SCAN MED CORRIDOR

Infrastructure
for a united Europe

FINLAND

NORWAY

SWEDEN

DENMARK

GERMANY

AUSTRIA

ITALY

MALTA

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Infrastructure
for a united Europe

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All concepts marked with * are explained in the glossary.

PREFACE

Violeta Bulc,
European Commissioner
for Transport

An efficient transport system is the foundation for a smooth functioning of the single market and an important means to secure the leading role of Europe globally, both in economic and political terms.

The Trans-European Transport Network (abbreviated as TEN-T) will close infrastructure gaps between member states, remove bottlenecks that currently still interfere with the smooth functioning of the single market, will overcome technical barriers, for instance incompatible standards in rail transport and will offer opportunities for start-ups and SMEs.

Ambitious environmental goals, for instance embedded in the European Commission's White Paper on transport and limited financial resources, both underline the importance of making the TEN-T especially sustainable and efficient, as well as to ensure innovative financing mechanisms. This is how we meet our responsibility to pass on an intact environment and sufficient financial leeway, which will be required for generations to come in order for them to face future challenges.

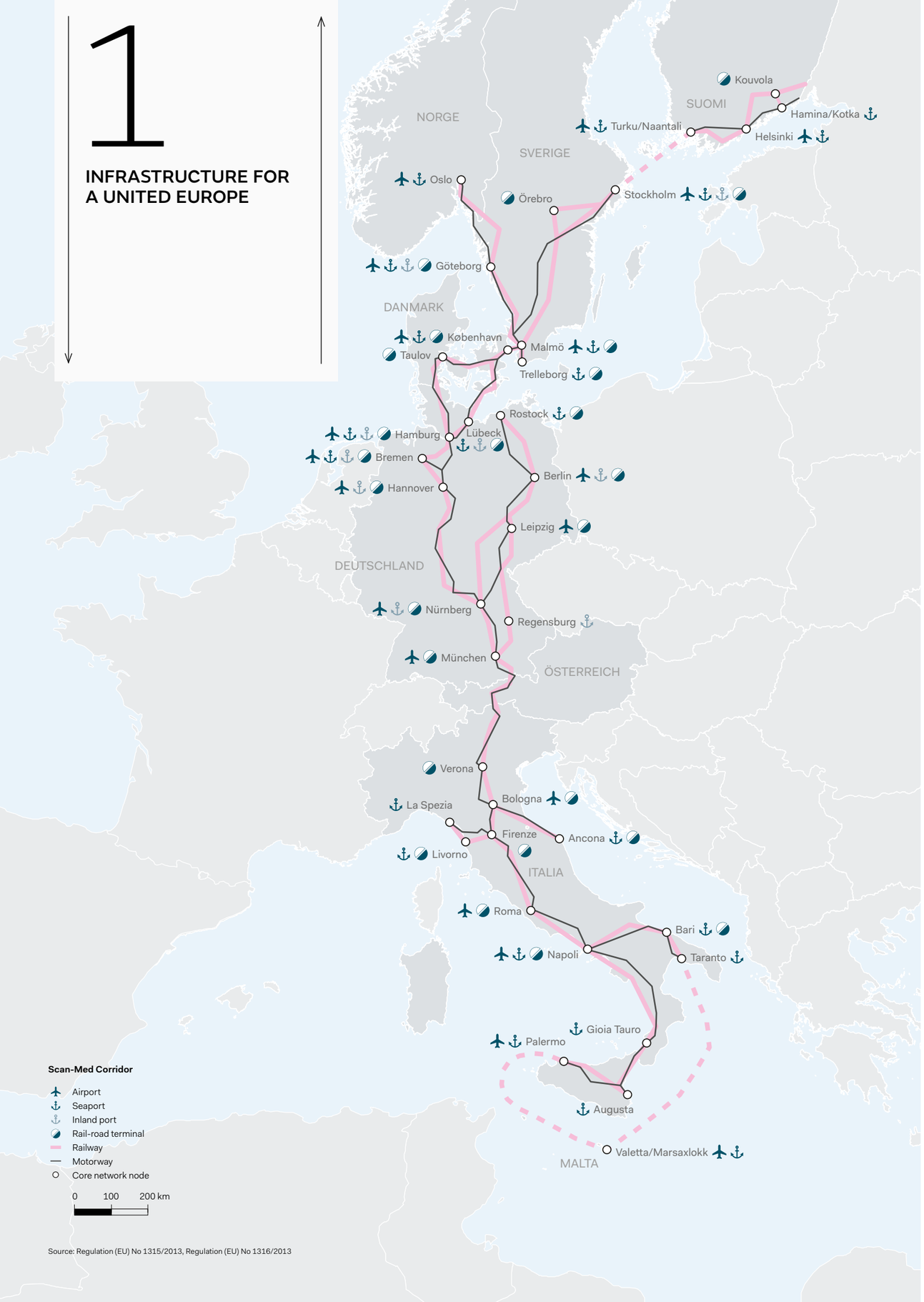
The TEN-T core network that will be implemented until 2030 is a united European answer to these challenges. The expansions of railways, roads, ports and airports, as well as accompanying policy measures, co-ordinately developed by member states, guarantee prompt and visible network effects. Until 2050 the comprehensive network will be implemented, which will add further connections to the core network.

This publication illuminates the strategic importance of the implementation of the Scan-Med Corridor. "Scan-Med Corridor - Infrastructure for a united Europe" is the outcome of cooperation between member states, national infrastructure companies and European institutions and thereby embodies the European spirit that is essential for the successful realisation of the TEN-T: mutual exchange and close cooperation within a common Europe.

Especially, I hope that this publication will enable you to see the advantages, the importance and the European dimension of the TEN-T in general terms and of the Scan-Med Corridor in particular. But first and foremost, I hope that all of us – from citizen to entrepreneur – will use the opportunities for growth, for new forms of employment and diverse forms of cooperation with partners in the entire EU.

1

INFRASTRUCTURE FOR A UNITED EUROPE



Source: Regulation (EU) No 1315/2013, Regulation (EU) No 1316/2013

INFRASTRUCTURE FOR A UNITED EUROPE

The Scandinavian-Mediterranean Corridor[1] is the longest core network corridor within the Trans-European Transport Network (TEN-T). It is used by passenger and freight traffic and connects Scandinavia with important city regions in Germany and Italy.

The Scan-Med Corridor stretches over almost all of the Continent of Europe. It connects regions on the northernmost border of the EU with the Mediterranean Island of Malta and runs through seven member states of the EU as well as Norway.

Within the TEN-T, the core network comprises those corridors with the greatest strategic relevance for the final realisation of the transport network. The Scan-Med Corridor is one of nine multimodal* transport corridors in this core network. Therefore the corridor includes all modes of transport and is of great importance for rail, road, shipping and also air traffic. The purpose of the Scan-Med Corridor is to collaboratively develop all means of transport within a Trans-European transport network[2]. The route is made up of important individual routes and connections between relevant hubs. The largest proportion of the corridor is over land, whereas the Alps form its greatest topographical barrier. At its northern and southernmost part the route crosses the Baltic Sea and the Mediterranean.

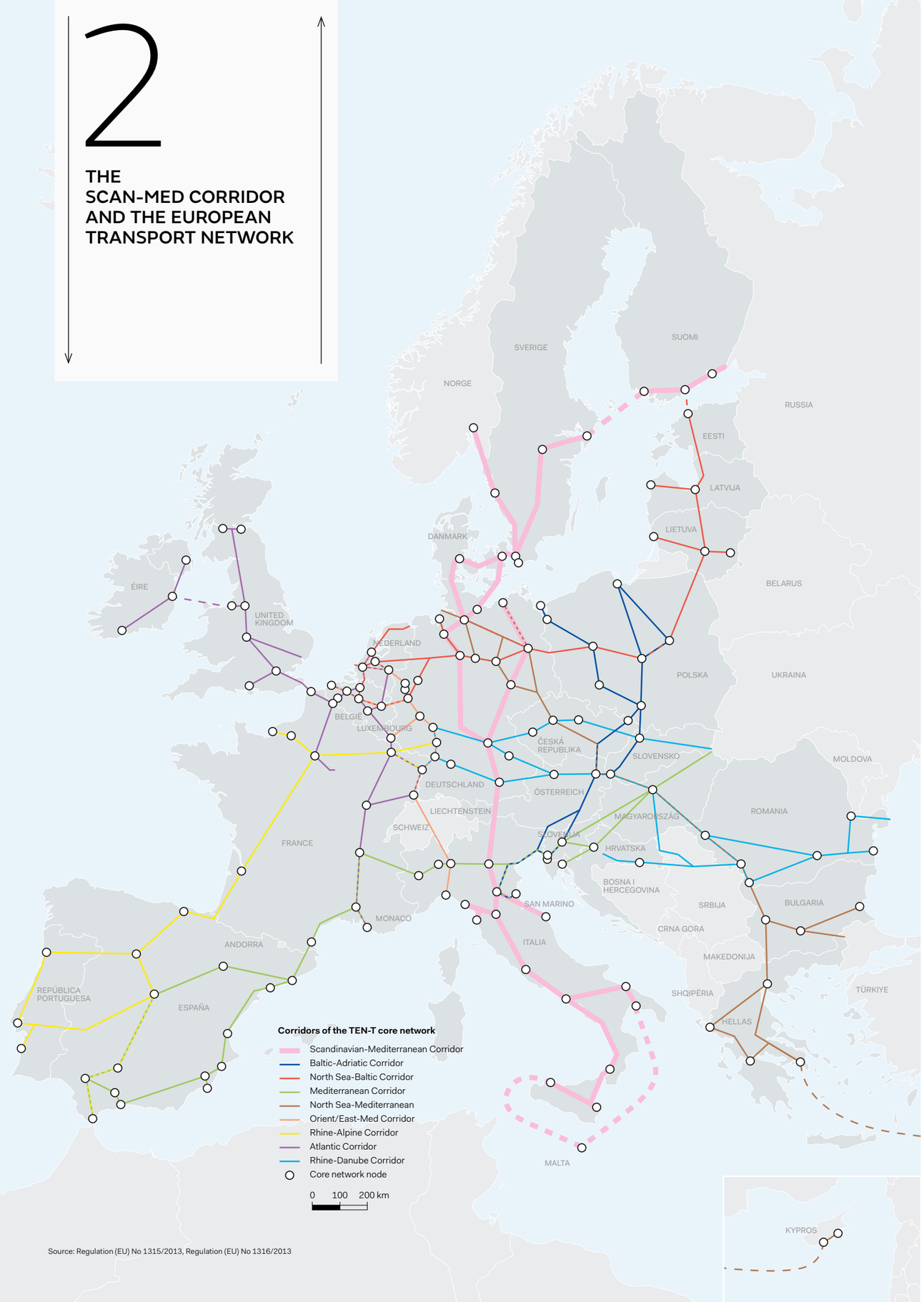
The Scan-Med Corridor runs through densely populated and economically powerful regions. In the Baltic Sea area the corridor connects all the capital city regions of four adjoining states: Helsinki, Stockholm, Oslo and København. In Germany it passes through Berlin, through its northern trading cities and also through important industrial cities in central and southern Germany. The transalpine section in Austria and northern Italy is one of the wealthiest areas of the whole of Europe. But this area is also exposed to heavy traffic that is channelled through the Alps. The Scan-Med Corridor then traverses the densely populated and economically important Po Valley, the capital region of Roma and also the important central and southern Italian metropolitan areas. Finally, Malta is connected to the international sea trade network with two seaports.

In total the Scan-Med Corridor contains roughly 9 400 km of railroad tracks, 6 900 km of motorways and expressways and 19 airports. 25 sea ports are located on the Baltic and the North Sea and on the Mediterranean parts of the Scan-Med Corridor. The corridor does not include any relevant inland waterways or inland ports and therefore includes no inland shipping activity.

[1] The term Scandinavian-Mediterranean Corridor will be abbreviated as: Scan-Med Corridor
[2] The collaborative development of the Trans-European transport network corresponds to the process of harmonisation within the EU, the process of creating common standards, consistency of laws, practices and regulations in order to facilitate free-trade and the common market.

2

THE SCAN-MED CORRIDOR AND THE EUROPEAN TRANSPORT NETWORK



Source: Regulation (EU) No 1315/2013, Regulation (EU) No 1316/2013

HIGH-LEVEL TRANSPORT NETWORKS IN THE EU

The Trans-European Transport Network (TEN-T) is a common network for high-level road, rail, air and shipping transport within the EU. Developing this network will strengthen the economic and social cohesion* of the EU.

The TEN-T supports the creation of an efficient and sustainable single European transport area, which will generate growth and which will be advantageous to all people using the corridor. The TEN-T contributes to achieving the goals of the European Commission's White Paper on Transport* that specifies the core goals of a European transport policy to the year 2050.

Regularly the European Commission develops and adapts the guidelines for the TEN-T to include new member states and in order to adapt to new framework conditions. The TEN-T guidelines were last changed in 2013/2014[3]. Currently the TEN-T is made up of a dual-layer structure: The comprehensive network and the core network.

The comprehensive network comprises all the existing and planned infrastructures of the Trans-European transport network, with the addition of measures for promoting an efficient, socially and ecologically sustainable use of these infrastructures. The comprehensive network is the final result of negotiations with the member states and should be implemented before 2050.

The core network consists of those parts of the comprehensive network, which, from the perspective of the European Commission, are of great strategic importance for the overall realisation of the goals related to the TEN-T. This network reflects the development of transport demand and the demand for multimodal transport. The core network was developed by the European Commission based on a pre-defined methodology. The network's implementation up until 2030 is given high priority by the Commission.

For the implementation of the whole core network, nine core network corridors were defined in total. European funding for infrastructure is focused on the core network. Its implementation and co-funding are not regulated through the TEN-T guidelines, but through the Connecting Europe Facility*.

The Scan-Med Corridor is one of nine core network corridors, established through the Connecting Europe Facility*. The most important elements and segments of today's Scan-Med Corridor were pursued as early as 1996 by the EU, as priority axes and projects (abbr.: PP). This means that some of the most important projects have already been completed or are already under construction[5].

Due to its central location within the EU and its enormous north-south extension, the corridor is linked with five of the eight other corridors and partly overlaps with them. This close-knit relation to the other core corridors and its great north-south expanse underscores the major importance of the corridor as the backbone of a united Europe.

[3] Regulation (EU) No 1315/2013
[4] For instance: Öresund Bridge between Malmö and København; new routes and route expansions Lübeck-Hamburg, Berlin-Halle/Leipzig, Halle/Leipzig-Erfurt, Nürnberg-Ingolstadt-München; first section of the Brenner Base Tunnel northern access route; new routes and route expansions Verona-Bologna, Bologna-Firenze, Firenze-Roma, Roma-Napoli, Napoli Salerno
[5] For instance: New routes and route expansions Rostock-Berlin, Erfurt-Nürnberg; Brenner Base Tunnel

GOALS OF THE SCAN-MED CORRIDOR

Overall expansion goals

The main purpose of the Scan-Med Corridor is to overcome bottlenecks and to complete missing links, especially on cross-border segments of the TEN-T core network.

Transport infrastructure on the Scan-Med Corridor should be extended within and between EU member states and Norway. Special attention is paid to ensuring efficient and continuous flows of traffic across national borders.

The TEN-T core network guarantees the optimum integration of all modes of transport in terms of multimodality*. The interoperability of national and transeuropean transport networks is secured through removing technical and administrative barriers. Therefore the use of telematics* is promoted in context of the European transport infrastructure policy and the development of innovative technologies is supported.

Based on the TEN-T, all the regions within the Scan-Med Corridor should be equipped with transport infrastructure to the same extent, in terms of quality. The goal is to cover the mobility and transport demand of users within the EU and in relation to third countries. This should improve the accessibility and connectivity of all European regions.

Environmental protection* is a major aspect of the implementation of all TEN-T core network projects. All low emission modes of transport, especially rail transport, are promoted the same as alternative fuels and innovative drive systems. This is particularly relevant for ecologically sensitive parts of the TEN-T core network, like the transalpine section of the Scan-Med Corridor.

The overall infrastructure expansion goals of the Scan-Med Corridor are in accordance with the vision and strategy of the White Paper on Transport*. The implementation of the Scan-Med Corridor makes an important contribution in creating a European transport system up until 2050 that is competitive and climate-friendly. Individual initiatives[6] listed in the White Paper on Transport* are both implemented in context of the TEN-T core network in general terms and in specific terms based on the Scan-Med Corridor.

High speed line Nürnberg-Ingolstadt and the motorway A9

[6] European Commission (2011): Appendix I

Requirements for infrastructure projects

Minimum requirements for infrastructure expansions in context of the Scan-Med Corridor arise from the requirements formulated by the EU for the TEN-T core network. Especially for rail infrastructure these requirements are more demanding than for the TEN-T comprehensive network[7]:

All TEN-T core network railway lines will be electrified. Freight transport routes will be accessible for at least 22.5 tonne axle loads, 100 km/h line speeds and 740 metre trains. Routes will be fully and continuously equipped with ERTMS*. New tracks will have a nominal gauge of 1 435 millimetres.

Apart from this, measures are taken to reduce negative impacts of noise and vibration, which applies to railway lines and rolling stock*. No minimum requirements are made for passenger transport, neither in terms of speed or train length, but member states are able to set national standards.

Based on these requirements, measurement parameters are defined for infrastructure expansions. For individual parameters a high degree of implementation has already been achieved: 96 % electrification, 94 % axle load of at least 22.5 tonnes, 93 % line speed beyond 100 km/h and 100 % nominal track gauge of 1 435 millimetres (except Finland which uses Russian broad gauge tracks). Other parameters have not yet reached such high degrees of implementation: 66 % train length of 740 metres, 6 % equipment with ERTMS*[8].

In addition to the requirements of the current TEN-guidelines[9], the performance parameters for rail systems[10] adopted in 2011 by the European Commission must also be applied. This means that newly constructed routes within the TEN-T core network must be able to operate trains with an axle load of 25.0 tonnes, length of 750 metres and with a track speed of 200 km/h. For rail infrastructure expansions within the core network the performance parameters determine an axle load of 22.5 tonnes, train lengths of 600 metres and a track speed of 160 km/h. Newly constructed routes used exclusively or partly by freight transport, are allowed to have maximum gradients as steep as 12.5 ‰ or in some cases even below this value[11].

[7] Regulation (EU) No 1315/2013: Art. 39
[8] KombiConsult et al. (2015)
[9] Regulation (EU) No 1315/2013
[10] Commission Decision of 26 April 2011: Chapter 4.2.2; the performance parameters affect routes with mixed traffic (passenger and freight transport on the same route). For newly constructed routes and route expansion exclusively reserved for passenger or freight transport lower performance parameters partly apply.
[11] Commission Decision of 26 April 2011: Chapter 4.2.4.3.


9 400 km
of railroad tracks
96 %
electrification
6 900 km
of motorways and expressways
94 %
axle load of at least 22.5 tonnes
19
airports
93 %
line speed beyond 100 km/h
25
sea ports
100 %
nominal track gauge of 1 435 millimetres

EUROPEAN GOVERNANCE AND CO-FUNDING

The EU-coordinator for the Scan-Med Corridor

Actual infrastructure expansions and enhancements on the Scan-Med Corridor are the responsibility of the individual states. These projects are funded and coordinated on the European level. This ensures a concerted and efficient implementation.

In 2014 an EU-Coordinator was assigned for each TEN-T core network corridor, whose task is to supervise and promote the implementation of a specific corridor. Pat Cox, the former president of the European Parliament from 2002-2004, is the current European coordinator for the Scan-Med Corridor.

He is supported by a consultative forum, the so-called Corridor Forum and also by various working groups made up of delegates from member states, of regions adjacent to the route and also by relevant infrastructure companies. The corridor forum offers the possibility for adjoining member states to discuss and coordinate infrastructure development, whereas the working groups focus on specific issues and thus function as "ideas laboratories"[12] for creating new approaches to assist implementing the goals of the Scan-Med Corridor.

In May 2015 the EU coordinator presented his first corridor work plan[13], identifying the most urgent steps to be undertaken. A detailed and comprehensive study of the corridor[14] is the foundation of the work plan, which assesses a total of 394 projects and measures by relevance for the implementation of the Scan-Med Corridor.

Additionally, a transport market study was prepared for every TEN-T core network corridor[15]. Apart from assessing available scientific findings, the study analysed the current transport market on all parts of the Scan-Med Corridor and their expected further development. Based on a SWOT analysis*, the transport market study discusses and recommends infrastructure expansions and administrative measures.

The EU coordinator Pat Cox supports initiatives and platforms devised by EU member states and infrastructure companies, which focus on the realisation of the Scan-Med Corridor and its individual sectors. The Brenner Corridor Platform is one of these platforms, which is already established and in operation. It was created in context of a previous European initiative, the PP1 Railway axis Berlin-Verona/Milano-Bologna-Napoli-Messina-Palermo. The function of the Brenner Corridor Platform is to ensure the regional coordination and implementation of the transalpine section of the Scan-Med Corridor.

[12] European Commission (2015): page 20f
[13] European Commission (2015)
[14] European Commission (2014)
[15] ETC Transport Consultants GmbH (2014) on behalf of the RFC 3 management board

Co-funding the Scan-Med Corridor

The co-funding of actual TEN transport projects is not regulated by the TEN-T guidelines, but by the Connecting Europe Facility*[16]. The facility defines conditions, methods and procedures for financing projects of common interest in the range of transport, telecommunication and energy infrastructures.

Furthermore, the Connecting Europe Facility* lists the funding that needs to be provided for the 2014-2020 Multiannual Financial Framework. Of the 26 billion Euro set aside for the transport sector, 11 billion will be invested in cohesion states*. The EU co-funds up to 40 % of transport infrastructure construction and up to 50 % of studies related to the development of corridors.

The EU member states are regularly encouraged to apply for co-funding for their TEN-T core network projects.

When applying for EU co-funding, the member states have to clarify how the project will contribute to the goals of the TEN-T core network, which will determine the amount of funding. Projects that have already been pre-identified in the Connecting Europe Facility* are listed as priority and are therefore likely to receive substantial co-funding. The Brenner Base Tunnel, for instance, was such a pre-identified project and received 40 % co-funding in 2015, the maximum amount for construction.

The majority of pre-identified projects listed in the Connecting Europe Facility*, relating to the Scan-Med Corridor, are investments in rail infrastructure and partly investments in upgrading and improving sea ports and access to their hinterland[17]. Although this does not exclude road infrastructure projects per se it does express funding priority for railway infrastructure.

**Pat Cox,
EU-Coordinator for the
Scan-Med Corridor**

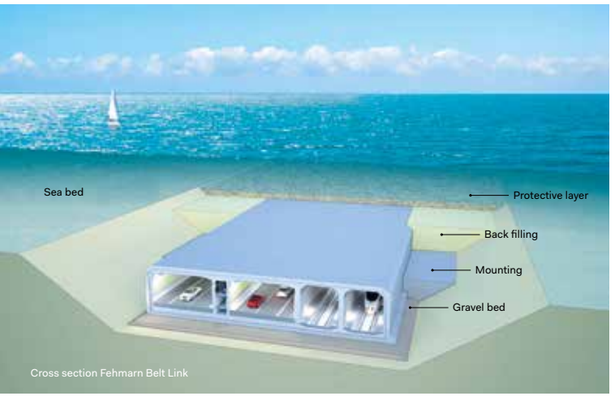
„The new TEN-T policy can make a vital contribution to boosting the long-term competitiveness, sustainable growth and development of the European economy. The Scan-Med Corridor, as well as the other core network corridors, is an instrument that acts as the centre of gravity around which our work on modal integration, interoperability and coordinated development of infrastructure orbits."

[16] Regulation (EU) No 1316/2013
[17] Regulation (EU) No 1316/2013: Appendix I Part I

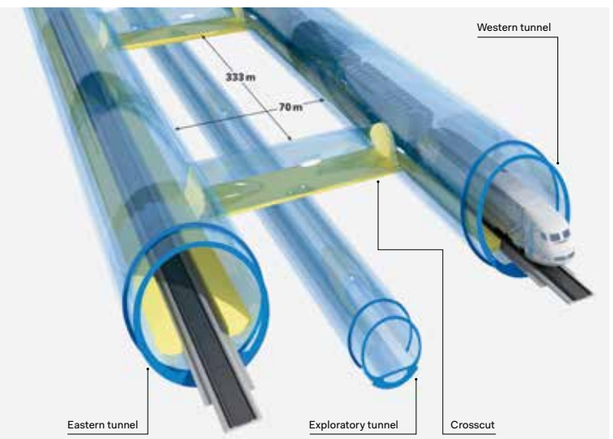
3

TOWARDS IMPLEMENTING THE SCAN-MED CORRIDOR

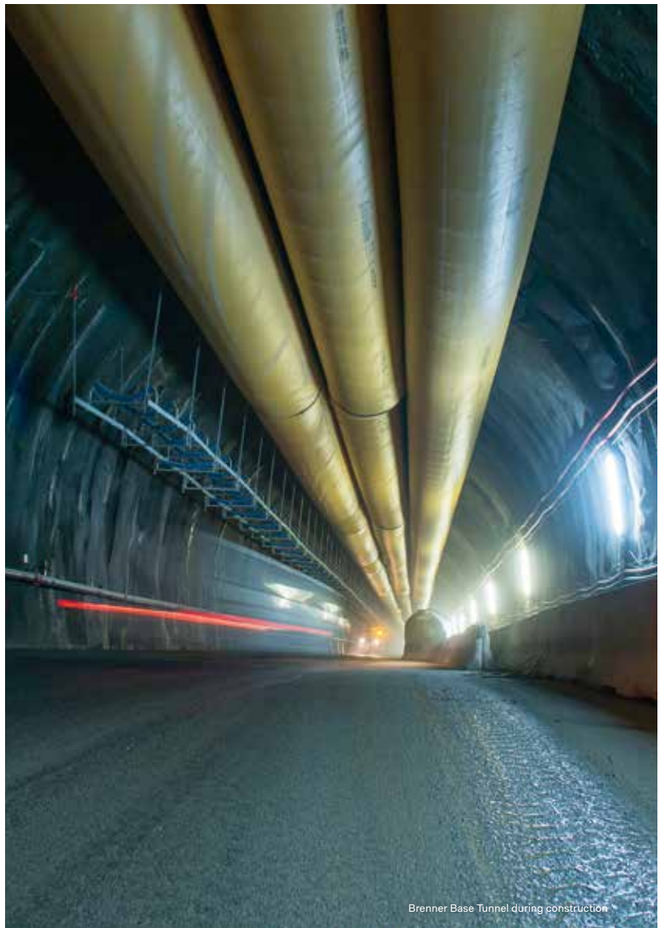

Entry Fehmarn Belt Link



Cross section Fehmarn Belt Link



Cross section Brenner Base Tunnel


Brenner Base Tunnel during construction

INFRASTRUCTURE BOTTLENECKS AND EXPANSION PLANS

Identifying the need for action

The performance of cross border multimodal* transport corridors is directly related to interoperability* and if the route offers continuous conditions for transport operation.

The main goal of the Scan-Med corridor is to remove infrastructure bottlenecks. In order to guarantee full operational functionality of the corridor, certain minimum requirements must be implemented for all infrastructure expansion projects on the corridor until 2030. All further infrastructure expansions are based on transport demand and national policy goals.

Depending on transport policy, the implementation of the Scan-Med Corridor will lead to a rise in rail freight transport demand.

To prevent capacity bottlenecks, further infrastructure expansions and enhancements are needed beyond 2030. This implies increasing the number of tracks on certain routes, from two tracks to four, which will increase capacity. This allows for unbundling of freight transport from long and short distance passenger services, which increases performance even further.

Determining infrastructure expansions

An overview of planned infrastructure expansions and accompanying studies was determined with the Connecting Europe Facility* in 2013. These pre-identified projects[18] are all considered a priority for EU co-funding. The majority of these projects are railway expansions and partly also investments in ports and their hinterland connections. Road infrastructure is already very well developed.

A detailed list of 394 projects and proposed measures for the Scan-Med Corridor was included in the appendix of the corridor study[19]. Projects and measures in the area of railway infrastructure – in contrast to road projects - are in general accordance with the pre-identified projects of the Connecting Europe Facility*.

The work plan of Pat Cox, the European coordinator, is directly related to these projects and measures. Accordingly, the two most important and best known projects on the Scan-Med Corridor are rail infrastructure projects:

- The Fehmarn Belt Link, including hinterland connections: Creating a fixed connection between Denmark and Germany via tunnel underneath the Fehmarn Belt[20]
- The Brenner Base Tunnel including access routes: Realizing a high performance level line route* across the Alps on the transalpine section of the Scan-Med Corridor.

It is the objective of the TEN-T guidelines[21] to complete all projects required to realise the TEN-T core network before 2030. Nonetheless some infrastructure expansions and enhancements necessary to reach sufficient capacities will require longer implementation periods that could go beyond 2030. Realising these infrastructure expansions step by step will be based on coordinated efforts between member states, Norway and the European Commission.

[18] Regulation (EU) No 1316/2013: Appendix I
[19] European Commission (2014)
[20] The tunnel underneath the Fehmarn Belt will include rail and road transport. A significant modal shift from road to rail is expected, as loading rail freight on ferries is not cost effective momentarily.
[21] Regulation (EU) No 1315/2013

ACCOMPANYING MEASURES FOR THE DEVELOPMENT OF THE SCAN-MED CORRIDOR

In order to thoroughly implement European transport policy, it will be necessary to develop high-performance infrastructures and to provide a suitable framework for coherent accompanying policy measures.

Infrastructure can be understood as “hardware”, which cannot operate without “software”, made up of administrative and regulative measures that make an efficient and sustainable transport system viable[22].

The infrastructure expansion and enhancement goals of the Scan-Med Corridor are clearly defined based on agreements between the European Commission and the member states. Defining a common set of accompanying measures is currently still in progress and not yet fully developed. The EU-coordinator Pat Cox has understood the urgency of this issue and it is now a priority of Corridor Forum agenda.

Developing, coordinating and defining accompanying measures takes time. For this reason it is necessary to start these processes as soon as possible, so that administrative and regulative measures take effect when the physical infrastructure itself is completed, for instance, in order to ensure desired modal shifts.

The individual member states and regions take up different positions concerning this issue (toll systems, cross financing, taxation etc.). Nonetheless it is clear that only a common concerted approach will bring about conditions for a functioning transport policy. A great number of initiatives, organisations and research projects aim to create trans-national administrative and regulative measures:

RailNetEurope

RailNetEurope (RNE) is an association consisting of 35 railway infrastructure companies and rail transport agencies based in Wien. The goal of the RNE is to simplify access to the European rail network and increase quality and efficiency of international rail services. The RNE develops common standards and procedures for railway transport and supervises systems for concerted operation of national railways, which are relevant for transport on the Scan-Med corridor.

The RNE and the rail freight corridors (RFC) are entwined in administrative and operative terms. The standards, procedures, processes and systems developed by the RNE are also in use in context of the RFC 3. Like all other RFCs, the RFC 3 uses the Train Information System (TIS) and the Path Coordination System (PCS) which are the basis for efficient trans-national rail freight transport. For instance, this information system makes it possible to track and determine the location of a train at all times.

[22] European Commission (2015): page 24

Rail freight corridor RFC 3

As part of the TEN-T core network the main objective of the Scan-Med Corridor is create conditions for infrastructure to function as the foundation for a single European transport area. To make competitive freight transport possible, in 2010 the EU established and organised legal requirements for transnational freight corridors[23]. At first nine rail freight corridors (RFC) were created, which connect at least three member states. In 2013 the selection of corridors were aligned and harmonized in accordance with the TEN-T core network corridors[24].

The rail freight corridors must be put into service by the respective member states within a certain time frame. Each RFC received an individual administrative structure, which should support extensive cooperation between all stakeholders and should lead to harmonising technical, operational and administrative regulations. For instance, all construction sites and construction site time tables will be coordinated trans-nationally. Another goal is to establish a common understanding of punctuality and quality management.

The RFC 3 runs from Stockholm, through Malmö, to København, Hamburg, Innsbruck, Verona and Palermo, which in large parts matches the Scan-Med Corridor and is partly used synonymously. The RFC 3 was put into service on November 10th 2015.

Through a One-Stop-Shop*, railway operating companies, forwarding companies and industrial enterprises can make applications for pre-arranged paths*, which will be available from 2017 onwards. They make possible continuous operation of international cross border freight trains based on long-term planning. Additional residual capacities can be offered on the short term if available.

Swiftly Green

Swiftly green (an acronym for Sweden-Italy Freight Transport and Logistics Green Corridor) was an EU funded project realized from 2013-2015. The main goal was to develop foundations and pathways towards “greener” transport and “greener” logistics on the Scan-Med Corridor. Various institutions, companies and platforms from Sweden, Denmark, Germany, Austria and Italy contributed to the project.

At first the project analysed the general condition and effectiveness of the corridor and to which degree results were transferable. The project focused on intervention measures and technical measures for reducing noise pollution and decreasing energy consumption. The results of the project are used to draft policy and best practice examples, which can be applied to develop more sustainable transport systems.

[23] Regulation (EU) No 913/2010
[24] Regulation (EU) No 1316/2013: Art. 29 Appendix II

4

THE SIGNIFICANCE OF THE SCAN-MED CORRIDOR


Öresund bridge between Malmö and København


The view from Reinhardsberg in Friedrichroda, Germany


Lake Saimaa in Finland


Alpine panorama


Po Valley near Solferino, Italy


Strait of Messina

REGIONS AND ECONOMIC CENTRES WITHIN THE SCAN-MED CORRIDOR

Topography and natural environment

The Scan-Med Corridor passes through diverse landscapes. This poses particular challenges for developing and operating transport infrastructures.

Finland's natural environment is characterized by relatively warm summers, extremely cold winters, forests and an abundance of lakes and marshlands, which freeze and thaw in course of the year. These ever-changing ground conditions, owing to extreme seasonal temperature changes, complicate the construction and operation of technical infrastructure. Similar environmental conditions are prevalent in southern Sweden and Norway.

The Baltic Sea has always been an important trading area. Nonetheless, from the perspective of contemporary transport and economic activity, the Baltic Sea is also a physical barrier. The Scan-Med Corridor crosses the Baltic Sea three times: between Turku and Stockholm (250 km), between Malmö and København (15 km) and at the Fehmarn Belt between Rødby and Puttgarden (20 km). A railway and road connection has already been established between Malmö and København. A tunnel for rail and road transport is currently being planned on the Fehmarn Belt.

Within Germany the Scan-Med Corridor runs through the North German Plain, through the Central Uplands and continues towards the Alpine foothills. The Central Uplands are a wide mountain range, extending from east to west through central Germany. This uneven topography forms a barrier for transport infrastructure and requires numerous tunnels and bridges.

The Alps, with peaks up to 4 000 meters above sea level, are an eye-catching topographical barrier between northern and southern Europe. Today's transport routes through alpine valleys and high altitude passes have been in continuous use since early history. The Scan-Med Corridor crosses the Alps between München and Verona along the Wipp Valley. At an altitude of 1 378 meters above sea level the Brenner Pass is the highest section of the corridor.

South of the Alps lies the flat and fertile Po Valley. In central and southern Italy the landscape is dominated by the Apennines. Twice the corridor crosses this mountain range, the first time between Bologna and Firenze and then between Napoli and Bari. South of Napoli the corridor follows the course of Apennines, making it a challenging route for transport infrastructure, which displays an abundance of tunnels and bridges. Sicily's geography is challenging in a similar way.

The southernmost section of the Scan-Med Corridor runs through the Mediterranean Sea. Although the Strait of Messina between mainland Italy and Sicily is only 5 km wide, strong winds and currents complicate shipping transport. Constant danger of earthquakes and great water depth make the construction of a fixed connection difficult. Malta is located approximately 100 km from Sicily in the Mediterranean Sea. The island state can only be reached by ship or aeroplane.

Connecting densely populated capital city regions and productive economic centres

Some of the most economically dynamic and most densely populated regions of Europe are part of the Scan-Med Corridor. Furthermore, nearly all capital cities of the adjoining countries, apart from Wien, are located on the corridor. In total approximately 110 million people live within the corridors catchment area[25].

Export-oriented manufacturing, industry, materials production and tourism require an efficient transport system.

In Scandinavia population and economy are concentrated in capital regions and metropolitan areas which are connected through the Scan-Med corridor. Helsinki is the cultural and economic centre of the country and most of Finland's population is concentrated in the south of the country. Although Finland is well known for its high tech economy, much of countries economy is based on transport-intensive paper and timber production: 18 % of industrial output and 20 % of export value in monetary terms is generated by forestry[26].

A third of Norway's population resides in Oslo. The economy of Norway is strongly focussed on oil and gas production which accounts for 39 % of the country's total export value[28]. København, the largest metropolitan region of Denmark, is located on the main transport routes between the Baltic Sea, the North Sea and northern Scandinavia. The country's main exports are machines, chemicals but also oil and gas[29].

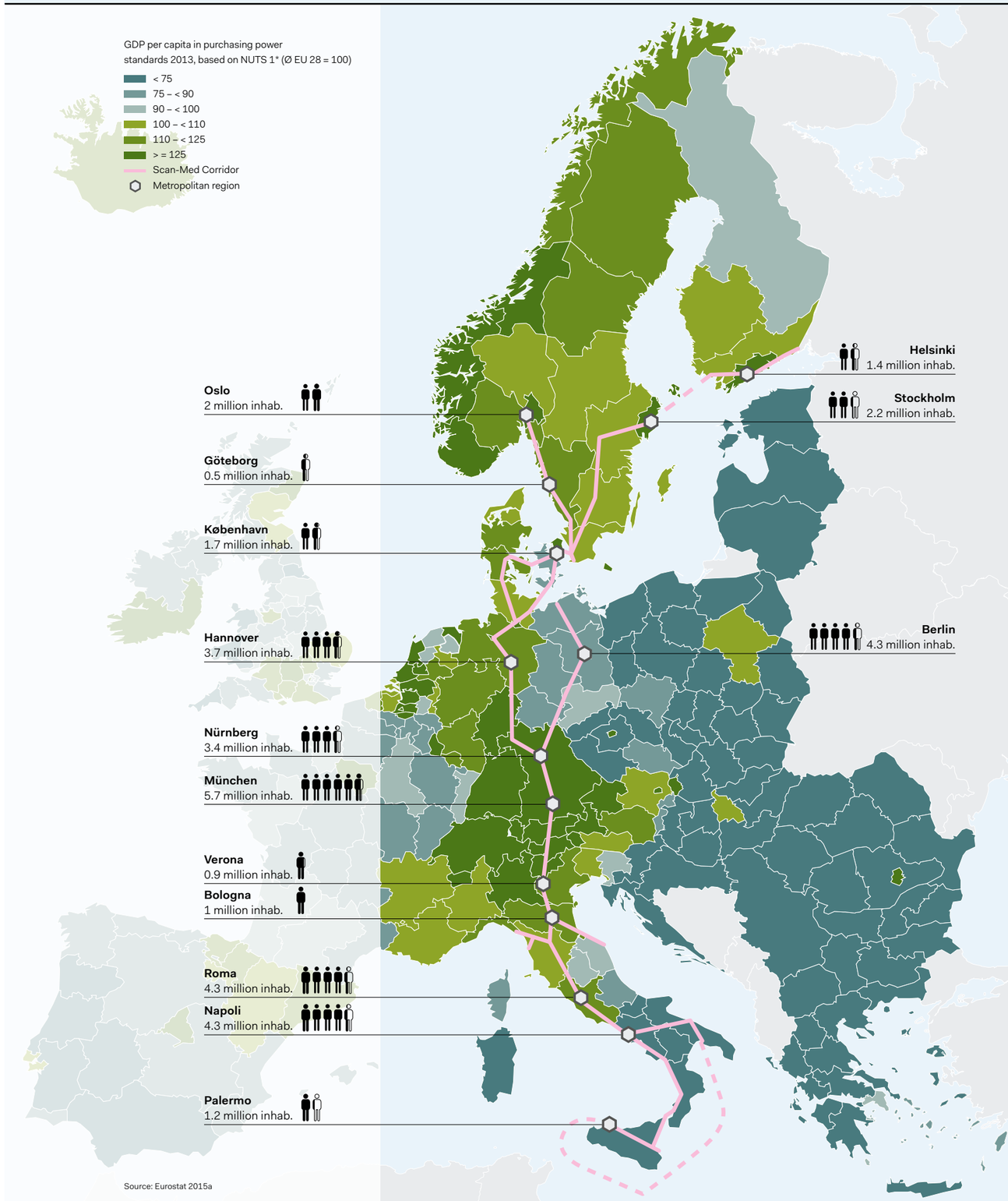
Close to a quarter of the Swedish population lives in Greater Stockholm. Also the metropolitan regions of Göteborg and Malmö that are important centres for the automotive and machinery industry are located on the Scan-Med Corridor. In total 45 % of Swedish export values are made up of machinery and industrially produced tools and equipment, which are mostly transported via sea route to neighbouring European countries[27].

Germany is the most powerful economy of Europe, which is heavily export-oriented: 28 % of total European export value of non-European trade is generated by Germany alone[30]. Accordingly, there is also great demand for foreign raw materials. Roughly 40 % of German export values in 2015 were generated by vehicle and vehicles components, machines and chemicals[31]. Many of the most important and densely populated city regions of Germany are located on the corridor. This includes the old trading cities Hamburg, Lübeck, Rostock, the dynamic German capital Berlin, and Leipzig, which is well known for its trade fairs and manufacturing, as well as the metropolitan agglomeration of Hannover-Braunschweig-Göttingen-Wolfsburg and the Bavarian cities of München and Nürnberg are linked through the corridor. These cities and city regions are characterized by their competitive economy and low unemployment, as compared to the rest of Europe. The industrial focus of these economic centres is in the automotive industry and chemicals, among others.

The Po Valley, home to roughly 30 million people, is the economic heart of Italy: 45 % of the country's GDP of 2007 was produced in the north of the country. The North Italian economy is characterized by many specialized small and medium enterprises. Firenze, Roma and Napoli are densely populated regions and important tourist destinations. Some of country's most important petrochemical, metallurgical, electro technical industry is located in southern Italy. Germany is the most important export and import market for the Italian economy. The main exports are petrochemical products and vehicle components[32].

[25] 110 million is the sum total of all inhabitants of NUTS 2* areas adjacent to the Scan-Med Corridor. Source for population data: Eurostat (2015c)
[26] Finnish Forest Industries (2015)
[27] Statistics Sweden (2016)
[28] Norwegian Petroleum (2016)
[29] Statistics Denmark (2016)
[30] Eurostat (2015b)
[31] Statistisches Bundesamt Deutschland (2016)
[32] Germany Trade and Invest (2009)

Important metropolitan regions and above average economic performance on the Scan-Med Corridor



Source: Eurostat 2015a

GATEWAYS TO THE GLOBAL ECONOMY

The Scan-Med Corridor not only strengthens ties between European countries, it also connects Europe with trade flows of the global economy, especially through its 25 sea ports.

The North Sea ports play an important role in context of the globalised trade system. Through the Port of Hamburg, the largest port in Germany and third largest in the EU, the Scan-Med Corridor is linked to Asian, Arabic, African, North- and South American markets. Roughly 1 100 freight trains per week and more than 7 000 logistics companies transfer goods shipped through the port via its hinterland[34].

The Port of Lübeck processes large amounts of the flow of goods between the EU and Russia, the EU's third-largest trading partner[34], via the Baltic Sea. Sweden and Finland export vehicles, machines, chemicals to Russia and import crude oil and other resources through their ports[35]. The Port of Göteburg, the largest container port in Sweden, processes 30 % of the country's overall foreign trade (in terms of value)[36].

The Baltic is the only land-based external border of the EU on route of the Scan-Med Corridor. Between Finland and the Russian Federation there are numerous road and rail connections: Finland is the only European country to be fully equipped with Russian broad gauge tracks and is not connected by land to the European rail network. This is the reason why some of foreign trade between EU member states and Russia is processed through Finnish ports.

Comparison of transport times between the Far East and South Germany via Adria and North Sea ports

Source: Österreichisches Institut für Raumplanung 2009; own illustration

All the larger southern and central Italian ports are located on the Scan-Med Corridor. These ports are becoming increasingly important for global freight. In comparison to North Sea and Baltic Sea ports, the Mediterranean ports are considerably closer to the Middle East and Asia. But this time advantage can only become relevant for European trade, if transport on the transalpine section of the Scan-Med Corridor, becomes as effective as the hinterland transport of the North Sea ports. This holds especially true for the Port of Gioia Tauro, the largest transhipment terminal for deep-sea navigation and short sea shipping* in Italy, that is strategically located on the sea route between the Suez Canal and Gibraltar[37].

[33] Hafen Hamburg (2016)
[34] European Commission (2015)
[35] Statistics Finland (2015); Embassy of Sweden (2014)
[36] Port of Gothenburg (2016)
[37] Port authority of Gioia Tauro and Calabria (2013)

Container terminal Hamburg

DEVELOPMENT OF TRAFFIC ON THE SCAN-MED CORRIDOR

The Scan-Med Corridor includes rail, road, shipping and air transport on some of the busiest European freight routes. Total market volume of freight transport reached 232 million tonnes in 2012[38].

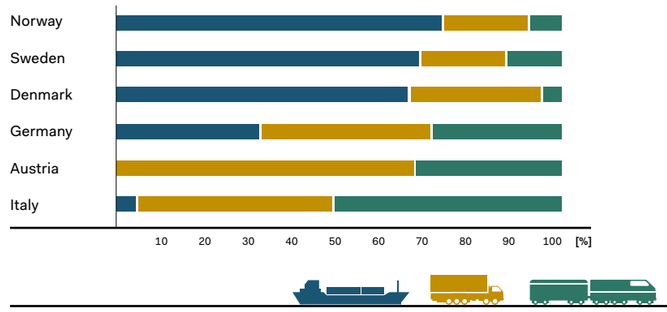
In 2012 nearly 30 000 cross border freight trains were in operation on the Scan-Med Corridor. An additional 17 000 trains had their start or end point on the corridor route. Roughly 90 % of the total volume of rail freight traffic within the corridor is generated on the relations Sweden-Germany, Germany-Austria, Germany-Italy and Austria-Italy[39]. In 2012 the overall market volume of rail freight transport peaked at 58 million tonnes. The absolute number of rail freight journeys within the corridor, or with an end or start point in the corridor area, is set to increase by 5.7 % from 2012-2017.

In terms of road freight traffic, the most important routes are between Denmark and Germany, Germany and Italy and between Sweden and Finland: 70 % of road freight traffic is generated on these routes[40]. The total market volume of road freight transport between the states adjacent to the Scan-Med Corridor amounted to 89 million tonnes in 2012.

The majority of freight transport within Scandinavia and between Scandinavia and Germany is based on short sea shipping* (85 million tonnes in 2012). Another 31 million tonnes a year are transported through RoRo*-ships and ferries, but this market volume is already accounted for by rail and road freight.

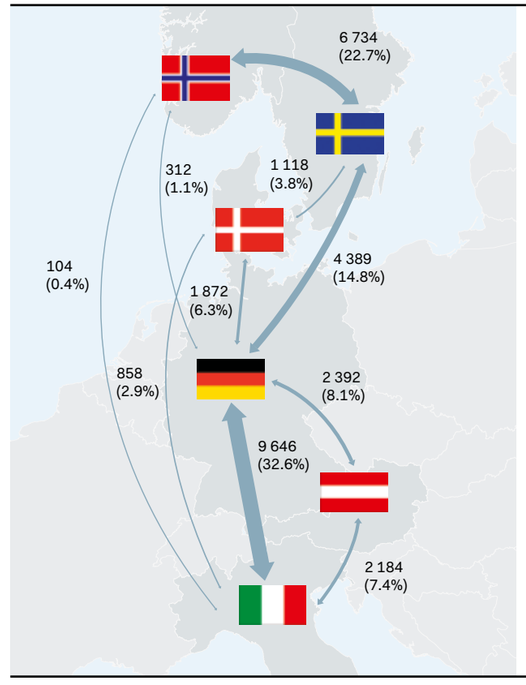
[38] The source of transport data referred to in this chapter, if not stated otherwise, is: ETC Transport Consultants GmbH (2014): pages 30, 66, 69ff, 175f, 191; excluding Finland and Malta.
[39] European Commission (2014): page 248
[40] European Commission (2014): page 248

Modal Split of transnational freight transport in % in 2012, excluding Finland and Malta



Source: ETC Transport Consultants GmbH 2014: page 76f

Amount and proportion of transnational rail freight trains within the Scan-Med Corridor on selected routes 2012



Source: ETC Transport Consultants GmbH 2014: page 87

Important sea ports are also included in the catchment area of the Scan-Med Corridor, notably the Port of Hamburg, with a cargo throughput volume exceeding 110 million tonnes annually in 2012. The important Italian ports, which are also included in the corridor, are nonetheless focussed on the Mediterranean and less on freight flows within the Scan-Med Corridor itself.

Numerous important TEN-T airports[41] are located on the Scan-Med Corridor: roughly 40 million air passengers travelled through each of the airports in München and Roma-Fiumicino in 2012, the largest airports on the Scan-Med corridor.

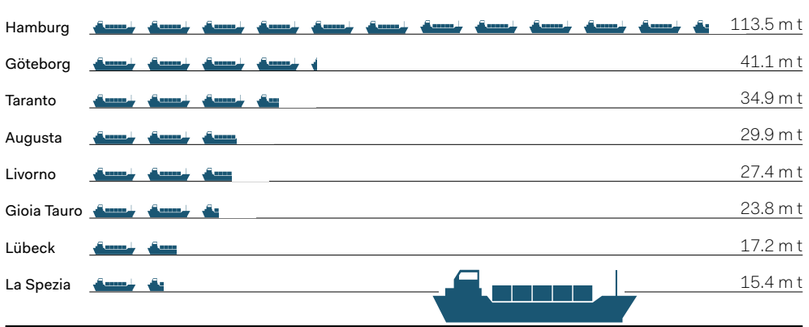
The amount of air freight transported through airports on the Scan-Med Corridor reached 2.3 million tonnes in 2013. The airport Leipzig/Halle, where the global logistics provider DHL operates one of three global cargo hubs, processed 40 % of all Scan-Med air freight[42].

By 2030 the freight transported on the Scan-Med Corridor will have increased by roughly 30 % (in tonne-kilometres*). This overall increase results from increased transport distances and increased freight traffic volumes.

How this estimated increase will be distributed on the various modes of transport depends on the development of infrastructure on the Scan-Med Corridor and on successfully implementing accompanying policy measures.

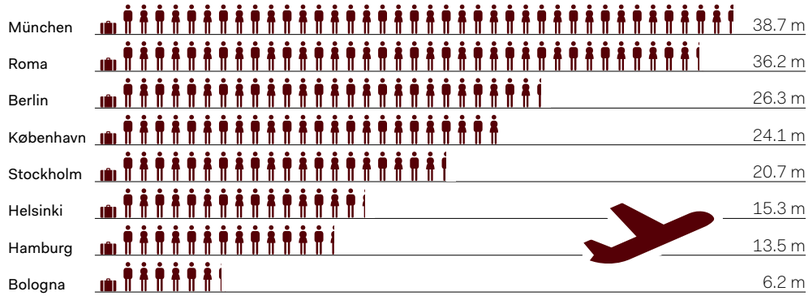

København airport

Loading volumes of the most important sea ports on the Scan-Med Corridor in 2012



Source: ETC Transport Consultants GmbH 2014

Passenger volumes on the most important airports on the Scan-Med Corridor in 2013



Source: European Commission 2014: page 197

[41] Regulation (EU) No 1315/2013: Art. 41 (3)
[42] European Commission (2014): page 197

CONTRIBUTING TO EUROPEAN GROWTH AND COHESION POLICY

As part of the TEN-T core network the Scan-Med Corridor improves and connects transport infrastructure throughout the entire European continent, especially between north and south. It makes overcoming topographical barriers and great distances easier and improves the access of economic regions and metropolitan areas to global trade flows. This is the foundation that makes the free movement of people, goods and services possible in the EU, which is the foundation for a thriving European economy and European cohesion.

Since its inception, the EU has pursued and advocated infrastructure improvement. Those regions that have received strong EU support for the development of infrastructure, have displayed a twice as high annual GDP grow rate (+3.3 %) compared to the European average (+1.9 %) between 1991 and 2000[43]. This positive effect can be explained by taking account of the key role taken up by high performance mobility infrastructure systems in trade of goods and services. These infrastructures secure basic access to sales markets and guarantee moderate transport costs, which are prerequisites for competitive trade in goods for globally connected economies.

An optimal connection between sea and inland ports, airports, rail and road, allows for all European regions to take part in economic activity to an equal extent. Based on easy access to a high performance transport network, each economic sector and each economic region can utilise its transportation needs cost-effectively.

The implementation focus of the TEN-T rests upon the core network corridors. This guarantees rapid implementation of those projects with the strongest positive effects on the transport network.

The infrastructure expansions and upgrades in context the Scan-Med Corridor represent a big step towards a single European transport area. As part of the TEN-T core network it will help remove infrastructure bottlenecks as well as technical and administrative barriers. By 2030, Europe will have received a core network of efficient transport routes, supporting economic cohesion within Europe and securing Europe's leading position in the global economy.

[43] Greece, Spain, Ireland, Portugal, Italy and Eastern Germany received 68 % of the EU Structural and Cohesion Funds between 1991 and 2000; see High-Level Study Group (2003): page 59

CONTRIBUTING TO A SUSTAINABLE TRANSPORT SYSTEM

Environment

The Scan-Med Corridor emphasises environmentally friendly transport and therefore supports the improvement and expansion of railway lines. Infrastructure expansions and accompanying measures combined can help strengthen rail transport, especially domestic transport, which is currently dominated by road freight.

In general, CO_2 emissions of transport by rail systems are lower than for road systems. An average rail journey causes less than half the emissions of a comparative car journey (in passenger-kilometres*). The average CO_2 emissions of trucks are more than three times higher than the emission of rail freight transport (in tonne-kilometres*). And if a rail system is powered by a sustainable energy mix, truck CO_2 emissions will be up to four times higher[44].

A continuous operation on level line routes* would reduce overall primary energy use within rail systems, because locomotive changes and shunting movement would become obsolete and steep track inclines could be avoided. In those countries, where the energy mix in rail transport consists nearly entirely of sustainable energy sources, like in Sweden (100 %) or Austria (92 %[45]), rail transport is an especially environmentally friendly mode of transport.

By making the railway an especially desirable mode of transport, the Scan-Med Corridor supports efforts to protect the environment and contributes to reaching climate goals.

Apart from supporting the modal shift from road to rail, road transport detours are reduced by creating shorter transport routes, for example, through the Fehmarn Belt Link. Such measures have positive effects for climate protection. Other measures, like enforcing the modernisation of heavy-duty vehicles, also support climate protection.

Public health

By implementing the Scan-Med Corridor as a part of the TEN-T core network, this will reduce exposure to high levels of noise and air pollution. Many of the new rail routes for high speed passenger and freight services circumvent populated areas and have been or will be equipped with mandatory noise abatement measures. Exposure to rail induced noise in many settlement areas would be reduced accordingly.

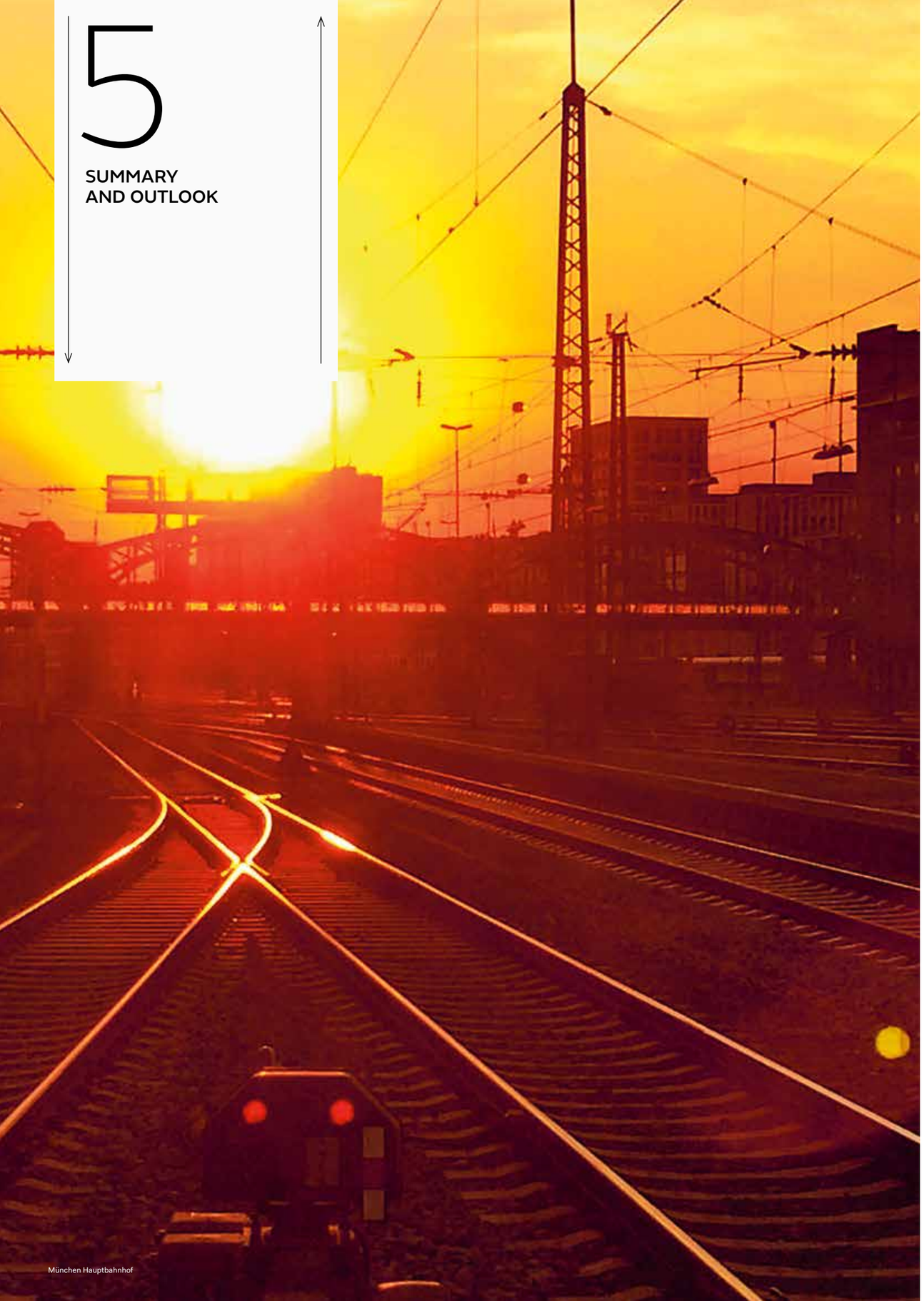
Shifting freight traffic from road to rail will reduce air pollution, especially in towns and settlements situated close to railway lines or that are located in valleys and basins – these areas will especially benefit from such developments. All heavy-duty transport* that cannot be shifted from road to rail will nonetheless be transported by less polluting, low-emission vehicles (currently emission standard 6). The more cargo that is transported by rail and not by road, the more congestion will be reduced, which will amplify the environmental benefits of low-emission vehicles.

The railway is the safest means of transport[46]. Making rail travel more desirable will help increase transport safety, especially if it reduces private automobile journeys on short- to medium-range routes.

[44] European Environment Agency (2013)
[45] ÖBB-Infrastruktur AG (2016); Statens Järnvägar AB (2016)
[46] European Commission (2013)

5

SUMMARY AND OUTLOOK



München Hauptbahnhof

SUMMARY AND OUTLOOK

The Scan-Med Corridor is the longest of the nine multimodal* TEN-T core network corridors. It includes passenger and freight transport and connects Scandinavia with productive metropolitan regions in Germany and Italy. The Scan-Med Corridor is connected to global freight and passenger routes through 19 airports and 25 sea ports.

By 2030 the Scan-Med Corridor will be implemented as part of the TEN-T core network and thus help establish an efficient and sustainable high performance transport network for Europe. This transport network secures Europe's leading position in the global economic system and contributes to the social and economic cohesion* within the EU.

It is the objective of the Scan-Med Corridor to remove infrastructure bottlenecks; this requires the expansion and/or construction of infrastructures, especially of rail infrastructure, which will be co-funded by the EU. The Fehmarn Belt Link and the Brenner Base Tunnel, including its northern and southern access routes, are two of the most prominent projects. Apart from constructing physical "hardware" it will be necessary to establish environmental and transport policy measures, which function as the "software" of an efficient and environmentally friendly transport network.

Pat Cox was assigned as the EU coordinator of the Scan-Med Corridor, in order to assist in the implementation of infrastructure projects and to support the adoption of appropriate policy measures. He supports member states, infrastructure companies and adjacent regions in carrying out transnational infrastructure projects. The path towards completing the physical infrastructure has taken concrete shape; therefore the focus for the years to come will rest upon the concerted development of accompanying measures.

All stakeholders working towards implementing the Scan-Med Corridor by 2030 must continue to assume their shared responsibility.

The member states are responsible for implementing infrastructure projects. The EU grants financial support for member states and helps coordinate the many planned projects and projected measures. Those projects will be prioritised, that help remove infrastructure bottlenecks. Many of the administrative and technological measures demand active coordination between infrastructure companies and will require their active support to establish a future-oriented transport policy.

Only if accompanying policy measures are implemented by the EU, member states and infrastructure companies in collaboration with the regions adjoining the Scan-Med Corridor, will it be possible to create a better European economy, to increase cohesion*, as well as to strengthen environmental protection*.

GLOSSARY

Cohesion:
In context of the EU regional policy, cohesion means reducing economic and social disparities between regions within the EU.
Cohesion States:
If the GDP per capita of an EU member state is less than 90 % of the EU average, it is called a cohesion state. These current 15 states can apply for funding through the EU cohesion funds, which supports balanced economic and social development of the EU regions.
Connecting Europe Facility:
The Connecting Europe Facility (CEF) is a financial instrument of the EU developed for funding TEN-T transport projects. The word "facility" is used in banking and finance and refers to funding possibilities within a defined limit.
Environmental protection:
Environmental protection is the practice of protecting and conserving the natural environment and the ecological basis for all living beings.
ERTMS, ETCS:
The European Rail Traffic Management System (ERTMS) will be used in future for managing and guiding the European rail transport system within the TEN-T core network. The European Train Control System (ETCS) is an important element of the ERTMS (on Level 2) as it will allow constant communication between trains and the Radio Block centre (RBC).
Level line routes:
Newly constructed routes within the TEN-T core network are allowed to have maximum gradients as steep as 12.5 ‰ (according to the Commission Decision of 26 April 2011 Chapter 4.2.4.3.). Routes that meet these criteria are called level line routes. Under special circumstances, for instance, flow resistance in tunnels, lower gradients could be required.
Heavy-duty transport:
Heavy-duty transport is transport by vehicles heavier than 3.5 tonnes.
Interoperability, interoperable:
Interoperability, in context of rail transport, refers to the possibility for cross-border trains to operate continuously within one unified train control system.
Multimodality, multimodal:
A transport system can be called multimodal, if transport demand is efficiently covered by multiple means of transport or by their combination.
NUTS:
The nomenclature des unités territoriales statistiques (NUTS) is a spatial classification of European regions for statistical purposes.
One-Stop-Shop:
One-Stop-Shop means to be able to resolve various administrative queries by consulting one single authority, instead of multiple sub-authorities.
Passenger-kilometres:
Passenger-kilometre is a unit of measurement used for calculating the performance of passenger services: 1 passenger-kilometre means that 1 person was transported for 1 km.
Pre-arranged path:
A pre-arranged path allows for a train to be used at a certain time, for a certain route (cross border is also possible). Infrastructure companies offer slots in their timetables for such transport and offer them to rail transport companies for a fee.
Rolling stock:
Rolling stock is the entirety of the rail vehicle (locomotive, wagon and other specialized vehicles).
RoRo:
Roll on, Roll of (RoRo) means loading the whole truck on a ferry or ship for a part of its journey.
Short sea shipping:
Short sea shipping is maritime freight transport within a continent, for instance between Finland and Germany.
SWOT:
SWOT is an acronym for strengths, weaknesses, opportunities and threats. SWOT-analysis is often used by companies and other organizations for strategic planning purposes.
Telematics:
Telematics are technologies that connect communication systems with information technology. Telematics is concerned with the connection of at least two information and communication systems through data processing.
Tonne-kilometre:
Tonne-kilometre is a unit of measure used for calculating the performance of freight transport: 1 tonne-kilometre means that 1 tonne of goods was transported for 1 km.
White Paper on Transport:
The White Paper on Transport (in full: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system) was published by the European Commission in 2011. The main goal is to reduce traffic induced CO_2 emissions by at least 60 % until 2050, compared to 1990.

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The Scan-Med Corridor is the longest core network corridor in the multimodal Trans-European Transport Network. It connects important economic centres and metropolitan regions within Europe and also strengthens their ties with the global economy. The Scan-Med Corridor contributes to an efficient and sustainable European transport system.