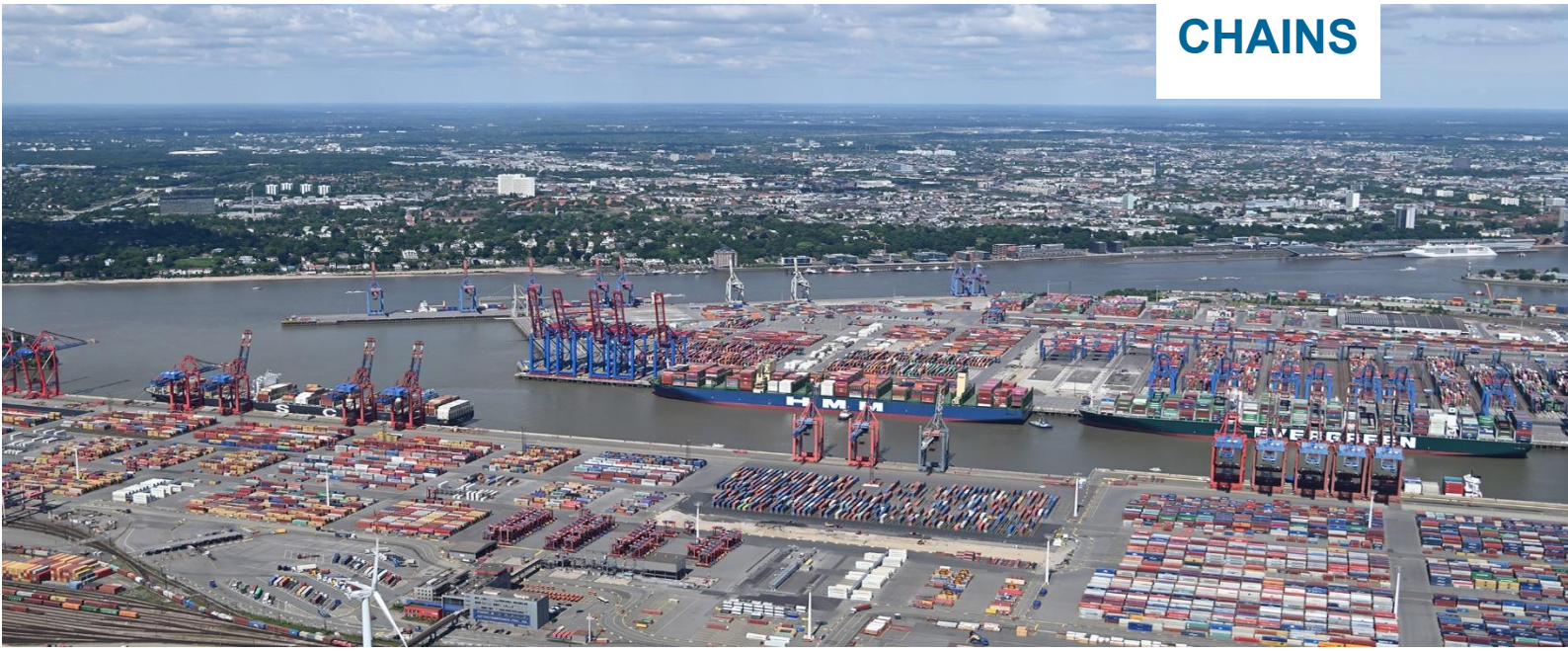
BLUE SUPPLY CHAINS



Improved green transport chains through demonstrated cooperation between port authority and operator

The Rail Ferry between Rostock and Trelleborg

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1. Introduction: The rail-ferry between Rostock and Trelleborg

The rail ferry between Rostock and Trelleborg is one of the last operational rail ferry connections in Europe. Operated by Stena Line between the ports of Trelleborg and Rostock, it provides an efficient alternative to the overland route via Denmark and Schleswig-Holstein, connecting Central Europe with Scandinavia.

It is a strategically important and operationally unique corridor within the Scandinavian–Mediterranean Core Network of the Trans-European Transport Network (TEN-T). As one of the few functioning maritime-rail links in Europe, it provides direct access between Northern Europe and Central and Southern regions of the continent. This connection supports key European Union priorities such as shifting freight from road to more sustainable transport modes, reducing greenhouse gas emissions, and enhancing the resilience of the transport system.

The rail ferries, currently 26 to 28 years old, are expected to remain operational for up to 40 years, supported by continuous maintenance and upgrades by Stena Line based on outcome of volumes indication and future relevance. BSC shall support getting more visible outcome of future relevance of rail ferries and how the ports Rostock and Trelleborg can maintain and provide the required infrastructure.

The rail ferry case underlines the importance of resilient supply chain solution and will base the outcome on an European perspective.

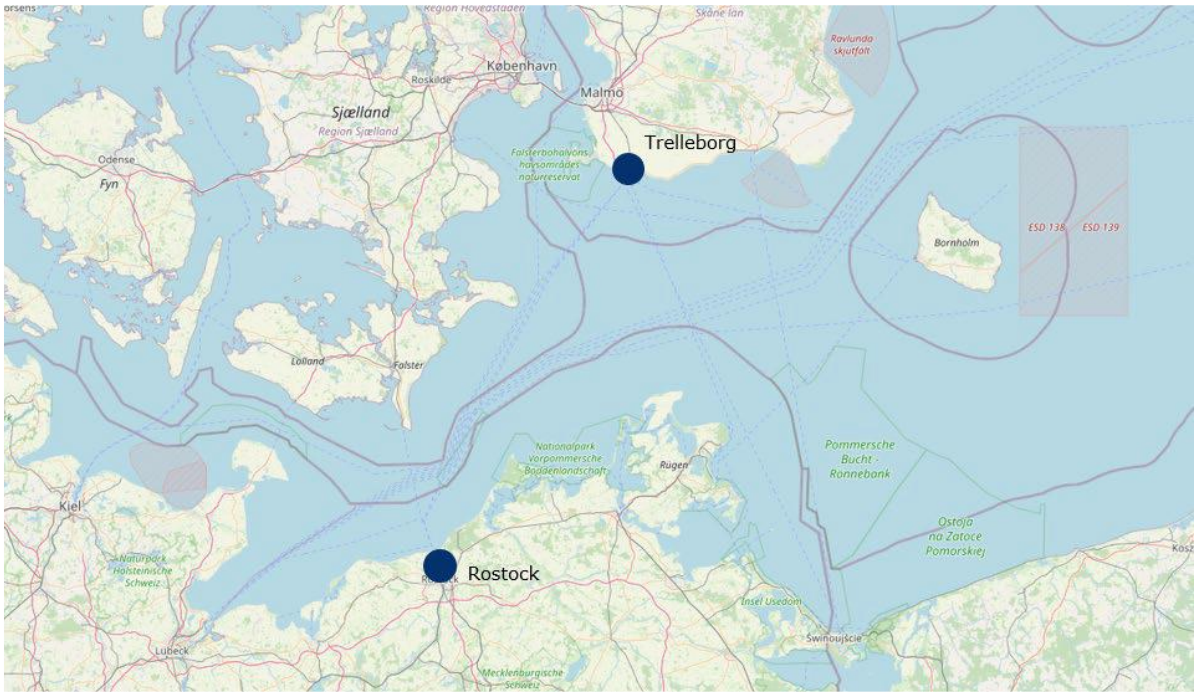

Figure 1: Rail-Ferry Link between Trelleborg – Rostock.

Source: Ramboll Deutschland GmbH (2024): Analysis of Future Potential of Rail Ferries, p. 7, based on OpenStreetMap.

Port of Trelleborg

Trelleborg is one of Sweden's most important trade gateways, with key ferry routes to Germany and Poland. While Germany remains the primary trade partner, volumes with Poland are rapidly increasing. As Swedish industry expands in the north—particularly in steel, battery production, and

raw materials—much of the output is destined for Germany. Though most of this freight will move by sea, rail traffic is also expected to grow, with the Port of Trelleborg playing a central role.

Sweden's Transport Administration anticipates 6–17 additional daily freight trains on the Northern Main Line due to industrial investments in Norrbotten and Västerbotten. Further increases are expected from southern Norrland, Dalarna, and western Sweden, and a significant portion of this will likely pass through Trelleborg due to current freight patterns.

The upcoming Fehmarn Belt tunnel will improve rail links via Denmark, likely boosting rail freight volumes. However, rail capacity constraints in Skåne (e.g., Lund–Hässleholm) and parts of Germany may limit this growth. Road freight, on the other hand, is less affected, making the Rostock–Trelleborg route attractive for truck transport.

Eastern German and southern European markets will likely continue to rely on Rostock, supported by German infrastructure upgrades, including access to the Brenner Pass. These developments also benefit intermodal traffic via Trelleborg.

Sweden's national transport plan includes key rail projects like track expansion between Lund and Hässleholm and upgrades in Malmö. However, budget constraints could limit further investments unless projects are already under construction or contractually obligated. Maintaining the business investment fund is crucial for smaller freight-related improvements.

The port must prepare for uncertainties, including shifts in transport policy and potential delays in infrastructure upgrades. Without expanded rail capacity, freight growth will rely more on trucks, limiting the potential for intermodal transport. A more favourable scenario sees infrastructure improvements enabling growth in rail shuttle services between Trelleborg, Gothenburg, and northern Sweden.

The use of unaccompanied trailers is expected to rise, necessitating investment in handling equipment. Regardless of infrastructure progress, the port must prepare for increasing volumes of electrified and intermodal transport, including ensuring sufficient power supply for ferries and trucks. Large batteries may be needed to balance peak demand with grid limitations.

Port of Rostock

The Port of Rostock, located on the southern coast of the Baltic Sea in northeastern Germany, is one of the most important multimodal transport hubs in the region. As Germany's largest port on the Baltic Sea, it plays a crucial role in connecting Central and Eastern Europe with Scandinavia and the wider international market. Strategically positioned at the intersection of major maritime and land transport corridors, Rostock serves as a vital link in European logistics and trade.

In maritime transport, the port specializes in RoRo (roll-on/roll-off) and ferry traffic, handling millions of tons of cargo and hundreds of thousands of passengers annually. It is a central gateway for ferry connections to Sweden, Denmark, Finland, and Lithuania with major operators like Stena Line, TT-Line, Scandlines, and Finnlines providing frequent and reliable services. The port also supports bulk and liquid cargo, project cargo, vehicles and intermodal traffic, making it a versatile node for international shipping and logistics.

Equally important is Rostock's role as a railway junction. The port is directly connected to the German and European rail networks, allowing seamless integration of maritime and rail transport. This multimodal capability is essential for shifting freight from road to rail and sea, thereby reducing emissions and contributing to the EU's climate goals. Rail connections from the port reach major economic centers such as Berlin, Hamburg, Leipzig, and beyond, enabling efficient hinterland transport for both imports and exports.

The port's infrastructure supports high-capacity rail operations, including on-dock rail terminals and block train handling, which reduces transshipment time and costs. This makes Rostock particularly attractive for industries relying on just-in-time delivery and long-distance freight transport. Combined with investments in digitalization and sustainability—such as shore power facilities and rail electrification—the Port of Rostock is increasingly positioning itself as a future-oriented hub for green logistics.

The rail ferry is part of the strategic development of the Port of Rostock and fits well into the role of the port in the German and European transport system as it contributes significantly to the efficiency, resilience, and sustainability of European supply chains.

Ongoing investments in capacity and technology, along with the growing importance of Baltic trade routes, will enhance the port's role—including the rail ferry link to Trelleborg.

Development of the rail ferry since 2017

Since the M/F Mecklenburg-Vorpommern and M/F Skåne began operations in 1996, wagon volumes initially dropped but have rebounded following the closure of the Mukran ferry route. By 2023, around 27,000 wagons were transported annually.

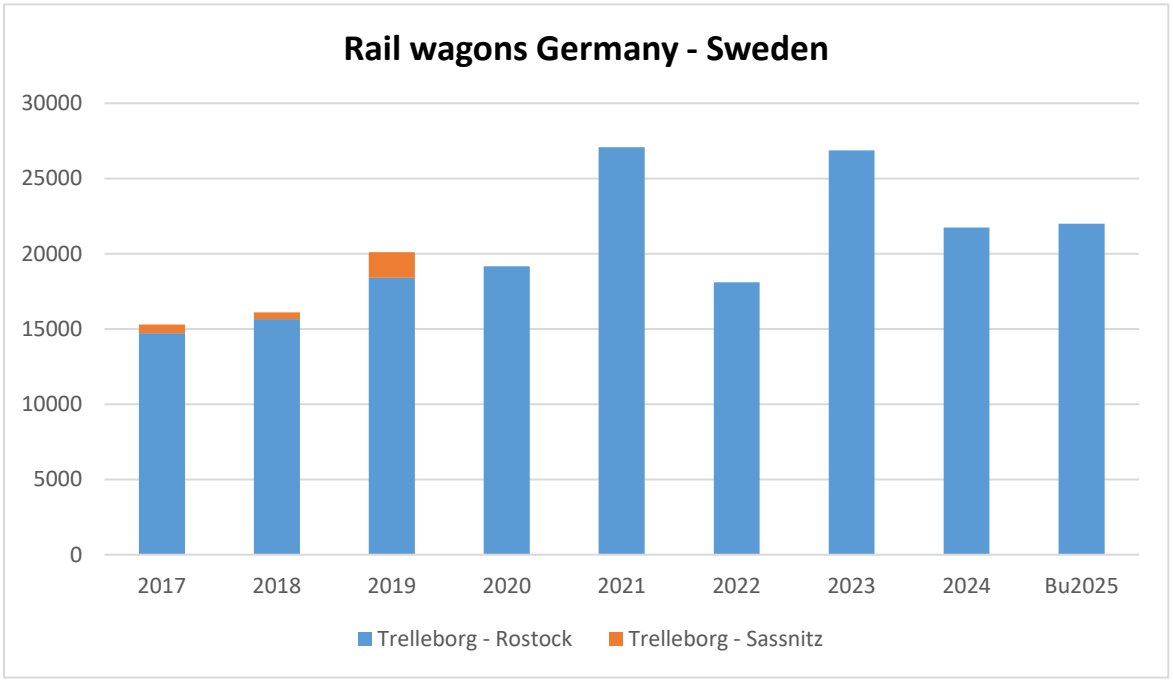

Figure 2: Number of rail wagons transported between Germany and Sweden

Source: Data: 2009-2022 Rostock Port, 2023-2025 Stena Line.

A major spike occurred in 2021 when a bridge accident disrupted the Great Belt route, temporarily diverting traffic to the rail ferry. While those intermodal flows didn't remain post-recovery, conventional and heavy rail wagons have continued to use the ferry, driven by high demand and the need for resilient alternatives.

Weight restrictions on the Rendsburg High Bridge—allowing only one heavy train at a time—highlight the importance of the ferry for steel trains weighing up to 3,800 tons. These trains now operate almost daily via Stena Line.

Congested intermodal terminals also make the ferry attractive, as it reduces handling and damage risk. Loading a full train of 38 trailers by crane or reach stacker increases the likelihood of issues, making direct rail transport via ferry a practical solution.

2. The rail-ferry in the European policy context

The rail ferry supports the implementation of a resilient transport system in the BSR and is well in line with political goals on different levels.

The International Maritime Organisation (IMO) envisages the decarbonisation of the shipping sector and supports the development of green shipping corridors. They are actively working to reduce greenhouse gas (GHG) emissions from shipping and have set ambitious targets, including a reduction of at least 20%, striving for 30%, of total annual GHG emissions by 2030, and at least 70%, striving for

80%, by 2040, both compared to 2008 levels. The ultimate goal is to achieve net-zero GHG emissions by or around 2050.

The green rail ferry service is contributing to achieve these goals.

The development of Green shipping corridors can play an important role in decarbonizing the maritime industry.

The Rostock Trelleborg rail ferry connection strives to fulfil all criteria of a green shipping corridor:

- Clear geographical linkage: Link between the two ports Rostock and Trelleborg
- Clean propulsion technologies: Future use of green fuels such as ammonia, methanol, hydrogen, or battery-electric propulsion systems is planned.
- Sustainable port infrastructure: Availability of shore power, alternative fuels, and zero-emission logistics at the port is in the planning.
- Collaborative effort: Shipping companies, ports, authorities, energy providers, and policymakers work together in planning and implementation. This is one main aim of BSC.
- Transparent monitoring and reporting standards: To track emission reductions and drive continuous improvement.

According to Maersk Mc-Kinney Moller Center:

“Green shipping corridors can be network, point-to-point, or single-point corridors. The green corridor projects bring together the entire maritime ecosystem to assess the feasibility of deploying low-emission fuels, thus including fuel producers, ports, vessel owners, and cargo owners.

Green shipping corridors enable early-stage demonstrations of the transition to alternative low-zero-emission marine fuels. They pilot the collaborative solutions required and provide valuable insights that can be scaled to accelerate the transition. This potential was recognized at COP26 in Glasgow when 22 governments signed The Clydebank Declaration for green shipping corridors, confirming their willingness to incentivize the establishment of green corridors by the middle of this decade.”

BSC supports the development of a green corridor with its specific stakeholder engagement strategy, By dividing the development process in different groups (infrastructure and market) complexity has been reduced.

The BSC approach ensures long term commitment of all stakeholders and serves as blueprint for other regions.

3. The rail ferry in the light of the geopolitical situation

The infrastructure in the ports is an important prerequisite for the development of the rail ferry. It remains to be a challenge for the ports to maintain the infrastructure and it is a strategic question, if this market segment is further developing in the future. As a first step, it is consequently important to have a look at the relevant volumes and cargo types.

Large volumes of base industry products from Sweden—such as steel, paper, pulp, and sawn timber—are transported southward to Germany via conventional rail freight (single wagonload traffic). Germany also serves as a key transit country for the extensive trade between Sweden and continental Europe, particularly the Benelux countries and Northern Italy. Northern Europe, especially in sectors like steel and batteries, offers significant growth potential for rail-friendly cargo types.

Historically, the Baltic Sea featured a dense network of railway ferry connections. Today, nearly all of these have been discontinued, making the rail ferry link between Rostock and Trelleborg an unique and vital connection. Although a Polish-Swedish line has recently resumed limited wagon transport, Rostock–Trelleborg remains the only reliable link of its kind.

Maintaining this rail ferry service requires all three components—port, ship, and terminal—to remain fully operational. Among them, the port segment is particularly cost-intensive in terms of both,

maintenance and operation, and requires substantial space. In Rostock, the additional costs for supporting wagon transshipment operations by ferry are estimated at roughly €1 million annually compared to a standard ferry service, of which approximately €500,000 can be recovered through revenues. The remaining €500,000 per year constitutes standby infrastructure costs—an investment in strategic resilience and public service obligations.

Rostock is currently undertaking significant infrastructure upgrades to support the system. In several construction phases—partially co-financed by EU funds—track switches leading directly to the ferry berth are being renewed. Further urgent investments in the central switch system on the pier, likely in the seven-figure range, are required in the near future. Meanwhile, the vessels used for the rail ferry service are aging, and replacement with suitable tonnage is uncertain, with long lead times for decision-making and implementation.

Beyond economic considerations, the recent shift in Europe's geopolitical landscape has created new strategic requirements for transport systems. Military logistics have become more prominent and demand redundancy and reliability. With Sweden and Finland joining NATO in 2024, the Rostock–Trelleborg rail ferry assumes heightened political and defence-related importance. The service ensures reliability in case of disruptions or restrictions on fixed links such as the Fehmarn Belt or Øresund crossings. These fixed links have axle load limits of 25 tons and dimensional constraints, which restrict the transport of heavy military vehicles such as tanks.

Thus, the rationale for maintaining the rail ferry service is not merely quantitative, but qualitative—grounded in political and strategic necessity. Effective crisis response and defence readiness require close coordination among operators, municipalities, state governments, and national authorities to safeguard the functionality and resilience of port infrastructure. This cooperation must also extend across borders, particularly between Germany and Sweden.

Politically, Sweden has taken a more proactive stance by supporting port and shipping operators in covering the system-related additional costs. In contrast, Germany has not yet established such a mechanism. It is therefore imperative that infrastructure and suprastructure operators in Germany also receive financial compensation to ensure the long-term viability of the rail ferry operation.

To achieve this, the Port of Rostock needs a reliable commitment to offset its recurring operational overhead. Furthermore, the ferry operator has indicated that a second rail ferry berth in Rostock may be required for redundancy purposes. Given the low volume—approximately 20,000 rail wagons per year—a second dedicated rail berth cannot be justified under normal circumstances. However, this could be feasible if a new, multipurpose berth (e.g., a proposed €34 million investment at adjacent berth LP 65) is designed as an universal RoRo terminal with backup capability for rail ferry operations in times of crisis. Such an approach would ensure strategic flexibility without compromising economic efficiency.

In the Port of Trelleborg also several actions are needed to maintain the system. Railway enhancements include the upgrade of existing rail sidings and marshalling areas to accommodate modern freight trains, including heavy-loaded wagons up to 1,400 t and 750 m length. This involves reinforcing track foundations, improving ballast quality, and upgrading turnouts and crossovers. Furthermore, electrification needs to be extended to align with DB Rostock's network and optimize cross-border operations, reducing dependence on diesel traction. Finally, the shunting yard needs to be expanded to enable sufficient locomotive run-around capacity. Covered or all-weather loading platforms to facilitate efficient ferry loading and unloading would further improve the system.

Besides these improvements, the ferry berth should be equipped with heavy-duty rails capable of handling the dynamic loads from train ferries during coupling/uncoupling. Adjustable linkspans designed specifically for rail-ferry operations to accommodate quay height variations and ensure seamless transfer are needed.

Quay walls and pavement to handle the increased rolling stock axle loads (up to 22.5 t per axle) need to be reinforced.

Shore power at the ferry berth is needed to allow vessels to shut down auxiliary engines while docked, improving air quality.

The overall investment needed in Trelleborg is estimated between 30 and 60 million euros.

Conclusion

To maintain and future-proof the rail ferry link between Trelleborg and Rostock, both ports must invest strategically across multiple dimensions: rail infrastructure, berth adaptation, logistics capabilities, regulatory compliance, digitalization, environmental sustainability, and transport connectivity. All these stakeholders need to be involved.

4. Stakeholder involvement plan for the rail ferry

A **Stakeholder Engagement Plan (SEP)** is a structured approach for identifying, analysing, involving, and communicating with individuals, groups, or organizations that have an interest in—or are affected by—the rail ferry. In BSC, stakeholder engagement plays a vital role in aligning objectives, ensuring implementation success, and managing risks proactively.

Purpose and Importance

The primary purpose of the Stakeholder Engagement Plan is to ensure that all relevant actors are meaningfully involved and support the rail ferry development. These stakeholders include public authorities, railway operators, shippers, industry representatives, infrastructure managers and customers of the rail ferry. Their involvement helps to:

- align interests
- avoid conflicts or misunderstandings
- gather expert knowledge and operational insights
- build trust and long-term partnerships
- secure political and financial support
- improve implementation speed and sustainability
- gather market potential

Without systematic engagement, projects risk delays, cost overruns, or even failure due to overlooked interests, technical incompatibilities, or lack of legitimacy.

Key Components of a Stakeholder Engagement Plan

A robust SEP generally includes the following components:

- **Stakeholder Identification and Mapping**

  The first step is to identify all relevant stakeholders and categorize them based on their level of influence and interest.

- **Engagement Objectives**

  For each stakeholder group, specific engagement objectives are defined. Examples include:

  - Informing port authorities about new berth requirements
  - Consulting logistics firms on scheduling needs

- Collaborating with policymakers on funding instruments
- Securing user feedback on digital booking systems
- Coordinating with defence agencies on dual-use infrastructure

These objectives ensure that engagement is tailored, relevant, and actionable.

- **Communication Strategy**

Effective communication is the foundation of any SEP. It defines:

- **How** stakeholders are contacted (e.g., workshops, newsletters, interviews, webinars)
- **When** interactions occur
- **What** information is shared (e.g., technical updates, policy changes, funding opportunities)
- **Who** is responsible for communication

Multi-channel, two-way communication ensures feedback is captured and integrated.

- **Engagement Phases**

Stakeholder engagement is not a one-time activity but an ongoing process. A well-developed SEP typically follows three main phases:

- **Initial Engagement and Planning**

Stakeholders are identified, contacted, and briefed on the project's scope, goals, and opportunities for participation. Their feedback is used to refine project planning and identify early bottlenecks or risks.

- **Active Involvement and Collaboration**

During project implementation, key stakeholders are involved in testing, feedback loops, and decision-making. For example, in the BSC context, rail operators helped to validate multimodal integration strategies, while ports contributed to the redesign of infrastructure components.

- **Strategic Communication and Policy Outreach**

In later stages, engagement shifts to awareness-raising and advocacy- especially toward policymakers and funding institutions. Policy briefs, public presentations, and media outreach help to create visibility and political support.

- **Dissolution**

Stakeholders are no longer required to contribute to the project and their involvement ends. A final feedback should be organised.

- **Benefits and Outcomes**

When done properly, a Stakeholder Engagement Plan provides measurable benefits:

- **Risk mitigation**: Early warnings about technical or regulatory problems
- **Project efficiency**: Reduced delays and smoother implementation
- **Knowledge integration**: Access to stakeholder expertise
- **Policy alignment**: Support for broader strategic goals, such as the EU Green Deal or TEN-T priorities

In the BSC project stakeholder engagement helped align industry needs, political awareness, and infrastructure planning across German and Swedish borders.

A Stakeholder Engagement Plan is not merely an administrative task - it is a strategic asset. Especially in complex, cross-border transport projects like the Rostock–Trelleborg rail ferry link, stakeholder cooperation is essential for aligning diverse interests, solving technical challenges, and building political and social support. As transport networks evolve toward sustainability, resilience, and digital integration, stakeholder engagement will remain a key success factor - ensuring that infrastructure serves both todays and tomorrow's needs.

Only with a close cooperation of all stakeholders, a successful development of the service can be assured. Consequently, BSC puts a strong focus on stakeholder cooperation.

Figure 3: Methodology for the Stakeholder Engagement

4.1. Stakeholder engagement plan in BSC

The theoretical concept of a stakeholder engagement plan has been adopted to the specific needs of BSC. The BSC stakeholder engagement plan follows an iterative and participatory process. This process can serve as blueprint for other ports/regions. The strategy consisting of the following core elements:

The first part is the stakeholder Identification. As outlined in Deliverable 1.3 Chapter 4, key stakeholder groups were identified and mapped according to their interest, influence, and potential contribution to the project. These stakeholders include public authorities, port administrations, shipping lines, rail operators, logistics service providers, environmental agencies, and end customers.

From the very beginning there was a focus on two main perspectives of stakeholder involvement: infrastructure and market.

After the identification the BSC project followed a phase-based approach:

1st phase Initiation: This early-stage involvement is mainly to inform stakeholders about the rail ferry, ideas to improve the services etc. It is also important to align on goals and by that ensure long-term willingness for cooperation.

2nd phase Co-Creation: In this phase the active participation of all stakeholders begins. It is about joint development of ideas to optimize the ferry service, identification of bottlenecks and needs for improvement and giving feedback on ideas and plans.

3rd phase Evaluation: Joint analysis and discussion of results and next steps.

The success of the "Blue Supply Chains" project depends on the effective identification and engagement of relevant stakeholders across the transport and logistics ecosystem.

Each stakeholder group was assigned a tailored engagement strategy. Public authorities and policy makers were involved through structured dialogue to ensure alignment with regional and national transport strategies. Port operators and shipping companies were invited to contribute technical and operational insights, while logistics and rail operators were engaged to evaluate multimodal integration potential. Additionally, customer-facing entities like ferry companies and digital platforms (e.g., modility) were included to bring the end-user perspective into consideration.

The primary aim of this phase was to gather input on the key challenges facing rail-ferry integration, identify bottlenecks, and determine the functional and technical requirements for the pilot implementations. Several initial meetings and stakeholder workshops—recorded in the meeting documentation—ensured that the defined aims were grounded in real-world logistics practices and market expectations. These sessions also served to gauge stakeholder commitment and identify frontrunners willing to participate in testing solutions.

The second phase focused on the **practical execution** of technical solutions and the active **involvement of stakeholders** in pilot activities. Following the strategic planning, various stakeholders collaborated in deploying and testing the project's proposed interventions, such as improved rail-port-ferry interfaces, digital booking tools, and optimization of freight flows through ports.

Stakeholder meetings—some of which were held during high-profile public events—enabled real-time feedback and validation of implemented measures. For example, events hosted by Stena Line and modility served as important touchpoints for capturing both operational and customer-centric feedback.

A continuous verification process was established to monitor adaptation needs. Stakeholders, especially port authorities and logistics providers, evaluated technical feasibility, environmental

performance, and interoperability of the solutions. This iterative feedback loop led to refinements in system design and processes. Ports committed to making infrastructure or IT adjustments based on these evaluations, ensuring the adaptability and long-term applicability of the project outputs.

Critical questions raised by stakeholders during meetings—such as concerns around system compatibility, business incentives, or regulatory barriers—were carefully documented and used as input for further development. These interactions strengthened the project's practical orientation and ensured that stakeholder needs directly informed the project's progression.

The final phase revolved around the **design and launch of a strategic marketing and communication campaign**. The campaign aimed at two key audiences:

(1) policy makers and public authorities, and

(2) logistics customers and users.

To reach the **policy level**, the campaign emphasized the climate and economic benefits of integrated rail-ferry logistics. Communication tools included tailored policy briefs, presentation materials for EU-level forums, and participation in key conferences such as the Strategy Forum for the EU Strategy for the Baltic Sea Region (EUSBSR). The campaign highlighted how modal shift to rail and sea can reduce emissions, relieve road congestion, and enhance regional competitiveness.

On the **customer side**, the marketing activities focused on the usability and benefits of the rail-ferry solutions, such as time savings, digital booking convenience, and reliable transit times. Ferry operators like Stena and digital platforms like modility played a central role in customer events, live demonstrations, and testimonial videos to increase trust and visibility. These campaigns were accompanied by press releases, social media outreach, and visibility at trade fairs to maximize industry awareness.

The campaign also leveraged visuals, including pictures from pilot events and stakeholder workshops, to provide a human-centred narrative of the transformation toward greener logistics. This not only supported project dissemination but also helped position the participating ports as frontrunners in sustainable supply chain innovation.

In the following subchapters, the process in the two main fields is described in more detail.

Below is an illustration of our overall planning to execute the stakeholder involvement, which served as an implementation aid for the project partners. Even though a simple excel sheet was used, it was an helpful instrument to keep the overview on plannings, next steps etc.

In the course of implementation and based on the coordination meetings and discussions (internal and external with stakeholders), the planning was evaluated and adjusted if necessary.

Stakeholder engagament plan - general execution & evaluation

WORKING DOCUMENT (regular updates based on working group meetings exptected)

Timing and Responsibilities | **Comments**

Aim and Group of Activities (GoAs): Cooperation network & strategy to push the set-up of green transport chains

		2024 Sept	Oct	Nov	Dec	2025 Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
GoA 2.3	Cooperation network & strategy to push the set-up of green transport chains (= stakeholder engagement plan)	**HHM** to finalise the plans. Input by all PPs.															
GoA 2.3	Kick-off the implementation of the strategy/cooperation network. Definition of framework conditions for the implementation & evaluation criteria of the pilot. Incl.: Documentation needs and -templates for workshops, events etc. (to enable proper documentaiton in the Output text report O2.3 & Deliverable 3.3.)	**HHM (coop. w/ Rostock)**: Kick-off during all PP meeting in Klaipeda															
GoA 2.3 OUTPUT	**Text reoport on "improved green transport chains through demonstrated cooperation between port authority and operator"** **Due-date: 12/2024 |** All rail-ferry case PPs to contribute.							**Rostock:** finalises the Output 2.3 report									

All results from the Stakeholder Engagament "Infrastructure" (1st - 3rd aims) will be used in the execution of the marketing campaign (part of the Stakeholder Engaggement "Market")!

Stakeholder engagament plan: Infrastrucutre

1st aim	Stakeholder(s) needed	Stakeholder(s) role	Stakeholder(s) engagement	2024 Sept	Oct	Nov	Dec	2025 Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Finding (and ideally agreeing to) future system parameters to enable low- or zero-emission rail ferry calls in the Ports of Trelleborg and Rostock.	Port Authority Rostock Port Authority Trelleborg Rail-ferry operator: Stena Line Local energy grit operator in Rostock and Trelleborg	Discuss and agree upon e.g. standards, needs, etc. to be prepared for future investments in port infrastrucutre and the ferry. Discuss about energy needs, peak times and grit stability.	Joint workshops		1st meeting: Lead: **Stena** (pysical, or teams,…)	2nd meeting (optional): Lead: **Rostock** (pysical, or teams,…)	3rd meeting (optional): Lead: **Trelleb.** (pysical, or teams,…)	**Working group meeting**: **Definition of future system parameters to enable zero-emission rail ferry calls** in the Ports of Trelleborg and Rostock. E.g. E-Ferry or Methanol ? Which port needs to offer which infrastructure? What does it mean in terms of investments? How much emission could be saved? **Working group meeting 2-3 (optional): Discuss and provide input if needed, based on 1st meeting (facts, data, statements, pre-conditions) to the report which needs to be prepared by Stena.**									

2nd aim	Stakeholder(s) needed	Stakeholder(s) role	Stakeholder(s) engagement	2024 Sept	Oct	Nov	Dec	2025 Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Exchange on future de-carbonisation aims and plans for port handling equipment and the potential upgrade of (floating) infrastrucutre to support long-term decarbonisation aims in ports.	Port Authority Rostock Terminal operators in Rostock Port Authority Trelleborg Terminal operators in Trelleborg Rail-ferry operator: Stena Line	Discuss and agree upon e.g. standards, needs, etc. to be prepared for future investments in the electrification of terminal handling equipment and/or terminal vehicles.	Joint regional stakeholder workshops. And an interregional exchange between Port Authorities and Stena Line. Stena Line to organise working group meetings (alll PPs & AOs) to provide input to adjust the blueprint concerning general technical questions on the electrification of terminal equipment, on-shore power supply solution to provide energy for future e-ferries.		**1st meeting:** Lead: **Stena** Working group meetings with needed PPs and AOs (see left), e.g.: Rostock/ Trelleborg/ SGKV.	**2nd meeting:** Lead: **Rostock** Working group meetings with needed PPs and AOs (see left), e.g.: Stena/ Trelleborg/ SGKV.	**3rd meeting:** Lead: **Trellebo**. Working group meetings with needed PPs and AOs (see left), e.g.: Stena/ Rostock/ SGKV.	Meetings on the different topicy (low-/zero emission rail ferry calls & port handling equipment) could be combined if sensefull and feasible **Working group meeting 1**: Definition of what terminal handling equipment to decarbonise, effects on Stena Ferrry Operations, and which date to collect (positive effects on emissions etc) **Working group meeting 2-x**: Discuss and provide input (facts, data, statements, pre-conditions) to the report which needs to be prepared by Stena. Input to adjust the blueprint concerning general technical questions on the electrification of terminal equipment, on-shore power supply solution and to provide energy or alternative fuels for future zero-emission ferries											Content of workshops and/or meetings to be discussed during our partner meeting. We assume a lot of the information is available already. Aim should be, to provide input for the marketing campaign and to enrich the campaigna and policy work with a factful vision on further de-carbonisation. At the same time, needs for policy support (and funds) shall be derived. COMMENT: Some workshops and meetigs of both topics (decarbonisation of the ferry respectively decarbonisation of terminal handling equipment) could be combined to increase efficiency and speed-up the progress.
	Local energy grit operator in Rostock and Trelleborg	Discuss about energy needs, peak times and grit stability, in respect of a further electrification of terminal handling equipment and/or terminal vehicles.																	COMMENT: Preparational work of SGKV/UIRR (greening terminals) could be used here. Same applies for the studies already delivered, which can be used too.
	Business support organisations: BPO, SKGV, UIRR	Supporting the Port Authorities, terminal operators and Stena Line in external communication, especially towards policy levels.	Joint workshops with Port Authorities, terminal operators, Stena Line.				**Stena:** finalises a report on a future decarbo-nisation vision											
	Policy level: National- and European policy level in charge for funding measures for (maritime) transport, de-carbonisation, modal shift actions	Long term planning support in respect of energy transition measures. Development of suitable funding measures and/or funding schemes.	Reached by individual contacts from Port Authorities, Stena Line and/or by business support organisations. Invitation to panels on conferences and/or workshop particiation.	--> Policy level involvement to be combined with "Infrastrucuture: 3rd aim" and "Market - 2nd aim"														

3rd aim	Stakeholder(s) needed	Stakeholder(s) role	Stakeholder(s) engagement	2024 Sept	Oct	Nov	Dec	2025 Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Adressing market uncertainties towards policy levels to create awareness in the framework of future infrastructure needs to support resilient transport systems.	Port Authority Rostock Port Authority Trelleborg Rail-ferry operator: Stena Line	Providing facts and figures on investment needs and obstacles.	Joint internal meeting(s) and/or workshop(s)		**Lead: SGKV** Teams Meeting & development of draft position paper		**SGKV:** Finalises a position paper based on investment needs (Stena report)												
	Rail infrastrucuture managers (DB Netze, DB Infra Go, Trafikverket, Oresund Bridge)	Feedback on infrastrucutre planning in the hinterland of the ports.	Individual meetings and/or workshops with Port Authorities to discuss about infrastrucutre measured planned in ports hinterland.			**Lead: SGKV** Workshops/ Teams meetings to gain input for final position paper													
	Business support organisations: BPO, SKGV, UIRR	Feedback on general perceptions regarding markte uncertainties, existing funding measures and/or funding schemes as well as information towards the policy level about members needs.	Port authorities Trelleborg and Rostock as well as Stena Line invite to joint meetings to share their latest experiances and suggestions on funding schemes and support measures.																
	Policy level: National- and European policy level in charge for (maritime)transport, logistics, economy	Long term planning and support of infrastructure. Development of suitable funding measures and/or funding schemes.	Reached by individual contacts from Port Authorities, shipping lines and/or by business support organisations. Invitation to panels on conferences and/or workshop particiation.	--> Policy level involvement to be combined with "Infrastrucuture: 3rd aim" and "Market - 2nd aim"														

Stakeholder engagament plan: Market

Updated first aim, due to the drop out of PP19 modility

1st aim	Stakeholder(s) needed	Stakeholder(s) role	Stakeholder(s) engagement	2024 Sept	Oct	Nov	Dec	2025 Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Develop and provide a transparent, and to use booking solution for rail ferry transports via the Ports of Rostock and Trelleborg in an existing booking system.	Rail-ferry operator: Stena Line	Develop an interface to include the rail ferry service into the exisiting DXI system operated by Kombiverkehr.	Working group meetings with Kombiverkehr to shape, test and release the rail ferry transport service in the DXI-tool							**Stena:** development of interface and inclusion of the service into the DXI-tool in close cooperation with Kombiverkehr. This includes: a) proof its functionality with customers, b) incorporating further possible adjustment needs, which might be expressed by customers, and c) Evaluation of the on-boarding process & benefits for customers.									
	Potential customers, like: Railway undertakings, freight forwarders and manufactures (e.g. TXLogistics, DB Cargo, GreenCargo, DB Schenker	Making use of the transport link between central Europe and Scandinavia via the DXI-tool offered by Kombiverkehr	Information to stakeholders about the new service route provided in the DXI tool											**Stena:** a) Customer workshops to receive feedback on functionality of the interface b) Information to stakeholders about the new service route provided in the DXI tool (e.g. events, workshops, media campaign)					

2nd aim	Stakeholder(s) needed	Stakeholder(s) role	Stakeholder(s) engagement	2024 Sept	Oct	Nov	Dec	2025 Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Promotion and campagning for the rail-ferry link as alternative transport route and resilient transport system component, towards customers and policy levels.	Port Authority Rostock	Increase capacitiy to be able to promote the rail ferry freight service Rostock-Trelleborg in the market and towards policy levels.	All stakeholders needed are involved as PPs and AOs, thus they will be directly involved in workshops etc. Stena Line will lead the development of a marketing campaigning to promote the rail ferry freight service Rostock-Trelleborg in the market. --> Port Authorities and BSOs will be enabled to promote the rail-ferry link.		**Stena Line** will lead the development of a marketing campaigning to promote the rail ferry freight service Rostock-Trelleborg in the market. **Online meetings w/: Rostock, Trelleborg, HHM, SGKV, BPO**						**Rostock to organise up to 5-6 meetings** with PA, inland terminals, customers, combined transport operators to promote rail ferry freight services between Southeast- and Northern Europe via Rostock – Trelleborg', ca Q2 - Q3 2025 [Before drop-out PP19 change: Oct. 2025: Rostock to organise a promotion events dedi-cated to PAs or inland terminal Operator]			**Rostock to organise a** study trip to Rostock (policy/market)			**HHM/ SGKV/ UIRR** to organise one event to inform wider stakeholder groups / up to 80 participants (incl. policy level!)	
	Port Authority Trelleborg														**Trelleborg to organise a** study trip to Trelleborg (policy/market)	**Trelleborg to organise a** promotion events dedicated to port authorities			
	Rail-ferry operator: Stena Line																		
	Business support organisations: BPO, SKGV, UIRR								**HHM/MOTUS:** preparation of info materials (input also from campaign by Stena)			**SGKV/UIRR** to organise an awareness campaign with their members	**HHM** to organise a workshop at TL München		**SGKV/UIRR to organise an awareness campaign** to inform policy level		**11/2025: UIRR Intermodal Summit (?)**	
	Potential customers, like: Railway undertakings, freight forwarders and manufactures (e.g. TXLogistics, DB Cargo, GreenCargo, DB Schenker Logistics, SIEMENS, etc.)	Considering the rail-ferry being a reliable and crucial part of their resilient transport system.	Stena Line will organise 3 customer workshops, meetings & events to inform about the ferry solution and to transfer results.	--> to be combined with "Market: 1st aim"			**SGKV:** 2x workshops with up to 15 stakeholders to discuss on the solution developed by BSC PPs from a European perspective and feedback to the PPs					**Stena Line** to organise 2 promotion events to inform potential customers	**Stena Line** to organise 1 promotion event to inform potential customers		**Stena Line** to organise 1 customer event **on the ferry**			COMMENT: One of the custmoer workshops in joint co-operation with REDII Ports & Trelleborg (REDII Ports: Renewable energy in land transport pilot)
	Policy level: National- and European policy level in charge for (maritime)transport, logistics, economy	Considering the rail-ferry being a crucial part of a resilient transport system linking central Europe with Scandinavia.	Reached by individual contacts from Port Authorities, shipping lines and/or by business support organisations. Invitation to panels on conferences and/or workshop particiation.											**Stena** to organise high-level political meetings in small groups (nationa and/or EU)		**Stena** to organise high-level political meetings in small groups (incl. EU COM, EUSBSR PA Ship, PA Transport)	**Rostock** to organise high-level political meetings in small groups (national)		

Figure 4: Overall planning instrument to execute stakeholder involvement (first version)

4.1.1. Stakeholder involvement to foster infrastructure development

The infrastructure in the ports plays a key role for the success of the rail ferry. Consequently, this was one focus of the stakeholder engagement, to ensure adequate infrastructure development. To keep the rail ferry service in operation, in both ports the specific infrastructure must be maintained and adopted to future needs (e.g. equipped with OPS).

The engagement of infrastructure related stakeholders has three aims:

- Finding future system parameters to enable low- or zero-emission rail ferry calls in the Ports of Trelleborg and Rostock.
- Exchange on future de-carbonisation aims and plans for port handling equipment and the potential upgrade of (floating) infrastructure to support long-term decarbonisation aims in ports.
- Addressing market uncertainties towards policy levels to create awareness in the framework of future infrastructure needs to support resilient transport systems.

Identified stakeholders have been grouped according to these aims. Their role has been defined and also the way of involvement. Finally, meetings/workshops have been scheduled and responsible leaders defined. For all meetings, meeting reports have been prepared.

For the first aim, stakeholders have two main roles:

- Discuss and agree upon (technical) standards, needs, etc. to be prepared for future investments in port infrastructure and the ferry, as well as infrastructure needs in ports in general.
- Discuss about energy needs, peak times and grid stability.

For a successful stakeholder engagement process the definition of clear roles of the stakeholders is crucial. It is also important to clearly communicate the role as expectation to the stakeholders.

The involvement of stakeholders was organized in the form of different workshops. According to the topics, separate workshops for the two ports and STENA have been organized.

For the second aim the role of the stakeholders has been defined as follows:

- Discuss and agree upon (technical) standards, needs, etc. to be prepared for future investments in the electrification of terminal handling equipment and/or terminal vehicles.
- Discuss about energy needs, peak times and grit stability, in respect of a further electrification of terminal handling equipment and/or terminal vehicles.
- Supporting the Port Authorities, terminal operators and Stena Line in external communication, especially towards policy levels.
- Long term planning support in respect of energy transition measures.
- Development of suitable funding measures and/or funding schemes.

The involvement is organized through

- Joint regional stakeholder workshops and an interregional exchange between Port Authorities and Stena Line.
- Working group meetings organized by STENA to provide input to adjust the blueprint concerning general technical questions on the electrification of terminal equipment, on-shore power supply solution to provide energy for future e-ferries.
- Joint workshops with Port Authorities, terminal operators, Stena Line.

- Bilateral discussions with Port Authorities, Stena Line and/or by business support organisations.
- Participation in conferences and workshops.

For the third aim the role of the stakeholders have been defined as follows:

- Providing facts and figures on investment needs and obstacles
- Feedback on infrastructure planning in the hinterland of the ports.
- Feedback on general perceptions regarding market uncertainties, existing funding measures and/or funding schemes as well as information towards the policy level about members needs.
- Long term planning and support of infrastructure as well as development of suitable funding measures and/or funding schemes.

Stakeholders will be reached through workshops and working group meetings mainly.

In general, different types of communication can be useful, a direct exchange via physical meetings and online workshops, documentation of results in written reports to foster consensus and feedback loops with interim updates (monthly rhythm).

The process is organised in phases, as described above.

4.1.2. Stakeholder involvement to exploit market potential

The engagement of “market” stakeholders has the aim to promote the rail-ferry link as alternative transport route and resilient transport system component, towards customers and policy levels.

To ensure long-term operation of the rail ferry, it is crucial to attract more customers and more cargo for the ferry. Consequently, BSC put some effort in intensifying collaboration with stakeholders and promoting the service and showing its benefits for the industry.

Key partner are:

1. Rail operators/ railway undertakers
2. Industry customers
3. Politicians
4. NATO/ military

Although STENA is working intensively with rail operators since years, they found out that there are even more rail operators to approach. It is necessary to have a close collaboration on continental side as well as on Scandinavian side.

Around 106 train operators who are registered and licensed in Germany (public transports and freight) have been identified in BSC, as well as 16 train operators in Sweden. Within BSC most of them have been contacted and a dialogue has been initiated. With some, some projects have already been set up. Three rail operators need to be approached.

The different rail operators have different interests. Most of them currently focus on the fixed link. Only during disruptions of the fixed link, the rail ferry is considered as alternative.

This means that in such cases the cost for the rail operator increases significantly as regular tracks must be ordered; the loco’s + drivers need to be positioned, etc. Rail operators should monitor the total costs during the year, including disruptions, and include the rail ferry in their standard operation process. An approach could be 75% regularly via fixed link and 25% via ferry. This would allow them to have from the very beginning a much more reliable solution to offer to the industry. Costs would also decrease significantly and this competitiveness of the rail ferry increase.

A change of mindset is needed.

Furthermore, it is of highest value to increase the market insight of different cargo types and the need for back-up solution putting future potential of more European transport flows due to more European production sides into consideration.

1. Cargo remains during supply chain transportation always in the wagons
2. Project cargo on rail
3. Intermodal traffic => units can be on/off loaded and shipped without wagon on ferry

So, it is important which rail operator is providing services into which cargo segment for the strategic approach. Furthermore, BSC contributed to improving the understanding of effective solutions that depend on the ferry system, with the Stena Line solution emerging as the most suitable choice.

Usually this is in the project for rail delivery. The characteristics are mainly spot volumes which cannot be planned to a full extent. It is more the experience of having somehow planning volumes at a low level and never sufficient to keep the rail ferries in operation.

Important is to get a clear mapping of industry customers with rail tracks on side. The key industries in Scandinavia are steel and paper/ pulp for this type of transport and are currently used in single wagon traffic. But there is a need, based on the cost pressure on one side and the competition with road transport on the other side, to work on more full train solutions. So did one of the biggest Steel producers in Sweden, who changed as of 2025 the rail setup. There has been implemented regularly full train round trip solutions via the fixed link. But there is a strong commitment to our rail ferry solution and the need for a vital second link is well understood. This underlines the importance of a close dialogue with industry as well. This has not been done in the past and especially not on the continental side. The Scandinavian Industry has a different view as the understanding is there that in case of disruptions on Oresund there is no way out of Sweden if our rail ferries would disappear.

Based on this understanding and an open mindset BSC started the discussion with Paper/ Pulp industry in Scandinavia as well as with Northvolt (before they went bankrupt). The same approach will be applied in continental Europe. A German Steel producer is first on the list. But facing again the price GAP for full supply chain via ferry is higher than subsidized fixed link with DK.

A key finding of BSC is, that the focus on redundancy is a promising approach. Raising awareness amongst the industry in this regard strengthens the position of the rail ferry. In tender processes, always a vital second link (e.g. 75% / 25%) should be included. The rail infrastructure faces huge difficulties due to a significant backlog in maintenance. It should be of their highest interest to plan from the very beginning, by choice and by strategic decision, a reliable supply chain solution. The industry, on the other hand, needs to understand in full and based on frank feedback from rail operators to plan properly in advance. Usually in the case of supply chain disruptions, the need to find an ad hoc solution is extremely high, and the willingness to pay as well. If those additional ad hoc costs would be taken into consideration in the very beginning during the tender process, it would be much easier also for the rail operator to offer alternative solutions.

An additional potential lies in combined transport. This segment means better planning on a more regular basis and a more diversified customer portfolio and at the same time higher volumes.

Furthermore, the passenger trains on the Oresund might increase even more in future and create bottlenecks. So, it would be wise to be prepared.

Based on a study of Trafikverket, the main infrastructure bottleneck will be the big Malmö shunting yard. The shunting yard is operated by one of the biggest rail operators in Sweden. Therefore, volumes are somehow steered via this operator and the price model is based on the highly utilized shunting yard. Taking this into consideration, the port of Rostock with more than 150.000 km of track length could play a vital role as a shunting yard and send already wagon sets into Malmö shunting yard (like Hannover-Lehrte HUB).

Stena Line and one big operator in the single wagon traffic investigated jointly how to overcome this, but this would require a joint effort of stakeholders.

Generally, one of the key findings is that there is a need for joint understanding between industry, continental and Scandinavian rail operators and Stena Line. We constantly try to open the mindsets to have joint meetings, brainstorming, and find the best logistic solution. The commercial part can be discussed separately between the partners. Stena Line worked in that way and therefore it is a proven concept such as framework agreement with industry about a certain volume in a certain timeline to be recalled by 4PL direct to Stena Line. So contractual wise the 4PL's have the contract for full supply chain with the industry but use different legs with different operators such as Stena Line.

In the future, Stena Line will invest much more in industry contacts and joint collaboration models.

The third pillar is much more intensified dialogue with the Politicians. Such as Swedish Rikstag, German Parliament and EU Parliament. BSC organized meetings in the German parliament to highlight the standalone product of the rail ferry and the importance for resilient supply chain solutions from consumer perspective but also for the military need since the war in Ukraine has created an immense need for short notice military movements. It could be also for the German Parliament from interest using existing setup for equipment movements. Stena Line could act as a partner of choice as in the wider concern group of Stena Line a bigger vessel fleet is in operation, even bulk carrier (Stena Line Bulk).

It turned out that awareness for the rail ferry is more advanced in Scandinavia then on the continental side. This, BSC will further work on.

4.2. Conclusion

The "Blue Supply Chains" (BSC) project has demonstrated the strategic value and operational necessity of maintaining and strengthening the rail ferry link between Rostock and Trelleborg.

The Stakeholder Engagement Plan developed in BSC demonstrates the critical importance of structured, inclusive, and purpose-driven collaboration in complex, cross-border transport initiatives. Through its phased and strategic engagement process, the BSC approach successfully aligned technical, operational, market and political perspectives to support the development of the Rostock–Trelleborg rail ferry.

One of the key outcomes of the SEP was the creation of mutual understanding between stakeholders across different domains—from infrastructure managers and rail operators to policy-makers and industry clients. This alignment enabled the identification of practical challenges, supported the co-creation of realistic solutions, and ensured that stakeholder insights were integrated into both technical planning and strategic communication.

The SEP also showed that stakeholder engagement is not a one-time task but a continuous process that must evolve alongside the project. From initial awareness-building to hands-on pilot involvement and high-level advocacy, the plan created an ongoing dialogue that fostered ownership, trust, and responsiveness. These elements proved essential in addressing complex topics such as digital integration, grid readiness, modal shift, and dual-use infrastructure potential.

Furthermore, the rail ferry's role as a resilient logistics component—especially in the context of geopolitical uncertainty and climate objectives—highlighted the need for transport redundancy and alternative corridors. Stakeholders from both the civil and defence sectors acknowledged this role, and the project positioned the rail ferry as a key enabler of secure and sustainable freight transport in the Baltic region.

Overall, the BSC stakeholder engagement model can serve as a blueprint for other ports and corridors seeking to modernize infrastructure, promote modal shift, and enhance the resilience of transport

networks. Its success lies not only in planning but in creating meaningful dialogue, bridging technical and political spheres, and translating engagement into tangible progress.

The future viability of the rail ferry depends on significant infrastructure investments in both ports, especially in adapting and maintaining the specialized facilities required for train ferry operations. Trelleborg and Rostock face unique technical and financial challenges, including aging vessels, berth modernization, and integration with electrified rail networks. Additionally, the growing geopolitical relevance of the corridor—especially after Sweden and Finland's NATO accession—has elevated the importance of this link for defence logistics and supply chain resilience.

From a market perspective, the rail ferry must evolve from a niche or fallback option to an integral part of the logistics chain. A key insight from BSC is the need for mindset change among rail operators and industry. Long-term planning, strategic redundancy (e.g., 75% fixed link, 25% ferry), and contractual flexibility can unlock cost savings, ensure supply chain stability, and increase volumes. Joint efforts with industry partners—especially in the steel, paper, and battery sectors—have already led to promising discussions and pilot initiatives.

Finally, political support is crucial. While Sweden has taken proactive steps in subsidizing ferry-related costs, Germany has yet to establish comparable mechanisms. Raising awareness in continental Europe about the ferry's strategic and commercial benefits remains a core task for BSC. A successful rail ferry future requires a unified approach: close cooperation among infrastructure operators, regulators, military planners, industry leaders, and political stakeholders across borders.

5. Future decarbonisation vision

A future-oriented decarbonisation strategy in European logistics must centre around the integration of sustainable, multimodal transport systems—where the combination of rail and ferry services plays a critical role.

The BSC project has laid the groundwork for such a vision by emphasizing modal shift, digitalisation, and cross-border collaboration. The Rostock–Trelleborg rail ferry link stands as a unique and scalable model for low-emission freight corridors, enabling a significant reduction in road-based transport emissions.

Decarbonisation requires a rethinking of infrastructure investment priorities. Both ports must modernize and adapt their facilities to support efficient rail-ferry operations, with a focus on electrification, optimized loading procedures, and the integration of onshore power systems (OPS). Electrified access routes and enhanced shunting capacities will allow longer and heavier freight trains, replacing diesel traction with cleaner energy sources and reducing the carbon footprint of port operations. Trelleborg's and Rostock's planned investments, co-financed in part by EU initiatives, reflect a growing awareness of the need to upgrade legacy systems for a climate-resilient future.

Beyond infrastructure, decarbonisation depends on logistics optimization and increased digitalisation. Smart booking platforms, real-time tracking, and interoperable data systems can improve route planning, reduce empty mileage, and support the dynamic allocation of capacity. This makes rail-ferry logistics not only cleaner but also more attractive and reliable for customers. Combined transport, particularly intermodal solutions, offers another opportunity to decarbonise by enabling more regular, high-volume flows with reduced environmental impact.

However, infrastructure alone is not enough. A genuine shift requires behavioural change among market actors. Rail operators and industry must view the ferry not just as a backup during fixed link disruptions, but as an integrated, stable part of their transport strategy. By proactively including rail ferries in long-term logistics planning—such as in 75/25 distribution models—companies can reduce exposure to disruption risks and simultaneously contribute to emissions reduction. Governments and

policymakers must support this shift by closing the funding gap for essential infrastructure and compensating operators for system-related costs that benefit the public and the planet.

In light of recent geopolitical developments and rising awareness around military and civilian resilience, the rail ferry has gained strategic importance. Climate protection and crisis preparedness are no longer opposing goals but complementary pillars of modern logistics. The decarbonisation of Europe's supply chains, therefore, must not only aim for CO_2 reduction but also for flexibility, redundancy, and cross-border alignment.

Ultimately, a successful decarbonisation vision will require an alliance between industry, operators, and politics—built on shared values of sustainability, reliability, and innovation. The Rostock–Trelleborg corridor provides a powerful example of how green transformation can be advanced through practical, scalable, and collaborative approaches. The future of freight lies not only in cleaner technologies but also in smarter, more integrated systems—where the rail ferry becomes a symbol of climate-smart logistics across Europe.

Within the framework of the EU project Green FIT 2025, the construction of two wind turbines (2*2.35 MW) will be completed in the spring, which are intended to meet the electricity connection of ships at the quay. Today, Stena Line uses this opportunity in ferry berth 9, but without fossil-free electricity.

Within the framework of the EU project Baltic Green NET, two OPS stations will be built in 2025 for the electrical connection of ships in ferry berths 10 and 11. These will also be supplied with fossil-free energy when the wind turbines are completed.

5.1. Best practice example windmills for energy production for OPS

OPS is a key element of greening port operations and achieving emission reduction goals in the ports. This requires, however, the use of green energy for the OPS system. BSC digged into a best-practice example from Sweden, where a windmill shall produce the energy for the OPS. This example should motivate other ports to follow and by that contribute to a greener Baltic Sea Region.

In BSC, key developments regarding shore power infrastructure at the Port of Trelleborg were discussed. The port is planning a total shore power capacity of 10 megawatts. Fixed costs for acquiring high-voltage power amount to €70,000 per megawatt annually, with only minor labour costs added. These fixed costs, along with the investment costs, must be borne by the shipowners. The shore power system is designed to comply exclusively with the "Swedish standard" of 10.5 kV at 50 Hz. The port interprets recent EU legislation to mean that shore power must be utilized even if vessels are running on green fuels.

To enhance sustainability, Trelleborg aims to supply as much of the shore power as possible through its own renewable energy sources, including two 2.5 MW wind turbines and solar installations. Stena Line currently operates a berth with 1.4 MW capacity, though full operational capacity of 3.6 MW will be required by 2030. At present, the connection is used only once per week for about 90 minutes.

TT-Line is preparing to retrofit four RoPax vessels—Peter Pan, Nils Holgersson, Akka, and Tinker Bell—with shore power systems by Q1 2025. Each ship will be equipped with two connections positioned at a height of 10 to 12 meters on the bow starboard/stern port side. Berths 10 and 11 are being readied accordingly. Each 2.5 MW connection incurs fixed provision costs of €350,000, although TT-Line has cited higher values in correspondence—likely due to differing specifications for reactive and apparent power. ACTEMIUM has been contracted to implement the systems, with an order expected in Q3 2024 and commissioning planned for October 2025. The total cost for the two connections is €1.56 million, fully allocated and depreciated over a 10-year period.

Unity Line is also evaluating shore power integration but has not yet reached a decision. Additionally, a funding proposal for the Trelleborg/Travemünde connection is being developed. Rostock Port has been invited to participate in the initiative.

5.2. Best practice example hybrid shunting locomotive

Port of Trelleborg, together with Väte Rail and BSC demonstrated the operation of PESA's hydrogen locomotive, SM42-6Dn.

The hydrogen locomotive is the first of a total of 25 locomotives ordered to replace older diesel locomotives in Swedish freight traffic. The company Väte Rail, which is one of the train operators and handles shunting in the Port of Trelleborg, plans to phase out all of its 20 diesel-powered locomotives in order to become completely carbon dioxide neutral by 2030.

Hydrogen fueled engines is the future of sustainable railway operation. With its advanced fuel cell technology, this locomotive offers a powerful and environmentally friendly solution for efficient shunting and light freight transport in ports, depots and terminals. The locomotive is equipped with two fuel cells of 85 kWh each and has an impressive refueling speed of only 30 minutes, ensuring minimal downtime and maximum productivity.

Figure 5: PESA's hydrogen locomotive, SM42-6Dn

5.3. Best practice example E-Tug masters

When greening port operations, also port handling equipment should be taken into consideration. Especially for the rail ferry, the tug masters are a relevant emittant. Consequently, BSC looked at emission free tug musters. The idea is to electrify the tog master fleet.

The terminal operator Euroports (EP) at the Port of Rostock announced that they achieved EcoVadis' Silver Rating at the end of 2024. Furthermore, all EP terminals are certified according to DIN ISO 14001:2015 and have therefore successfully introduced an environmental management system.

EP has defined the goal of achieving a 40% reduction in greenhouse gas emissions by 2030. To achieve this, new handling technology is to be procured. EP is closely in contact with suppliers to assess alternative drive technologies and their benefits at an early stage. EP has already carried out the following tests:

- Test Linde H80 E forklift Q4 2023
- Test Terberg YT203EV Q4 2022

The tests have shown that the devices are not yet suitable for multi-shift operation and relatively continuous use, as required in the port, or do not yet deliver the required performance. At around

200% of the previous investment costs per device, the fleet would have to be expanded further, which would make the implementation uneconomical.

EP also generally examines the TCO for every new purchase. Consumption data therefore also plays a major role when evaluating operating costs and EP opts for devices with low consumption/hour.

In addition, some general information from the Sustainability Report 2023 of EP, p. 20:

ENVIRONMENT

INITIATIVES FOR REDUCTION

ELECTRIC EQUIPMENT, VEHICLES AND TERMINAL OPTIMISATION

In Euroports China, we have invested in electric forklifts and terminal tractors after a thorough trial period. Similarly, our entities in Germany and Finland have adopted advanced Dual Engine Motor material handling equipment. This is supported by our new procurement policy, which prioritises the acquisition of sustainable equipment for our (new) terminal locations.

As part of our broader electrification efforts, we are accelerating the transition of our company vehicles to electric power and installing charging stations at both our offices and terminal parking locations. We also focus on operational improvements through increased efficiency, including reduced driving distances for equipment transport and introducing more efficient handling equipment like in Euroports Belgium. Additionally, we have implemented measures such as reducing terminal speed in Euroports Germany to increase safety and lower emissions.

HVO, RENEWABLES AND ENERGY MANAGEMENT

We are currently evaluating the favourable outcomes of implementing HVO (Hydrotreated Vegetable Oil) in our terminal operations in Finland, exploring its potential integration across the broader Euroports group.

Our Scope 2 emissions decreased due to reduced electricity consumption and green initiatives, including purchasing green certificates and installing solar panels. These efforts involve transitioning to renewable energy sources, which saw a 28,5% year-on-year increase and optimising operations to minimise energy consumption.

	TOTAL AMOUNT (KWH)	RECOVERED [1]	RENEWABLE [2]	% RENEWABLE
2021	45.067.594	44.168.999	898.595	2%
2022	44.341.929	41.232.799	3.109.130	7%
2023	41.027.046	37.389.311	3.637.735	9%

-7,4% -9,3% +17% +28,5%

[1] Gray
[2] Certified green or produced on site

Building on last year's successful transition to electric terminal tractors and lift trucks, we are developing a comprehensive roadmap to achieve a fully electric fleet by 2030. This initiative not only supports our commitment to sustainable terminal operations but also aligns with the Group's 2030 emission reduction targets. By investing in advanced electrification technologies and green energy solutions, we aim to significantly reduce our environmental impact while maintaining high operational efficiency and reliability for our customers.

ANTHONY **GU**
Managing Director
Euroports China

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Figure 6: EP Sustainability Report 2023

Figure 7: Terberg YT203EV Q4 2022 | Source: https://www.terbergspezialfahrzeuge.de/aktuelles/ev-terminal-traktoren

The involved ports and terminals are continuing their investigation to ensure implementation soon, after some technical adaptations that make the operation more economically feasible.

5.4. Green shipping

The third pillar of greening port operation is green shipping, means the use of alternative fuels and ship propulsions. BSC partner STENA lines has developed a vision for green shipping that will also apply for the rail ferry.

Stena Line is developing innovative vessel concepts and integrating advanced technologies. This review synthesizes information from recent sources to provide an overview of Stena Line's future vision for its ferry operations.

Figure 8: Stena Futuro Ferry

Stena Futuro[1] represents a significant step in ferry design, emphasizing energy efficiency and environmental sustainability. Sten Futuro is a concept vessel which symbolically combines different approaches in one future concept. The vessel incorporates hybrid propulsion systems, allowing operation on multiple fuel types, including methanol. Its battery systems enable partial electric operation, particularly useful during port manoeuvres. Additional features include solar panels for auxiliary power, an air lubrication system to reduce hull friction, and a waste heat recovery system to utilize exhaust heat for onboard energy needs. Notably, the vessel is equipped with four retractable 40-meter wing sails, which have demonstrated potential fuel savings of up to 15% in simulations. This vessel concept is used for research and development of new potential sustainable ideas to reduce CO2 emissions. (https://stenaline.com/media/stories/meet-stena-futuro-our-new-concept-vessel/ ; https://www.thedcn.com.au/region/australia/stena-line-develops-new-concept-vessel/ ; https://www.shippingherald.com/stena-line-develops-new-concept-vessel/ ; https://www.shippax.com/en/news/stena-line-develops-new-concept-vessel.aspx)

Stena Line is expanding its fleet with two NewMax hybrid ferries, Stena Connecta and Stena Futura, designed to enhance freight capacity on the Belfast–Heysham route by 40%. These vessels are methanol-ready and incorporate technologies such as battery propulsion and shore power connectivity. Stena Connecta will feature two Norsepower rotor sails, expected to deliver up to 9% fuel savings by harnessing wind power for auxiliary propulsion. (https://stenaline.com/media/stories/future-proofing-our-superfast-ferries/ ; https://news.cision.com/stena-line/r/stena-line-marks-significant-milestones-in-build-of-newmax-ships--stena-futura-and-stena-connecta%2Cc4057742 ;

[1] https://news.cision.com/de/stena-line-deutschland/r/stena-line-entwickelt-neues-konzeptschiff,c4129222

https://www.offshore-energy.biz/stena-line-splashes-second-methanol-ready-newmax-hybrid-ferry/ ; https://www.offshore-energy.biz/stena-line-picks-norsepower-rotor-sails-for-brand-new-methanol-ready-newmax-ferry/)

As part of its commitment to reducing carbon emissions, Stena Line has been retrofitting existing vessels—such as the Superfast VII and VIII—to operate on alternative fuels like e-methanol and to utilize shore power. This initiative began in 2015 when Stena Germanica made history as the world's first commercial vessel to run primarily on methanol. Collaborations with companies like Wärtsilä facilitate the conversion of ships to methanol fuel, aligning with international regulations and emission reduction targets. (https://stenaline.com/media/stories/future-proofing-our-superfast-ferries/ ; https://news.cision.com/wartsila-corporation/r/wartsila-to-accelerate-stena-line-s-decarbonisation-journey-through-methanol-conversions%2Cc3794365)

One key factor in the energy efficiency of ships is the strategic usage of AI on board. The so called "Stena Fuel Pilot" calculates the optimal route between start point and destination for each crossing by using historic data and real time data such as wind, waves and depth. The AI-powered algorithms calculate the best route to reduce fuel consumption by up to 5%. (https://stenaline.com/media/stories/ai-assisted-vessels/)

Possibilities for adapting the future vision to the use case of rail ferries between Rostock and Trelleborg

This report presents an in-depth analysis of Stena Line's evolving sustainability strategy, with particular attention to the company's rail ferries operating on the Rostock–Trelleborg route. The vessels MS Skåne and MS Mecklenburg-Vorpommern represent a unique capability within the ferry industry: the direct sea transport of rail freight wagons. This analysis integrates recent technological developments, fleet-wide initiatives, and leadership insights, offering a cohesive vision of how rail ferries can be adapted to contribute to a decarbonized maritime future.

Stena Line has emerged as a leader in the transformation of maritime transport towards sustainable operations. Among its many routes and vessel classes, the Rostock–Trelleborg corridor stands out for its integration of rail freight via two specialized ferries—MS Skåne and MS Mecklenburg-Vorpommern. These vessels are critical for enabling modal shifts from road to rail transport across the Baltic Sea, helping reduce CO_2 emissions and improve the overall efficiency of European logistics chains and for being a vital second link to enable transports between continental Europa and Scandinavia. Considering the company's broader strategy to reduce emissions by 30 percent by 2030, this report explores how the sustainability vision being pursued at the fleet level can be applied to these vital but aging vessels.

MS Skåne, built in 1998, and MS Mecklenburg-Vorpommern, built in 1995, are both around 200 meters in length and capable of transporting road vehicles, passengers, and most importantly, rail wagons. Each vessel contains rail tracks integrated into the cargo deck, allowing trains to be driven directly onto the ferry. Despite their age, both vessels remain integral to the region's transport infrastructure, especially as sustainable transport solutions gain prominence.

A central component for decarbonizing Stena Line's fleet is the goal to reduce greenhouse gas emissions by 30 percent by 2030, through both new ship development and the retrofitting of existing tonnage. The most environmentally sound course of action is not always to build new ships, but to enhance the efficiency of vessels already in service. For this reason, Stena Line is prioritizing upgrades such as more efficient propellers, rudders, hull coatings, and digitally assisted navigation.

One of the most innovative technologies currently being introduced is the Norsepower Rotor Sail™ system. The vessel Stena Connecta, scheduled for delivery in late 2025, will be the first in the fleet to feature two 28-meter-high rotor sails, which are expected to yield fuel savings of up to 9 percent on the Belfast–Heysham route. Other vessels, like the NewMax-class Stena Futura, represent the next generation of RoRo ships that will combine methanol-fuelled engines, battery-electric capabilities, and advanced aerodynamic designs.

Beyond hardware, the company is increasingly investing in software and digital optimization. One of the most notable tools is “Stena fuel pilot” an artificial intelligence-based system designed to advise captains on energy-efficient routing and speed profiles. According to early performance data, AI-driven guidance is already demonstrating measurable improvements in emissions reduction and voyage efficiency.

While MS Skåne and MS Mecklenburg-Vorpommern are not new vessels, they are strong candidates for retrofitting under Stena Line’s sustainability framework. Both vessels could benefit from conversion to methanol dual-fuel engines, enabling them to transition away from fossil-based marine diesel. The route’s predictability and relatively short crossing time would seem to make battery systems very logical for zero-emission operations during port manoeuvring and hoteling. But due to the heavy weight of the rail tracks on board, it seems at the moment not to be an option to use heavy batteries on board.

The implementation of shore power, or “cold ironing,” would allow the vessels to shut down their engines while docked in Rostock and Trelleborg, further reducing emissions and local air pollution. Additionally, given the favourable wind conditions of the Baltic Sea, rotor sail technology could potentially be adapted to these ships, following feasibility studies and deck-space assessments.

Moreover, these ferries could be fitted with various energy-saving devices (ESDs) to enhance propeller performance and reduce hydrodynamic drag. Such devices include pre-swirl stators, post-swirl fins, and boundary layer control mechanisms, which are known to improve wake symmetry, reduce fuel consumption, and lower underwater radiated noise (URN). As URN becomes a growing environmental concern due to its impact on marine ecosystems, improvements in wake quality and propeller efficiency can provide important co-benefits beyond fuel savings.

The rail ferry segment has unique operational constraints and advantages. Future rail ferries will likely feature a hybrid propulsion architecture capable of switching between methanol and possibly even hydrogen fuel cells, depending on voyage conditions and port infrastructure. Lightweight materials may be used in hull construction to reduce displacement and improve fuel economy, while automated loading systems will optimize the transfer of rail and road freight, minimizing port times and energy expenditures.

Digitalization will also play a key role. Real-time performance analytics, predictive maintenance through digital twins, and AI-enhanced routing tools will be standard elements in next-generation rail ferries. These systems will help reduce lifecycle costs and maximize sustainability metrics throughout the vessel’s operational lifespan.

By retrofitting older vessels like MS Skåne and MS Mecklenburg-Vorpommern and aligning their capabilities with Stena Line’s digital and mechanical innovations, the company can ensure that rail ferry services remain relevant and sustainable within the broader transformation of European transport.

MS Skåne and MS Mecklenburg-Vorpommern are more than aging ferries—they are essential components of a rail freight corridor that supports Europe’s environmental and logistical goals. As Stena Line continues to lead in sustainable ferry innovation, the retrofitting and operational enhancement of these vessels represents both a practical and symbolic investment in the future of low-emission maritime transport. Integrating technologies such as methanol propulsion, energy-saving devices, rotor sails, and AI navigation will enable these rail ferries to meet the challenges of the 2030 climate targets while continuing to serve a critical link between Germany and Sweden.

What has already been done on Rostock-Trelleborg rail ferries

New silicon painting for more environmentally friendly transport:

In 2024, during the planned yard time, the vessel Skane has received a new environmentally friendly silicon painting. The underwater hull of the ship was sandblasted and coated with a new layer of silicone paint. This biocide-free coating prevents marine organisms like algae from attaching to the

hull, maintaining a smooth surface. As a result, water resistance is reduced during crossings, leading to annual fuel savings of approximately 780,000 litters. This translates to a reduction of around 2,500 metric tons of CO_2 emissions per ship each year. Additionally, the silicone paint has a significantly longer lifespan, lasting up to eight years compared to typical paintings. The vessel Mecklenburg-Vorpommern will follow soon. (https://stenaline.com/media/stories/stena-line-launches-newly-refurbished-ships-on-north-sea-corridor/)

The above-mentioned AI system "Stena Fuel Pilot" to reduce the CO2 emissions by using historic and real time data to calculate the best path Rostock and Trelleborg to reduce the fuel consumption and thus the CO2 emissions has already been implemented on both rail ferries.

Both ferries are also equipped with a connector to shore power. At the moment the ferries use shore power in the port of Trelleborg for stays longer than 90min.

As mentioned above retrofitting of the machines is one option that has already been started. In the past the vessel Stena Germanica (on the relation Kiel-Göteborg) has successfully demonstrated that methanol and biofuels can reduce the CO2 emissions significantly.

This year the refurbishment of all machines on board of both vessels on the Rostock-Trelleborg corridor has started. Within the next years the machines of both vessels will be fully refurbished to be able to use biofuels in the future, but also conventional fuels. The machines will be refurbished during the daily operations. This will make both aged ships more future proof and extend the lifetime significantly to ensure rail freight transports for at least the next 15 years.

6. Create awareness to support green & resilient transport systems

The Rostock–Trelleborg rail ferry connection represents a strategic transport link within the Scandinavian–Mediterranean Core Network Corridor (Scan-Med) of the TEN-T network. It plays a crucial role in ensuring multimodal connectivity between Scandinavia and Central/Southern Europe by integrating rail and maritime transport. As such, it contributes significantly to the objectives of the European Green Deal and strengthens the resilience of the European transport system. In light of current geopolitical developments—such as Sweden's and Finland's NATO accession and the war in Ukraine—this corridor is increasingly valued not only for its environmental benefits but also for its critical role in civil protection and military mobility.

Despite these strategic advantages, the future of the rail ferry service is at risk due to a combination of market uncertainties and high investment requirements. The ferry, operated by Stena Line, offers six daily crossings and accommodates heavy and oversized rail cargo, including military equipment, thanks to vessels with embedded rail tracks and specialised port infrastructure. However, while Trelleborg has two operational berths, Rostock has only one ageing ferry berth with rail access. This lack of redundancy significantly reduces the route's resilience and increases vulnerability in case of technical failures or maintenance downtime.

From a cost perspective, rail ferry operations face major challenges. The need for specialised vessels and infrastructure results in high capital and operational expenditures, which are not offset by economies of scale—especially when compared to road-based transport. This financial pressure is further exacerbated by the absence of dedicated support mechanisms or strategic policy backing in Germany. The existing ferries are ageing and must be replaced in the coming years, but investment uncertainty makes it difficult for operators to commit to costly procurement of rail ferry-compatible vessels. While Sweden is already evaluating long-term support options through strategic planning, Germany has yet to formally acknowledge the route's critical function for resilient and military mobility.

To address these issues, policy-level action is urgently needed. At the regional level, the state of Mecklenburg-Vorpommern could consider compensating the port of Rostock for the higher costs associated with maintaining the specialised rail ferry berth. Furthermore, public investment is required to construct a second berth with rail capability, which could serve as both a backup and an operational enhancement to current infrastructure. This would significantly improve system resilience and ensure continuity in service.

At the national level, it is essential that the German government formally recognises the Rostock–Trelleborg ferry as strategic infrastructure. This recognition would unlock access to federal funding mechanisms, enhance planning security, and incentivise long-term investment in vessels and port facilities. Moreover, the route should be integrated into national transport, defence, and logistics strategies—especially in coordination with Bundeswehr planning.

At the EU level, the ferry connection should be included in relevant programmes such as the Connecting Europe Facility (CEF) and Military Mobility framework, reflecting its unique value in terms of cross-border connectivity and strategic transport capacity. Enhanced cooperation between Germany and Sweden could also support the development of harmonised technical and operational standards to increase long-term interoperability and integration into the broader TEN-T system.

In conclusion, the Rostock–Trelleborg rail ferry stands as a highly relevant case for illustrating the importance of early policy engagement to address market uncertainties and guide infrastructure investment. Without timely and targeted intervention, this sustainable and strategically vital link risks degradation or discontinuation. Ensuring its continuity is not only a question of maintaining current operations, but of securing future-ready, resilient, and green transport corridors for Europe's logistics, economy, and defence preparedness.

Figure 9: Loading of a rail ferry, copyright: Stena Line

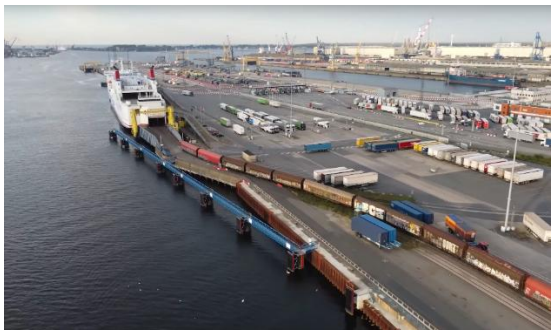

Figure 10: Loading of a rail ferry, copyright: Stena Line

7. Benefits of the rail ferry service

This ferry link offers distinct advantages over conventional road and bridge connections. It serves as an important complement to fixed infrastructure such as the Öresund Bridge, particularly in scenarios involving infrastructure maintenance, capacity bottlenecks, or geopolitical disruptions. Against the backdrop of Russia's war against Ukraine and Sweden's recent accession to NATO, the corridor has gained additional strategic relevance—not only as a green logistics route but also as a key asset for civil protection and military mobility across Europe. Its capacity to transport rail freight wagons, locomotives, project cargo, and heavy military equipment—thanks to specialized vessels with integrated rail tracks—makes it uniquely suited to both commercial logistics and defence transport operations.

Operationally, the connection is maintained by Stena Line, with six daily sailings and a theoretical capacity of approximately 1,000 rail metres per departure. Trelleborg is well equipped with two modern ferry berths dedicated to rail cargo, enabling full train handling within 90 minutes.

Both ferries are also able to load very heavy cargo trains with up to 3500 tons which usually finds some restraints on the land way.

By having 3 departures per direction per day, the rail ferry service between Rostock and Trelleborg is very good plannable for customers and partners. The crossing time of 6-7 hours is also lower than using the land way and increases the plannability.. They can rely on the service because there are no blocked tracks due to higher train traffic. A booked ferry means for the customer a reliable confirmation of a transport. The punctuality on the Rostock – Trelleborg corridor with nearly 98% secures this reliability. Besides these facts the transport on the ferry is a very safe and secure way of transporting goods. The crew and the captains are checking the transports before the ferry transport.

Since both ports in Rostock and Trelleborg are specialized for train transports, a huge shunting yard with many parking tracks has been build. These parking tracks offer customers more flexibility and enable the reordering of wagons and the possibility to create new train sets before the train departs.

When it comes to intermodal trains, the rail ferries offering a more resilient system. During the craning process of trailers the loaded cargo occasionally moves into the trailer plane which causes huge damages. This can be avoided by simply loading the whole intermodal train on board of the ferries. This also reduces the loading and unloading times in the ports. Instead of loading / unloading e.g. 36 trailer units by chassis, only 1 shunting operation would be needed.

In conclusion, the Rostock–Trelleborg rail ferry stands as a highly valuable asset within the European transport and security landscape. It exemplifies the type of resilient, sustainable, and strategically aligned infrastructure that the EU seeks to promote under its Green Deal, mobility, and defence initiatives. Ensuring the longevity and reliability of this corridor will require proactive policymaking, targeted financial instruments, and strategic cooperation across borders.

8. Conclusion and recommendations

The Rostock–Trelleborg rail ferry connection stands as a critical element in Europe's transition toward greener, more resilient, and strategically secure transport systems. BSC has underlined the value of this unique link within the TEN-T network, providing vital capacity for multimodal, low-emission freight transport across the Baltic Sea. The ferry not only enables modal shift from road to rail but also offers essential redundancy and flexibility in times of geopolitical tension, climate-induced disruptions, or infrastructure bottlenecks. Despite these clear advantages, the system remains vulnerable due to market uncertainties, outdated infrastructure, and high investment requirements for vessels and port equipment.

From an environmental and operational standpoint, the rail ferry connection delivers substantial benefits. It enables the direct transport of rail wagons—including heavy industrial goods and military equipment—across national borders with high punctuality and minimal handling risks. The crossing time of 6–7 hours and high departure frequency make it a reliable alternative to overland routes. Moreover, the ferry contributes to the EU's decarbonisation goals by reducing road congestion, lowering CO_2 emissions, and enabling the use of shore power and hybrid vessel technologies. However, its long-term viability hinges on consistent support at regional, national, and EU levels—particularly given the aging ferry vessels, rising operating costs, and limited backup infrastructure at the Port of Rostock.

To address these challenges and secure the system's future, BSC recommends the following strategic actions:

Strategic Policy Recognition and Funding Instruments

- **National recognition of the route** as critical infrastructure is essential—especially in Germany, where such status would improve access to national funding, defence integration, and regulatory priority.
- At **EU level**, continued support through **Connecting Europe Facility (CEF)** and **Military Mobility funding** is vital. The route should be embedded into both civil and military infrastructure planning frameworks, with corresponding financial instruments.
- Inclusion of **resilience requirements in national tendering** and transport strategies (e.g. "75/25" fixed link/rail ferry logistics models) would strengthen planning security for operators and ensure long-term supply chain stability.

Infrastructure Investments and Operational Redundancy

- A **second rail ferry berth at the Port of Rostock** is essential to safeguard redundancy and continuity. While volumes alone may not justify a dedicated second berth, a **multipurpose RoRo terminal** with rail ferry compatibility offers a cost-effective solution.
- **Track modernization and switch systems** on the German side, alongside **marshalling yard upgrades in Trelleborg**, must continue—particularly to support heavier, longer trains and electrification.
- Investments in **shore power systems** (OPS) and local renewable energy (e.g., wind turbines) should be expanded to ensure that port electrification delivers tangible environmental benefits, especially under future emissions legislation.

Market Engagement and Customer Integration

- A **mindset shift among rail operators and industry** is crucial. The rail ferry must move from being a backup option to a fully integrated transport mode. Logistics strategies should proactively include ferry transport as part of routine operations.
- Enhanced **collaboration with industrial stakeholders**—particularly in the steel, pulp, and automotive sectors—is needed to develop reliable volume forecasts and full train solutions. Customers with rail sidings should be systematically identified and approached.
- The ferry service should promote **intermodal flexibility**, reducing loading risks and turnaround times by enabling direct ferry boarding of full trains or trailer units.
- **Digitalisation**, including smart booking tools and real-time performance tracking, will increase the service's attractiveness and transparency.

Green Innovation and Vessel Modernisation

- Continued implementation of **retrofit measures** on the vessels—such as silicone hull coatings, AI-based route optimization (e.g., Stena Fuel Pilot), and eventual adoption of **methanol-compatible engines**—can reduce emissions and extend vessel life.
- As older vessels approach end-of-life in the 2030s, procurement strategies for **next-generation rail ferries** (with hybrid propulsion, reduced emissions, and automated loading systems) must begin now to avoid service interruptions.
- Integration of **AI-driven route planning, predictive maintenance**, and energy-saving devices (e.g., rotor sails) will further improve sustainability and cost-efficiency.

Political Outreach and Cross-Border Coordination

- **Awareness in Sweden is more advanced** than in Germany. The BSC project partners must continue to raise visibility of the ferry's dual-use value (civil + military) among German stakeholders—especially parliamentarians and ministries.
- **Bilateral working groups** between Germany and Sweden should be established to align technical standards, coordinate funding strategies, and accelerate decision-making across borders.
- Defence agencies, including **NATO and the Bundeswehr**, should be directly involved in long-term planning and operational support to reflect the rail ferry's growing strategic importance.

In summary, the Rostock–Trelleborg rail ferry is not merely a mode of transport but a linchpin for sustainable logistics, military mobility, and European infrastructure resilience. It must be preserved and developed through joint political will, forward-looking investments, and a shared commitment to green transformation. The BSC project has provided the roadmap—now it is up to stakeholders to follow through.

ANNEX

Policy Paper: Safeguarding the Rostock–Trelleborg Rail Ferry: A Resilient and Sustainable Link in the Scan-Med Corridor

1. Context and Strategic Relevance

The rail ferry connection between Rostock in Germany and Trelleborg in Sweden is a key multimodal corridor within the Scandinavian–Mediterranean Core Network Corridor (Scan-Med) of the Trans-European Transport Network (TEN-T). It links Scandinavia directly with Central and Southern Europe and serves as an important alternative to fixed infrastructure such as the Öresund Bridge. With its ability to combine rail and maritime transport, the route supports both the European Green Deal objectives and broader efforts to strengthen the resilience of the European transport system.

Current geopolitical developments, including Sweden's and Finland's NATO accession and the ongoing war in Ukraine, have further increased the strategic relevance of this corridor. In particular, the ferry offers an additional transport route in situations where fixed links may be disrupted due to maintenance, natural hazards or political tensions. As such, the Rostock–Trelleborg rail ferry is increasingly seen not only as a green logistics solution but also as a critical component of civil protection and military mobility planning.

2. Technical and Operational Overview

Operated by Stena Line, the rail ferry runs six crossings per day—three in each direction—offering a theoretical capacity of around 1,000 rail metres per sailing. The two operating vessels are equipped with embedded rail tracks and are capable of carrying rolling stock, including freight wagons, locomotives, oversized project cargo, and heavy military vehicles. This makes the route especially suitable for all kinds of railway transport and specialised shipments that cannot be handled on standard RoRo or RoPax ferries.

The Port of Trelleborg currently operates two dedicated rail ferry berths and can load or unload full-length trains within 90 minutes. In contrast, the Port of Rostock is currently operating only one ferry berth that is technically capable of handling rail cargo. This facility is ageing and requires substantial investment to maintain operational safety and reliability. There is currently no redundant infrastructure on the German side, which limits resilience in case of technical failure or maintenance downtime.

3. Challenges and Risk Assessment

While the route offers clear environmental and strategic advantages, its long-term operation is under pressure. One of the key challenges is the comparatively high cost of ferry operations involving rail transport. Specialised infrastructure and vessel requirements, along with low economies of scale compared to road-based alternatives, result in significant additional costs for both ferry operators and port authorities.

Another critical issue is the investment uncertainty for the operator. The current vessels are ageing and will need to be replaced in the coming years. However, given the lack of dedicated support mechanisms and the limited planning certainty, it is unclear whether rail ferry-compatible tonnage will be procured in time to secure long-term continuity of service. In parallel, Sweden is already conducting strategic studies on rail ferry services, while Germany has not yet formally recognised the route as critical transport infrastructure.

The absence of a second ferry berth with rail access in Rostock further exacerbates this risk. While such redundancy exists in Trelleborg, the lack of a backup structure on the German side means that any temporary outage of the existing berth could result in a complete suspension of rail ferry services.

4. Contribution to European Objectives

The rail ferry contributes directly to several EU policy goals. It supports modal shift from road to more sustainable transport modes, thereby helping to reduce greenhouse gas emissions in line with the Fit for 55 package and the European Sustainable and Smart Mobility Strategy. By offering a reliable alternative to congested road corridors and limited-capacity on fixed links, it helps to mitigate bottlenecks in the freight network.

Moreover, the route has growing significance in the context of military mobility. As highlighted by EU and NATO representatives in recent policy discussions, ports with rail ferry capacity are essential for strategic troop and equipment movements across Europe. The Rostock–Trelleborg connection has already been identified as a relevant corridor in this regard, particularly because it supports heavy and oversized military cargo that cannot be transported across certain bridges due to axle load restrictions.

5. Recommendations for Action

To safeguard the long-term viability of the rail ferry service, coordinated action is needed at regional, national, and EU level. On the regional level, the federal state of Mecklenburg-Vorpommern could consider a compensation for the additional operational costs incurred at the port of Rostock by maintaining rail ferry infrastructure. This would support the availability of the existing berth constructed exclusively for the operation of the two existing rail ferries. In addition, state aid is needed to facilitate the construction of a second alternative rail ferry berth in the port of Rostock, which is available for the rail ferries in emergencies but serve in general regular RoRo or RoPax vessels.

At the German national level, the ferry should be formally recognised as strategic infrastructure serving both civil and military purposes. This would improve access to federal funding instruments and provide the planning certainty required for long-term fleet and infrastructure investment. Integration of the route into national transport and defence strategies, including Bundeswehr logistics planning, is also recommended.

At the EU level, inclusion of the ferry in relevant funding programmes—particularly within the Connecting Europe Facility (CEF) and the Military Mobility framework—is essential. Enhanced cooperation with Sweden on harmonised technical and operational standards would also increase efficiency and long-term integration into the TEN-T network.

6. Conclusion

The Rostock–Trelleborg rail ferry is a functioning example of sustainable, resilient, and strategically valuable infrastructure within the European transport system. It plays a vital role in achieving EU goals for climate neutrality, supply chain robustness, and strategic mobility. However, to ensure long-term reliability and competitiveness, the system requires continued investment, policy support, and coordinated cross-border planning. Proactive measures are needed now to secure its continued contribution to a connected, green, and resilient Europe.