Where sea meets rail

by Ewa Kochańska

Decarbonising freight transport across Europe requires not only cleaner and smarter technologies but also an innovative use of existing corridors. The reports *Role of port authorities in the set-up of green transport chains*, *Set-up of Green Transport Chains Rail Ferry Case Rostock-Trelleborg,* and *Improved green transport chains through demonstrated cooperation between port authority and operator,* from the Blue Supply Chains project, analysed the Rostock-Trelleborg rail ferry link as an example of how ports can support the creation of greener supply chains by combining sea and rail. This type of solution eases congestion on the roads and diversifies access between countries and cities. The analysis showed that the Rostock-Trelleborg service has long-term potential to support both climate targets and resilience strategies as long as investments in rail capacity, digitalisation, and alternative fuels keep pace with demand.

Besides new fuels and innovative digital tools, decarbonisation of freight transport across Europe also demands a rethinking of how existing corridors are utilised. The Rostock-Trelleborg rail ferry, the last train ferry connection between Germany and Sweden and a vital link in the Scandinavian-Mediterranean (ScanMed) TEN-T Core Corridor, serves as a perfect example of this. Once seen simply as a niche service, it is now being repositioned as a model for green logistics, with security and geopolitical implications, at the centre of Europe's transport network.

From polluters to pioneers

Ports have long been the engines of trade, just as they have long been major polluters. As Europe accelerates its Green Deal ambitions, seaports are under pressure not only to cut their own emissions but also to lead the energy transition, helping the entire transport sector decarbonise. The Rostock-Trelleborg partnership demonstrates how ports can assume this role: by modernising facilities, investing in alternative fuels infrastructure, and supporting sea-rail solutions that reduce truck traffic and diversify supply chains.

Trelleborg, Sweden's busiest ro-ro port, is already consolidating intermodal operations to reduce internal driving distances, renewing equipment with electric tug masters and hydrogen shunting locomotives, and expanding shore power connections for ferries. Meanwhile, Rostock is building up its combined transport terminal with new storage, additional 680-metre tracks, and is testing e-tug masters to cut emissions from port operations.

Stena Line operates the rail ferry between the two. The company's existing vessels, about 26-28 years old (expected to run for up to four decades), are being retrofitted with silicone hull coatings (one ferry so far), upgraded propellers, and AI-assisted navigation tools to reduce drag and optimise routes. Additionally, terminal time is being optimised to reduce fuel burn, and vessel machinery is being renewed to prepare for biofuels. Methanol conversion and hybrid propulsion are being explored, following Stena Line's earlier introduction of the world's first methanol-powered ferry. The strategy is twofold: extend the life of the current fleet while laying the foundation for fossil-free operations in the coming decades.

In terms of digitalisation, the KV4.0 Data Hub is a new machine-to-machine data exchange system, able to provide real-time visibility across intermodal terminals, allowing users to track shipments, optimise truck arrivals, and better allocate resources. This level of transparency

Photo: Stena Line

reduces congestion and makes combined transport more attractive, particularly for smaller operators who previously found intermodal logistics too complex.

The strategic shortcut

The Rostock-Trelleborg link also plays a strategic role in Europe's economy and security. It provides an alternative to infrastructure such as the Öresund Bridge when congestion, pandemics, or political upheaval threaten supply chains. Past disruptions have shown how fragile a single-corridor system can be, and policymakers in Germany and Sweden now emphasise a 'two-corridor strategy' as a security issue.

Geopolitical developments have only reinforced this point. The Russian aggression against Ukraine as well as Sweden and Finland's NATO accession highlight the corridor's importance for civil protection and military mobility. The ferries can carry entire trains, locomotives, and heavy equipment unsuited for roads due to axle load and clearance limits, and and is approved for the transport of dangerous and critical goods, underlining the link's twofold role in trade and defence logistics.

Demand is expected to climb steadily for the connection. Northern Sweden's industrial plans in areas of green steel, batteries, and raw materials will create new freight flows southwards; yet, inland rail remains congested. In the country's south, the Skåne network is already stretched, and while upgrades, such as the Lund-Hässleholm double track, will certainly help, they will not meet long-term demand. It has been forecasted that daily rail traffic through Trelleborg could double by 2045. Without investment in tracks and yards, road haulage could end up absorbing the additional volumes, undermining EU climate goals. Germany, meanwhile, offers a stronger base as Rostock's facilities were originally built for far higher traffic. Technical barriers (e.g., incompatible wagon couplings) are being addressed through EU initiatives like digital automatic coupling, which will simplify cross-border operations and improve efficiency.

Risks and rewards

However, the corridor is not without its unique challenges. In Rostock, there is currently only one rail-enabled berth; an investment in a second one requires recognition of the ferry's strategic importance at the federal level. While Sweden is already including the route in its long-term transport planning, Germany has yet to formally recognise its strategic role. Without this recognition, access to national funding is limited. At the EU level, inclusion in frameworks like the Connecting Europe Facility and the Military Mobility programme could secure resources and planning security, but only if Germany and Sweden coordinate. The vessels themselves also need a clear investment path for future replacements. Purchasing specialised, rail-capable ferries is costly and carries high risks for operators unless public policy helps lessen that financial burden.

Despite the challenges, for customers, the Rostock-Trelleborg service is already a reliable alternative. Six daily departures provide flexibility, and punctuality rates average 98% – something land routes rarely match. The six-hour crossing is shorter than the road trip through Denmark and is unaffected by traffic in southern Sweden. Therefore, booking the rail ferry gives shippers an 'almost' certainty that their cargo will move on time.

Operationally, the service is efficient and safe. Entire trains roll on and off in a single move, avoiding the risks and delays of craning trailers individually. Ports in both Rostock and Trelleborg are equipped with large shunting yards, allowing wagons to be reordered and new train sets formed before departure. This reduces handling time, minimises the risk of cargo damage, and enhances planning security for operators.

Future decided now

The Blue Supply Chains project has highlighted that the key to the success of the Rostock-Trelleborg link lies in stakeholder engagement. Workshops, roadshows, and advocacy have helped with understanding that the ferry has the potential to be a key part of Europe's transport network.

The Rostock-Trelleborg train ferry has already been proving itself, as it has reduced road congestion and emissions – likewise improved Europe's resilience to disruptive events. But its future will be decided by choices made now. The political recognition of its strategic role must match investment in inland rail, port infrastructure, and vessel modernisation. ■