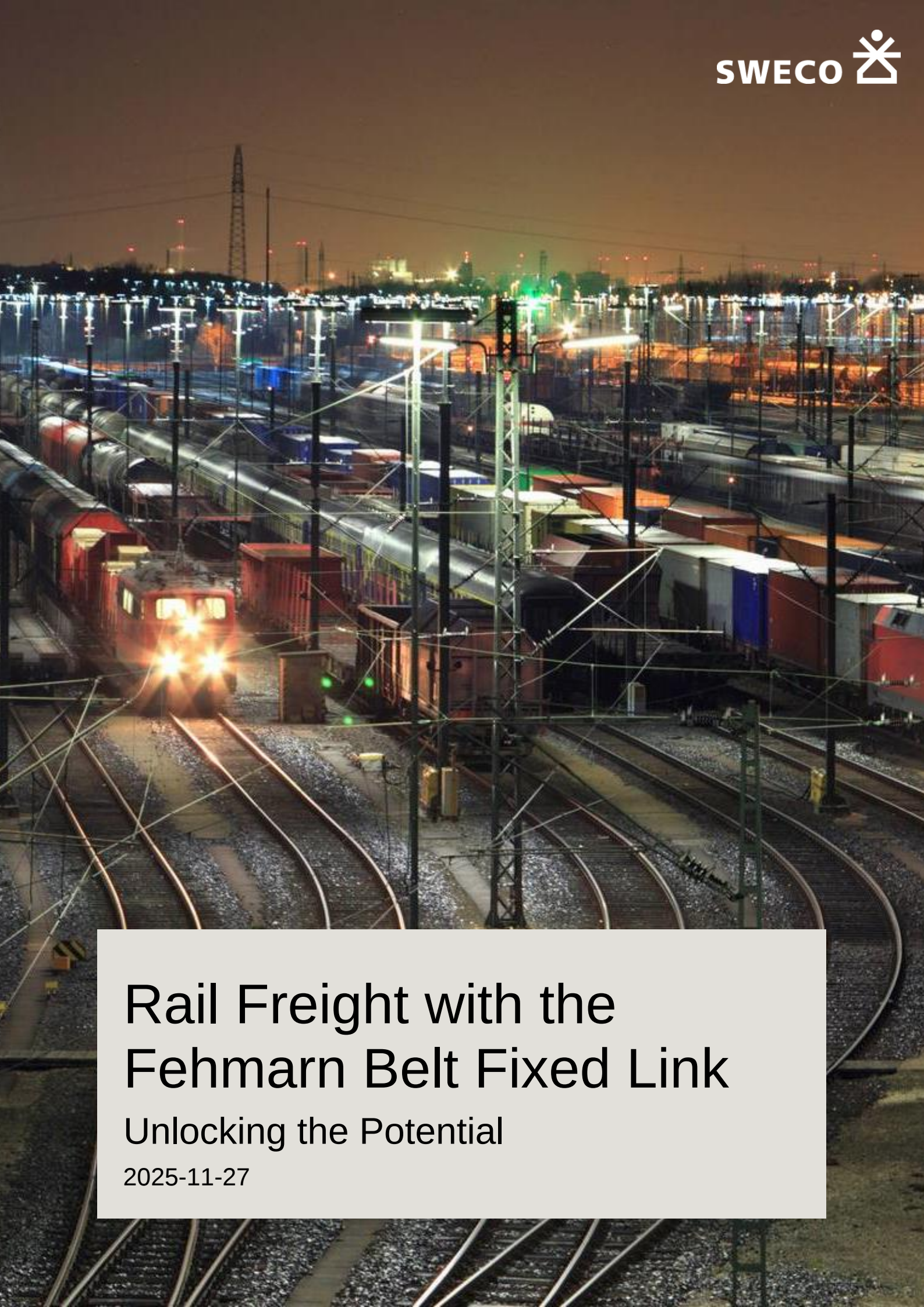




Rail Freight with the Fehmarn Belt Fixed Link

Unlocking the Potential

2025-11-27



STRING is a political member organisation for local and regional authorities in Northern Europe between Oslo and Hamburg. Major cities and regions in STRING join together to connect and align politically, industrially and geographically to accelerate the green transition and unlock new potential for green growth and sustainable transport infrastructure.

GREATER CoPENHAGEN

Greater Copenhagen is a cross-border political partnership promoting growth and development in the largest Nordic metropolitan area, home to 4.5 million residents across Southern Sweden and Eastern Denmark.



Sweco is Europe's leading architecture and engineering consultancy.

Foreword

Greater Copenhagen and the **STRING** corridor – anchored by Hamburg, Copenhagen, Malmö, Gothenburg and Oslo – form one of Europe’s most productive and innovation-dense economic belts. World-class ports, advanced manufacturing, life-science clusters, green energy and digital services power millions of jobs. While the growth corridor already captures a vast share of Nordic–German trade, its full potential remains untapped.

The Fehmarn Belt Fixed Link (FBFL) is a once-in-a-generation opportunity to stitch Northern Europe closer together. By removing rail bottlenecks, aligning standards, and delivering cross-border investments, the corridor’s logistics clock speeds up: faster, longer, more reliable trains; cheaper, cleaner freight; and tighter links between firms and ports. Completing missing tracks and coordinating upgrades across borders will reduce delays and lower the cost of inaction. And strategic infrastructure improvements will enhance competitiveness, boost resilience and strengthen civil and military mobility in uncertain times.

Unlocking the Growth Potential of the Northern European Powerhouse

As this report shows, the full benefits of FBFL depend on addressing 15 critical rail bottlenecks in the northern section of the Scandinavian-Mediterranean (ScanMed) corridor. This demands political courage and action coordinated at a scale and speed not yet achieved.

Why act now? Because delay comes at a cost. Each year without expanded capacity, harmonized standards, and longer trains, trucks gain market share and freight shifts back to road. Emissions rise, industries lose competitiveness, and our green transition falls further behind. The window to reset freight patterns when FBFL opens is real – but also perishable. If we miss it, the cost of inaction will be decades of congestion, higher transport costs, and a weakened green transition.

The message is clear: remove the red lights. Together, we can transform fragmented efforts into a coherent, competitive Northern European transport system.

Each bottleneck removed is time saved, emissions avoided, and competitiveness gained. STRING and Greater Copenhagen stand ready to assume responsibility. As partners, we will monitor progress and advocate for the reforms that turn plans into projects.

The prize is a reliable, high-capacity green bridge between the Nordics and Continental Europe. The risk is that we talk while others build. Let us invest and build.

Jan Juul Christensen



*Managing Director
Greater Copenhagen*



Thomas Becker



*Managing Director
STRING*



Summary

The Fehmarn Belt Fixed Link (FBFL) will remove a key bottleneck between Scandinavia and Germany, hereby reducing transport times and costs, contributing to efficient logistics in the Northern part of the Scandinavian-Mediterranean Corridor (from here: the Northern part of the ScanMed corridor).

In 2023, Sweco, together with four prominent professors in logistics, studied the potential of transferring goods from road to rail due to the positive effects of FBFL. In the scenarios in the report, **rail freight volumes are expected to increase with about 20 % or less until 2040.** Meanwhile, **road freight across the Fehmarn Belt is expected to increase by at least 50 %.** **The main reason for this prognosis is 15 capacity constraints (“bottlenecks”) in railways within and adjacent to the Northern part of the ScanMed corridor.** Capacity constraints affect all factors important to the choice of transport mode, hence severely impeding the benefits of the FBFL.

The purpose of this report is to **describe the status of these bottlenecks as well as give recommendations on how to expedite the resolution of them.** The capacity constraints appear in all parts of the Northern part of the ScanMed corridor as well as in adjacent regions (Figure 1). The status and the recommendations are presented in Table 1.

The table shows how the infrastructure bottlenecks continue to threaten the competitiveness of rail freight in the Northern part of the ScanMed corridor. Most bottlenecks will remain unresolved by 2029, risking increased truck traffic and missed opportunities for rail-based logistics improvements. **Since the report in 2023, the situation has worsened, as 2.5 years have passed without sufficient progress having been made.** This is despite the targets of the EU and the states concerned to strengthen the competitiveness of the railway and also the fact that revision of the EU regulation for the TEN-T network as well as national long-term transport infrastructure plans in Norway and Sweden were finalized during this period. **Inaction has a very distinct cost as too little is done to achieve the targets and to promote the competitiveness of the most energy-efficient and climate-friendly mode for freight transport.**

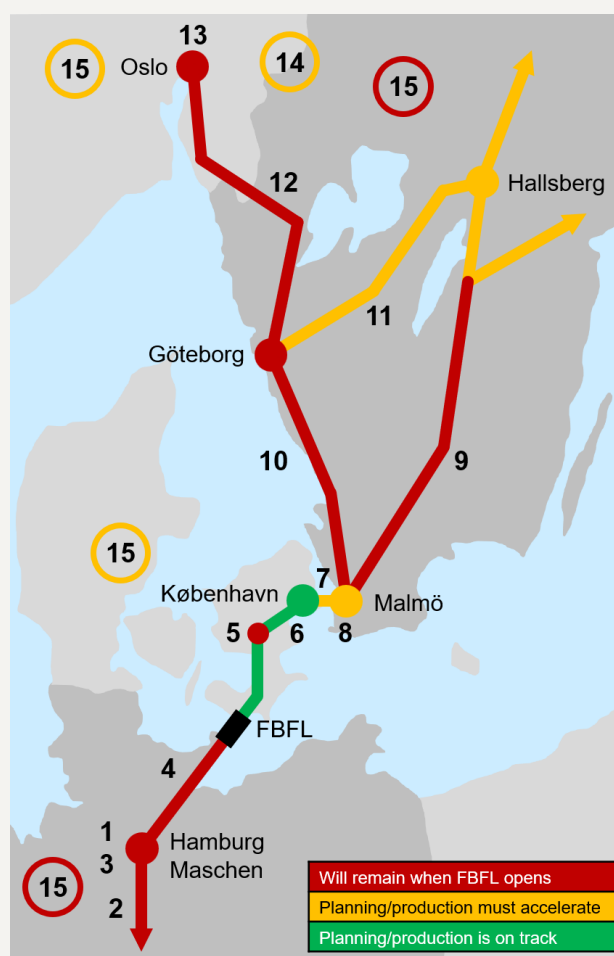


Figure 1. Most bottlenecks will remain by 2029 and beyond, impeding the development of rail freight transport.

Table 1. Status and recommendations for the 15 bottlenecks.

Bottleneck/status	Recommendation
1. Railway node Hamburg. A couple of measures are ready by 2030, but planning for more tracks over the Elbe has stalled.	Restart planning for more tracks over the Elbe as soon as possible.
2. The railway Hamburg-Hannover. Completion is expected around the year 2040.	The European Commission should take the initiative for a review and reform of how we plan and build railways in Europe.
3. Hamburg terminal capacity. Terminal capacity is already heavily strained and will worsen when the Fehmarn Belt tunnel opens.	Start planning a new container terminal and co-finance it with the EU and the federal government.
4. Hamburg - Lübeck – Puttgarden – FBFL. The Fehmarnsund tunnel is delayed, and the risk is high that more subprojects will be as well.	Electrify the existing single track on the Fehmarnsund bridge and give priority to freight trains. Accelerate planning on the line between Lübeck and FBFL.
5. Terminal availability and prices in Denmark. Current suggestion of a new terminal in Ringsted will not be in place by 2029.	The Danish government needs to get involved to promote the establishment.
6. Danish bottlenecks around Copenhagen. Denmark seems to succeed in fulfilling its extensive commitment to ensure full benefit from FBFL.	
7. Strategic redundancy across the Öresund. Train ferries receive state support and future accessibility for transport across the Öresund continues to be investigated.	The Swedish and Danish governments should initiate a new, joint and unbiased investigation on how to ensure capacity, redundancy and accessibility across the Öresund.
8. Swedish bottlenecks around Malmö. Measures are being implemented on time, but future capacity remains uncertain.	The Swedish government should task the Swedish Transport Administration with studying a new, dedicated freight track outside of Lund combined with a new, efficient marshalling yard.
9. The Southern Main Line in Sweden. Remains the biggest bottleneck in southern Sweden even towards 2050.	Accelerate the implementation of smaller improvements in Skåne and the expansion to four tracks Hässleholm-Lund. The stretch Hässleholm-Alvesta needs to be urgently investigated.
10. The West Coast Line around Gothenburg. Lack of capacity Gothenburg-Kungsbacka, which there are no plans to solve.	The Swedish government should task the Swedish Transport Administration with starting planning for quadruple tracks south from Göteborg to Kungsbacka.
11. The Western Main Line in Sweden. Measures will be completed in the 2030s.	Capacity should be further strengthened by extending the new four-track line from Partille to Alingsås.
12. The railway Oslo-Gothenburg. The insufficient railway hinders the exchange between two of the Nordic's growth engines.	The Swedish and Norwegian governments should study a new double-track border railway for routes to Oslo from both Gothenburg and Stockholm.
13. The railway system in the Oslo region and the Alnabru terminal. A "follow-up" project is planned but there is no concrete measure ready in time for FBFL.	Norwegian authorities should develop and implement concrete measures to strengthen the Alnabru terminal.
14. Train lengths in Sweden and Norway. Planned measures will allow long freight trains to run on all main corridors in Sweden by 2040.	Accelerate the implementation to meet the opening of the FBFL.
15. ERTMS. There will be ERTMS in Denmark and Norway by 2034, but Sweden and Germany are far behind.	The EU Commission needs to put pressure on the national governments that are currently not fulfilling the ambition to seamlessly operate trains within Europe.

The situation increases the risk that freight transports by truck will continue to gain market share. This is especially likely, taking into consideration that the Fehmarnsund bridge will set severe limitations on railway capacity, even with the recommended electrification (Table 1), until the Fehmarnsund tunnel opens no earlier than 2032. **We hence risk losing the window of opportunity to reevaluate logistics chains in connection with the opening of FBFL, setting up new supply chains based on railway freight.** On the contrary, there is a risk that truck traffic will get ahead, which may consolidate new truck-based transport setups.

The Sweco report from 2023 resulted in five clear recommendations, in addition to eliminating bottlenecks, to strengthen rail freight in the Northern part of the ScanMed corridor:

- 1. Enable full train lengths and faster trains throughout the corridor.**
- 2. Improve TEN-T standards to reflect real operational needs.**
- 3. Ensure fair taxation across transport modes, considering externalities like greenhouse gas emissions.**
- 4. Support low-emission road transport infrastructure.**
- 5. Promote sea transport to relieve rail bottlenecks.**

Three new recommendations can be added based on the results from this report:

The European Commission should initiate a review and reform of how we plan and build railways in Europe. The slow planning and implementation are symptomatic of railway construction in most of the EU and illustrates a major challenge for the railway's competitiveness.

Develop existing implementation and financing methods to increase efficiency and enable rapid expansion despite limited government investment funds. Infrastructure development benefits many groups in society, while it often faces complex challenges. This is a characterization very much present in, for example, the Railway node Hamburg and Hamburg terminal capacity. At the same time, current needs for improving the railway in the EU are huge. This is an argument for developing collaboration between the beneficiaries and allowing various actors to contribute with their expertise and resources. The Northern part of the ScanMed corridor also plays an important role for military mobility. Both the EU and its member states emphasize the importance of so-called dual use, meaning that infrastructure investments have both military and civil benefits.

Strengthen cross-border infrastructure planning and political dialogue. National planning of infrastructure tends to stop at national borders, which is manifested in how cross-border connections, for example Oslo-Gothenburg, are systematically less developed than domestic infrastructure. However, the EU's increasingly integrated economy makes it crucial to develop corridors that stretch across multiple national borders, not least to strengthen rail freight transport, which also struggles with a heavy regulatory burden at border crossings. Nation-states must establish stronger forums for joint political dialogue and decision-making.

The recommendations in the report are Sweco's own and do not necessarily correspond with the views of STRING, the Greater Copenhagen Committee, or their members.

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1. Introduction

The Fehmarn Belt Fixed Link (from here: FBFL) will remove a bottleneck and reduce transport times, contributing to efficient logistics between Scandinavia and Continental Europe. This could be an opportunity to realize the potential for more rail transport in the Northern part of the Scandinavian-Mediterranean Corridor (from here: the Northern part of the ScanMed corridor). It is a clear objective for the EU and the states concerned to strengthen the competitiveness of the railway, the most energy-efficient and climate-friendly mode for freight transport.

On behalf of STRING and the Greater Copenhagen Committee, Sweco studied in 2023 the potential for FBFL to increase the transfer of goods from truck to train. The project team consisted of four professors within freight transportation, logistics and supply chain management from Norway, Sweden, Denmark, and Germany together with senior consultants from Sweco. In the scenarios in the report, rail freight volumes are expected to increase with about 20 % or less until 2040. Meanwhile, road freight across the Fehmarn Belt is expected to increase at least by 50 %.

The main reason for this prognosis is 15 capacity constraints (“bottlenecks”) in other parts of the railway network within and adjacent to the corridor. Capacity constraints affect all factors important to the choice of transport mode, hence severely impeding the benefits of the FBFL.

The purpose of this report is to describe the status of the 15 bottlenecks as well as give recommendations on how to expedite their resolution. The status of the bottlenecks has been studied using current transport infrastructure plans as well as other documents in the concerned countries. The status of each bottleneck has been assessed with a three-step scale, see Table 2.

Table 2. The capacity restraints have been assessed with a three-step scale.

Red: The bottleneck will remain by 2029, severely hampering the potential for railway freight.	Orange: To remove the bottleneck and/or reduce the negative impacts, planning/production must increase in speed and efficiency.	Green: Planning/production is progressing with adequate speed and efficiency to remove the bottleneck and/or reduce the negative impacts.
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It has become clear over the past year that the Fehmarn Belt tunnel will not be able to open in 2029, as the completion and approval of a special vessel intended for immersing tunnel elements is delayed by 18 months (Femern AS 2025A and B). As no new, official opening year has been presented, the status of bottlenecks is assessed relative to the year 2029, the original opening year for the tunnel. It should be added that the situation is serious, as truck traffic continues to gain market share during this time and the window of opportunity that FBFL represents is being delayed.

The recommendations in the report are Sweco's own and do not necessarily correspond with the views of STRING, the Greater Copenhagen Committee, or their members.

2. The importance of railway capacity

Capacity constraints, such as single-track routes, train length or weight limitations, speed reductions, steep gradients, inadequate terminal capacity, and other infrastructure deficiencies, adversely affect all the critical factors in selecting a transport mode, see Table 3.

Table 3. Capacity constraints severely affect railway competitiveness.

Critical factors when choosing transport mode	Impact of bottlenecks and capacity constraints
Reliability of service	Disturbances have more severe effects and are transmitted through the system. The time to restore traffic is long. Timetables need more safety marginals, increasing the difference versus road transport.
Transport time	Trains must wait for each other, and freight trains are often downgraded in favour of passenger trains. The slowest trains (the freight trains or local passenger trains) define the capacity of the railway.
Transport costs	Longer transport times due to capacity constraints lead to lower utilization of rolling stock and locomotives, hence increasing the share of fixed costs and reducing railway competitiveness. When train length or weight is restricted, cost efficiency is reduced.
Availability and flexibility	Lack of available time slots reduces flexibility. Bottlenecks in the railway network define the entire logistics chain, leading to unwanted effects at the origin or destination.
Environmental performance	Longer transport times and frequent stops, leading to more braking and acceleration, increase energy consumption. When train length or weight is restricted, energy efficiency is reduced.

Within the Northern part of the ScanMed corridor, this issue is notably difficult. The setup for rail transport, the most effective and eco-friendly method for transferring substantial amounts of passengers and cargo, is advantageous in this heavily populated corridor with significant industrial output and numerous crucial hubs. Nevertheless, limitations in capacity result in harmful rivalry between transportation needs that are equally vital for societal benefit.

The 15 bottlenecks addressed in the upcoming chapter consequently contribute to severely worsening the competitiveness of freight trains in relation to truck traffic. As stated in the 2023 report, most of these bottlenecks are already a problem for the train's competitiveness, and the situation worsens when FBFL opens.

3. 15 bottlenecks – status and recommendations

This chapter describes the status for the 15 capacity constraints and also gives recommendations on how to expedite their resolution. The bottlenecks are shown in Figure 2.

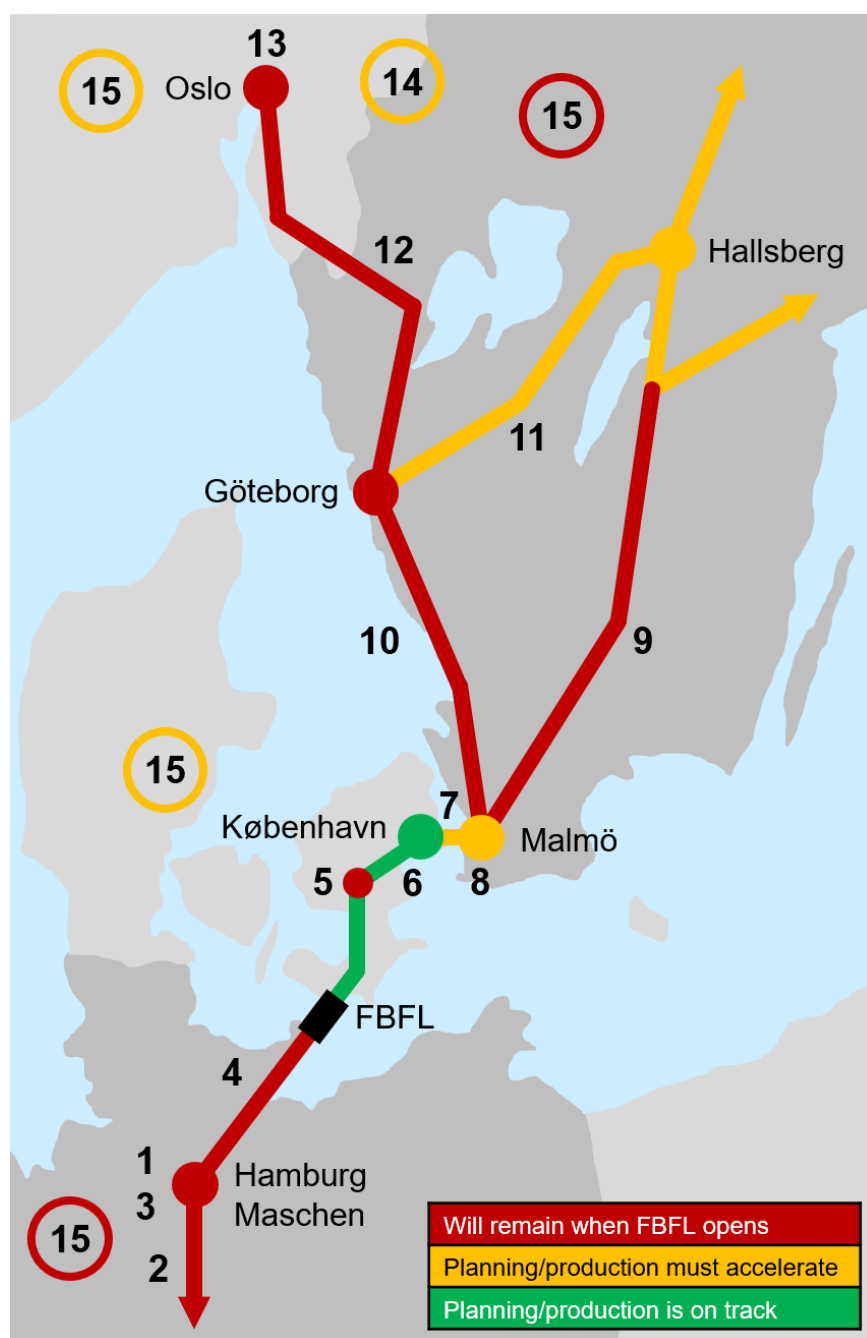


Figure 2. Capacity constraints that will severely hamper the positive effects of the FBFL.

1. Railway node Hamburg

Hamburg is a significant metropolitan area and a key intersection for three TEN-T corridors. The German initiative to enhance local and long-distance passenger and freight traffic (“Deutschland-Takt”), will strengthen the Hamburg node even further. The port of Hamburg is the third-largest seaport in Europe by volume and the third-largest container port. It is also Europe's largest railway port, underscoring its role in intermodal transport. Ensuring necessary railway capacity is critical.

Status

The project program "More trains to Hamburg" (Mehr Bahn für Hamburg) includes four projects in central Hamburg, none of which are directly connected to the Lübeck-Hamburg-Maschen route, which will be the main future route for freight trains (Deutsche Bahn 2025D). Notably, tracks 9-10 at the central station, currently designed for through freight traffic, are being reconfigured. This measure reduces the capacity for freight trains between Jutland and Hamburg; however, most of this traffic will be transferred to FBFL, and there is also a freight bypass railway, Güterumgehungsbahn, in northern and eastern Hamburg. It is somewhat concerning that there is a study underway to use the railway for local traffic (Dialogforum Schiene Hamburg-Altona 2025). The eastern section, between the railway heading towards Lübeck and the one towards Hannover/Maschen, remains very important for freight trains.

Two projects have direct benefits for freight traffic. First, in the corridor from Hamburg approximately 20 km towards Lübeck, new tracks will form a new S-Bahn line, S4, thereby relieving the existing tracks (Hamburg et al. 2025). The project is planned to be completed by 2030. Second, two freight traffic lines intersect in Meckelfeld, just north of Maschen. To separate the freight traffic flows, the line from Maschen to Hamburg-Wilhelmsburg in Meckelfeld will be expanded to four tracks (Deutsche Bahn 2025E). The building permit has been granted, planning is underway, and some preparatory work has started.

The railway link between Hamburg Central Station and Hamburg-Harburg serves as the primary route for traffic to and from Central, Western, and Southern Europe. It is heavily utilized with 600 trains daily, including 225 freight trains (Freie und Hansestadt Hamburg 2023). The hundred-year-old railway bridges over Norderelbe constitute a serious bottleneck. All trains between the centre of Hamburg and Harburg, including international freight trains, must take this route. The bridges are to be renovated, but there is no indication of any project for increased capacity. The Deutsche Bahn, the city of Hamburg, and state authorities have agreed to replace parts of the old bridges while simultaneously extending the U4 subway line over the Elbe. However, this proposal is complicated and requires extensive preparation. There is yet no set timeline for the start of construction, which means that capacity problems persist (Deutsche Bahn 2025C).

Conclusion

Status: It is positive that both the expansion to four tracks in Meckelfeld and the new S-Bahn line will be ready around 2030. The planning for six tracks across the Elbe has stalled.

Recommendation: Restart planning for more tracks over the Elbe as soon as possible.

2. The railway Hamburg-Hannover

The railway between Hamburg and Hannover is one of the most utilized transport corridors in Germany. There is an urgent need for two more tracks to increase capacity. The importance and urgency are well illustrated by the following quote from the Bundesministerium für Verkehr:

“With a capacity utilization rate of 147 percent, the Hamburg-Hannover line is one of the most congested and consequently most unpunctual lines in Germany. Given the increasing number of trains projected by the federal government, both in passenger and freight traffic, there is a great need for measures on this axis, as the line affects the entire German railway network.” (Bundeministerium für Verkehr 2025)

Status

Following a location study, the German railway authority Deutsche Bahn has selected a route for the new Hamburg-Hannover railway, which, after consultation, is expected to reach the German Bundestag for decision in 2026 (Bundesministerium für Verkehr 2025). Subsequently, the more detailed planning will begin. This can reach a determination and implementation by around 2030 (Deutsche Bahn 2025F). When the new railway might be completed is not indicated, but as it involves approximately 130 km of new double track, completion is likely around 2040 at best.

Conclusion

Status: The reasons for the Hamburg-Hannover railway can hardly be stronger. The route is heavily overloaded, and measures should have been implemented several years ago. Completion is expected around the year 2040.

Recommendation: The slow planning and implementation are symptomatic of railway planning in most of the EU and illustrates a major challenge for the railway's competitiveness. This challenge increases in connection with the need to quickly promote military mobility.

The European Commission should take the initiative for a review and reform of how we plan and build railways in Europe. It has previously taken similar initiatives, for example, for common legislation for allocation of capacity on the railway (European Parliament 2024).

Of course, Germany, Denmark, Sweden, and Norway are not dependent on the EU Commission to initiate such an initiative themselves. Although national legislation and administrative models mean that solutions may vary between countries, there should be a clear value of bench learning between the countries in such a process.

3. Hamburg terminal capacity

The Port of Hamburg ranks among the largest logistics and industrial regions in Germany, offering a diverse array of operations from goods handling and logistics services to manufacturing. Many intermodal terminals exist in the Hamburg vicinity. Nevertheless, their capacity is extensively used, culminating in waiting periods and heightened requirements for swift movement of loading units, thereby complicating logistics. Delayed freight trains risk missing their scheduled times, leading to long waiting periods for transshipment. Berthing and dwell times (the time containers remain at the terminal) have increased, indicating that there are bottlenecks in handling. There are limitations on semi-trailers, since unlike containers, they cannot be stacked, thus proving less space efficient.

Status

Hamburg's port has started using feeder vessels for internal transshipment between terminals, instead of truck transfers, to reduce congestion. Automation and modernization are ongoing to increase capacity and efficiency. The Burchardkai terminal is undergoing extensive automation during ongoing operations – the largest project of its kind globally (HHLA 2025).

During modernization and expansion of Waltershofer Hafen, currently handling 90 percent of the largest container vessels calling at Hamburg, new terminal areas are being created, as well as automation of container handling. Hamburg Port Authority (HPA) is responsible for the infrastructure development, which is expected to be completed around 2035. Public funding covers part of the costs. The terminal areas remain publicly owned and are leased to Eurogate, which will invest at least EUR 700 million in expanding the existing container terminal. The project is part of the state of Hamburg's port development plan. (American Journal of Transportation 2025).

There are plans for a new container terminal (from among others, the Hamburg Chamber of Commerce) with full automation and an area of 120 hectares. This would increase the existing capacity from around ten million TEU to 12–14 million TEU at a cost of around 5 billion euros. With rapid implementation, the terminal could be operational around 2035. [dagenslogistik.se]

Conclusion

Status: Terminal capacity is already heavily strained and will worsen when the Fehmarn Belt tunnel opens. Ongoing efficiency efforts at existing terminals have potential, but it is unclear how significant this potential is.

Recommendation: Start planning a new container terminal. Base it on the proposal from Handelskammer Hamburg. Given Hamburg's and Hamburg Port's national and international significance for intermodal traffic and Europe's trade, there should be potential for co-financing from the EU and also from the German federal government. The EU supports investments in infrastructure that strengthen the Trans-European Transport Network (TEN-T), where the port of Hamburg is a central node. The EU also prioritizes projects that promote digitization and automation within the transport sector. Germany's government has supported investments in port infrastructure, especially regarding strengthening logistical hubs and promoting sustainable transport solutions. "Sondervermögen Infrastruktur und Klimaneutralität" is a state investment program that allows up to 500 billion euros in investments until 2034. The fund is intended to, among other things, modernize transport infrastructure (Deutscher Bundestag 2025).

4. Hamburg - Lübeck - Puttgarden - FBFL (Hinterlandanbindung FBQ)

The railway line Hamburg-Lübeck-Puttgarden (Hinterlandanbindung FBQ) is part of the state treaty between Germany and Denmark and is to be ready when the FBFL opens. The project includes new tracks, electrification, new passing stations, and an extension of passing tracks to 850 metres. If the railway is not completed when the FBFL opens, it will be the most severe bottleneck in the Northern part of the ScanMed corridor (Sweco 2023). Also, the connection from the island Fehmarn to the German mainland, the Fehmarnsund-bridge, is a critical bottleneck.

Status

The treaty from 2008 governing the FBFL does not include any measures for the Fehmarnsund bridge – "the railway connection over the Fehmarnsund bridge shall remain single-tracked" (Deutschland/Danmark, 2008). The state of Schleswig-Holstein noted this problem in 2012, and in 2014 started planning for a new connection. In 2020, a decision was made for an immersed tunnel for motorway and double tracks. In July 2025, the federal railway authority estimated the construction time, including commissioning, to about 6 years and 5 months. This delays the opening of the Fehmarnsund tunnel to no earlier than the end of 2032 (Eisenbahn-Bundesamt 2025). The German transport ministry then suggested to the Danish parties, in accordance with article 22 of the treaty (Deutschland/Danmark, 2008), that the project organizations, Femern A/S and DB InfraGO AG, should agree on a commissioning date adapted to the changed conditions (Bundesministerium für Verkehr 2025B). The ministry also pointed out the raised serious delay risks for the Fehmarn Belt connection (Sund & Bælt 2025D).

With respect to the treaty, there is a plan to electrify the existing single track via the Fehmarnsund bridge and, as a temporary solution, run trains on the existing bridge. However, there are statements suggesting that this solution is for passenger trains, not freight trains (Lübecker Nachrichten 2025). The Fehmarnsund bridge has a limited axle load of 20 tons, indicating that if freight trains stay within this limit, the temporary solution is also available for freight traffic. (In the current railway system in Germany, Denmark, and Sweden, the maximum axle load is 22.5 tons.)

The new railway connection from Lübeck to FBFL, the Schienenanbindung der Festen Fehmarnbeltquerung, is divided into ten sub-projects, of which only two (PFA 5.2 and 6) have approved "railway plans" (Deutsche Bahn 2025G). Hence, there is an imminent risk that more parts of the new railway, besides the Fehmarnsund tunnel, will be missing when the FBFL opens. However, there is an existing single-track railway between northern Lübeck and Puttgarden.

Conclusion

Status: Germany should fulfill the treaty from 2008 and prepare for traffic via the old Fehmarnsund bridge when the FBFL opens. Overall, most sub-projects between Lübeck and FBFL have a very tough schedule, but officially, no measures are delayed.

Recommendation: Electrify the existing single track on the Fehmarnsund bridge to enable some freight traffic. This means an additional cost, but the alternative is that rail freight falls far behind trucks, which can already use FBFL and the Fehmarnsund bridge (albeit with capacity constraints). Consider prioritizing the capacity that is thereby available on the bridge for freight trains.

5. Terminal availability and prices in Denmark

Denmark suffers from a shortage of open intermodal road/rail terminals, leading to limited competition and high usage costs (significantly greater compared to equivalent terminals in Sweden, Germany, and Italy). Market dominance by a single actor can obstruct other logistics operators' ability to transfer goods from road to rail, resulting in additional costs due to extra lifts. This barrier hampers modal shift and undermines the potential to enhance Copenhagen's position as a centre for intermodal freight transport. Establishing new, accessible terminal capacity would alleviate these issues and make road/rail intermodal transport more competitive.

Status

The municipal association KKR Sjælland advocates for the location of a new intermodal terminal in eastern Ringsted after analyses and comparisons with locations in Køge (Ringsted municipality 2025). A screening of possible locations compared several parameters such as available area, business synergies, distance to the capital area, etc. Ringsted is considered the best location and scores particularly high on the parameters of available area, nature protection considerations, location on the Northern part of the ScanMed freight corridor, and railway freight routes through Eastern Denmark (KKR Sjælland 2025).

The location is along the stretch where both lines to Copenhagen run parallel, and just north of the location is the motorway between Copenhagen and Funen. The Danish transport minister has Accessed the site and met with the municipality's mayor (Sjællandske Nyheder 2025). It is not indicated in any material which party or parties are considered to invest in the terminal.

Conclusion

Status: There is a lack of competitive intermodal terminals in the corridor, and the location in Ringsted appears efficient. It is commendable that a municipal association identifies a suitable location, but there is a lack of commitment from other parties. It is unrealistic for a new intermodal terminal to be in place by 2029.

Recommendation: STRING and Greater Copenhagen should collaborate with KKR Sjaelland and Ringsted municipality to develop the project further, for example by identifying possible terminal operators and discuss financing and the business model. The Danish government needs to get involved to promote the establishment.

6. Danish bottlenecks around Copenhagen

The railway system around Copenhagen, Copenhagen Airport, and the connection to the fixed link over the Øresund has several bottlenecks that need to be resolved. The needs already exist but will become acute when the Fehmarn Belt tunnel opens. If they are not solved, the possibilities for developing train traffic over Fehmarn Belt will be severely limited.

In Ringsted, multiple railway intersections are not grade-separated, leading to trains having to wait for one another. Facilitating train movements from the Copenhagen area toward South Zealand and Hamburg, to cross paths with trains from Odense heading towards Copenhagen without delays, necessitates a height-separated track junction. A comparable issue exists in Ny Ellebjerg where train routes conflict. Without resolution, most freight trains will reroute via Roskilde railway instead of utilizing the new Køge line. Additionally, it is crucial to examine ways to ensure adequate railway capacity between Kastrup and Kalvebod, although passing tracks for freight trains are planned post-Kalvebod and at Copenhagen Airport station. There is an evident need to boost capacity at Copenhagen Airport.

Status

At Copenhagen Airport station, the freight tracks will have side platforms and will be served by passenger trains towards Copenhagen from 2027 (Sund & Bælt 2025). The object with turnaround tracks at the same station, for trains towards Sweden, is put on hold (Sund & Bælt 2025B).

Two new passing tracks will be built at Kalvebod, ensuring accessibility for all train traffic between Kastrup and København Syd (Sund & Bælt 2025C). The Danish Transport Agency has approved an environmental impact assessment (EIA), and planning proceeds towards completion in 2028.

At København Syd, there is a separation in height between Øresundsbanen-Vestbanen and the new Ringsted/Køge railway towards København H. It least affects capacity if the trains stay within these relations, which means that freight trains are preferred to run via Vestbanen and Roskilde, which also fits slower trains, since fast trains run via Køge.

The biggest remaining project in Denmark connected to FBFL is the need for a separation in height in Ringsted at the intersection of railways from four directions (Banedanmark 2025B).

Banedanmark is investigating two solutions and after consultation, a decision basis should be ready for the ministry by 2026. The project is to be implemented 2028-2030 (Banedanmark 2025).

Furthermore, the railway between Ringsted and Rødby/Holeby, i.e., the Danish connection to FBFL, will be ready by 2029 (Banedanmark 2025C). By then, the entire railway, of just over 120 km, will have double tracks, a few new bridges, higher speed, and passing tracks, at a cost of almost 10 billion Danish kroner.

Conclusion

Status: The crucial aspect is whether the separation in height in Ringsted adheres to the time schedule and thereby demonstrates that Denmark is fulfilling its extensive commitment to the connection to FBFL.

7. Strategic redundancy across the Öresund

The evident risk exists that the railway ferries connecting Trelleborg and Rostock will discontinue due to insufficient profitability. Initiatives to bolster railway competitiveness might enhance market conditions for the ferries too, yet the FBFL's launch will redirect transportation to the fixed links. Numerous operators affirm that redundancy is vital for their operations. Losing redundancy between Southern Sweden and Germany while redundancy through Denmark is being established would be problematic. Although this alone might not decide the establishment of another fixed link across the Öresund, it is a point worth considering.

Status

The Swedish government has tasked Swedish Transport Administration with taking measures aimed at maintaining continuous train ferry traffic between Sweden and Germany (Swedish government 2025). Funds have also been allocated in the state budget for 2026, and beyond, for this purpose. The government writes that to maintain train ferry traffic between Sweden and Germany, agreements need to be made that entail financial commitments over several years (Swedish Government 2025D).

The government assignment *Capacity and Redundancy for Transport Across Öresund* (Trafikverket 2024), conducted during 2023-2024 without any participating Danish authority, concluded that the capacity via the existing Øresund Bridge connection is sufficient until approximately 2050. Another conclusion was that the capacity of the Southern Main Line Malmö-Alvesta must be increased before more capacity across Øresund is needed. The redundancy for railway traffic is less developed, but it is assessed that it is not cost-effective to build new infrastructure solely to improve this dimension. The Swedish Transport Administration proposes continued bilateral work, where the Swedish and Danish authorities receive a joint assignment from their respective governments.

In June 2025, a special investigator was tasked by the Swedish government to prepare for a bilateral strategic Swedish-Danish investigation with the ambition of creating a common view on the need for capacity and redundancy for transport across Øresund from 2050 (Swedish government 2025B). This assignment is to be reported no later than February 2026, and then hopefully a bilateral investigation will be initiated in 2026 or 2027.

Conclusion

Status: Train ferry traffic receives state support and future accessibility for transport across Öresund continues to be investigated, again in collaboration between Swedish and Danish authorities.

Recommendation: The Swedish and Danish governments should initiate a new, joint investigation on how to ensure capacity, redundancy and accessibility across the Öresund. The investigation should look at possible solutions without any bindings to current proposals.

8. Swedish bottlenecks around Malmö

In Malmö and close to the fixed link across Öresund, several bottlenecks need to be solved to ensure the accessibility for freight trains when FBFL opens, with an emphasis on longer trains.

Status

When the planning of the new railway Hässleholm-Lund was stopped in 2022, the Swedish Transport Administration was tasked with investigating the capacity in Skåne (Swedish government 2022; Trafikverket 2023). This resulted in the government deciding in 2023 to reintroduce the project for two new tracks Hässleholm-Lund along with six smaller projects, four of which are located in the Malmö area (Swedish government 2023). Three measures in Malmö – separation in height to Malmö C “Upper”, more platform tracks at Malmö C, and double tracks between Malmö C Upper and Östervärn – have the greatest impact on passenger train traffic, while a new sidetrack on the Godsstråket genom Skåne between Kävlinge and Teckomatorp greatly benefits freight train traffic. The sidetrack will be completed in the early 2030s and is affected by the task of speeding up measures related to FBFL (Swedish government 2025C).

Svedab (Svensk-Danska broförbindelsen) is carrying out an extension of the passing tracks at Svågertorp from 750 to 1,050 meters, which will be completed by 2029 at the latest (Svedab 2025). The Swedish Transport Administration is planning to add an inbound track to Malmö freight marshalling yard in the northern direction, which will also facilitate the handling of long freight trains in the yard (Trafikverket 2025H). This measure may be completed by 2030.

Conclusion

Status: Planned measures for Svågertorp and Malmö freight marshalling yard are being implemented on time, but future capacity for (long) freight trains remains uncertain.

Recommendation: In the long term, it will be very challenging for Malmö freight marshalling yard and the transition between the Continental Line and the Southern Main Line/Lomma Line, since the yard cannot accommodate significant growth in freight traffic. A long-term solution for train traffic, especially freight trains, in the Malmö area is a new, dedicated freight track outside of Lund combined with a new, efficient marshalling yard. Four municipalities have identified a possible route for the track in their strategic plans; see Figure 3 (Malmö stad 2023; Staffanstorps kommun 2022; Lomma kommun 2022; Lunds kommun, 2018).

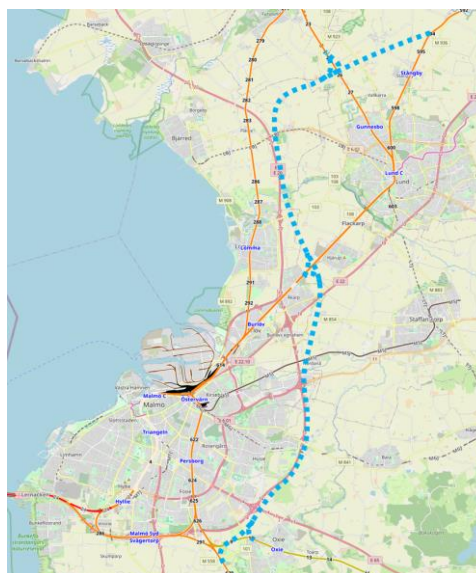


Figure 3. A potential corridor for a new, dedicated freight track outside of Lund.

9. The Southern Main Line in Sweden

The Southern Main Line is crucial for developing freight transports by train to and from Sweden and the FBFL. The stretch Lund-Hässleholm-Alvesta is characterized by significant capacity problems and high sensitivity to disruptions. It is reminiscent of the railway Hamburg-Hannover as well as the Western Main Line in Sweden, in that major capacity measures should have already been implemented. Since 2000, transport times between Swedish railway hub Hallsberg and Malmö has increased by two hours (Nelldal and Ahlstedt 2024), reducing the net gain from the FBFL for transports to and from the European continent to only about 30 minutes.

Status

The stretch Lund-Hässleholm was part of the Swedish programme for a high-speed network. The programme was questioned by the government and the planning halted (Swedish government 2022). In a 2023 government decision, Lund-Hässleholm was reinstated with a new focus on strengthening regional commuting and freight transports through two more tracks of conventional standard (Swedish government 2023). A railway plan for two additional tracks through Lund will soon begin, while a localization study for the section between northern Lund and Hässleholm has already started (Trafikverket 2025E). Four tracks through Lund might be completed around 2035. The rest of the section will likely be completed ten years later.

The Swedish Transport Administration is investigating an earlier completion of planned, smaller capacity measures in Skåne and will report in January 2026 (Swedish government 2025C).

The authority further highlights that after the realization of new tracks Lund-Hässleholm, the next restraint will be the section Hässleholm-Alvesta (Trafikverket 2023 and 2024B). The proposal for the national plan 2026-2037 says that the section needs an in-depth analysis (Trafikverket 2025). The Southern Main Line north of Hässleholm will likely not get more tracks before 2050. Regarding smaller measures along the Southern Main Line (Malmö-Mjölby), the national plan proposal includes four new passing tracks (two north of Hässleholm, two south of Älmhult) and a triangle track towards the Coast-to-Coast Line westward (Trafikverket 2025).

In the corridor to Hallsberg, via the freight corridor through Bergslagen from Mjölby, the double track will be complete by 2031 (Trafikverket 2025F).

Conclusion

Status: There are planned and decided measures, but none will be completed by 2029, and analyses show that even with planned measures, the corridor Lund-Alvesta is the biggest bottleneck for freight trains in southern Sweden.

Recommendation: There is an ongoing government mandate to expedite implementation in Skåne that covers both smaller improvements and the expansion to four tracks Hässleholm-Lund. The latter has also been confirmed by statements from the management of the Swedish Transport Administration. The remaining shortage Hässleholm-Alvesta, including development of the Hässleholm as a railway node, needs to be urgently investigated. The involved regions and municipalities have significant roles for a smooth planning process.

10. The West Coast Line around Gothenburg

The West Coast Line is central for transport in the Northern part of the ScanMed corridor. South of Gothenburg, capacity constraints are obstructing the development of rail transport for passengers as well as freight.

Status

The double track through Varberg opened in 2025, and now it is only in northern Helsingborg that the West Coast Line between Lund and Gothenburg lacks double track. However, freight trains do not pass through Helsingborg, as they travel via the “Freight route through Skåne” and onto the West Coast Line in Ängelholm.

By 2027, a turning track in Båstad will be completed for local trains from Helsingborg, thereby reducing the load on the West Coast Line Båstad-Halmstad, which benefits freight trains (Trafikverket 2025I).

In the proposal for the national plan for 2026-2037, there are four new passing tracks on the West Coast Line (two between Halmstad and Falkenberg, one between Falkenberg and Varberg, one north of Åsa) (Trafikverket 2025). These measures will be implemented in the 2030s.

The section Kungsbacka-Gothenburg is heavily used, including by commuter trains, and there is a need for quadruple tracks (Trafikverket 2021). Studies have been conducted, but no measures are currently planned. For the Göteborg-Borås project, measures are included for the section Mölndal-Almedal which will facilitate traffic along the West Coast Line (Trafikverket 2025J). These measures will likely be implemented during the first half of the 2030s.

The West Link will open no earlier than 2031 for commuter trains and regional trains, which will relieve the central section of the West Coast Line (Almedal-Göteborg C) where freight trains operate and have connections to, among other places, the freight marshalling yard (Trafikverket 2025K). Sävenäs freight marshalling yard will be rebuilt and improved during the late 2020s (Trafikverket 2025L).

Conclusion

Status: The lack of capacity between Göteborg-Kungsbacka have a serious impact on freight traffic, and there are no current plans to solve it.

Recommendation: The Swedish government should task the Swedish Transport Administration with starting planning for quadruple tracks south from Göteborg to Kungsbacka.

11. The Western Main Line in Sweden

The Western Main Line could be considered the most important in Sweden due to significant passenger and freight volumes, together with the Southern Main Line. However, insufficient capacity has negatively affected traffic quality, causing disruptions and extended transit durations. The section from Gothenburg to Alingsås urgently requires four tracks (Sweco 2021; Trafikverket 2021 and others).

Status

In the proposal for the national plan 2026-2037, the first stage of a four-track line from Gothenburg/Olskroken to Partille is included, with an expected implementation during the 2030s (Trafikverket 2025). The measure includes a grade-separated connection to Sävenäs freight marshalling yard from the east, which clearly facilitates the extensive freight train traffic to the yard and further towards the port in Gothenburg.

The plan also includes an extended passing track (south of Skövde) and six new passing tracks (one in Floby, one south of Skövde, two north of Skövde, and two north of Töreboda), which will be built during the 2030s (Trafikverket 2025).

Conclusion

Status: Measures are planned, which will be completed in the 2030s.

Recommendation: Capacity on the Western Main Line should be further strengthened by extending the new four-track line from Partille to Alingsås.

12. The railway Oslo-Gothenburg

The railway between two of the largest Nordic regions has major flaws. Both the Oslo and Gothenburg regions are among the most competitive European knowledge regions (ESPON 2019). In an analysis of the environmental technology industry, it is noted that the corridor Oslo-Gothenburg-Öresund-Hamburg together would rank among the world's 20 strongest regions (Danish Technological Institute, 2021). The substandard railway connection hinders development and exchange between the regions. Regarding freight train traffic, the transport time is 6 hours 30 minutes to cover 350 km while road transport time is approximately 3 hours 30 minutes. The line speed is below 100 km/h on 50 % of the distance and there are steep gradients and length restrictions affecting cost efficiency very negatively (Sweco 2022; Trafikverket and Jernbanedirektoratet 2016 and 2023 and others).

Status

The Swedish Transport Administration and the Norwegian Railway Directorate conducted a Feasibility Study Oslo–Gothenburg in 2023 in response to their respective government assignments (Trafikverket/Jernbanedirektoratet 2023). The report outlines, among other things, a freight concept, which is profitable and includes at least six new passing stations between Haug and Skälebol. The report suggests that these measures should be pursued in the short term. This direction is confirmed by the Swedish Transport Administration by preparing a comprehensive impact assessment for the new national plan for two of the three proposed new passing stations on the Swedish side between Skälebol and Kornsjö (Trafikverket 2025B). The Swedish Transport Administration is also updating two evaluations for measures between Gothenburg and Skälebol in 2025, including several kilometres of double track and passing tracks (Trafikverket 2025C and D). However, despite the obvious need to strengthen the railway, none of these measures qualify in the Swedish Transport Administration's proposal for the national plan for 2026-2037 (Trafikverket 2025). A major deficiency along the stretch is the steep gradients along Tistedalsbakken and Brynsbakken where helper locomotives are needed to manage heavy freight trains. The feasibility study recommends state-funded helper locomotives, but there is no indication of any commitment to this issue.

Norway's National Transport Plan 2025-2036 presents a new measure for the Østfold Line (Det kongelige samferdselsdepartement 2024). Ongoing double track expansion at Moss, which is likely to be completed by 2030, will continue almost the entire stretch to Fredrikstad. Approximately 16 billion NOK will be invested in the line during the planning period. The main purpose is to enable more regional train traffic between Oslo and Fredrikstad, but it is also seen as a measure that supports traffic between Oslo and Gothenburg. The double track section towards Fredrikstad is 16 km and is set to begin within 2030, meaning the expansion will be completed in the 2030s. Bane NOR has not yet restarted the planning work (Bane NOR 2025).

Conclusion

Status: There are no decided measures that provide any significant improvement for freight traffic in the Gothenburg-Oslo corridor.

Recommendation: A feasibility study Oslo-Stockholm has also been conducted (Trafikverket/Jernbanedirektoratet 2022). A border line is being considered and recommended to run via Ski, that is, via the Follo Tunnel, which coincides with the Østfold Line towards Gothenburg. The Oslo-Stockholm corridor has no new measures in the Swedish Transport Administration's proposal for the national plan, except for four new passing stations on the Värmlandsbanan between Kil and Charlottenberg (Trafikverket 2025). These measures do not noticeably contribute to the short travel time between Karlstad and Oslo, which the organization Oslo-Stockholm 2.55 aims for. Infrastructure development in both the Gothenburg-Oslo and Stockholm-Karlstad-Oslo corridors is progressing slowly. To increase the chances of any cross-border project being implemented at all, the recommendation is that stakeholders in both corridors coordinate to try to realize a new border line. A border line that is properly executed can bring great benefits to both corridors, including the Gothenburg-Karlstad relationship. Figure 4 shows a solution.

The Swedish and Norwegian governments should study a new double-track border railway for routes to Oslo from both Gothenburg and Stockholm.

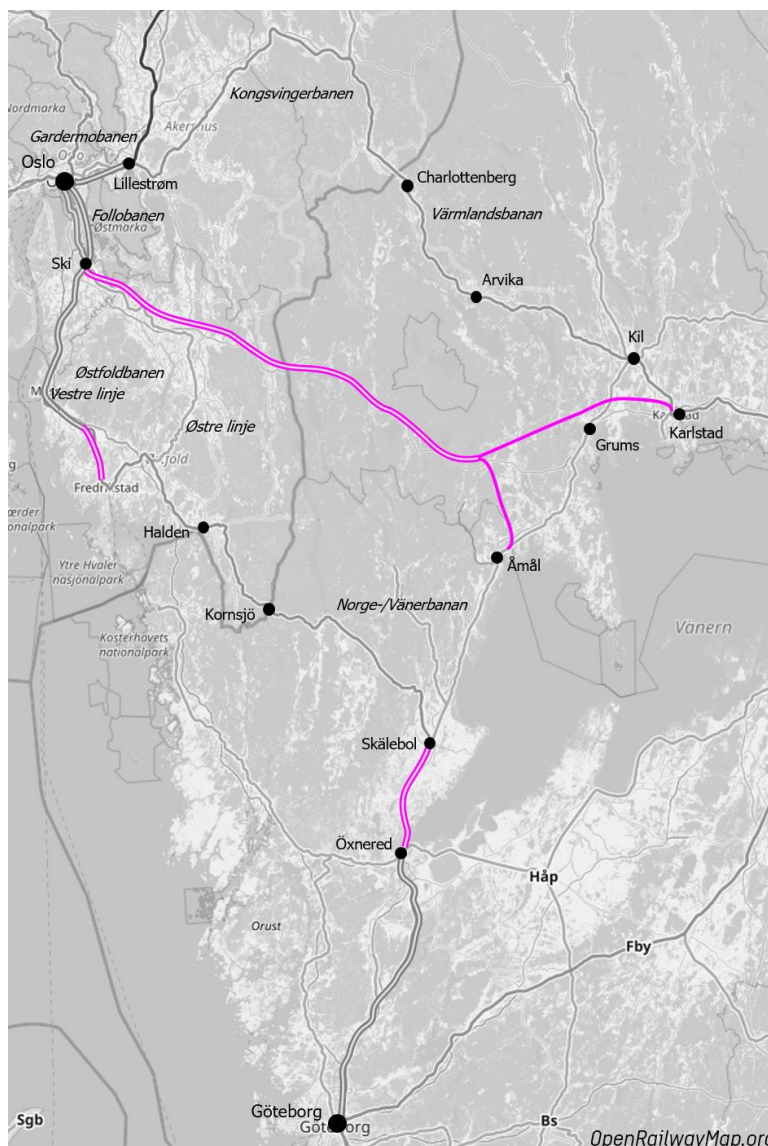


Figure 4. A new, double-track border rail can be used for both routes Oslo-Stockholm and Oslo-Gothenburg.

13. The railway system in the Oslo region and the Alnabru terminal

The railway network in the Oslo region has severe capacity challenges because of large passenger flows as well as freight volumes. This leads to disturbances affecting transport quality negatively. For example, there are restrictions for freight trains on specific links during rush hours (Transportetatene 2023).

The Alnabru terminal is the largest in the Nordic countries and plays an important role in Norwegian rail freight. The Alnabru terminal handles about half of all containers being transported on the Norwegian railway and the terminal is experiencing capacity problems (Transportetatene 2023). To promote a modal shift, the terminal capacity must be further developed.

Status

The Norwegian government believes that it will be necessary to expand the capacity of the national railway network in the long term to meet the increased demand for transport, especially in Eastern Norway, but also between the major cities and abroad. Central to this work will be finding a solution to the capacity limitation through the Oslo hub in the form of a "rikstunnel" (new national tunnel) and on the Østfoldbanen southward towards the Swedish border (Det kongelige samferdselsdepartement 2024).

The Norwegian National Transport Plan 2025-2036 includes a "Follow-up of terminal solutions Alnabru" (Det kongelige samferdselsdepartement 2024). The plan highlights that the capacity at Alnabru is highly utilized and that it limits the development of combined freight traffic. The follow-up of Alnabru, including a budget, together with the yard in Trondheim, of 2.8 billion NOK is scheduled for the period 2031-2036. Noteworthy is that the project's title is "follow-up," while several other projects in the plan have more concrete titles, such as "Increased capacity...".

Along the Main Line between central Oslo and Alnabru, freight has its own single track, the Loenga-Alnabru line, which directly connects to the Østfold Line southwards. The single track is approximately 5 km and probably handles four freight trains per direction per hour, which is likely sufficient also in the long term.

Conclusion

Status: Long-term plans for improving the capacity in the Oslo railway system has not been decided. For the Alnabru terminal, a "follow-up" project worth a couple of billion NOK is included in the plan, however, there is no concrete measure ready in time for FBFL.

Recommendation: If the Gothenburg-Oslo corridor and its attractiveness for freight trains is not developed, there is no major reason to prioritize Alnabru from an FBFL perspective. Still, to promote a modal shift in current transport flows, Norwegian authorities should develop and implement concrete measures to strengthen the Alnabru terminal.

14. Train lengths in Sweden and Norway

Longer and heavier trains have a large potential of increasing railway competitiveness. Typically, it is the last few wagons on a freight train that make the transport profitable. Hence, with every added wagon, profitability increases. Restrictions and/or capacity constraints in Sweden and Norway limit train lengths to 630/600 metres. Current EU-standard is 740 metres and measures are being taken to increase the length to 835 metres and even 1 050 metres (KombiConsult and Ramboll 2021).

Status

It is difficult to get an overview of the Swedish strategy for long freight trains, which could have been clarified in a comprehensive report in conjunction with the Swedish Transport Administration's proposal for a new national plan. There is a recent comprehensive impact assessment that covers an overall picture beyond the measures that were previously planned and implemented in the triangle Hallsberg/Gothenburg/Malmö (Trafikverket 2025G). The package of measures aims to meet the TEN-T requirements for long freight trains along the major freight lines in Sweden, including the connection between Gothenburg and Oslo. In the actual plan proposal, measures have been included on all corridors except on the Norway/Väner Line between Skålebol and Kornsjö, and on the Bergslagen Line (Trafikverket 2025). Measures for long freight trains, such as passing tracks and extended meeting tracks, are included in the plan proposal along the Southern Main Line, the West Coast Line, the Western Main Line, the Väner Line towards Kil, the Värmland Line, the Freight Corridor through Bergslagen, the Northern Main Line, and the Ådalen Line (Trafikverket 2025).

Norway's freight strategy states that there is a need for measures to accommodate 740-meter-long freight trains on the Østfold Line (Jernbanedirektoratet, 2019). However, the national plan does not mention this, and there are no such measures (Det kongelige samferdselsdepartement 2024). There is, however, a package of measures for the Kongsvinger Line worth 2 billion NOK during the period 2031-2036, likely aimed at extending meeting tracks. This matches the mentioned measures on the Värmland Line on the Swedish side (Trafikverket 2025).

Practically speaking, it will thus be possible to run long freight trains to Oslo via Kil, west of Karlstad, towards the end of the 2030s.

Conclusion

Status: There are planned measures that will allow long freight trains to run on all main corridors in Sweden by 2040, at least a few trains per day (TEN-T requirement for single track is one long freight train per direction every three hours).

Recommendation: Proceed with the expansion of long passing tracks to enable longer trains, increasing rail freight competitiveness. Follow-up on this bottleneck reinforces the bleak status of the Gothenburg-Oslo corridor. This concerns the section Skålebol-Fredrikstad, which is a single track where there are no decided measures for long freight trains, while Tistedalsbakken and Brynsbakken are too steep to accommodate a heavy freight train with only one locomotive. See Oslo-Gothenburg for further recommendation. Norway and Sweden should also begin planning for the next level(s) in train lengths.

15. ERTMS

The new European standard signalling system will have important benefits for freight transport. ERTMS will enable more efficient traffic management in real-time, increase average speed, reliability and capacity as well as reduce operating costs. Over time costs will be reduced if locomotives do not need to be equipped with interphases to several signal systems for various European countries. The current TEN-T Guidelines establish ERTMS as one of the priorities for railway infrastructure development with a deadline for its deployment on the Core Network, which includes the major railways in the Northern part of the ScanMed corridor, by 2030 (European Commission, undated).

Status

In Denmark, ERTMS is planned to be fully implemented by 2033 (Banedanmark 2025), and in Norway, it is expected to be completed by 2034 (Det kongelige samferdselsdepartement 2024).

In Sweden, The Swedish Transport Administration aims in the proposal for a new national plan to implement ERTMS on high-traffic routes by 2042, except for the Stockholm area (Trafikverket 2025).

The implementation of ERTMS in Germany falls under the program Digitale Schiene Deutschland. The program does not present a clear plan for the entirety, but it is evident, for example, that the Northern part of the ScanMed corridor will be completed by 2035 (Deutsche Bahn 2025). The new rail connection to FBFL between Lübeck and Puttgarden will be equipped with ERTMS (Deutsche Bahn 2025B). Based on the project map for Digitale Schiene Deutschland, a gap for ERTMS will arise between Hamburg and Lübeck, where there currently are no plan for the implementation of ERTMS.

Conclusion

Status: There will be ERTMS in Denmark and Norway by 2034, but Sweden and Germany are far behind. It will be well into the 2040s before a long-distance freight train can seamlessly operate solely on ERTMS between significant destinations in Norway/Sweden and Germany.

Recommendation: The EU Commission needs to put pressure on the national governments that are currently not fulfilling the ambition to seamlessly operate trains within Europe.

4. Conclusion

Bottleneck status and recommendations

The status of the 15 bottlenecks is summarized in the following table, including recommendations on how to solve them and/or reduce their negative impacts.

Table 4. Status and recommendations for the 15 bottlenecks.

Bottleneck/status	Recommendation
1. Railway node Hamburg. A couple of measures are ready by 2030, but planning for more tracks over the Elbe has stalled.	Restart planning for more tracks over the Elbe as soon as possible.
2. The railway Hamburg-Hannover. Completion is expected around the year 2040.	The European Commission should take the initiative for a review and reform of how we plan and build railways in Europe.
3. Hamburg terminal capacity. Terminal capacity is already heavily strained and will worsen when the Fehmarn Belt tunnel opens.	Start planning a new container terminal and co-finance it with the EU and the federal government.
4. Hamburg - Lübeck – Puttgarden – FBFL. The Fehmarnsund tunnel is delayed, and the risk is high that more subprojects will be as well.	Electrify the existing single track on the Fehmarnsund bridge and give priority to freight trains. Accelerate planning on the line between Lübeck and FBFL.
5. Terminal availability and prices in Denmark. Current suggestion of a new terminal in Ringsted will not be in place by 2029.	The Danish government needs to get involved to promote the establishment.
6. Danish bottlenecks around Copenhagen. Denmark seems to succeed in fulfilling its extensive commitment to ensure full benefit from FBFL.	
7. Strategic redundancy across the Öresund. Train ferries receive state support and future accessibility for transport across the Öresund continues to be investigated.	The Swedish and Danish governments should initiate a new, joint and unbiased investigation on how to ensure capacity, redundancy and accessibility across the Öresund.
8. Swedish bottlenecks around Malmö. Measures are being implemented on time, but future capacity remains uncertain.	The Swedish government should task the Swedish Transport Administration with studying a new, dedicated freight track outside of Lund combined with a new, efficient marshalling yard.
9. The Southern Main Line in Sweden. Remains the biggest bottleneck in southern Sweden even towards 2050.	Accelerate the implementation of smaller improvements in Skåne and the expansion to four tracks Hässleholm-Lund. The stretch Hässleholm-Alvesta needs to be urgently investigated.
10. The West Coast Line around Gothenburg. Lack of capacity Gothenburg-Kungälv, which there are no plans to solve.	The Swedish government should task the Swedish Transport Administration with starting planning for quadruple tracks south from Göteborg to Kungälv.
11. The Western Main Line in Sweden. Measures will be completed in the 2030s.	Capacity should be further strengthened by extending the new four-track line from Partille to Alingsås.

Bottleneck/status	Recommendation
12. The railway Oslo-Gothenburg. The insufficient railway hinders the exchange between two of the Nordic's growth engines.	The Swedish and Norwegian governments should study a new double-track border railway for routes to Oslo from both Gothenburg and Stockholm.
13. The railway system in the Oslo region and the Alnabru terminal. A "follow-up" project is planned but there is no concrete measure ready in time for FBFL.	Norwegian authorities should develop and implement concrete measures to strengthen the Alnabru terminal.
14. Train lengths in Sweden and Norway. Planned measures will allow long freight trains to run on all main corridors in Sweden by 2040.	Accelerate the implementation to meet the opening of the FBFL.
15. ERTMS. There will be ERTMS in Denmark and Norway by 2034, but Sweden and Germany are far behind.	The EU Commission needs to put pressure on the national governments that are currently not fulfilling the ambition to seamlessly operate trains within Europe.

Recommendations in addition to bottleneck elimination

The Sweco report from 2023 resulted in several recommendations, in addition to eliminating bottlenecks, to strengthen rail freight in the Northern part of the ScanMed corridor. They are still very much relevant:

- 1. Ensuring full train lengths and faster trains in the entire corridor and its connections will improve railway competitiveness.** It will increase rail freight transport capacity as well as enable more trains in the network.
- 2. The infrastructure standard in the TEN-T freight corridors is not sufficient but rather represents a minimum standard.** The standard does not take into consideration capacity constraints hindering full utilization of the railway network, nor steep gradients (for example between Oslo and Gothenburg) and other bottlenecks. For example, the requirement for speed for passenger trains states that 75% of a route must allow speeds of at least 160 km/h. But if there is a lack of capacity on the track, congestion means that the actual average speed will be significantly lower. **The EU's target standard for infrastructure simply does not provide sufficient grounds to enhance the attractiveness and competitiveness of the railway.** Another aspect concerns the EU's weak pressure capabilities, where, for example, Sweden's and Germany's inability to introduce ERTMS on the core network by 2030 is essentially just acknowledged, without any actual consequences.
- 3. A level playing field between transport modes regarding fees and taxes is necessary.** This should ensure that all transport modes pay for their externalities.
- As road transport is expected to remain the dominant freight transport mode in the Northern part of the ScanMed corridor, any effort that minimizes greenhouse gas emissions from road vehicles would be just as important as paving the way for more rail freight. **Providing necessary infrastructure for zero or low-emission fuels is crucial in this respect.**
- 5. While railway transport has many advantages, sea transport could give significant contributions to the Northern part of the ScanMed corridor,** primarily for transport to and from the corridor. Railway bottlenecks could be partially relieved if cargo is transported by ship to a seaport closer to the origin or destination, before being transferred to rail transport.

Three additional recommendations can be made based on the results of this report:

6. **The European Commission should initiate a review and reform of how we plan and build railways in Europe.** This was commented also in the description of the railway Hamburg-Hannover above. The slow planning and implementation are symptomatic of railway construction in most of the EU and illustrates a major challenge for the railway's competitiveness. As stated above, Germany, Denmark, Sweden, and Norway are not dependent on the EU Commission to initiate such an initiative themselves. Two national initiatives are worth highlighting. First, in December 2022, Germany appeared to achieve some advancements as the responsible Federal Minister outlined 70 concrete suggestions from the "acceleration commission for the railways." This comprehensive effort aimed to enhance railway efficiency and growth. One major focus is on minor and medium-scale measures that can swiftly contribute to boosting the network's reliability and punctuality. For example, the commission advocates for shortening and minimizing approval processes for minor and medium-sized strategies (BMDV 2022). Despite this, the initiative seems to have had limited effect on real infrastructure development. Second, in Norway, the public company Nye Veier A/S was founded in 2016 and has around 200 employees. The company's main task is to expand the infrastructure in Norway, and financing is often done through a mix of tolls and government grants. The goal of Nye Veier is to reduce construction time and costs through faster planning and larger, cohesive projects. The company facilitates construction, challenges established norms and prioritizes functionality over purely technical requirements. It is about institutional competition within the Norwegian state, aiming to challenge rules and standards that limit infrastructure development without providing clear value. Evaluations show that Nye Veier A/S has managed to lower costs while simultaneously improving accessibility, traffic safety, climate impact, and land use. Statens Vegvesen (The Norwegian Public Roads Administration) has also improved its operations, partly with lessons learned from Nye Veier A/S (Sweco 2024).
7. **Develop existing implementation and financing methods to increase efficiency and enable rapid expansion despite limited government investment funds.** Infrastructure development benefits many groups in society, while it often faces complex challenges. This is a characterization very much present in, for example, the Railway node Hamburg and Hamburg terminal capacity. At the same time, current needs for improving the railway in the EU are huge. This is an argument for developing collaboration between the beneficiaries and allowing various actors to contribute with their expertise and resources. The need has also been stressed by the coordinators of the TEN-T transport corridors:

"[...] it must be acknowledged that the public sector cannot bear the necessary investments into the TEN-T alone. This implies that **all options to attract more private financing must be explored to the fullest.**" (TEN-T Coordinators' Position Paper 2024 p.10, original bold text).

The coordinators have identified that the categories of infrastructure projects with the weakest commercial potential are innovation projects, cross-border investments, major infrastructure projects in general and rail infrastructure (TEN-T Coordinators' Position Paper 2024). Hence, a public responsibility is necessary and, in many ways, beneficial for development (Sweco 2024). However, private funding can alleviate the strain on governmental finances by distributing the expenses throughout the project's lifecycle, thereby enabling the completion of additional projects more quickly within the same

budgetary constraints. One method typically suggested is the Private-Public Partnership (PPP), which is briefly described in Appendix. Finally, the Northern part of the ScanMed corridor plays an important role for military mobility, creating opportunities primarily for EU grants from the Connecting Europe Facility. Possibly, NATO's infrastructure requirements could also mean opportunities for co-financing; however, these funds are usually directed primarily towards more specific, military infrastructure rather than the type of route that the Northern part of the ScanMed corridor represents. For natural reasons, military needs are also surrounded by secrecy, and it can be difficult to create synergies with commercial use. However, both the EU and its member states emphasize the importance of so-called dual use, meaning that infrastructure investments have both military and civil benefits.

8. **Strengthen cross-border infrastructure planning and political dialogue.** National planning of infrastructure tends to stop at national borders, which is manifested in how cross-border connections are systematically less developed than domestic infrastructure. This, in turn, is because nation-states tend to build radial systems that strengthen the capital city as well as other metropolitan regions, while border areas are almost by definition peripheral. An example is Oslo-Gothenburg, where the border connection receives too little attention in both Sweden's and Norway's infrastructure plans. However, the EU's increasingly integrated economy makes it crucial to develop corridors that stretch across multiple national borders, not least to strengthen rail freight transport, which also struggles with a heavy regulatory burden at border crossings. Nation-states must establish stronger forums for joint political dialogue and decision-making.

Concluding remarks

As shown in Table 4, the status of the bottlenecks is damaging. Basically, all of them will still be in place by the year 2029, severely impeding railway competitiveness and reducing the potential of the Fehmarn Belt Fixed Link. Since the report in 2023, the situation has worsened, as 2.5 years have passed without sufficient progress having been made. This increases the risk that the gloomy forecast for railway transports between Scandinavia and the European continent will become true and that freight transports by truck will continue to gain market share. This is especially likely, taking into consideration that the Fehmarnsund bridge will set severe limitations on railway capacity, even with the recommended electrification (Table 4), until the Fehmarnsund tunnel opens no earlier than 2032. We hence risk losing the window of opportunity to reevaluate logistics chains in connection with the opening of FBFL, setting up new supply chains based on railway freight. On the contrary, there is a risk that truck traffic will get ahead, which may cement new truck-based transport setups where the FBFL's positive effects on road traffic come into their own.

Also, a point that was made in the previous report but not highlighted, the reduction in transport time from the FBFL, 2.5 hours, means only a partial restoration of transport times from the early 2000s. The Swedish Transport Administration (Trafikverket 2025, p.19) writes:

“Congestion on the main lines has [...] resulted in the transport times for freight trains along the main lines increasing by several hours just in the last 10–15 years.”

Still, there are some developments that should be commended. Denmark seems to deliver on their extensive commitment, removing bottlenecks around Copenhagen as well as finishing the connecting railway to FBFL on time. Also, Norway and Sweden are gradually developing the railway network to allow longer and heavier trains, which increases freight train competitiveness.

Another positive measure is the Swedish government's recognition that the train ferries between Trelleborg and Rostock need public support, which benefits military mobility and preparedness as well as redundancy for rail transport across the Baltic Sea.

To strengthen rail freight competitiveness, the following needs to be done as soon as possible:

- Eliminate bottlenecks or reduce their negative consequences in line with Table 4.
- Ensure full train lengths and faster trains.
- Adjust infrastructure standard in the TEN-T freight corridors to really strengthen railway competitiveness.
- Level the playing field between transport modes regarding fees and taxes to ensure that all transport modes pay for their externalities.
- Provide necessary infrastructure for zero or low-emission fuels for truck transports.
- Take advantage of sea transport to partially reduce railway bottlenecks, primarily for transport to and from the corridor.
- The European Commission should initiate a review and reform of how we plan and build railways in Europe.
- Develop existing implementation and financing methods to increase efficiency and enable rapid expansion despite limited government investment funds.
- Strengthen cross-border infrastructure planning and political dialogue.

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Appendix. Public-Private Partnerships

Public-private partnership (PPP) is a model for collaboration between the public sector and private companies to finance, build, and operate public infrastructure. PPP has been used around the world for various types of projects, including roads, bridges, airports, and railways. PPP can be seen as a further development of existing contracting forms in a hierarchy, where the contractor progressively takes more responsibility for planning and design, construction, operation, and maintenance. Thus, the degrees of freedom and the possibility to choose different solutions increase. A performance contract with comprehensive commitment means that operation and maintenance are included over a longer period, hence follows that the facility can be optimized over a large part of its lifecycle. At the next level, the top of the hierarchy is PPP, where mainly the financing element is added.

A common setup is that a consortium is formed to plan, design, build, finance, and operate a facility during a concession period of 15-25 years. During the concession period, payments are received from the government and/or from the users. After the concession period, the facility should be handed over to the state in a predetermined condition. This is very much the model for all major fixed links where Denmark is involved (The Great Belt, the Öresund bridge, the FBFL), apart from the fact that no private capital is involved, and the construction companies are public. When it comes to major infrastructure projects, the risk premium that a private consortium would need, will sometimes increase the costs too much. For example, when Finland plans three major, strategic railway projects to and from Helsinki, they have decided on state-owned project companies, benefiting from some advantages with a separate entity (for instance, a complete focus on the project ahead) while reducing the capital costs. At the same time, there are many private actors, for example, pension foundations, who seek to invest in long-term, stable, low-yield projects such as infrastructure. The advantages and disadvantages of PPP are presented in Table 5.

Table 5. Advantages and disadvantages with Public-Private Partnerships (Sweco 2024).

Advantages	Disadvantages
- Urgent investments can be brought forward, as the state's payment commitment is spread over a concession period of about 15-25 years and not just over the construction period. - Private financiers can continuously review the projects to minimize their risk-taking, which reduces the risk of cost overruns. - A long-term PPP-agreement can limit taxpayers' risk-taking with, for example, new technical solutions,	- The method is almost entirely untested in, for example, Sweden. International experience shows that a learning period is required for the procurements to be good. - Private capital and loan financing require returns, but efficiency gains can compensate for more expensive financing.

Advantages	Disadvantages
thereby stimulating innovation. The model highlights risks and thus creates conditions to manage them. • PPP has been presented as an opportunity to increase the industry's productivity through, among other things, better incentives for innovation. • More parties can be involved in a PPP consortium. Thus, each party can limit their risk-taking and thereby become more efficient, while many more can also be given the opportunity to submit bids in competition, which normally lowers the cost for the state. • Construction technology can be adapted for a life cycle perspective. • One advantage of public-private partnership is the strong incentives to be completed early and reduce costs, which can stimulate efficiency and innovation.	• A challenge with PPP solutions, for example, is that the long concession period combined with uncertainties forces renegotiation of agreements. This has been a recurring theme in recent years' studies, how the risk of renegotiation can be reduced and how it can be handled.

PPP serves only as an example and inspiration for alternative implementation and financing forms.

