Shifting from Green Shipping Corridors to Green Economic Corridors

By Joan Miquel Vilardell, Partner at ALG

MULTILATERAL COOPERATION CENTER FOR DEVELOPMENT FINANCE

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ALG is a business and strategic consultancy firm specialized in transport, infrastructure and logistics, with a broad experience in the maritime and logistics sectors

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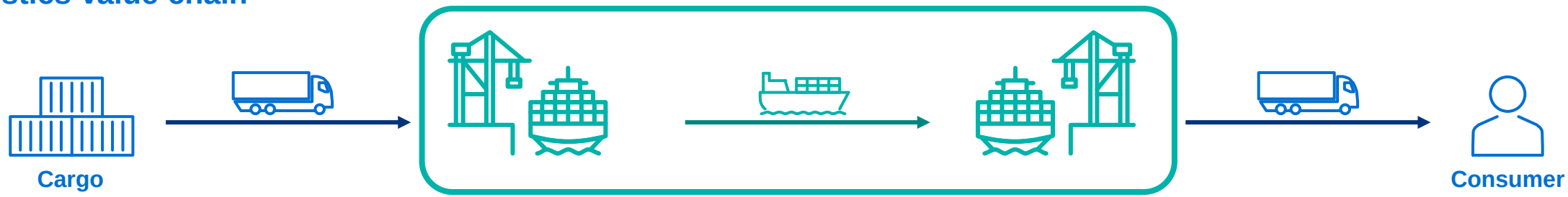
Green Shipping Corridors are a critical part of current efforts to decarbonize global trade by establishing maritime routes with low-emission vessels, fuels, and port infrastructure

Global trade remains a significant emissions source, contributing to about **7% of global CO_2 emissions**
Maritime shipping alone contributes to **2-3% of all global CO_2 output**

World Economic Forum

Logistics value chain



Green Shipping Corridors

A **Green Shipping Corridor** is a designated maritime route where shipping companies, ports, and governments **collaborate to decarbonize shipping**, including:

- Use of **vessels with low-carbon** or **zero-emission fuels**
- **Supporting infrastructure** to enable refueling, charging, or bunkering of clean fuels along the route
- **Green ports** based on energy-efficient operations, renewable energy and low-emission logistics

Reduction of GHG emissions in maritime trade

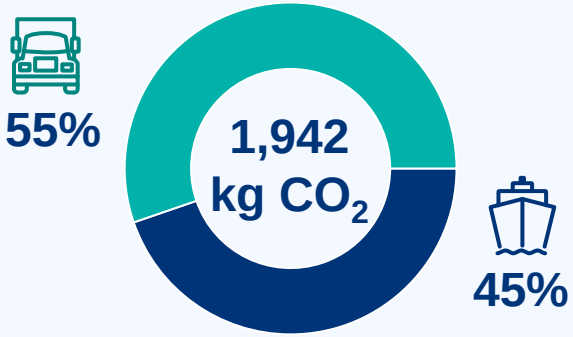
However, GSCs often focus mainly on the maritime leg of trade, overlooking how these corridors connect with their hinterland and the full scale and impact of door-to-door logistics

Hinterland transport contributes largely to trade costs in both the economic and climate sense, potentially minimizing the benefits of GSC implementation

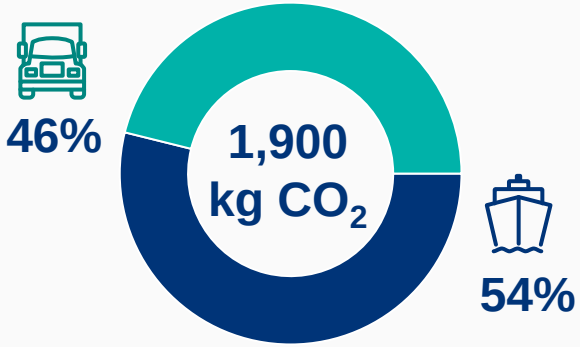
Transport Costs per TEU (USD/TEU)

Emissions per TEU (kg of CO_2/TEU)

Shanghai - Kampala



Shanghai - Bogotá



Efficient, reliable and clean hinterland connectivity is also essential for port competitiveness and to minimize GHG emissions of trade

ALG Analysis based on Northern Corridor Transport Observatory, Clean Cargo, Government of UK, and quotes from freight forwarders and shippers operating in selected areas and routes

Intermodal transport through rail is often considered the best option to extend and enhance a port's hinterland connectivity, both in cost and emission terms

Hinterland transport options overview

Road transport

- Low upfront requirements for infrastructure
- Low capacity
- Tailored transport with high flexibility
- **High carbon intensity and external costs**

Rail transport

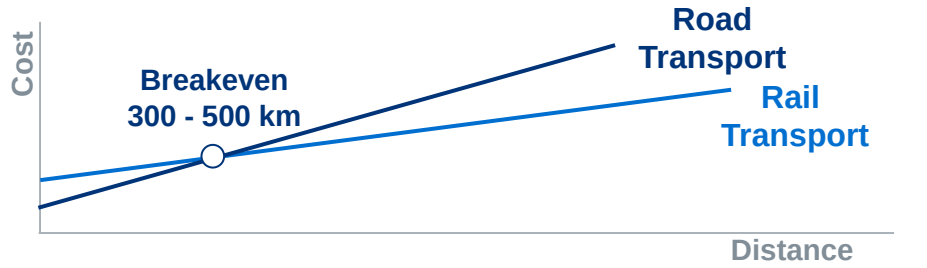
- Higher capital expenditure needs
- High capacity
- Limited reach, requiring intermodal change for first/last-mile delivery at inland terminals
- **Low emission intensity (90% less than road)**

Barge

- Not available to all ports or geographies

Decision factors for hinterland transport

Costs



Throughput

- Need **critical mass** to assure costs levels

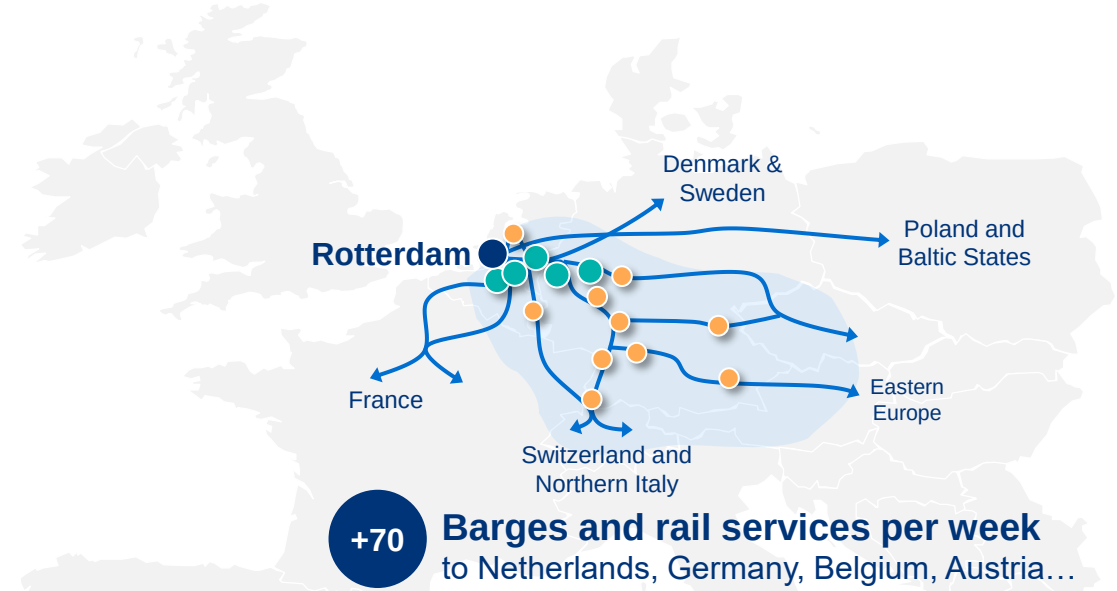
Service Level

- **Frequent, reliable services** to meet transit times
- Efficient transshipment and **last-mile connections**
- **Security**, **safety** and **readiness of information**

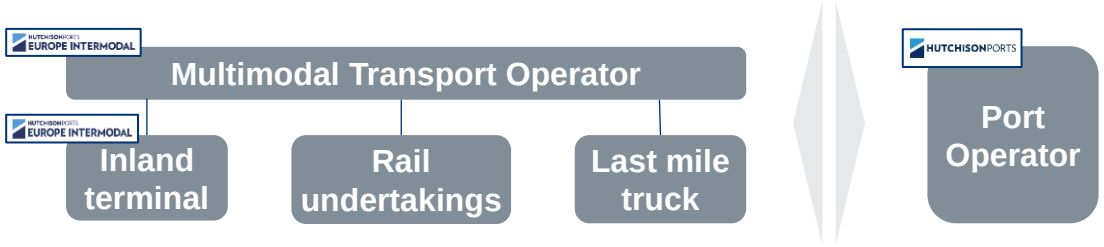
Rail can not only contribute to lower logistics costs in the hinterland but also to significantly lowering the emissions of trade

Efficiently integrated intermodal frameworks can contribute to the expansion of the hinterland and enhancement of operations at the port

Case study #1: Rotterdam Port and Hutchison Terminals hinterland



Hutchison Intermodal (HPEI) strategy



- **Vast service network** of inland terminals
- **Dedicated block trains and barges** through regional operators
- **High competitive environment** with other port operators in the intermodal business, and also with independent MTOs

Results

- Full control of intermodal chain, **enhancing port operations**

>6 Mn TEU (~50% Port's container throughput)

ALG Analysis based on HPEI, OpenRailwayMap and Port of Rotterdam

Rotterdam's digital ecosystem also allow shipping companies, agents, terminals and other service providers to exchange real-time information regarding their operations

Case study #1: Rotterdam Port's PortXChange

- Port of Rotterdam established a **Port Community System** to facilitate communication between stakeholders

PortXchange

- Provides **real-time data** on vessel arrival times, berth availability, and port conditions
- Cargo status updates and alerts for ready cargo or delays
- **AI-driven forecasts** of vessel and cargo movements

Results

- Enables better **planning of train composition and scheduling**
- Facilitates **smooth ship-to-rail transfers (20% saving in waiting time)**
- Reduces demurrage, storage and idle time costs

PortXchange

ALG Analysis based on Port of Rotterdam, PortXchange

In Barcelona, the Port's network of inland terminals connected by rail enhanced its competitiveness against other gateway ports

Case study #2: Barcelona Port and intermodal network

Barcelona Hutchison BEST Terminal

Barcelona APM Terminal

- Semi-automated terminals with and **integrated rail marshaling yard**
- **Digital train-slot coordination** with services to inland depots
- **Participation in inland depots** in key hinterland locations, reaching a population of over 12 Mn people

Results

- **Barcelona overcomes Valencia Port** as the main Gateway to Aragón province despite similar distances (>65% market share[1])
- Barcelona shows slightly **better performance** in key indicators (container dwell time[2] and CPPI[3]) **than key competitor Valencia**

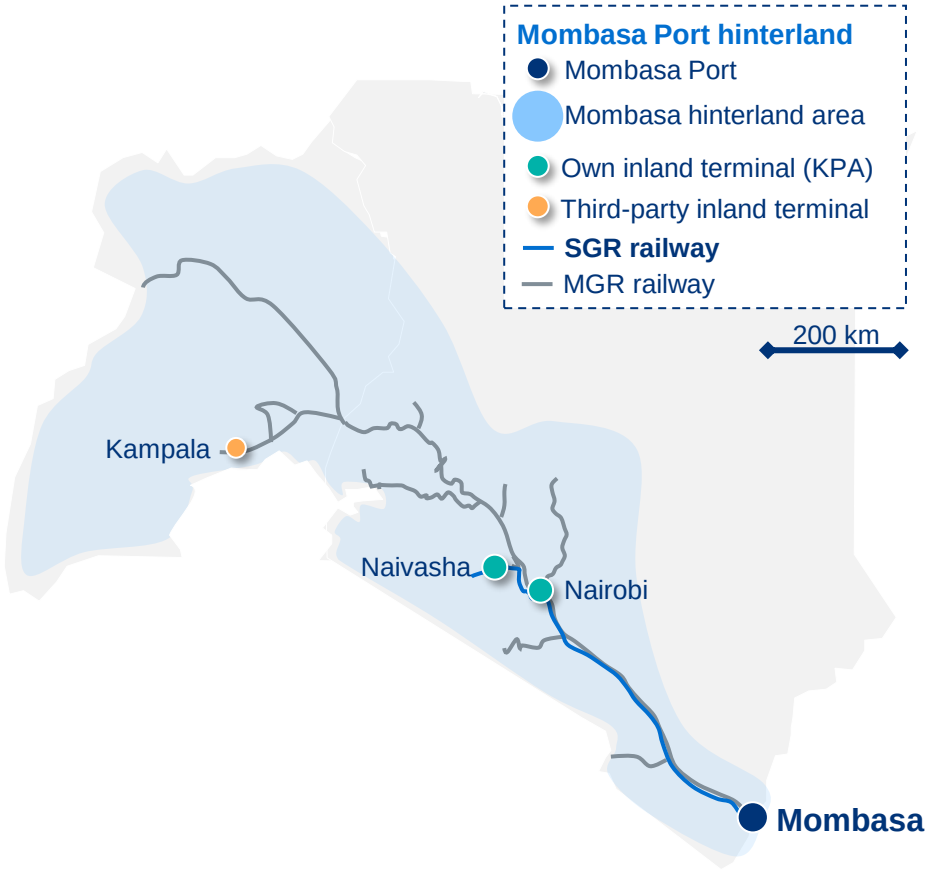
Challenges

- **Unreliability and congestion of national rail network** and limited interoperability with French network
- **New rail hub** to solve current rail yard operability challenges

ALG Analysis based on Port de Barcelona, Hutchison, APM, EconDB, and World Bank
Note: 1) Port de Barcelona; 2) Based on EconDB data; 3) Container Port Performance Index 2024

In Mombasa, despite harsh competition from the road sector, the SGR has managed to shift over 25% of the port's cargo to railway, reducing critical congestion at the Port

Case study #3: Mombasa Port and Kenya Railways SGR



- Colonial MGR provided uncompetitive transport, mainly used for bulk
- SGR developed as a **dedicated port–hinterland rail corridor**
- **State-driven initiative** with initially mandated modal shift, **not market-driven**
- Operational alignment between authorities and use of block trains

Results

- **Improved transit time and reliability**, and reduction of informal trucking
- **Decongestion at Mombasa Port** and **reduction of container dwell time**
- **Modal share** of rail **from 5% to over 25%**, even after non-mandatory use

Challenges

- **High costs of last-mile** and empty returns, especially beyond Nairobi
- **Inefficient transshipment** and limited visibility of cargo shipments
- Strong lobby and **harsh competition from truckers**
- **Financial sustainability** challenges – high debt burden

ALG Analysis based on Kenya Ports Authority

However, developing a robust railway network to support a port presents challenges; securing financing for the upfront investment is a key bottleneck for most countries

Typical challenges in railway projects in port hinterlands

		Solutions & best practices
High upfront capital costs	• Greenfield railways require significant upfront investment (>10 Mn USD/km) • O&M costs are high and must be sustainably funded • Revenue streams materialize slowly • Long payback periods and perceived risks increase financing costs	• PPPs (*UK HS1, Camrail, Uruguay*) • Viability gap funding • Innovative financing schemes
Technical and operating challenges	• Interoperability between networks within the hinterland • Lack of on-dock rail, inefficient marshalling yards, or poor scheduling • Poor inland terminal operations or last-mile bottlenecks	• Harmonized standards (*EU network*) • Coordinated port-rail and rail-road operations (*Transnet)*
Competition from road transport	• Road often appears cheaper, faster, or more flexible, especially when trucks are under-regulated • Rail often faces pressure from powerful road transport lobbies • Insufficient multimodal inland infrastructure and poor coordination between rail and road transport	• Market-driven rail development • Policies to enhance modal shift *(Mombasa, EU)*

Beyond traditional schemes, several innovative instruments and mechanisms can help funding the construction of railway lines

Financial Instruments

Loans
- By guaranteed status and concessionally
- By lending arrangement and intermediation
- By disbursement and repayment structure

Securities
- Bonds
- Notes

Grants
- Government funding
- External development funding

Equity
- Public sector equity instruments
- Private sector equity instruments

Guarantees
- Government-backed guarantees
- Financial institution-backed guarantees

Others
- Agreements
- Swaps
- Subsidies

Resource mobilization & Delivery structure

Financial Mechanisms

To increase public funds
- Debt-based financing
- Direct public financing
- Asset recycling
- Revolving funds
- Railway funds and ring-fenced funds
- **Green financing mechanisms**

To incentivize private participation
- De-risking mechanisms
- Blended financing
- Contractual Performance Incentives
- Viability Gap Funding (VGF)

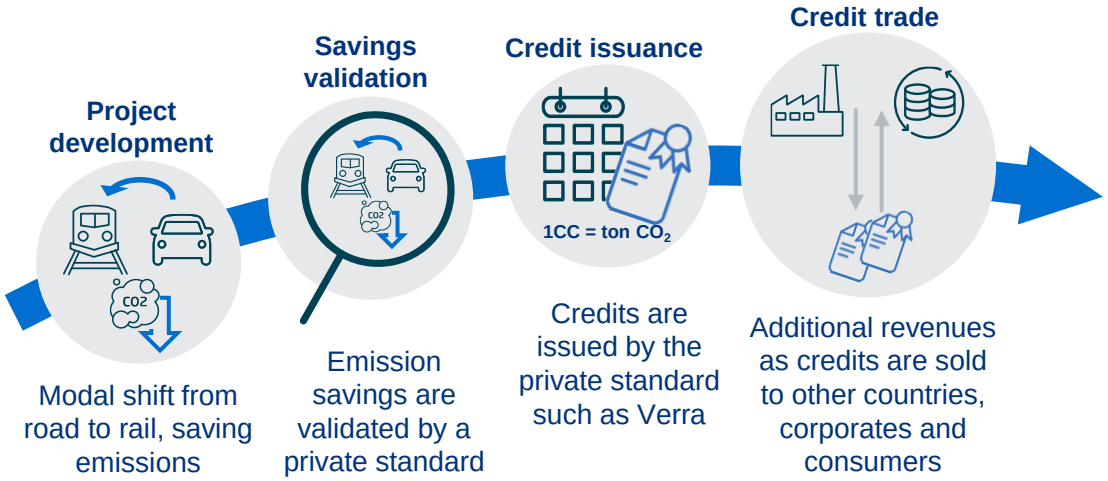
Hybrid mechanisms
- Equity-based financing
- Post-implementation debt restructuring
- Milestone-based financing

Climate financing, through the nascent carbon credit market and specialized funds, offers a new avenue to support funding for these climate-aligned infrastructure investments

Green financing mechanisms options

Carbon Credit trading

- **Nascent market of tradable certificates** representing verified greenhouse gas emissions reductions
- **Trade of carbon credits rising** as a result of climate-related regulations and policies
- Carbon credit revenues boost project viability and investor appeal
- Potential to securitize revenues to sell bonds for upfront capital



Green Bonds

- ***Morocco** successfully issued **Green Bonds to refinance Al-Boraq**, Africa's first HSR*
- ***Germany** dedicates almost 50% of its **green bond market** to development and maintenance of railway network*

Climate funds

- *The **Green Climate Fund** is supporting the extension of the Central Corridor railway between Tanzania and Burundi*
- ***Global Environment Facility** provided an US$ 8.2 million grant to China to improve freight efficiency in China and shift cargo from road to rail*

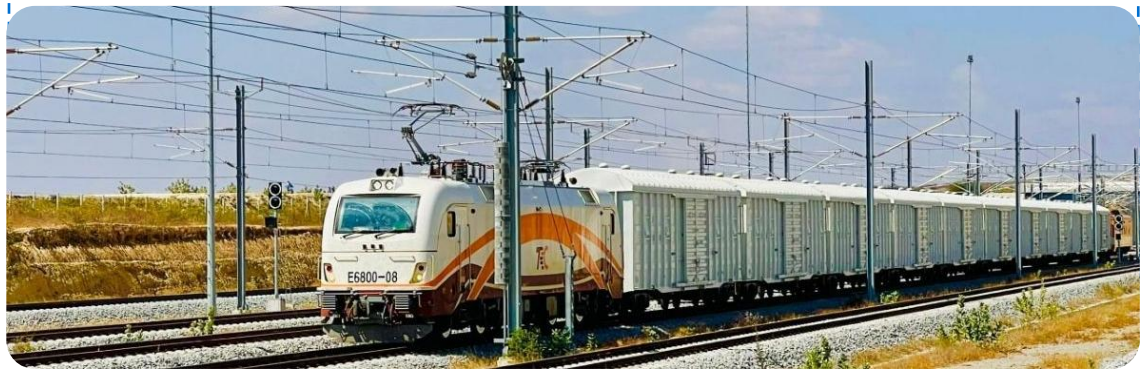
Green financing mechanism case studies

Green Bonds: Morocco

- Morocco built **Africa's first HSR in 2018 - USD 2.3 Bn**
- Reduced travel time between Tangier and Casablanca by **60%**
- **Debt service** (1.77 Bn in loans) **impacted profitability**
- In 2022 and 2025, Morocco issued a total of **USD 300 Mn in green bonds** to **refinance** some of the debt incurred
- Investors: EBRD - 20%, domestic institutional investors – 80%
- Green bond refinancing alleviated financial strain of the railway

Climate funds: Burundi

- Burundi and Tanzania are pursuing **Green Climate Fund** support to extend the Central Corridor railway (Dar es Salaam Port, Tanzania) into Burundi
- Engagement with GCF through AUDA-NEPAD to secure financing
- Successful mobilization will enable the railway extension, **lowering trade costs for landlocked Burundi**
- Could offer **strategic financing for high-risk country**



THANK YOU

Joan Miquel Vilardell
Partner – Logistics & Africa
jmvilardell@alg-global.com
www.alg-global.com