-border links as the ones that ensure continuity between the nearest urban nodes either side of a land border. It was clarified by EC that only (shared) land borders (including Channel Tunnel) are to be considered. The identification of the nearest urban nodes depends upon the mode of transport.

Table 42: Cross Border Sections

Border	Road	Rail Freight	Rail Pass.	IWW
UK-IE	Dublin-Belfast M1 (IE), A1 (UK-NI)	Not applicable.	Dublin-Belfast	Not applicable.
UK-FR	No cross border road.	London-Lille (Channel tunnel)	London-Lille (Channel tunnel)	Not applicable.
FR-LU	Strasbourg to Luxembourg City A31 (FR), A3 (LU)	Strasbourg to Luxembourg City Lyon to Luxembourg City	Strasbourg to Luxembourg City Lyon to Luxembourg City	Lyon-Luxembourg City (via Moselle and future Saône-Moselle Link)
FR-BE	Lille to Brussels A22 (FR), A14 (BE)	Lille to Antwerp (conventional line)	Lille to Brussels (HS line)	Paris/Lille to Antwerp via Ghent. Although the Seine Escaut missing link is not located on a border per se, it is also considered as cross-border since it is currently an important barrier towards connecting national markets.

BE-NL	Antwerp to Rotterdam A1 (BE), A16 (NL)	Antwerp to Rotterdam (conventional line)	Antwerp to Rotterdam (HS line)	Antwerp to Rotterdam Ghent-Terneuzen Liège-Venlo
BE-LU	Brussels to Luxembourg City A4 (BE), A6 (LU)	Antwerp to Luxembourg City	Brussels to Luxembourg City	Not applicable.

ANNEX 2: Compliance Maps

Figure 41: Core Airports - Connection with Rail

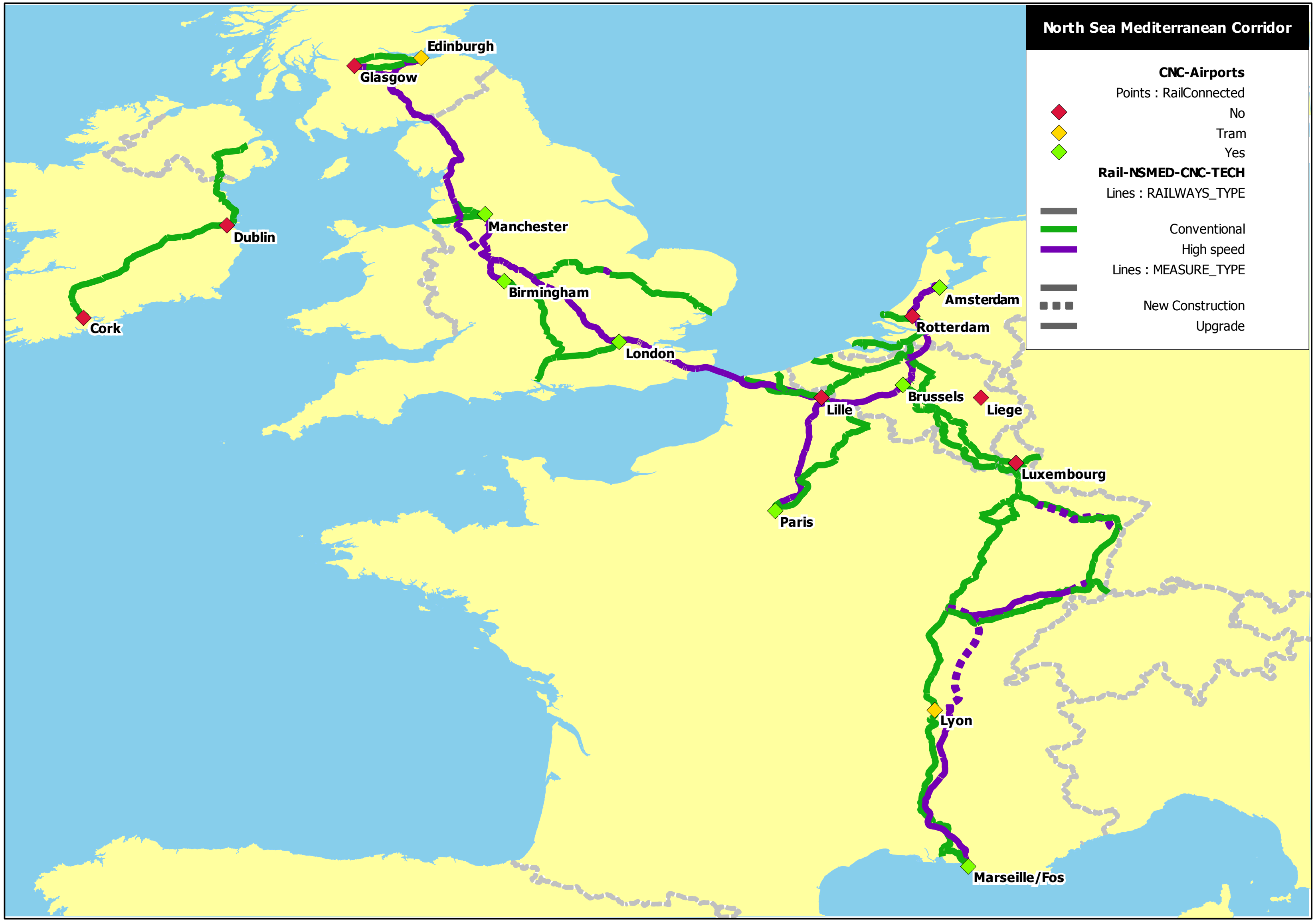


Figure 42: Maritime and Inland Ports-Connection with CEMT IV Waterways

Figure 43: Maritime and Inland Ports - Connection with Rail

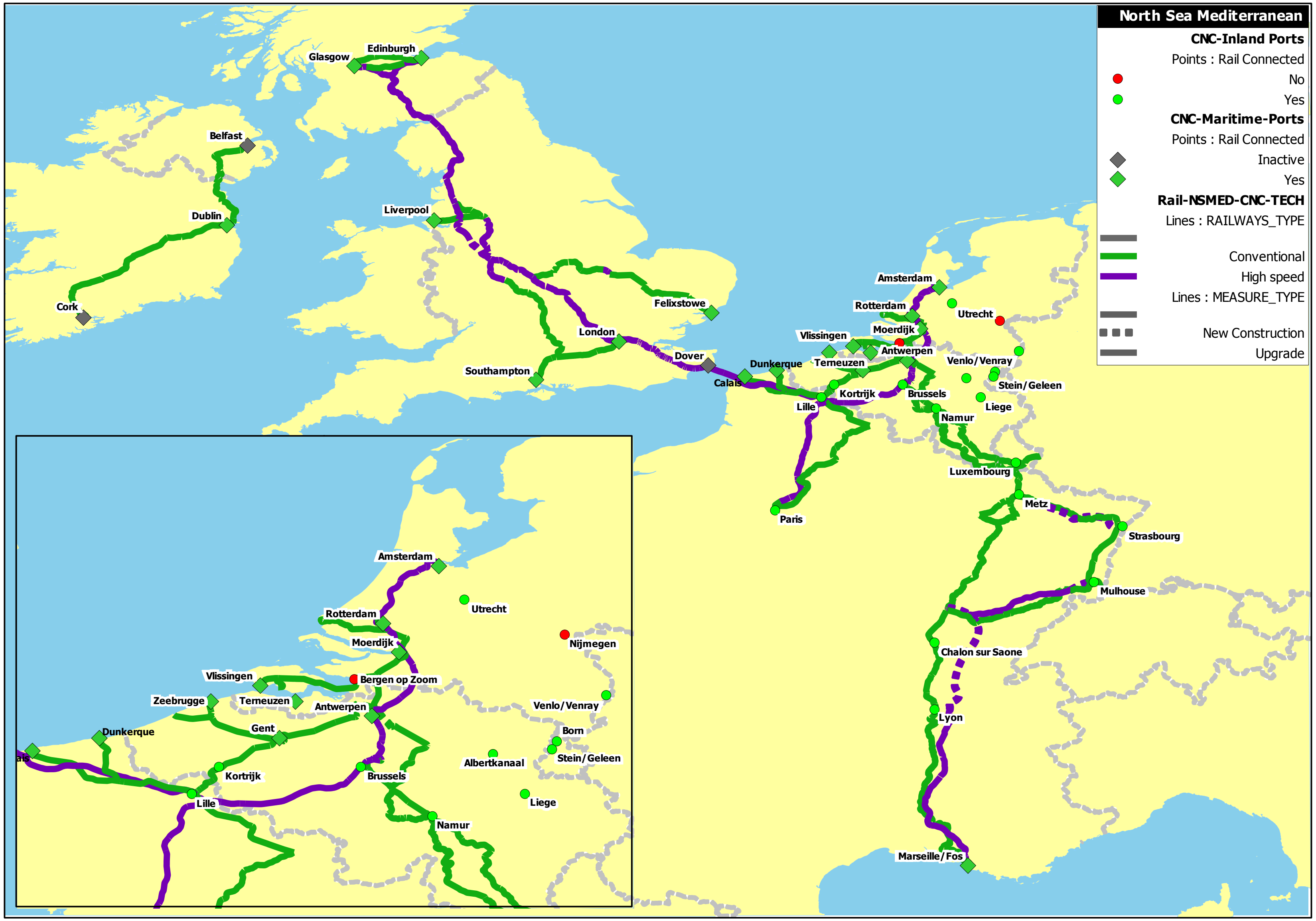


Figure 44: Maritime Ports, Inland Ports and RRTs-Road Connection

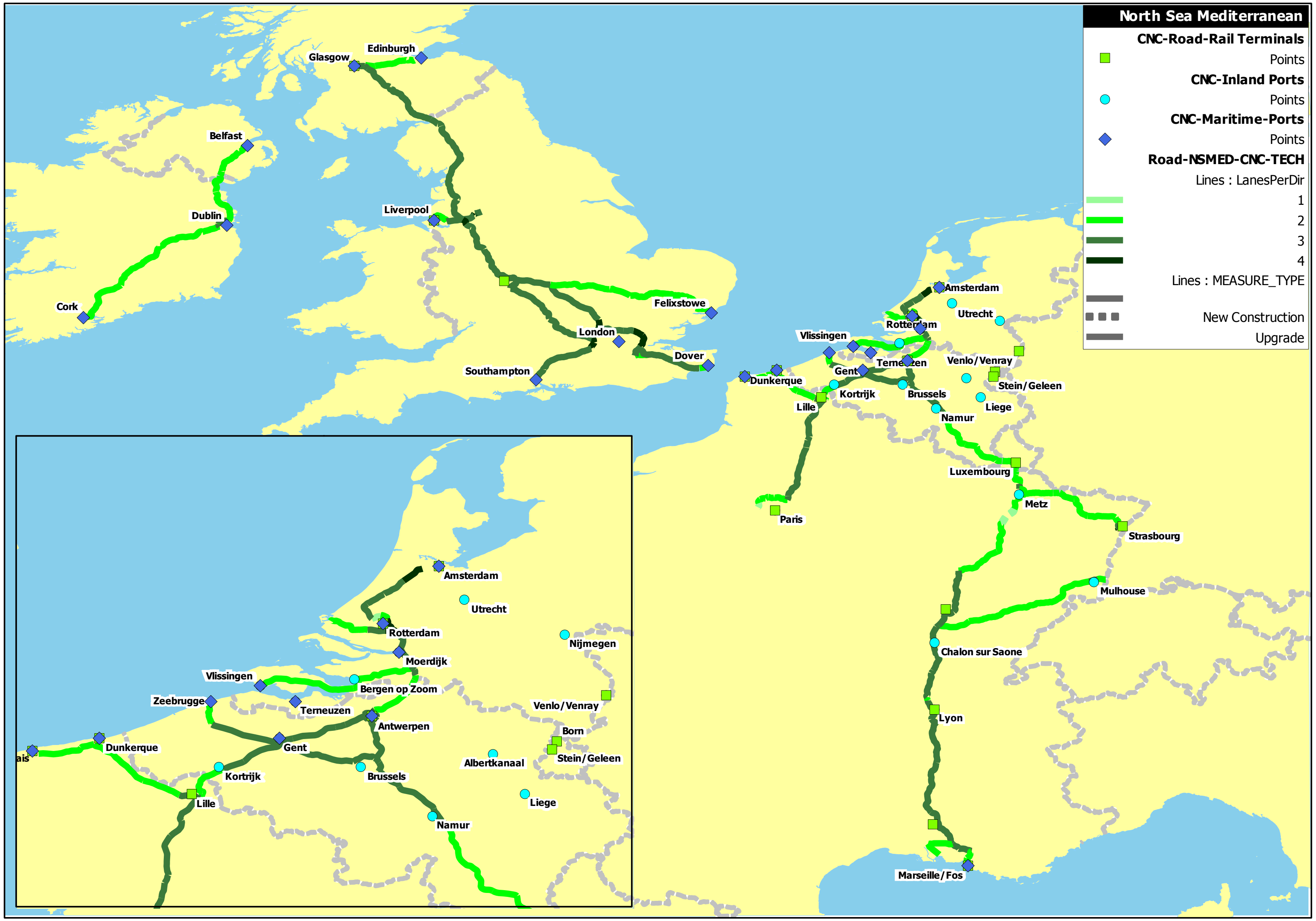
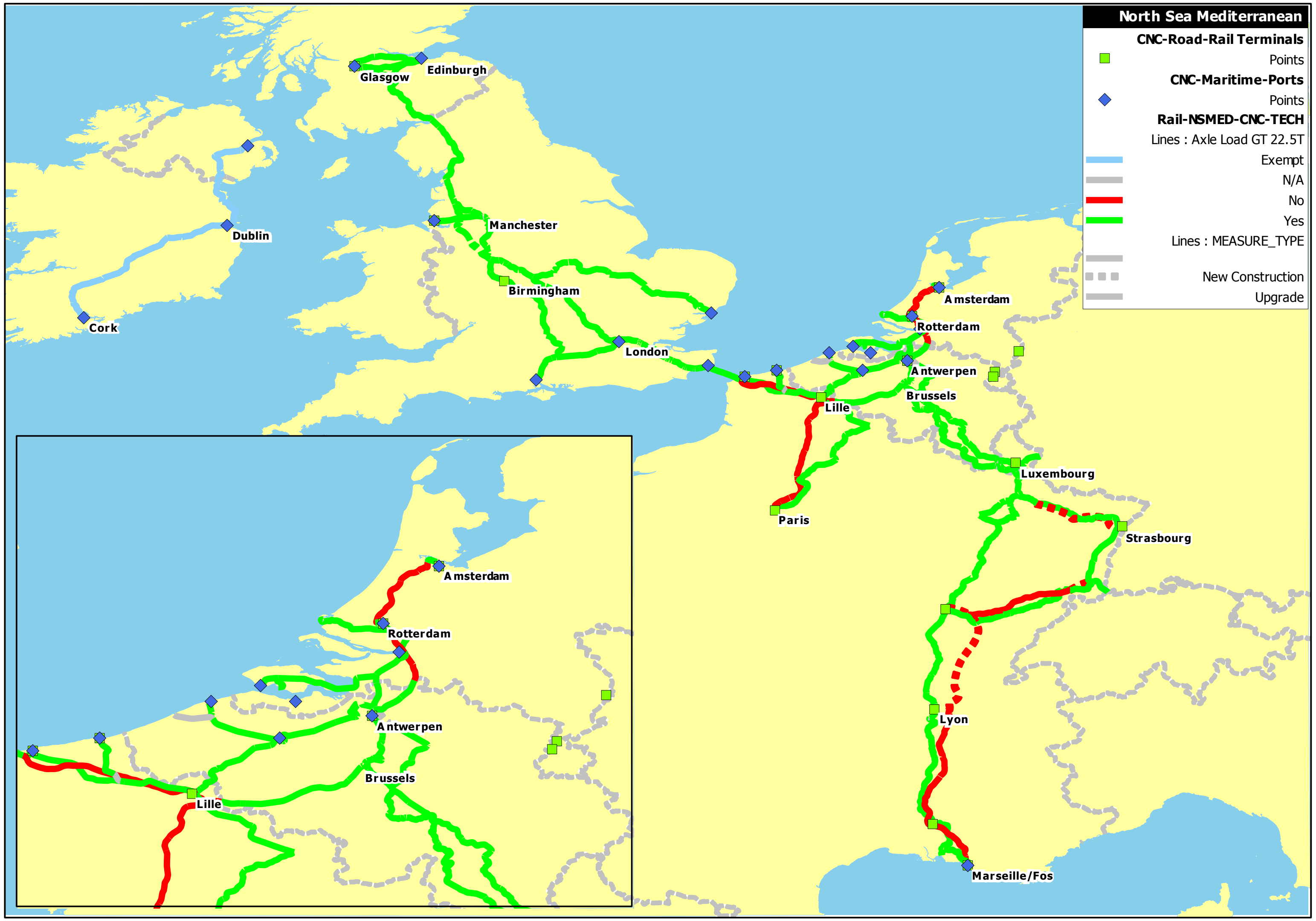


Figure 45: Rail - Axle Weight Limits



Note: the railway section from the Dutch port of Vlissingen to the main Rotterdam-Antwerp line has a short stretch at the end which is not cleared for 22.5 T axle loads. TENtec uses the minimum axle weight on a section, and this link is encoded as a single section. However the majority of the link which is visible in this map is capable of carrying 22.5 tonnes.

Figure 46: ERTMS in Operation

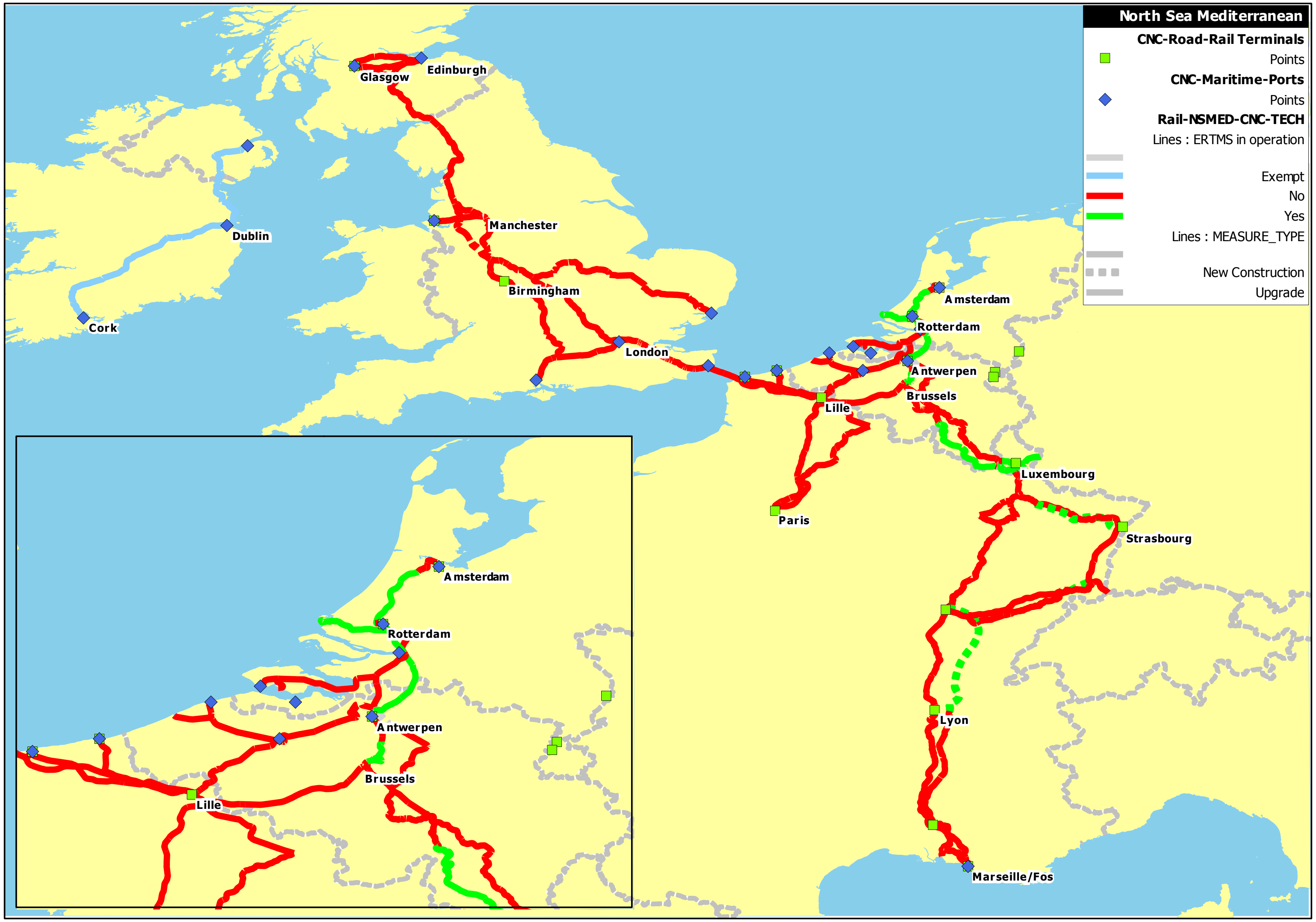


Figure 47: Diesel or Electrified Traction

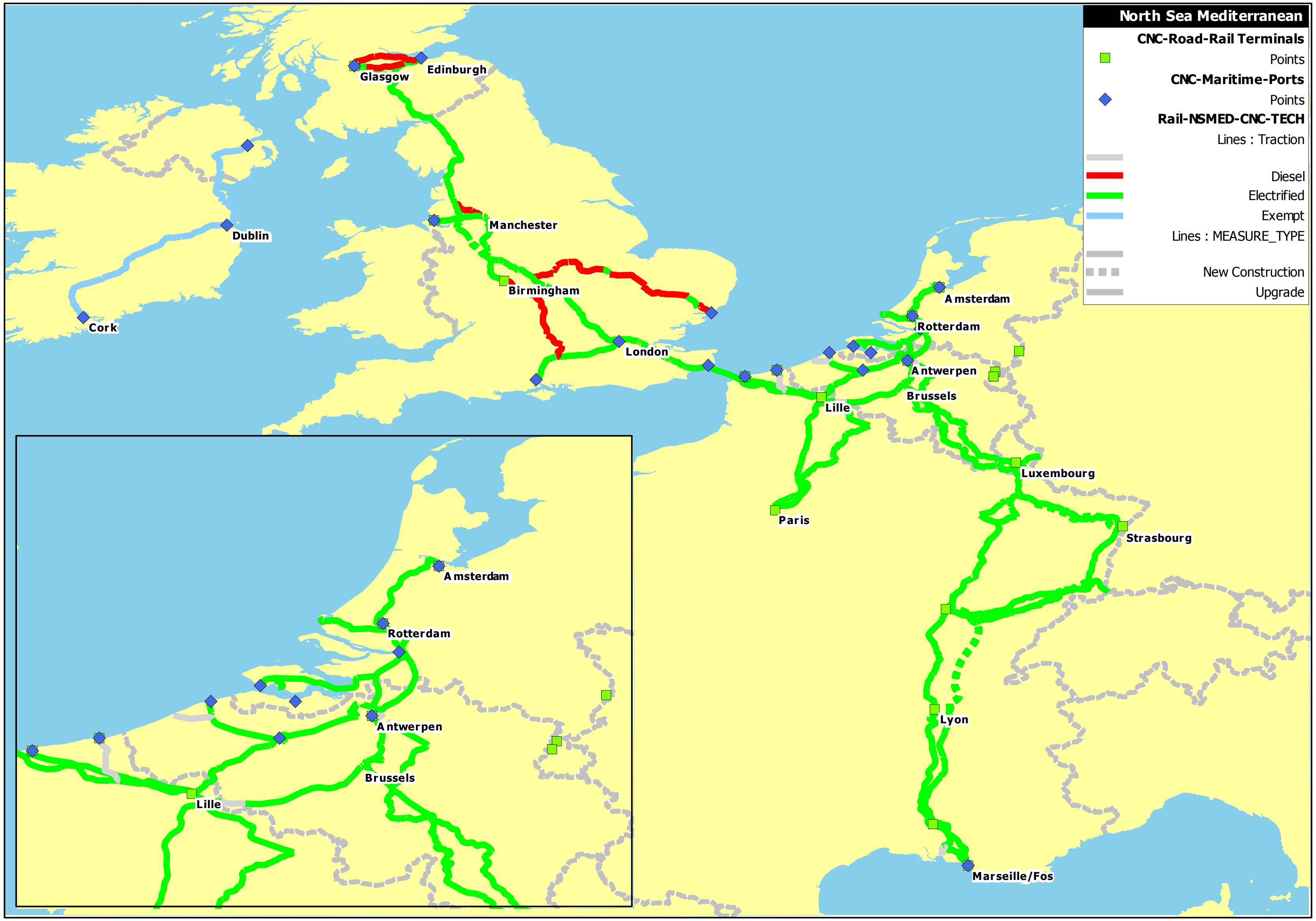
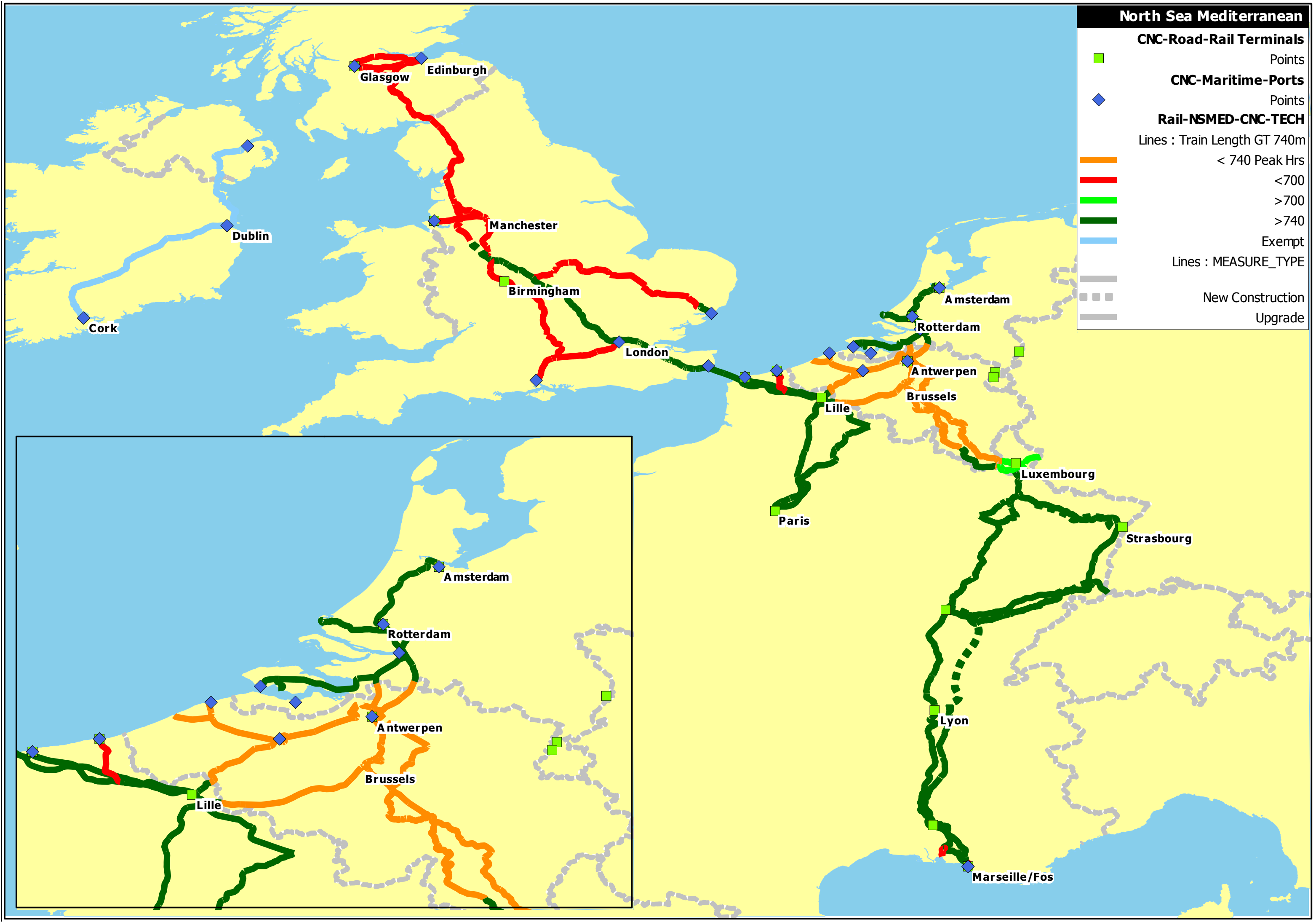


Figure 48: Train Length >740m



Note: the Belgian railway network is officially capable of handling trains of up to 740m, but at peak times it may frequently be limited to 650m. The lines are coloured red to indicate a possible restriction, but the restriction only applies at certain times of day.

ANNEX 3: Stakeholder Lists

Table 43: Fourth Forum Stakeholders

Country			Name	Organisation	EMAIL
BE	Mr	Chris	DANCKAERTS	De Scheepvaart	c.danckaerts@descheepvaart.be
BE	Ms	Yvon	LOYAERTS	DGO de la Mobilité et des Voies Hydrauliques	yvon.loyaerts@spw.wallonie.be
BE	Mr	Pascal	MOENS	Direction générale opérationnelle de la mobilité et des voies hydrauliques	pascal.moens@spw.wallonie.be
BE	Ms	Virginie	WISLEZ	Direction générale opérationnelle de la mobilité et des voies hydrauliques	virginie.wislez@spw.wallonie.be
BE	Mr	Etienne	WILLAME	Direction général des routes et des bâtiments	etienne.willame@spw.wallonie.be
BE	Mr	Jacques	HACOURT	DGO de la Mobilité et des Voies Hydrauliques	jacques.hacourt@spw.wallonie.be
BE	Ms	Julie	BUY	Federal Transport Department of Belgium	Julie.Buy@mobilit.fgov.be
BE	Mr	Laurent	DEMILIE	Federal Transport Department of Belgium	laurent.demilie@mobilit.fgov.be
BE	Mr	Pim	BONNE	Flemish Ministry of Mobility and Public Works	pim.bonne@mow.vlaanderen.be
BE	Mr	Olivier	VANDERSNICKT	Ministry of Ecology, Sustainable Development and Energy	olivier.vandersnickt@mow.vlaanderen.be
BE	Mr	Tom	ROELANTS	Agentschap Wegen en Verkeer	tomjj.roelants@mow.vlaanderen.be
BE	Ms	Erika	VERSTREPEN	Departement Mobiliteit en Openbare Werken-Afd. Luchthavenbeleid	erika.verstrepen@mow.vlaanderen.be
BE	Mr	Michael	DIERICKX	Infrabel	michael.dierickx@infrabel.be
BE	Mr	Alfons	MOENS	Port of Brussels	portdebruxelles@port.irisnet.be
BE	Mr	Eddy	BRUYNINCKX	Port of Antwerp	eddy.bruyninckx@haven.antwerpen.be
BE	Mr	Guy	JANSSENS	Port of Antwerp	Guy.janssens@portofantwerp.com
BE	Mr	Toon	TESSIER	Port of Antwerp	toon.tessier@portofantwerp.com
BE	Ms	Kate	VERSLYPE	Port of Ghent	Kate.Verslype@havengent.be
BE	Mr	Daan	SCHALCK	Port of Ghent	d.schalck@havengent.be
BE	Mr	Emile-Louis	BERTRAND	Port de Liege	el.bertrand@portdeliege.be
BE			PORT AUTONOME DE NAMUR	Port de Namur	nistace@portnamur.be
BE	Mr	Paul	GERARD	Port of Oostende	paul.gerard@portofoostende.be
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ANNEX 4: Transport Market Study

Overview

Introduction
The transport market study's main objective is to identify the current and prospective transport needs in the corridor from the perspective of demand. More specifically, demand-wise, this part of the report provides information on how the traffic will evolve, and by which mode.

It will also examine the multimodal performance of the Corridor. To this end, the study will identify existing barriers for currently under-utilised modes, and how multimodal solutions could be further adopted in the corridor.

During the Second Corridor Forum, the participants argued for the study to focus upon infrastructure, with the demand analysis limited to analysis of pre-existing literature. Therefore no new forecasts or work plan related impacts are analysed.

Socio-economic profile
The NSMED corridor accounts for some of the most densely populated and economically active regions in Europe.

In the following tables, standard 2010 indicators are shown for the corridor Member States, followed by forecasts derived from national plans. These figures apply to the corridor Member States as a whole and not only the corridor nodes.

Table 46:2010 Socio Economic Statistics

	BE*	FR	IE	LU*	NL	UK
Population (m)	10.951	62.793	4.468	0.502	16.575	62.300
GDP €bn	356	1932.8	156.0	39.3	588.4	1706

** Source: National statistics.*
Otherwise: Eurostat.

In total, the population of the six Member States within the corridor amounts to 157 million. Total GDP for the six is €4.8 trillion.

Table 47: 2030 Socio Economic Estimates

	BE	FR	IE	LU	NL	UK
Year	*2030*	*2030*	*2031*		*2040*	*2030*
Source	*BNB*	*BIPE*	Central Statistics Office		*CPB/GE*	Office of National Statistics & DfT Road Transport Forecasts 2013
Population	12.0m	68m	5.2m	0.630	19.7m	71.4m
GDP (%pa)					2.6%	
GDP €bn	470	3190	-	N/A		£2,232[42]

Together, these national forecasts imply that by 2030, the population of the NSMED corridor Member States will grow by around 19 million persons, and that the GDP will increase by around 2.5 billion Euros. Most of this growth will occur within the major cities, nearly all located inside the corridor.

In order to analyse more local impacts, the BNB data for Belgium were analysed at a disaggregated NUTS2 level. The basis for the GDP (2010 value) was €356 billion of which €310 billion belong to the NUTS2 region covered by the corridor and specifically two thirds within the Flemish region. This value is expected to grow – on average – within the range of 1.4% to 1.5% annually.

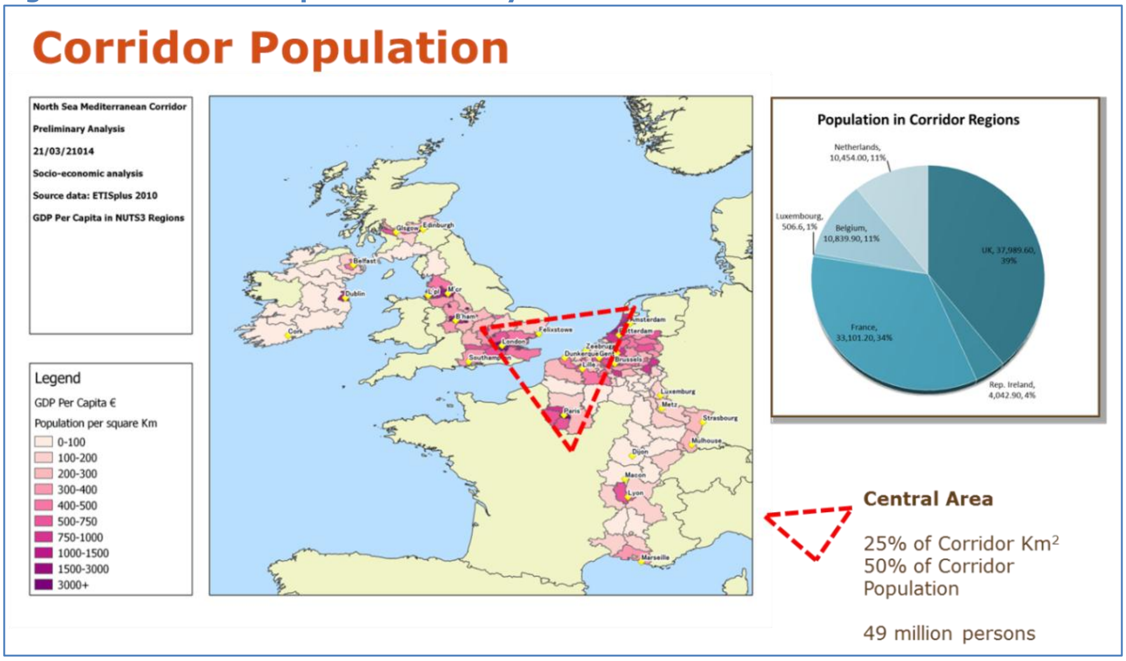
Population-wise, the discrepancies between the local, national and European growth factors are marginal. From the SPF regional data, the highest growth is expected for the regions of Brussels, Walloon Brabant and Antwerp, demonstrating an urban-oriented trend to 2030.

The Netherlands forecasts are derived from the Central Plan Bureau's WLO scenario study from 2006. In the Global Economy scenario, the economy is forecast to grow at 2.6% per annum, and the population to increase to 19.7 million.

The corridor is defined within this study as a transport network, not as a selection of regions. However, if the socio-economic data is aggregated for NUTS3 regions crossed by the corridor, it can be seen that almost 100 million people, two thirds of the corridor Member States' population or a fifth of the EU population as a whole live here. Of those, almost exactly half live in the central area shown below.

[42] Consultants' calculation based on DfT's 53.1% growth in GDP from 2010, quoted in DfT Road Transport Forecasts 2013

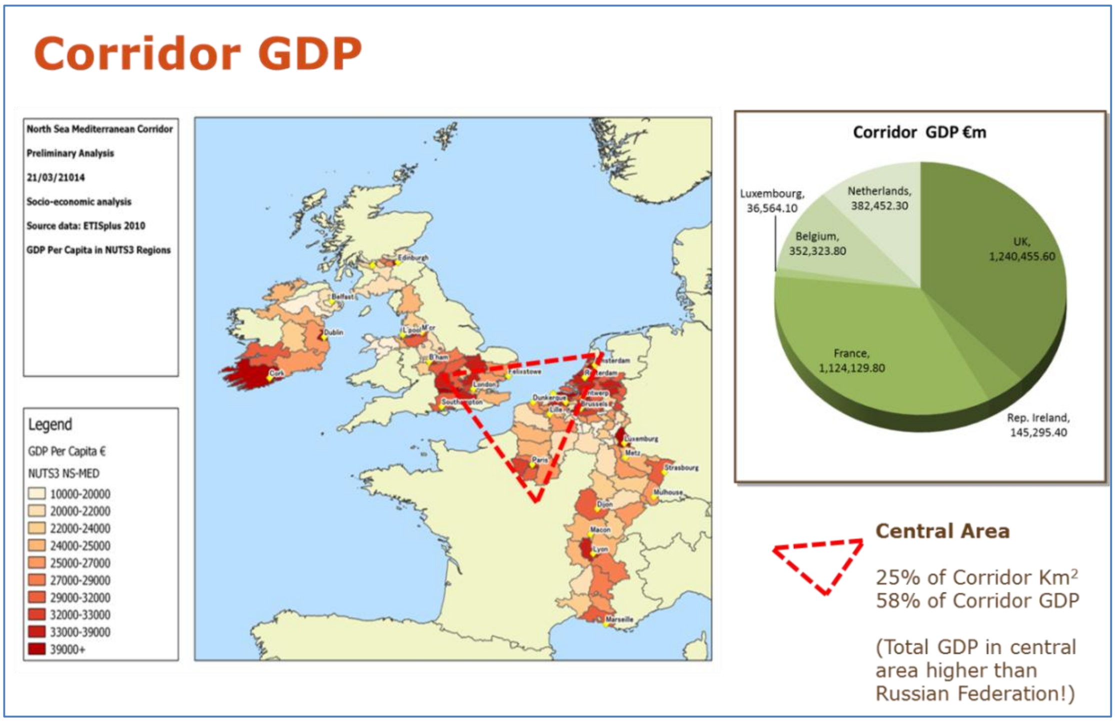
Figure 49: Corridor Population Density



Source: Eurostat, Study authors.

In terms of total economic activity, the regions adjacent to the NS-MED corridor account for 3,281 billion Euros, approximately one quarter of total EU GDP, thus indicating statistically that is one of the wealthy regions of Europe with one fifth of EU population accounting for one quarter of output.

Figure 50: Corridor GDP per Capita



The central area, accounting for half of the corridor population accounts for 58% of output.

Urban/Rural Population Profile
On the first of January 2011, 55% of the population within NSMED corridor countries was classified by Eurostat as urban, a total of 87.6 million inhabitants. For the EU-27 as a whole, the urban population is 41%.

Table 48: Population by urban-rural typology in thousands, 1 Jan 2011

	Urban	Intermediate	Rural	Total
Belgium	7,322	2,581	938	10,841
France	23,022	23,099	18,573	64,694
Ireland	1,201		3,280	4,481
Luxembourg		512		512
Netherlands	11,885	4,665	107	16,657
UK	44,187	16,032	1,808	62,027
Total	87,617	46,889	24,706	159,212
Shares	55%	29%	16%	

Source: Eurostat. (51/2012 – 30 March 2012)

Belgium, the Netherlands and the UK all have urban populations of approximately 70%.

In terms of population growth, there is disproportionate growth within the urban regions with a 5.2 persons per thousand increase in the urban population for the EU-27, compared to a decrease in the rural population of 0.8 persons per thousand. The Netherlands, Belgium and the UK show rates of urban population growth of between 6.0 and 8.5 persons per thousand inhabitants.

Table 49: Population change per 1000 inhabitants by urban-rural typology, 2010

	Urban	Intermediate	Rural
Belgium	8.5	7.1	7.3
France	5.9	4.9	5.1
Ireland	-5.7		6.1
Luxembourg		19.3	
Netherlands	6.0	2.3	-2.9
UK	7.7	5.5	2.7
EU27	5.2	2.2	-0.8

Source: Eurostat.

Applying the above rates of growth to the population distribution table shows that at the time of the estimation (2010), the annual population change for the six countries combined was 969 thousand persons. The urban population grew by 603 thousand, meaning that just over 62% of the net increase was occurring in urban areas. See below.

Table 50: Annual population growth (in thousands) 2010

	Urban	Intermediate	Rural	Total
Belgium	62.2	18.3	6.8	87.4
France	135.8	113.2	94.7	343.7
Ireland	-6.8	0.0	20.0	13.2
Luxembourg	0.0	9.9	0.0	9.9
Netherlands	71.3	10.7	-0.3	81.7
UK	340.2	88.2	4.9	433.3
Total (6 MS)	602.8	240.3	126.1	969.2

Source: consultants' estimates.

Given these patterns, if population in the corridor countries increases by 19 million as forecast (Table 47) in the period up to 2030, then it can be expected that 11.78 million new inhabitants will settle in urban areas, and especially in London, Paris, Lille, Brussels Antwerp and the Randstad, which is a significant potential change capable of affecting road and rail capacity within the corridor network.

Freight Transport Profile

The following table shows freight transport volumes measured in billion tonne kilometres (btkm) per mode, as well as seaport and airport volumes measured in thousands of tonnes (kTonnes) lifted/landed. The indicators measure total transport, including short distance and national volumes, inside and outside the corridor.

Table 51: National Freight Volumes in 2010

	BE	FR	IE	LU	NL	UK
Road btkm	35.00	182.19	10.94	8.69	76.34	151
Rail btkm	6.3	30.0	0.1	0.2	5.9	19
Rail unitised btkm						6.4bn[43]
IWT btkm	8.2	8.4[44]		0.4	40.3	0.1
Seaport Traffic '000T	226,359	308,239	45,000		537,715	512,000
Seaport Container Traffic '000T	96,180	35,886	6,457		87,324	56,807
Seaport RORO Traffic '000T	23,668	25,286	12,256		14,081	96,185
Air Cargo '000T	1,118	1,575	116	694	1,600	2,500

Source: Eurostat and National Ministries

Total transport performance (billion tonne kilometres) within the six corridor Member States shows a strong reliance upon road transport in absolute terms, the main exceptions being waterway transport in the Netherlands, and rail transport in France.

[43] For 2011 (source: *Network Rail Long Term Planning Study: Freight Market Study*, October 2013)
[44] Source: VNF, excluding Rhine Transit

Seaport traffic aggregated for the five maritime countries in the corridor amounts to over 1.6 billion tonnes, almost half of all seaport throughput in the European Union. The core ports in the corridor handle 1.2 billion tonnes, 31.4 million container TEU, and 34 million passengers.

Table 52: Available National Forecasts for Freight Transport (Tonne Kms)

	BE	FR	IE	LU	NL	UK
Year	*See below*	*2030*	-		*2040*	2030 except where stated
Source		*CGDD*	-		*CPB/GE*	UK Department for Transport, Network Rail & MDS Transmodal
Road – billion tonne kms		426.0	-		125	25.4bn vkm[45]
Rail – billion tonne kms		79.4	-		16	43.7bn[46]
Rail Unitised – billion tonne kms		26.5 (combined rail transport only)	-			29.4bn
IWT– billion tonne kms		10.7[47]	-		80	Not available.
Seaport Tonnes ('000 Tonnes)	*See below*	No homogenous forecast available	-		1,148,000	694 million[48]
Seaport LOLO ('000 Tonnes)		As above	-		542,000	20 million
Seaport RORO		As above	-			171 million[49]
Air Freight		As above	-			Not available[50].

In the countries for which detailed national forecasts are available for either 2030 or 2040, high rates of growth are foreseen for freight (i.e. approximately doubling) except in England for HGVs where freight vehicle kilometres are forecast to grow from 23.1bn vkm in 2010 to 25.4bn vkm in 2030 (growth of only 10% in 20 years). Thus, freight growth is expected to outstrip economic growth in the corridor with the exception of the

[45] Road traffic forecasts for rigid and articulated HGVs in England, expressed in vehicle kilometres (source: *Road Traffic Forecasts 2013*, DfT July 2013); comparator for 2010 was 14.3 bn vkm
[46] For 2033; source: *Network Rail Long Term Planning Study: Freight Market Study*, October 2013 (based on modelling by MDS Transmodal)
[47] Using actual 2010 traffic data and the CGDD 2009-2030 annual growth rate excluding Rhine transit.
[48] Source: *Update on UK Port Demand Forecasts to 2030 & Economic Value of Transhipment Study Final Report*, MDS Transmodal 2007 (for DfT); it should be noted that these forecasts were completed before the economic downturn.
[49] Includes HGVs transported on the Eurotunnel Freight Shuttle.
[50] *UK Aviation Forecasts* (DfT, January 2013) provided forecasts for freighter and passenger aircraft movements, but forecasts were not provided in terms of tonnes lifted.

UK. European scenarios, such as iTren-2030, in which a common methodology is applied to all countries show lower rates of growth for both GDP (1.4% average yearly growth in EU15) and transport (1.4% average yearly growth of tonne-kms for all modes in EU15), but these aggregated models do not consider, for example, the way in which globalisation drives traffic growth through major gateway ports. Many NSMED corridor regions contain large seaports, most of which are gearing up for expansion, especially in the container sector.

Dutch freight forecasts are derived from the 2040 Global Economy Scenario published by the Central Plan Bureau. They show approximately a doubling of volumes across sectors before 2040, with particularly high growth in container handling in seaports.

Belgian Freight Forecasts

The main Belgian study (FBP, 2012) covering the projected transport flows was conducted by the FOD (Federale Overheidsdienst) Mobiliteit en Vervoer together with the Federal Planning bureau, employing the PLANET national transport model. The model uses a set of policies (e.g. environmental targets) and macroeconomic parameters to project the transport flows and the effects of policies on the economy.

The base year for the study is 2008 and provides aggregated figures for tonnes (all modes) as well as tonne-km and vehicle-km figures (per mode) up to 2030. In addition, the study estimates the number of road vehicles for peak and off-peak hours. For passenger transport the model estimates the aggregated number of trips and passenger-km. Hence, the study presents the growth rates for the future transport in Belgium. However, due to the aggregated level there are no conclusions for the corridor-specific performance.

Table 53: Belgium freight growth factors

Tonnes performance	2008 values (in billion tonnes)	2008-30 average annual growth rate
Road, Rail, Inland waterways	**0,876**	**2,26%**
National transport	0,404	1,81%
From ROW to Belgium	0,212	2,14%
From Belgium to ROW	0,202	3,28%
Transit without transhipment	0,057	1,74%
Air, deep sea shipping and pipelines	**0,135**	**1,95%**
From ROW to Belgium	0,089	1,73%
From Belgium to ROW	0,046	2,35%

ROW : rest of the world

For freight transport, in 2008, the total performance for road, rail and inland waterways in tonnes was 0.9 billion tonnes, of which 0.4, or 46% of the total, were domestic freight transport, 0.4 billion tonnes (47%) between the rest of the world to Belgium and 0.1 billion tonnes (7%) transit without transhipment. There were also 0.1 billion tonnes transported from and to Belgium using air, deep sea and pipelines.

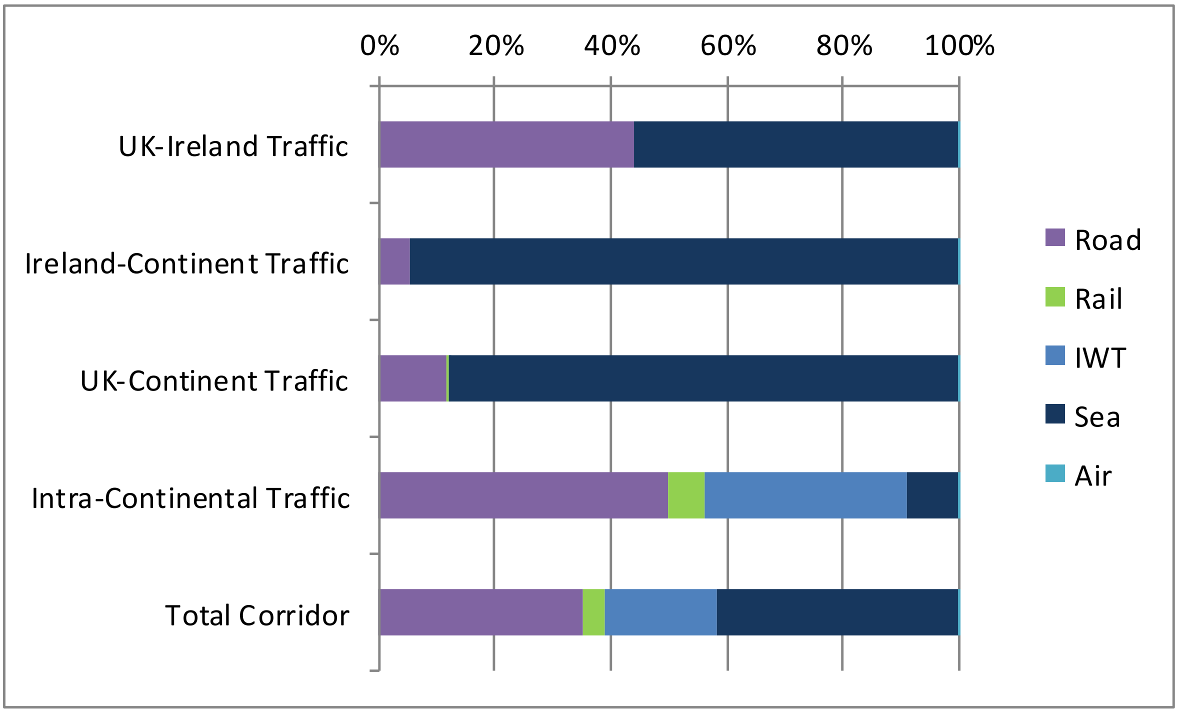
The study estimates that the average annual growth rate for the road, rail and inland waterways is almost 2.3% annually, related mainly to the expected growth in imports and exports (expected to grow by more than 3% annually). The other modes are also affected by the exports growth, expecting a growth of 2.4% annually. This impacts the freight distribution, shifting from domestic to imports and exports, with 42% and 53% respectively.

Based on its tonne-km results, the study also provides insight on the transport modes for the international freight demand.

Corridor Modal Split, Freight

To analyse modal split throughout the corridor, it is necessary to separate different traffic streams to take account of the different transport options available.

Figure 51: Modal Shares for Freight in 2010 (Based on tonnes lifted)



Source: Eurostat, Study Authors.

This graph shows modal shares for flows of goods (all commodities) exchanged between the six member States[51]. Sea is naturally the main mode of transport for the bulk freight flows involving the UK[52] and Ireland, while road transport (i.e. including RORO services or the Eurotunnel Shuttle for the necessary crossings to the continent) is the other main mode. Rail freight through the Channel Tunnel between Great Britain and the Continent remains at a relatively low level compared to the capacity available for through rail

[51] Note: road freight flows travelling as driver-accompanied RORO are counted as road flows. Ireland-Continent includes RORO traffic land-bridging via the UK.

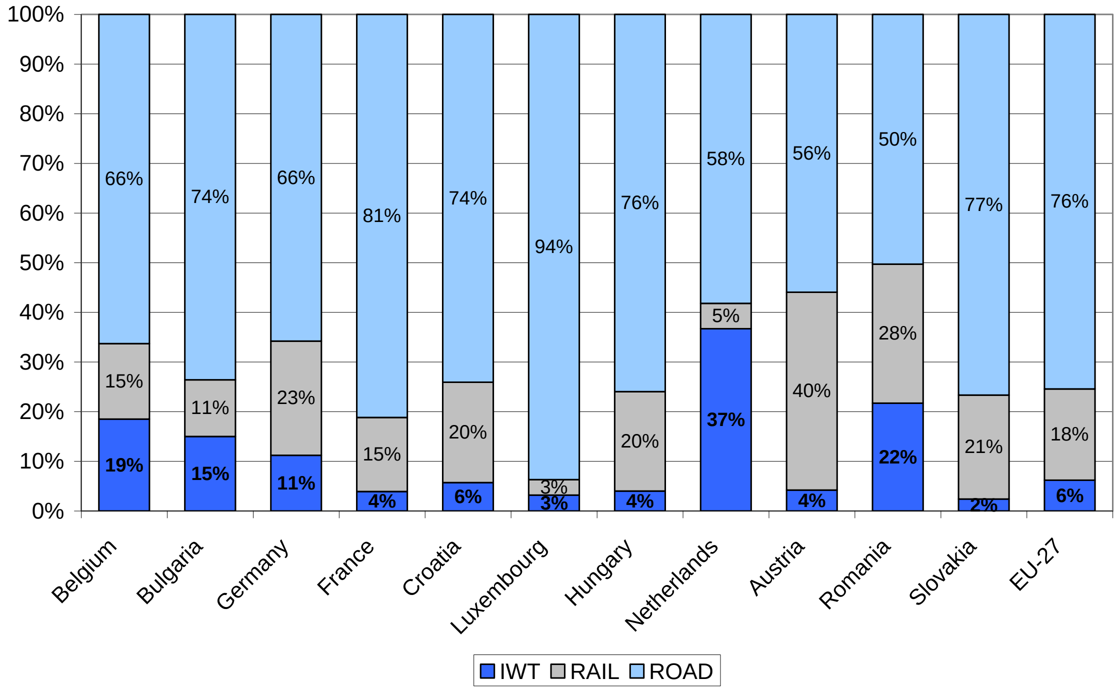
[52] UK includes Northern Ireland.

freight services. In 2013, the Channel Tunnel handled 1.36 million tonnes of long distance through rail freight. The Channel Tunnel does not have unlimited capacity, but in 2012, Eurotunnel's Annual Review showed that 45% of paths were unused, so lack of paths is not a bottleneck at present. However, even if almost all the through rail freight capacity were utilised in practice, the rail market share would not change radically which emphasises the importance of RORO links between Great Britain and the Continent for unitized freight.

Within the Continental part of the corridor, cross-border volumes are higher, and the mix between modes of transport is also more diverse. Rail and waterway account for 6.4% and 35% respectively. However, much of the waterway traffic is concentrated around the Dutch and the Flemish ports, so these are not uniform shares throughout the corridor.

In the case of waterway, the PLATINA 2 analysis shows a similar picture. Netherlands and Belgium have lowered road shares to 58% and 66% respectively by developing inland waterway transport, as a complementary mode for maritime transport. This is an important factor when considering that seaport transport volumes are high within this corridor, and growing faster than other traffic streams.

Figure 52: Modal share in the 11 IWT-connected countries (based on tkm)



Source: PLATINA 2: Information Package, using Eurostat data.

In the case of rail, market shares are relatively low within the corridor countries, compared to nearby countries such as Germany and Austria. Across the Alps, rail has a 34% share overall, amounting to 68 million tonnes per annum[53]. Container ports, such as Bremen and Hamburg, which have high throughputs, but which lack waterway connections, achieve inland modal shares of 53% and 36% respectively by rail.

So although the general picture is one in which freight is being moved primarily by sea and road, there are important clusters where waterway and rail compete effectively. In

[53] ALPINFO, 2011.

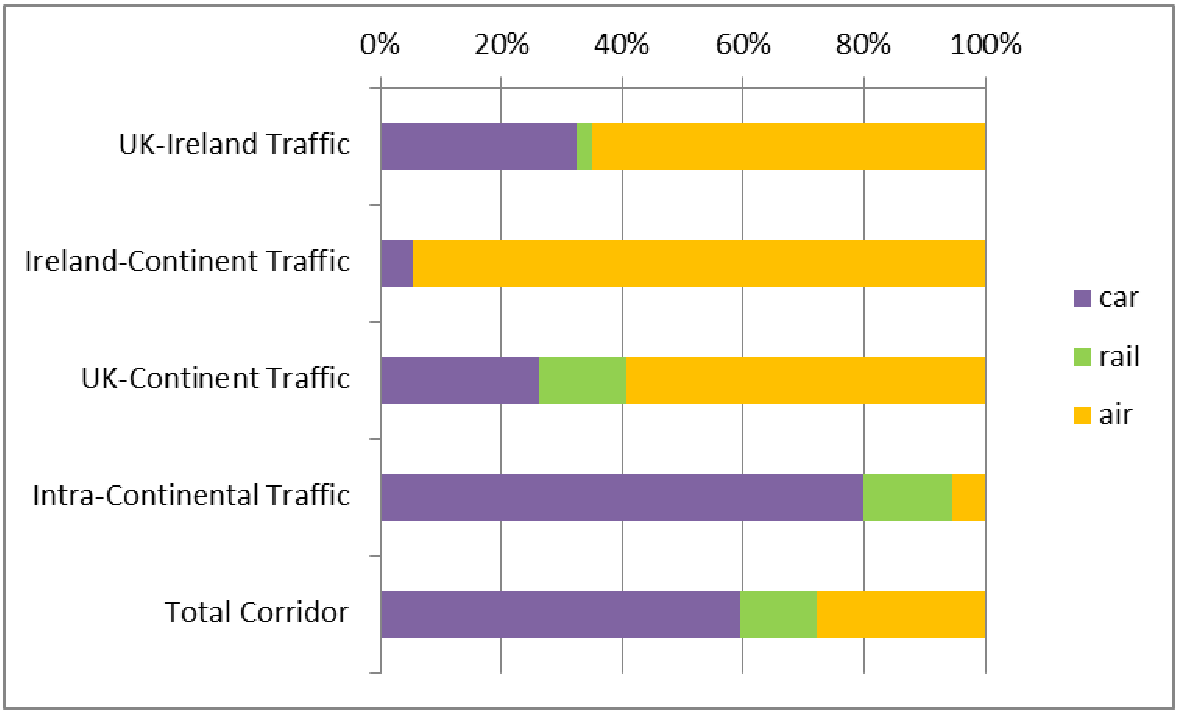
this context, the concentration of traffic at seaports is an important catalyst for developing inland transport, together with the planning of inland ports, rail terminals, and associated logistics activities.

Corridor Modal Split, Passengers

In the cross-border passenger market, the same geographical split has been made in order to separate qualitatively different branches of the corridor. Flows involving the UK[54] and Ireland are dominated by air transport, but between the UK and the Continent the availability of high speed rail services between London, Paris and Brussels has created a substantial passenger rail market via the Channel Tunnel. In 2013, a total of 10,132,691 passengers were carried by Eurostar compared to a similar number of car passengers using Eurotunnel's shuttles.

Note: Car transport between the UK and the Continent requires the use of a ferry or a Eurotunnel rail shuttle, so implicitly there is sea transport involved as well. For the Republic of Ireland and Northern Ireland this is also the case, for transport to the UK mainland or to the Continent, which may involve two sea crossings.

Figure 53: Modal Split Passengers



Source: Study Authors

Between continental countries in the corridor, estimated trip generation rates are higher, and the shares of terrestrial modes are much higher, as would be expected. Road transport dominates.

Therefore, unlike the situation with freight transport, the potential for achieving a more even modal share appears more limited, especially given the number of high-speed rail services connecting the cities today. Nevertheless, there are routes such as Brussels-

[54] UK includes Northern Ireland.

Luxembourg-Strasbourg (Euro-Cap-Rail) which are being developed, and which can benefit from modernisation and faster journey times.

Cross-border Freight Flows

Throughputs per corridor port are shown in Table 56 below. Together, these core ports account for 1.256 billion tonnes, around one third of total EU port handling, 34 million passengers, and 31 million TEU. This is a mix of deep-sea and short-sea traffic, highlighting the fact that the NSMED corridor ports act as 1) gateways for intercontinental trade and 2) interconnecting nodes within the corridor.

Trade statistics provide information for the volumes of freight moving across borders. Trade between individual corridor countries[55] and their neighbouring countries have been collected and presented in the following pages.

In summary, trade flows within the six corridor MS, and to and from their neighbours amounts to just over one billion tonnes.

Table 54: Intra-EU Trade Flows in NSMED Corridor, 2012, Tonnes (000s)

	IE	UK		FR	LU	BE	NL		Alpine	Iberian	Central	Total
IE		7,454		1,214	6	782	1,019		286	431	693	**11,885**
UK	15,469			12,808	67	12,790	31,928		1,831	5,735	22,927	**103,555**
												-
FR	1,080	10,230			5,185	27,818	16,445		25,290	23,463	32,242	**141,753**
LU	19	302		2,085		1,224	459		305	86	2,361	**6,841**
BE	564	9,333		63,837	4,723		45,142		5,476	3,562	37,905	**170,542**
NL	1,266	21,400		19,257	645	91,804			7,437	8,567	143,569	**293,945**
												-
Alpine	176	4,996		20,546	142	2,413	7,025					**35,298**
Iberian	713	7,867		22,235	78	3,466	7,476					**41,835**
Central	1,828	23,869		48,511	6,571	29,097	114,311					**224,187**
Total	**21,115**	**85,451**		**190,493**	**17,417**	**169,394**	**223,805**		**40,625**	**41,844**	**239,697**	**1,029,841**

Source: Eurostat, Comext, 2012.

The flows are colour coded in the table to indicate the flows within the main geographical areas:

Table 55: Intra-EU Trade Flows in NSMED Corridor, 2012, Tonnes (000s)

FR, BE, NL, LU (Intra)	278,624	Mainly road, with rail and waterway.
UK <--> Continent	166,083	Mainly sea with CT rail.
IE <--> Continent	10,077	All by sea.
UK <--> Ireland	22,923	Mainly sea, with road t/f NI.
FR,BE,NL,LU <--> Alpine	68,634	Mainly road, with rail.
FR,BE,NL,LU <--> Iberia	68,933	Mainly road, with rail.
FR,BE,NL,LU <--> Central	414,567	Road, rail and waterway.
TOTAL	1,029,841	

Source: Eurostat, Comext, 2012.

[55] Within trade data analyses, UK includes Northern Ireland.

Non-corridor trading partners are split into three groups:

- Alpine region – Switzerland and Italy.
- Iberian region – Spain and Portugal.
- Central region – Germany, Denmark, Poland, Czech Republic, and Austria.

Within the largest category, i.e. flows between the four continental countries and the central region, a high proportion of traffic is between Netherlands and Germany, which only uses the NSMED network for a small proportion of its overall transport distance. In all cases, traffics are calculated from national data, not regional data.

Corridor Seaport Throughputs
In the following table showing seaport freight and passenger throughput, data has been sourced from individual port authorities, and from Eurostat.

Corridor Airport Throughputs
In the following table showing airport freight and passenger throughput, data has been sourced from Eurostat.

Table 56: Corridor port Throughputs, 2013

		Dry Bulk	Liquid Bulk	Containers	RORO	Other General Cargo	Total	Container Units	Passengers
		000T	000T	000T	000T	000T	000T	(TEU)	(number)
Belgium	Antwerpen	14,377	59,494	102,326	8,227	6,426	190,850	8,578,269	1,217
	Ghent	16,367	3,871	587	1,972	3,158	25,955	70,228	1,045
	Zeebrugge	1,285	6,916	20,413	12,544	1,674	42,832	2,026,270	816,755
	Oostende	1,247	56	0	442	74	1,819	0	27,709
France	Calais	342	48	0	40,637	152	41,179		10,371,657
	Dunkerque	21,589	6,093	2,711	12,337	839	43,570	291,628	2,301,834
	Marseille/Fos	13,173	49,486	10,765	3,908	2,621	79,953	1,099,247	2,400,000
Ireland	Cork	1,759	5,200	1,515	50	183	8,707	166,103	80,000
	Dublin	1,985	3,531	5,171	18,122	38	28,847	517,086	1,607,987
Netherlands	Amsterdam Ports	44,404	41,094	816	644	7,337	94,293	65,088	518,000
	Moerdijk	2,103	2,146	962	1	453	5,667		
	Rotterdam	89,187	206,799	121,251	18,512	4,715	440,464	11,621,249	1,181,000
	Zeeland (Terneuzen, Vlissingen)	10,652	12,880	188	1,365	7,943	33,028		
UK	Belfast	6,719	2,165	1,617	5,838	444	16,783	205,300	1,390,366
	Dover	82	0	0	24,872	342	25,295	1,200	12,740,199
	Edinburgh (Forth Ports)	1,125	22,109	2,286	572	273	26,365	260,800	686
	Felixstowe	0	60	23,469	2,680	5	26,214	3,731,300	7,276
	Glasgow (Clydeport)	8,377	5,777	499	0	130	14,783	75,700	
	Liverpool	7,991	10,976	4,637	6,644	902	31,149	622,700	119,545
	London	11,577	12,573	8,162	7,603	3,291	43,206	945,200	14,307
	Southampton	1,616	24,083	8,130	1,780	189	35,797	1,488,300	
TOTAL		255,615	475,309	315,505	168,750	41,037	1,256,756	31,468,068	34,088,038

Figure 54: Airport Freight and Passengers within NSMED Corridor

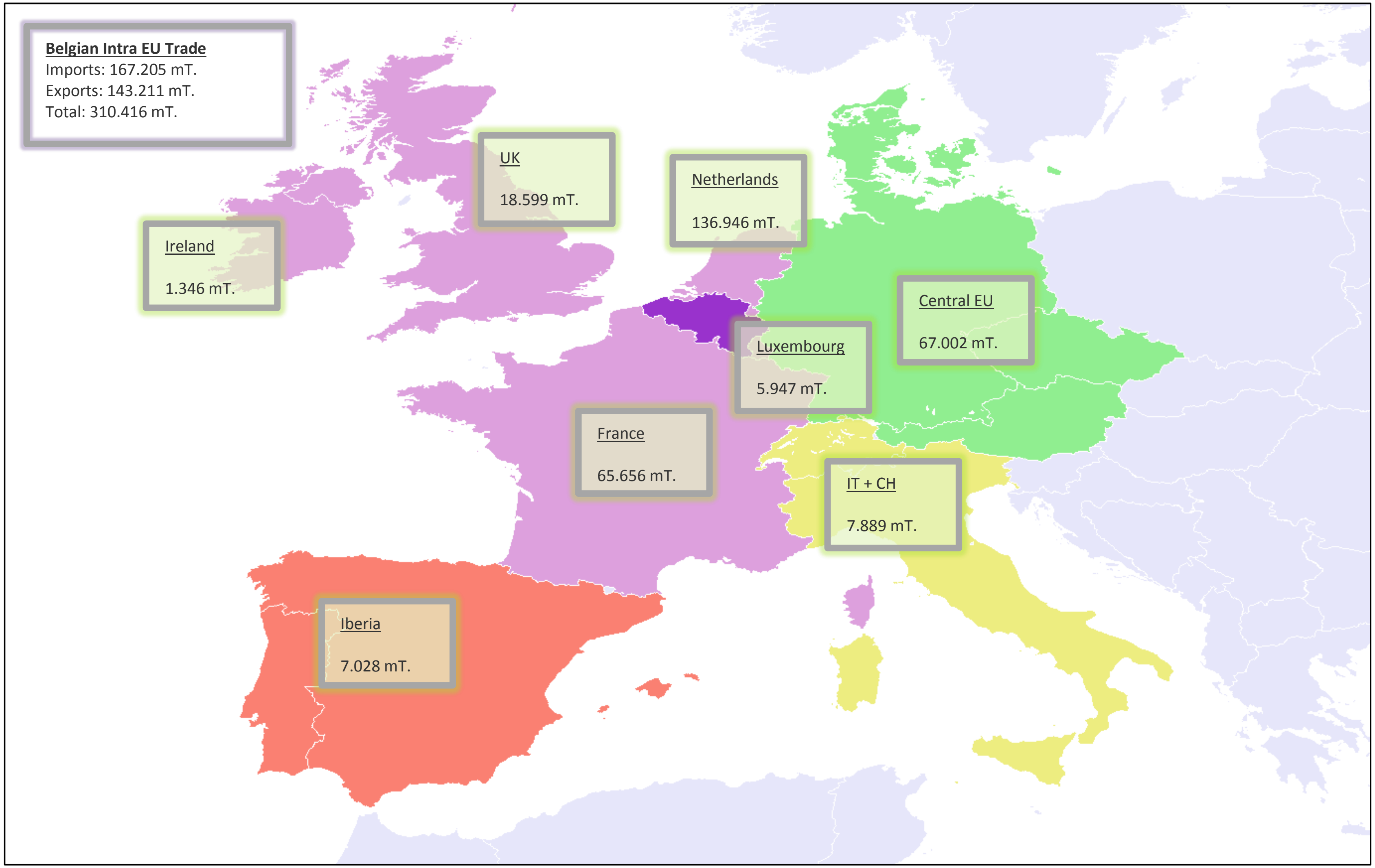
		Freight and Mail Loaded/Unloaded (Tonnes)					Passengers Carried				
		2010	2011	2012	2013	Share	2010	2011	2012	2013	Share
Total EU27/8		13,126,780	13,532,204	13,321,629	13,388,513	100%	776,851,750	821,265,790	826,463,402	842,315,363	100%
Belgium		973,776	1,000,990	963,564	957,012	7%	22,690,502	25,098,923	25,913,625	26,387,222	3%
	Brussels	385,029	386,652	405,270	378,672	3%	16,980,274	18,613,386	18,815,368	18,984,862	2%
	Liège	508,518	544,034	510,286	534,215	4%	294,712	302,979	296,411	310,155	0%
France		1,582,342	1,813,646	1,810,203	1,787,675	13%	122,887,263	131,425,313	135,005,802	138,085,382	16%
	Lyon St Exupery	35,210	36,294	37,209	45,425	0%	7,793,437	8,318,143	8,366,503	8,500,937	1%
	Marseille Provence	59,627	58,937	58,232	56,167	0%	7,337,492	7,223,736	8,172,207	8,212,427	1%
	Paris CDG	1,292,518	1,532,724	1,513,871	1,494,871	11%	57,951,639	60,742,357	61,376,720	61,890,299	7%
	Paris Orly	53,747	58,788	63,785	63,712	0%	25,158,350	27,099,908	27,193,022	28,249,193	3%
	Lille Lesquin	99	78	157	88	0%	1,149,383	1,143,242	1,367,443	1,645,798	0%
Ireland		122,231	113,409	126,834	127,423	1%	23,093,749	23,362,889	23,594,089	24,603,640	3%
	Cork	794	795	708	651	0%	2,412,439	2,350,843	2,328,237	2,246,884	0%
	Dublin	105,339	101,193	111,069	113,482	1%	18,408,088	18,719,711	19,077,659	20,135,844	2%
Luxembourg		705,829	666,011	615,286	673,380	5%	1,613,600	1,836,761	1,893,988	2,168,748	0%
	Luxembourg	705,829	666,011	615,286	673,380	5%	1,613,833	1,836,920	1,893,991	2,169,327	0%

(Continued)

(Continued, Airport Freight and Passengers within NSMED Corridor)

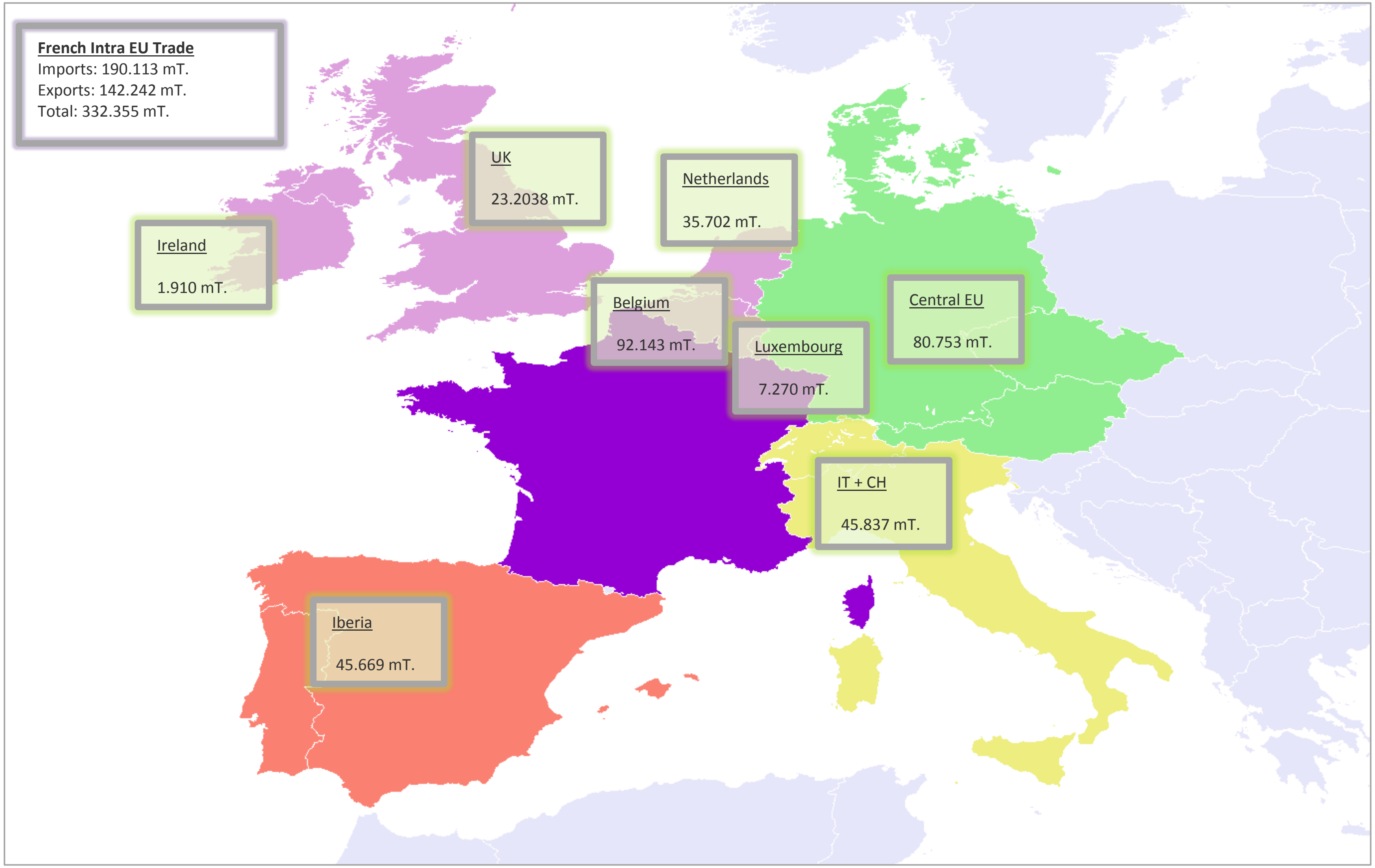
		Freight and Mail Loaded/Unloaded (Tonnes)					Passengers Carried				
		2010	2011	2012	2013	Share	2010	2011	2012	2013	Share
Total EU27/8		13,126,780	13,532,204	13,321,629	13,388,513	100%	776,851,750	821,265,790	826,463,402	842,315,363	100%
Netherlands		1,600,381	1,614,895	1,563,500	1,620,038	12%	48,616,387	53,895,216	55,680,131	58,077,221	7%
	Amsterdam Schiphol	1,538,034	1,549,445	1,510,925	1,565,956	12%	45,146,033	49,690,392	50,988,293	52,543,412	6%
	Rotterdam/The Hague	21	47	46	54	0%	927,894	1,081,841	1,192,632	1,494,316	0%
UK		2,428,996	2,419,713	2,428,374	2,369,868	18%	192,884,537	201,535,227	203,066,646	210,468,756	25%
	London City	0	0	0	0	0%	2,780,505	2,941,781	3,016,664	3,379,576	0%
	London Gatwick	108,552	92,056	101,096	100,441	1%	31,341,366	33,638,323	34,213,203	35,427,201	4%
	London Heathrow	1,551,308	1,569,303	1,555,992	1,513,668	11%	65,741,996	69,388,105	69,983,473	72,331,500	9%
	London Luton	28,743	27,905	29,635	29,008	0%	8,733,080	9,509,911	9,613,912	9,693,360	1%
	London Stansted	229,812	230,162	241,368	236,253	2%	18,562,806	18,043,407	17,460,567	17,844,342	2%
	Birmingham	21,659	16,642	19,090	22,331	0%	8,562,586	8,606,497	8,916,094	9,114,226	1%
	Edinburgh	44,083	44,308	42,938	38,004	0%	8,593,666	9,383,242	9,193,840	9,774,636	1%
	Glasgow	2,933	2,475	9,567	11,889	0%	6,521,758	6,858,264	7,150,034	7,358,088	1%
	Manchester	116,559	108,537	98,270	96,708	1%	17,662,429	18,803,819	19,654,321	20,680,467	2%
Corridor Countries		7,413,555	7,628,664	7,507,761	7,535,396	56%	411,786,038	437,154,329	445,154,281	459,790,969	55%
	Corridor Airports	6,788,414	7,026,386	6,924,800	6,974,975	52%	353,673,766	374,296,807	380,270,594	391,986,850	47%

Figure 55: Trade Flows, to and from Belgium, 2012



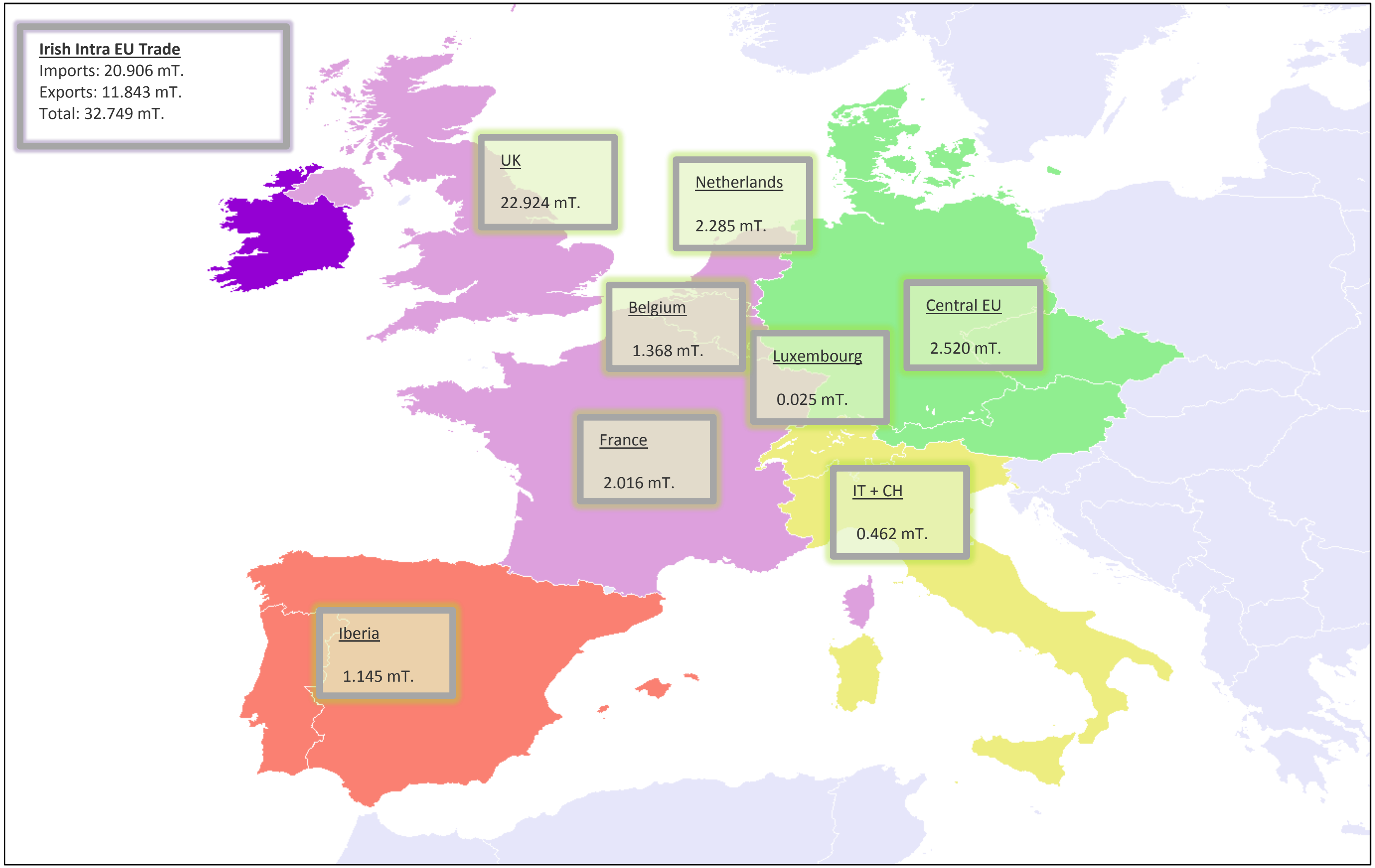
Source: Eurostat, COMEXT, 2012

Figure 56: Trade Flows, to and from France, 2012



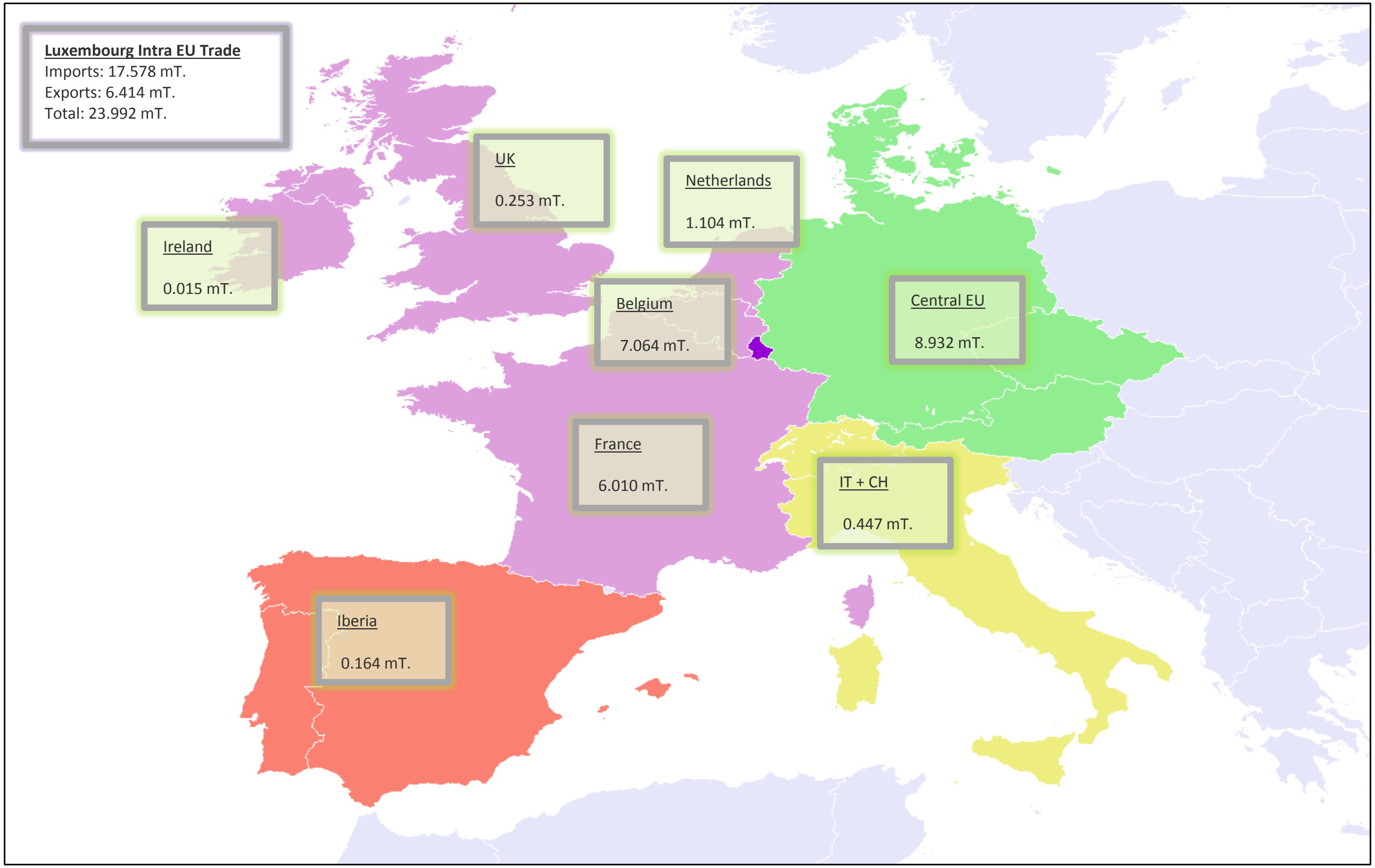
Source: Eurostat, COMEXT, 2012

Figure 57: Trade Flows, to and from Ireland, 2012



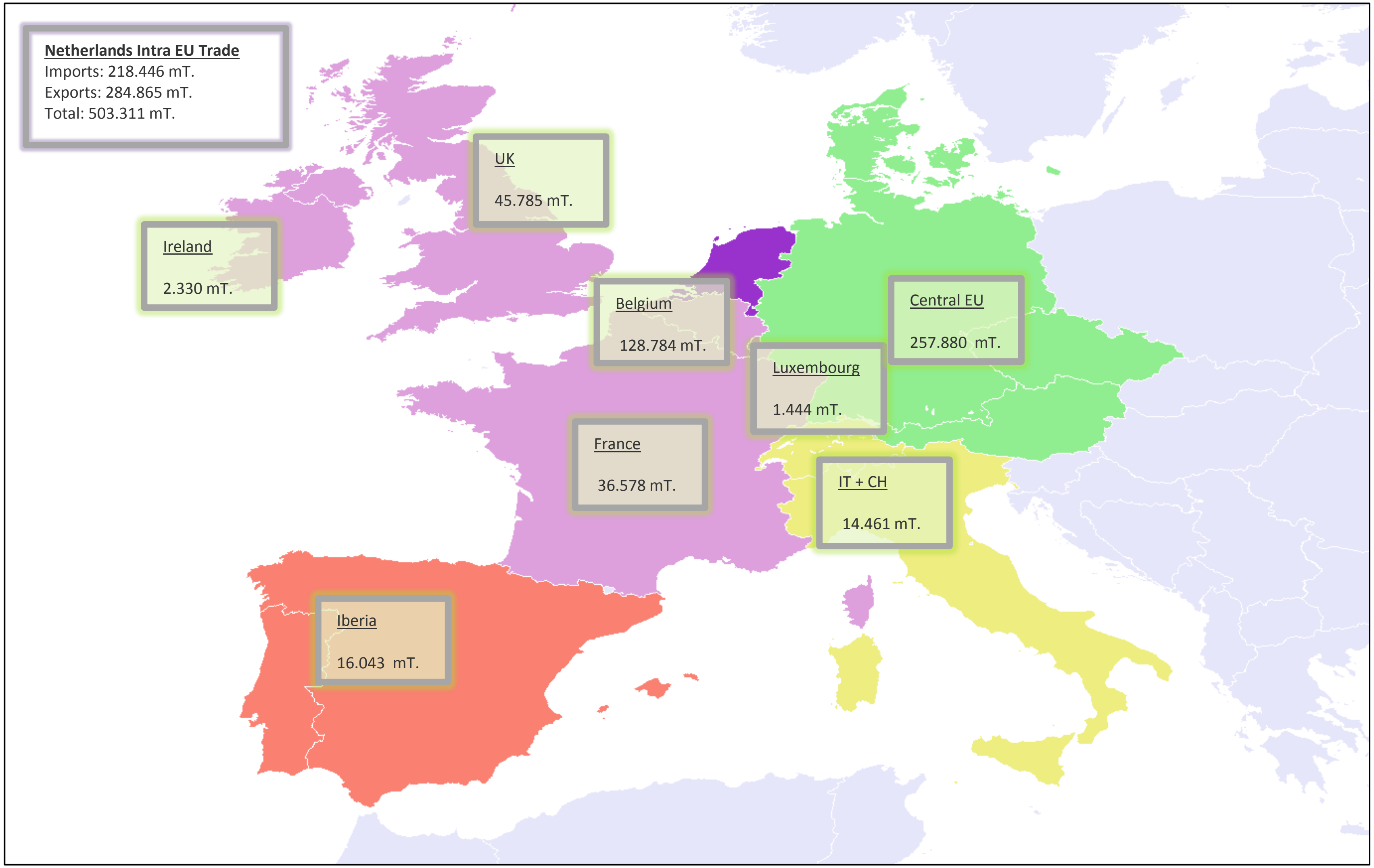
Source: Eurostat, COMEXT, 2012

Figure 58: Trade Flows, to and from Luxembourg, 2012



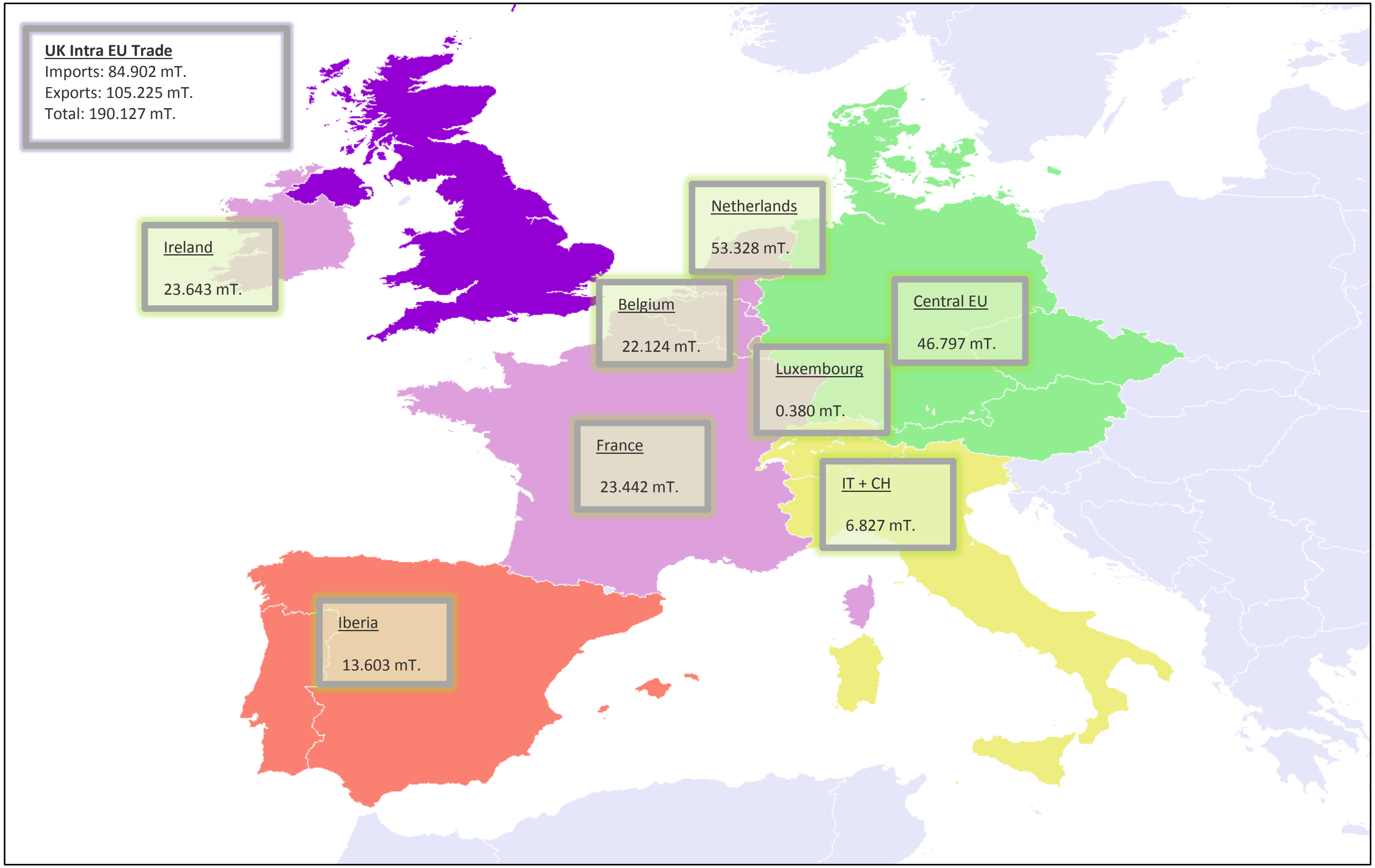
Source: Eurostat, COMEXT, 2012

Figure 59: Trade Flows, to and from the Netherlands, 2012



Source: Eurostat, COMEXT, 2012

Figure 60: Trade Flows, to and from the UK, 2012



Source: Eurostat, COMEXT, 2012

Short-Sea and Cross-border Trade Flows

Table 57: Belgian Trade Flows, Tonnes, 2012.

	Import	Export	Total
Netherlands	91,804,145	45,142,261	136,946,406
France	27,818,571	37,838,067	65,656,638
Luxembourg	1,224,049	4,723,009	5,947,058
Ireland	782,514	564,163	1,346,677
UK	10,599,456	8,000,125	18,599,581
Corridor MS	*132,228,735*	*96,267,626*	*228,496,361*
Italy	2,275,987	3,828,900	6,104,887
Switzerland	137,254	1,647,352	1,784,606
Alpine Group	*2,413,241*	*5,476,252*	*7,889,493*
Spain	2,861,946	3,001,202	5,863,147
Portugal	604,107	561,050	1,165,157
Iberian Group	*3,466,053*	*3,562,252*	*7,028,304*
Austria	738,559	922,881	1,661,439
Czech Rep.	520,405	759,603	1,280,008
Germany	26,377,376	33,586,960	59,964,336
Denmark	325,728	773,526	1,099,254
Poland	1,135,329	1,862,465	2,997,794
Central Group	*29,097,396*	*37,905,434*	*67,002,830*
Total Tonnes	***167,205,425***	***143,211,564***	***310,416,988***

Source: Eurostat, COMEXT, 2012

Table 58: French Trade Flows, Tonnes, 2012.

	Import	Export	Total
Belgium	63,837,859	28,305,426	92,143,285
Luxembourg	2,085,603	5,185,368	7,270,971
Netherlands	19,257,699	16,444,718	35,702,416
Ireland	830,475	1,080,113	1,910,588
UK	12,808,321	10,230,557	23,038,878
Corridor MS	*98,819,957*	*61,246,182*	*160,066,139*
Italy	18,044,053	17,699,450	35,743,503
Switzerland	2,502,699	7,590,909	10,093,609
Alpine Group	*20,546,752*	*25,290,360*	*45,837,112*
Spain	20,136,532	21,178,666	41,315,198
Portugal	2,098,671	2,285,153	4,383,824
Iberian Group	*22,235,203*	*23,463,819*	*45,699,022*
Austria	1,625,513	993,783	2,619,296
Czech Rep.	1,008,015	939,547	1,947,563
Germany	42,153,637	27,592,573	69,746,210
Denmark	742,429	855,381	1,597,810
Poland	2,981,585	1,860,935	4,842,520
Central Group	*48,511,180*	*32,242,219*	*80,753,399*
Total Tonnes	***190,113,092***	***142,242,579***	***332,355,671***

Source: Eurostat, COMEXT, 2012

Table 59: Irish Trade Flows, Tonnes, 2012.

	Import	Export	Total
UK	15,469,782	7,454,743	22,924,525
France	801,804	1,214,503	2,016,307
Belgium	630,512	738,404	1,368,916
Netherlands	1,266,112	1,019,007	2,285,119
Luxembourg	19,428	6,103	25,531
Corridor MS	*18,187,637*	*10,432,760*	*28,620,397*
Italy	168,814	273,776	442,590
Switzerland	7,703	12,338	20,041
Alpine Group	*176,517*	*286,114*	*462,630*
Spain	616,390	298,672	915,062
Portugal	97,523	133,039	230,563
Iberian Group	*713,914*	*431,711*	*1,145,625*
Austria	55,032	17,506	72,538
Czech Rep.	53,612	37,131	90,743
Germany	1,039,010	502,428	1,541,438
Denmark	172,030	69,037	241,067
Poland	508,447	66,653	575,100
Central Group	*1,828,130*	*692,755*	*2,520,885*
Total Tonnes	***20,906,197***	***11,843,340***	***32,749,537***

Source: Eurostat, COMEXT, 2012

Table 60: Luxembourg Trade Flows, Tonnes, 2012.

	Import	Export	Total
Belgium	5,941,426	1,123,426	7,064,852
France	4,130,759	1,879,372	6,010,131
Netherlands	645,439	458,963	1,104,402
Ireland	1,803	13,994	15,797
UK	67,498	185,507	253,005
Corridor MS	*10,786,924*	*3,661,263*	*14,448,187*
Italy	111,220	221,701	332,921
Switzerland	30,769	84,261	115,030
Alpine Group	*141,988*	*305,962*	*447,950*
Spain	47,308	73,600	120,909
Portugal	30,922	12,636	43,558
Iberian Group	*78,231*	*86,236*	*164,466*
Austria	47,604	86,202	133,806
Czech Rep.	25,612	57,724	83,336
Germany	6,348,214	1,971,655	8,319,869
Denmark	5,771	79,925	85,696
Poland	143,795	165,711	309,506
Central Group	*6,570,996*	*2,361,216*	*8,932,212*
Total Tonnes	***17,578,139***	***6,414,677***	***23,992,816***

Source: Eurostat, COMEXT, 2012

Table 61: Netherlands Trade Flows, Tonnes, 2012.

	Import	Export	Total
Belgium	45,972,281	82,812,354	128,784,635
France	14,776,240	21,802,579	36,578,818
Luxembourg	669,581	775,355	1,444,936
Ireland	870,631	1,460,304	2,330,935
UK	27,344,820	18,440,906	45,785,726
Corridor MS	*89,633,552*	*125,291,498*	*214,925,050*
Italy	6,770,329	5,073,615	11,843,944
Switzerland	254,315	2,363,693	2,618,008
Alpine Group	*7,024,644*	*7,437,307*	*14,461,952*
Spain	6,203,321	5,739,092	11,942,414
Portugal	1,272,804	2,828,761	4,101,565
Iberian Group	*7,476,126*	*8,567,853*	*16,043,979*
Austria	893,597	5,247,907	6,141,504
Czech Rep.	618,937	1,160,410	1,779,348
Germany	105,630,737	128,407,757	234,038,494
Denmark	1,986,879	3,655,882	5,642,761
Poland	5,181,600	5,097,098	10,278,699
Central Group	*114,311,750*	*143,569,055*	*257,880,805*
Total Tonnes	***218,446,072***	***284,865,713***	***503,311,785***

Source: Eurostat, COMEXT, 2012

Table 62: UK Trade Flows, Tonnes, 2012.

	Import	Export	Total
Ireland	7,172,280	16,471,086	23,643,366
France	9,960,174	13,462,640	23,422,814
Belgium	9,333,487	12,790,517	22,124,004
Netherlands	21,400,018	31,928,614	53,328,631
Luxembourg	302,317	77,726	380,043
Corridor MS	*48,168,276*	*74,730,582*	*122,898,859*
Italy	4,882,711	1,596,378	6,479,089
Switzerland	113,800	234,721	348,521
Alpine Group	*4,996,511*	*1,831,099*	*6,827,609*
Spain	6,876,938	4,075,250	10,952,188
Portugal	990,628	1,660,695	2,651,323
Iberian Group	*7,867,566*	*5,735,945*	*13,603,511*
Austria	803,460	272,107	1,075,567
Czech Rep.	818,909	345,508	1,164,417
Germany	14,564,989	18,904,927	33,469,916
Denmark	4,536,064	1,748,186	6,284,250
Poland	3,146,299	1,656,975	4,803,274
Central Group	*23,869,721*	*22,927,703*	*46,797,423*
Total Tonnes	***84,902,073***	***105,225,329***	***190,127,402***

Source: Eurostat, COMEXT, 2012

The implication of the demand-side analysis is that although headline activity indicators such as population and economic growth are at modest levels for the EU as a whole, there is substantial growth expected within the NSMED corridor, linked to a high degree of urbanisation, and the faster-than-average growth in long-distance traffic, especially inter-continental container traffic with East Asia which naturally feeds directly into the corridor's networks from both the North Sea ports and from the Mediterranean (Marseille/Fos).

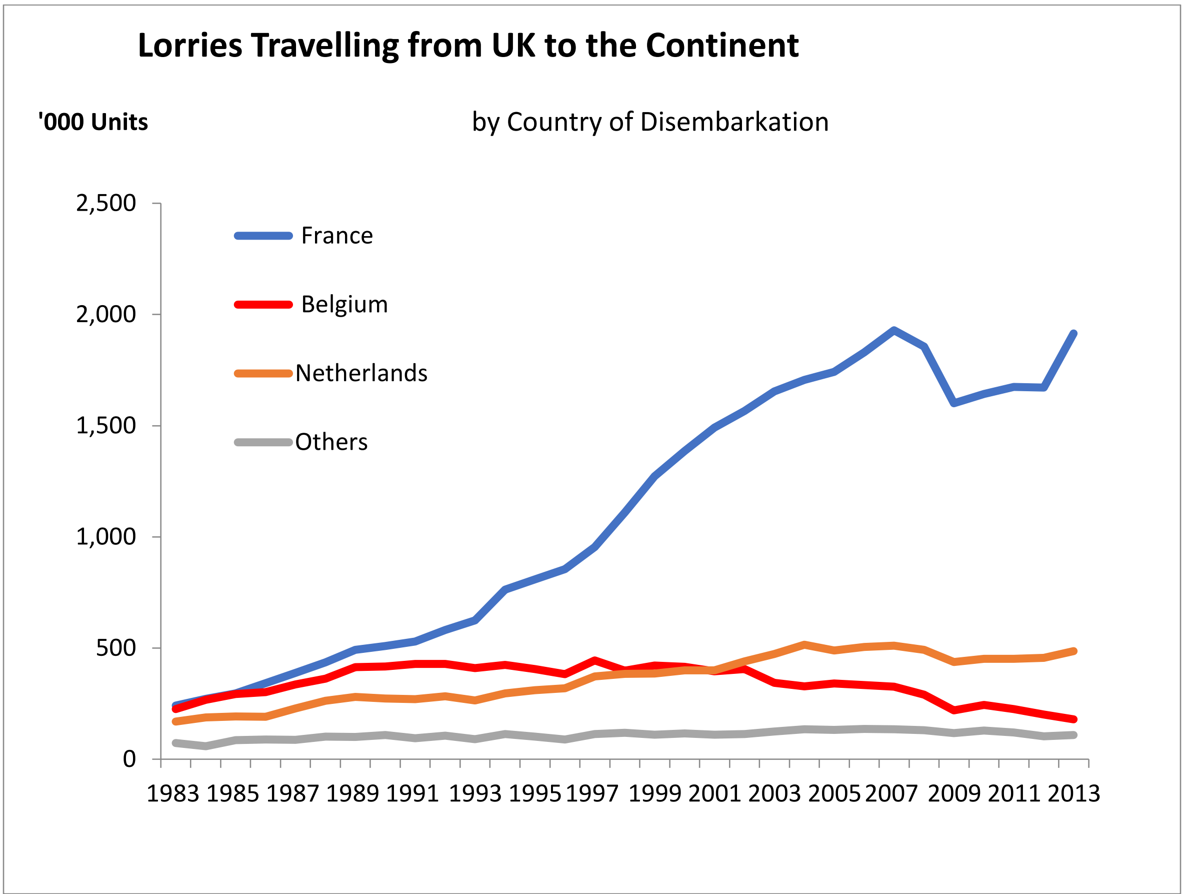
Base year data allows a comparison to be made between the levels of traffic arriving in the corridor's ports, and the cross-border flows between the corridor's Member States. This shows high levels of activity, with total port traffic, i.e. EU and worldwide flows feeding into the inland corridors, of 1.2 billion tonnes, and intra-corridor flows of just over 1 billion tonnes. These are heavily concentrated within the central part of the corridor, meaning Southeast England, Northeast France, Belgium (especially Flemish region) and the Netherlands.

The analysis of future flows so far has focused on examining demand-side issues for both passengers and freight, including available official forecasts that have been produced by or for the Member States. This has been extended by analysing plans at a more local level for major transport facilities, including seaports and inland ports.

Key Market Sectors

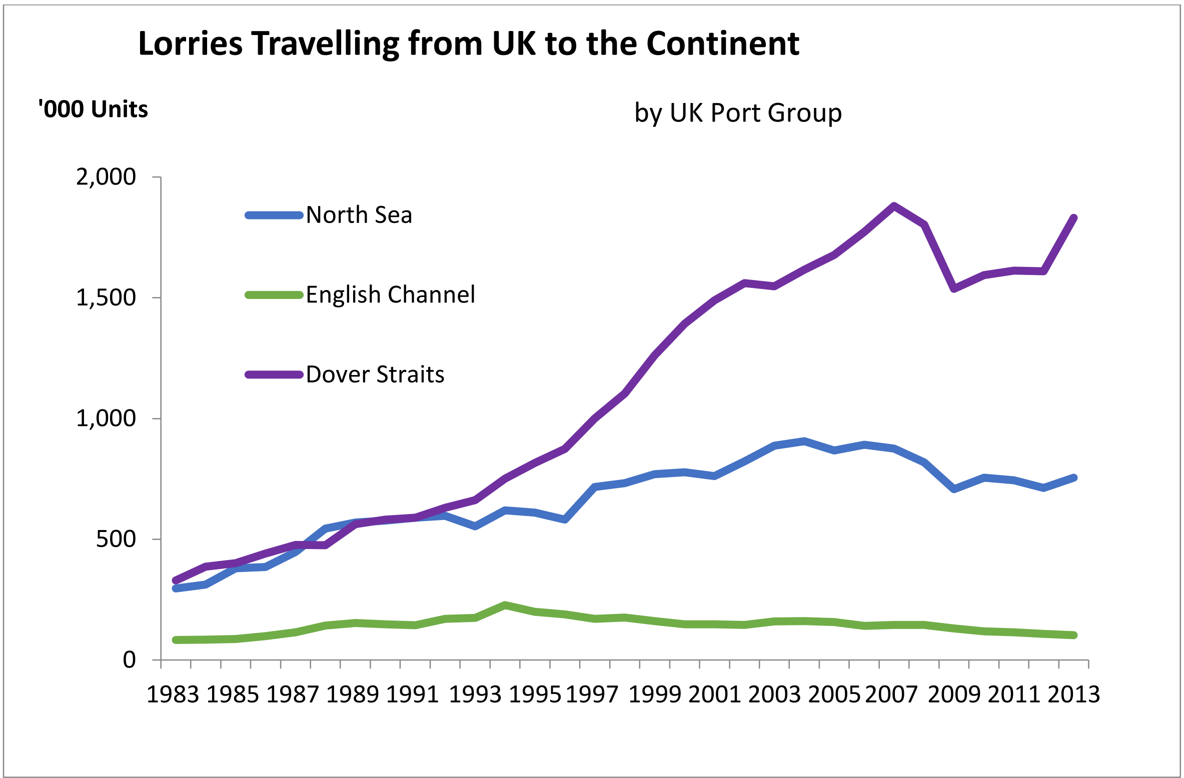
Cross Channel Roll-on/Roll-off Freight Market
DfT figures show that there has been significant growth in the cross-Channel freight market, especially in the period 1990-2008. The following graph shows the total number of HGV units, travelling from the UK to the Continent (one-way figures), including accompanied and unaccompanied units, and the traffic carried by the Channel Tunnel lorry shuttles (rail-rolling motorway). This amounted to 2.8 million units per direction, or 5.6 million units in total. Within this total, in 2013, the Channel Tunnel carried 1.4 million lorries (accompanied units both directions). Since the opening of the Channel Tunnel and the intense competition which has ensured on the Dover Straits, there has been a strong trend towards growth on routes between the UK and France, while other routes have remained static or actually declined.

Figure 61: Cross Channel Freight by Continental Country of Disembarkation



Source: DfT: Road goods vehicles travelling to mainland Europe: April to June 2014 (quarter 2)

Table 63: Cross Channel Freight by UK Port Range



Source: DfT: Road goods vehicles travelling to mainland Europe: April to June 2014 (quarter 2)

It is clear from the above graphs that nearly all of the growth has been on routes starting in the UK's Dover Straits ports and disembarking in France. This peaked in 2008 and, after a significant decline in 2009, has slowly recovered. The longer crossings from the UK's North Sea ports to Belgium and Netherlands have stabilised at around 700-800,000 units per direction per year combined.

In 2015, the GB-Continent RORO market will need to adjust to the impact of the new limits on sulphur emissions, affecting all East and South coast routes to the Continent. Higher maritime fuel costs have a disproportionate effect on the longer routes, where fuel costs account for a greater share of total quay to quay costs. There is therefore a prospect of further concentration of GB-Continent traffic upon the Dover Straits, and therefore greater volumes of Continental freight passing London by road, affecting existing bottlenecks on the Thames crossings.

UK Lift-on/Lift-off Container Market
Container Lift-on/Lift-off statistics for the UK show that the corridor ports account for 7.032 million TEU combined, or 85% of the total UK market. Felixstowe and Southampton lead within this group. The table below shows volumes per corridor port, according to the overseas origin or destination of the cargo. Most relevant for the corridor analysis is the Intra-EU sector, which includes short-sea connections from the UK to other NSMED corridor ports on the Continent, or in Ireland.

Table 64: Container Traffic (TEU 000s) at UK Seaports, 2013

	Domestic	Intra EU	Other Shortsea	Deepsea	Total	Share (%)
Belfast	48.4	157.0	-	-	205.4	2%
Clyde	22.8	52.4	-	0.3	75.5	1%
Dover	-	0.9	-	0.3	1.2	0%
Felixstowe	112.1	588.6	323.0	2,274.6	3,433.7	42%
Forth	67.2	183.3	2.8	7.4	260.7	3%
Liverpool	41.8	335.7	18.0	226.8	622.3	8%
London	0.5	560.7	19.7	361.3	945.2	11%
Southampton	91.0	135.9	11.0	1,247.9	1,488.3	18%
Total Corridor	383.8	2,014.5	374.5	4,118.6	7,032.3	85%
Share (%)	***5%***	***29%***	***5%***	***59%***	***100%***	
Other UK	192.5	682.0	78.9	254.2	1,211.4	15%
Total UK	576.3	2,696.5	453.4	4,372.8	8,243.7	100%
Share (%)	***7%***	***33%***	***5%***	***53%***	***100%***	

Source: DFT, UK major ports, container traffic in TEUs and weight carried, by route: 2013

Nationally, 33% of TEUs handled at UK ports are from short-sea connections with EU countries. For the core corridor ports, the percentage of EU-related short-sea traffic is lower (29%) reflecting the fact that the two largest South East ports (Felixstowe and Southampton) attract the most direct calls from deep-sea (intercontinental) lines.

However, the smaller (and more northerly) ports such as Belfast, Clyde (Glasgow), Forth (Edinburgh) and Liverpool have relatively high shares of domestic, intra-EU and other short sea traffic. Forth Ports for example handled 183,300 intra-EU TEU, compared to an overall throughput of 260,700 TEU, so 70% of activity was on intra-EU routes.

Together, these findings indicate the extent to which maritime hub-and spoke operations and short-sea container services are being used to create parallel capacity within the corridor, potentially alleviating bottlenecks on the UK motorway network on the Corridor.

Cross Channel Through Rail Freight
Long distance rail traffic between the UK and the Continent is carried exclusively via the Channel Tunnel. In 2013 the Tunnel was used by 2,547 freight trains (between 3 and 4 trains per day per direction), carrying 1.36 million tonnes of cargo in total. Traffic levels are around 15% lower than in 2005, and 67% lower than their high point of 3.141 million tonnes[56] in 1998.

[56] DfT, TSGB, Channel Tunnel: traffic to and from Europe, annual from 1994

Table 65: Channel Tunnel Rail Freight Traffic, Tonnes (m) and Trains

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tonnes (mill)	1.6	1.6	1.21	1.24	1.18	1.13	1.32	1.23	1.36
Trains	3,902	3,786	2,840	2,718	2,403	2,097	2,388	2,325	2,547

Source: Eurotunnel

Network Rail's 2012 Study "European Rail Freight Corridor: Linking UK and Continental Europe" indicates that there are constraints that prevent the market from reaching its full potential, but several indications of long-term potential are mentioned (p14):

- 3.1 million tonnes, based on recapturing 1998 levels.
- Over 6m tonnes, based on Eurotunnel analysis.
- 10m tonnes based on the UK rail industry's forecasts for 2030, and
- Levels in excess of 12m tonnes based on the size of the UK-Continent RORO and LOLO markets (although these are not considered realistic).

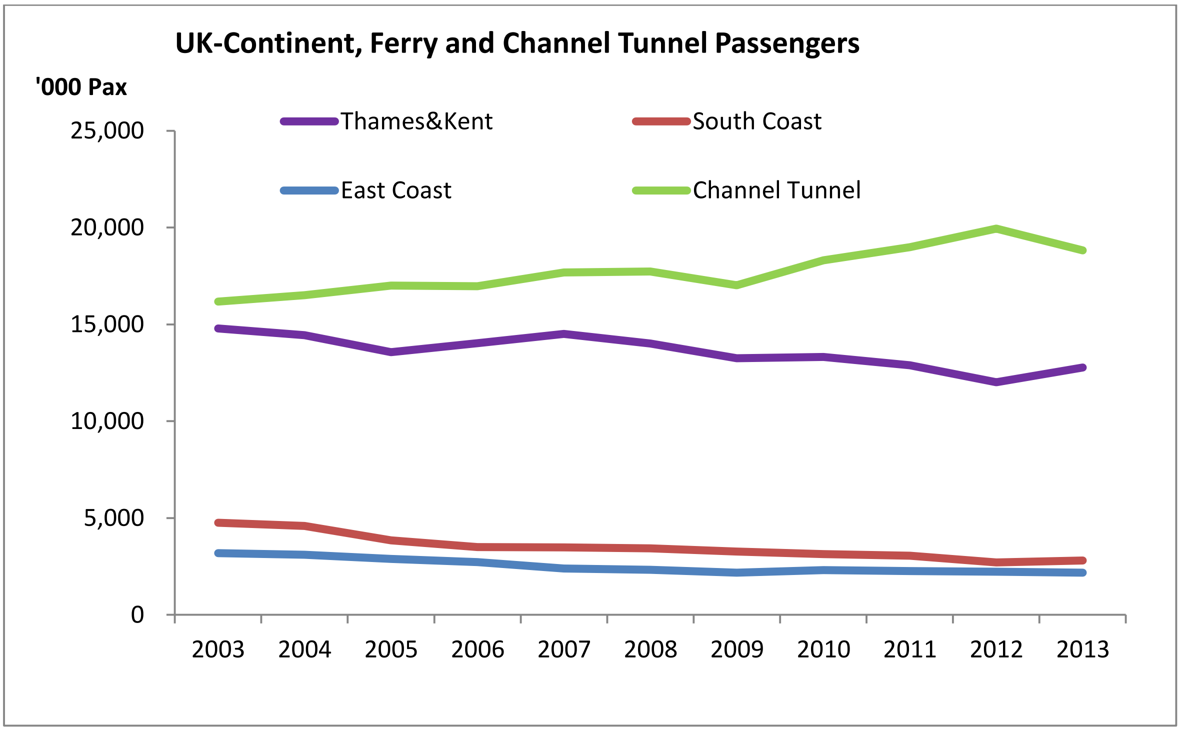
Given that rail freight volumes in the NSMED and RFC2 corridor as a whole amount to some 21.7 million tonnes, including UK volumes, changes of this magnitude on the UK connections would be significant. Achieving an extra 5m tonnes throughput figure would raise rail freight on the corridor as a whole by 25% for example.

Cross Channel Sea/Channel Tunnel Passengers

Total passengers travelling by sea or via the Channel Tunnel to or from the UK in 2013, amounted to 39.3 million passengers, with about half using the Channel Tunnel and the other half using sea crossings. Note that although many of these passengers travel through the corridor, many are on parallel crossings such as via the Humber Ports or the Western Channel, and many are travelling beyond the corridor area e.g. into Germany or Western France.

Total passenger volumes have been generally stable since 2003 with a decline in 2009 and then a slow recovery to reach 39.3 million passengers in 2013. Since 2009, most of the growth has been via the Channel Tunnel Shuttle.

Figure 62: Cross-Channel Sea and Channel Tunnel Passengers



Source: DfT: Sea Passenger Statistics, 2013.

Dover (within Thames and Kent group) is by far the largest port handling sea passengers in the UK, with 12.8 million passengers in 2013, mainly on the Dover-Calais (10.5m) and Dover-Dunkerque (2.3m) routes.

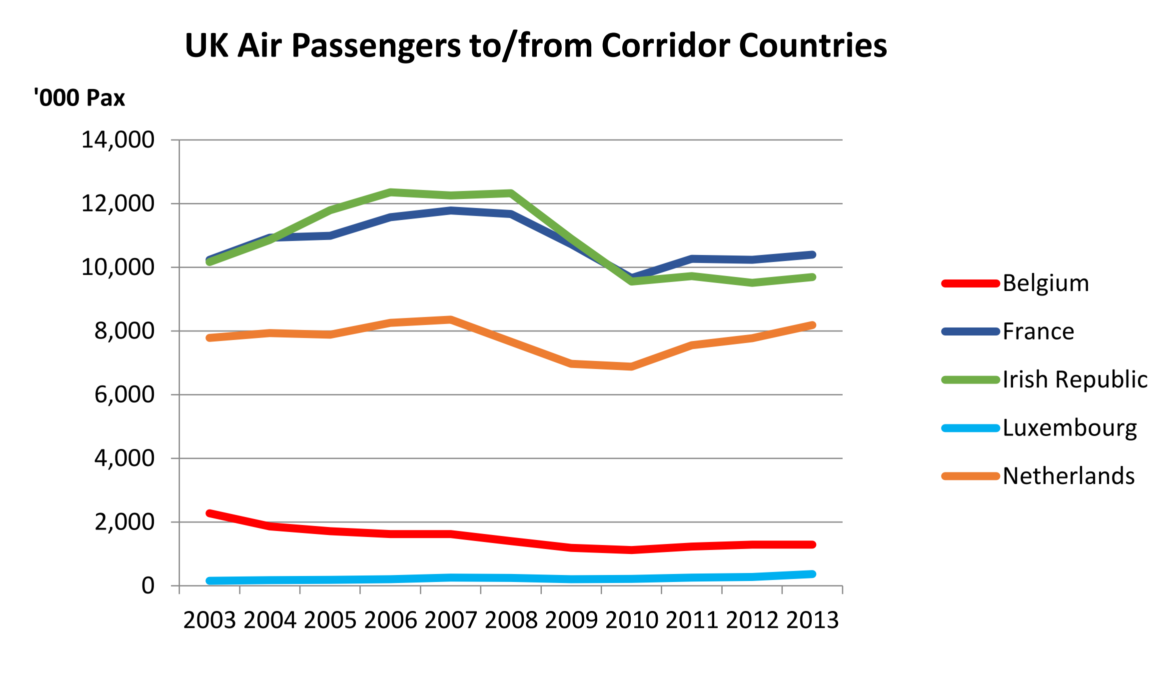
Eurotunnel reported that there were 10,132,691 passengers via the Channel Tunnel using Eurostar in 2013. In addition they carried 2,481,167 cars and 64,507 coaches. DfT statistics[57] record a total of 18.828 million passengers for Eurotunnel as a whole.

UK Air Passenger Market

In the aviation sector, air travel between the UK and the five other NSMED corridor countries amounted to 29.9 million passengers.

[57] UK international short sea passenger movements by ferry route: 2003-2013 (SPAS0102).

Figure 63: UK Air Passengers flying to or from Corridor Countries



Source: DfT: Air Traffic Statistics

The market grew steadily between 2003 and 2008 with a sharp 10% decline during the financial crisis. Since 2009 there has been a slight recovery, but not enough to reach-re-downturn levels.

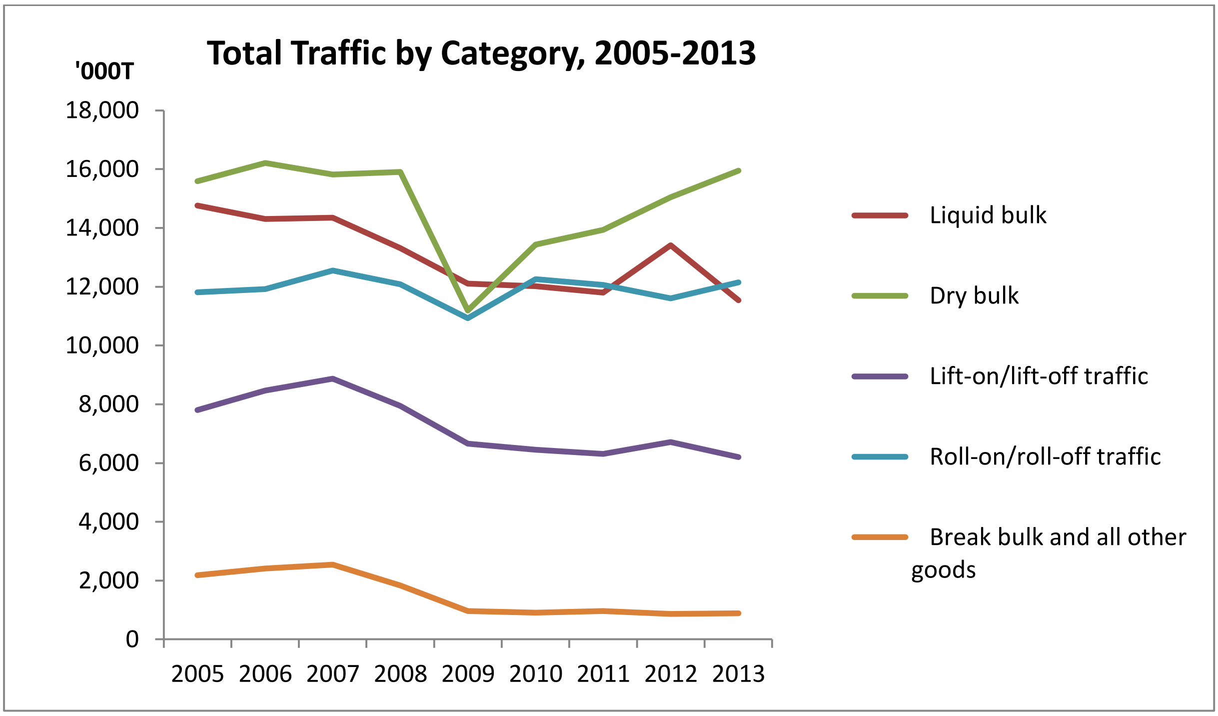
The five corridor countries account for around 25% of UK intra-EU air travel, while Spain and Germany are the most important intra-EU origins/destinations for passengers travelling between the UK and the EU.

Irish Maritime Freight

Within the NSMED corridor, Ireland's access to the rest of the corridor for freight transport is essentially all short sea. Furthermore, access to deep-sea markets is often via feeder services to UK or Continental hubs. Figures from the Irish Central Statistical Office show that the market is not growing. After the financial crisis, some sectors such as dry bulk have recovered, but the key unitised sectors, lift-on/lift-off (LOLO) and roll-on/roll-off (RORO), which account for a high proportion of manufactured or higher value added goods were essentially flat, up to 2013.

However, in 2014, figures for economic growth in Ireland show that confidence is returning, with half-year figures of 7.7% growth leading to expectations of further recovery in the trade and transport sectors.

Figure 64: Irish Seaport Traffic by Category (Tonnes 000s)



Source: CSO, Ireland, 2013

In terms of unit loads (rather than tonnes), the volumes for RORO and LOLO both show marked decreases since the start of the financial crisis:

Table 66: Unitised Traffic for ROI (HGVs, TEUs)

	2007	**2013**	**%Difference**
RORO Units (HGVs)	919,591	883,862	-4%
LOLO (TEUs)	1,175,155	727,331	-32%

The industry responded to the downturn by reducing capacity, and in many cases this resulted in vessel-sharing agreements, particularly for LOLO (containers). These arrangements at one stage could change on an almost weekly basis.

Apart from a few minor exceptions (Fyffe's transatlantic service of tropical fruit and the Dublin-Nigeria RORO service) all unitised traffic to/from Ireland is via short-sea or feeder services to other European ports. The country depends on feeder services for access to global shipping networks.

Republic of Ireland and Northern Ireland Container Lift-on/Lift-off Market

The Irish Maritime Development Office (IMDO) monitors traffic trends in its Irish Maritime Transport Economist[58] publication.

The IMDO shows container throughputs of 727,331 TEU (loaded plus empty) for the Republic of Ireland (ROI) and 238,918 for Northern Ireland (NI), making a total of 966,249TEU in 2013. The three largest ports are Dublin with a 54% share, Belfast with 21% and Cork with 18%. These are the three NSMED core ports, with a combined share of 93%.

Average weekly TEU capacity offered by shipping lines at Irish ports is estimated by IMDO to be 21,500 TEU, about 10,000 TEU per week lower than pre-crisis levels. The four largest carriers visiting Ireland were Eucon (26%), BG Freightline (23%), McAndrews (9%) and X-Press (9%), all specialist short-sea and feeder operators.

There is a capacity surplus in the world container fleet, which results in "cascading" – larger ships replace smaller capacity ones, all the way down from mega-carriers (18,000 TEU) to small feeder/short-sea vessels. So shortage of shipping capacity has not been, and is unlikely to be a problem.

Irish CSO figures show that container (Lift-on/lift-off) traffic is predominantly (87%) on routes to and from EU ports other than those in the UK (8%). Only 2% is deep sea. Thus, nearly all of Ireland's containerised trade with the rest of the world depends upon short-sea connections within the NSMED corridor, passing through the Sulphur Emission Control Areas (SECA).

[58] Issue 14, 2014.

Table 67: Irish Container Volumes in Thousands of Tonnes, 2013

Tonnes '000

Category of traffic	Region of trade					Total
	Great Britain & Northern Ireland	Other EU	Non-EU	Other ports	Coastal trade	
Lift-on/lift-off traffic						
20 ft containers	55	918	3	13	17	1,005
40 ft containers	440	3,853	9	86	55	4,444
Other containers	2	627	0	0	126	755
Total	**497**	**5,398**	**13**	**99**	**198**	**6,204**
Shares (%)	8%	87%	0%	2%	3%	100%

Source: CSO, Ireland, Statistics of Port Traffic 2013.

The short-sea sector is expected to be negatively impacted by the EU Sulphur Directive, which will raise costs for routes connecting Ireland to either the North Sea or the English Channel. This is because traffic between Ireland and the continent passes through the SECA area (Sulphur Emissions Control Area), once it enters the English Channel. Without dual fuel systems on board, the SECA limit applies to the whole crossing. The default solution being adopted by shipping companies to the new 0.1% sulphur limit is to do nothing, which means moving to distillate fuel and will increase the fuel bill and thefeore the freight rate per container. Apart from the negative impact of increased cost, this could also lead to some switch of traffic back onto the UK "land bridge" (i.e. traffic being taken by road trailer using the shortest ferry crossings between Ireland and GB and then between GB and the Continent and therefore maximising road distances).

Irish Roll-on/Roll-off Freight Market
In contrast to the LOLO sector, which is predominantly Ireland-Continent, the Roll-on/Roll-off (RORO) sector is 85% across the Irish sea with Great Britain. Only 13% of the total was with Continental ports in 2013. The split between driver-accompanied units and unaccompanied units was approximately equal.

Table 68: Irish RORO Traffic in Thousands of Tonnes, 2013

Tonnes '000

Category of traffic	Region of trade					Total
	Great Britain & Northern Ireland	Other EU[59]	Non-EU	Other ports	Coastal trade	
Roll-on/roll-off traffic						
Road goods vehicles	4,891	270	0	137	-	5,298
Trade vehicles	29	73	2	4	-	109
Unaccompanied trailers	5,392	1,277	0	70	-	6,739
Total	**10,312**	**1,620**	**2**	**211**	-	**12,145**
Shares (%)	85%	13%	0%	2%		100%

Source: CSO, Ireland, Statistics of Port Traffic 2013.

IMDO reports statistics for Northern Ireland and the Republic of Ireland. They show a total of 1.63 million trailer RORO units being handled in Irish ports, of which 1.22 million were handled in the NSMED corridor ports of Dublin, Belfast and Cork.

Operationally, Rosslare (comprehensive seaport) is an integral part of the RORO network, although not officially within the NSMED core network corridor. Much of the Irish RORO traffic travelling direct to the European continent (avoiding the UK land bridge), transits through this point. Although at a low base, this traffic has proven resilient, and has grown steadily from 2007 to 2013, despite recession. Continental (Other EU) RORO traffic is now approaching 16% of that on the UK routes. These direct services offer longer sea routes which can reduce overland traffic transiting the UK, avoiding congested areas in Dublin and within the UK road network.

[59] Other EU: the main category of RORO services from Ireland direct to the Continent, avoiding the UK land bridge.

Table 69: RORO Traffic via Corridor Ports in 2013, HGV Units.

Port	Accompanied Units	Share (%)	Unaccompanied Units	Share (%)	Total RORO Units	Share (%)
Dublin	286,429	45%	475,222	48%	761,651	47%
Cork	805	0%	149	0%	954	0%
Belfast	157,050	25%	308,903	31%	465,953	29%
Total Core Ports	444,284	70%	784,274	79%	1,228,558	75%
Total ROI	354,073	56%	529,789	53%	883,862	54%
Total NI	282,090	44%	465,403	47%	747,493	46%
Total IRL	636,163	100%	995,192	100%	1,631,355	100%

Source: IMDO, 2014

The above table shows that, of the Core Ports on the corridor, Dublin and Belfast capture most of the RORO traffic at present, and that the flows are more or less equally balanced between the ROI and NI (UK) sea corridors.

Irish Sea Passenger Traffic

IMDO reports that in 2013, a total of 4.4 million sea passengers travelled between the island of Ireland and Great Britain and the Continent. 2.33 million travelled through seaports in the Irish Republic, whilst 1.7 million travelled via Northern Irish ports. Most of the Irish Sea passengers use either the Northern Corridor (between Northern Ireland and GB) or Central Corridors (between Dublin and North wales or North West England), with around 500,000 on the Southern corridor (via Cork and Rosslare to South Wales), and 336,000 on the direct Continental services to France. The total number of tourist cars carried on all corridors was 1.2 million.

The total number of air passengers travelling via airports in the Republic of Ireland was 24.8 million. In addition, 7.0 million passengers travelled through airports in Northern Ireland[60] (2012 figures). In both cases volumes have not recovered since their peaks in 2008, 31.3 million air passengers in the Irish Republic and 8.2 million in Northern Ireland. Dublin airport handled 20.1 million passengers in 2013, and Cork Airport 2.3 million, with 4.3 million and 2.2 million respectively in Belfast International and Belfast City airports.

In 2014, overseas travel statistics[61] show an increase of 11.1% compared to the same period in the previous year. This is a positive sign for the sector.

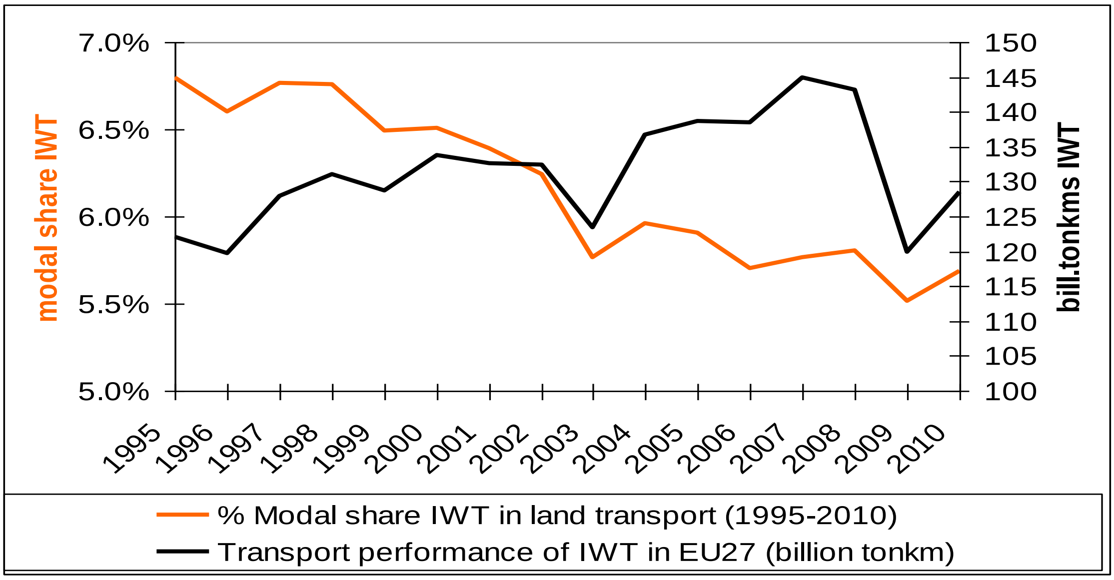
[60] http://www.drdni.gov.uk/ni_transport_statistics_annual_2012-13.pdf (p70)
[61] CSO, Overseas Travel, up to July 2014.

Continental Inland Waterways

Analysis of the inland waterway sector has been sourced from the 2012 study, "Medium and long term perspectives of Inland Waterway Transport in the European Union", by Panteia, CE Delft, MDS Transmodal, PLANCO and Via Donau on behalf of the European Commission.

The study demonstrates that although waterway transport performance, measured in tonne-kilometres is relatively stable in Europe as a whole, the share of the sector has been falling steadily since the 1990s.

Figure 65: Inland Waterway Modal Share 1995-2010



Source: Panteia.

The inland waterway corridors for the 2012 study were defined as follows, to incorporate the CEF corridors, which are now re-packaged within the core network corridors.

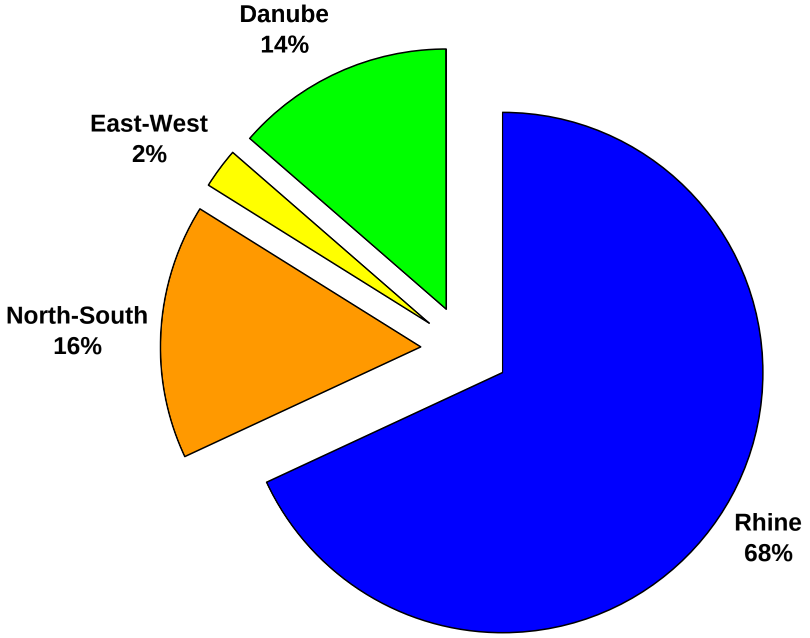
For the NSMED corridor, the most relevant geographical segments are the Rhine and North-South waterway corridors. The Rhine corridor includes the heavily used links to the northern range (ZARA) ports, whilst the North-South waterway corridor includes the Maas/Meuse, the Albertkanaal, the Scheldt/Escaut, Terneuzen-Ghent, the Seine-Nord mssing link, the SMSR missing links and the Rhône/Saône waterway.

Table 70: Corridor definitions for 2012 IWT Study

Waterway Corridor	*CEF Corridor*
1. Rhine	**Genoa – Rotterdam**: Basel - Rotterdam/Amsterdam/ Antwerpen
2. North-South	**Dublin – London – Paris – Brussels**: Le Havre – Paris **Amsterdam – Basel/Lyon – Marseille:** Maas, Albert Canal, Terneuzen – Ghent, Canal Seine – Escaut, waterways upgrade in Wallonia, Canal Saône - Moselle/Rhin, Rhône
3. East-West	**Warszawa – Berlin – Amsterdam/Rotterdam – Felixstowe – Midlands:** West-German Canals, Mittellandkanal, Hannover – Magdeburg – Berlin, Amsterdam locks **Hamburg – Rostock – Burgas/TR border – Piraeus – Lefkosia**: Hamburg - Dresden - Praha – Pardubice and Děčín locks
4. Danube	**Strasbourg – Danube Corridor**: Main– Main-Donau-Canal – Danube

Based on the above definitions, the study shows clearly the extent to which the Rhine corridor dominates, with a 68% share measured in transport performance (tonne-kms). The North-South corridor, which overlaps closely with the NSMED core network corridor accounted for 16%, with the implication that there is untapped potential here, provided that missing links such as the Seine-Escaut and the SMSR links are addressed.

Figure 66: Waterway Traffic Shares per Waterway Corridor

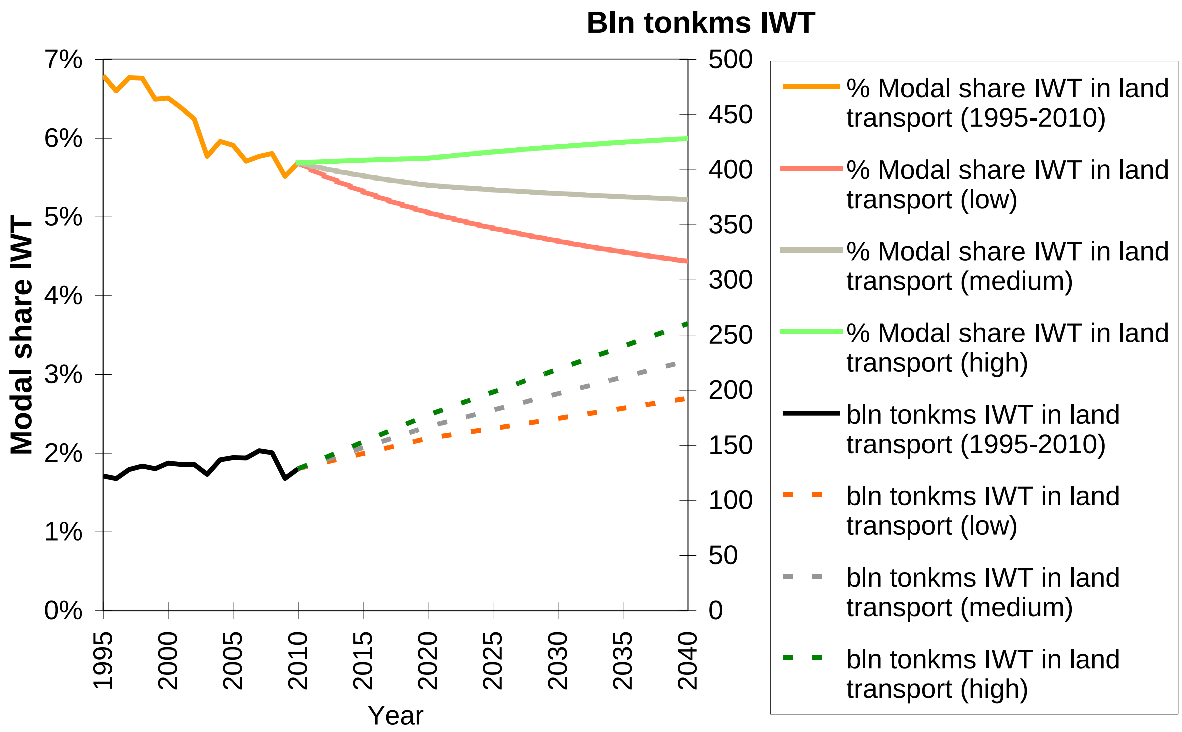


Source: Panteia.

The study makes the following forecast, indicating that for Europe as a whole, under the high scenario, that the falling market share trend can be halted. The assumptions behind these forecasts were based on the 2011 White Paper expectations, but did not include any additional measures specifically targeting inland waterways.

Nevertheless, the forecasts show overall traffic volumes approximately doubling by 2040 in the high scenario.

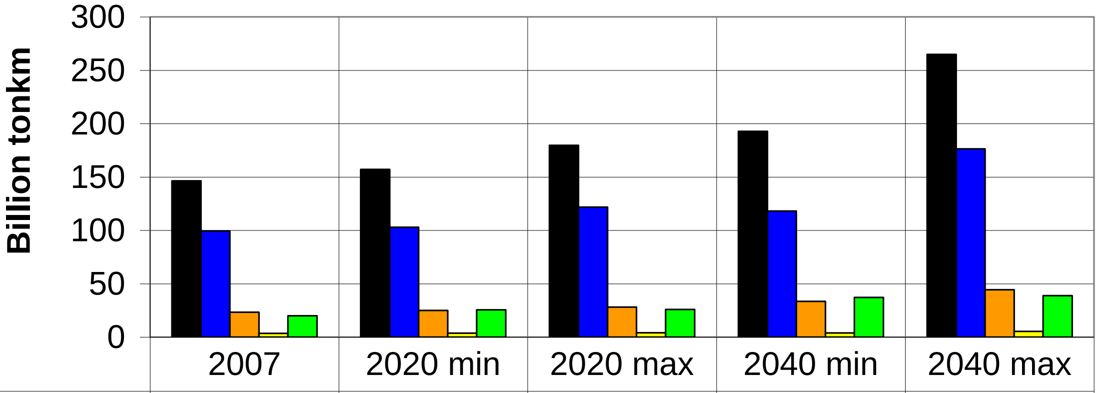
Figure 67: Forecast growth in inland waterway transport to 2040



Source: Medium and Long Term Perspectives of IWT in the EU, 2012.

Growth rates expected per route are broadly comparable, with both the North-South and Rhine corridors approximately doubling in the high growth scenario.

Figure 68: Expected Waterway Growth per route (Billion tonne-kms).



	2007	2020 min	2020 max	2040 min	2040 max
EU27	146	157	180	193	265
Rhine	99	103	122	118	176
North-South	23	25	28	34	44
East-West	4	4	4	4	5
Danube	20	25	26	37	39

EU27 Rhine North-South East-West Danube

Source: Medium and Long Term Perspectives of IWT in the EU, 2012.

The study also argues (p92) that "new infrastructure projects (e.g. Seine-Escaut) will almost certainly create additional market volumes". This refers to the containerised sector which today (p87), "almost exclusively consists of transport on the River Rhine and transport on the North-South axis between Belgium and the Netherlands".

In the graph (above) volumes in the North-South corridor are shown to grow from 23 billion tonne-kms in 2007 to 34 billion tkms in the lower (min) scenario and 44 billion in the higher (max) scenario).

Benelux Inland Waterways
Counts of vessels at locks (Sluistellingen from Waardevol transport 2010-2011 and 2013-2014) are shown below. They indicate the importance, for example, of the Volkerak, Kreekak and Terneuzen lock complexes in handling the high volumes of waterway traffic between Netherlands and Belgium and between Belgium and Germany. The numbers in the figures are the vessel counts for the year 2011.

Figure 69: Vessel Counts at Locks in Zeeland

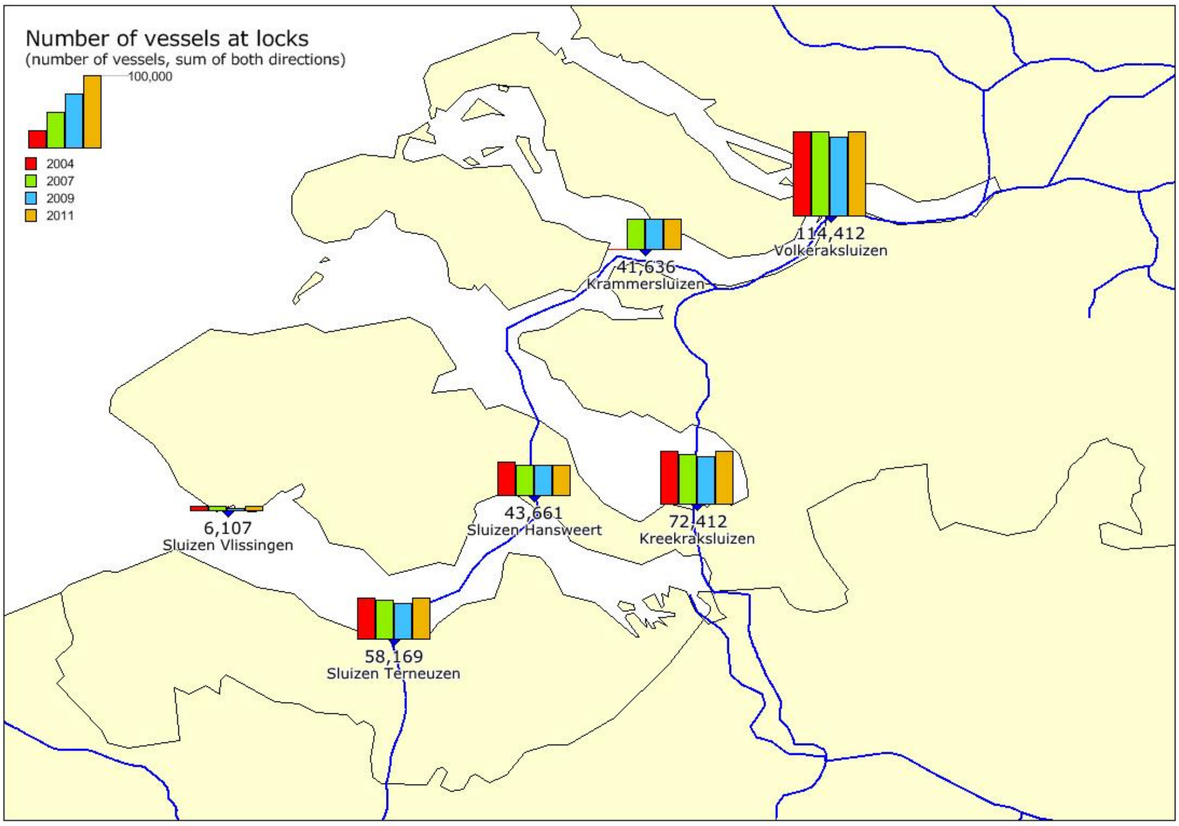


Figure 70: Vessel Counts at Locks in Limburg

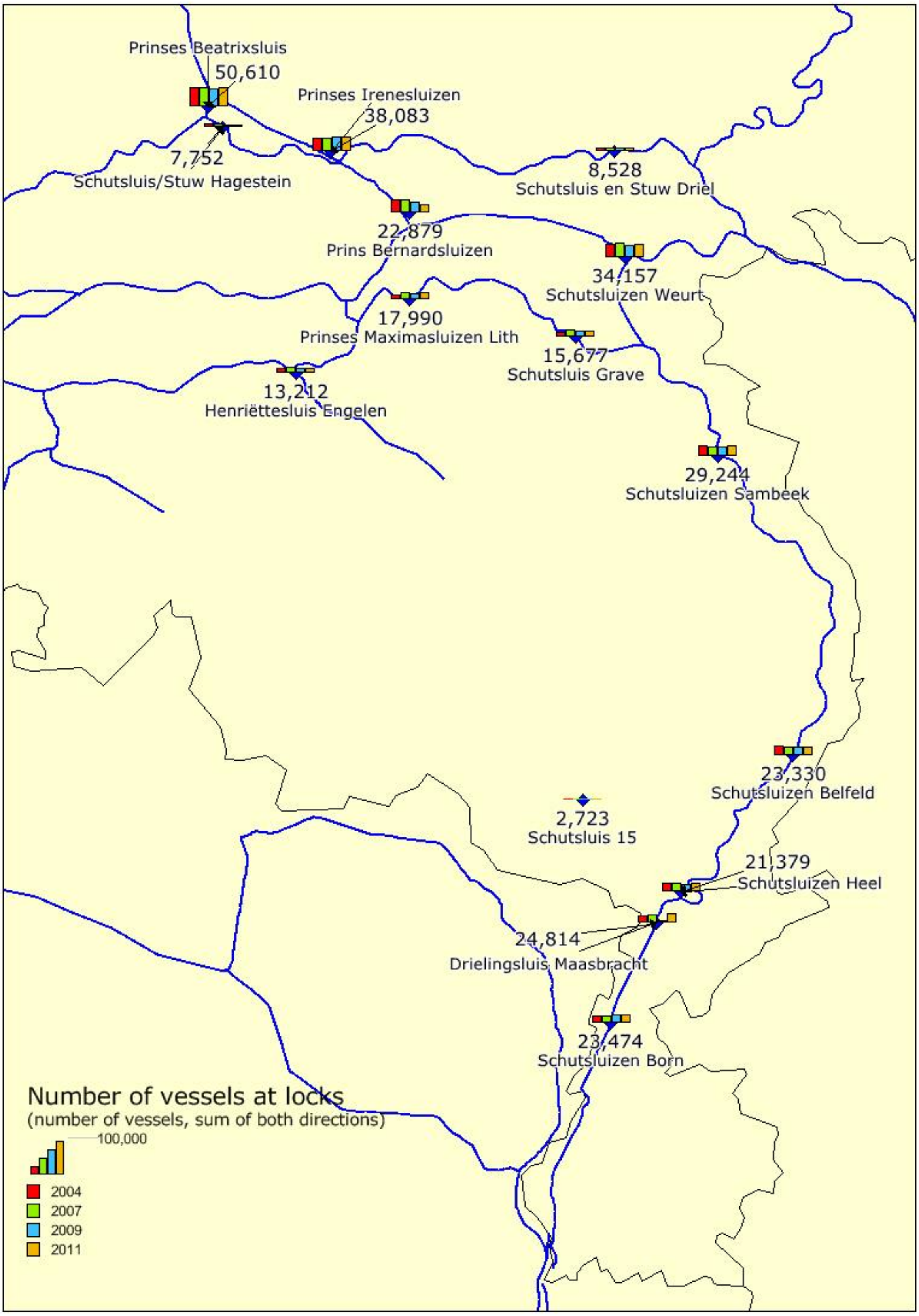
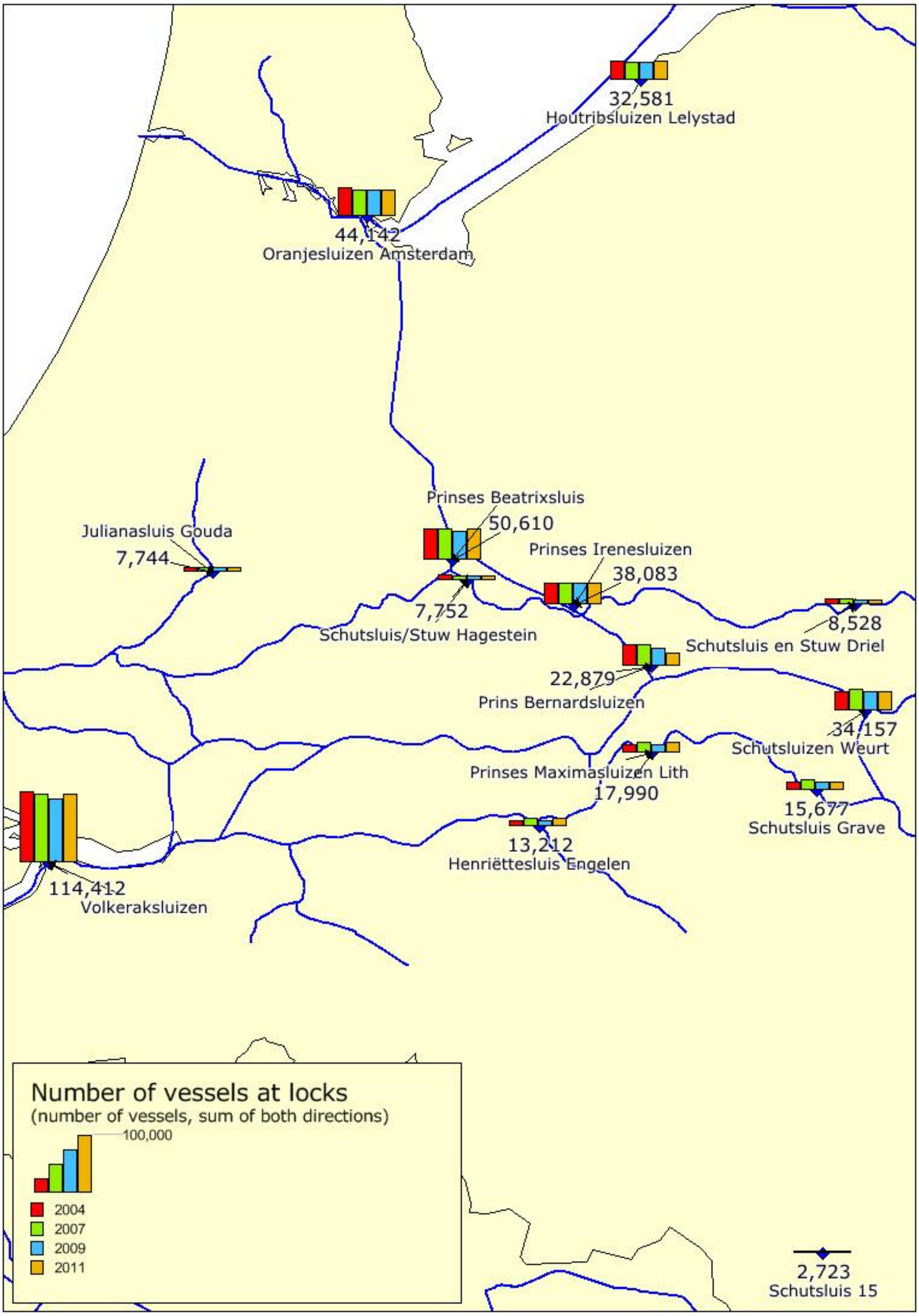
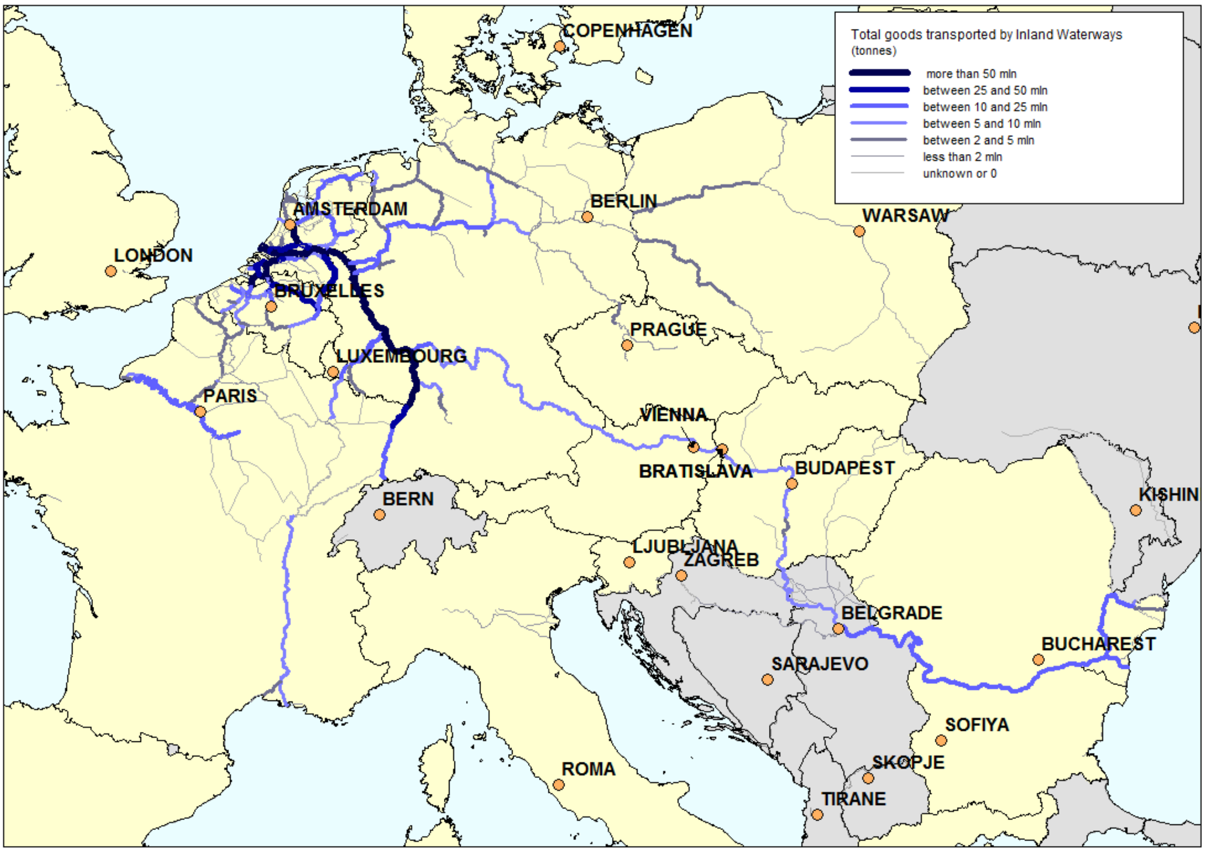


Figure 71: Vessel Counts at Locks in Amsterdam/Utrecht Area



Data from the Platina project has been used to make waterway traffic flow maps (Data year 2007) with updated French data 2013 (from TENtec) and Belgian data 2013.

Figure 72: Inland Waterway Traffic Flows: European Overview



Source: French data 2013 (Tentec) and Belgian data 2013, Platina 2007

Figure 73: Inland Waterway Traffic Flows, France

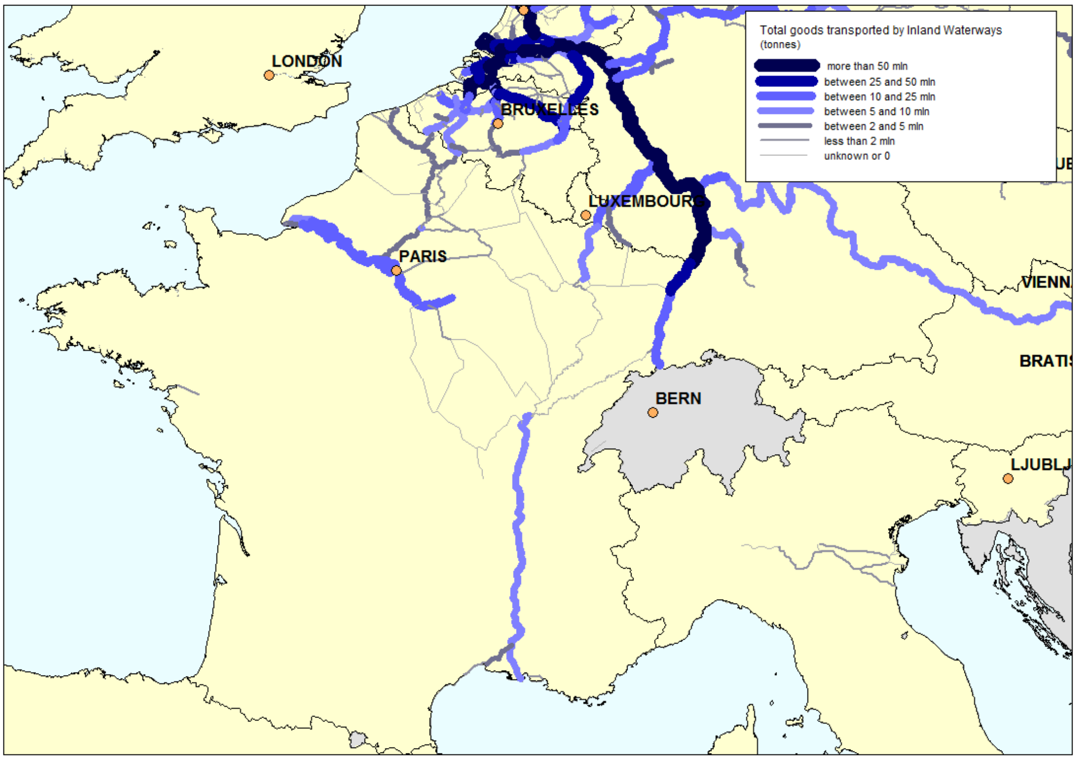


Figure 74: Inland Waterway Traffic Flows, Belgium

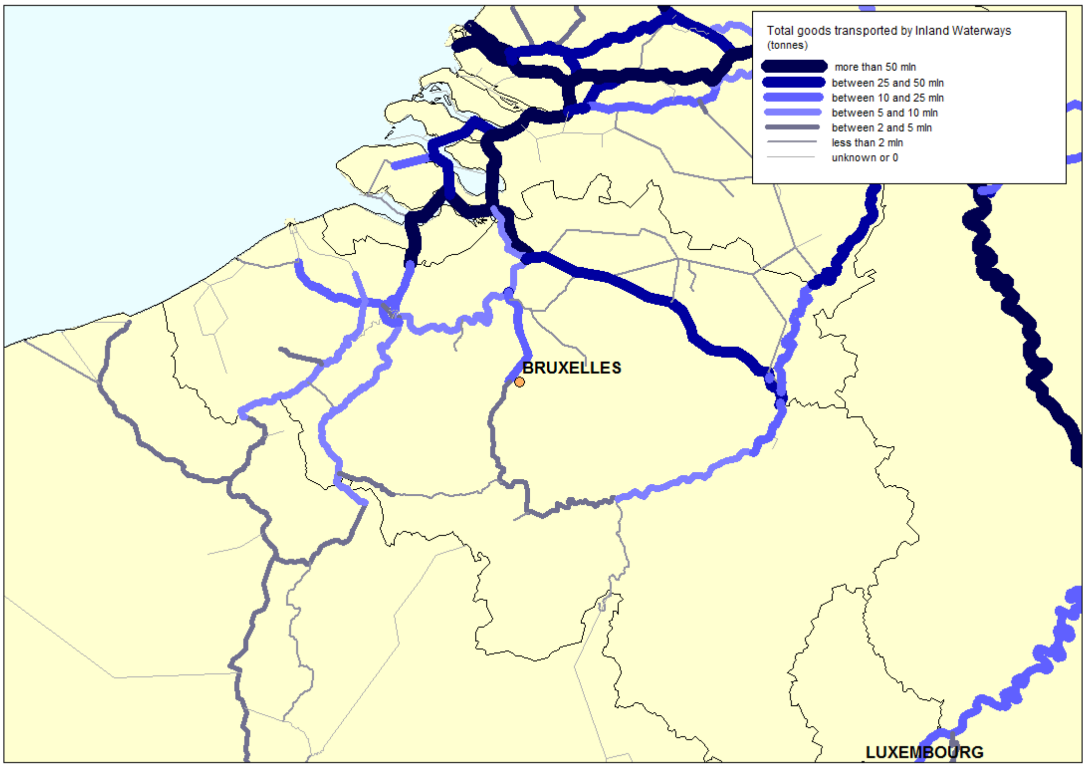
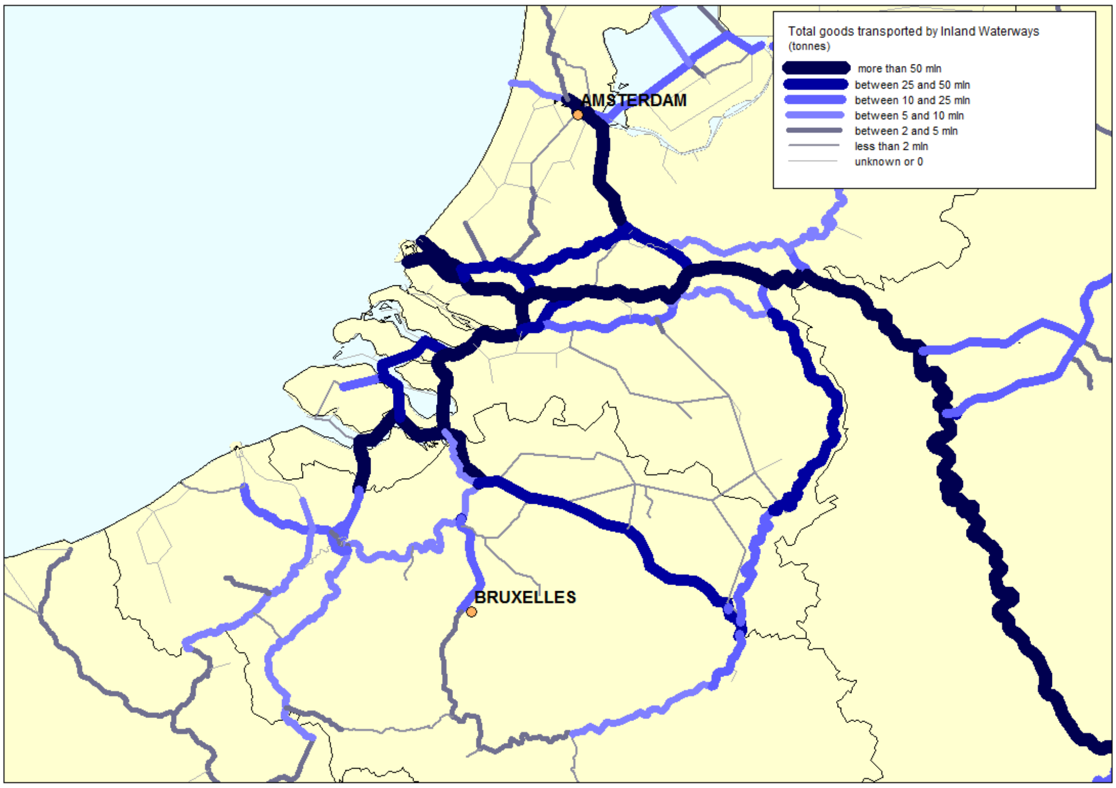


Figure 75: Inland waterway Traffic Flows, Netherlands



The Albert Canal, one of the main waterways in Belgium, connecting the Meuse River towards Antwerp provides a good example of how innovation and management of the industrial areas along the waterways play a key part in the development of the IWT market.

The development of the inland waterways requires infrastructural development, but requires also additional measures and efforts such as:

- Spatial planning that is adapted to the waterways, e.g. industrial areas directly connected to the waterway.
- A management structure in which the stakeholders and the local authorities are represented.
- Good connections with the other modes

Much of the analysis focuses upon nodes but the inland waterways in Flanders do not have many nodes, but instead a total of 100 km quay walls. Industries along the waterway with dedicated wharves transport high volumes of cargo between quay walls or from node to quay wall and vice versa.

Continental Rail Freight

Analysis of the rail freight sector within NSMED has been derived directly from the Rail Freight Corridor 2 study (2013). This study estimated an O/D matrix for the defined RFC2, which is similar in structure to the Continental parts of the NSMED corridor. In the base year of 2010, the study estimated that international (cross-border) rail freight within the corridor accounted for:

- 33,853 freight trains per annum
- 21.8 million tonnes per annum (see O/D breakdown below)
- 13.2 billion tonne-kms.

Table 71: Rail Tonnes Lifted ('000s) Per Annum for RFC2, 2010

2010 Base Year

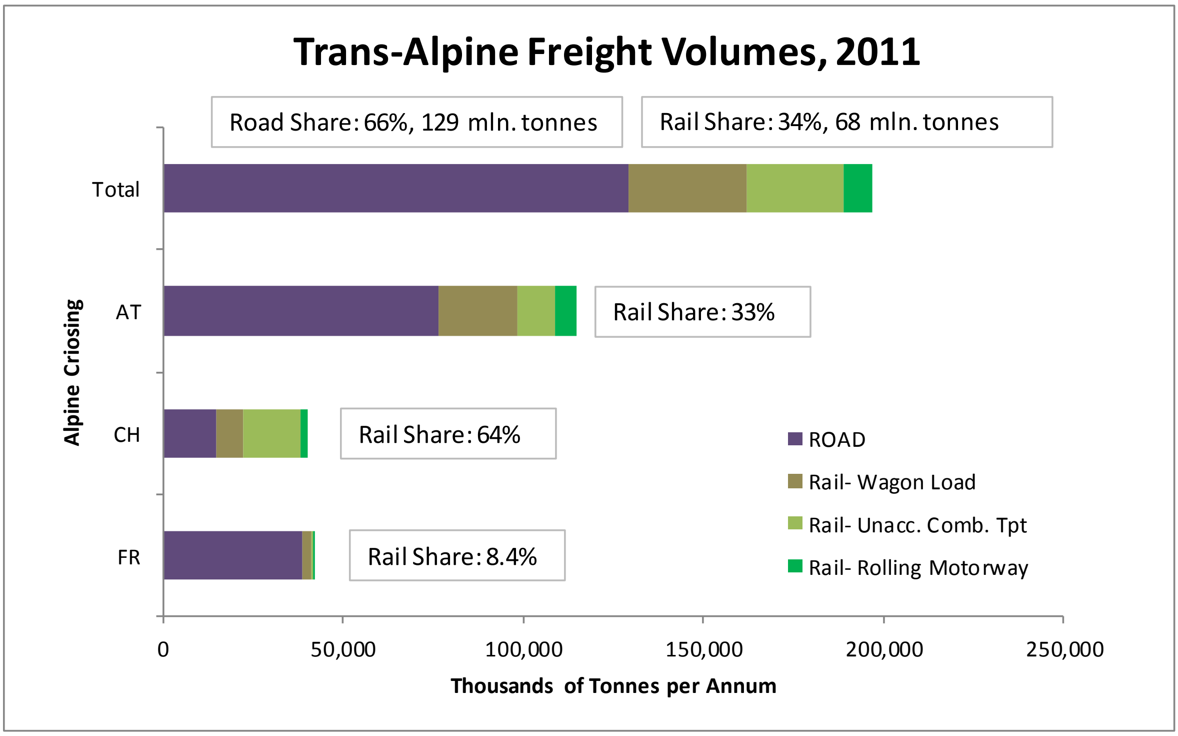
	BE	CH	DE	ES	FR	IT	LU	NL	PL	SE	UK	Total
BE		346	646	289	4,814	1,163	1,119	1,256	56	229	156	10,074
CH	186				75		29					290
DE	703				94						92	889
ES	117											117
FR	4,929	427	103			456	387	178				6,480
IT	1,121				32		25					1,178
LU	622	28	313		105	133						1,201
NL	664				542							1,206
PL												-
SE	244											244
UK	95		45									140
Total	8,681	801	1,107	289	5,662	1,752	1,560	1,434	56	229	248	21,819

Source: RFC2, Transport Market Study, 2013.

The largest volumes are found between France and Belgium, with approximately 4.8-4.9 million tonnes per direction, therefore accounting for almost half of the corridor volumes.

Where there are empty cells in the matrix, this implies that the flows (e.g. Switzerland to Germany) do not enter the corridor, and not that there is no traffic at all. As a result, the selected volumes are generally low in comparison, for example, with rail volumes along the Rhine corridor between the Dutch seaports, Germany, Switzerland and Italy. In comparison, the quantity of rail freight crossing the Alps in 2011 was 68 million tonnes. See below.

Figure 76: Freight Volumes crossing the Alps, 2011

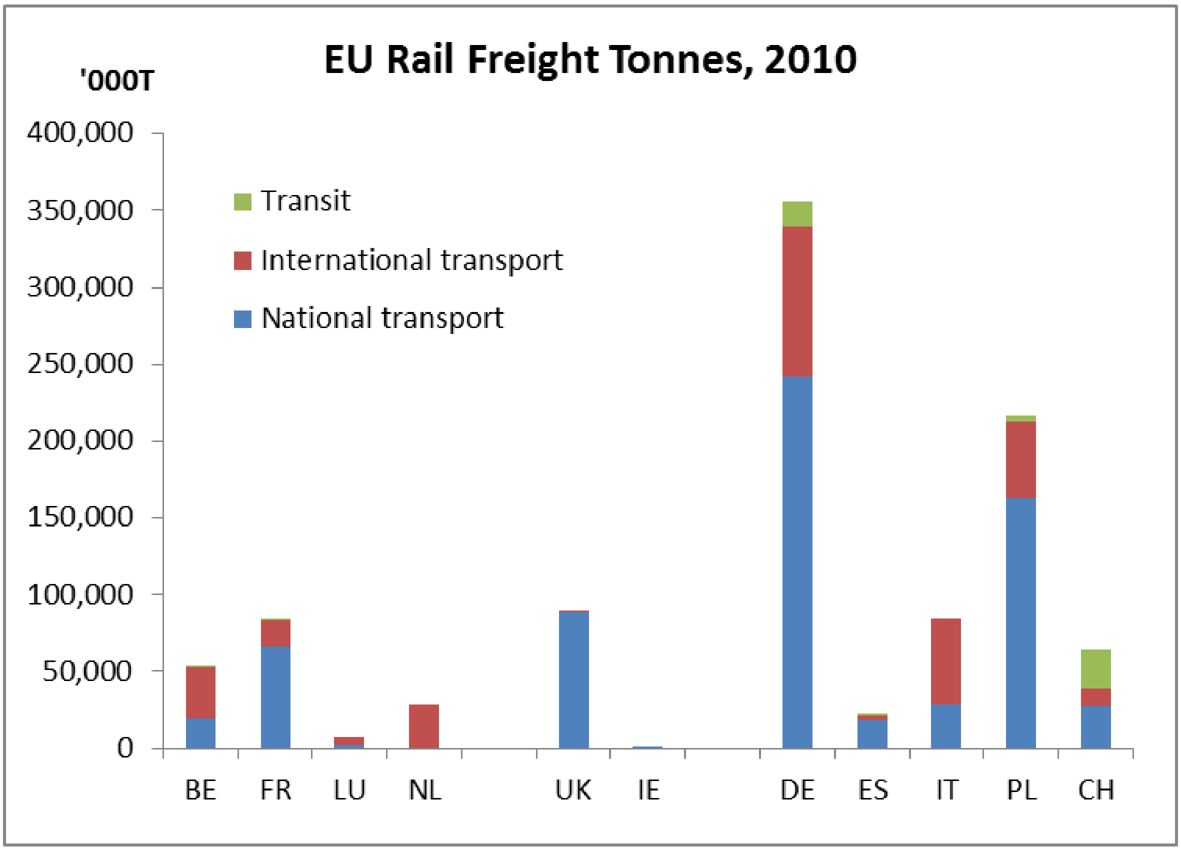


Source: Alpinfo.

In context, Eurostat figures for 2010 show a comparison per country, for domestic, international and transit rail freight.

Within the corridor countries (see below), total international flows for Belgium and the Netherlands are the highest, but much of these volumes are directed towards Germany, and are not handled within the main branches of the NSMED corridor.

Figure 77: EU Rail Freight Tonnes Lifted, 2010



Source: Eurostat (rail_go_typall)

Note: In this Eurostat figure, NL domestic and transit figures are not reported due to confidentiality. CBS Statline reports a total of 35.5 mln tonnes of rail freight traffic for 2010 for the Netherlands, of which 28.5 mln tonnes are international incoming and outgoing transport.

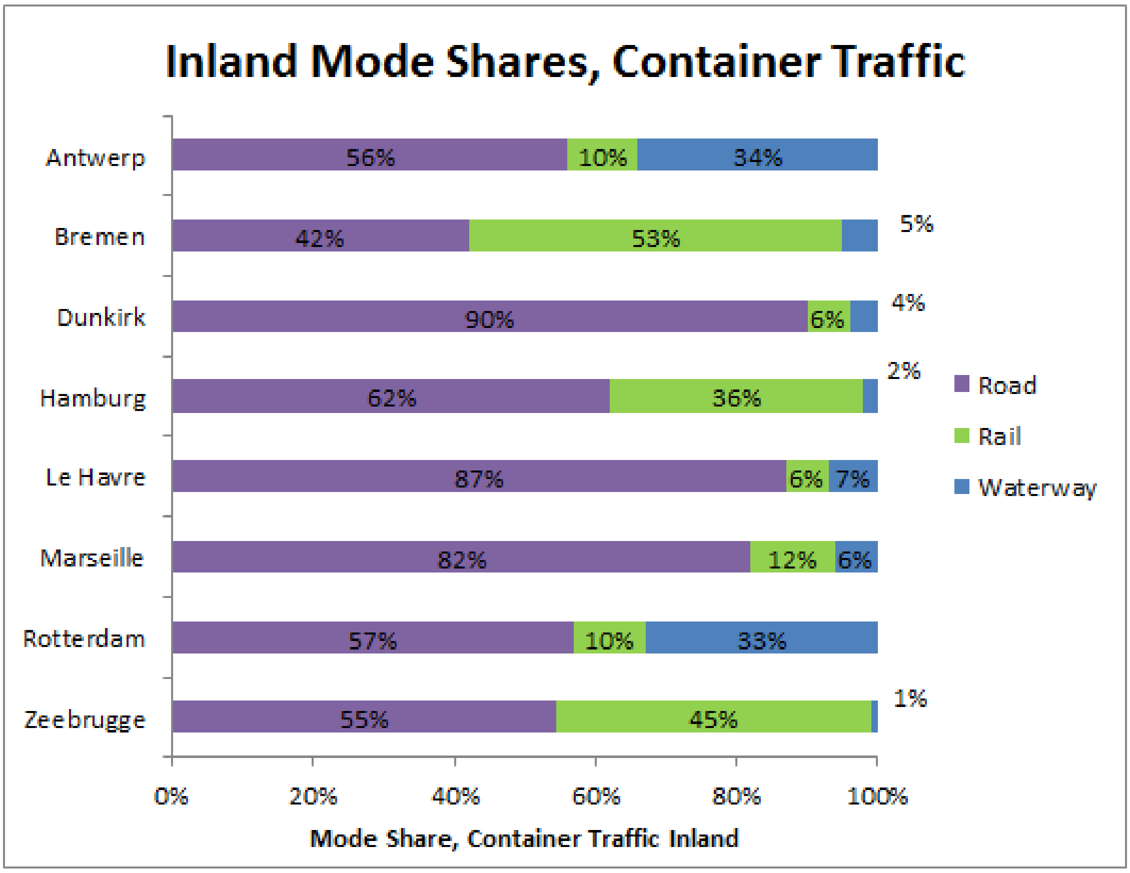
In France and the UK, rail freight volumes are considerable, but the majority of traffics are national rather than cross-border. Note, however, that port hinterland flows by rail count as national rather than international flows under Eurostat's nomenclature, because the train loads are moved within national borders, even if the goods are being handled across borders (by sea).

Germany is the obvious leader in Europe for both national and international rail freight volumes, but it is also noticeable that the Alpine countries (Italy and Switzerland) and Poland generate large volumes of international rail freight.

In the Netherlands, the majority of rail traffic (28.5 mln tonnes) is international (CBS data), but in addition there are important national traffics between Rotterdam-Tilburg, Rotterdam-Eindhoven, and Rotterdam-Venlo, using the Brabant Route (Rotterdam-Tilburg-Eindhoven-Venlo).

When considering modal shares at seaports (for containerised traffic) a similar pattern can be seen:

Figure 78: Inland Mode Shares for Containerised Traffic at Seaports



Source: Port authority statistics, study authors.

The two German ports (Bremen and Hamburg) and Zeebrugge have high inland shares by rail. Antwerp and Rotterdam both have high inland shares by waterway. Dunkerque, Le Havre and Marseille all have smaller shares or rail and waterway, although in other traffic sectors (e.g. bulks) rail shares are known to be higher.

By 2030, under the high growth scenario, the RFC2 market study estimated that corridor rail freight would increase:

- From 21.8 million tonnes in 2010, to
- To 27.0 million tonnes in 2030.

Table 72: Rail Tonnes Lifted ('000s) Per Annum for RFC2

2030 High Economic Growth - Reference Scenario

	BE	CH	DE	ES	FR	IT	LU	NL	PL	SE	UK	Total
BE		424	750	289	5,911	1,669	1,373	1,196		229	156	11,997
CH	206				82		34					322
DE	827				121						92	1,040
ES	117											117
FR	6,091	513	127			697	517	200				8,145
IT	1,767				51		56					1,874
LU	916	46			179	265						1,406
NL	720		347		662							1,729
PL												-
SE	244											244
UK	95		45									140
Total	10,983	983	1,269	289	7,006	2,631	1,980	1,396	-	229	248	27,014

Source: RFC2, Transport Market Study, 2013.

Continental Seaports

Overview – Northern Range Seaports

NSMED includes the busiest stretch of the northern port range, covering all the major ports between Amsterdam and Calais, accounting for 75% of total throughput.

Table 73: Northern Range Ports, Total Tonnes (mln) and Shares, 1990-2013

	1990	%	2000	%	2008	%	2013	%
Hamburg	61.40	9%	85.10	9%	140.40	11%	139.10	11%
Bremen	29.40	4%	45.00	5%	74.60	6%	78.80	6%
Wilhelmshaven	0.00	0%	43.40	5%	40.10	3%	24.50	2%
Amsterdam	47.00	7%	64.00	7%	94.70	8%	95.70	8%
Rotterdam	287.90	41%	322.30	35%	421.20	34%	440.50	36%
Zeeland Seaports	17.80	3%	24.80	3%	33.30	3%	33.00	3%
Antwerp	102.00	14%	130.50	14%	189.50	15%	190.80	16%
Ghent	24.40	3%	24.00	3%	26.90	2%	26.00	2%
Zeebrugge	30.30	4%	35.50	4%	42.10	3%	42.80	4%
Dunkerque	36.50	5%	45.20	5%	57.70	5%	43.60	4%
Calais	16.0	2%	31.7	3%	40.4	3%	40.6	3%
Le Havre	54.00	8%	67.40	7%	80.50	6%	67.20	5%
Northern Range	706.74		918.90		1,241.40		1,222.60	
AMS-CAL Range	561.94	80%	678.00	74%	905.80	73%	913.00	75%
Marseille/Fos	90.33		94.09		95.93		79.97	

Over time, volumes have increased from 561 million tonnes to 913 million tonnes, but the port shares have gradually narrowed in range, with German ports increasing share, so although Rotterdam and Antwerp are clear leaders, the distribution of traffic is otherwise quite even. Many ports saw their traffic peak in 2008, but volumes in 2013 are close to this level, with the larger ports slightly strengthening their position over this period. Long term growth since 1990 is equivalent to 2.41% per annum.

For container traffic, growth has been much higher than total tonnage. In 1990, the Northern Range ports handled 100.8 million tonnes in containers. By 2013, this had increased more than four-fold to 429.5 million tonnes, equivalent to a year on year growth rate of 6.5% per annum, sustained over twenty three years. Almost 60% of this traffic is handled within the Northern Range corridor ports.

Table 74: Northern Range Ports, Container Tonnes (mln) and Shares, 1990-2013

	1990	%	2000	%	2008	%	2013	%
Hamburg	19.6	19%	45.3	22%	95.1	23%	94.8	22%
Bremen	11.4	11%	27.5	13%	55.1	13%	61	14%
Wilhelmshaven	0	0%	0.4	0%	0	0%	0.6	0%
Amsterdam	0.8	1%	0.8	0%	3.9	1%	0.8	0%
Rotterdam	39.3	39%	65.2	31%	107	26%	121.3	28%
Zeeland Seaports	0	0%	0	0%	0.2	0%	0.2	0%
Antwerp	16.6	16%	44.5	21%	101.4	25%	102.3	24%
Ghent	0.1	0%	0.1	0%	0.4	0%	0.6	0%
Zeebrugge	3.9	4%	11.6	6%	21.2	5%	20.4	5%
Dunkerque	0.8	1%	1.3	1%	1.7	0%	2.7	1%
Calais	0	0%	0	0%	0	0%	0	0%
Le Havre	8.3	8%	13.8	7%	24.9	6%	24.8	6%
Northern Range	100.8		210.5		410.9		429.5	
AMS-CAL	*61.50*	61%	*123.50*	59%	*235.80*	57%	*248.30*	58%
Marseille/Fos	*5.37*		*7.16*		*8.39*		*10.76*	

Table 75: Northern Range Ports, RORO Tonnes (mln) and Shares, 1990-2013

	1990	%	2000	%	2008	%	2013	%
Hamburg	0.00	0%	0.00	0%	0.00	0%	0.00	0%
Bremen	0.00	0%	0.00	0%	0.00	0%	0.00	0%
Wilhelmshaven	0.00	0%	0.00	0%	0.00	0%	0.00	0%
Amsterdam	0.80	2%	0.80	1%	1.10	1%	0.50	1%
Rotterdam	7.30	15%	10.00	14%	17.90	19%	18.50	20%
Zeeland Seaports	0.00	0%	0.00	0%	2.30	2%	1.40	2%
Antwerp	3.30	7%	6.00	9%	4.40	5%	4.60	5%
Ghent	0.90	2%	1.30	2%	1.70	2%	2.00	2%
Zeebrugge	12.30	25%	15.40	22%	11.80	13%	12.50	14%
Dunkerque	5.40	11%	1.60	2%	12.70	13%	12.30	13%
Calais	16.04	32%	31.70	45%	40.40	43%	40.60	44%
Le Havre	3.40	7%	3.40	5%	1.90	2%	0.00	0%
Total	49.44	100%	70.20	100%	94.20	100%	92.40	100%
AMS-CAL	46.04	93%	66.80	95%	92.30	98%	92.40	100%

For RORO freight traffic, Calais, Rotterdam, Zeebrugge and Dunkerque dominate, also showing that virtually the whole of the UK cross-channel RORO market uses this range of ports. Growth rates overall are equivalent to 2.76% per annum over the whole period, but as implied by the UK cross channel analysis, growth on the Dover Straits has been higher than other routes, and as a result Calais has been growing at 4.12% per annum, significantly higher than the market rate.

Antwerp

Within the NSMED corridor, Antwerp is an international gateway for cargo entering the inland networks (three core network corridors).

With a throughput of 190.8 million tonnes in 2013, including 102 million tonnes of containerized transport (8.6 million TEU), it is the largest Flemish port, and the second largest port in Europe.

According to the Port of Antwerp's 2011 Master Plan for inland transport, the port aims to increase rail's share from 11% to 15% by 2020, while new infrastructure is being built and new services being started. Current rail volumes therefore amount to some 20 million tonnes.

For inland barge transport they aim to increase the share from 40% to 43% by 2020. This amounts to 94.3 million tonnes by barge.

Inland road transport is currently 46%, and in the Master Plan they aim to reduce this share to 42%.

While Antwerp serves hinterlands within the corridor, especially Belgium, Northern France, and Western France, a large part of its inland traffic is directed towards the Rhine and Western Germany. Waterway flows to Germany use the waterway sections included in the NSMED corridor in Belgium and Netherlands, so a large part of Antwerp's total hinterland traffic is carried in the corridor.

Ghent

Ghent functions both as a maritime gateway with the corridor and an inland node along the Paris-Amsterdam and Liège-Brussels-Zeebrugge branches. It is connected to the sea via the Ghent-Terneuzen sea canal, which is a cross-border link via the Netherlands.

The port of Ghent is accessible for both maritime ships and barge transport, handling 48.2 million tonnes in 2013, combined for both sea and inland categories, primarily bulk cargo, but also containers.

This node permits the exchange of goods between sea, inland waterway, road and rail, with direct or nearby access to core corridor links for road, rail, and inland waterway.

Traffic arriving in the port is transhipped by the following inland modes:

- Inland waterway: 50.2%
- Road: 41.8%
- Rail: 8%

According to the Port's 2013 Annual report the plan is to increase the share of rail to 15% and to reduce the share of road to 35%.

Inland waterway links are planned to be extended with the development of the Seine-Scheldt project, which would ultimately connect the port to Paris. (Ghent is situated on the Scheldt River)

Access for sea-going ships is limited by the size of the Terneuzen lock, but there are plans to enlarge the capacity of the lock by 2021.

Zeebrugge/Oostende

Oostende and Zeebrugge are both included as core maritime ports in the corridor. In 2013, Zeebrugge handled 42.8 million tonnes, and Oostende handled 1.8 million tonnes, mainly dry bulk and roro. Zeebrugge's traffic is mainly unitized; containerised (20.4 million tonnes) and roro (12.5 million tonnes), so this is the main point of attention for the corridor.

The Port of Zeebrugge currently reports that 52% of goods arrive or leave by road, 15% use rail (40% of container traffic uses rail), 16% are transhipped between seagoing vessels, 1% use inland navigation, 5% sails up the Scheldt with an estuary barge, and 11% is transferred by pipeline. Goods can therefore be exchanged between six modes of transport.

Within the NSMED corridor, Zeebrugge functions as an international gateway and as a maritime node for short-sea services to the UK (amongst others). It is linked via road, rail, and waterway within the corridor to Ghent, thus connecting with routes towards Luxembourg and along the Amsterdam-Paris branch. There are in addition (but not indicated in the corridor maps) estuary barge services that allow for direct connection into the Scheldt river.

Calais

Calais is classified in TEN-T as a core maritime port and as a road/rail terminal. This node covers the seaport and the (separate) Eurotunnel terminal in Coquelles/Fréthun. Both the seaport and the Eurotunnel terminal handle RORO freight and passengers. In addition, the Fréthun terminal is the point of connection between the French rail network and the cross-border Channel Tunnel railway.

Within the corridor, this is the only cross-border link between the UK and the Continent, and the most important one, but in a wider context it is one of many short-sea connections.

Calais seaport handled 10 million passengers and 38.5 million tonnes of freight (mainly RORO freight) . In addition to these volumes, Eurotunnel carried 10.3 million RORO passengers (cars and buses on rail shuttle) , 17.7 million tonnes of RORO (driver-accompanied lorries on rolling motorway), 10.1 million passengers on Eurostar trains (through rail), and 1.36 million tonnes by through-rail freight trains .

In aggregate, this amounts to 30.4 million passengers and 57.6 million tonnes of freight for the Calais node.

The seaport is primarily a sea to road (RORO) interchange, although there are rail connections into the port's industrial areas. The Eurotunnel terminal provides a road/rail interface for cars and lorries.

The Canal de Calais which links Calais to the waterway network is not included in the TEN-T core or comprehensive networks.

Dunkerque

Port of Dunkerque (Grand Port Maritime de Dunkerque) is a major gateway port along the North French coastline, close to the Belgian border. It also handles short-sea (RORO) traffic, with connections (amongst others) to Dover in the UK.

In 2013, the port recorded total freight traffic of 43.6 million tonnes, mainly dry bulk traffic, but including 12.3 million tonnes by RORO, and 2.7 million tonnes of containerised cargo (291,600 TEUs in 2013). A LNG terminal is under construction to tap into the potential for liquid bulk development (currently 6 million tonnes). In addition Dunkerque handled 2.3 million passengers.

In the NSMED corridor, Dunkerque is classified as a core seaport, inland port and road/rail terminal. The seaport has direct access to waterway and rail networks, as well as motorway connections. Inland modal split in 2013 was 52% road, 33% rail, and 15% waterway. However, the rail modal share exceeds 50% if we include the numerous industrial activities around the port. The port reports that 3 million tonnes are loaded or unloaded here to/from inland waterway, and 12 million to/from rail. Much of this is accounted for by bulk commodities.

Marseille/Fos

Marseille/Fos is the largest cargo port in France, and one of the top five ports in Europe, with a total throughput of 79.95 million tonnes in 2013, with container throughput of 1.1 million TEU in 2013. It is also a significant port for passenger transport with 2.4 million passengers per annum, including cruise and ferry traffic.

The port is split into two main port areas, the Eastern Harbour, close to the city centre of Marseille, and the Western Harbour located close to Fos-sur-Mer (over 90% of tonnes carried through the Marseille-Fos ports). Both areas can be reached by road and rail. The main waterway connection inland is from Fos. The last mile rail connections into the Western Harbour (Fos) are also not shown in the maps. Marseille reports that there are 16 terminals with rail connections for the Eastern Docks and 8 on the Western side. There are 13 terminals connected to inland waterways and many industrial activities (Arcelor and petrochemical sector for instance)

Inland traffic via waterways amounted to 3.1 million tonnes in 2012, including 75,500 TEU of containerised cargo. Inland share for waterways for containerised traffic 7.4% overall, and 9.2% from the Western Docks (which has the primary waterway connection).

The Canet Terminal located near the Eastern Harbour is being relocated at Mourepiane by its operators, with aims to increase the inland rail share. Mourepiane rail/route terminal will therefore be expanded. Its traffic amounted in 2009 to 115,000 units. On the Western side, the main road/facility is the Clesud terminal next to Miramas.

Amsterdam

Amsterdam is the most northerly gateway in the continental part of the NSMED corridor. It is designated as a core node in all categories; urban, airport, maritime, inland port and road/rail terminal. Within the wider core-network it is a point of interconnection with the Rhine-Alpine and North Sea-Baltic corridors.

Apart from being a major urban and industrial node, Amsterdam functions as a gateway for the corridor, handling 95 million tonnes in 2013 , mostly bulk cargo, split approximately 18:78 between Ijmuiden and Westpoort. This makes Amsterdam the third largest port in the corridor, after Rotterdam and Antwerp, and the fourth largest in Europe, after Hamburg.

Following Amsterdam's Visie 2030 , the port is expected to increase its volumes to 145 million tonnes in 2030. Currently 63 million tonnes are handled by barge, 38 million by road, and 5 million by rail. In 2030, these are expected to increase to 89 million by barge, 56 million by road, and 10 million by rail.

In terms of geographical distribution from the port, the Visie 2030 shows 10.7 million tonnes of cargo being handled within the NSMED corridor, increasing to 17.1 million in 2030. This is split between modes as: 7.7 million tonnes by waterway, 1.1 million by rail, and 1.9 million by road. Similar volumes, shares and growth rates were forecast for the Rhine-Alpine and North Sea Baltic corridors. A further 25 million tonnes is moved by short-sea routes to the UK, expected to increase to 40 million in 2030.

Moerdijk

Moerdijk is a medium-sized seaport and inland port, just to the South of the Port of Rotterdam. In TEN-T it is classified as both core maritime and inland port. In the corridor it is located near the main road and rail bridges for the North-South connections between Rotterdam and Antwerp. This location gives Moerdijk an extended gate function for both main-ports Rotterdam and Antwerp.

Following Port of Moerdijk's Jaarverslag for 2013, freight volumes amounted to 18.5 million tonnes, of which 5.6 million was from seagoing ships, and 12.8 million was from inland waterway transport. Most of the volume is accounted for by bulk cargo, but there are around 3m tonnes of container transport. In 2013, rail traffic amounted to around half a million tonnes.

The 2030 Havenvisie indicates an increase in maritime traffic from around 6 million tonnes in 2010 (maritime traffic) to over 10 million tonnes in 2030 under the Global Economy scenario, with much of the growth coming from the container sector.

With the expected growth of goods, and in particular containerised goods, the Port of Moerdijk wants to expand the rail infrastructure. To realise the expansion a Rail Service Center is needed to contribute to the realisation of a sustainable multimodal transport system.

Currently Moerdijk Container Terminal is being used for consolidating barge-loads of containers for Rotterdam, as one of the measures being used to prevent delays at the main deep-sea terminals.

Furthermore, Moerdijk is an access point for the underground pipeline transport network in the Netherlands. Leidingenstraat Nederland (LSNed) manages an obstacle-free pipeline route between the industrial areas of Rotterdam and Moerdijk in the direction of Vlissingen and Antwerp. The LSNed pipeline route coincides with the NSMED corridor between Rotterdam and Antwerp. Some one-third of annual imports from Rotterdam pass through the pipeline system. An important part of the route is the tunnel under the Hollands Diep. This tunnel measuring approximately two kilometres long is practically full. The whole piping system consequently runs at near - full capacity. To assure the total transport capacity in this part of the NSMED Corridor, the capacity of this tunnel will have to be expanded in the near future (Source: N Brabant Region, LSNED).

Rotterdam

Rotterdam is the largest port in Europe by a considerable margin, with throughput of 440.5 million tonnes of cargo in 2013, including 12 million TEU of container traffic.

Within the NSMED corridor it is a core node, in all categories; urban, airport, maritime, inland port and road/rail terminal. Primarily it is an international gateway feeding large volumes of cargo into the inland networks, within three TEN-T core network corridors; North Sea Mediterranean, Rhine Alpine and North Sea Baltic. However it also functions as a short-sea node with links to the UK and Ireland (amongst others), and as a multi-modal cargo centre, connecting rail and inland waterway networks. Short-sea and feeder container traffic amounts to 4.1 million TEU, of which 1.4 million is for the UK and Ireland.

Around 60-65% of Rotterdam's container traffic moves to or comes from the hinterland, with the remainder being transhipped to feeder vessel. Of the hinterland traffic, 54% goes by road, 35.3% by barge and 10.7% by rail .

In 2030, port volumes are expected to reach 750 million tonnes, an increase of 70% compared to the present day. Unitised cargo (including containers) is expected to increase to 360 million tonnes, around two and a half times current levels. Inland shares of container traffic are also expected to change, with the barge share increasing to 45%, rail to 20%, with road falling to 35%. The combination of increasing port volumes and increasing shares for rail and waterway have important implications for hinterland capacity, including infrastructure, services and inland terminals.

Main road and rail access to the port is along the A15 route connecting the main terminals to the NSMED corridor links (A16) at the South East of the port. Port accessibility is shown diagrammatically below, including planned infrastructure.

Figure 79: Accessibility - Port of Rotterdam

Source: Port Vision 2030, Port of Rotterdam

Rail access from port terminals is concentrated upon a single main artery leading from Maasvlakte to the open network at Kijfhoek. One of the issues in future will be the replacement of the Caland Bridge, which is a current bottleneck for rail traffic to and from the main container terminals at Maasvlakte.

Zeeland (Terneuzen, Vlissingen)

Zeeland Seaports comprises two main port areas; Vlissingen and Terneuzen either side of the Scheldt estuary.

Together they handled 33 million tonnes of cargo from seagoing vessels and 35.5 million tonnes of cargo from inland waterway vessels in 2013, mainly conventional cargo.

In the NSMED corridor, the roles of Vlissingen and Terneuzen differ for rail and road connections. Terneuzen is connected, within the core network, by cross-border waterway to the city of Ghent, while Vlissingen is connected via the Western Scheldt to the Terneuzen-Ghent Canal. Vlissingen is connected by rail and road core network via Roosendaal to the main corridors. Vlissingen also connects via the river Western Scheldt to the main deep-sea, short-sea and other inland waterway connections. The inland waterways connects Vlissingen to the hinterland in both directions; to the Rhine and south via Terneuzen / Ghent. Terneuzen's inland rail connection is via the comprehensive network, and it joins the TEN-T road network south of the Dutch/Belgian border. From the maritime side, Vlissingen and Terneuzen are both deep-water ports, where the main part of Terneuzen is accessible via the Terneuzen lock and the Terneuzen-Ghent canal.

In the 2011 annual report , Zeeland ports published forecasts showing an expected increase of sea cargo reaching 50 million tonnes, and 40 million tonnes of inland cargo by 2020.

Vlissingen has an important logistics cluster, while Terneuzen attracts investment by the chemical industry. Zeeland Seaports is being developed as a multimodal hub, supported by infrastructure projects such as the Seine-Schelde link and the Terneuzen lock.

Continental Inland Nodes

Brussels

Key Terminals/Facilities	Description
Brussels Airport	Core airport
Brussels Container Terminal	Inland port with rail connection
Cargovil Container Terminal	Inland port
Dry Port Muizen	Road to rail terminal

Apart from being a main urban node, Brussels functions as a crossroads within the corridor for the Paris-Amsterdam and Luxembourg-Flemish seaports branches.

For passenger transport, Brussels connects road, air and rail (including high speed). Brussels airport has a direct rail connection, which is part of the core network and included in the NSMED corridor.

The port of Brussels is accessible for both sea-shipping and barge transport, up to 4,500 tonnes. In 2010, container transport amounted to 18,000 TEU.

For freight, there is a tri-modal terminal with a container port. There is a direct connection between road, rail and inland navigation, linking to core network corridor sections for both waterway and rail. Waterway connections to the port of Antwerp take 6 to 8 hours. Rail access is via a single track spur connecting to the Schaerbeek marshalling yard and the main lines towards Mechelen and Antwerp.

The Cargovil terminal, 12km to the north of the city, near Vilvoorde and Grimbergen, connects waterway and road transport, while the Dry Port Muizen, further north again, connects road and rail. Both are adjacent to the NSMED corridor.

Overall, connectivity is therefore good, in terms of the possibilities available for transferring between modes of transport, but room for expansion is limited in certain areas because of land constraints and access to congested parts of the road and rail networks. The waterway network around Brussels is also restricted by bridge height constraints; currently five bridges in the Brussels regions do not provide 5.25m clearance.

Kortrijk

Key Terminals/Facilities	Description
Dry Port Mouscron	Road Rail terminal
Delcaterminal	Road Rail terminal in LAR industrial area.
Avelgem Container Terminal	Inland Container Port
River Terminal Wielsbeke	Inland waterway terminal

Kortrijk functions as a cross-border point within the NSMED corridor, along the Paris-Amsterdam branch, adjacent to Lille and Ghent.

It is situated on the Leie (Lys) river, and connected via the Kortrijk-Bossuit canal to the Scheldt river, although a part of this canal link is not CEMT IV.

Close (within 20km) there are several inland ports and rail-road terminals. Near the French border, there are two road/rail terminals. The Delcaterminal has direct connections to the corridor sections for both road and rail, whereas the Dry Port in Mouscron has a direct rail connection on the corridor.

The Avelgem container terminal links road and inland waterway modes with connections by barge to the Flemish seaports.

Downstream from Kortrijk, along the Leie river there is a further inland port, the River Terminal Wielsbeke (RTW).

As a corridor node, Kortrijk can be accessed by either road, rail or waterway, but there are no direct tri-modal connections here.

Liège

Key Terminals/Facilities	Description
Liège Logistique Intermodal	Road-rail Terminal
Liège Trilogiport	Road-rail-waterway terminal (under construction)
Liège Container Terminal (Renory)	Road-rail-waterway terminal
Liège Airport	Accessible by road.

In the NSMED corridor, Liège functions as a major inland hub (passenger and freight traffic). It is a core airport, and a core inland port. It is part of the waterway branch of the corridor leading from the Dutch seaports towards Namur and Lille. In the broader core network, it also forms a cross-border node in the Rhine-Alpine and North Sea Baltic corridors towards Aachen and Köln. So while it will mainly be analysed as an inland port within NSMED, it is also necessary to consider connectivity with rail and road within the broader scope of the core network.

Altogether the Liège Port Authority (PAL) operates 32 different sites, of which certain key facilities have been shown in the map. Projects are known to be underway on several parts of the Meuse waterway near Liège, including Lixhe, Renory, Jemeppe, Seeraing, Flémalle, Ivox-Ramet, Hermalle-sous-Huy and port de Monsin.

The Liège Container terminal currently offers tri-modal facilities, and the development of the Trilogiport further North is planned to add to this capacity. Both facilities are directly connected to the core network. The waterway connection is part of the NSMED corridor, while the road and rail connections are part of the Rhine-Alpine and/or the North Sea Baltic Corridors.

For passenger transport, Liège airport has only road connections.

The city functions as major node for rail and road traffics. In fact, it is practically a node where several networks interconnect. For road it concerns west-east traffics between Belgium and Germany and north-south traffics between The Netherlands, Belgium, Luxembourg and France.

Namur

Key Terminals/Facilities	Description
Sambre	Seven inland waterway facilities
Moyenne Meuse	Thirteen inland waterway facilities
Haute Meuse	Six inland waterway facilities

Within the NSMED corridor, Namur is classified as a core node (as an inland port). Within the regulation, the part of the port covering the Meuse river is a core node, whereas the part covering the Sambre is comprehensive.

It functions in the corridor as a crossroads between the Luxembourg-Flemish ports branch and the waterway branch from the Netherlands ports via Liège towards Charleroi and Lille.

Combined, the Namur terminals handle around 5 million tonnes, mainly bulks.

No road-rail or other multimodal facilities have been identified in Namur.

Albertkanaal

Key Terminals/Facilities	Description
Haven Genk	Tri-modal platform –road, rail, waterway.
Genk Euroterminal	Road, rail
BCTN Meerhout	Tri-modal platform – road, rail, waterway.
Container Terminal n.v. Beverdonk	Road, waterway
Gosselin Container Terminal (GCT) Merksem	Road, waterway

The Albertkanaal is categorised as a core inland port node within TEN-T. In reality it is a stretch of waterway connecting Antwerp and Liège, as well as the Juliana Canal in the Netherlands. Within the corridor it is therefore considered as a cluster of freight facilities, implicitly including the canal itself and the area enclosed by the Dessel-Kwaadmechelen Bocholt-Herentals canals.

Haven Genk has direct rail, road, and water connections. The rail connection is via a 5km link to the main line which is part of the core network.

In addition, the Albert Canal has approximately 100 inland waterway facilities other than container terminals.

Luxembourg

Key Terminals/Facilities	Description
Bettembourg	Road to rail terminal
Port de Mertert/Luxport	Trimodal road, rail, waterway.
Luxembourg Airport	Air, road.

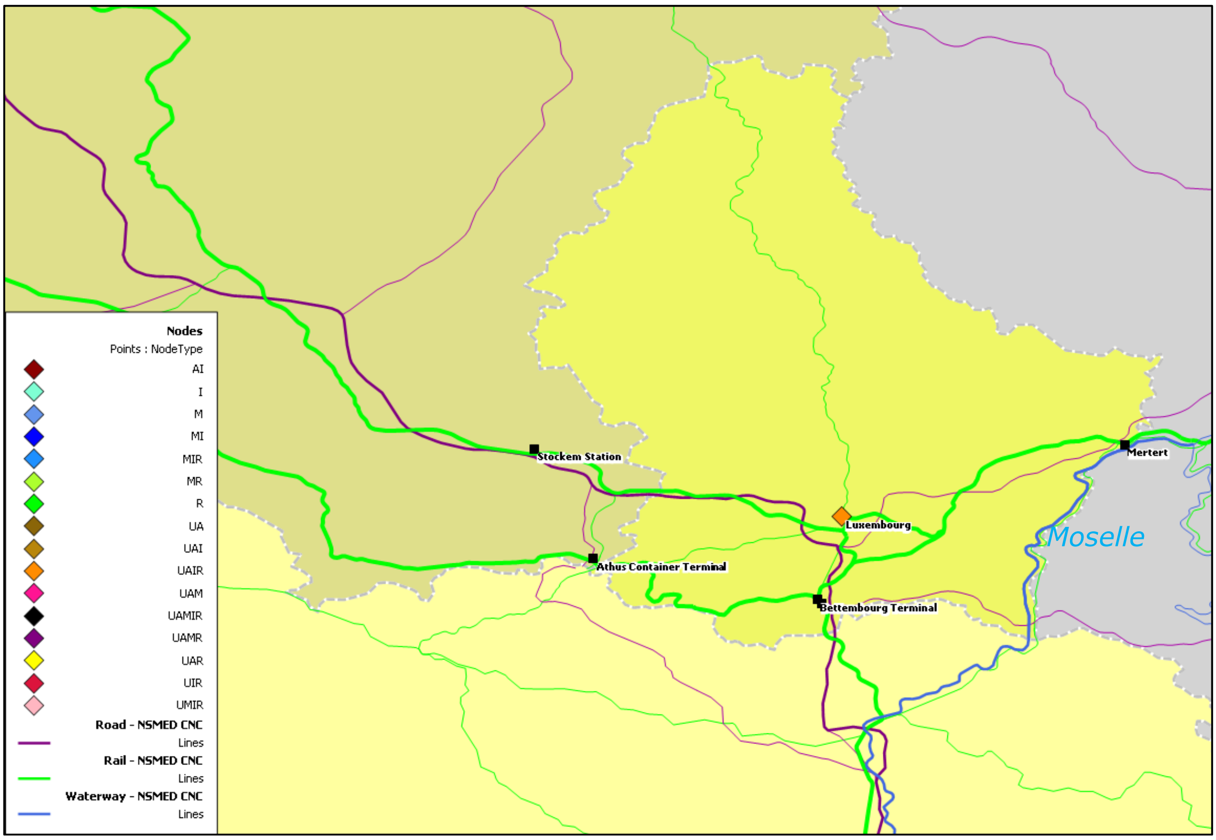
The Luxembourg node is a mid-point in the main North-South branch of the corridor stretching from Marseille via Lyon and Brussels towards the northern range seaports. There is also a short branch in the corridor in order to connect with the Moselle port of Mertert.

Luxembourg has been defined as a core urban node, a core airport, inland terminal, and road/rail terminal. In reality there are three distinct facilities within the node.

Mertert is a tri-modal facility with direct water and rail access. It connects to the Moselle river, providing a point of interconnection towards Germany and the Rhine Alpine corridor, and a waterway route parallel to the corridor for traffic towards the Dutch and Belgian seaport gateways.

Bettembourg is a road-rail facility, located at the point in the network where the cross-border Belgian, German and French main rail lines cross. The lorry-rail facility allows for unaccompanied road trailers to be loaded and unloaded onto rail services.

Figure 80: Map of Corridor Node: Luxembourg



Luxembourg airport is a core airport, and an important international airfreight hub. It is connected to the core network by road.

Avignon

Key Terminals/Facilities	Description
Le Pontet	Inland Port – Road, waterway
Avignon Courtine (Novatrans)	Road/rail Terminal

Avignon is situated towards the Southern end of the NSMED corridor, located at the point where the main North-South axis along the Rhône River towards Arles and Fos-sur-Mer splits with the South-Western branch towards Sète and the South-eastern branch towards Marseille. This is the point of connection with the Mediterranean corridor. It is also one of the few rail crossing on the Rhône.

In the NSMED corridor, Avignon is classified as a core road/rail terminal only. However it also has an inland port (Le Pontet), mainly handling bulk commodities, with volumes of 222,000 tonnes in 2013 . This facility lies on the Western branch of the Rhône in Avignon, which is not shown in the above map. Le Pontet is close to the railway line (<1km) but there is no direct rail access to the quay.

Avignon Courtine is the only road/rail terminal for combined transport (Novatrans), a city-centre site, close to the Central railway station. 850,000 units went through this terminal in 2009.

Chalon-sur-Saône

Key Terminals/Facilities	Description
Port de Chalon-sur-Saône	Inland Port with road and rail connections. (Aproport)

Chalon-sur-Saône is located in the middle of the main Luxembourg-Marseille branch of the corridor, and is a strategically important node in the waterway network, as one of the most northerly points accessible for ships of CEMT V standard along the Rhône-Saône waterway basin.

As is the case for other ports on the Saône (Pagny and Mâcon), port de Chalon-sur-Saône is operated by Aproport. It handles bulk and containerised traffic, in a large rail-connected industrial and logistics area.

Aproport reports that they receive 1500-2000 vessel calls per year, and that they handle 1-1.2 million tonnes of waterborne freight, 300,000 to 400,000 tonnes by rail, and 1.5 to 2 million tonnes by road. They handle 40-50,000 TEU per year.

Dijon

Key Terminals/Facilities	Description
Gevrey - Naviland	Road, rail connections.

Dijon is situated along the main Luxembourg-Marseille branch of the corridor, and is also the point of connection for the East-West link towards Paris and Mulhouse (LGV, high speed rail line). It is about 30km away from the Saône River, and the Port of Pagny (operated by Aproport).

In TEN-T Dijon is classified as a core road/rail terminal, with the main combined transport terminal being Gevrey, on the south side of the city. This terminal is operated by Naviland Cargo .

Note that the core rail links shown above include a planned passenger line crossing the city from East to West, just North of the city centre.

Lille

Key Terminals/Facilities	Description
Lesquin Airport	Air, road.
Dourges (Delta 3)	Road, rail, waterway
Port Fluvial de Lille (LCT)	Road, rail, waterway
Halluin HCT	Road, waterway

In the NSMED corridor, Lille is the point at which the main Amsterdam-Paris and the London-Calais/Dunkerque-Brussels branches connect, making it the central point of a three-way connection to London, Paris and Brussels. Lille connects all three inland modes of transport, but the primary rail connections in the core network here, are the high speed (LGV) rail lines. The conventional (mixed passenger and freight lines) to Calais, and via Mouscron to Kortrijk are included in the corridor, but the conventional line to Paris is classified as a comprehensive link, so it is not part of the core network.

It is a key cross-border node, classified as a core node in TEN-T as an urban centre, an airport, an inland port and a road/rail terminal. Like other major urban nodes in the corridor, in reality it consists of a number of transport facilities distributed within a 10-15km radius of the city centre.

The airport is located in Lesquin, to the south of the city, with road connections, but no direct rail connection.

Ports of Lille manages nine inland port terminals: Lille, Santes, Wambrechies, Halluin 1 and 2, Houplin-Ancoisne, Haubourdin, Loos-Sequedin, and Marquette .Together they handle 6.6 million tonnes of cargo, including 78,300 TEU of container traffic . The Halluin terminals on the Lys are located precisely on the Belgian border.

Lille Dourges Container Terminal (LDCT-Delta 3) is a separate facility located approximately 10km south of Lille. It is a tri-modal facility, for combined transport, with throughput of around 260,000 TEU . Lille Dourges is incidentally one the most important and modern rail-road terminal in France with a growing industrial area. It will benefit from the NIFT (rail bypass of Lille) and the Seine – Nord Europe canal projects due to its location on the rail and waterway networks.

Lyon

Key Terminals/Facilities	Description
St Exupèry Airport	Air, road, and rail (LGV) connections
Lyon Terminal 1 and 2	Road, rail, waterway
Lyon Saint Priest	Road, rail
Lyon Venissieux	Road, rail

Lyon is situated on the main North-South branch of the corridor between Luxembourg and Marseille. It is also a point of interconnection to the Mediterranean corridor towards Torino [IT]. Lyon is classified as a core urban node in TEN-T, and it has a core airport, with direct road and rail (LGV) connections.

There are freight facilities for road/rail transfer and for waterway to road and rail. The two inland port terminals (Lyon Terminal 1 and Lyon Terminal 2) have a central location in the Port Edouard Herriot area. They handled 5.4 million tonnes of cargo in 2011, of which 1.4 million by water, and 380,000 tonnes by rail. This amount includes 188,000 TEU of which 59,500 were transferred to or from waterways . Lyon Terminal reports steady growth in intermodal traffic . An additional terminal for road/rail transfer is found on the east with the Vénissieux rail/road terminal (121,000 units in 2009) with the operators Novatrans and Naviland Cargo.

It is a key point in the French rail network, with LGV connections into the city centre and bypassing the city centre to the East. Note that the core network maps include planned high speed rail lines leading towards Dijon. The current situation and the planned rail layout are illustrated below.

Metz

Key Terminals/Facilities	Description
Metz Port	Road, rail, waterway
Metz Sablon	Rail – Marshalling Yard

In NSMED, Metz functions as a three-way connection between Luxembourg and the French Nord-Pas-de-Calais region in the North, Strasbourg in the East, and Dijon in the South. Within TEN-T it is classified as a core inland port only, but in reality it is an important railway node linking the main corridor branch (Luxembourg-Lyon) to the Paris-Strasbourg (Atlantic Corridor) and the Lille-Strasbourg (comprehensive network) lines. Ports de Moselle (2.7 million tonnes in 2013) includes the following 3 ports: Nouveau port de Metz, Thionville-Illange and Metz-Mazerolle.

For waterway traffic, Metz is situated on the Moselle, and therefore connected along the NSMED corridor as far as Luxembourg, at which point there is a connection to the Rhine Alpine corridor and into Germany. The inland terminals (Mazerolle and Nouveau Port) are operated by the Moselle Ports Company . The Port Nouveau terminal is road, rail and connected to the wide gauge Moselle handling 3.9 million tonnes in total in 2013, with approximately 1.7 million tonnes by waterway and road, and 51,000 tonnes by rail.

Mulhouse

Key Terminals/Facilities	Description
Euro Airport: Basel-Mulhouse-Freiburg	Air, road.
Ottmarsheim - Contargo	Trimodal – road, rail, waterway
Huningue	Trimodal – road, rail, waterway
Ile Napoleon	Trimodal – road, rail, waterway

Mulhouse is a point of interconnection between the NSMED corridor and the Rhine-Alpine corridor at the point where the French, German and Swiss borders meet on the Rhine river close to Basel. EuroAirport, which is in France, is shared between Mulhouse, Basel and Freiburg.

For rail transport, Mulhouse is the border crossing point between France and Switzerland, and for waterway the terminals have access to the Rhine, which gives Class VI access all the way to the North Sea ports along the Rhine-Alpine corridor.

Ports de Mulhouse-Rhin operates three tri-modal inland ports in Mulhouse. Ottmarsheim is the main terminal for containerised transport. 2013 traffics amount 5.1 million tonnes and 29,000 TEU on water and 0.8 million tonnes on rail.

West of the Rhine is the Canal du Rhône au Rhin, but this is only accessible for CEMT VI vessels as far as Mulhouse. West of Mulhouse the existing canal is CEMT I. TENtec maps indicate a potential new waterway connection (coloured pale blue) between the Rhine towards Chalon-sur-Saône, but this is part of a study, and not under construction.

Paris

Key Terminals/Facilities	Description
Le Bourget	Rail
Noisy le Sec	Road, rail
Valenton	Road, rail
Rungis	Road, rail
Port de Gennevilliers	Road, rail, waterway
Port de Bonneuil-sur-Marne	Road, rail, waterway
Port d'Evry	Road, rail, waterway
Port de Bruyères sur Oise	Road, rail, waterway
Airport Roissy (CDG)	Air, road, rail
Airport Orly	Air, road, rail

It is difficult to underestimate the importance of Paris within the North East corner of the French transport network, which is essentially a hub-and-spoke system with Paris at the centre.

For the waterway network, Paris is the point of interconnection between the main corridor branch from the direction of Lille and the Seine river (Atlantic corridor) leading to Le Havre. At present, the waterway route along the NSMED corridor follows a CEMT V route along the Oise river as far as Compiègne, beyond which it follows the Canal Du Nord (CEMT II) as far as the Escaut River on the outskirts of Lille. This connects it to the CEMT IV and CEMT V links towards Dunkerque and into Belgium.

For rail, there are two lines in the core network between Paris and Lille/Brussels. The first is the LGV, going directly to Lille, and the second is the core freight network link via Busigny towards Liège, which meets the (partly comprehensive) Lille-Metz line to the East of Lille. In reality this line connects across the Belgian border at Charleroi, but that connection is not included in the core network, and therefore not in the corridor. Therefore the NSMED corridor contains only one of the available cross-border routes, i.e. the passenger high-speed line.

Paris itself is both a major rail hub, and a large inland port (part of the HAROPA grouping together with Le Havre and Rouen).

As a whole HAROPA reports throughput of 21.1 million tonnes of cargo for the Port of Paris. Traffics include 161,000 TEU on waterways and 2 million tonnes on rail in 2013. The two main multimodal terminals in Central Paris are Gennevilliers and Bonneuil-sur-Marne. These report 3.6 and 1.0 million tonnes respectively of waterborne cargo . Other important multimodal terminals on the corridor include Port de Limay and the Evry multimodal platform.

There are currently four rail/road terminals in the Paris area: Valenton, the first rail/road terminal in France, Noisy-le-Sec, the port of Bonneuil-sur-Marne and the port of Gennevilliers, with a total of 229,000 units in 2009.

Strasbourg

Key Terminals/Facilities	Description
Hausbergen	Rail
Port Autonome de Strasbourg (PAS) - Sud	Road, rail, waterway
Port Autonome de Strasbourg (PAS) - Nord	Road, rail, waterway

Strasbourg is the point of connection of the NSMED corridor with the German border and transport links towards the East. The waterway connections (dominated by the Rhine) have been illustrated in the map above, but are part of the Rhine Alpine, and not the NSMED corridor. Nevertheless, Strasbourg is classified as both an inland port and a road/rail terminal within the TEN-T regulation.

As such, Port Autonome de Strasbourg is the second most important inland port in France, handling 7.96 million tonnes (across all its terminals) in 2013 and 406,000 TEU (across all modes) . The main river terminals are all directly rail connected. Rail traffic on the port facilities amounted to over 1.5 million tonnes in 2011.

Existing rail connections link Strasbourg Westwards towards Metz (along NSMED corridor) and Paris (Atlantic corridor). Rail Freight Corridor 2 has identified bottlenecks between Strasbourg and Vendenheim.

Bergen-op-Zoom

Key Terminals/Facilities	Description
Markiezaat Container Terminal	Waterway and road connections

Bergen op Zoom is a core inland waterway node, situated between Rotterdam and Antwerp along the main Amsterdam-Paris branch of the NSMED corridor. It is also near the point where the road and rail connections to Vlissingen connect to the main branch.

It consists of several conventional cargo terminals (including for example chemicals with total volume around 3 million tonnes per annum), and it has a container terminal, handling more than 100,000 TEU in 2013.

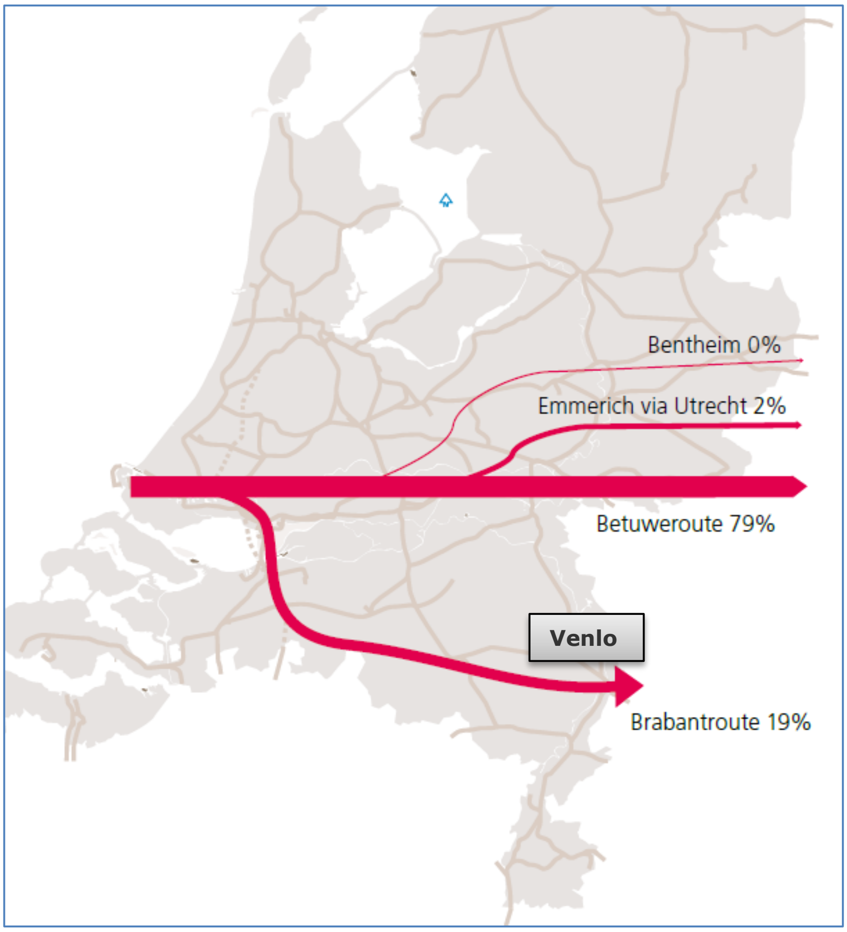
Bergen op Zoom is upgrading the current inland port area and is developing a new barge terminal.

Venlo/Venray/Wanssum

Key Terminals/Facilities	Description
Venray/Wanssum	Road, waterway
Venlo	Trimodal – Road, rail, water

Venlo/Venray and Wanssum are classified as two comprehensive nodes within TEN-T. They are included in this analysis as they form a key cross-border transport hub, situated on the crossroads for the Nijmegen-Liège (Maas and highway A73) and Rotterdam/Antwerp-Eindhoven-Duisburg sections (Rotterdam-Venlo-Duisburg rail connection and A67 road) of the TEN-T network. Some 19% of the international rail cargo from the Netherlands crosses the border in Venlo. This area handles more than 400,000 TEU container traffic and additionally 2,5 million tonnes of other cargo. Venlo is one of the hubs within the Greenport Holland network, and is classified as the number one logistics hotspot in the Netherlands.

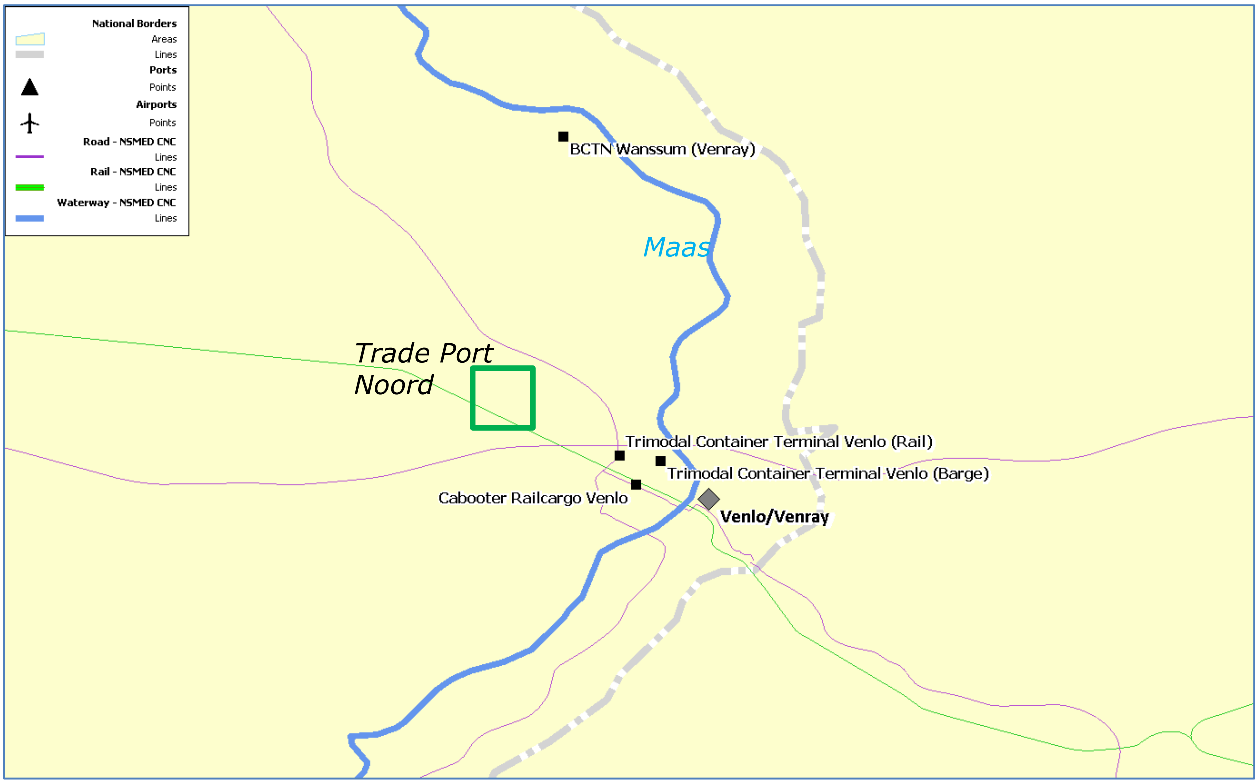
Figure 81: Rail cargo Flows in NL, 2013



Source: Keyrail in Spoor in cijfers 2013, p.39, Railcargo Information Netherlands

Within the NSMED corridor it functions as an multimodal node, containing a cluster of terminals and logistics centres, interconnecting to the East-West rail and road connections, and a crossing point from the seaports of Rotterdam and Antwerp towards Germany and Italy on the Rhine-Alpine corridor (see figure above). It is therefore essential to include these terminal locations along this waterway branch of the corridor.

Figure 82: Map of Corridor Node: Venlo/Venray/Wanssum



Venlo consists of the tri-modal Container Terminal (ECT's TCT Venlo site), which is the extended gateway on the Dutch/German border, and the Cabooter rail terminal. Between 2015 and 2018 the new rail terminal Greenport Venlo (Trade Port Noord) will be developed on the international rail connection, as an extension of the existing Trade Port complex. At the same time the current Barge Terminals of Venlo and Barge Terminal Wanssum (BCTN/Port of Rotterdam) will be extended. It will add capacity of 350-400,000 TEU.

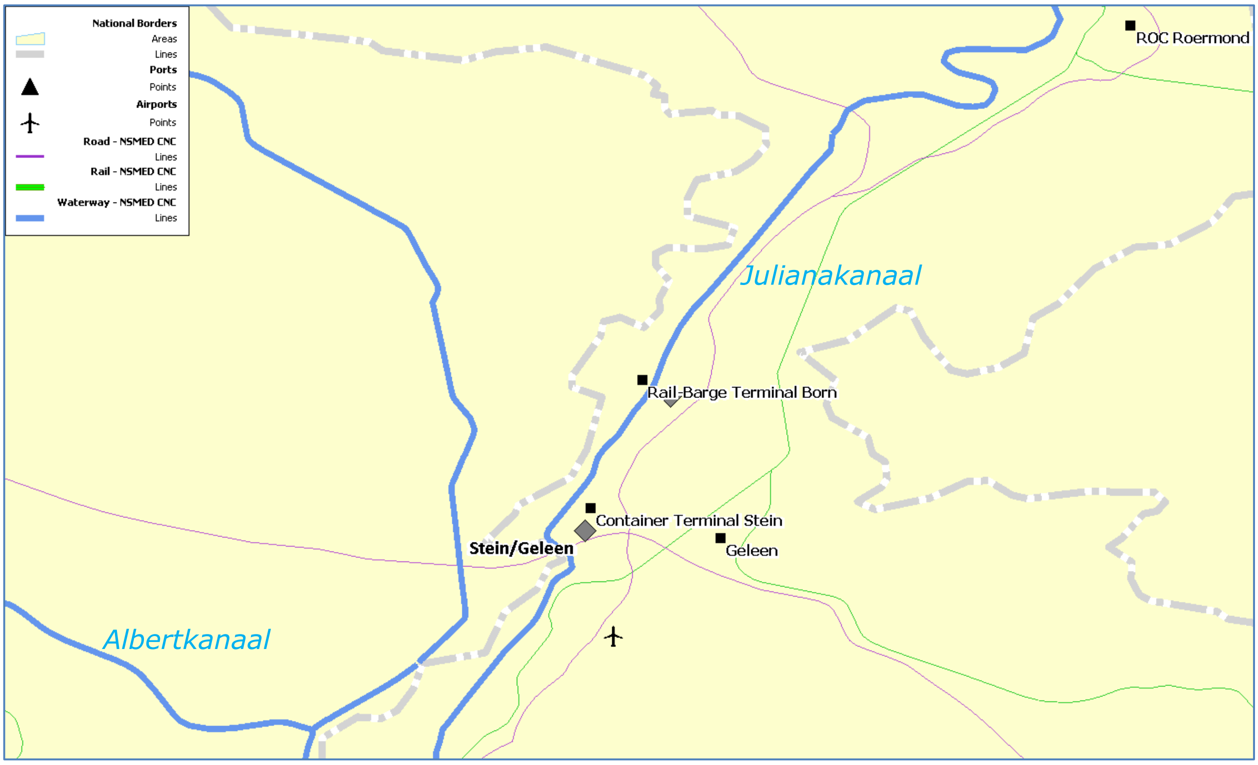
The new tri-modal port (Trade Port Noord) development in Venlo and Venray is needed because the current two rail terminals and two barge terminals are currently at full capacity, whereas the logistics business in the region continues to grow with the advent of new European Distribution centres (EDCs) and further cross-border growth in traffic between the Netherlands, and Belgium, Germany and further afield.

Stein – Sittard - Geleen/Born

Key Terminals/Facilities	Description
Sittard-Geleen/Born	Born Trimodal – Road, rail, waterway Geleen – road/rail terminal
Stein	Stein - Road, rail, waterway

Born and Stein are classified as comprehensive nodes within TEN-T, but they are included in this analysis as key cross-border points within the corridor, situated next to both the Dutch/Belgian and Dutch/German borders. Born and Stein are situated on the cross-roads for the Nijmegen-Liège (Maas and highway A2) and Antwerp-Geleen-Koln (A76) sections. Like Venlo/Venray, this is considered as a key multimodal terminal complex for the Maas/Julianakanaal area including Sittard/Geleen/Born and Stein. The comprehensive network airport at Maastricht is nearby.

Figure 83: Map of Corridor Node



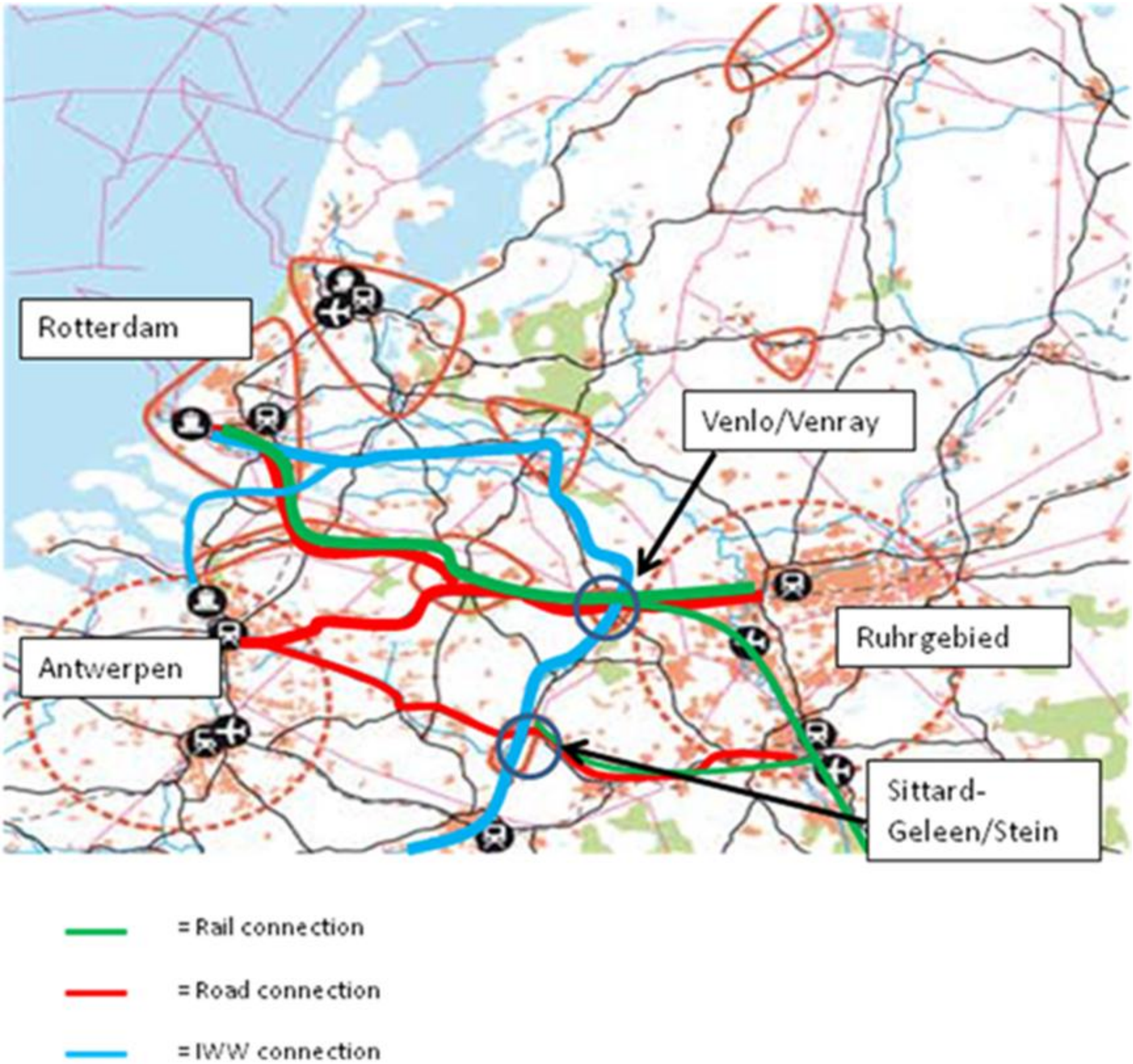
Within the NSMED corridor, this group of terminals form a node along the Maas waterway, with links to road and rail transport, handling 200,000 TEU per annum. There is a need to include terminal locations along this waterway branch of the corridor.

Born Container Terminal (Waalhaven Group) is one of the largest Dutch inland container ports with capacity of 300-350,000 TEU, and container throughput of around 125,000 TEU. It is rail connected. Total throughput of conventional cargo in the inland port of Born is 2.1 million tonnes.

Geleen contains road/rail terminals on the Chemelot industrial site (operational since 2013, handling around 50,000 TEU). This intermodal terminal is being developed with the Port of Antwerp, Ewals Intermodal and Meulenberg Group and offers international rail destinations towards Germany, Switzerland and Italy.

The interconnected terminal Stein (Wessem Group/ CTS) handles 30-70,000 TEU of container transport. Total throughput of the inland port of Stein is 3.5 million tonnes (mainly conventional cargo).

Figure 84: Roles of Venlo/Venray and Sittard/Geleen/Stein in cross-border logistics



Source: Focus multimodal international logistic position Venlo/Venray and Sittard-Geleen/Stein (based on map SVIR 2012)

Nijmegen

Key Terminals/Facilities	Description
Container Terminal Nijmegen – (BCTN)	Inland Port – Waterway, road.
Inland Terminal Cuijk	Inland Port – Waterway, road.

The main route from the Dutch seaports to the Maas River branch of the NSMED corridor is via the Waal, and the Maas-Waal canal. This connection between the Maas and the Waal occurs at Nijmegen, which is also a connecting point for East-West road and rail connections on the Rhine-Alpine and North Sea Baltic Corridors.

Nijmegen has its own inland port handling around 85,000 TEU in the container terminal (BCTN), and 2.2 million tonnes of conventional cargo. Upgrade works are ongoing to increase the container capacity up to 250,000 TEU per annum.

The port of Cuijk on the Maas also contains a container terminal (Van Berkel Group), and this handles over 5 million tonnes of cargo.

Utrecht

Key Terminals/Facilities	Description
Container Terminal Utrecht	Road, waterway, (rail)

Utrecht is situated along the Amsterdam Rijn Canal, close to the intersection with the East-West links from Rotterdam to Nijmegen. This is the most important waterway connection between Rotterdam and Amsterdam, and from Amsterdam to all points towards the South and East. It is also a point of connection to the Rhine Alpine and North Sea Baltic corridors for all modes.

The main terminal is the Container Terminal Utrecht (CTU b.v.), which is an inland port within an industrial area with a rail connection to the main line between Amsterdam and Utrecht. The inland port handles between 3 and 5 million tonnes, mainly bulk cargo for the industrial area, and the container terminal handles 70,000 TEU.

ANNEX 5: Technical Compliance

Description of the characteristics of the corridor

Technical Parameters

Regulation 1315/2013 provides, inter alia, technical requirements for the core network infrastructure. These are summarised below.

Table 76: Technical Parameters

Rail: (non-isolated networks) Electrification ERTMS Track Gauge: 1435mm[62] *Freight:* Axle Load: 22.5t Line speed: Freight: 100kph Train Length: 740m	**Inland Waterways:** CEMT IV (1000-1500t vessel) Length: 80/85m Beam: 9.5m Draught: 2.5m Height: 5.25/7.00m
Road: Express road or Motorway Secure parking areas every 100km. Availability of clean fuels. Interoperable tolling.	**Ports/maritime**: Rail connection -where possible[63] Waterway connection – where possible[64] Availability of clean fuels Promoting MOS (short sea connections)
Airports: Availability of clean fuels Connection to rail network (heavy or urban)[65] Connection to road network	**Road/Rail Terminals:** Indication of capacity. **Inland ports** Indication of capacity. Availability of clean fuels

Source: DG-Move, working paper, 26-02-2014

The implementation of projects to upgrade the network, "*depends on their degree of maturity, the compliance with Union and national legal procedures, and the availability of financial resources, without prejudging the financial commitment of a Member State or of the Union*[66]*.*"

Article 7 states:

1. *Projects of common interest shall contribute to the development of the trans-European transport network through the creation of new transport infrastructure, through the rehabilitation and upgrading of the existing transport infrastructure and through measures promoting the resource-efficient use of the network.*

[62] Except in cases where the new line is an extension on a network the track gauge of which is different and detached from the main rail lines in the Union.
[63] Article 41.2: by 2030 .. except where physical constraints prevent such connection.
[64] Article 41.2: by 2030 .. except where physical constraints prevent such connection.
[65] Article 41.3: by 2050 .. except where physical constraints prevent such connection.
[66] Regulation 1315/2013, Article 1.4

2. A project of common interest shall:

(e) contribute to the objectives falling within at least two of the four categories set out in Article 4;

(f) comply with Chapter II, and if it concerns the core network, comply in addition with Chapter III;

(g) be economically viable on the basis of a socio-economic cost-benefit analysis;

(h) demonstrate European added value.

Thus, projects should be mature and economically viable, they should contribute to at least two of the defined objectives (cohesion, efficiency, sustainability, and increasing user benefits), and they should be able to demonstrate European added value[67], meaning that they should contain actions to improve cross-border connectivity.

An analysis has been made to compare the network sections defined as belonging to the corridor against these technical parameters. The results are listed in the following tables.

Road Network
Road parameters mainly refer to safety and sustainability issues, as well as the existence of interoperable tolling schemes.

[67] Whereas 13: .. in particular cross-border sections, missing links, multimodal connecting points and major bottlenecks serving the objective, set out in the White Paper, of reducing greenhouse gas emissions from transport by 60 % below 1990 levels by 2050.

Table 77: Road Compliance

ROAD		Proportion (km%) of corridor links reaching standard.					
Technical Parameters		**BE**	**FR**	**IE**	**LU**	**NL**	**UK**
Length of all sections	km	524	1,545	346	94	194	1,487**
Express road or motorway	Express or motorway?	All M or Dual	97%	100%	All M or Dual	All M or Dual	100%
Secure parking areas every 100km	>= 1 area/ 100km	20%	100%	100%[68]	N/A	100%	100%
Availability of clean fuels	Section km with clean fuels avail.	See here under	Hydrogen – 0% LPG in almost all motorways No electric charge on motorways	100%	N/A	LPG 100%	LPG 100%
Use of tolling system or other traffic management?	Toll road km	0%	67%	33%	0%	0%	<1%~
Sections	No. of sections	31	64	8	4	18	51

**Including 75km in Northern Ireland

~ Dartford Crossing is tolled.

In Belgium there are currently two clean fuel stations; one in Wetteren (E40 and one in Minderhout (E19). There are also two LNG fuelling stations for trucks in Kallo and in Veurne (not in core network). Three more clean fuels gas stations are planned in Belgium; one in Gierle (E34), one in Kalken (E17) and one in Kruishouten (E17).

In the corridor, France is the only country with a majority of toll roads in operation. The requirement is for toll systems to be interoperable, but there is no requirement for toll schemes to be introduced. Vehicle registration databases are not normally exchanged between countries, which would be necessary to establish interoperability.

Although road congestion is one of the most familiar causes of bottlenecks in the corridor, road capacity requirements are not set. Roads in the corridor should be either motorways or express roads[69], which are defined in terms of characteristics other than their lane capacity.

The availability of secure parking has been derived from the IRU TransPark map[70]. Parking facilities have been classified according to the facilities they provide. Ireland,

[68] HGV parking available, but this may not always be "secure" in the sense of having security fencing, CCTV and/or security patrols.

[69] A motorway is a road specially designed and built for motor traffic, which does not serve properties bordering on it and which: (i) is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other by a dividing strip not intended for traffic or, exceptionally, by other means; (ii) does not cross at grade with any road, railway or tramway track, bicycle path or footpath; and (iii) is specially sign-posted as a motorway.
An express road is a road designed for motor traffic, which is accessible primarily from interchanges or controlled junctions and which: (i) prohibits stopping and parking on the running carriageway; and (ii) does not cross at grade with any railway or tramway track.

[70] http://www.iru.org/transpark-app (International Road Union)

UK, Netherlands and France all have sufficient parking areas, some of which have security guards, fencing, flood-lighting and security cameras. In Belgium there are a large number of parking areas, but only two have been given IRU ratings. In Luxembourg, six parking areas are listed, but none have IRU ratings.

Rail Network

For rail, the technical requirements go further than for road by specifying more precise thresholds for size and weight dimensions. Reaching the TEN-T standards would allow electrified 740 metre freight trains to be used throughout the network.

At a basic level, most of the network uses standard 1435mm track gauge, the exception being in Ireland, with 1600mm track gauge. In this context, as an isolated network, corridor sections in Ireland are exempt from the compliance criteria.

Table 78: Railway Compliance

RAILWAYS		**Proportion (km%) of corridor links reaching standard.**						
Technical Parameters		**BE**	**FR**	**IE**	**LU**	**NL**	**UK (GB)**	**UK (N.Ire)**
Length of all sections	Km	934,4	2,939	372	131	236	1,748	86
Length of freight lines	Km	810,5	2,305			138		
Length of passenger-only lines	Km	123.9	634			98		
Electrification Requirement	Electrified	100%	100%	0%	100%	100%	68%*	0%
Track gauge	1435 mm	100%	100%	1600mm	100%	100%	100%	1600mm
line speed (core freight lines)	>= 100 km/h	84%	99%	100%	79%	69%	68%**	Various
Axle Load (core freight lines)	22.5 t	100%	99%	0% (18.8t)	100%	93%	100%	Not stated
Train length (core freight lines)	min. 740 m	0%~	100%	0%	100%	100%	20% ***	0%
ERTMS/signalling system	In Operation?	21%	<1%	NIL	100%	63%	0%	NIL

* 1,022 km overhead, 160 km third rail

** In addition to the 68% with lines speed greater than 100kph, a further 29% have speeds which vary either side of the benchmark, reflecting freight versus passenger speed differentials, depending upon the exact running line and the type of traffic. Only 1% of the core network corridor in the UK has a line speed which is definitively under 100kph.

*** 50% of the Uk rail network in the corridor has a train length limit under 740m, and for 30% of the network, the limits were not identified.

~ Trains longer than 740m are allowed to run on the Belgian rail lines of the CNC NSMED during off-peak hours.

The entire French network on the corridor is electrified but with two different types of voltage:

- 25000V, mostly in the North of the country and on high speed lines,
- 1500V on most lines in the south.

Not all lines allow speeds over 100 km/h. Only the 16km link between Paris Nord and Gonnesse does not permit loads of 22.5t per axle (20t).

In Belgium, 740m trains are permitted during night, but restrictions exist during peak hours, which limit freight trains to 650m.

In the UK (excluding Northern Ireland) 68% of the network in the corridor is electrified, and two (incompatible) forms of electrification exist - third rail (14% of the total) and overhead (86%).

The interoperability issue which stands out in the majority of countries is the extent to which ERTMS has been implemented on the corridor. ERTMS deployment is explained in more detail in Annex 7.

Inland Waterway Network

The four continental countries within the NSMED corridor contain core waterway networks. No core network waterway links are defined in in the TEN-T Regulation for either the UK or Ireland.

In the Netherlands, there is a high degree of compliance with the TEN-T (CEMT IV) standard which requires a draught of 2.5 metres, and a minimum bridge clearance of 5.25m. This height restriction applies to vessels with two layers of containers. National waterways are now designed (new waterways and upgrades) to CEMT Va specification, with 3.5 metres draught and clearance for four containers (9m). On international routes, CEMT Vb, and 7m air draft (three containers) are required[71] as the European standard. For CEMT Vb, the air draft in the Netherlands is 9.1m.

In Luxembourg the only core network connection is the CEMT V Moselle which connects to the Rhine at Koblenz, and for a short distance towards Metz in France.

In Belgium, there are a few short stretches of waterway in the corridor which limit vessel size below CEMT IV. This applies for example to the Bossuit-Kortrijk Canal, where 25% of the total length does not yet meet the criteria and also to a part of the Bocholt-Herentals Canal. Moreover, in the Upper Sea Scheldt it is difficult to navigate with Class IV ships, due to the tide. The Brussels-Charleroi canal is listed as a Class IV waterway but its current profile is less than optimal for shipping with Class IV ships. National waterways are now designed to Class Vb. The upgrading of the Seine-Scheldt connection to Class Vb will take place along two main axes: (1) Class Vb[72] via the Borderlys and the Lys rivers between the French border and the town of Deinze, the diverting canal of the Lys, the canal from Ghent to Ostend and the Ring Canal around Ghent as far as the canal from Ghent to Terneuzen and (2) Class Va via the Upper Scheldt from the French border with Wallonia, the connection to the Ring Canal around Ghent and the Upper Sea Scheldt to Antwerp. This implies that some bridges on the axes have to be elevated and that the locks have to be modified. The heavily used Albert canal also faces gauge, capacity and reliability issues. Bridge heights constrain vessels to load only two layers of containers and the Wijnegem lock compound has insufficient capacity leading to reliability issues.

In France all currently defined inland waterways within the corridor are either CEMT class IV (8% of the total length) or V (92% of the total length), hence complying with

[71] Waterway Guidelines, 2011, Rijkswaterstaat.
[72] Infrastructure is accessible to Class Vb vessels, but they can only pass each other in certain dedicated sections.

TEN-T standards. However, the three main waterways, the Seine/Oise, the Rhône/Saône, and the Escaut are inter-connected with CEMT II or lower grade links[73]. Furthermore, only 64% of the corridor waterways satisfy the criterion for minimum height under bridges. In the Northern part of France, most links do have a 5.25m height under bridges. This is the case for the Dunkerque-Valenciennes canal, the Deûle, the Haut-Escaut. On the Oise, the height under bridges is also limited to 5.25 metres and in Paris, the Seine has a limited height of 5.15 meters.

On the Rhône-Saône axis, the minimum height under bridges is 4.40 metres on the Saône, 7.40 metres on the Rhône as far as Avignon and 6.30 metres south of Avignon. Finally, the Sète-Rhône canal has a 4.95 metres minimum height under bridges.

Table 79: French non-compliant waterway links (bridge height – metres)

Link	Height
Saint-Jean-de-Losne <--> Avignon	4,40
Deulemont <--> Menen	4,42
Marseille <--> Avignon	4,95
Avignon <--> Saint Gilles	4,95
Sete 2 <--> Sete 1	4,95
Sete 2 <--> Saint Gilles	4,95
Paris <--> Conflans-Sainte-Honorine	5,15
Ivry <--> Paris	5,15

The most prominent issue in France regards the missing link in the CEMT IV (or higher) network between the Escaut (Scheldt) and the Seine basin as the existing Canal du Nord does not meet modern standards. This 95km long CEMT class II link is located between two class V links: the river Oise, tributary to the Seine, and the river Escaut (Scheldt). Currently, barges longer than 91 metres or wider than 5.7 metres cannot transit from the Seine basin to the North of France.

Table 80: Inland Waterway Compliance

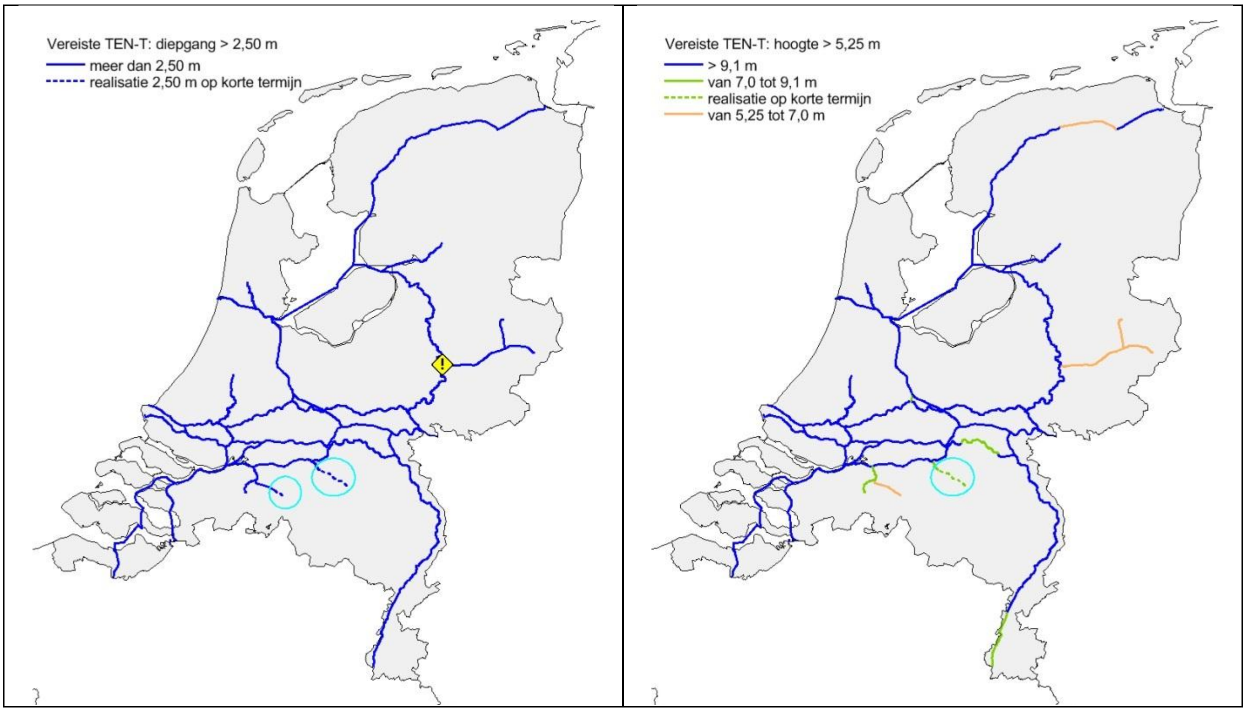
Inland Waterways		**Proportion (km%) of links reaching standard.**					
Technical Parameters		**BE**	**FR**	**IE**	**LU**	**NL**	**UK**
Length of all sections	km	1023	1320	None on CNC	36	904	None on CNC
Length of network of at least CEMT IV		87%	100%		100%	94%	
Length of vessels and barges	from 80-85m	92%	100%		100%	96%	
Maximum beam/width	from 9.5m	92%	100%		100%	94%	
Maximum draught allowed	from 2.5m	95%	100%		100%	94%	
Tonnage	from 1000-1500t	92%	100%		N/A	100%	
Minimum height	from	72%	64%		100%	97%	

[73] The interconnecting CEMT II (or lower) links are not part of core network.

under bridges	5.25/7m					
Availability of alternative fuels in inland ports	Availability	LNG in Port of Antwerp, shore power in Port of Antwerp and Ghent	0%		N/A	LNG in RTM and AMS
Length of network where RIS is implemented		92%	95%			94%

In France, the existing Canal du Nord is an important bottleneck (CEMT 2) but the existing Canal du Nord sections (where the bottleneck occurs) are not defined to be part of the core network. The planned Seine Nord-Europe project (not yet constructed) belongs to the core network as indicated in the Regulation annex (4.1). Technically therefore, the core network corridor is 100% compliant in France for vessel length, beam, and draught, but this only refers to completed corridor links.

Figure 85: Maximum draught[74] and height restrictions of vessels (NL)



Source: Study authors.

[74] Eefde Lock, from the Ijssel to Twente canal (not NSMED corridor)

Seaports

The North-Sea Mediterranean is a maritime corridor incorporating Europe's two largest island nations, four of Europe's top ten ports[75], and a large number of core ports handling in excess of ten million tonnes.

Apart from their role as gateways for European trade, the corridor ports offer short-sea connections with high capacity alternatives to land transport, and they are increasingly becoming multimodal hubs for inland transport, as well as logistical platforms.

Table 81: Identification of Seaports

Belgium	Antwerp
	Ghent
	Zeebrugge/Oostende
France	Calais
	Dunkerque
	Marseille/Fos
Ireland	Cork
	Dublin
Netherlands	Amsterdam
	Moerdijk
	Rotterdam
	Zeeland (Terneuzen, Vlissingen)
UK	Belfast
	Dover/Folkestone
	Edinburgh -Forth, Grangemouth, Rosyth and Leith
	Felixstowe/Harwich
	Glasgow - Clydeport, King George V Dock, Hunterston and Greenock
	Liverpool
	London – London, Tilbury and London Gateway
	Southampton

Seaports are required to offer rail connections by 2030[76], and if relevant, waterway connections. In addition they should offer clean fuels, and promote Motorways of the Sea (MoS). In terms of clean fuels, several ports are developing LNG bunkering facilities[77]. In the corridor ports these are at different stages of development. Bunkering by truck has been available at e.g. Antwerp and Rotterdam since 2011/12. Since 2013, LNG has been used for inland waterway barges at Rotterdam and Amsterdam, and a broader range of LNG bunkering facilities are available for maritime vessels from Rotterdam, Antwerp and Zeebrugge amongst others. In the near future, Rotterdam will also offer on shore power supply. Up to now this possibility is only for dedicated

[75] EUROSTAT, 2011; Rotterdam, Amsterdam, Amsterdam/Ijmuiden and Marseille/Fos
[76] Except where physical constraints prevent such connection.
[77] See: Wang, Notteboom, 2014.

terminals, but the quays on Maasvlakte II are already prepared to facilitate on shore power supply connections.

Table 82: Seaport Compliance

Seaports		Number of Core Seaports Reaching Standard.					
Technical Parameters		**BE**	**FR**	**IE**	**LU**	**NL**	**UK**
Total Number	No.	4	4	2	0	5	8[78]
Rail Connection		4	4	2[79]		5	6[80]
IWT Connection		Antwerpen: Vb Ghent: Va Zeebrugge: IV Oostende: IV	2	0	N/A	5	N/A[81]
Clean Fuels		LNG (truck-to-ship) can be performed in all ports, shore power on dedicated berths in Antwerp/Zeebrugge	0	0		2	0
Promoting MOS		N/A	N/A	N/A		N/A	N/A

In Belgium, the Port of Zeebrugge has an inland waterway connection limited to class IV vessels.

In France all ports of the corridor have rail access, but only Dunkerque and Fos-sur-Mer have waterway connections of CEMT IV or higher. Calais is accessed via the class 1 Calais - St-Omer canal. Marseille, which is the Eastern part of the Marseille/Fos core node does not have direct inland waterway access.

In the UK, the two ports without active rail connections, Dover and Belfast are not non-compliant. Dover's Eastern Docks, which is the main cross-Channel RORO port, cannot be reached by rail due to physical constraints and handles fast-moving HGV traffic that is unlikely to switch to rail in any case. Rail traffic via the Dover/Folkestone node is carried via the Channel Tunnel. Belfast Harbour is close to railway lines, along its perimeter but inland rail is not likely to be economically viable due to short inland distances. Railways in Northern Ireland are exempt from the regulation due to being part of an 'isolated network'.

UK waterways are not included in the core network, so connections of ports to inland waterways are not required under TEN-T.

[78] London, Glasgow & Edinburgh are clusters of port facilities but have only been counted as single ports for the purposes of this exercise.
[79] Dublin has a rail connection, and Cork (Tivoli) is adjacent to the railway. However, use of rail freight is minimal in Ireland, and railways in Ireland are exempt from the technical compliance requirements as an 'isolated network'.
[80] Active rail connections to Felixstowe, Southampton, London, Edinburgh, Glasgow & Liverpool.
[81] There are no inland waterways included on the TEN-T for the UK, although the Port of Liverpool has inland waterway access via the River Mersey and the Manchester Ship Canal.

Airports

Core airports are required, subject to the previously mentioned conditions, inter-alia, of economic feasibility and lack of physical constraints, to have connections to both TEN-T road and rail networks by 2050, with links to the high speed rail network[82]. At present, the larger airports such as London (with five separate airports, three of which are rail-connected), Paris, Amsterdam and Brussels have heavy rail connections. Amsterdam and Roissy (CDG) are both linked to the high speed rail network.

Table 83: List of Airports in Corridor

Country	Node
Belgium	Brussels
	Liege
France	Lille
	Lyon
	Marseille/Fos
	Paris
Ireland	Cork
	Dublin
Luxembourg	Luxembourg
Netherlands	Amsterdam
	Rotterdam
UK	Birmingham
	Edinburgh
	Glasgow
	London (5 separate airports)
	Manchester

Table 84: Airport Compliance

Airports		Number of Core Airports Reaching Standard.					
Technical Parameters		**BE**	**FR**	**IE**	**LU**	**NL**	**UK**
Total Number	No.	2	5	2	1	2	9
Rail Connection		BRU: Yes LGG: No	4	0	0	AMS: yes RTM: no	5[83]
Clean Fuels		0	0	0	0	0	0

In France, the corridor includes five airports, among which four have rail access:

- Roissy CDG (Paris) is equipped with both a train station connected on the high speed rail network and an suburban train connection to Paris (RER B);
- Orly (Paris) is connected to Paris with suburban rail connection: the Orlyval links the airport to the RER B line;

[82] Except in cases where physical constraints prevent such connection.
[83] Rail connections direct to the following Core Network airports: London Heathrow, London Gatwick, London Stansted, Birmingham & Manchester.

- Marseille Provence airport has a station which is part of the national rail network,
- Lyon-St-Exupéry is connected to the city with a fast tramway system,
- Lille is the only French airport on the corridor which is not connected by rail.

In the UK, London consists of five airports, of which Heathrow, Gatwick and Stansted all have direct heavy rail connections. London City has a light rail connection. London Luton is near a railway station (about 2km), and uses a bus service to connect airport to station.

In Scotland, neither Edinburgh nor Glasgow has direct heavy rail access. However, Edinburgh has a tram service, and Glasgow airport is around 1 mile away from a railway station with a bus service to connect airport to station. Both also have express bus connections to their respective city centres and main intercity stations.

Luxembourg airport has no rail connection, and neither do the two Irish airports, Cork and Dublin. The Irish Government is actively considering the feasibility of a heavy or light rail or Bus Rapid Transit connection between Dublin Airport and the city centre, whereas Cork Airport is not considered to require a rail/tram connection given that it is located only 8km from the city centre and has direct bus links.

Road/rail terminals – inland ports

The following corridor nodes are defined to be road/rail terminals, inland ports or both. In reality many nodes contain more than one, often privately owned, or specialised terminals, and the TEN-T definitions do not identify which terminals belong to the network. A node such as Metz, for example, is classified in TEN-T as an inland port, whereas in reality there are also important rail facilities there. Nodes classified as both inland ports and rail terminals may contain tri-modal terminals where water to rail transfers are possible, or they may contain separate (not directly connected) rail and barge terminals. The following list shows the TEN-T classification, but this should not be interpreted as an indication of the presence or absence of water to rail connectivity. All inland ports in Belgium, France and the Netherlands[84] have rail connections.

Table 85: Road/rail Terminals and Inland Ports

Country	Node	Inland Port	RRT
Belgium	Albert Canal	X	
	Antwerp	X	X
	Brussels	X	
	Ghent	X	
	Kortrijk	X	
	Liege	X	
	Namur	X	
France	Avignon		X
	Calais		X
	Chalon sur Saône	X	
	Dijon		X
	Dunkerque	X	X
	Lille	X	X

[84] One exception for the Netherlands is Bergen op Zoom.

Country	Node	Inland Port	RRT
	Lyon	X	X
	Marseille/Fos	X	X
	Metz	X	
	Mulhouse	X	
	Paris	X	X
	Strasbourg	X	X
Luxembourg	Luxembourg	X	X
Netherlands	Amsterdam	X	X
	Bergen op Zoom	X	
	Born	X	X
	Moerdijk	X	
	Nijmegen	X	
	Rotterdam	X	X
	Stein	X	X
	Terneuzen	X	
	Utrecht	X	
	Venlo	X	X
	Vlissingen	X	
	Wanssum/Venray	X	X
UK[85]	Birmingham		X
	Glasgow		X
	Liverpool		X

There are no specific compliance targets set for either road/rail terminals, inland ports, or tri-modal terminals. There is a lack of consistent information available concerning terminal capacity.

Table 86: Road/Rail Terminal Compliance

Road/Rail Terminals		**Number of Road/Rail Terminals Reaching Standard.**					
Technical Parameters		**BE**	**FR**	**IE**	**LU**	**NL**	**UK**
Total Number	No.	1	9	0	1	5	3[86]
Indication of Capacity				-			Privately owned & capacity not in public domain.

85 There are also RRTs in the London, Manchester and Grangemouth (near Edinburgh) areas, but they were not included as nodes on the TEN-T

86 "Birmingham", "Liverpool" & "Glasgow" on the Core Network, although these are, in reality, clusters of RRTs rather than single terminals.

ANNEX 6: Horizontal Priorities and ITS

TEN-T, in addition to the nine core network corridors highlights four horizontal priorities:

1. Single European Sky – SESAR system
2. Telematics applications systems for road, rail, inland waterways and vessels (ITS, ERTMS, RIS and VTMIS)
3. Core network ports, motorways of the sea (MoS) and airports, safe and secure infrastructure
4. New technologies and innovation in accordance with points (a) to (d) of Article 33 of Regulation (EU) No 1315/2013.

Points (a) to (d) of Article 33 (regulation 1315.2013) are:

a) support and promote the decarbonisation of transport through transition to innovative and sustainable transport technologies;
b) make possible the decarbonisation of all transport modes by stimulating energy efficiency, introduce alternative propulsion systems, including electricity supply systems, and provide corresponding infrastructure. Such infrastructure may include grids and other facilities necessary for the energy supply, may take account of the infrastructure-vehicle interface and may encompass telematics applications;
c) improve the safety and sustainability of the movement of persons and of the transport of goods;
d) improve the operation, management, accessibility, interoperability, multimodality and efficiency of the network, including through multimodal ticketing and coordination of travel timetables;

Thus, in order to support the process of improving the hard infrastructure, there is scope for attaching the new technologies to ensure optimal functioning and use of the corridor so that there is added value in terms of safety and environmental performance. Therefore information services for transport, traffic management, logistics and information should be applied to optimise the contribution towards the desired policy goals.

Intelligent Transport Systems/Services for Road
Intelligent Transport Systems/Services, ITS, contribute to enhancing the capacity of roads, reduce time loss by congestion or incidents and can reduce the environmental impact of traffic. They also provide information for other services, such as logistics and allow the corridor to operate seamlessly across borders as well as in a synchro-modal way linking information services across different transport modes.

The performance of ITS systems in road transport can be significant and it can be achieved in a cost-effective way with relatively moderate investments. Many ITS schemes are already is in place through national investment programs and in a number of cases with EC support via the TEN-T program. Typical realized achievements of ITS are:

- Increasing road capacity in congested situations by up to 30%
- Increasing truck parking spaces by up to 30%
- Reducing accidents up to 50 %
- Lowering noise pollution and exhaust to help stay within legal limits with increased traffic
- Support speed enforcement with 99+% compliance

New ITS areas, as Connected Mobility and Cooperative Mobility, have the potential to further enhance those results.

Also, the information services from, or based on ITS help users make better informed choices to optimize their trips or which mode or combination of modes to choose. Standardized information allows cross border operation or multimodal information services.

European support has been given through at first EC R&D programs and standardization organizations to develop ITS systems and standards, e.g. the DATEX standard for language independent exchange of traffic information and the e-call standard.

Later EC support was given amongst others by the TEN-T program to realize harmonized implementation of ITS in the member states and across borders. Typical projects for that have been EasyWay1 and 2, and now the horizontal platforms for ITS harmonization, EIP and EIP+ as well as projects for the implementation of harmonized ITS services along corridors and connected networks, e.g. the Ursa Major project for freight ITS services from the Netherlands via Germany to Italy and the Arc Atlantique project for the harmonized deployment of ITS services for Traffic Management and Traffic Information running from the Irish Republic, via the United Kingdom, The Netherlands, Belgium, France, and Spain, to Portugal.

Apart from standards, EC ITS specifications, adopted under the ITS Directive (2010/40/EC) are applied.

In practice deployment of ITS services is often done in a way which is not restricted to one specific road or corridor, but includes interfaces to other networks or hubs. Investment and operation for those systems and services can be both public or private, depending on local-, national-, or business considerations.

In conclusion, the completion and upgrade of harmonized ITS services for traffic management, traffic and travel information, multimodal information, freight mobility support and, in later years, cooperative mobility, have the potential to significantly enhance the performance of the corridor.

ANNEX 7: ERTMS

ERTMS Compatibility
As shown, several countries within the corridor do not yet comply with ERTMS requirements.

ERTMS in the Netherlands

Figure 86 : Introduction of ERTMS in the Netherlands

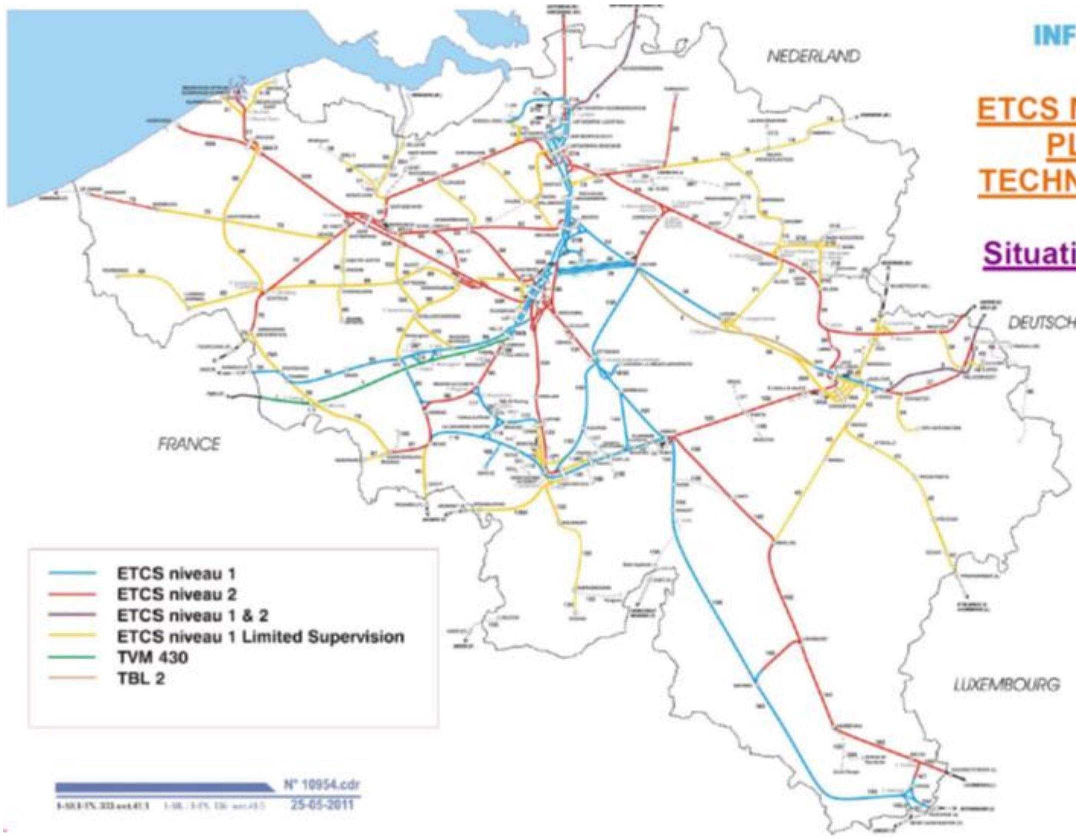
Source: MinIenM (NL)

In the Netherlands ERTMS is working on the two key international routes; the new sections of the Amsterdam-Antwerp high speed line (Thalys line) and the Rotterdam-Nijmegen Betuwe line (dedicated freight route). All trains will be equipped with ERTMS by 2022 and the infrastructure to support the system will be rolled out across the busiest lines in the network until 2028, meaning that both the high speed passenger route and the conventional intercity route between Den Haag and Antwerp via Roosendaal which make up the NSMED rail corridor in the Netherlands, will be compliant. The route via Eindhoven to Maastricht is not in the corridor.

ERTMS deployment in Belgium

A program for the deployment of ETCS on railway lines in Belgium has been planned for Belgian railways.

Figure 87: ERTMS Deployment in Belgium



This programme has multiple objectives:

- Major improvement in the level of safety on the entire network;
- Improvement in the interoperability of the Belgian network situated in the heart of the European railway network for freight (connection of three railway freight corridors to the port of Antwerpen and Zeebrugge) and for passengers (European high-speed network);
- Meeting European requirements set by TS CCS and by the European deployment plan for ERTMS;
- Equipping the whole Belgian Network with ERTMS by 2022. Following decision 2012/88/EC, Belgium will give priority to ERTMS deployment on corridor C in 2015;
- Improving the management of the network and quality of service;
- Optimising the use of energy for railway traffic, particularly freight convoys.

Sections with ERTMS in operation are listed below:

Figure 88: Belgian Railway sections with ERTMS in Operation

Section		ERTMS in operation
Schaerbeek	Y.Zaventem	YES
Y.Luchthaven	Y.Zaventem	YES
Bruxelles-National-Aéroport	Y.Luchthaven	YES
Y. Brucargo	Bruxelles-National-Aéroport	YES
Y. Machelen-Nord	Y. Brucargo	YES
Y. Machelen-Sud	Y. Brucargo	YES
Y. Machelen-Nord	Y. Machelen-Sud	YES
Y. Machelen-Sud	Y. Albertbrug	YES
Y. Machelen-Nord	Malines	YES
Noorderkempen	Galder / Border NL/BE	YES
Y.Luchtbal	Noorderkempen	YES
Y.Luchtbal	Anvers-Luchtbal	YES
Malines	Malines-Nekkerspoel	YES
Bertrix	Y.Aubange	YES
Y.Neffe	Bertrix	YES

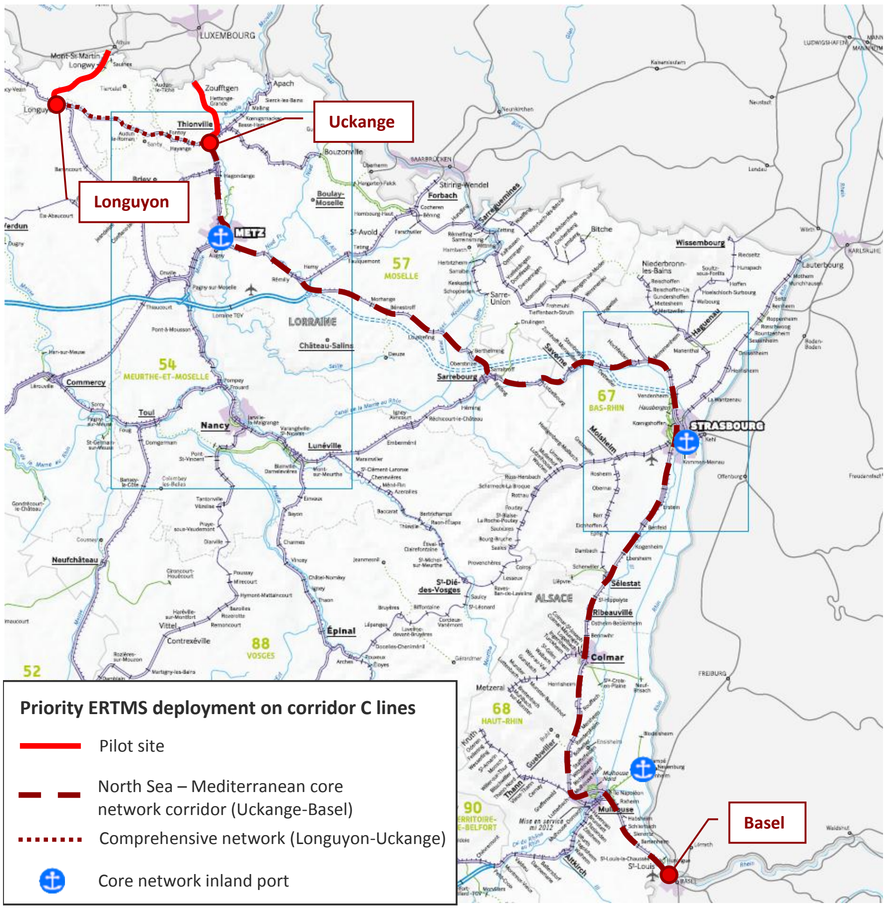
ERTMS deployment in France
In France, most of the rail signalling systems are not obsolete yet as they date from the 1990s. Since only minor safety gains would come from deploying ERTMS, the benefits would be limited to an increase in infrastructure capacity and interoperability. France is therefore currently drawing up a plan for ERTMS deployment taking into account system obsolescence. The plan should become available during summer 2014.

On the conventional network, ERTMS is being deployed since 2013 on 2 pilot sites:

- Uckange to Zoufftgen on the French-Luxembourg border (20km),
- Longuyon to Mont-Saint-Martin on the French-Belgian border (20km).

Apart from those two short links, priority is being given to the Longuyon-Basel line on ERTMS corridor C with an objective for 2018. This line is located on the North-Sea – Mediterranean corridor apart from a short stretch between Longuyon and Uckange. Studies on this line have already started in 2013.

Figure 89: First ERTMS deployment on Conventional Lines in France



ERTMS in the UK
In the UK, ERTMS is being implemented nationally on the main high speed and conventional lines. The 2007 ERTMS National Implementation plan shows the following timetable for rolling stock ETCS fitment and infrastructure fitment:

Table 87: ERTMS Deployment in UK

Route Type	Route	Rolling Stock Fitment	Infrastructure Fitment
High Speed	Great Western Main Line	From 2013-2018	From 2017-2035 (majority complete by 2025)
	East Coast Main Line	From 2013-2022	From 2018-2035 (majority complete by 2025)
	West Coast Main Line	From 2014-2027	From 2027-2030
	Channel Tunnel Rail Link	From 2025-2030	From 2038-2042
Conventional	Brighton Main Line	From 2011- 2022	From 2021-2025
	South West Main Line	From 2014-2025	From 2017-2034
	Midland Main Line	From 2015-2027	From 2021-2023
	Great Eastern	From 2015-2023	From 2027-2029

Source: DfT, Network Rail, 2007

Principal lines on the corridor in the UK are highlighted. As newly built or newly upgraded lines these do not need further upgrade until beyond 2027.

By 2030, it is intended that much of the UK network will have ERTMS deployed. See Figure 90 below. Much of the Eastern part of the country will be equipped, as well as the South West of England. In the corridor (highlighted yellow), around half of the track is expected to be ready by 2030, including the northern part of the WCML, between Crewe, Glasgow and Edinburgh. In addition,most of the track between Felixstowe and Nuneaton is expected to have been upgraded, together with part of the Southampton-Birmingham line.

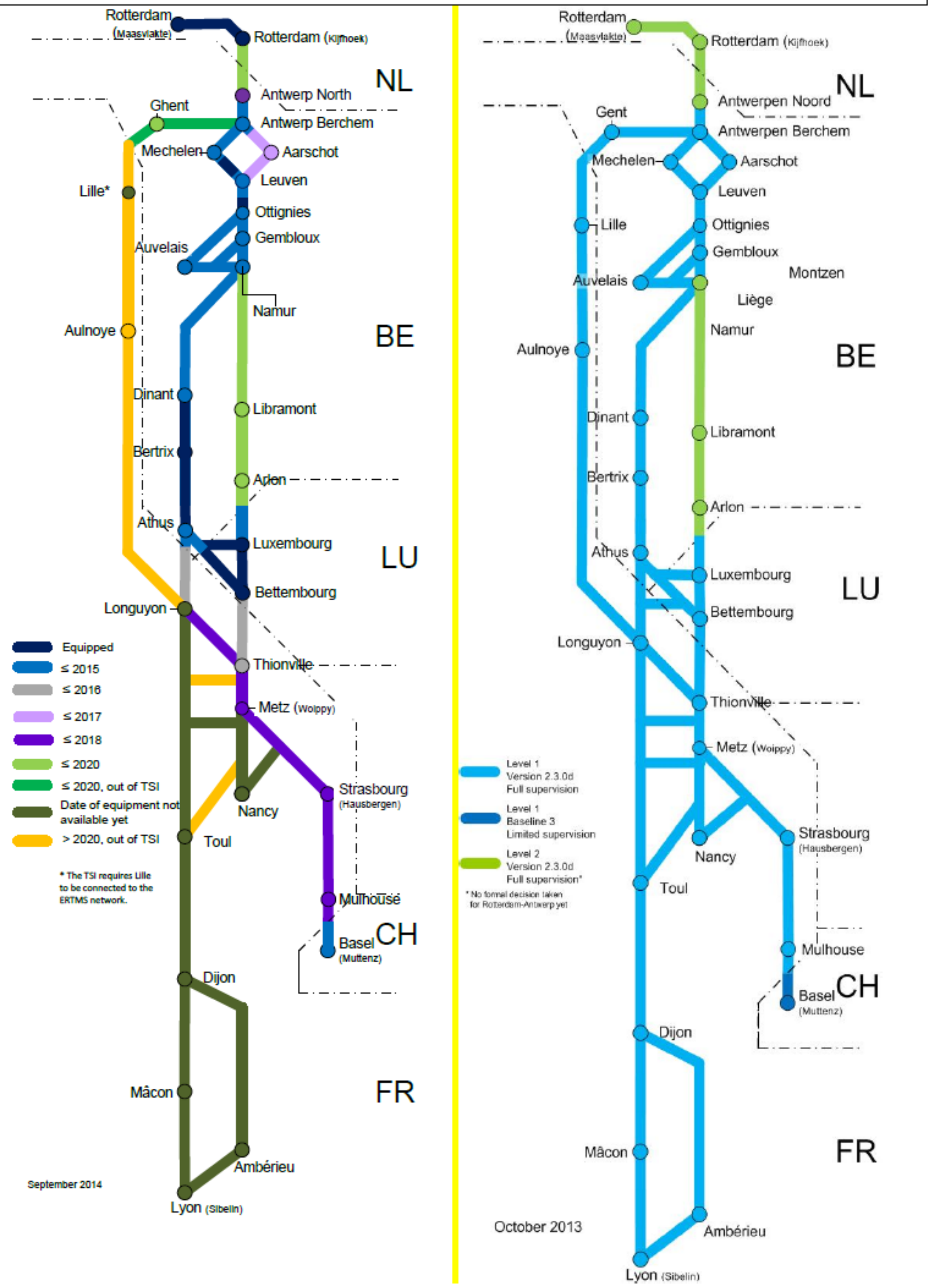
Figure 90: ERTMS Intended Deployment Plan in the UK - pre 2030

RFC2

Rail Freight Corridor 2 has analysed ERTMS deployment for the majority of the continental corridor sections. A map is shown below, indicating plans for upgrading.

Figure 91: ERTMS Deployment in Rail Freight Corridor 2

The planning of ETCS deployment along the corridor lines that were established in November 2013 and the nature of the ETCS deployment system are described in the following maps[1]:



Map 21: Timing of the ETCS deployment along the corridor lines that were established in Nov. 2013

Map 22: nature of the ETCS deployment system along the corridor lines that were established in Nov. 2013

Source: Rail Freight Corridor 2. (Includes lines not present in corridor)

ANNEX 8: RIS (SIF)

RIS are typically composed of the following elements:

- Notices to skippers,
- AIS, a geo-positioning system which allow an optimisation of navigation,
- Electronic reporting,
- Electronic Navigation Charts (ENC) such as Electronic chart display and information system for inland navigations (ECDIS).

River information systems in Belgium
From a legal perspective, the three regional administrations in Belgium are each responsible for the implementation of RIS. These are Brussels, Flanders and Wallonia. Due to autonomy of the Regions, RIS is implemented on regional level and this way, the status of implementation may differ throughout the country.

With regards to Notices to Skippers, two systems are present in Flanders (Flaris and VTS-Scheldt) and one for Wallonia. The systems differ in such a way that the Flanders NTS can be read in any of the 23 European languages whilst the Walloon NTS are only available in Dutch, German, French and English. NTS in Flanders covers Ice Messages, as opposed to its Walloon counterpart.

Onboard AIS equipment is obligatory since the end of 2013 in Belgium. By subsidy programmes, vessel owners were eligible to receive financial support. This subsidy programme was implemented in collaboration with other Member States, making it possible to apply for subsidy in the Netherlands or France. Belgium reports that about 90% of the fleet have installed an AIS transponder.

Shore-side AIS infrastructure is fully operational in Flanders. It exists of 21 base stations. Also the Ports of Brussels, Antwerp and Ghent have their own base stations. Full coverage of all the Flemish waterways is realized. On the contrary, Wallonia currently has no AIS shore infrastructure.

Cross border AIS data exchange with the Netherlands is a topic of discussion, as no decision has been made on which Flemish RIS authority will be designated to exchange ERINOT messages. The main obstacle in this issue is the protection of market sensitive information. Cross border exchange of data between Belgium and France does not yet occur.

Electronic Ship Reporting is fully implemented in Flanders and for Brussels and Wallonia, this will be implemented in the near future. Shore stations can receive and respond to electronic messages in Flanders. In Brussels, this will be realized once the port has acquired the software from the Flemish system. For Wallonia, the ERI infrastructure is created. Currently, the GINA system is used. This system is not compliant to the ERINOT standard.

Flemish RIS authorities are able to receive and respond to ERINOT messages. However, the use of messages with reports to passengers (PAXLST) or berth management (BERMAN) is not available.

International data exchange of Electronic Reporting is realized at the Scheldt area. For the cross-border sections on the Meuse to the Netherlands or France, the data-exchange is semi-operational. Data exchange at the cross-border sections between France and

Belgium is also operational, although the status of the Meuse cross-border section is unknown.

Electronic charts are available for all Flemish Class IV waterways. For lower CEMT class waterways, the charts are under development. The format of the charts differs for the Regions: whilst Flanders' charts are being updated to format version 7, the formats of the Brussels and Walloon charts use format 5.

The Belgian authorities use different RIS indexes; a single index for the country is lacking as the data collected by the three regional administrations is not consistent and uniform. In Flanders and Wallonia, actions are taken to make one single index that complies to the European standards.

River information systems in the Netherlands
In the Netherlands, the RIS elements are included in the Dutch Shipping Traffic Act. Rijkswaterstaat is the main infrastructure manager in the Netherlands, although also some infrastructure managers are regional governments and ports.

Notices to skippers are offered by infrastructure managers via the online portal www.vaarweginformatie.nl. Since 2007, the format of the messages in in accordance with the current EU technical regulation. Besides of the Notices to Skippers, also Water Related Messages are available on this website, covering the catchment areas of the two main rivers in the Netherlands: the Rhine and the Maas/Meuse. Ice Charts are published during periods of floating ice and are available in both text and map. Weather related messages are published in text format only.

The implementation of AIS has been available since the end of 2013. A national base station is available, covering every single kilometre of fairways in the Netherlands. Moreover, the entire fleet is using AIS transponders due to a special agreement between the industry and the government. This agreement however limits the use of AIS data in such a way that the data will only be used for infrastructure traffic management and the enhancing of safety.

Electronic Ship Reporting is possible in the Netherlands with support of the BICS application that is provided freely to ship operations. All messages (ERINOT, BERMAN and PAXLIST) are supported. It must however be noted that only ERINOT is used on a regular basis. International exchange of data is fully operational with Germany on the Rhine river and with Belgium (Flanders) on the Westerscheldt area. On the Maas/Meuse river, data exchange is semi-operational for RINOT 1.2/1.1.

Inland ECDIS charts are available on all main waterways (meeting the requirements of CEMT IV or higher) in the Netherlands. The charts provide information about the fairway, marking, signposting, bridge clearances and lock dimensions. Update frequencies and quality of charts vary among the different fairways: on canals, the update frequency and the quality of data is less than on rivers)

A RIS index is available for the Netherlands since 2004 and it is compatible with the ERDMS standards.

River information systems in France
In France, the SIF (French for RIS) is mainly being implemented by VNF, infrastructure manager for most of the network. Other waterway infrastructure managers are CNR, on the Rhône, and ports.

Infrastructure managers offer notices to skippers via e-mail, fax and online portals. Moreover, VNF's project POGO aims at developing a phone application for iOS, Apple

Computers' operating system, to send real time notices to skippers such as water related messages, fairway and traffic messages.

AIS is operational on the Seine although only around half of the French fleet is equipped with an AIS transponder.

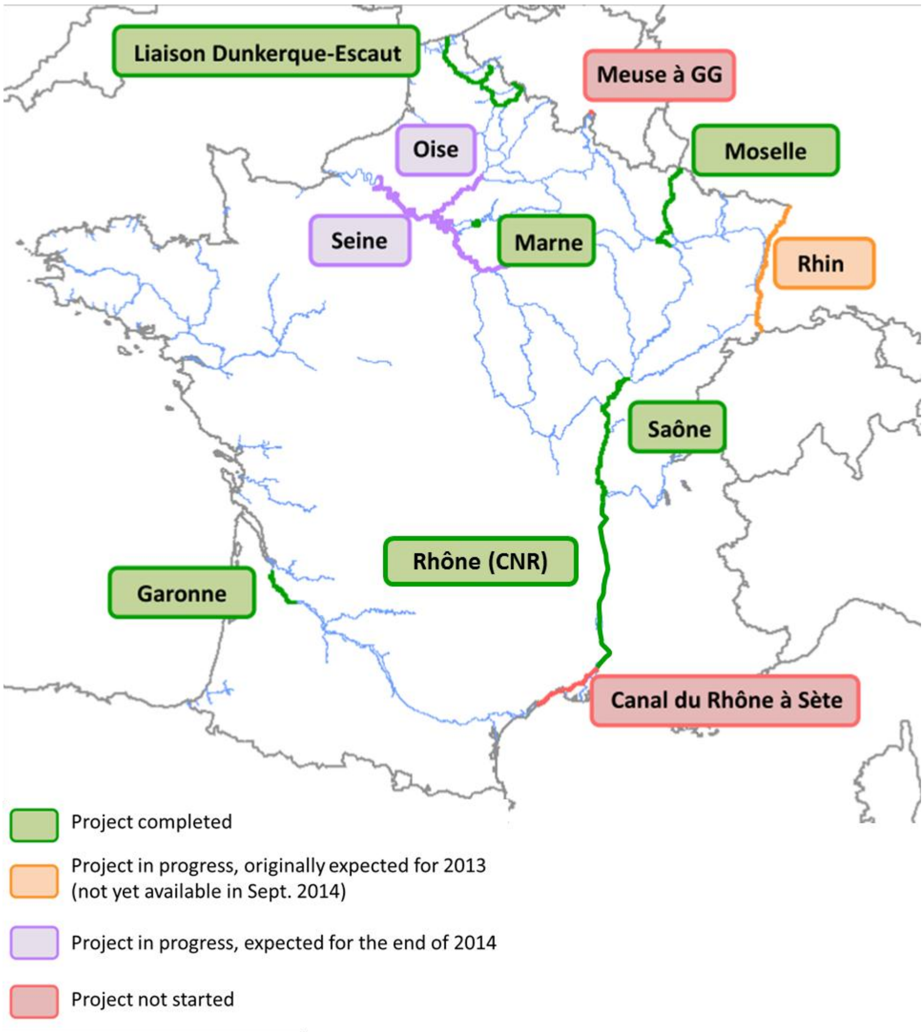
Electronic ship reporting is carried out by VNF but not by other infrastructure managers. A new web application called VELI allows skippers to declare their trips online.

ECDIS mapping is being carried to help navigation on the main waterways.

On the North Sea – Mediterranean corridor ECDIS is already implemented in the main waterways of northern France (liaison Dunkerque-Escautas well as on the Moselle and the Saône.

ECDIS for the Seine and Oise is scheduled for the end of 2014. Finally, ECDIS implementation on the Rhône to Sète canal has not yet started (see VNF map below).

Figure 92: Progress of ECDIS mapping, VNF and CNR (Rhône)



ANNEX 9: Critical Issues, Objectives and Measures

Work Plan Projects/Measures and Objectives

The draft work plan is organized, as in the previous report, by country and by main mode.

Belgium – Road

Table 88: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Antwerp Ring Road	Severe Congestion issues leading to loss of reliability and decreases in productivity.
Brussels Ring Road	
Ghent Ring Road	Congestion but to a lesser extent than Antwerp and Brussels.
Missing Motorway Link to Zeebrugge	One important missing link in the network near Zeebrugge (A11).
Congestion at parking areas	Congestion at parking areas and saturation at the borders, linked to differences in HGV regulations (e.g. lorry ban/Sunday working) between the various countries of the corridor.

Table 89: Technical Compliance Gaps

Compliance Issues	Description
Availability of Clean Fuels	In Belgium there are currently two clean fuel stations; one in Wetteren (E40 and one in Minderhout (E19). There are also two LNG fueling stations for trucks in Kallo and in Veurne (not in core network). Three more clean fuels gas stations are planned in Belgium; one in Gierle (E34), one in Kalken (E17) and one in Kruishouten (E17).
Number of secure parking areas	In Belgium there are a large number of parking areas, but only two have been given IRU ratings.

Table 90: Relevant Market Developments

Related Market Issues	Description
Urban population growth.	Reduces available capacity for long distance traffic.
Growth of Flemish Ports	Greater volume of freight traffic inland from international gateways, especially Antwerp and Zeebrugge.

Table 91: Indicative Measures

Indicative Measures	Description
Brussels Ring Road	The Flemish Government is studying the possibility to optimize the Northern part of the Brussels Ring. Increasing the capacity of this important road section would highly reduce the current congestion and improve traffic safety, which is particularly high between Zaventem and Groot-Bijgaarden at the peak.
Upgrade of Ring of Antwerpen: Oosterweel connection	The Road Ring of Antwerpen shows high level of congestion at peak hour. A project is currently being studied to complete and upgrade the Ring. These links would offer an alternative enabling to solve this local congestion issues.

Indicative Measures	Description
Upgrade of the Ring-west of Ghent (west R4)	The completion of the Ring of Ghent would enable to reduce congestion on the existing sections. This project is currently studied and would be achieved via the construction of a West link between the existing R4 in the North and the E40 in the West.
Access to Zeebrugge	A new 12km long A11 motorway link between Brugge and Westkapelle is being constructed by Flemish region to connect the port of Zeebrugge and the European motorway network. This project is the first under the Project Bond Initiative.
Increase supply of clean fuels	*Measure not identified yet.*
Increase capacity of secure parking areas	Three secure parking areas are currently planned in Flanders and in Wallonia in addition to the two existing ones.

Table 92: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
BE10	Upgrade of Ring of Brussels - Severe Congestion issues leading to loss of reliability and decreases in productivity.	X	X							
BE11	Upgrade of Ring of Brussels - Severe Congestion issues leading to loss of reliability and decreases in productivity.	X	X							
BE12	Upgrade of the Ring-west of Ghent (west R4)	X	X							
BE13	Upgrade of the Ring-west of Ghent (west R4)	X	X							
BE14	New 10km deviation road around the city centres on the existing N74, resulting in a better and faster connection for the transit traffic between Eindhoven and Hasselt to the E314 (core network)			X						
BE15	New 12km long A11 motorway link between Brugge and Westkapelle to connect the port of Zeebrugge and the European motorway network	X	X							

Belgium – Rail and Rail Terminals

Table 93: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Saturation at North-South Junction in Brussels	Main bottleneck on the Belgian railway network; the heavy use around 1,200 trains every working day of different types (TGV, IC, IR, L) leads the North-South Junction close to saturation.
Speed limitation on Brussels-Luxembourg-Strasbourg section	Major bottleneck for passenger rail transport by limitation on the speed, reducing the competitiveness of rail in comparison with road and air transport.
Level crossings	Problems linked to safety, capacity and punctuality caused by 670 of 1,857 level crossings which cross lines included in TEN-T network. - safety: they generate additional risks for train traffic and road users; - capacity: the existing level crossings are bottlenecks that reduce among others the smooth flow of train traffic and thus reduce capacity on the railways concerned; - punctuality: incidents at level crossings cause delays.
Access to Antwerp	Long-term bottleneck by restricted rail capacity. The L27A (the Rechteroever access connecting series of lines to the port of Antwerp) suffers in particular from cross-overs limiting capacity.
Capacity issue on section between Ghent and Zeebrugge	Capacity problem caused by the high usage by both passenger and freight trains.
Missing link between Leuven and the Luxembourg border (section from RFC2)	Missing link and to be adapted in order to increase the train speed and optimise the capacity of this axis, enabling 750m trains long to circulate. In addition, the high passenger traffic link between Namur and Ottignies must be bypassed via Fleurus and Auvelais for freight trains. Major works in this section are included, this will increase the speed between Leuven and Ottignies.
Speed and capacity limitation of high speed trains in Mechelen	The reduced speed and capacity of the major connecting Mechelen station and the connecting track of the Diabolo with the traditional network to the south of Mechelen causes delay of high speed trains in Mechelen.

Table 94: Technical Compliance Gaps

Compliance Issues	Description
Difference of electrification systems	Interoperability constraints due to the difference of electrification systems, in particular in the Benelux, constitutes a key issue. In Belgium uses 3 kV and 25 kV on some lines (HSL / line "Athus-Meuse" (south part of RFC2 connected to FR and LUX)). In the next years a large part of the Brussels – Luxembourg axis will be equipped with 25 kV. Luxembourg uses 25kV electrification, The Netherlands uses 1,5kV as a standard and The French network uses 2 different standards: 1.5kV (mainly in the South) and 25kV. 25kv is used for major cross-border lines between BE, LU, FR and NL: HSL and Athus-Meuse.
ERTMS	The Belgian railway network is not yet fully equipped with the ERTMS, which leads to heterogeneity in the network. Its full implementation is planned to be effective by the year 2022.
Train length restrictions of 650m	The train length restrictions of 650m during day time raises costs for operators and prevents the optimal use of network capacity.
Line speed	100 kph line speed not available throughout the network.

Table 95: Relevant Market Developments

Related Market Issues	Description
Opportunity to develop rail as inland mode, especially at port of Antwerp.	Antwerp's hinterland extends beyond Belgium into Germany and France, including many regions which are not accessible by inland waterway. Antwerp intends to increase inland share for rail from 11% to 15%.

Table 96: Indicative Measures

Indicative Measures	Description
ERTMS implementation	The Belgian railway network is planned to be fully equipped with the ERTMS in 2022. It is planned to improve the level of safety, the quality of service, energy use and the interoperability for freight and passengers of the network.
Capacity increase North-South Junction in Brussels	The optimisation of the Belgian rail network will require necessarily the capacity increase of the North-South Junction in Brussels. This section constitutes the main bottleneck of the national network and represents the main passenger issue to solve in future.
EuroCap-Rail project (speed/capacity increase and re-electrification)	To extend the exchanges between the North and the South of the Corridor, the cross-border EuroCap-Rail project aims to modernise the Brussels-Luxembourg axis, by increasing the train speed to 160 km/h, re-electrifying certain lines to 25 kV and enhancing the components of the infrastructure. This project also involves the building of a third and a fourth tracks between Watermael and Ottignies and the completion of the rail link "Watermael – Schuman – Josaphat".
Diabolo project (link Brussels-Antwerp-Amsterdam via Mechelen)	Facilitating links between Brussels (city and airport) and Amsterdam via Antwerpen by creating a bypass in Mechelen, where trains currently face considerable delays. This project is part of the Diabolo project linking Antwerpen to the Brussels National Airport.
Construction of bridges or tunnels for removal of level crossings	Belgian railway network includes a high number of level crossings (1857 in total) which cause safety, capacity and punctuality issues. To respond to this problem and to enhance the network reliability, Infrabel has undertaken the removal of these level crossings where possible by the construction of bridges or tunnels.
Creation of a third and fourth track between Ghent and Brugge	To cope with increase of traffics in Zeebrugge and ensure that trains can move around smoothly in the future, Infrabel is investing in the creation of a third and fourth track between Ghent and Brugge. Express trains will then travel on the central tracks and slower trains will travel on the outer tracks, preventing the different trains from hindering one another.
Creation of a third track between Brugge and Dudzele	Another project to cope with increase of traffics in Zeebrugge and to prevent capacity problem is a third track planned between Brugge and Dudzele.
Investments in the railway infrastructure of the Port of Zeebrugge and Ghent	Various investments in the railway infrastructure of the Port of Zeebrugge and Ghent are necessary to support the development of intermodality between rail, sea and inland waterway.
Construction of a second rail access and other capacity projects (port of Antwerp)	Concerning the port of Antwerpen the construction of a second rail access and other capacity projects such as Oude Landen and Krijgsbaan investments are mandatory to increase freight traffic capacity and furthermore modal shift from road to rail. These projects should provide an adapted infrastructure for the port activities.
"Leuven – Ottignies – Luxembourg" link	The "Leuven – Ottignies – Luxembourg" link suffers from speed and capacity limitations. These parameters should be enhanced through the implementation of the several projects identified in the Rail Freight Corridor 2 (project BE08). This includes the implementation of the bypass by Fleurus and Auvelais to avoid the highly requested path Ottignies Diabolo project.
Diabolo project	the rail connection of the Brussels Airport with the international railway axes: (a) Frankfurt – Liege – Brussels – Paris and (b) Amsterdam – Antwerpen – Brussels – Paris.
Upgrade of the Brussels – Antwerp axis	Improve links between major cities and major airport platforms more effective, connected by the high-speed network, in particular from Brussels and Amsterdam via Antwerp to the national airport.

(Projects planned until 2025, further projects will complete the list in a later stage for 2025-2030)

Table 97: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
BE1	Capacity increase of the access to the port of Antwerp		X					X	X	
BE2	ETCS deployment on Core Network (Budget is for entire core network in BE, infrastructure only)	X		X	X	X				
BE3	Removal of level crossings (Entire Belgian network)	X							X	
BE4	Diabolo project – rail connection of Brussels airport with the international railway axes Frankfurt – Liège – Brussels – Paris and Amsterdam – Antwerp – Brussels – Paris	X	X						X	
BE5	Upgrade of the Brussels - Antwerp axis	X								
BE6	EuroCap-Rail: modernisation of the Brussels-Luxembourg axis	X		X	X					
BE7	Capacity increase of the North-South Junction in Brussels	X						X	X	
BE8	Capacity increase of Ghent-Zeebrugge railway line	X	X				X	X	X	
BE9	Upgrade of Rail Freight Corridor 2 : Leuven - LUX border	X	X	X	X				X	

Belgium – Sea and Inland waterway

Table 98: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Albert Canal	Capacity constraints caused by limitation on height under the bridges, lock capacity (Wijnegem) and CEMT class gauge. An improvement of these characteristics at a European scale is important to ensure a sustainable import and export of goods. Specific requirements are mandatory in order to cope with the traffic forecasts increase and to facilitate the modal shift from road to IWW in medium and long distance journeys.
Seine-Escaut (Seine-Scheldt)	Seine-Scheldt includes all projects to be implemented in the scope of the Canal Seine Nord Europe opening, whose role will be to connect the Seine to the Scheldt, the Upper Sea Scheldt, the Upper Scheldt, the Canal Roeselare Lys, the Meuse and furthermore to the Rhine and the northern seaports (the major missing link in the IWT). The objective is to enhance the reliability and the gauge of waterways such as the Scheldt in Tournai, the Lys, the Dorsale Wallonne, the Bossuit-Kortrijk canal, Ghent ring canal or the rehabilitation of the canal Condé-Pommeroeul, which represents a missing link between France and Wallonia. All these projects contribute to achieve a North-South multimodal sustainable corridor in Western Europe.
Inland waterway connection to Port of Zeebrugge	The project Seine-Scheldt West includes the connection of Zeebrugge with the Inland Waterway network via a class Va canal. This project (under study) is undertaken to cope with the current unsustainable process and should boost the current inland modal share for IWW transport in the port of Zeebrugge.
Meuse (the Maas) upgrade projects.	The gauge of 2 locks (Ampsin-Neuville and Ivoz-Ramet) as well as deepening of the Maas between Namur and Liège and the weir in Monsin are bottlenecks in the network. Their increase is mandatory to match with the forecasted traffics, to host bigger vessels and to have a homogeneous network between Antwerpen and Namur.
Lanaye (Ternaaien)	The cross-border Lanaye lock is facing severe capacity issues.
Brussels canal between Charleroi and Vilvoorde	Several sections should be improved, as the height of the bridges in Brussels is too low (below 5,25m) and the section between Lembeek and Halle needs to be modernised.
Ghent-Oostende Canal	Ghent-Oostend Canal, downstream from Schipdonk, represents a bottleneck as it is Class IV, unlike the rest of the network which is class Va.
Canal Roeselare-Lys	Canal Roeselare-Lys has a limited gauge that needs to be improved.
Upper Sea Scheldt	Upper Sea Scheldt faces depth, height under bridge and width constraints.
Sea canal from Antwerpen to Brussels (Willebroek-Bornem)	Presents a bottleneck in Willebroek-Bornem as this section doesn't allow 10 000 tons class VIb vessels to navigate.
Bocholt-Herentals canal	Upgrades needed on the "Lommel-Bocholt" section to respond to the minimum European standards (class CEMT IV).
Dendermonde	Upgrades needed at Dendermonde (mouth of the Scheldt)-Aalst sections to respond to the minimum European standards (class CEMT IV).
Beneden - Nete canal, section Scheldt-Rupel	The clearance under the bridges on the "Scheldt-Rupel" section of the Beneden - Nete canal is limited to 1 layer. This represents an important constraint to an optimised circulation on the canal.
Left bank of Antwerpen seaport	The accessibility and connectivity to the left bank of Antwerpen seaport are restricted, and this side of the port is currently growing at a fast pace. A lock is needed to connect the left bank to the Deurganckdock basin and a railway connection is needed to link the main railway network to the left bank via a railway tunnel (Liefkenshoek tunnel)
Rail capacity to the port of Antwerp	A lack of capacity exists to connect the Antwerpen port with the railway network. A second rail access connecting and giving capacity from the continental network to the port area is necessary to respond to this need.
Royer lock (Antwerpen)	Royer lock in Antwerpen cannot cope with the capacity needs. A local upgrade is needed to enable the operation of large barges.
Replacement of Schijnpoort (Antwerpen)	The connection between the Antwerpen North marshalling yard and the interior requires construction of a branch line to replace Schijnpoort and ensure that freight trains can cross each other easily.

Critical Issues	Description
Lock Terneuzen / Canal Ghent-Terneuzen	The canal between Ghent and Terneuzen is a major shipping connection for both maritime and inland navigation. The canal, with an overall length of 32 km, lies 15.4 km on Belgian territory and 16.6 km in The Netherlands. Present delays, scale problems and limited reliability of the current Westsluis in Terneuzen urge the construction of a new lock.
Visart lock	Within the frame of the "Strategic Port Infrastructure Project" (SHIP), the Flemish government has decided to convert the port area near the current Visart lock and the old inner port into a "limited open tidal zone". This implies that the existing Visart lock will be replaced with an open access channel and that a new lock is built further inland. The lock of 1907 has become obsolete and no longer responds to the demands of present-day maritime navigation
Connectivity and capacity limitation of port of Zeebrugge	The fast growing port of Zeebrugge is facing some critical issues concerning its bulk freight transport connections in terms of connectivity and capacity. Furthermore, the port of Zeebrugge does not have a direct motorway connection to the port. 55 % of inland traffic is coming to and from the port by road (N31/N49). The port is 20 km from E40 and construction of a new highwaylink is planned (completion 2016 of A11/E34).

Table 99: Technical Compliance Gaps

Compliance Issues	Description
Waterway network not fully upgraded to CEMT IV standard.	Especially with issues related to bridge clearance for 28% of the Belgian network. There are short sections of key waterways which limit navigation across the network. CEMT Va and Vb are needed to prevent future bottlenecks on international connections.
River Information System (RIS)	RIS must be developed in Wallonia to ensure a good quality of management and communication on the network.
LNG and other clean fuel projects	LNG and other clean fuel projects are currently under study or under implementation to extend this offer in the Belgian Inland Waterways.

Table 100: Relevant Market Developments

Related Market Issues	Description
Seaport growth	Flemish seaports have expectations of significant growth up to 2030, estimated at around 2% growth per annum, with higher growth expected in the container sector, affecting Antwerp and Zeebrugge especially.
Waterway shares	Waterway volumes are high between Antwerp and (via) Rotterdam to the Rhine. But relatively low elsewhere in Belgium. For inland barge transport Antwerp aim to increase the inland share from 40% to 43% by 2020. This amounts to 94.3 million tonnes by barge. The Port of Ghent has already reached its goal of 50% inland navigation, as is said in the strategic plan for 2020. Ghent focuses on France as its natural hinterland.

Table 101: Indicative Measures

Indicative Measures	Description
Seine-Scheldt project in Flemish region	Collection of measures related to the implementation of the full Seine-Scheldt project with CEMT IV connection to Paris.
Upgrade to CEMT Vb of the Lys between Deinze and the French border	The Lys will be deepened between the French border and Deinze, where the inland waterway will be one meter deeper, vertical quays will be built to increase the navigable width, the height of bridges will be extended to reach 7m, and new locks will be built (in Harelbeke) to achieve CEMT Vb gauge.

Indicative Measures	Description
Upgrade to CEMT Va of Ghent-Oostend Canal downstream from Schipdonk	Class Va is planned for the Ghent-Oostend Canal downstream from Schipdonk. The rebuilding of the Dammepoort lock and the construction of the new Steenbrugge bridge in the passage through Bruges are expected to be completed by 2020. Both interventions will significantly improve navigability to Zeebrugge and also serve the traffic flow in Brugge.
Upgrading to CEMT Va of the Canal Roeselare-Lys	Upgrading of the Canal Roeselare-Lys to a class Va waterway
Upgrading to CEMT IV of the Canal Bossuit-Kortrijk	Upgrading of the Canal Bossuit-Kortrijk: 8.5% of the total length of this canal does not yet satisfy the characteristics of class IV. It concerns three class I locks at the entrance to the canal from the Lys that need to be removed.
The river restoration plan for the Lys	River restoration: This river restoration plan entails various interventions in environmental quality and scenic beauty of the river (development of nature-friendly banks, construction of fish passes, reconnecting and upgrading meander cut-offs), as well as of the valley area (development of aquatic, terrestrial nature).
Upgrading of lock capacity the Upper-Scheldt	Locks and weirs on the Upper-Scheldt: The locks on the Upper Scheldt at Asper, Oudenaarde and Kerkhove form a serious bottleneck regarding lock capacity and they are worn down. In order to facilitate future developments the new locks will be constructed at class Vb, like those on the Seine-Scheldt connection via the river Lys. Also the weir at Kerkhove needs to be replaced.
Upgrade of the Upper-Sea Scheldt and the Southern section of the Ghent Ring Canal	Upgrade of the Upper-Sea Scheldt and the Southern section of the Ghent Ring Canal to eliminate bottlenecks hindering class IV vessels. The most important bottlenecks on the Upper-Sea Scheldt concern limited depth and width, as well as sharp bends. Furthermore there is a limited vertical clearance under several bridges.
Seine-Scheldt project in Walloon region	
Lys (Comines)	Lys : Improvement in the crossing of Comines ; enhancement of the bridge Comines ; deepening and shoreline development
Upper Scheldt	Upper Scheldt : Adaptation of crossing Tournai including the Pont des Trous ; modernization of dams of Kain and Hérinnes ; adaptation of depth of locks.
Pommeroeul-Condé canal	Pommeroeul-Condé canal : Construction of a pier at Lock Hensies; renovation of locks and Hensies Pommeroeul ; dredging sediment.
Nimy-Blaton canal	Nimy-Blaton canal : Enlargement of the canal and modification of certain curves.
Construction of a new lock to CEMT Va on Canal du Centre	Canal du Centre : Construction of a new lock to class Va Obourg
Charleroi-Brussels canal	Charleroi-Brussels canal: Construction of new locks to Viesville, Gosselies and Marchienne-au-Pont; modernization of Ronquières Inclined Plane.
Lock Auvelais (Basse-Sambre)	Basse-Sambre: Lowering the threshold of the lock Auvelais.
Upgrade for all waterways in Walloon region	Bridges : Upgrading of the bridges program (up to 7m gauge)
	Inland ports : Port infrastructure equipment, i.e. Trilogiport.
	Navigability equipments: Turning points/mooring equipments/ adaptation of locks.
The modernisation of the canal Brussels-Charleroi between Lembeek and Halle	The modernisation of the canal Brussels-Charleroi between Lembeek and Halle that will have for objective a full extension of the channel for vessels up to 1,350 tons
Capacity increase of the lock complex of Wijnegem	The increase of capacity of the lock complex of Wijnegem in order to allow forecasted traffics.
Upgrade to CEMT VIb of the section "Wijnegem-Antwerpen" of the Albertcanal	The upgrade of the section "Wijnegem-Antwerpen" of the Albertcanal, which is the main channel of Flanders, but where the growth in tons of goods transported is severely hampered by a bottleneck on this section (class V instead class VIb). The project aiming at eliminating this bottleneck includes both the reconstruction/lifting of seven bridges and the widening of the canal section itself
Upgrade of the Lys Diversion Canal	The project 'Seine-Scheldt-West' aims at giving the ports of Zeebrugge a full connection to the Trans-European inland navigation network. The opening-up of Zeebrugge through an upgrade of the existing Lys Diversion Canal, which reaches from Heist to Deinze, is a logical extension of the large-scale European project Seine-Scheldt, which will connect the industrial region of Paris and the north of France with Ghent, Antwerpen

Indicative Measures	Description
	and Rotterdam. Just like on the Seine-Scheldt, ships up to 4,500 ton or 300 TEU could be deployed.
Upgrade to CEMT VIb of the canal section Willebroek-Bornem	The completion of the canal section Willebroek-Bornem to 10,000 tonnes (class VIb), and several complementary works (particularly dredging works and works on the canal banks)are required to enable the Brussels-Scheldt Sea Canal to function satisfactorily
Modernisation of the Bocholt-Herentals canal	The modernisation of the Bocholt-Herentals canal implies to upgrade the section Bocholt-Dessel from CEMT class II to CEMT class IV. Investments required correspondto the replacement of three small gauge locks by one class IV lock, the adaptation of the Bocholt-Herentals canal from Lommel to Bocholt, replacement of two 600 tonnes locks on the South Willemsvaart to Lozen and Bocholt, and the adaptation of the South Willemsvaart from Bocholt to the Dutch border.
Upgrading the vertical clearance to 7m on the Beneden - Nete canal	Upgrading the vertical clearance to 7m on the Beneden - Nete canal to enable vessels to go from the Scheldt through the Rupel (class V waterway for ships with a tonnage of 2000 tons) with 3 layers of containers.
Upgrading to CEMT IV of the Dender	Upgrading the Dender to class IV in one way navigation from the mouth of the Scheldt in Dendermonde to Aalst. At first, the upgrade of the Dender will be focused on the lock at Denderbelle which is, together with the weir, to be upgraded to class IV.
Implementation of the RIS in Wallonia	Implementation of the IWW RIS project, including a RIS center in Wallonia. Flanders already has two RIS centers.
Increase the height of bridges in Brussels	Increase the height of bridges in Brussels in order to allow container traffic with 2 to 3 layers of containers to be carried.
Overall improvement and modernisation on IWW in Wallonia	The improvement of crossings, the increase of bridges height, the renovation or construction of locks, the enlargement of sections and the modernisation of the equipment on IWW in Wallonia.
Upgrade of the Meuse Bassin	The general upgrade of the Meuse Bassin under corridor NS-MED, including the construction of a new lock on the river Meuse (section Ampsin-Neuville) to increase the capacity and the gauge of the Meuse between Namur and Liège, the upgrade of the depth of the Meuse between Flémalle and Seraing, the upgrade of Monsin bridge-dam, and the upgrade of port infrastructure equipment.
Build of a fourth lock in Lanaye (Ternaaien)	A fourth lock is being built in the cross-border section of the canal Juliana between Belgium and Netherlands in order to increase the capacity of the waterway.
Improve the access to the left bank docks of the Scheldt (new lock project Deurganckdok lock)	The Kallo Lock enables access to the Waasland port since 1979 but no longer caters for present-day needs. The new lock project (Deurganckdok lock) will enable the Flemish Region and the Antwerpen Port Authority to access to the left bank docks of the Scheldt. These two locks will allow ships to travel from the Scheldt to the port docks.
Increase of capacity of the lock compound in Terneuzen (under study)	The canal between Ghent and Terneuzen is currently facing a capacity and reliability restriction because of the limitation of the lock compound in Terneuzen. The construction of a new lock appears urgent.
Port of Zeebrugge – convert area near Visart lock to "limited open tidal zone"	Within the frame of the "Strategic Port Infrastructure Project" (SHIP), the Flemish government has decided to convert the port area near the current Visart lock and the old inner port into a "limited open tidal zone". This implies that the existing Visart lock will be replaced with an open access channel and that a new lock is built further inland.
Port of Zeebrugge – rail and waterway projects	Projects have been planned concerning the port of Zeebrugge to face its capacity problems: the construction of a third rail track between Zeebrugge and Bruges, the construction of a third and fourth track rail between Bruges and Ghent, an extension of the marshalling station and the Seine Scheldt West project to connect Zeebrugge to the Lys waterway via the Schipdonk canal.

Table 102: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
BE16	Enlargement of the Channel, augmentation of the bridges and enlargements of the locks of Sint-Baafs-Vijve and Harelbeke in order to have CEMT Vb	X			X					
BE17	River restauration: various interventions in environmental quality and scenic beauty of the river as well as of the valley area				X					
BE18	Lifting of bridges over the Canal Albert	X			X		X	X		
BE19	Upgrade of the section Bocholt-Dessel (from CEMT class II to CEMT class IV)			X	X					
BE20	new lock (Va) in connection with Lys + adaptation canal depth	X		X	X		X			
BE21	Study modernisation canal	X		X	X		X			
BE22	Modernisation of Brussels-Charleroi Canal	X		X	X		X			
BE23	Modernisation of Brussels-Charleroi Canal between Lembeek and Halle.	X		X	X		X			
BE24	Construction of a new Dammepoort lock and upgrade of the Steenbrugge bridge in the passage through Brugge	X	X	X	X		X		X	
BE25	New lock in Terneuzen	X	X	X	X		X	X	X	
BE26	Studies modernisation Canal				X					
BE27	Upgrading of the Canal Roeselare-Lys to a class Va waterway				X					

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
BE28	Works on the bridge in Ingelmunster + study that supports the further implementation of the works on the bridge of Ingelmunster				X					
BE29	Implementation of River Information Services (RIS) in Flanders			X		X				
BE30	Building of a trimodal platform in Liège including a rail link in Chertal		X	X			X	X	X	
BE31	Increase of the vertical clearance under bridges over the Albert canal, in Haccourt, Lixhe and Lanaye. Upgrading docks in Lixhe.		X				X	X	X	
BE32	Connection to the Meuse, the Rhine and the northern seaports : Gauge locks of Ampsin-Neuville and Ivoz-Ramet, New lock in Ampsin-Neuville Deepening of the Meuse Monsin Weir Upgrading of the bridge programme Navigability equipments Upgrading ports (Renory, Hermalle-sous-Huy)	X		X			X	X	X	
BE33	Construction of a new dock at Noordlandbrug, in order to have sufficient waiting capacity for barges.									
BE34	New Deurganckdok lock to upgrade access to Waasland Port (Antwerp)		X					X	X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
BE35	Renovation of the Royers lock in port of Antwerp		X					X	X	
BE36	Upgrading shunting yards and junctions; freight transport services		X					X	X	
BE37	Development of a rail terminal in the left bank of Ghent port. It is an internal port rail infrastructure, to enhance port connection to inland network and interoperability between the modes (maritime-inland navigation-rail)	X (standard of rail tracks 750m)	X	X		X	X		X	
BE38	'Seine-Schelde-West' project : Upgrade and socio-economic monitoring to detect the need for the long term solution	X	X	X	X		X		X	
BE39	Replacement of the existing Visart lock with an open access channel and construction of a new lock							X	X	
BE40	Upgrade of the Dender from CEMT class II to CEMT class IV in one way navigation from the mouth of the Scheldt in Dendermonde to Aalst	X		X			X			
BE41	Building of three new class Vb locks on the Upper-Scheldt (at Asper, Oudenaarde and Kerkhove)	X			X		X			
BE42	Canal Pommeroeul-Condé : Pier at lock of Hensies Renovation locks in Hensies and Pommeroeul Deepening	X							X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
BE43	Dorsale wallonne : Canal Nimy-Blaton enlargement and modification of curves Basse Sambre - Lock of Auvelais Navigability optimisation: bridges, docks and equipements Navigability optimisation: deepening, crossing zones, turning points Building of four new locks of class Va - studies (Obourg, Marchienne, Gosselies and Viesville) Upgrade of four existing locks (Havré, Marchienne, Gosselies and Viesville)	X		X			X	X	X	
BE44	Lys capacity : Crossing of Comines	X		X			X		X	
BE45	Schelde capacity : Crossing of Tournai Kain and Hérinnes (dams, depth of locks, building new locks (studies)), navigability optimisation (docks)	X		X			X		X	
BE46	Dredging works and works on the banks of the Brussels-Scheldt Sea Canal and adaptation of bridges	X					X	X		
BE47	Enlargement of the channel of the Upper-Sea Scheldt and Southern Ghent Ring Canal in order to eliminate bottlenecks hindering class V vessels	X	X	X	X		X			
BE48	RIS - RIS center in Wallonia	X				X				
BE49	Capacity extension of locks in Wijnegem							X	X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
BE50	Upgrade of the section Wijnegem-Antwerpen on the Albert Canal	X					X	X		

Belgium - Airports

Table 103: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Railway connection at the Brussels National Airport (Diabolo railway project)	Currently there is a missing rail link from the Flemish and Brussels areas to Brussels airport. The Diabolo railway project linking Brussels and Antwerpen through the Brussels National Airport has been partly achieved.

Table 104: Technical Compliance Gaps

Compliance Issues	Description
Rail access to Liège airport.	No existing rail connection to Liège airport.

Table 105: Relevant Market Developments

Related Market Issues	Description
None identified.	

Table 106: Indicative Measures

Indicative Measures	Description
Railway connection at the Brussels National Airport (Diabolo railway project)	This new railway induces a higher dimension to freight and passengers transit between the airport and the Northern Europe. It still needs some works to connect the airport more efficiently with rail lines L25N and roads such as E19.

France – Road

Table 107: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Congestion	The corridor includes heavily congested roads in urban areas, in particular Paris, Strasbourg, Lille and Lyon.

Table 108: Technical Compliance Gaps

Compliance Issues	Description
None identified	

Table 109: Relevant Market Developments

Related Market Issues	Description
None identified	

Table 110: Indicative Measures

Indicative Measures	Description
Development and upgrade of the road network in Provence-Alpes-Côte d'Azur (road access to Marseille-Fos port)	Construction of the Martigues - Port-de-Bouc bypass
	Miramas bypass, work in progress, end scheduled for 2016
	Motorway link Fos-Salon, studies from 2015 onwards, work to be carried out after 2020.
	Arles road bypass (concession project), studies in progress, work to be carried between 2020 and 2024.

Table 111: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR32	Construction of the Martigues - Port-de-Bouc bypass		X							
FR33	Miramas bypass, work in progress, end scheduled for 2016		X							

France – Rail and Rail Terminals

Table 112: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Metz node	Lorraine is a major industrial area in France. The Metz node, with its key position South of Luxembourg and west of Alsace, constitute an important bottleneck on the magistrale eco-fret. The Metz node needs to be upgraded to cope with regional train traffic and allow enough capacity for freight trains.
Strasbourg node	At Strasbourg capacity is already reaching its limit but the opening of the second phase of the LGV Est (Eastern high speed rail line) in 2016 will increase the number of passenger trains circulating on the conventional network between Vendenheim and Strasbourg. A 4th track is planned between Vendenheim and Strasbourg (before 2020) and the station will ultimately be upgraded (2025).
Mulhouse node	Mulhouse is a bottleneck impacting flows to Basel and Besançon (mostly a passenger issue in the later). Port of Mulhouse is connected to the national network by a single track line. Work is therefore expected to begin before 2020 to upgrade the node.
Lyon node	The Lyon node is a major bottleneck on the main French axis (Paris-Lyon-Marseille). As for other nodes, capacity on the route through Lyon is largely used by heavy local passenger traffic. This is particularly serious in the case of Lyon since there currently exists no bypass to Lyon for freight trains. To solve this issue, work on the node itself is expected in phases (first treatment and further treatment), together with a rail bypass of the node for freight trains (CFAL).
Locomotive accreditation (Administrative Barrier)	Despite agreements between countries, there is still room for improvement on this matter (for example common locomotive accreditation for several countries).
Approval of locomotive drivers (Administrative Barrier)	There is a need for harmonisation of rules between countries. In the current situation locomotive drivers approved in one country are often not allowed to work in another.

Table 113: Technical Compliance Gaps

Compliance Issues	Description
ERTMS deployment	In France, most of the rail signalling systems are not obsolete yet as they date from the 1990s. Since only minor safety gains would come from deploying ERTMS, the benefits would be limited to an increase in infrastructure capacity and interoperability. France is therefore currently drawing up a plan for ERTMS deployment taking into account system obsolescence. Priority is being given to the Longuyon-Basel line on ERTMS corridor C (and on RFC2) with an objective for 2018. This line on the French conventional network is located on the NS-Med corridor apart from a short stretch between Longuyon and Uckange. Studies on this line have already started in 2013. However, in France the rest of the corridor is to be equipped at a later stage.

Table 114: Relevant Market Developments

Related Market Issues	Description
Opportunity to develop rail for port traffic	Despite its potential, rail modal share is often limited for French ports. In 2012, rail modal share for all Grand Ports Maritimes (GPM) was 11.5%. This hides wide differences between Dunkerque, by far the first port in France for rail, and other ports with a smaller rail modal share (Marseille and Calais in particular).

Table 115: Indicative Measures

Indicative Measures	Description
Capacity on the Metz-Réding line	The Metz-Réding line, between Metz and Strasbourg, is heavily used for passenger train traffic but is also important for freight trains. It is located on RFC2. Deployment of IPCS (permanent counter-flow installations) deployment between Baudrecourt and Rémilly is therefore planned for 2020.
Capacity on the Mulhouse-Belfort line	Study and work on IPCS (permanent counter-flow installations) deployment between Mulhouse and Altkirch (15 million €). Planned for 2020.
Capacity on the Toul-Dijon line	Study and work on IPCS (permanent counter-flow installations) deployment between Toul and Dijon (200 to 250 million €). Studies before 2020, work after 2020.
Capacity on the Lille - Valenciennes	With the high population density in the Lille area, the rail line between Lille and Valenciennes offers very little capacity to freight trains. To solve this issue, studies (2015-2020) and work (2020-2030) is planned to increase capacity on the line.
Upgrade of the Dunkerque – Calais line	Study and work on a direct rail connection between Dunkerque west port terminals and Calais/Tunnel main line (8 million). Planned for 2018-2020.
Completion of high speed link between Dijon and Mulhouse	The first phase of the Rhin-Rhône high speed rail line (LGV Rhin Rhône) consisted of 140km and was opened in 2011. The remaining 50km of the East branch (Dijon-Mulhouse) is regarded as a second priority in the Mobility 21 report (planned for after 2030). Alsace, Bourgogne, Franche-Comté regions plan to launch a study co-financed by the French State to optimise the construction of this last part of the line.
Loading gauge on the Metz – Strasbourg line	Tunnels between Metz and Strasbourg limit the loading gauge to GB. To fully allow combined transport on this link of the RFC2, the loading gauge should be upgraded to GB1. A first cost estimation for this project will be known by the end of 2015.
Reinforcement of electric supply	Electric supply on several parts of the corridor's network must be reinforced. This is the case for Longuyon-Thionville, Metz and Strasbourg.
Upgrade of Creil node	Creil, located on the corridor between Lille and Paris is the main rail node north of Paris and as such it has a great influence on traffic of freight and conventional passenger trains in all the northern part of France. Creil was identified as a first priority in all scenarios of the so called Mobilité 21 - "Duron report". After the first treatment of the Creil node, additional work will be held from 2020 to 2023.
Upgrade of the Lyon-Avignon conventional line	The conventional line on the right bank of the Rhône is dedicated to freight trains. This line, connecting the Mediterranean part of the corridor, needs to be upgraded to improve safety, capacity and performance.
Upgrade of the Avignon-Marseille/Fos conventional line	As for the Lyon-Avignon line, the Avignon-Marseille/Fos conventional line requires an upgrade to improve safety, capacity and performance.
Upgrade of Marseille node	Upgrade of the Marseille node consists of an underground crossing of Marseille with a new 4 tracks underground station as well as a 4th track in the Huveaune valley.
Avignon-Mourepiane line (rail access to the port of Marseille-Fos)	Rail access to the port of Marseille is carried on the Avignon-Mourepiane line where traffic is limited by the GB loading gauge. Planned upgrade of the line also includes automation of the signalling system and electric supply reinforcement. This project is essential to develop the port's hinterland and spur modal shift from road to rail.
Network improvements for rolling motorways	The opening of rolling motorways between Lille (Dourges) and Paris requires network improvements such as upgrades to GB1 (tunnel de Séry) and sidings. RFF plans to start studies and work on this matter.
Development of multimodal urban logistic centres.	Ports de Paris, together with Caisse des Dépôts et Consignations and Sogaris, aims at developing multimodal urban logistic Centers in (Beaugrenelle, La Chapelle International, etc.) and around Paris (Vigneux, Vitry-sur-Seine, etc.). This idea is to offer a competitive alternative to raod transport for consumption goods.
Fast rail link Lille-former mining area	This new 30km rail link will connect Lille to the former mining area and offer a rail access to Lille-Lesquin airport, core network airport with currently no rail connection.
Mulhouse-Basel EuroAirport rail connection	Connection of the Mulhouse-Basel EuroAirport (comprehensive network) to the rail network (core-network). This project is supported by both French and Swiss authorities. The preliminary studies and the public consultation were finished in 2013. The projects studies and, at the same time, the beginning of the construction, are now ready to start.
Port of Dunkerque	Dedicated multimodal platform for dangerous goods, including rail and road

Indicative Measures	Description
	connection to the core network and will be connected to a maritime container terminal and inland waterways
Port of Dunkerque	Improvement of the interoperability between the port of Dunkerque and the national railway network

Table 116: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR1	Creation of a trimodal platform IWW-rail-road by upgrading and intergating existing port facilities on Courtine area and RRT of Champfleury (development of multimodal logistics platforms with road, rail and IWW connections)						X	X	X	
FR2	Construction of a multimodal platform and a 38 ha industrial zone (development of multimodal logistics platforms with road, rail and IWW connections)						X	X	X	
FR3	Fos combined transport terminal						X	X	X	
FR4	Mourepiane combined transport terminal		X				X	X	X	
FR5	Mourepiane combined transport terminal		X				X	X	X	
FR6	Rolling motorway terminal	X	X					X	X	
FR7	Development of a new port area in Mulhouse urban area								X	
FR8	Study and work on a new container terminal and a logistics zone in Ottmarsheim shared with Basel and Weil-am-Rhein						X	X	X	
FR9	Development of a common and unique information system (Port Community System) to optimize the use of all existing tools with a slot booking system for loading and unloading					X				
FR10	ERTMS deployment on the Longuyon- Basel line			X	X	X				

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR11	Avignon-Lyon (right bank of the Rhône): Upgrading and Capacity improvement, Safety / Security, Capacity improvement, Maintenance of performance	X							X	
FR12	Creil, located on the corridor between Lille and Paris is the main rail node north of Paris and as such it has a great influence on traffic of freight and conventional passenger trains in all the northern part of France. Creil was identified as a first priority in all scenarios of the so called Mobilité 21 - "Duron report". Studies and first work are planned from 2014 to 2020	X								
FR13	Optimisation of the Rhin-Rhone high speed rail line (LGV Rhin Rhône) 2d phase of the East branch	X								
FR14	Direct rail connection between Dunkirk west port terminals and Calais/Tunnel main line		X						X	
FR15	Network improvements for rolling motorways	X						X		
FR16	Reinforcement of electric supply on Longuyon-Thionville	X								
FR17	First treatment of Lyon node. Works on the existing network aiming to increase reliability, security and capacity of train operations (resolution of physical bottlenecks)	X			X				X	
FR18	Metz node upgrade	X			X					
FR19	Reinforcement of electric supply in	X								

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
	Metz									
FR20	IPCS (permanent counterflow installations) deployment between Baudrecourt and Rémilly	X			X					
FR21	Mulhouse node upgrade	X			X					
FR22	Connection of the Mulhouse-Basel EuroAirport (comprehensive network) to the rail network (core-network). This project is supported by both French and Swiss authorities. The preliminary studies and the public consultation were finished in 2013. The projects studies and, at the same time, the beginning of the construction, are now ready to start.		X						X	
FR23	IPCS (permanent counterflow installations) deployment between Mulhouse and Altkirch	X			X					
FR24	Dedicated multimodal platform for dangerous goods, including rail and road connection to the core network and will be connected to a maritime container terminal and inland waterways									
FR25	Improvement of the interoperability between the port of Dunkirk and the national railway network		X						X	
FR26	Mourepiane (east bassin): rail connection to the port		X						X	
FR27	Increase in the west basins rail capacity in the Fos gulf (project planned on the CPER State-region contract)		X						X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR28	Extension of the siding to improve rail access to the port of Metz area								X	
FR29	Strasbourg rail : Increasing capacity at the Port du Rhin station ; Upgrading rail access to the port; Upgrading signaling and points equipments; Rail access to the port from the German network								X	
FR30	Reinforcement of electric supply in Strasbourg	X								
FR31	Strasbourg node upgrade (4th track between Strasbourg and Vendenheim)	X			X					

France – Sea and Inland waterway

Table 117: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Seine-Escaut project: Seine-Nord Europe canal	The existing link between the French northern IWW network and the Seine basin, the canal du Nord (CEMT II), is a major bottleneck as it doesn't comply with modern standards. The canal Seine-Nord Europe is a major canal project to create a CEMT Vb link. As planned, the canal 106 km long from Compiegne to Aubencheul-au-Bac will include 7 locks (single chamber), 2 water storage reservoirs, 3 aqueducts, 4 multimodal platforms, 5 grain docks, 2 transhipment docks and 5 tourist boating centres. The canal is the main component of the Seine-Escaut project which also include complementary network upgrades on the river Seine, the river Oise and the waterway network in the Nord-Pas-de-Calais region (French part of the Scheldt basin).
Saône-Moselle/Saône-Rhine Canal	The other main canal project on the corridor aims at connecting the Saône-Rhône basin to the northern waterway network. As missing link to Benelux and Germany, the Saône-Moselle Saône-Rhine (SMSR) Canal will connect the basins of Saône and Rhône to 20 000 km of the European large-gauge waterway network. The SMSR canal therefore would potentially become an important part of the waterway and multimodal corridor between Mediterranean Sea and Rhine River, enhancing efficiency and ecological sustainability of transport along North-South axis. The project also aims to tapping the potential of waterway tourism market.

Table 118: Technical Compliance Gaps

Compliance Issues	Description
Seine-Escaut project: Waterway network upgrade in the Nord-Pas-de-Calais region	The Seine-Escaut project include several important component in the Nord-Pas-de-Calais region to enhance the reliability and the capacity of waterways: • Recalibration of Escaut river between Valenciennes and Trith (work completed) • Restoration of the cross border Condé-Pommeroeul canal which is a missing link since its closing in 1992 due to its silting • Recalibration of Deûle river (Lille Deûlémont), lengthening and doubling of the Quesnoy-sur-Deûle lock on Deûle river • Recalibration of Lys river (Deûlémont-Halluin) • Raising of bridges on the Nord-Pas-de-Calais network for a minimum height of 5.25m, 2 layers of containers (project completed) • Restoration of locks and dams and implementing remote management of the locks on the Nord-Pas-de-Calais network (work in progress) • Design studies concerning the creation of a multimodal transport system (IWW, rail, short-sea, and road) for the Port of Dunkerque are under the CAP 2020 framework program. • Development of services to users, including turning basin and waiting areas
Seine-Escaut project: Waterway network upgrade on the river Oise	Several elements of the river Oise are bottlenecks which must be removed to offer an optimal access to the coming Seine – Nord Europe canal: • North of Paris, the Mours railway bridge must be raised from 5.83m to a 7m height; • Although the Oise is officially classified as CEMT Vb, navigation of 180m long vessels is difficult due river curves and a lack of waiting areas; • The river needs to be dredged downstream of Creil to reach a 4m depth (3m currently).

Compliance Issues	Description
	Removal of these bottlenecks on a 37km stretch of the Oise is planned under project MAGEO. Moreover, VNF plans to implement remote control of locks on the Oise to increase opening hours to 24 a day.
Seine-Escaut project: Waterway network upgrade on the river Seine downstream from Paris	Many structures on the Seine downstream from Paris require modernisation or upgrade. The following aspects have been identified and were included in the Seine-Escaut project: • Lengthening of the second lock at Méricourt and of the Amfreville lock; • Modernising and rehabilitating dams on the downstream Seine including dams of Suresnes, Bougival, Méricourt, Andresy GC, Poses and Port Mort; • Improvement of reliability at other locks and dams; • Rehabilitating of the rail bridge at Maisons Lafitte; • Raising of the Poses-Amfreville footbridge, • Services to users.
Seine-Escaut project: Waterway network upgrade on the river Seine upstream from Paris (not including the Bray-Nogent project, see below)	Apart from the Bray-Nogent project (see below), the following elements were identified upstream from Paris for network upgrades. • Renovation and modernisation of dams, including reconstruction of the Beaulieu dam and restoration of the Livon weir which holds the channel to the Nogent-sur-Seine nuclear power plant • Renovation and/or deepening of the small locks on the upper Seine • Creating a second lock at Varennes-sur-Seine • Restoring the environmental continuity with the construction of fish passes including at Port à l'Anglais, Ablon/Vigneux, Evry, Marolles, seuil du Livon and Conflans/Seine • Improving reliability of other locks and dams • Services to users: turning basin and waiting areas • Implementing remote control of locks on the upstream Seine
Seine-Escaut project: upgrade of the Seine to a large gauge between Bray and Nogent.	South of Paris, the Seine is characterised by a wide gauge up to Bray-sur-Seine, the following 27 km section between Bray-sur-Seine and Nogent-sur-Seine being classified as CEMT II. The Nogent area exports mostly agricultural products and building material and is increasingly reliant on IWW. Waterway traffic on this part of the Seine has more than tripled between 2001 and 2010 in terms of tonnes-kilometres. The Bray-Nogent project aims at upgrading this part of the upper Seine from CEMT II to CEMT Va.
Bottlenecks and needed network upgrades on the Moselle	North of SMSR project, the French part of the Moselle presents three smaller bottlenecks: • The Clévant lock currently only allows access to the Nancy-Frouard port to vessels shorter than 110m despite the fact that many vessels on the Moselle are 135m long. Moreover, the development of a multisite multimodal platform in the Lorraine region and the opening of a new line of 135m long container-carrying vessels further increase the need for a lengthening of the Clévant lock. • Guard gates at Metz and Pont-à-Mousson are narrower than the regulation allows with a 12m width instead of 18m. This forces vessels to slow down and increase the risk of accidents. • Major renovation of the Liégeot dam which was constructed in 1958 presenting safety issues and significantly hinders traffic on the upstream part of the Moselle.
Upgrade on the Saône	Upgrade of the Couzon lock on the Saône by increasing length to 195 m and creating guiding wall for long vessels.
Upgrade of the Rhône-Sète canal	On the Rhône-Sète canal bridge clearance and CEMT class gauge are limited. The infrastructure upgrade works will improve the capability of the Rhône-Sète canal, including raising of 5 bridges, new zones of crossing in Gallician and Aigues-Mortes, and modification of a few curves with low values of radius of curvature.
Network upgrade on the Rhône	On the Rhône 3 network upgrades were identified: • Standardisation of slipway in Arles • Development of quays and waiting areas for alternate traffic direction • Development of stops for passenger ships.
Clean fuel at the port of Dunkerque	LNG bunkering infrastructure. Development of a small-scale LNG supply chain from the Port of Dunkerque, not only or primarily for ship bunkering but also, potentially, for other markets such as road or waterway transport, or industry. Note the cross-border dimension of this project, developed in coordination with the British port of Dover.

Table 119: Relevant Market Developments

Related Market Issues	Description
IWW modal share	Even though the modal share for IWW is low in France (2.4% of tonne-kilometres in 2013) compare to other countries of the corridor, waterway traffics are on an upward trend since the end of the 1990's highlighting the potential of waterway transport in France. Large canal projects to link the different basins and developments of inland ports will enhance the potential for more waterway transport in France.

Table 120: Indicative Measures

Indicative Measures	Description
Calais 2015	The Calais 2015 project plans the creation of a new sea dock north of the existing port facilities to increase the current capacity of the port (Calais Port 2015 development scheme). This include: • A new seawall and counter-pier, • Building of a new port basin, • Gradual carrying out of new earth platforms, • Gradual construction of a new berth.
Upgrade of the Port of Lyon	Upgrade of the Port of Lyon including : • Renewal of roads in the port (modification of the circulation plan with a new entry way for trucks) • Construction of a new dock to stock liquid bulk commodities • Various upgrades enabling to increase the supply of containers transport (including the upgrade of the Terminal 1 and new equipment) • Direct connection with the national rail network (creation of a new track and electrification works on the existing track)
Development of the multimodal platform of Salaise – Sablons on the Rhône	Construction of a multimodal platform and a 38 ha industrial zone: development of multimodal logistics platforms with road, rail and IWW connections
The multimodal and multisite platform development in Lorraine, on the Moselle river	The development of a multimodal and multisite platform in Lorraine between the ports of Thionville, Metz and Frouard will allow an increase in container traffic on the Moselle. A second phase of the project will focus on the port of Metz with the extension of the container terminal inside the port.
Development of the multimodal plateform at Pagny	Near Dijon, the Pagny trimodal platform is located at the northern extremity of the wide gauge Rhône-Saône river axis. The development of this platform will improve intermodality on the corridor.
Improving rail access to the port of Metz	Rail access to the port area must be improved by extending the port's siding.
Improving rail access to the port of Lyon (PEH)	Although the port Edouard Herriot (PEH) in Lyon has a rail access, the connection to the national network needs to be upgraded by creating a new track and electrifying the existing infrastructure.
Development of the port of Chalon-sur-Saône	Extension of the quay, development of a stocking platform on the quay
	Enlargement of the container platform, development of the container terminal and extension of the port's rail network
Marseille-Fos: development at the east basin (Marseille)	Mourepiane combined transport terminal: The Marseille-Fos port plans the construction of a new combined transport terminal at the east basin. This terminal will be built on the existing port area and will be used both for rail-route and rail-sea operations. Importantly, the terminal will allow 850m trains in one piece.
	Construction of a rolling motorway terminal at Marseille port will allow RoRo traffic to continue their route on rail.
	Upgrade of Marseille Short Sea Shipping terminals: development of RoRo short sea shipping traffics across the Mediterranean require the compete redevelopment of the 2 short sea shipping terminals at the east basin.
	The widening of the North Pass follows the trends for ever bigger ships. The project is necessary to allow entry to big ships by any weather and maintain or develop the role of the port in the Mediterranean.
Marseille-Fos: development at the west basin (Fos-sur-Mer)	Fos combined transport terminal: development of the port's hinterland and rail modal share require the construction of a combined transport

Indicative Measures	Description
	terminal on the port. The terminal will carry both maritime traffic and traffic from the logistics activities of the port.
	Waterway link: To further develop multimodality at the port, Marseille-Fos plans to open a new waterway link between container terminals and the Rhône.
	Dock infrastructures: New developments in the size of ships require an upgrade of the dock infrastructure of the container terminals at Fos 2XL. This includes lengthening of quays and deepening of the basin.
	Following the opening of the Fos 2XL port extensionl, the port of Marseille plans the construction of a new extension with the 4XL container terminal.
	Construction of a multiclient bulk platform at Fos
	Increase in the west basins rail capacity in the Fos gulf (project planned on the CPER State-region contract)
	Port industrial area at Fos-sur-Mer (west basins of the Marseille/Fos port): automation of rail acess and sidings, new connections
Development of the port of Mulhouse	Development of a new port area in Mulhouse urban area
	Study and work on a new container terminal and a logistics zone in Ottmarsheim shared with Basel and Weil-am-Rhein
Development of the port of Strasbourg	Rail access: In Strasbourg itself, rail access to the port must be upgraded as well as signalling and points equipment inside the port. The port du Rhin station also needs an increase in capacity.
	Waterway access: Increasing the size of entry locks to the port
	Road access: Road access to the port is made difficult by congestion on the route du Rhin. Strasbourg and its ports plan to open a new access road to the port in north to solve this issue.
	A new terminal for empty containers to be shared with Kehl port is planned.
	Development of the container terminal in the north part of the port.
Development of the Lauterbourg terminal (port of Strasbourg)	With 48ha of available land, the Lauterbourg terminal on the Rhine (62km north of Strasbourg) benefits from ample room for its development. Port of Strasbourg plans to develop the existing terminal into a trimodal platform b: • Opening a rail link between the terminal and the existing Lauterbourg station, • Building a container terminal at Lauterbourg.
Information system at the ports of Strasbourg	Development of a common and unique information system (Port Community System) to optimize the use of all existing tools with a slot booking system for loading and unloading
Improving rail access to the port of Dunkerque	Direct rail connection between Dunkerque west port terminals and Calais/Tunnel main line
	Improvement of the interoperability between the Port of Dunkerque and the national railway network
Port of Dunkerque: CAP Port Ouest framework program	Maritime access adaptation: widening of the turning circle between the outer port and the basin called Atlantic.
	Container berth upgrade. Development of transshipment to feeder or short-sea services and of inland multimodal transfer to rail and inland waterway services.
	Bulk terminal revamp: development of transshipment operations for bulk material.
Port of Dunkerque: CAP 2020 framework program	Design studies concerning the creation of a multimodal transport system. Development of new basins, maritime infrastructures and terminals including all associated multimodal network (rail, inland waterways, short-sea, road) in a global and long term vision of the Port of Dunkerque.
	Improvement of land access to multimodal and deep sea terminals
	Extension of rail infrastructure capacity to container terminals
Development of a new port at Triel-sur-Seine (Ports de Paris)	Ports de Paris plans the construction of an urban port at Triel-sur-Seine. The port shall specialize in building and recycling material. The aim is to complete the network of ports in the Paris area.
Multimodal access to the ports of Paris	Ports de Paris wishes to improve land access to its ports over the next 5 years. In particular, road access to the port of Bonneuil-sur-Marne will be improved with the extension of the expressway RN406 to the port area to offer a direct road access to the port (currently carried on a road passing

Indicative Measures	**Description**
	through an urban environment).
Paris Seine Métropole phase 2 (western part).	After a first phase dedicated to building material, the expansion of the port at Achères at the confluence between the Oise and the Seine will follow with the development of multimodal platforms.

Table 121: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR34	Restoration of the Condé-Pommeroeul canal (Seine-Scheldt inland waterway)	X		X					X	
FR35	Development of the multimodal plateform near Dijon (Pagny trimodal plateform)						X	X		
FR36	Fos 4XL combined transport terminal (enlarging port container facilities)						X	X	X	
FR37	Fos Dock infrastructures : allowing call of bigger ships and improvement of terminal operations	X								
FR38	Waterway link : create an IWW connection between Fos container terminal (second basin) and the Rhône		X						X	
FR39	Waterway link : Multiclient bulk platform	X								
FR40	Upgrade of Short Sea Shipping terminals	X								
FR41	Widening of the North Pass	X								
FR42	Upgrading of the Couzon lock on the Saone by increasing length to 195 m and creating guiding wall for long vessels	X							X	
FR43	Recalibration of Deûle river (Lille Deûlémont) (Seine-Scheldt inland waterway)	X		X					X	
FR44	Implementing remote control of locks on the downstrem Seine (Seine-Scheldt inland waterway)	X				X			X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR45	Improvment of reliability at other locks and dams (Seine-Scheldt inland waterway)	X							X	
FR46	Modernising and rehabilitating locks on the downstream Seine, including locks of Suresnes, Bougival, Méricourt and Notre Dame de la Garenne (Seine-Scheldt inland waterway)	X							X	
FR47	Raising of the Poses-Amfreville footbridge (Seine-Scheldt inland waterway)	X		X						
FR48	Rehabilitating of the rail bridge at Maisons Lafitte (Seine-Scheldt inland waterway)			X						
FR49	Restoring the environmental continuity with the construction of fish passes (Seine-Scheldt inland waterway)									
FR50	Services to users (Seine-Scheldt inland waterway)								X	
FR51	Seine Nord Canal and mulimodal platforms (Seine-Scheldt inland waterway) * Missing Link * Bottleneck * Cross Border * Interoperability	X		X					X	
FR52	Construction of an Information and waterway traffic management centre					X				
FR53	Extension of Clévant lock on the Moselle	X							X	
FR54	Implementing remote control of locks on the wide-gauge Moselle	X				X			X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR55	Reconstruction and enlargement of the gate at Pont-à-Mousson	X							X	
FR56	Reconstruction of the Liégeot dam on the Moselle	X								
FR57	Rehabilitation of broadband network along the Moselle river									
FR58	The multimodal and multisite platform development in Lorraine, on the Moselle river						X			
FR59	Recalibration of Lys river (Deûlémont-Halluin) (Seine-Scheldt inland waterway)	X		X					X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR60	Improvement of capability of the Rhône-Sète canal Compliance with class IV* requirements at least (waterway allows the passage of a vessel or a pushed train of craft 80 to 85 m long and 9.50 m wide): Works consist in : - raising of 5 bridges - Compliance with Core network standards concerning minimum height under bridges (Target:>5.25/7.00m) - new zones of crossing in Gallician and Aigues-Mortes - modification of a few curves with low values of radius of curvature Compliance with Core network standards concerning length of vessels and barges (Target: >80-85m) Compliance with Core network standards concerning minimum draught (Target: >2.50m)	X							X	
FR61	Implementing remote management of the locks on the Nord-Pas-de-Calais network and upgrading the locks involved (Seine-Scheldt inland waterway)	X	X			X			X	
FR62	Increasing reliability of the Nord-Pas-de-Calais network, including shore protection at Goeulzin and Aire Neuffossé (Seine-Scheldt inland waterway)	X							X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR63	Services to users: turning basin and waiting areas (Seine-Scheldt inland waterway)								X	
FR64	Dredging dowtream of Creil (access to locks) (Seine-Scheldt inland waterway)	X							X	
FR65	Implementing remote control of locks on the Oise (Seine-Scheldt inland waterway)	X				X			X	
FR66	Reconstruction of the Mours bridge to du pont de Mours to a height of 7 metres (Seine-Scheldt inland waterway)	X		X					X	
FR67	Services to users: turning basin (Seine-Scheldt inland waterway)								X	
FR68	Upgrade to European gauge of the Oise between Creil and Compiègne (MAGEO project) (Seine-Scheldt inland waterway)			X						
FR69	Development of multimodal urban logistic Centers (Beaugrenelle, La Chapelle International, etc.) inside Paris						X	X		
FR70	Development of multimodal urban logistic Centers in Paris area (Vigneux, Vitry-sur-Seine, etc.)						X	X		

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR71	Calais 2015 project Creation of a new sea dock north of the existing port facilities to increase the current capacity of the port (Calais Port 2015 development scheme). This includes: - a new seawall and counter-pier, - building of a new port basin, - gradual carrying out of new earth platforms, - gradual construction of a new berth.		X					X	X	
FR72	Port of Chalon-sur-Saone: Enlargement of the container platform, development of the container terminal and extension of the port's rail network						X	X	X	
FR73	Port of Chalon-sur-Saone: Extension of the quay, development of a stocking platform on the quay						X		X	
FR74	Bulk terminal revamp (Cap Port Ouest framework program). Development of transshipment operations for bulk material.	X								
FR75	Container berth upgrade (Cap Port Ouest framework program). Development of transshipment to feeder or short-sea services and of inland multimodal transfer to rail and inland waterway services.							X	X	

ID	**Description of project**	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR76	LNG bunkering infrastructure. Development of a small-scale LNG supply chain from the port of Dunkirk, not only or primarily for ship bunkering but also, potentially, for other markets such as road or waterway transport, or industry.			X						X
FR77	Maritime access adaptation (Cap Port Ouest framework program). Widening of the turning circle between the outer port and the basin called Atlantic.	X								
FR78	Extension of the container terminal inside the port (2nd phase of the multimodal and multisite platform development in Lorraine)						X		X	
FR79	City port of Triel-sur-Seine						X	X	X	
FR80	Extension of the Limay multimodal terminal						X	X	X	
FR81	Multimodal access to platforms of the ports of Paris (including new road link N406)						X	X	X	
FR82	Paris Seine Métropole phase 1 (western part). Development of aggregate products platform.						X	X	X	
FR83	Increasing the size of entry locks to the port								X	
FR84	North road access to the port									

ID	**Description of project**	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR85	Strasbourg inland port : development of a container terminal ; study and work on a new terminal for empty containers to be shared wuth Kehl port (Germany) / Lauterbourg inland port : development of the Lauterbourg container terminal						X	X	X	
FR86	Development of stops for passenger ships									
FR87	Standardisation of Slipway in Arles	X							X	
FR88	Development of quays and waiting areas for alternate traffic direction	X							X	
FR89	Implementing remote control of locks on the upstream Seine (Seine-Scheldt inland waterway)	X				X			X	
FR90	Improving reliability of other locks and dams (Seine-Scheldt inland waterway)	X							X	
FR91	Renovation and modernisation of dams, including reconstruction of the Beaulieu dam and restoration of the Livon weir which holds the channel to the Nogent-sur-Seine nuclear power plant (Seine-Scheldt inland waterway)	X							X	
FR92	Renovation and/or deepening of the small locks on the high Seine (Seine-Scheldt inland waterway)	X							X	

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
FR93	Restoring the environmental continuity with the construction of fish passes including at Port à l'Anglais, Ablon/Vigneux, Evry, Marolles, seuil du Livon and Conflans/Seine (Seine-Scheldt inland waterway)									
FR94	Services to users: turning basin and waiting areas (Seine-Scheldt inland waterway)								X	

France - Airports

Table 122: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
None identified.	

Table 123: Technical Compliance Gaps

Compliance Issues	Description
Rail access to Lille airport	No existing rail connection to Lille airport.

Table 124: Relevant Market Developments

Related Market Issues	Description
None identified.	

Table 125: Indicative Measures

Indicative Measures	Description
Mulhouse-Basel EuroAirport rail connection	Connection of the Mulhouse-Basel EuroAirport (comprehensive network) to the rail network (core-network). This project is supported by both French and Swiss authorities. The preliminary studies and the public consultation were finished in 2013. The projects studies and, at the same time, the beginning of the construction, are now ready to start.

Ireland – Road

Table 126: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
N7/M7 Naas Bypass to the west of Dublin	The main road bottleneck on the Irish road network that is relevant to corridor is the N7/M7 Naas Bypass to the west of Dublin, which is a two lane dual carriageway which links the M7 to the M50 Dublin orbital motorway.
Dublin (urban node)	While the Irish inter-urban motorway network generally has sufficient current capacity, there is road congestion in and around Dublin particularly in peak commuting hours and there is a need to encourage greater use of public transport in the Greater Dublin Area.
Dunkettle Interchange Upgrade	To remove bottleneck on strategic road network near Cork.

Table 127: Technical Compliance Gaps

Compliance Issues	Description
None identified	

Table 128: Relevant Market Developments

Related Market Issues	Description
None identified	

Table 129: Indicative Measures

Indicative Measures	Description
Dublin. M7 Naas Bypass widening	Road widening from 2 to 3 lanes in each direction between M7 at Naas and M50 at Dublin.
Cork. Last mile connection to Port of Cork.	Upgrade of last mile road connection to the port facility at Ringaskiddy (Cork)

Table 130: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
IE6	N/M28 Cork to Ringaskiddy Improvement Scheme	X	X							
IE7	Dunkettle Interchange Upgrade	X		X						
IE8	M7 Naas - Newbridge Motorway Widening Scheme	X		X						

Ireland – Rail and Rail Terminals

Table 131: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
The Irish rail network has the gauge of 1600 mm and it is an isolated network under the TEN-T Guidelines.	Irish track gauge is 1600mm, but it is an isolated network under the TEN-T Guidelines. There is therefore no requirement for the Irish network (and the network in the UK in Northern Ireland) to be upgraded to meet the standards set out in the TEN-T Guidelines.
Dublin stations and improvement in rail routes	There is an acknowledged need for greater focus in the future on improving the line speed on the Dublin-Cork and Dublin-Belfast routes and facilitating connections for passengers between stations in Dublin, so that the rail network is able to compete with the inter-urban motorway network.
Bottlenecks in Dublin	The DART Underground tunnel and the associated sub-projects (City Centre Re-signalling, the Central Traffic Control Centre and the Phoenix Park Tunnel, will contribute towards the removal of the bottleneck at Connolly Station, including for the Enterprise cross-border train service. In addition, the development of the Maynooth Line (e.g. removal of level crossings), another DART Undergrounc sub-project, will remove bottlenecks along this line for rail and road users. Furthermore, the envisaged works at La Fanu Bridge will remove a rail freight restriction/bottleneck on the Cork-Dublin line and is also part of the enabling work s for the DART Underground.
Rail freight services in the future, particularly to and from the ports	While the scope for rail freight services is more limited in Ireland than in other parts of the corridor because of the shorter distances that are available, there may be scope for the development of rail freight services in the future, particularly to and from the ports on the corridor.

Table 132: Technical Compliance Gaps

Compliance Issues	Description
None	Isolated network has no requirement for TEN-T compliance.

Table 133: Relevant Market Developments

Related Market Issues	Description
Use of inland rail from ports.	Dublin and Cork both have rail connections, but very little rail freight is carried. This option might be developed further in future.

Table 134: Indicative Measures

Indicative Measures	Description
Dublin. DART Underground. (CEF pre-identified project)	DART Underground extends the urban rail network, significantly boosting public transport capacity in the Greater Dublin Area, and the elimination of major commuter rail bottlenecks. It is the missing link in the provision of a fully integrated rail based commuter service for the Dublin area. It contributes towards a more balanced environmentally, socially and economically sustainable transport system. It will also provide the current missing link within the Cork- Dublin-Belfast railway line, linking the three main urban centres within the island of Ireland.
Cork-Belfast Rail Connection Upgrade.	Package of measures to benefit the rail corridor between Cork and Belfast via Dublin to help it compete with the motorway network. Options include upgrading stations, improving line speeds and the interconnection with the DART in Dublin (Cork - Northern Ireland border).
DART Underground associated projects	The DART Underground and associated projects, City Centre Re-signalling, Central Traffic Control Centre, the Maynooth Line development and the Phoenix Park Tunnel projects will contribute towards the removal of the

Indicative Measures	Description
	bottleneck, particularly at Connolly Station in Dublin, including for the Enterprise cross-border train service between Belfast and Dublin.

Table 135: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
IE1	Dublin city centre re-signalling Phases 3 & 4 (sub-project of DU)	X							X	
IE2	Central Traffic Control Centre (sub-project of DU)	X							X	
IE3	Electrification of the DART from Malahide to Balbriggan (sub-project of DU)									
IE4	Allow some services on the Kildare line to bypass Heuston station and into the Central Business District	X								
IE5	Works could include upgrading Cork Kent station, Pearse station roof and DART stations in Dublin	X								

Ireland – Sea and Inland waterway

Table 136: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Development of adequate and efficient infrastructure capacity.	While the two Core Network Ports in Ireland, Dublin and Cork, have no significant maritime capacity constraints at present, there is likely to be a need to ensure the development of adequate and efficient infrastructure capacity in the future in response to, in particular, increasing ship size.
Development of inland connections.	As Ireland's economy is based to such a great extent on maritime trade, and affected by the cost and availability of connections, the efficiency of inland connections will need to be maintained and enhanced.

Table 137: Technical Compliance Gaps

Compliance Issues	Description
No LNG bunkering facilities	Neither of the ports (Dublin nor Cork) is able to provide LNG bunkering facilities.

Table 138: Relevant Market Developments

Related Market Issues	Description
Reduction in availability of container services following economic crisis.	The number of short-sea feeder services connecting Ireland to global trade networks via European ports has fallen.
Potential cost increases between Ireland and the Continent.	Shipping costs will be adversely affected by sulphur emission legislation after 2015.

Table 139: Indicative Measures

Indicative Measures	Description
Port of Cork Infrastructure.	Port infrastructure developments primarily at Ringaskiddy as part of the Port of Cork Master plan.
Port of Dublin – Alexandra Basin redevelopment.	Alexandra Basin redevelopment as part of the Port of Dublin Master plan.

Table 140: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
IE9	Port infrastructure developments primarily at Ringaskiddy as part of the Port of Cork Masterplan	X								
IE10	Alexandra Basin Redevelopment Project (part of the Port of Dublin Masterplan)	X								

Ireland - Airports

Table 141: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
None Identified	

Table 142: Technical Compliance Gaps

Compliance Issues	Description
Dublin Airport	No existing rail connection.
Cork Airport	No existing rail connection.

Table 143: Relevant Market Developments

Related Market Issues	Description
Tourism market recovering.	2014 figures show an increase in tourism, an important sector for the Irish economy which depends to a high degree on air transport.

Table 144: Indicative Measures

Indicative Measures	Description
None identified.	

Luxembourg – Road

Table 145: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Capacity problem on motorway E25 between Luxembourg and France.	The low level of capacity of the motorway E25 between Luxembourg and France is a major bottleneck. This section presents an important level of congestion due to the high intensity of daily commuter traffic and international transit traffics between the North and the South of Europe.
Parking areas in Luxembourg	Parking areas in Luxembourg are highly utilized and have saturation issues. As trucks are not allowed to drive during the weekend in some border countries, drivers have to use these parking areas. This situation leads to insufficient parking areas.

Table 146: Technical Compliance Gaps

Compliance Issues	Description
None identified	

Table 147: Relevant Market Developments

Related Market Issues	Description
High volumes of lorries transiting Luxembourg.	Development of Luxembourg as a European hub for logistics.

Table 148: Indicative Measures

Indicative Measures	Description
A3/A31 motorway to France Increase capacity and connectivity to Bettembourg	The project concerning the A3/A31 motorway to France consists in building one more lane in each direction on the section between Luxembourg (LU) and Metz (F) in order to increase capacity and connectivity to Bettembourg (LU). This motorway would then have six lanes instead of four as at present.
A1 Motorway Bridge - Maintenance bridge of Sernigerbaach	Maintenance works to reinforce the bridge of Sernigerbaach at the German border have begun in April 2014 on the A1 Motorway linking Luxembourg to Trier.
A3/E25 truck parking - Project to extend the truck parking area in the highway station of Berchem.	The project to extend the truck parking area in the highway station of Berchem (A3/E25) is currently under study. It consists in building a new parking with an Intelligent Parking System in order to increase the capacity of the existing parking area. Many truck drivers are forced to stop in this highway station, as they are not allowed to drive further in neighbouring countries because of binding legal driving schedules.

Table 149: Specific Objectives Being Addressed by Proposed Measures

(No road measures listed in set 1)

Luxembourg – Rail and Rail Terminals

Table 150: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Speed limitation in the lines Petange – Esch/Alzette and LU Berchem JCT – Oetrange	Speed limitation to 90km/h in the lines : Petange – Esch/Alzette and LU Berchem JCT - Oetrange
Lack of capacity on the national railway network	A lack of capacity exists on the national railway network which is due to high levels of passenger traffic during peak hours and competition between passenger trains (linking all parts of the country to the city of Luxembourg) and freight trains transiting across the country. A new line is forecasted as well as the construction of a new peripheral railway station in Luxembourg-Howald.
Capacity restriction in Luxembourg City station	Capacity restriction exists in Luxembourg City station. It concerns both passenger and freight trains.
Speed limitation on the Brussels-Luxembourg-Strasbourg section	The traffic speed on the Brussels-Luxembourg-Strasbourg section constitutes a major bottleneck for passenger rail transport. This cross-border network doesn’t provide an alternative to road or even air transport.
Railway line Rodange-Esch/Alzette-Bettembourg/border	The Railway line Rodange-Esch/Alzette-Bettembourg/border needs some technical modifications to permit 750m trains to cross the border, to get rid of some level crossings and to renew passenger quays.
A cross-border bottleneck at the Bettembourg station	A cross-border bottleneck exists in the Bettembourg station. This implies a need for a modernization of the marshalling yard.
Road/Rail terminal of Bettembourg/ Dudelange	The capacity and the connectivity of the Road/Rail terminal of Bettembourg/ Dudelange have to be improved to provide a higher quality of service.

Table 151: Technical Compliance Gaps

Compliance Issues	Description
Cross border electrification systems	Interoperability constraints due to the differences of electrification systems between the countries of the corridor are noticed. Luxembourg uses 25kV electrification, but the line Luxembourg to Kleinbettingen still uses 3kV.
ERTMS	The national railway network is not yet fully equipped with the ERTMS.
Line Speeds	Some line-speed restrictions on short stretches of the network between Brussels-Luxembourg and Strasbourg.

Table 152: Relevant Market Developments

Related Market Issues	Description
Need to develop Brussels-Luxembourg-Metz rail connections for freight and passengers.	Route offers possibility to increase capacity between Northern range ports and Switzerland/Eastern France.
Logistics opportunities	Rail terminal at Bettembourg/Dudelange has good location for intermodal traffic.

Table 153: Indicative Measures

Indicative Measures	Description
Luxembourg City railway station works/upgrades.	To adapt the capacity of the Luxembourg City station, technical works will be undertaken. This implies the modification of fixed installations, the construction of a new control centre, the construction of a building, the construction of a new storage yard and the modernisation of the electric traction installations.
Bettembourg railway station works/upgrades.	Technical works will also be implemented in the Bettembourg railway station to respond to local issues. This consists in the modification of fixed installations, the construction of a new control centre, the construction of a new building and the modernisation of the fixed installations of the marshalling yard Bettembourg-Dudelange.
Modernisation of the Luxembourg-Kleinbettingen railway line (EuroCap-Rail project)	The EuroCap-Rail project aims at modernising the Luxembourg-Kleinbettingen railway line. One phase has already been implemented, and two more phases remain. The phase 2 implies the re-electrification (25000 Volts) of the railway line and the lifting of bridges in Kleinbattingen, in Mamer and in Mamer-Lycée. The last phase will require the modernisation of railway stations and rail structures.
Howald: Construction of a new line and a new railway station in Luxembourg-Howald.	The construction of a new line and a new peripheral railway station is planned to be built in Luxembourg-Howald to help develop local services.
Modernisation of the railway line Rodange-Esch/Alzette-Bettembourg/border	The railway line Rodange-Esch/Alzette-Bettembourg/border will be modernised, through the upgrading of the Differdange railway station infrastructures and equipments, the removal of level crossings and the reconstruction of the rail stop of Obercorn on the Pétange-Esch/Alzette railway line, the renewal of fixed installations in Belval-Usines station, the removal of level crossings in Schiffange, and the modernisation of the Schifflange station.
New tram connection of Luxembourg City-Luxembourg airport	There is currently no rail link to the Luxembourg airport. A project is starting concerning the building of a tram with connections from the airport to all major economic centres of Luxembourg City and modal interchange stations
New intermodal terminal in Bettembourg/Dudelange	To respond to these requirements, the construction of new bi-modal terminals (rail/road) in Bettembourg/Dudelange is planned. This project aims at extending the capacity of the global terminal infrastructure. It should also offer additional accesses and better connectivity conditions with the existing transport networks.

Table 154: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
LU1	Bettembourg railway station - Modification of fixed installations - Construction of a new signal box - Modernisation of fixed installations of the marshalling yard Bettembourg-Dudelange	X		X	X					
LU2	Construction of a new bimodal terminal (rail/road) in Bettembourg/Dudelange	X								
LU3	Construction of a new peripheral railway station in Luxembourg-Howald	X			X					
LU4	Luxembourg railway station: - Modification of fixed installations. - Construction of a signal box - Construction of a new storage yard - Modernisation of the electric traction installations	X								

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
LU5	EuroCap-Rail : Phase 2 : Modernisation of the Luxembourg-Kleinbettingen railway line Re-electrification (25000 Volts) of the railway line : 49 400 000 € Re-electrification of the railway line : lifting of bridge at pk 17,030 in Kleinbettingen : 950 000 € Re-electrification of the railway line : lifting of bridge at pk 9,984 in Mamer : 7 100 000 € Re-electrification of the railway line : lifting of bridge at pk 8,913 in Mamer-Lycée : 3 350 000 € - Phase 3 : Modernisation of the Luxembourg-Kleinbettingen railway line, railway stations and rail structures : 328 482 000 € - Construction of a new railway line between Bettembourg and Luxembourg : 212 804 000 € International passenger traffic will be affected to the new line.	X								

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
LU6	Railway line Rodange-Esch/Alzette-Bettembourg/border : - Modernisation of Differdange station - Modernisation of fixed installations in Differdange station - Removal of level crossings - Reconstruction of the rail stop of Obercorn - Modernisation of fixed installations in Belval-Usines station - Modernisation of Schifflange station	X			X		X		X	

Luxembourg – Sea and Inland waterway

Table 155: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Capacity restriction by single locks in the Moselle River	At the German border, Mertert is connected to the Rhine via the Moselle River. However only single lock exist in the Moselle River, which constrains its maximum capacity and its reliability in case of a lock failure. The current capacity bottleneck of the Moselle River represents a major issue for local waterway traffic.
Accessibility of Port of Mertert	The inland road accessibility of the port of Mertert should be improved.

Table 156: Technical Compliance Gaps

Compliance Issues	Description
None identified	

Table 157: Relevant Market Developments

Related Market Issues	Description
Waterway growth potential.	Because of the restriction posed by single lock (class Vb), the current maximum capacity of the Luxembourg – Germany section is 10 million tons per year on the Moselle River, when the effective needs are between 12 and 15 million tons per year. This restriction causes important delays in the ships transit on the Northern part of the Moselle River and lowers the IWW competitiveness with respect to other modes.

Table 158: Indicative Measures

Indicative Measures	Description
Increase the capacity of the Northern part of the Moselle River	The project consisting in the doubling of the locks on the Northern part of the Moselle River between Luxembourg and Germany is planned. Its implementation would enable to increase the local capacity, in a way to correspond to the transit needs.

Luxembourg - Airports

Table 159: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
None identified	

Table 160: Technical Compliance Gaps

Compliance Issues	Description
Rail connection at Airport.	Lack of Direct Rail Connection between Luxembourg Airport and Luxembourg City.

Table 161: Relevant Market Developments

Related Market Issues	Description
None identified.	

Table 162: Indicative Measures

Indicative Measures	Description
New rail connection of Luxembourg City-Wasserbillig (Luxembourg) and Trier (Germany) line	There is currently no rail link to the Luxembourg airport. A project is on-going concerning the building of a rail connection of 8,4 km with connections in both directions from the Luxembourg City-Wasserbillig (Luxembourg) and Trier (Germany) line.

The Netherlands – Road

Table 163: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Amsterdam (urban node)	High congestion on several road sections, especially during peak hours, including on the last mile connections.
Rotterdam (urban node)	High congestion on several road sections, especially during peak hours, including on the last mile connections.
Road charging and tolls	Road charging and tolls are not yet relevant, except on a few new infrastructure sections, which are currently under study (e.g. Blankenburg tunnel)

Table 164: Technical Compliance Gaps

Compliance Issues	Description
None identified	

Table 165: Relevant Market Developments

Related Market Issues	Description
Urban population growth.	Reduces available capacity for long distance traffic. Seaports and major cities in close proximity.
Growth of Dutch Ports	Greater volume of freight traffic inland from international gateways, especially Rotterdam and Amsterdam.

Table 166: Indicative Measures

Indicative Measures	Description
Amsterdam A9 and A10 (upgrade in progress)	Amsterdam A9 and A10 southern motorways are being upgraded for additional capacity.
Rotterdam A4 and A15 (upgrade in progress)	In the Rotterdam-Area, the A4 (linking Amsterdam and Rotterdam) is undergoing an upgrade. The A15 last mile connection of the Rotterdam port is congested and works are underway, including work on the Botlek bridge. One subject under study is an extra connection between the Port area and Rotterdam North: The Blankenburg tunnel.
Rotterdam A13 and A16 (under study)	The route between Rotterdam and the north (The Hague, Amsterdam) is congested on the A13 and A16 motorways. A bypass is under study.

Table 167: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
NL9	New infrastructure to relieve bottlenecks, or upgrading current infra on corridor from Breda to Utrecht.									
NL10	A10 Seperate local from long-distance traffic.	X								
NL11	Traffic congestion (A9 junction).									
NL12	A4 New infrastructure to relieve bottlenecks, or upgrading current infra.		X							
NL13	Blankenburg Tunnel	x	X							
NL14	North eastern Rotterdam Bypass to connect the A13 and A16 motorways.		X							
NL15	Construction northern route (Noordelijke Randweg Utrecht)									
NL16	Increase capacity A12. Different solutions under study (A27/A12 Ring Utrecht)	X								
NL17	A12 One more lane (in both directions)	X								

The Netherlands – Rail and Rail Terminals

Table 168: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Caland railway bridge (port area of Rotterdam)	The railway infrastructure around the port area of Rotterdam requires upgrades to meet the future demand. The Caland railway bridge on the Rotterdam port railway which allows access to the main container terminals, will not be able to cope with capacity around 2015. Life expectancy of the bridge will also end around 2020.
Capacity limit between Rotterdam and Belgium	The railway demand between Rotterdam and Belgium is nearing its capacity according to a MoT study from 2003. In this study, railway noise and rail safety are also mentioned as issues.
Border crossing ETRMS implementation (NL-BE)	Border crossing ETRMS implementation is different per country. The Dutch corridor passenger line (HSL-zuid) has ERTMS deployed. The freight connection doesn't have full ERTMS. The Dutch government has decided to implement ERTMS in stages.
Border crossing electrification (NL-BE)	The Dutch and Belgian railways use different voltages for electrified railways. However, there are locomotives in operation that allow multiple types of current.
Hinterland terminal capacity in corridor regions	Substantial growth in inland intermodal transport is expected for the future (around the year 2030) as a direct result of growing port volumes. This demands more capacity from container transhipment terminals. Bottlenecks at both rail and waterway terminals are expected to occur in many regions, and opportunities are seen for developing hinterland terminal capacity in corridor regions including Zeeland, Noord Brabant and Limburg.

Table 169: Technical Compliance Gaps

Compliance Issues	Description
Line Speed	Mainly compliant, but gaps remaining.
ERTMS	Corridor links mainly have ERTMS in operation. Some gaps remaining.
Axle Load	Mainly compliant, but gaps remaining.

Table 170: Relevant Market Developments

Related Market Issues	Description
Need to increase rail share from ports.	Within corridor, rail bottlenecks within or near ports need to be removed. Rail routes towards Belgium and Luxembourg need to developed further as freight routes.
Need to develop inland rail terminals.	Substantial growth in inland intermodal transport is expected for the future (around the year 2030) as a direct result of growing port volumes.

Table 171: Indicative Measures

Indicative Measures	Description
Upgrade of the rail link from Maasvlakte to Dordrecht	To improve the accessibility of the port area of Rotterdam, the rail link from Maasvlakte to Dordrecht will be upgraded (with additional shunting yards and improved junctions).
Upgrade of Caland railway	To improve the accessibility of the port area of Rotterdam, the Caland railway

Indicative Measures	Description
bridge	bridge will be upgraded.
Betuweline	The completion of the cross-border connection of the Betuweline.
Greenport Venlo Rail Terminal	The Railterminal Greenport Venlo (Trade Port Noord) will be developed between 2015 and 2018 on the international rail connection, as an extension of the existing Trade Port complex in Venlo/Venray.

Table 172: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
NL1	Increase of multimodal logistic platform Venlo (increase Railterminal and Barge Terminal)						X	X		
NL2	Increase capacity of railway station Amsterdam South. Improve road and immediate junctions.		X						X	
NL3	Caland railway bridge, upgrade, new construction or diverting route	X	X					X	X	
NL4	Upgraded along port railway line (junctions and shunting yards).		X						X	
NL5	ERTMS deployment plan. Infrastructure + Rolling stock				X	X				
NL6	New rail infrastructure to improve hinterland rail connection		X						X	
NL7	New rail infrastructure to improve hinterland rail connection		X						X	
NL8	ERTMS deployment plan. Infrastructure + Rolling stock				X	X				

The Netherlands – Sea and Inland waterway

Table 173: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
Capacity and accessibility of Port of Rotterdam	Rotterdam has good multimodal connection with its hinterland but the limitation of the A15 motorway capacity is de facto leading to a need in capacity for the other modes.
Capacity and accessibility of Port of Amsterdam	Amsterdam has a crucial issue concerning maritime accessibility. The locks at Ijmuiden limit access to the whole port area. This is caused by the increase, globally, of vessel sizes and the handling of expected future demand.
Organisation of multimodal transport chains at seaports	It is expected that sea terminal capacity issues will be solved by the end of 2014 with the introduction of two new sea terminals (APMT and RWG) at Maasvlakte 2. Shared attention for the hinterland organisation is planned by Port of Rotterdam to improve the balance between deep sea, container terminal and inland container shipping (Container Logistics Maasvlakte).
Locks at Amsterdam (bottleneck in linking maritime and inland waterway services)	For Amsterdam, accessibility from the sea to the Noordzeekanaal and the hinterland waterway networks is limited by the dimensions of the locks at Amsterdam, which creates a bottleneck in terms of linking maritime and inland waterway services.
Capacity problem at the lock in Terneuzen (entry to the canal Ghent-Terneuzen)	The canal between Ghent (Belgium) and Terneuzen (Netherlands) is a major shipping connection for both maritime and inland navigation. The canal, with an overall length of 32 km, lies 15.4 km on Belgian territory and 16.6 km in the Netherlands. There is presently an issue linked to capacity at the lock compound in Terneuzen.
Volkerak locks (the biggest bottleneck in the waterways of the Scheldt area)	The Volkerak locks are the largest and busiest inland locks in Europe. They form a link in the main Belgium-Netherlands transport axes connecting the Scheldt ports to Rotterdam and to the Rhine. The Volkerak locks also constitute the biggest bottleneck in the waterways of the Scheldt area, as there is no realistic alternative route. Both capacity and shorter operations would improve the situation.
Kreekaklock and Krammerlock (bottlenecks in the waterways of the Scheldt area)	Two of the locks in the vicinity of the Volkerak locks are the Kreekaklock and Krammerlock. These locks have similar issues related to waiting times.
Upgrade of the Maas route	The existing Maas route is aiming to offer an alternative for sustainable transport. It will be upgraded to meet the modern larger vessels in inland waterway shipping. Upgrading also presents an opportunity to improve the safety, flooding risk and ecological value of the Maas river.
Lack of mooring places on the Rhine-Scheldt connection	Sufficient mooring places (or berths) are important for IWW planning and rest regulation compliance. These locations also need to be safe locations. In the Dutch part of the corridor there is a future lack of mooring places on the Rhine-Scheldt connection. An existing shortage is on: i. The Merwede river between, Rotterdam – Tiel. ii. The Lek river between Rotterdam – Utrecht. iii. Tiel-German border. For (iii), the location is mainly important for traffic related to the Rhine-alpine corridor, but this certainly influences the NS-MED traffic as well.
Erosion of the Rhine river bed	In the Netherlands the erosion of the Rhine river bed is another issue. This erosion can lead to damages in locks and thus disturb operations. The controlled dredging to stabilise the river bed is resource consuming process, necessary equipment are limiting the capacity of the river infrastructure during operations.
Full implementation of RIS; upgrade of traffic management system near Moerdijk (Hollandsch Diep-Dordtsche Kil)	RIS enabled management helps reliability and efficiency of IWT. When fully implemented, it is a success factor for being able to handle the expected growth in container transport in a sustainable manner. Upgrade needed of traffic management system near Moerdijk (Hollandsch Diep-Dordtsche Kil) to improve safety on the busy waterway. This is under study.
Capacity problem at the Prinses Beatrix Lock on the Lek Canal	The Prinses Beatrix Lock on the Lek Canal to the south of Utrecht will become a bottleneck due to increasing volumes of inland waterway traffic between

Critical Issues	Description
	Amsterdam and Rotterdam. The construction of a third lock would improve throughput capacity. This is a pre-identified project for the (overlapping) North Sea Baltic corridor.
LNG availability (infrastructure and vessel equipment)	LNG is available as IWT fuel at the nodes of Rotterdam and Amsterdam and more nodes are planned/expected in the future. An overlapping supply chain or fuel infrastructure is not present today. Also vessels need time and funding to convert to dual fuel engines.

Table 174: Technical Compliance Gaps

Compliance Issues	Description
Vessel Draught	Minor gaps, mainly in connecting links.
Bridge Height	Minor gaps, mainly in connecting links.

Table 175: Relevant Market Developments

Related Market Issues	Description
Growth foreseen in NL ports.	Need to maintain accessibility of seaports as ship sizes increase.
Growth foreseen especially in container sector.	High volumes of waterborne and rail freight using main connections between seaports and German border.
Broaden reach of waterway routes.	Possibility to develop Maas routes to a greater extent.
Inland Port development.	Need for inland port development to match seaport growth.
Monitoring the level of usage of RIS	The technical standard for RIS is met in the Netherlands. Still monitoring is necessary for the level of usage of the system.

Table 176: Indicative Measures

Indicative Measures	Description
Area of Port of Rotterdam	Current projects: • The Transferium to transfer large numbers of containers from the Maasvlaakte to Alblasserdam by IWW. • The completion of the cross-border connection of the Betuweline. • The upgrade of the rail link from Maasvlakte to Dordrecht. • The upgrade of Caland railway bridge and the upgrade of A4 motorway that links the A15 and the A20.
New lock at Amsterdam (North Sea Canal area)	For the North Sea Canal area, the national authority (Rijkswaterstaat) is planning to build a new lock at Amsterdam to simplify access to the port region of Ijmuiden/Velsen and Amsterdam.
Transshipment point of bulk sea ships (North Sea Canal area)	Due to the restriction of the lock a transshipment point of bulk sea ships is in operation. Near the northern lock, bulk cargo sea ships are lightened in their load to pass the canal towards the port of Amsterdam. This location on occasion blocks the way for other traffic using the lock and creates safety issues. A new location is under construction.
New lock at Terneuzen	The Flemish – Dutch Scheldt Commission (VNSC) is preparing for the construction of a new lock at Terneuzen. The scope of the large lock project on the Ghent-Terneuzen canal includes the preparation, construction and infrastructure maintenance for thirty years.
The Volkerak locks Capacity study	The Volkerak locks Capacity study: The study considers four main measures (alternatives) ranging from low-cost “quick wins” such as better traffic management, the adaptation of existing facilities, the construction of a fourth lock chamber, and the construction of a semi-open connection. These are considered for a range of traffic growth scenarios up to 2040.

Indicative Measures	Description
Maasroute modernisation Phase II	Maasroute modernisation Phase II: Transport projects are ongoing until 2020 and parts are completed. Total projects encompass: - Upgrade of waterway to CEMT Vb (the Juliana Canal) - Upgrade of locks - Increase depth of waterways - Extend bends to widen the waterway - Heighten bridges for container transport - Traffic management centre at Maasbracht
Future Vision Waal	Future Vision Waal (Toekomstvisie Waal) is a work plan containing the increase of mooring places and the maintenance plan to manage the erosion of the Rhine river bed. Further mooring place projects are defined at Beneden Lek and Merwedes.
LNG availability	LNG is available as IWT fuel at the nodes of Rotterdam and Amsterdam and more nodes are planned/expected in the future. An overlapping supply chain or fuel infrastructure is not present today. Also vessels need time and funding to convert to dual fuel engines.
Upgrade of traffic management system near Moerdijk	Upgrade of traffic management system near Moerdijk (Hollandsch Diep-Dordtsche Kil) to improve safety on the busy waterway is under study.
Construction of a Rail Service Centre at Port of Moerdijk	Study to prepare the construction of a Rail Service Centre at Port of Moerdijk to improve interconnectivity between sea, rail and inland waterway transport.

Table 177: Specific Objectives Being Addressed by Proposed Measures

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
NL18	Projects regarding Lek canal: Increase capacity of Princess Beatrix Lock and Widen the Lek canal	X						X		
NL19	Future vision Waal. Short term dredging to extend the dimensions. Finding a long term geological solution. Finally increasing the number of mooring places.	X		X				X		
NL20	Amsterdam lock: build of a new lock to increase port handling capacity and safety. Furthermore to comply with larger dimensions of vessels.	X							X	
NL21	New location for transhipment; lock, Averijhavendepot.	x	x					x		
NL22	Maasroute phase 2	X								
NL23	Study to prepare the construction of a Rail Service Centre at Port of Moerdijk to improve interconnectivity between sea, rail and inland waterway transport		X					X	X	
NL24	Container Logistics Maasvlakte (CLM) - logistical solutions of combining cargo in order to create full trians and reduce turnaround times and nr of calls.	X					X	X	X	
NL25	Deepening of the Nieuwe Waterweg to ensure nautical accessibility									
NL26	Increase the number of mooring locations	x								
NL27	Improvement of nautical accessibility Port of Vlissingen		X							
NL28	New lock in Terneuzen	X	X	X	X		X	X	X	
NL29	Wilhelmina Canal phase 1.5			x			x			

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
NL30	Options for increasing traffic throughput in Volkeraklock, Kreekaklock, and Krammerlock.							X		

The Netherlands - Airports

Table 178: Critical issues - Bottlenecks, Missing Links

Critical Issues	Description
None identified	

Table 179: Technical Compliance Gaps

Compliance Issues	Description
Rail access to Rotterdam Airport missing.	Currently no direct rail connection to airport.

Table 180: Relevant Market Developments

Related Market Issues	Description
None identified.	

Table 181: Indicative Measures

Indicative Measures	Description
None identified.	

United Kingdom

Critical Issues – Road

Critical Issues	Description
Manchester M6/M62	Road congestion during peak hours
Birmingham M6	Road congestion during peak hours
Felixstowe-Midlands, A14	Road congestion during peak hours
Southampton M27/M3	Road congestion during peak hours
London M25	Road congestion during peak hours, including the Dartford Crossing.

Critical issues – Rail

Critical Issues	Description
WCML	Lack of capacity on southern sections of West Coast Main Line.
HS1. Channel Tunnel to London	For routes to and from the Channel Tunnel, the HS1 route between the Tunnel and London St. Pancras is included on the corridor and is only likely to have capacity for freight services at night.
Conventional Kent Line, London to Channel Tunnel.	Loading gauge for Channel Tunnel freight trains on the conventional route through Kent is more restricted than that in France. For intermodal units, rail freight operators have to adopt wagonload solutions to carry the relevant size of intermodal units, but face additional costs related to the lack of interoperability between the two main Channel Tunnel routes (track gauge and electrification).
Potential missing link between HS1 and proposed HS2.	Plans for a physical link between the existing HS1 at London St Pancras and the London terminus of the proposed HS2 link at London Euston are not concluded. The UK Government intends to carry out a study of how to improve connections between the UK's high speed rail network and the continent that could be implemented once the initial stages of HS2 are complete.

Table 182: Specific Objectives Being Addressed by Proposed Measures – UK Rail

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
UK1	Improvements in terms of capacity requirements for road and rail traffic , alleviation of bottlenecks and the promotion of cross-border connectivity.	X								
UK2	Electrification of the key routes to improve connectiions between key nodes, remove bottlenecks and reduce carbon emissions.			X						
UK3	Improvements to increase the gauge and overall capacity of this important freight route. Will enhance capacity, remove bottlenecks and reduce C02 emissions.	X							X	
UK4	Northern Hub: Installation of or improvements to electrification and capacity developments. Will remove bottlenecks and support economic growth.	X		X						
UK5	To address capacity and performance constraints in the Stafford area and remove bottlenecks.	X								
UK6	Power supply upgrade to increase capacity and reliability and reduce carbon emissions.			X						
UK7	Major north-south rail electrification and capacity enhancement to imporve capacity and remove bottlenecks.	X		X					X	

Table 183: Specific Objectives Being Addressed by Proposed Measures – UK Road

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
UK8	Improve accessibility between the Westlink and the M2 and M3 with a grade-separated junction in central Belfast and remove one of the last remaining bottlenecks on the Core Network/Corridor in Northern Ireland.	X								
UK9	Improve the M6 by making it a "smart motorway" between junctions 10a and 13 to provide additional capacity via the hard shoulder.	X				X				
UK10	The M8 M73 M74 Motorway Improvements project involves constructing 10km of new M8 motorway and a new A8 trunk road, major improvements on the M74 and widening of sections of motorway to improve connectivity through the Central Scotland motorway network. The will reduce congestion and improve journey times and safety.	X								
UK11	Improvements to the M3 by making it a "smart motorway" between junctions 2 and 4a (13.4 miles / 21.6km). This will enhance capacity.	X				X				
UK12	Widening the A14 J7-9 Kettering bypass by providing an extra lane in each direction.	X								

ID	Description of project	Improve level of service for longer distance links.	Facilitate last mile access to seaports and airports.	Adopt or exceed TEN-T standards in corridor, subject to need.	Integrate cross-border initiatives e.g. RFC2.	Increase use of interoperable telematics technology.	Develop network of inland terminals – logistical hubs.	Develop greater range of combined transport services via rail and waterway.	Increase inland modal share for rail and IWT at seaports, and rail at airports.	Extend access to clean fuel at core nodes.
UK13	A high standard southern relief road linking Warrenpoint Harbour to the A1 TEN-T Core Corridor to national and cross-border destinations such as Belfast, Warrenpoint Harbour and Dublin. Improve journey times and road safety and significantly reduce congestion.	X	X						X	
UK14	Improve capacity on M25 Junction 30 and in particular the A13 through Junction 30 and to the junction with the A126, to address capacity constraints on the development of the lower Thames Valley.	X								

Switzerland

Although Switzerland is not an EU Member State, nor one of the NSMED corridor countries, Basel as a node is a natural end-point one branch of the corridor and constitutes a gateway to other European areas such Switzerland and Northern Italy.

Critical issues	
Bottlenecks	**Basel bottleneck**: Freight traffic between Basel and the French border is limited due to flat (at grade) junctions and the signalling system.

ANNEX 10: TALLINN DECLARATION

On the 17th October 2013, the following declaration was signed by the European Commission and the Transport Ministers of France, Netherlands, Flanders and Wallonia.

Declaration on the implementation of the TEN-T Core Network Corridor North Sea – Mediterranean

"The signing parties to this declaration:

HAVING REGARD TO

the forthcoming Regulation of the European Parliament and of the Council on Union guidelines for the development of the trans-European transport network which aims at the development of the TEN-T core network in accordance with the Regulation in a coordinated and a timely manner; and that such coordination includes the establishment of a corridor approach as an instrument to coordinate the various projects on a transnational basis in order to maximise network benefits;

the forthcoming Regulation of the European Parliament and of the Council establishing the Connecting Europe Facility which allocates EUR 26 billion from the Union budget for/with the aim of accelerating investment in the field of trans-European networks and leverage funding from both the public and the private sectors for the period 2014-2020 and which identifies for this purpose nine Core network corridors including the North Sea – Mediterranean Corridor;

the recent adoption of the NAIADES II Communication by the Commission which identifies the implementation of the TEN-T network as one of the key areas of intervention required to make better use of inland navigation as a key component of Europe's multimodal transport network;

CONSIDERING

that this declaration concerns inland waterways of the North Sea-Mediterranean corridor, access routes and intermodal connections for the Seine-Scheldt connection and inland waterway projects contributing to good accessibility of seaports on the North Sea – Mediterranean Core network corridor;

that inland navigation represent the core components of the French, Belgian and Dutch sections of the North Sea - Mediterranean Core network corridor and has to play a key role in strengthening the multimodal character and the resource-efficient of the corridor;

RECOGNISING

the significant preparatory work (studies and effective works) which has already been carried out in the framework of Priority Project 30 by France, Flanders and Wallonia, especially concerning the Seine Nord Europe canal, the Lys, upper Scheldt or Condé-Pommeroeul.

the strategic role that the Intergovernmental Committee (IGC) and, at technical level, the European Group of Economic Interest (EEIG) have played for the cooperation between the French, Flemish and the Walloon administrations for Priority Project 30;

the important role that this inland waterway connection will play providing accesses in France, Belgium and The Netherlands in a multimodal environment;

COMMIT TO

strengthen and broaden the existing coordination mechanisms for the implementation of the French, Belgian and Dutch inland waterway sections of the North Sea - Mediterranean Core network corridor, building upon the existing coordination mechanisms and in consultation with the Corridor Forum of this corridor;

take the appropriate measures to develop the inland waterway sections of the North Sea - Mediterranean Core network corridor by 2030 through the Trans-European Transport Network and for this purpose swiftly consolidate the preparatory phases of the various projects, including the restructuring of the current co-funding Decisions to allow maximising the EU co-funding as of 2014;

exploit to the fullest extent the co-financing possibilities offered until 2020 by the Connecting Europe Facility for the inland waterway projects on the North Sea – Mediterranean Core network corridor, including the studies/upgrading related to the Maas, the Albert canal, the canal Ghent/Terneuzen, the canal Bocholt/Herentals, the various locks on the Seine-Scheldt corridor as well as on the Upper-Scheldt, the maritime lock in Terneuzen, the canal Seine-Nord, the Seine – Scheldt interconnection, including the canal Roeselare-Lys and the canal Bossuit-Kortrijk, the inland waterway axes Dunkerque - Valenciennes, Lille – Douai and the river Seine from Le Havre to Nogent-sur-Seine, Antwerpen-Brussels-Chaleroi and the waterways in Wallonia, as well as for the further development of access routes and intermodal connections for the Seine-Scheldt connection, including multimodal platforms and the inland waterway connection to the ports of Dunkerque, Ghent, Antwerp and Zeebrugge and for inland waterway projects contributing to a good accessibility of seaports, including Le Havre and Amsterdam and its locks and Beatrix lock which are interconnected with this corridor through inland waterways;

exploit in particular the possibilities offered in the Connecting Europe Facility of the co-financing rate of up to 40% for grants for the above mentionned sections.

take appropriate steps to fully integrate these projects with relevant projects related to the other modes of transport, in particular with rails, maritime, inland and sea port and road projects, in order to fully develop the multimodal aspect of the corridor;

maximise, through the integrated cross-border governance of the Seine-Scheldt connection and through the integrated multimodal development of the various related *projects, the EU added value of the project which will justify the allocation of the highest possible co-financing rate."*

ANNEX 11: CEF: Pre-identified Projects

LIST OF PRE-IDENTIFIED PROJECTS ON THE CORE NETWORK IN THE TRANSPORT SECTOR

(Annex I, Part I, Regulation 1316/2013)

Horizontal Priorities

Innovative management & services	Single European Sky – SESAR system
Innovative management & services	Telematic applications systems for road, rail, inland waterways and vessels (ITS, ERTMS, RIS and VTMIS)
Innovative management & services	Core network ports, motorways of the sea (MoS) and airports, safe and secure infrastructure
New technologies and innovation	New technologies and innovation in accordance with points (a) to (d) of Article 33 of Regulation (EU) No 1315/2013

North Sea Mediterranean Corridor

Corcaigh/Cork - Dublin - Baile Átha Cliath/Belfast	Rail	Studies and works; Baile Átha Cliath/Dublin Interconnector (DART);
Belfast	Port, multimodal connections	Upgrading
Glasgow – Edinburgh	Rail	Upgrading
Manchester – Liverpool	Rail	Upgrading and electrification, including Northern Hub
Birmingham – Reading – Southampton	Rail	Upgrading of the freight line
Baile Átha Cliath/Dublin, Corcaigh/Cork, Southampton	Ports, rail	Studies and works on port capacity, MoS and interconnections
Dunkerque	Port	Further development of multimodal platforms and interconnections
Calais – Paris	Rail	Preliminary studies
Bruxelles/Brussel	Rail	Studies and works (North-South connection for conventional and high-speed)
Felixstowe – Midlands	Rail, port, multimodal platforms	Rail upgrading, interconnections port and multimodal platforms
Maas, including Maaswerken	IWW	Upgrading
Albertkanaal/Canal Bocholt-Herentals	IWW	Upgrading
Rhine-Scheldt corridor: Volkeraklock and Kreekaklock, Krammerlock and Lock Hansweert	IWW	Locks: studies ongoing
Terneuzen	Maritime	Locks: studies ongoing; works
Terneuzen – Ghent	IWW	Studies, upgrading
Zeebrugge	Port	Locks: studies, interconnections

		(studies and works)
Antwerpen	Maritime, port, rail	Locks: studies ongoing; port: interconnections (including second rail access to the port of Antwerpen)
Rotterdam - Antwerpen	Rail	Upgrading rail freight line
Canal Seine Nord; Seine - Escaut	IWW	Studies and works; upgrading including cross-border and multimodal connections
Dunkerque – Lille	IWW	Studies ongoing
Antwerpen, Bruxelles/Brussels, Charleroi	IWW	Upgrading
Waterways upgrade in Wallonia	IWW	Studies, upgrading, intermodal connections
Brussel/Bruxelles - Luxembourg – Strasbourg	Rail	Works ongoing
Antwerpen – Namur - LUX border – FR border	Rail	Upgrading of rail freight line
Strasbourg - Mulhouse - Basel	Rail	Upgrading
Rail Connections Luxembourg - Dijon - Lyon (TGV Rhin - Rhône)	Rail	Studies and works
Lyon	Rail	Eastern bypass: studies and works
Canal Saône - Moselle/Rhin	IWW	Preliminary studies ongoing
Rhône	IWW	Upgrading
Port of Marseille-Fos	Port	Interconnections and multimodal terminals
Lyon - Avignon - Port de Marseille - Fos	Rail	Upgrading

Overlapping Corridors – Selected Projects Relevant for NSMED

North Sea – Baltic

Amsterdam locks & Amsterdam - Rijnkanaal	IWW	Locks studies ongoing; port: interconnections (studies and works, including Beatrix lock upgrade)

Mediterranean

Lyon	Rail	Relieving Lyon bottlenecks: studies and works
Lyon – Avignon – Marseille	Rail	Upgrading

Rhine – Alpine

Basel – Antwerpen/Rotterdam - Amsterdam	IWW	Works for better navigability
Liège	Rail	Port and airport rail connection
Rotterdam – Zevenaar	Rail	Studies ongoing, upgrading
Zeebrugge – Ghent – Antwerpen - DE border	Rail	Upgrading

Atlantic

Paris	Rail	Southern high-speed bypass
Baudrecourt - Mannheim	Rail	Upgrading
Baudrecourt - Strasbourg	Rail	Works ongoing, to be completed 2016
Le Havre - Paris	IWW	Upgrading
Le Havre - Paris	Rail	Studies, upgrading

Other Sections on the Core Network

Milford Haven – Swansea – Cardiff	Other core network	Rail	Upgrading
Rail connection Sionainn/Shannon Faing/Foynes - Gabhal Luimnigh/Limerick junction	Other core network	Rail	studies
High Speed 2	Other core network	Rail	Studies & works for a high-speed line London – Midlands
Cardiff - Bristol – London	Other core network	Rail	Upgrading, including Crossrail