EU ETS Observatory
Summary of Report 2

20th July 2026

Puertos del Estado

ETS Observatory

Based on Report 2
Data up to March 2026

Introduction.

Since 1 January 2024, merchant ships of 5,000 gross tonnage (GT) and above have fallen within the scope of the European Union Emissions Trading System (EU ETS).

For large container vessels operating between Europe and Asia via the Cape of Good Hope, the legislation is estimated to increase the cost of a voyage by between €400,000 and €500,000.

The scale of this additional cost creates a clear economic incentive for shipping companies to reorganise, or even segment, their maritime services around hub ports located in neighbouring non-EU countries, thereby avoiding or reducing their exposure to the EU ETS.

Such a scenario is considered plausible for the following reasons:

- **Market competition**. The container shipping market is highly price-competitive, encouraging shipping companies to pursue cost-optimisation strategies on a continuous basis.
- **Mobility of transhipment traffic**. Transhipment flows have only limited links to local import and export activity. They can therefore be transferred relatively easily from one port to another, depending on operating costs and comparative efficiency.
- **Limited availability of alternative fuels**. Although low-carbon fuels may partially mitigate the costs arising from the EU ETS, their limited availability and the uncertainty surrounding their economic competitiveness on deep-sea routes encourage operators to seek alternative operational solutions to reduce the emissions covered by the scheme.
- **Port capacity in neighbouring third countries**. Investment in ports located in countries neighbouring the EU, whether through the development of new terminals or the upgrading of existing facilities, has enabled the emergence of transhipment hubs around the EU that are connected to the principal deep-sea shipping corridors.

There are also indications that the inclusion of maritime transport in the EU ETS, in the absence of an equivalent measure for road freight transport, may be contributing to a reverse modal shift from short-sea shipping—particularly roll-on/roll-off traffic—to road transport.

Introduction.

The reconfiguration of maritime transport networks to reduce the impact of the EU ETS give rise to several adverse effects:

- **Environmental effectiveness**. The relocation of port calls and traffic reduces the effectiveness of the EU ETS as an emissions-mitigation instrument by shifting emissions outside its scope.
- **Economic competitiveness.** The gradual loss of direct connectivity with the main deep-sea shipping routes could increase logistics costs and delivery times, thereby undermining the competitiveness of the EU economy.
- **Economic security**. Greater dependence on port hubs located outside the EU weakens Europe's economic security by reducing direct control over critical segments of the supply chains serving the EU market.
- **External transport costs**. A potential shift of freight from short-sea shipping to road transport could increase the external costs associated with transport, including emissions, road congestion, accidents and the deterioration of land-based infrastructure.

Against this background, the Observatory's second report introduces the following developments:

- **Extended timeframe**. The period under review has been expanded to cover the years from 2023 to the first quarter of 2026.
- **Broader geographical scope**. Additional EU ports in the East-Med have been included, and traffic developments in the West-Med are also examined.
- **Inclusion of new datasets**. A container tracking data-set has been incorporated, allowing container flows to be analysed.
- **Analysis of ro-ro traffic**. The report examines developments in ro-ro traffic between Spain and Italy.
- **Recalibration of the route-choice model**: the model parameters updated in order to improve its explanatory capacity.
- **Proposed measures**. The report puts forward measures aimed at reducing the risk of maritime routes being altered or segmented for the purpose of avoiding the EU ETS.

Impact of EU-ETS on vessels operational cost.

EU-ETS

Since 1 January 2024, merchant vessels with a gross tonnage of 5,000 GT or above have been brought within the scope of the EU Emissions Trading System (EU ETS).

For large container vessels operating on transoceanic routes, the full implementation of this regulation is expected to **increase navigation costs by around 28 per cent**. For instance, for a 20,000 TEU container vessel sailing between Singapore and Rotterdam via the **Suez Canal**, **fuel costs** would amount to approximately **€1.1 million**, with a further **€335,000** arising from the **application of the EU ETS**. On the same voyage undertaken via the **Cape of Good Hope**, **fuel costs** would rise to around **€1.6 million**, with an **additional €476,000** due to the **application of the EU ETS.**

Other causes of changes in maritime traffic.

Around the time maritime transport was included in the EU ETS, a number of regulatory and geostrategic developments also affected maritime traffic, making it more difficult to determine the individual contribution of each of these “disruptions” to the observed changes in shipping routes.

Red Sea Crisis

At the end of 2023, in response to attacks on maritime traffic in the Red Sea, shipping companies stopped using the Suez Canal and switched to the Cape of Good Hope route

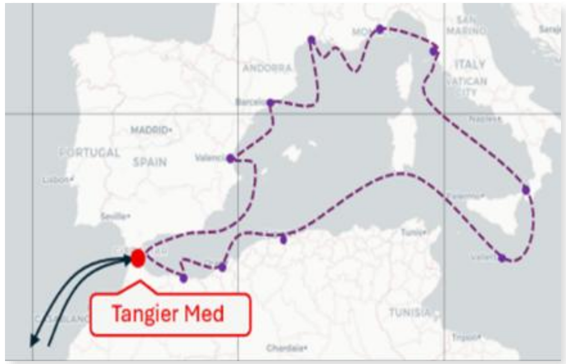
End of the CBER

On 25 April 2024, the European Commission stopped renewing the CBER (Consortia Block Exemption Regulation), which allowed shipping companies to establish cooperation agreements that, under certain conditions, were exempt from the antitrust rules applicable within the EU.

EU ETS avoidance strategies.

Route Transformation: Port calls at neighbouring-country ports when entering or exiting the EU maritime area. This strategy do not break the continuity of the service, as the same vessel covers both the transoceanic leg and the EU access or exit leg.

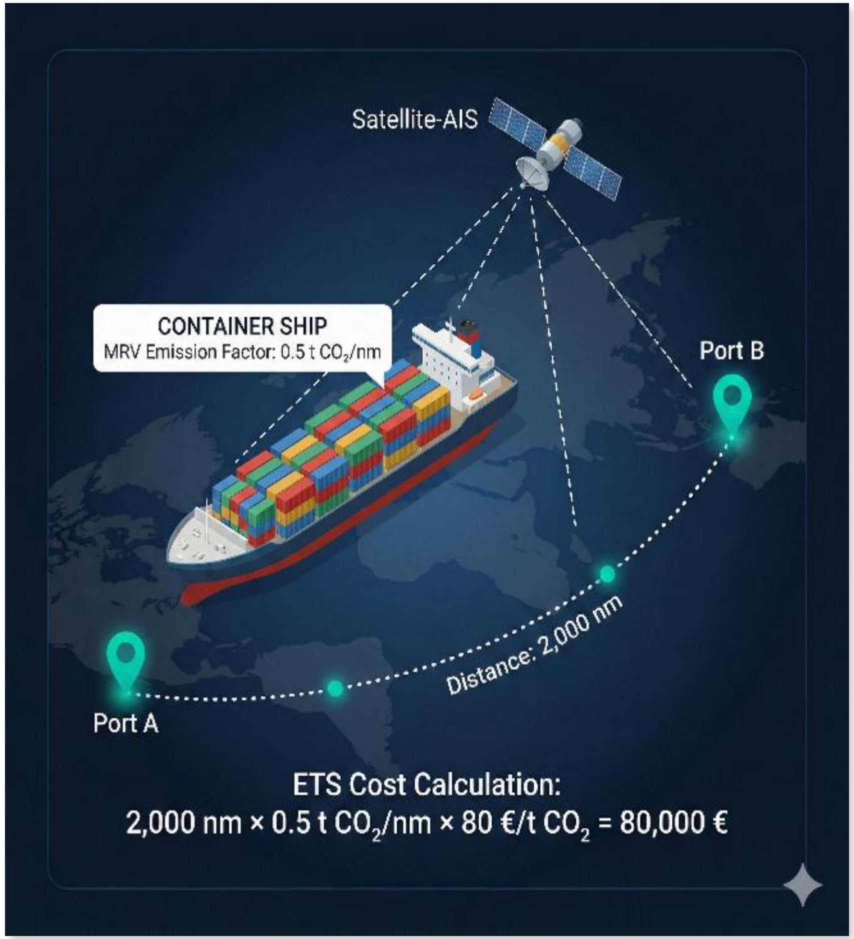
Route splitting: The strategy consists of splitting the original route into two distinct legs. Transoceanic vessels call at hub ports in neighbouring countries. From these locations, cargo is distributed to or consolidated from neighbouring countries via feeder routes.

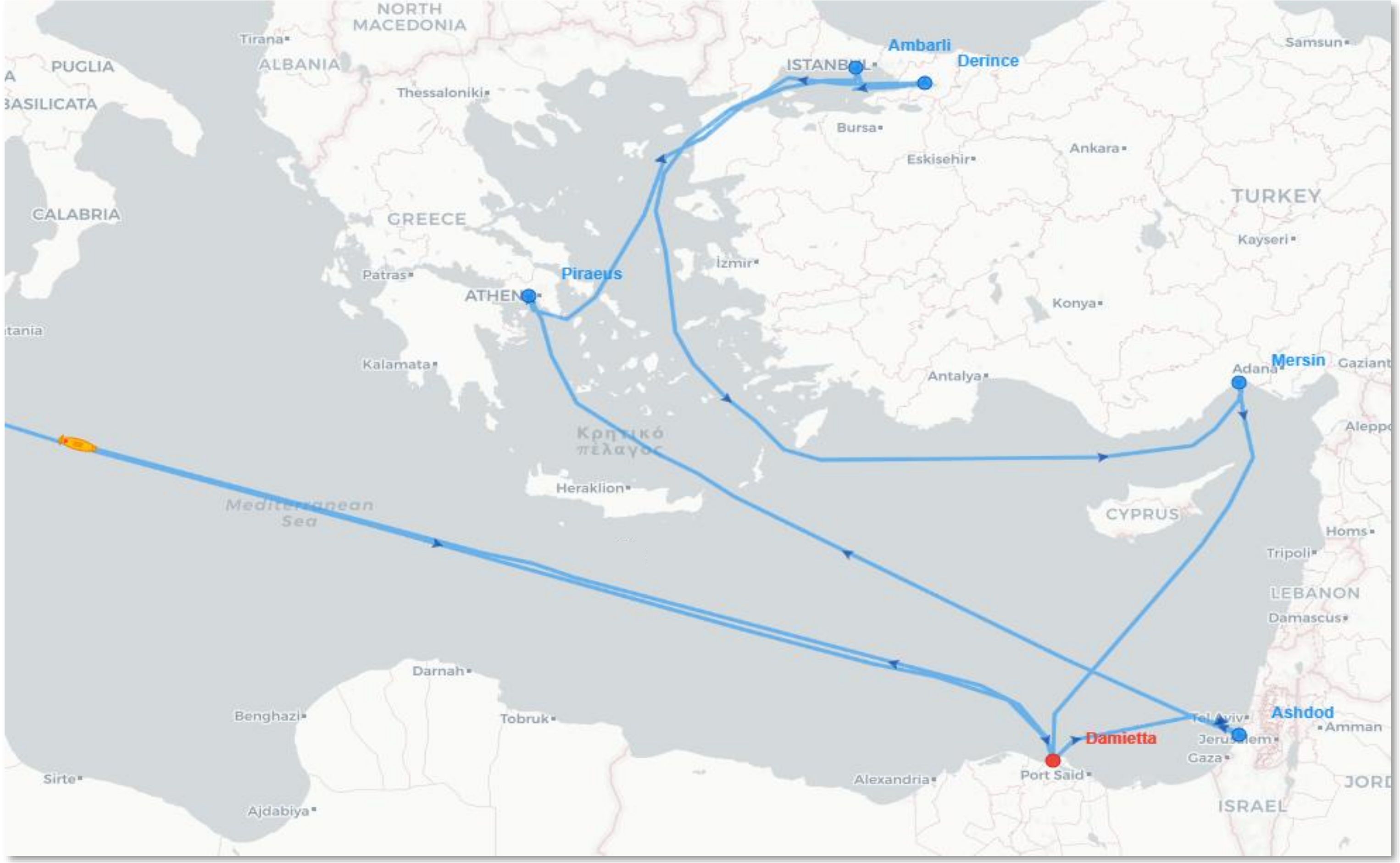


Modal backshift from sea to road: freight previously carried by sea through roll-on/roll-off maritime services returns to a fully road-based transport model

Data monitoring System: Vessel tracking.

The Observatory's data platform includes a vessel-tracking dataset based on AIS data, which makes it possible to reconstruct the routes of maritime services and how they evolve over time. Alongside these data, the EMSA database enables the estimation and calibration of the emissions associated with each voyage made by vessels operating across the different maritime services.

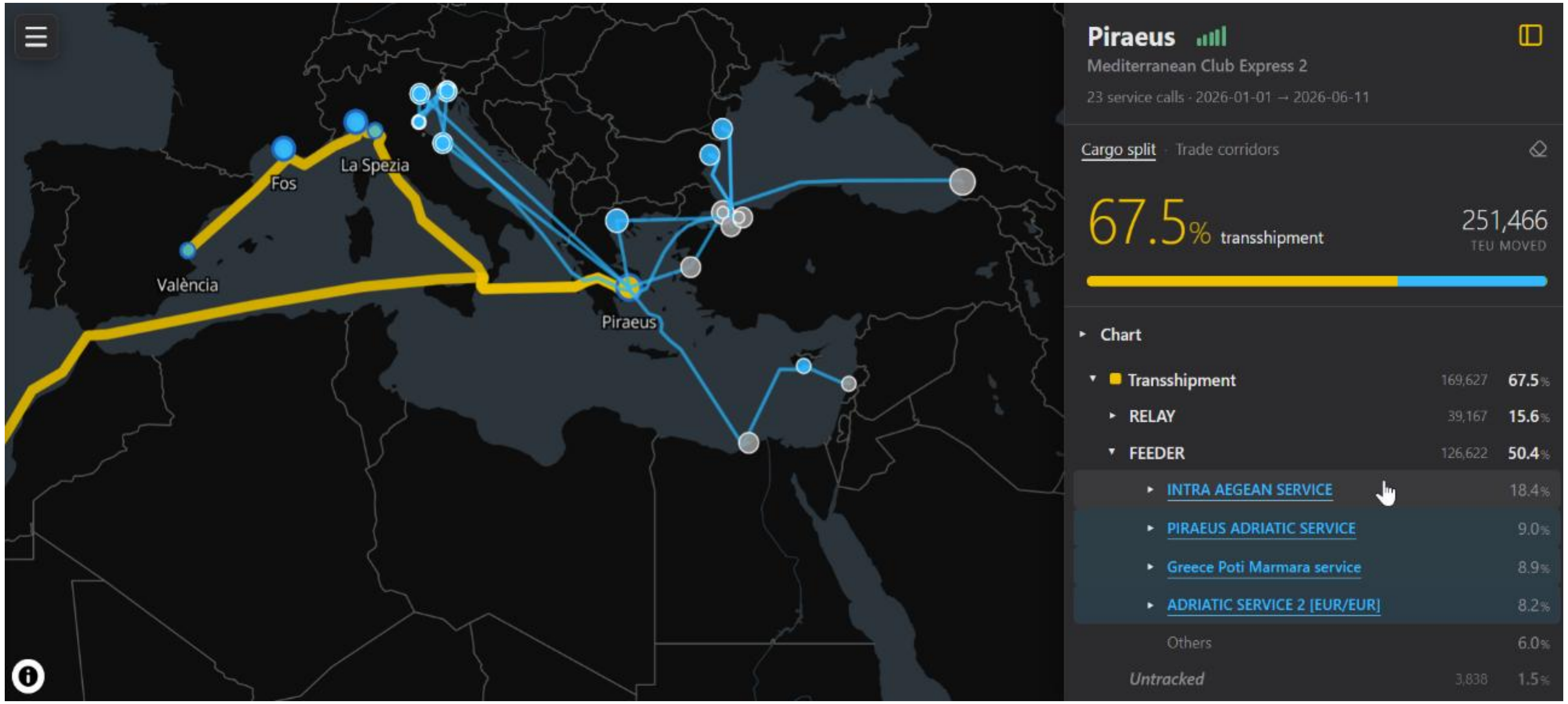




Data monitoring System: Container tracking.

The Observatory's Data Platform incorporates a *Container Tracking Dataset from EconDB* that reconstructs the journey of each container from port-call events: at every call, the system records which cargo is loaded onto and which cargo is discharged from the vessel.

The dataset tracks only a sample of one million containers, so it does not provide absolute container traffic figures. However, it allows to examine how transshipment and import/export activities at ports evolve over time. It also supports the assessment of the *direct connectivity ratio*, defined as the proportion of containers arriving at a port without having previously been transhipped through a port in a EUROMED port (see Euromed definition ahead).



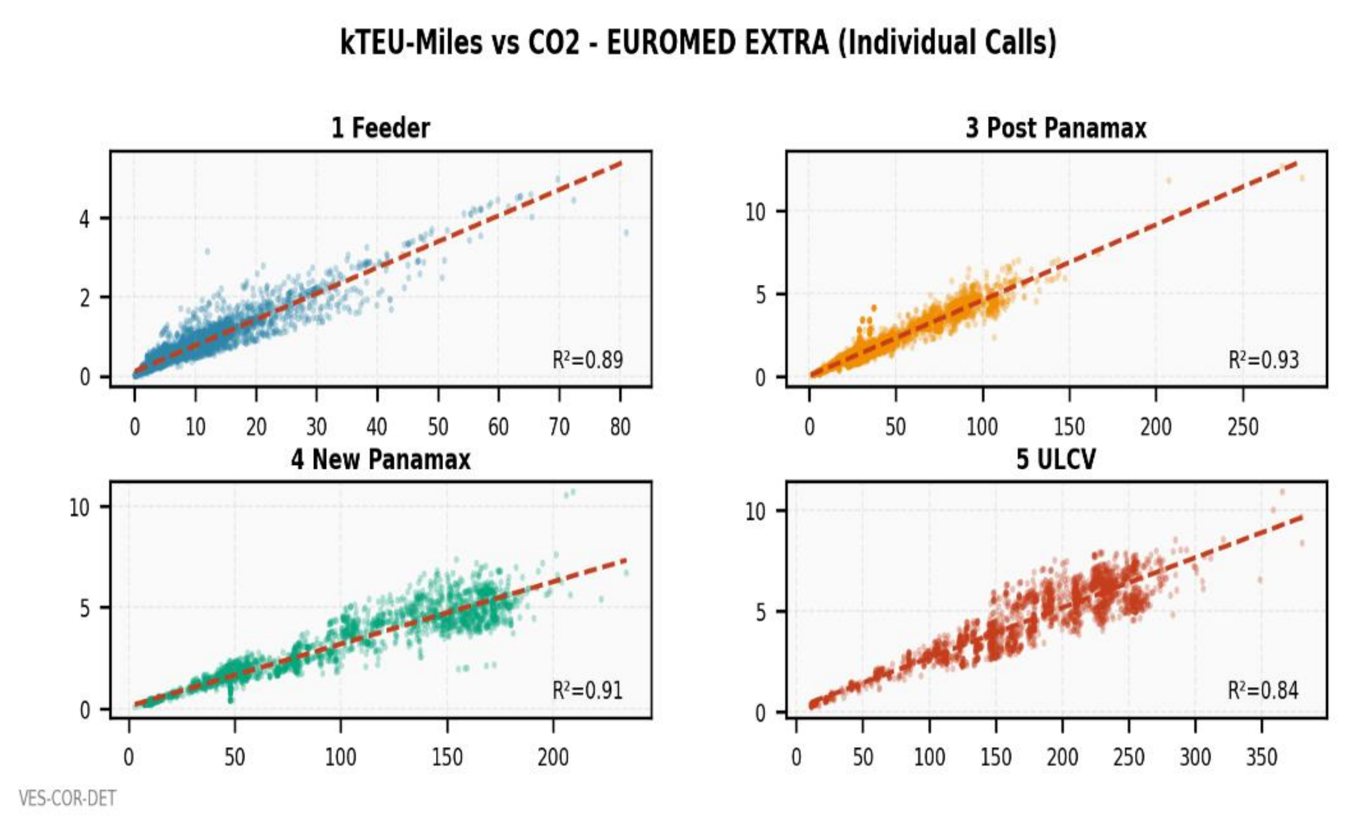
The chart on the left shows how this dataset makes it possible to identify the way several maritime services are integrated at the same port, thereby revealing the connections between deep-sea shipping lines or feeder services.

Data Monitoring System: The TEU-mile indicator.

- **TEU-miles of a vessel =** Vessel TEU capacity × (distance to the origin port + distance to the destination port)
- **TEU-miles of a port =** Sum of the TEU-miles of all vessels calling at the port.
- **Share_TEU-mile =** Percentage of total EUROMED TEU-miles attributable to a port.

Advantages of the TEU_mile share_TEU_mile

- **CO_2 emissions**: Strongly correlated with the CO_2 emissions reported by vessels.
- **Connectivity:** Enables the identification of changes in port connectivity.
- **Fast:** Fast computation and automated data exploration capability.
- **Robust:** The TEU-mile share makes it possible to identify changes in the traffic balance between the EU and its neighboring countries (*EEA ports vs EEA+ ports*) , even in situations involving structural changes such as those introduced by the Red Sea crisis.



Data Monitoring System: Regional scope.

EEA
Ports in EU Member States

EEA+
Ports in EU neighboring countries located within 300 nautical miles.

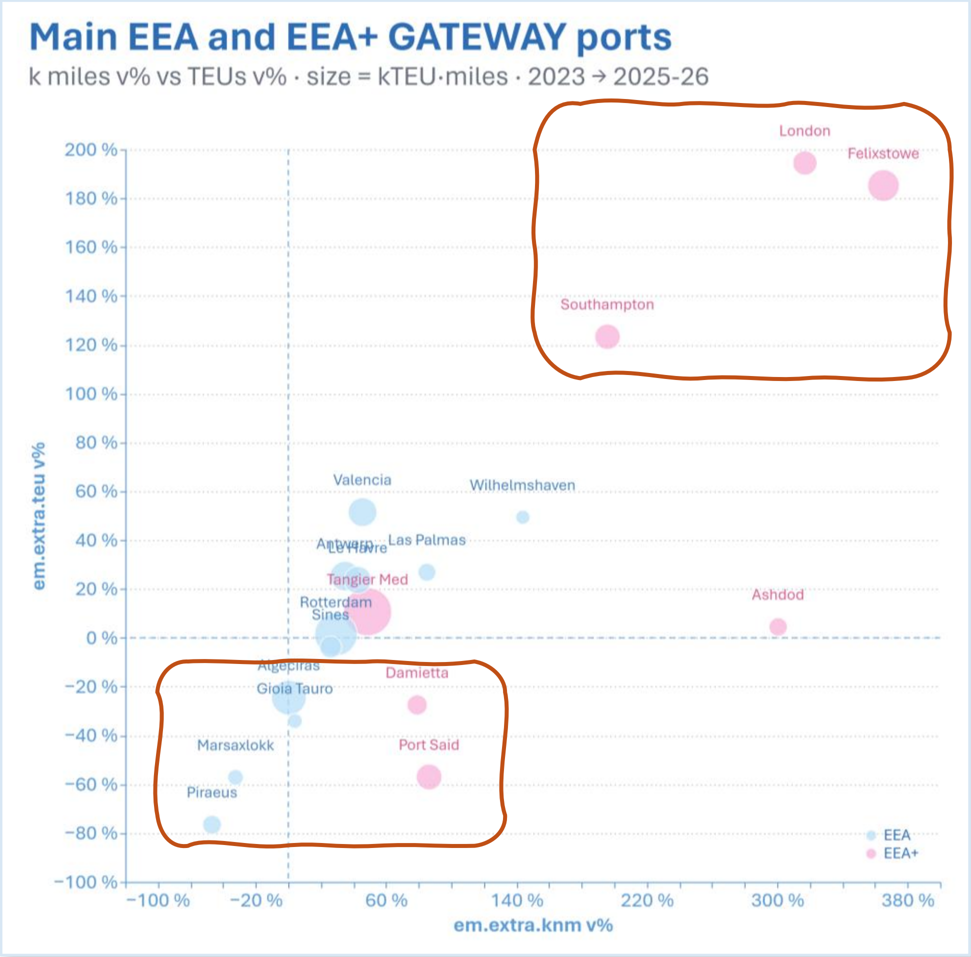
EUROMED
Ports in the EEA and EEA+ regions

EUROMED Gateway Calls
Calls at EUROMED ports by vessels operating on transoceanic (deep-sea) routes. TEU miles of gateway port considers only the deep-sea leg

Where is the TEU-mile balance changing?

Main EEA and EEA+ GATEWAY ports

TEU variance vs miles variance. Bubble size = k TEU mile
[April 2025 – March 2026 vs 2023]



NORTH SEA

EAST MED

NORTH SEA.

EEA Ports of EEA countries

EEA+ Ports of neighbouring countries. All neighbouring ports are within 300 miles.

NORTH SEA. Evolution over time in the number of container vessel port-calls.

EUROMED

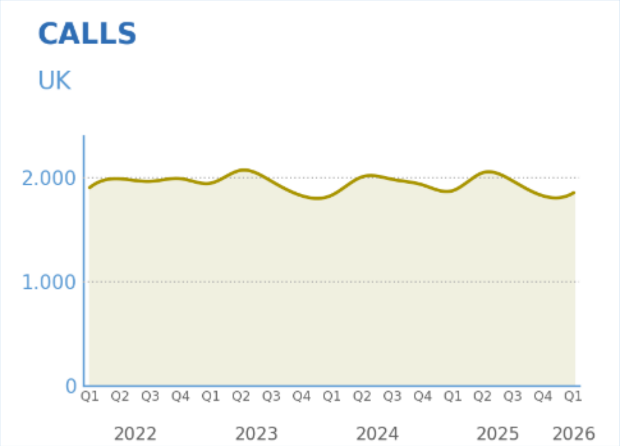
ALL CONTAINER SHIPPING ROUTES

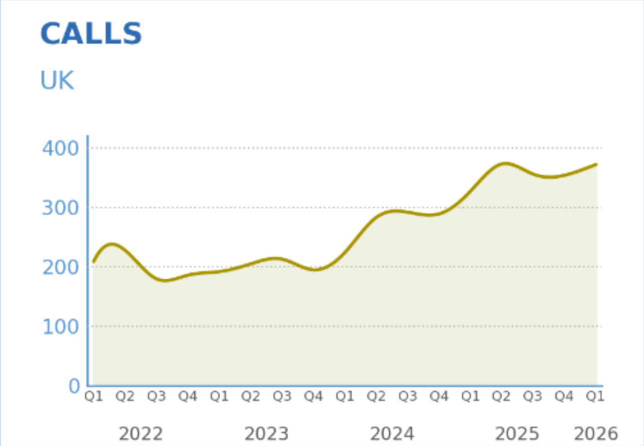
EUROMED GATEWAY

DEEP-SEA CONTAINER SHIPPING ROUTE

Non - EU

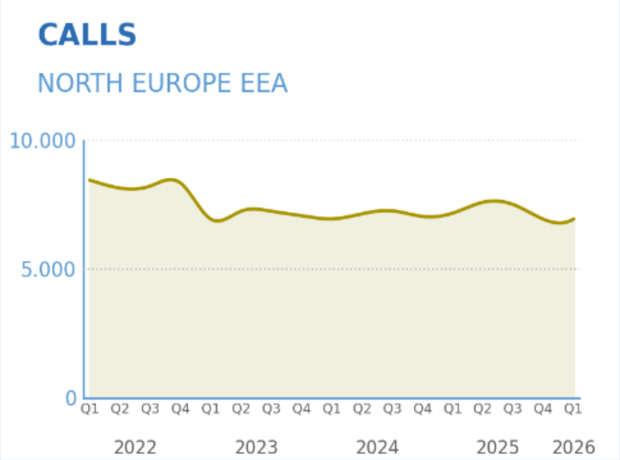
NUMBER OF PORT CALLS

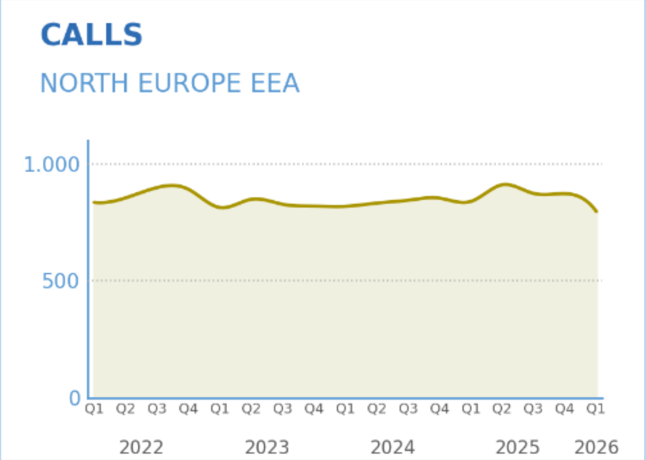




EU

NUMBER OF PORT CALLS





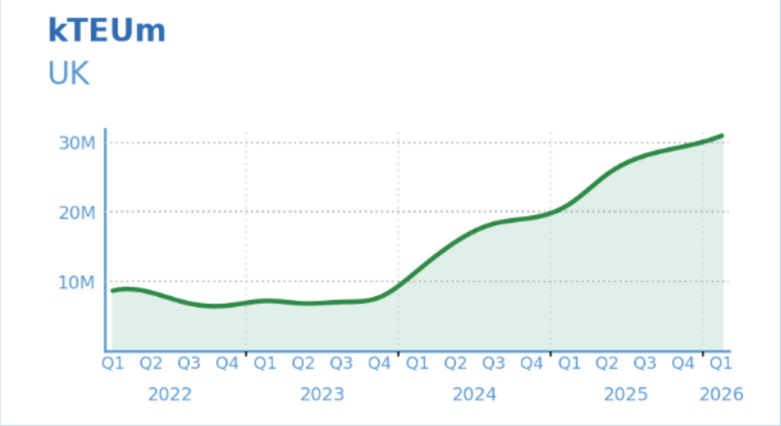
The analysis of the number of container ship calls at ports in the United Kingdom and at ports in Northern European EU countries shows no significant changes since 2023.

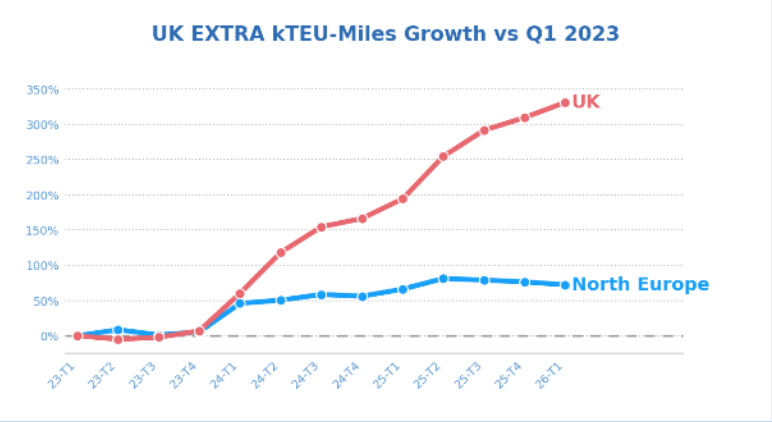
However, when the analysis focuses on container ship calls on transoceanic routes, UK ports show sustained growth from late 2023 through the first quarter of 2026.

This highlights the importance of focusing the analysis on the study of entry and exit routes to the EUROMED region; that is, on the study of deep-sea container shipping routes

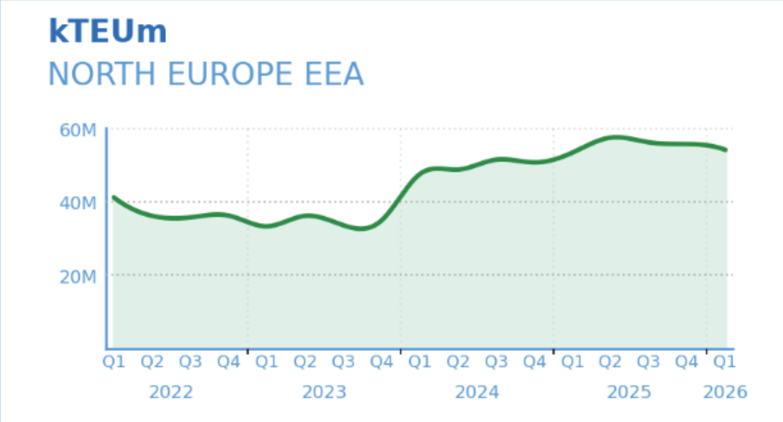
NORTH SEA. Evolution over time of the TEU_Mile indicator.

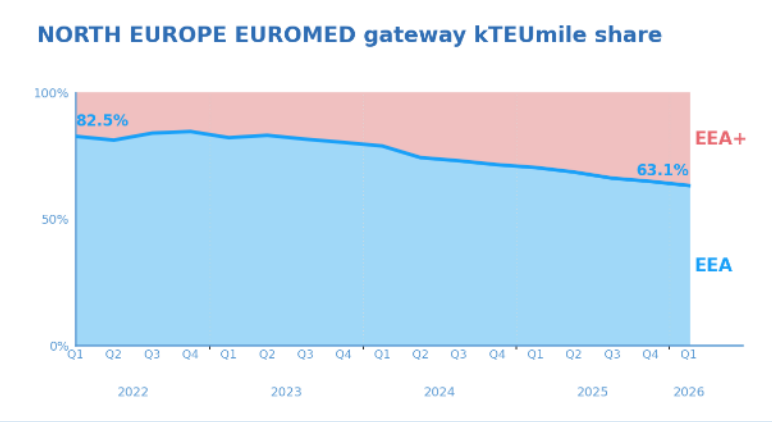
DEEP-SEA CONTAINER SHIPPING ROUTE





Percentage growth of the TEU-mile indicator relative to Q1 2023. This chart shows, first, a faster and sustained growth of the TEU-mile indicator in UK ports, and second, a flattening of the indicator's growth in Northern European EU ports at the end of the period.



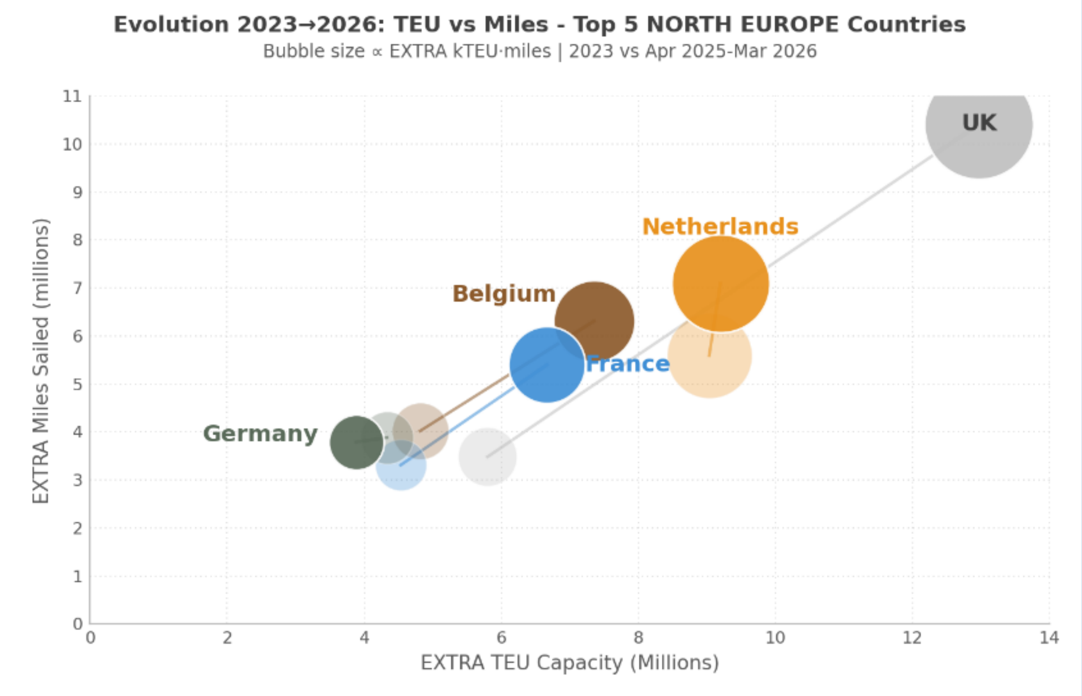


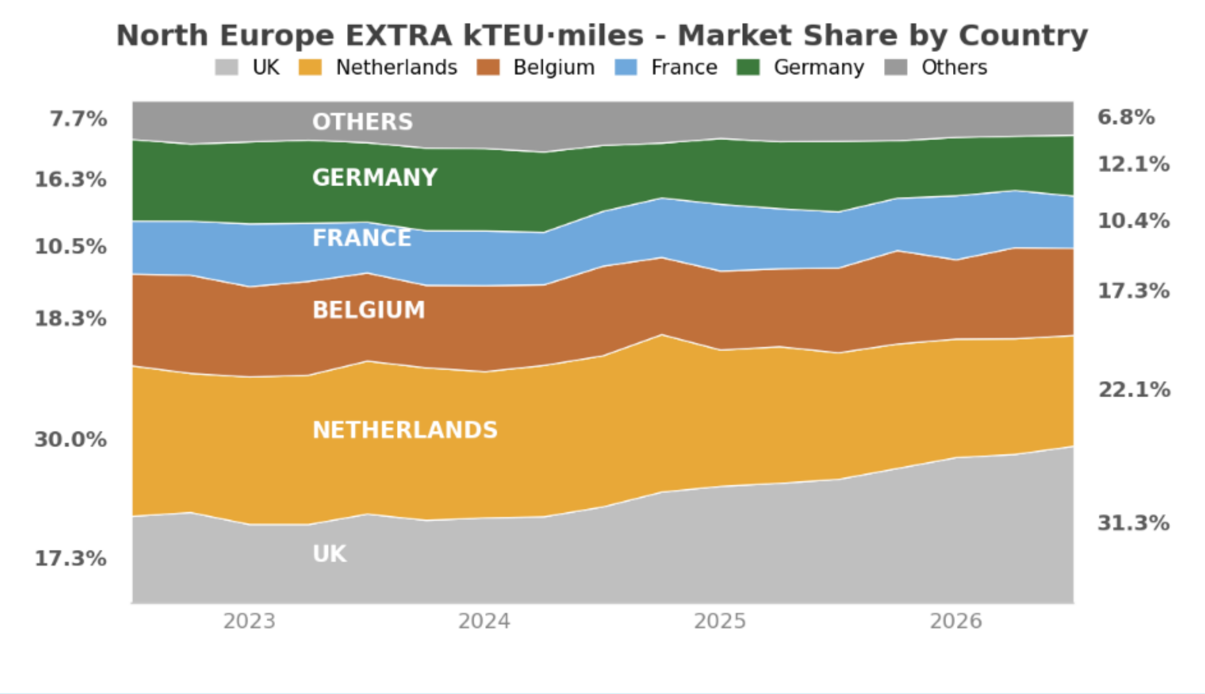
The evolution of the share kTEUm show these findings as a consistent and sustained expansion of the UK ports' share relative to Northern European EU counterparts.

The evolution of the kTEU_mile indicator shows a sharp increase at the end of 2023 in response to the Red Sea crisis. From that point onward, sustained growth is observed in the United Kingdom, with no signs of deceleration. This increase is also recorded in ports in Northern Europe, although at a slower growth rate

NORTH SEA. Evolution over time of the share_TEU_Mile indicator, by country

DEEP-SEA CONTAINER SHIPPING ROUTE



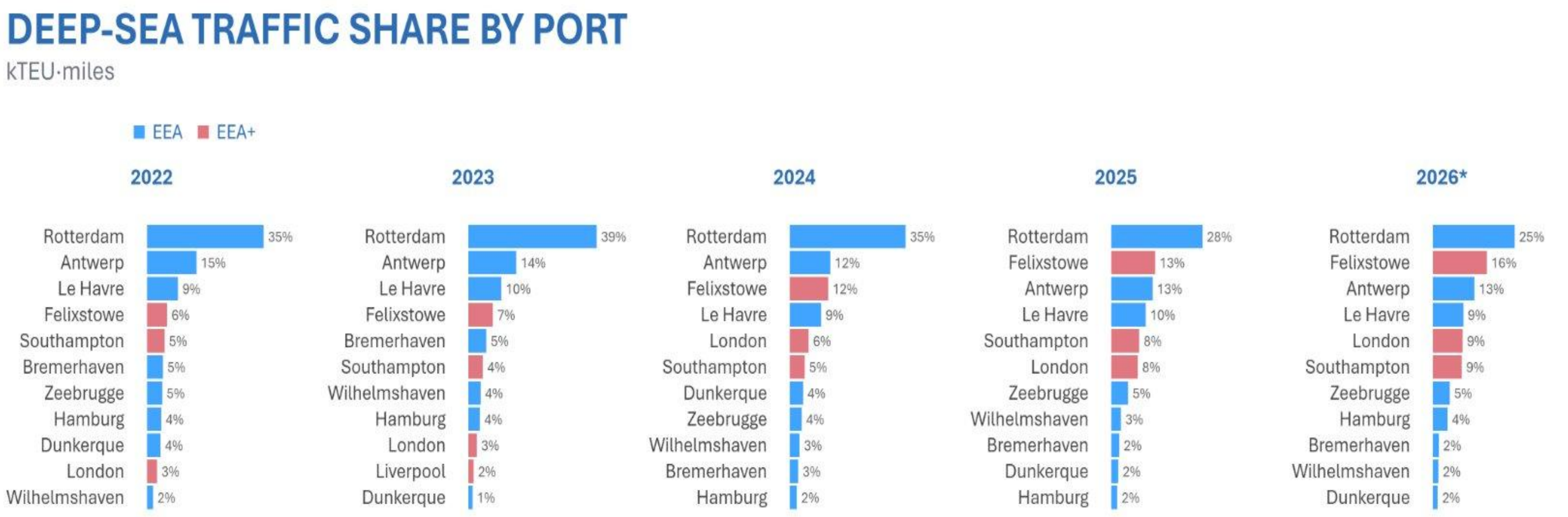


The light circles show the status of each country in 2023. The dark circles show the status in apr.2025-mar.2026. The UK surpasses the northern European countries in both the total vessel capacity calling at its ports and the nautical miles sailed by ships arriving at or departing from them.

Evolution of kTEU-mile share over time. The area chart illustrates a clear reallocation of kTEU-miles: the United Kingdom's increase of around 15 percentage points in TEU-mile share is almost symmetrically reflected in the combined decrease of the Netherlands and Germany.

NORTH SEA. Evolution over time of the share_TEU_Mile indicator by port.

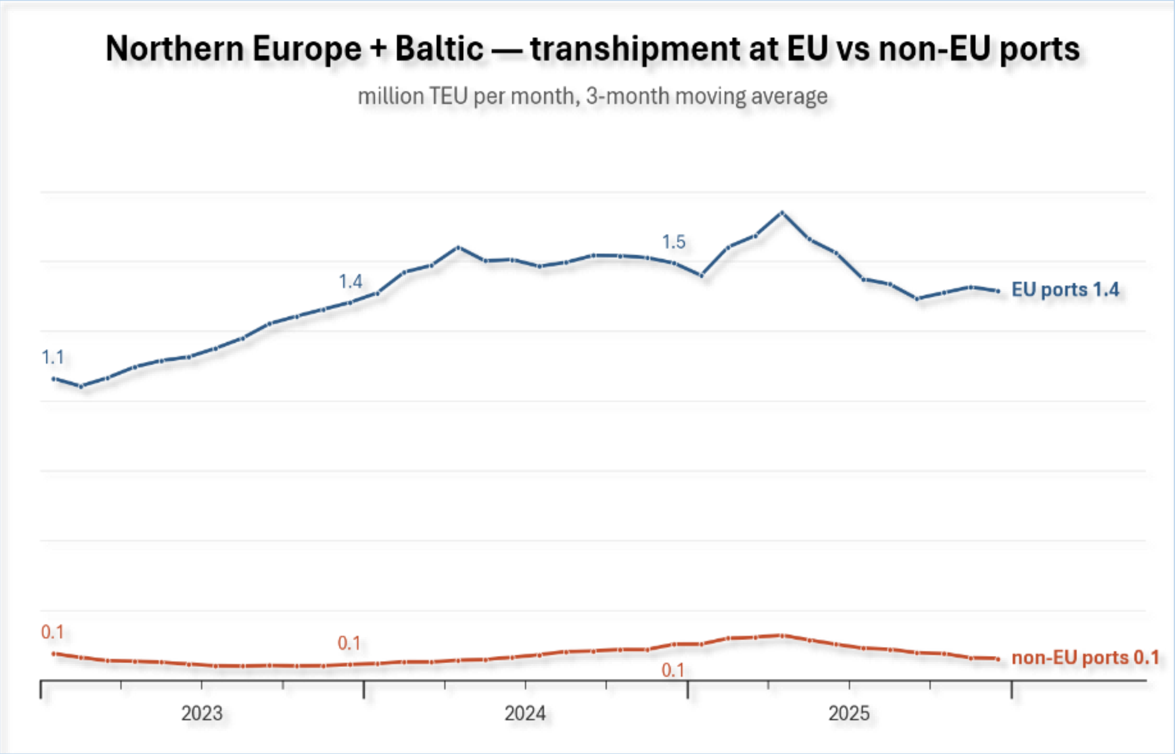
DEEP-SEA CONTAINER SHIPPING ROUTE

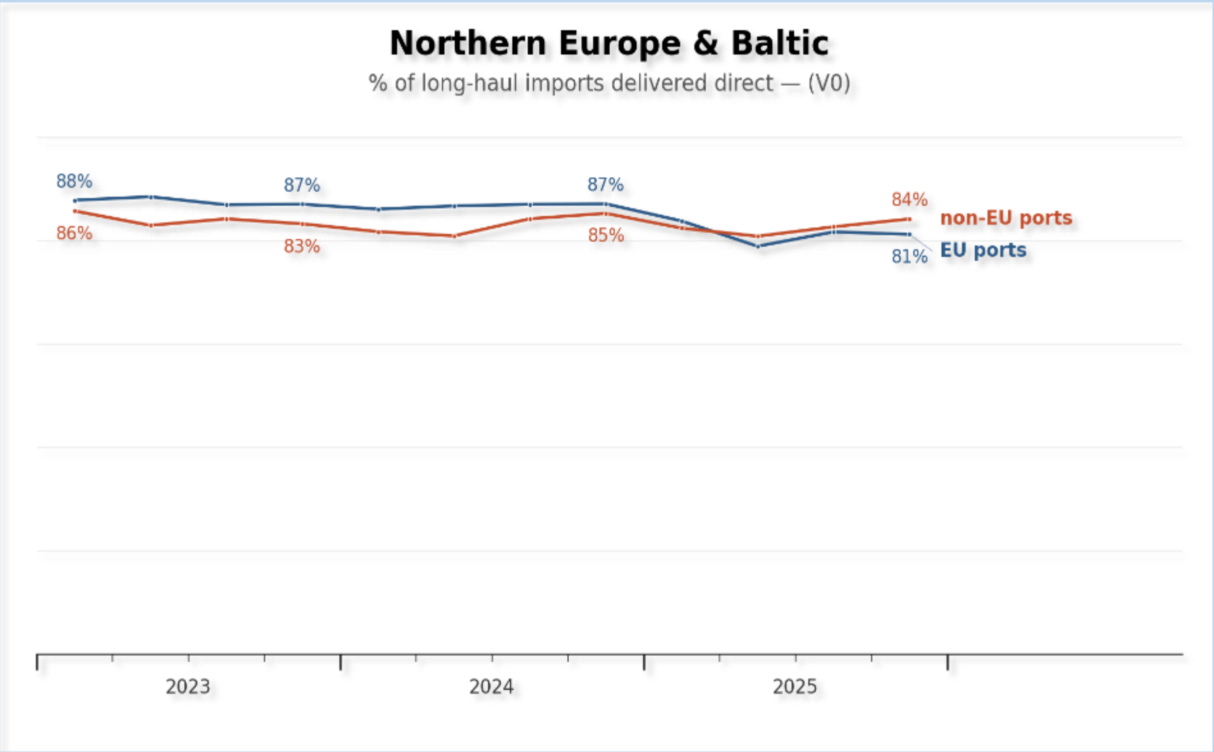


The TEU mile share of British ports has grown from 16% in 2022 to 34% in 2026. As a result, the UK has become the leading port area in Northern Europe in terms of TEU mile share.

NORTH SEA. Evolution over time of transhipment and *direct connectivity*

Transhipment and Direct Connectivity based on cargo flow analysis using *container tracking dataset**





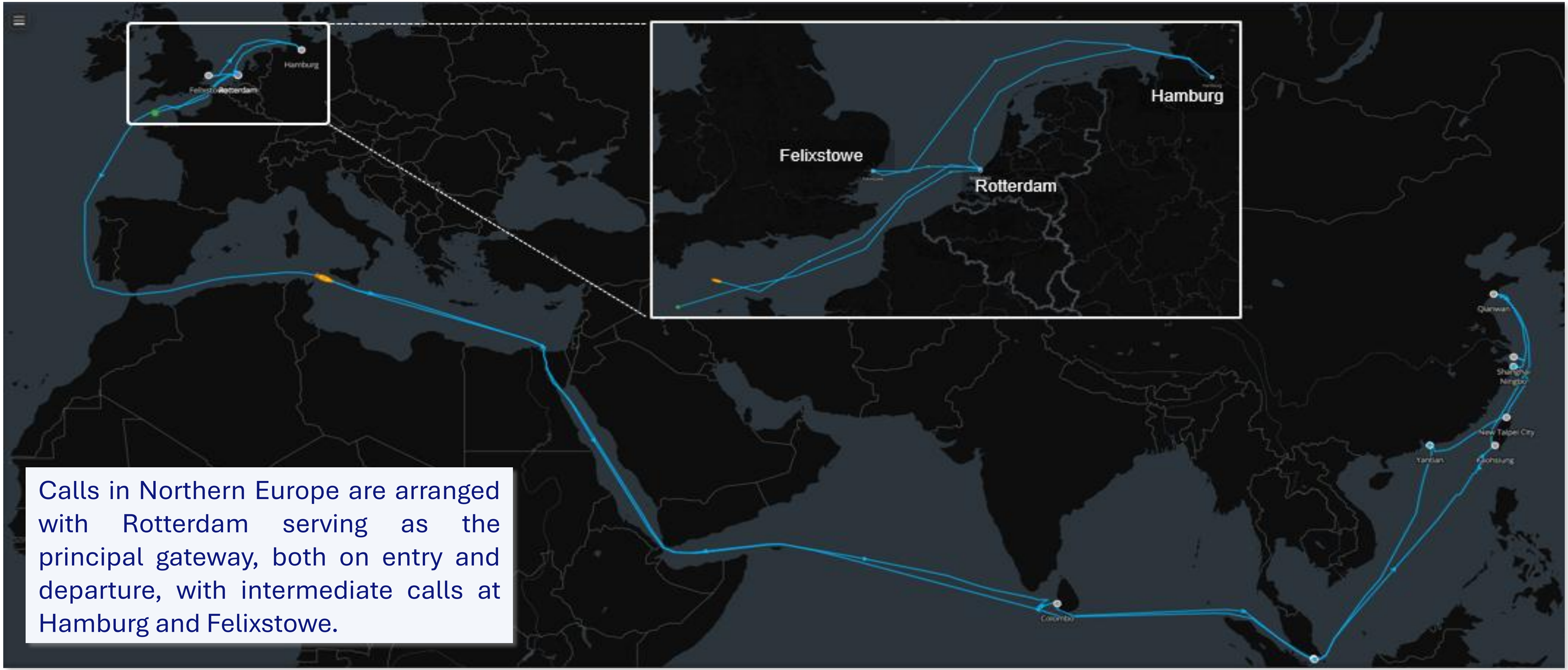
Despite the sustained rise in UK deep-sea calls identified previously, container-tracking data indicate that transhipment activity remains broadly stable around 13-14% of total UK throughput.

The direct connectivity ratio of EU ports have been reduced from 88% to 83%. This reduction of the direct connectivity ratio is compatible with EU-ETS evasive strategies based on service transformation o fragmentation so must be carefully monitored.

* Source: EconDB

NORTH SEA. Maritime service transformation

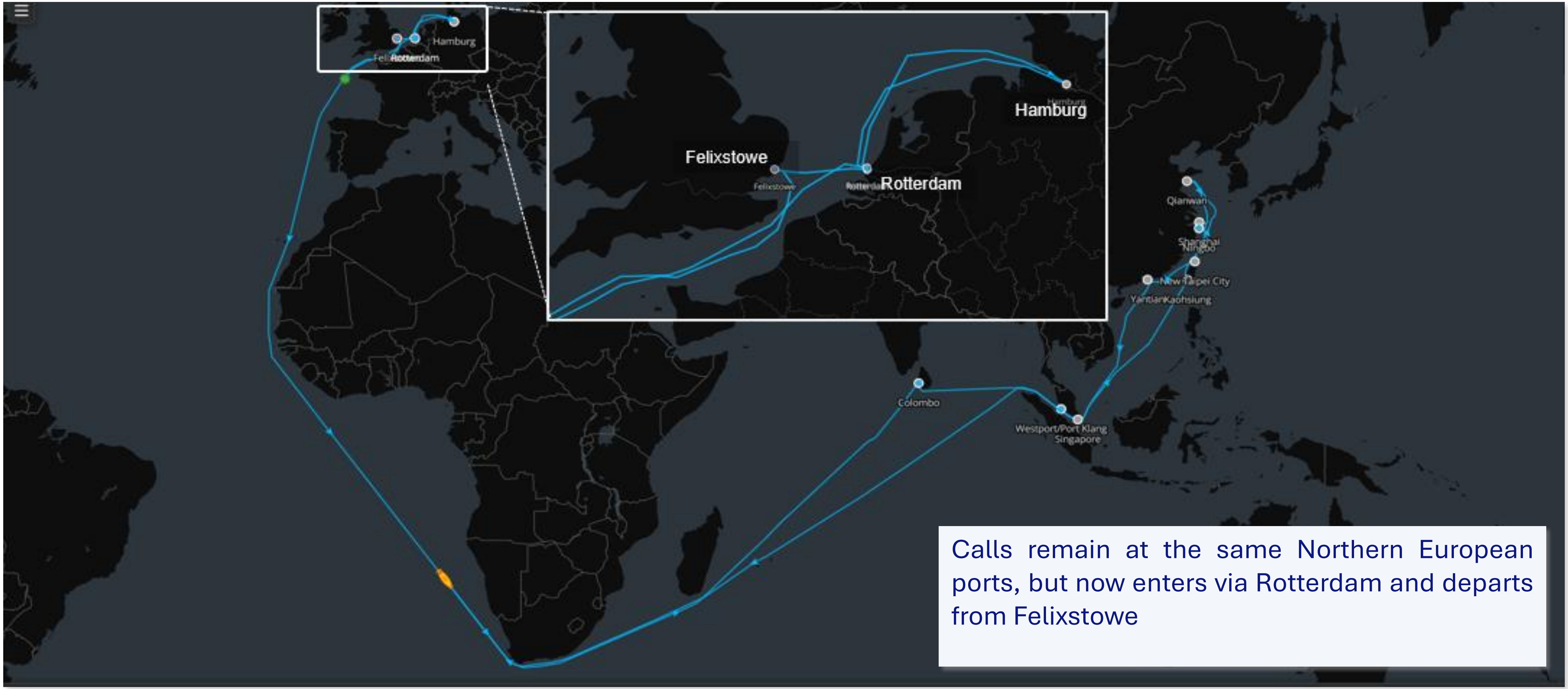
Asia-North Europe 2023



Calls in Northern Europe are arranged with Rotterdam serving as the principal gateway, both on entry and departure, with intermediate calls at Hamburg and Felixstowe.

NORTH SEA. Maritime service transformation.

Asia-North Europe 2025

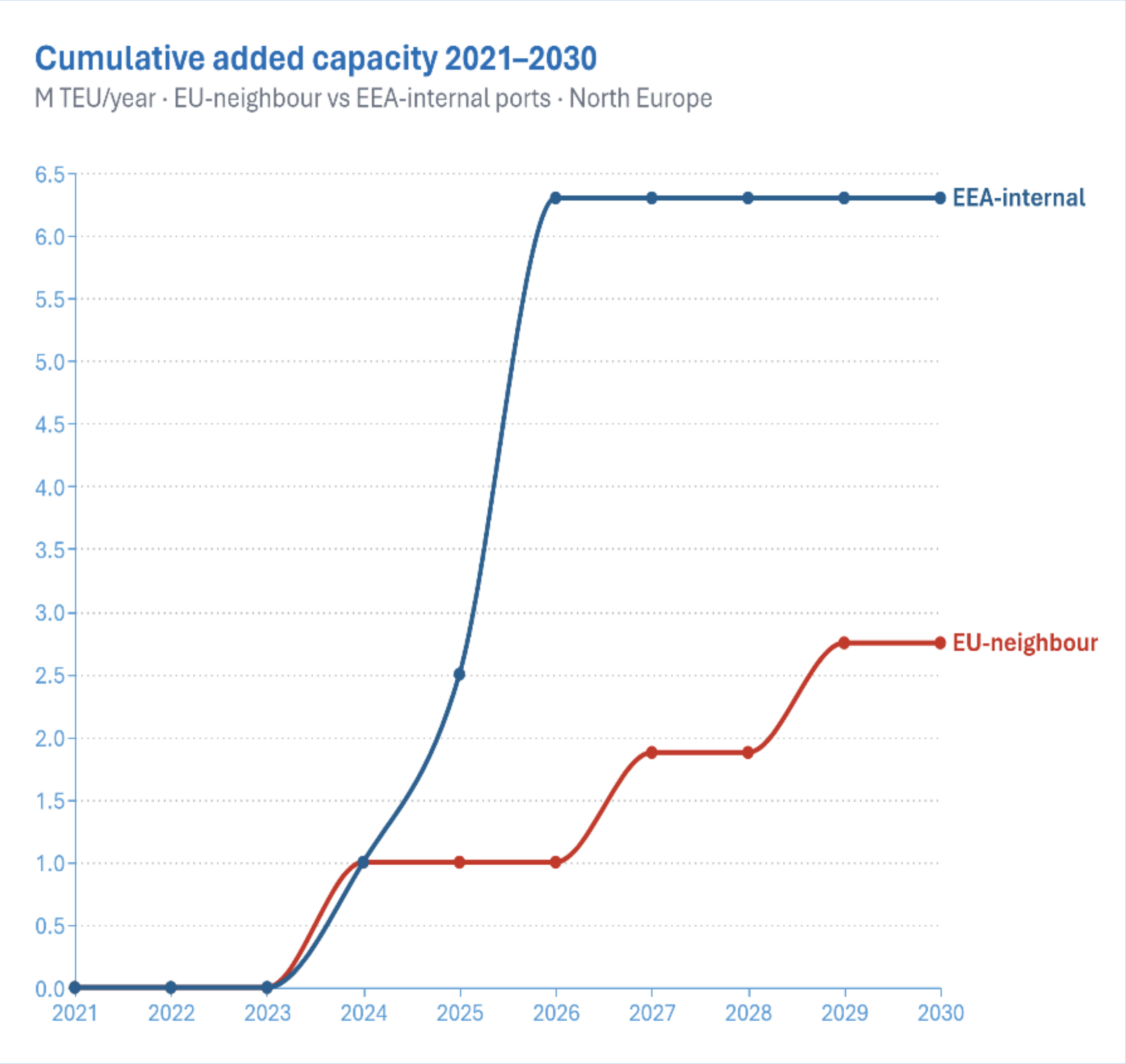


Calls remain at the same Northern European ports, but now enters via Rotterdam and departs from Felixstowe

NORTH SEA. What could be the causes of the increase in the UK’s connectivity?

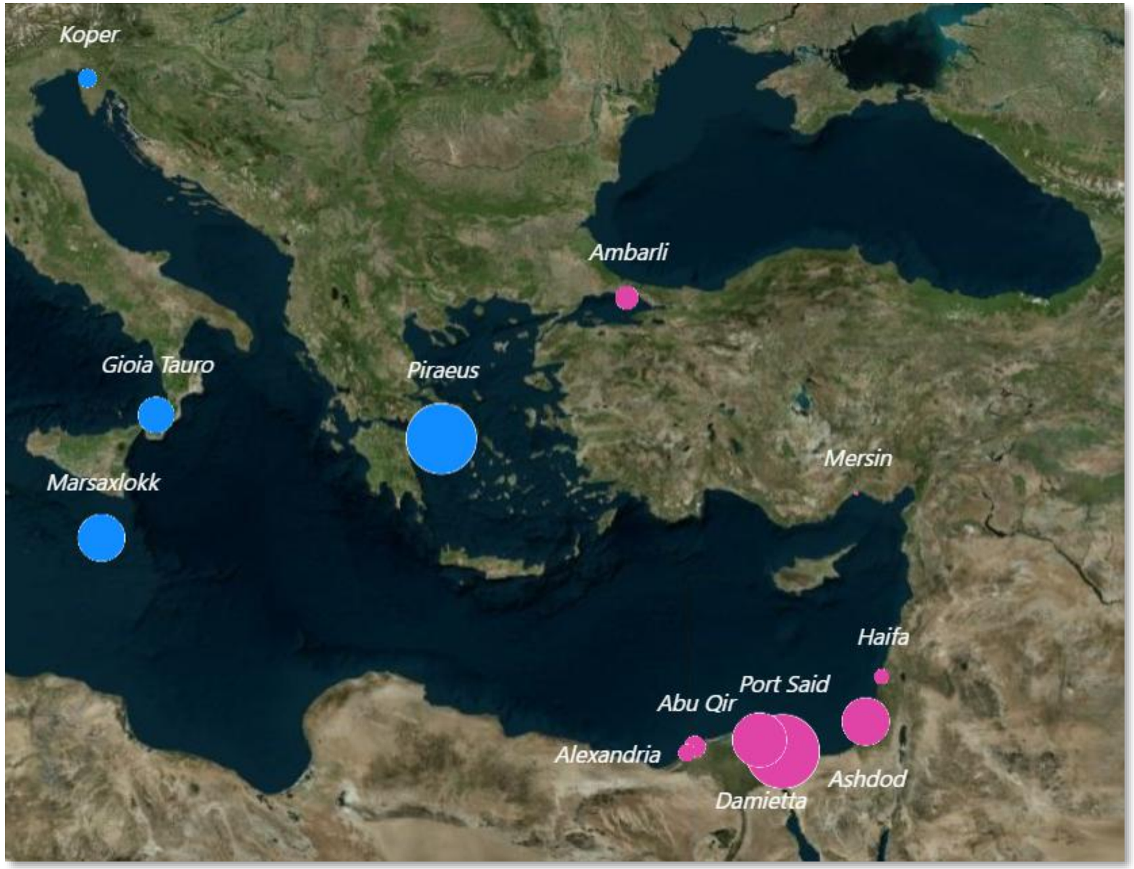
Has there been a significant improvement in the UK’s economic activity?	The United Kingdom has not experienced economic growth that would explain higher import–export traffic
Has there been a reduction in operating costs at UK ports?	In the current inflationary environment, there are no signs that operating costs have decreased.
Are there structural congestion problems at Northern European ports?	There have been congestion problems at Northern European ports, but due to short-term factors such as strikes.
Do UK ports have better infrastructure or greater capacity?	Investments are being made in dredging and cranes, which indicates that the ports were not previously adapted for ULCVs.
Could the closure of the Suez Canal have given any advantage to UK ports?	The increase in distance implied by routing via the Cape of Good Hope affects all ports equally.
Could the expiration of the CBER have given any advantage to UK ports?	The expiration of the CBER coincided with the simultaneous end of the UK’s equivalent competition exemption..
Is there any other factor that could increase the profitability of a transoceanic service if it makes an intermediate call at UK ports?	Diverting a ULCV coming from Asia to a UK port can represent an approximate saving of €1 million in ETS costs per voyage.

NORTH SEA. Investments on container terminals in EU ports vs non-EU ports



Ctry.	Port	Terminal	Inv. €M	Expected Date	Inc. Throughput M TEU per year
UK	London Gateway	Berth 4	350	2024	1,0
UK	London Gateway	Berths 5+6	1.150	2027–29	1,8
Total EEA+			1.500		2,8
FR	Le Havre	Port 2000 berths 11–12	154	2024	1,0
PL	Gdansk	Baltic Hub T3	470	2025	1,5
NL	Rotterdam	APMT MVII	800	2027	2,0
NL	Rotterdam	RWG MVII	500	2026	1,8
Total EEA			1.924		6,3

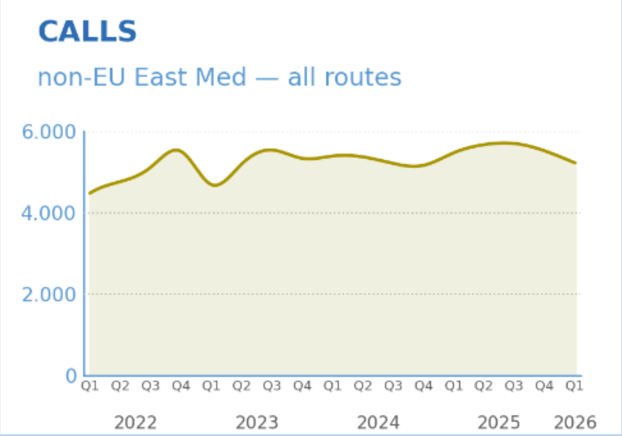
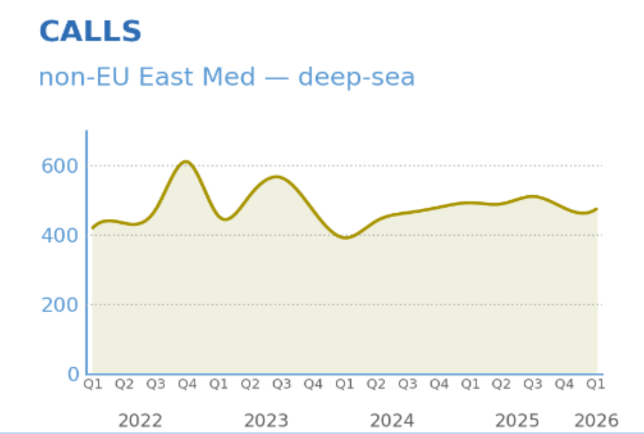
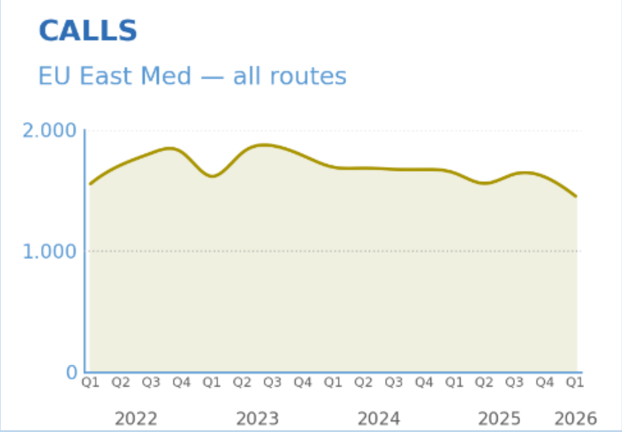
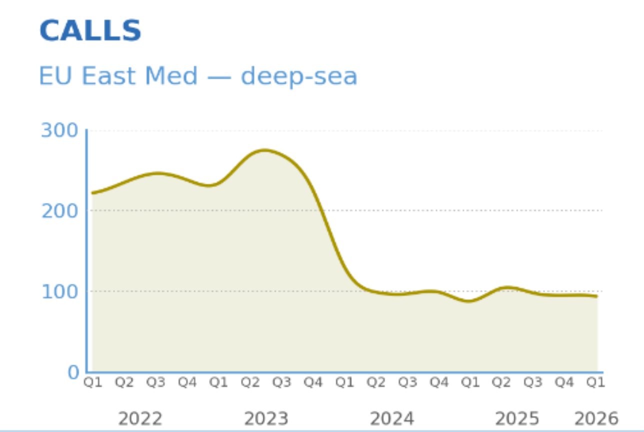
EAST - MED.



EEA Ports of EEA countries

EEA+ Ports of neighbouring countries.
All neighbouring ports are within 300 miles.

EAST - MED. Evolution over time in the number of container vessel port-calls.

	EUROMED	EUROMED GATEWAY
	ALL CONTAINER SHIPPING ROUTES	DEEP-SEA CONTAINER SHIPPING ROUTE
Non - EU NUMBER OF PORT CALLS		
EU NUMBER OF PORT CALLS		

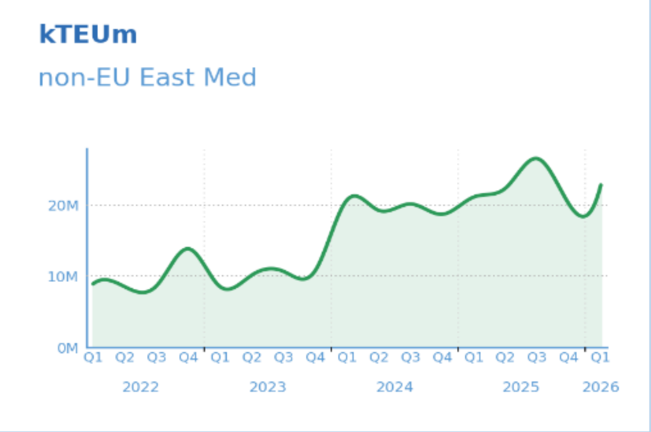
When looking at the evolution of port calls across all container shipping routes, non-EU ports do not display a clear trend. By contrast, EU ports have recorded a gradual decline since the end of 2023.

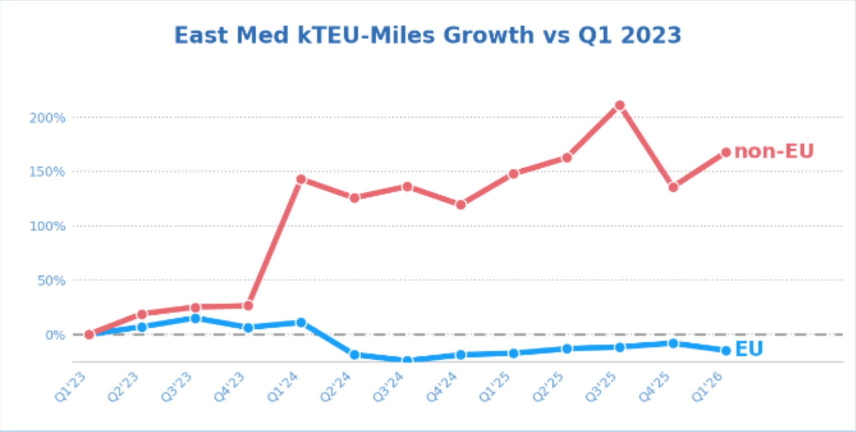
The picture is more pronounced for *deep-sea* routes. In this segment, port calls fell markedly in the last quarter of 2023 in both non-EU and EU ports, with the decline being sharper and more pronounced in EU ports.

Since then, however, *deep-sea* port calls at non-EU ports have followed a gradual recovery path. No comparable rebound is observed in EU ports, where the series has remained broadly flat.

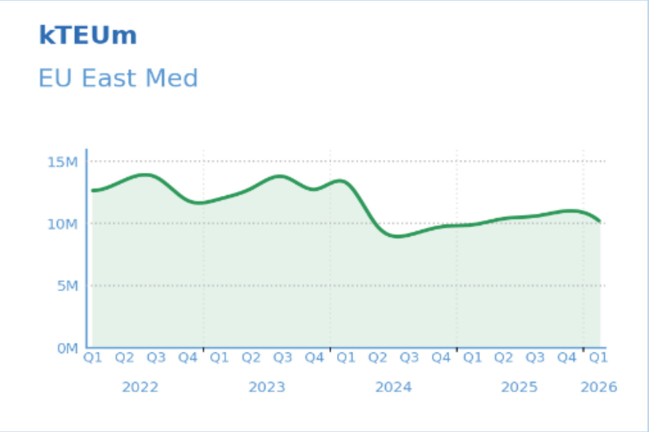
EAST - MED. Evolution over time of the TEU_Mile indicator.

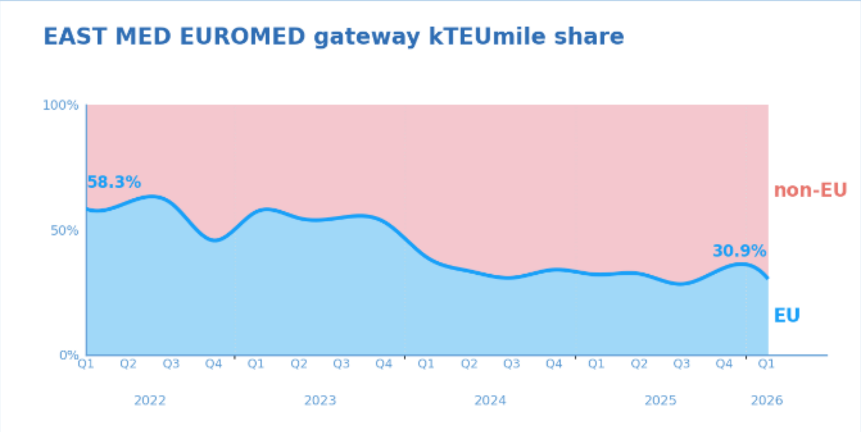
DEEP-SEA CONTAINER SHIPPING ROUTES





Percentage growth of the TEU-mile indicator relative to Q1 2023. Non-EU ports, the indicator exhibits rapid and sustained growth. By contrast, in EU-Ports the indicator, after a drop in Q4 2023, show a flat evolution.



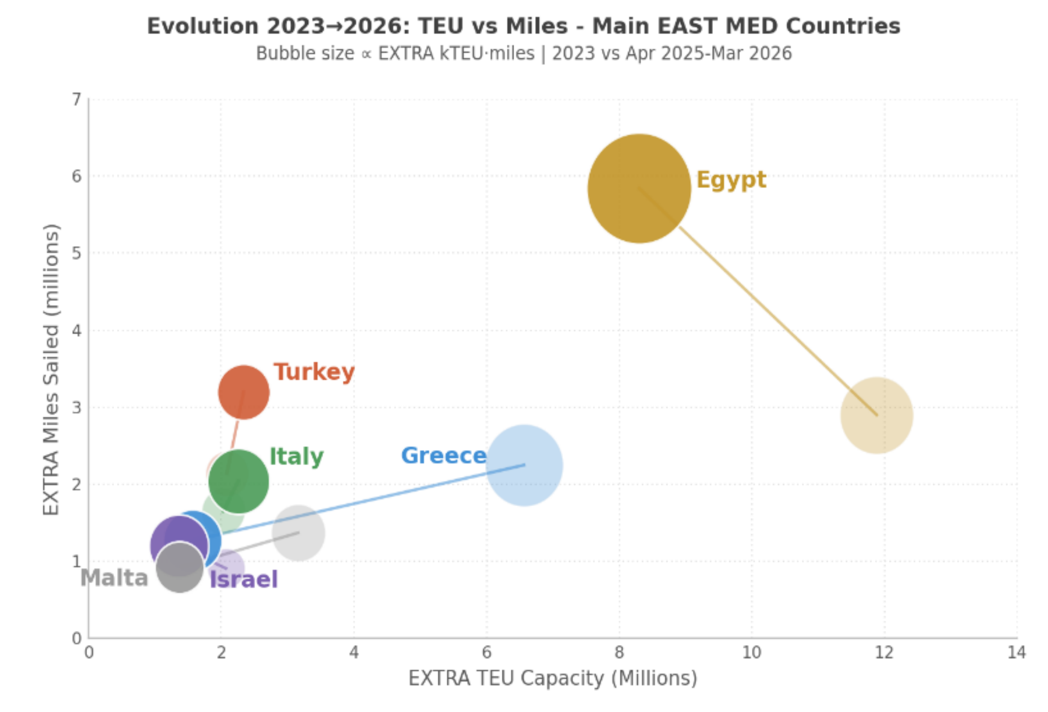


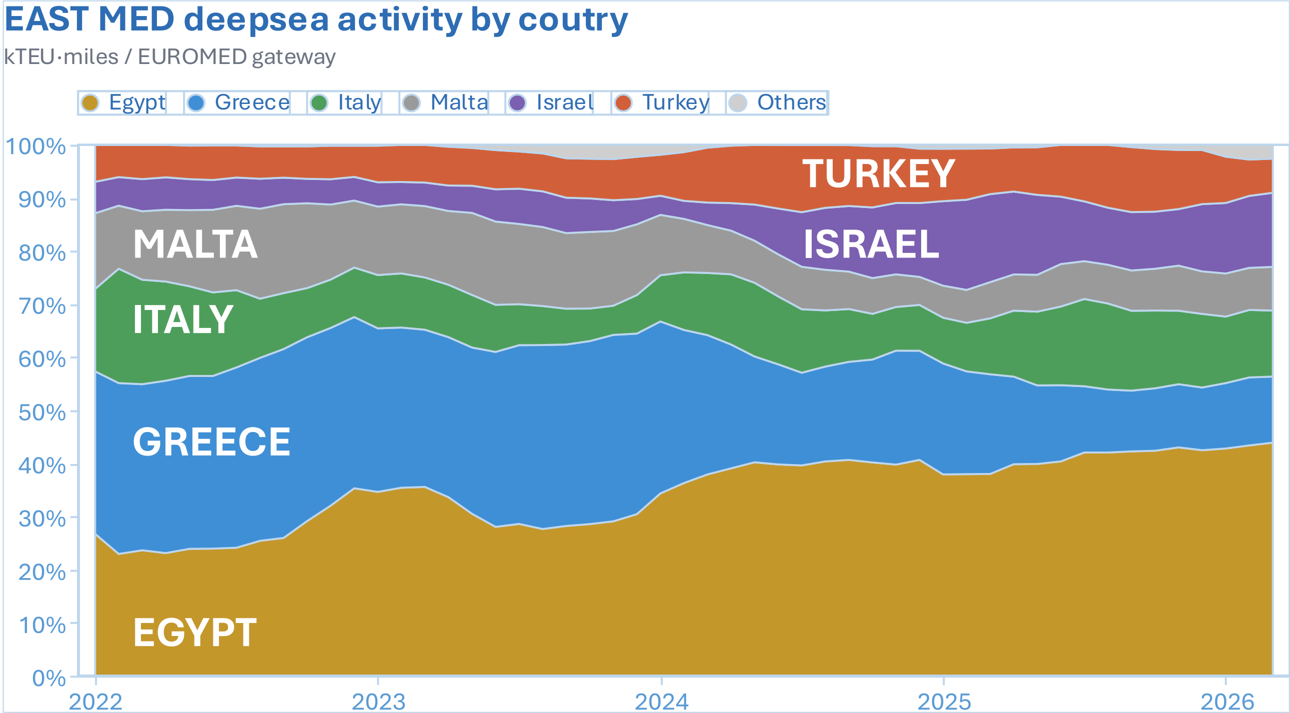
There has been a steady and sustained decline in the EU ports' share of TEU-miles in the Eastern Mediterranean, relative to that of their neighbouring states (mainly Egypt, Turkey and Israel)

In EU ports, the TEU-mile indicator reacts to the Red Sea crisis with a sharp drop, followed by an almost flat evolution. In non-EU ports, the TEU-mile indicator responds to the canal closure with sudden increases.

EAST - MED. Evolution over time of the TEU_Mile indicator by country.

DEEP-SEA CONTAINER SHIPPING ROUTES



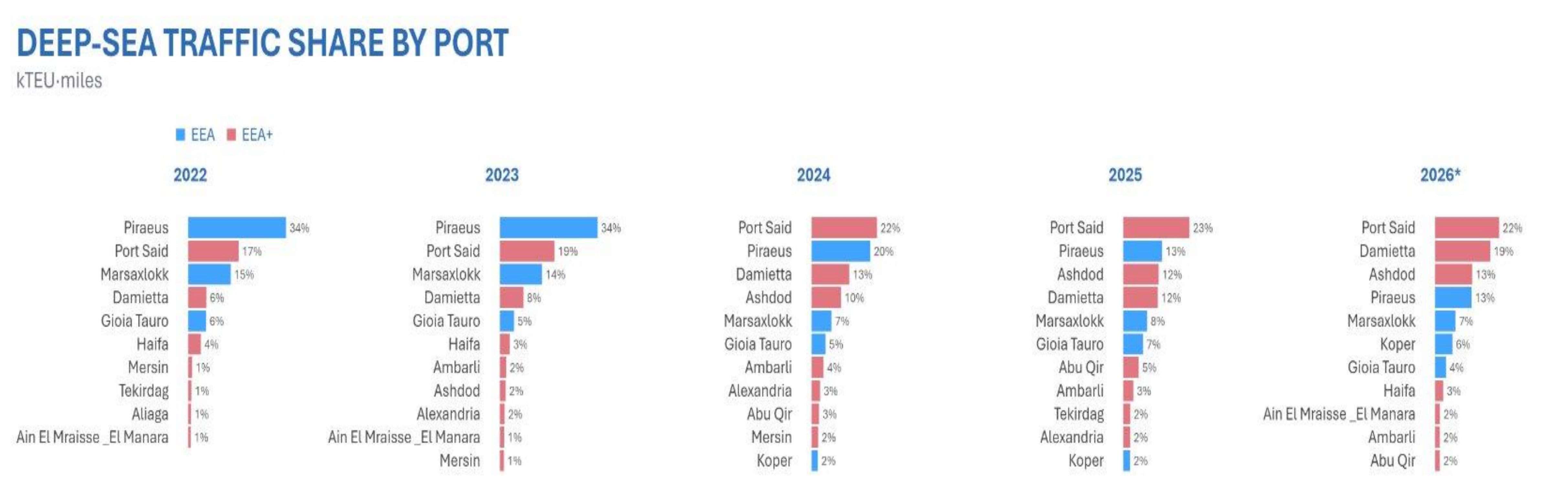


Greece is the country that loses the most connectivity, in both, the total vessel capacity calling at its ports and the nautical miles sailed by ships arriving at or departing from them (light circles, 2023; dark circles, apr.2025-mar.2026).

After the Red Sea crisis, Greece and Malta has progressively lost TEU-mile share, while Turkey, Israel and Egypt have gained TEU-mile share, with Egypt showing both the largest TEU-mile share and the strongest growth trend.

EAST - MED. Evolution over time in the share_TEU_Mile indicator, by port.

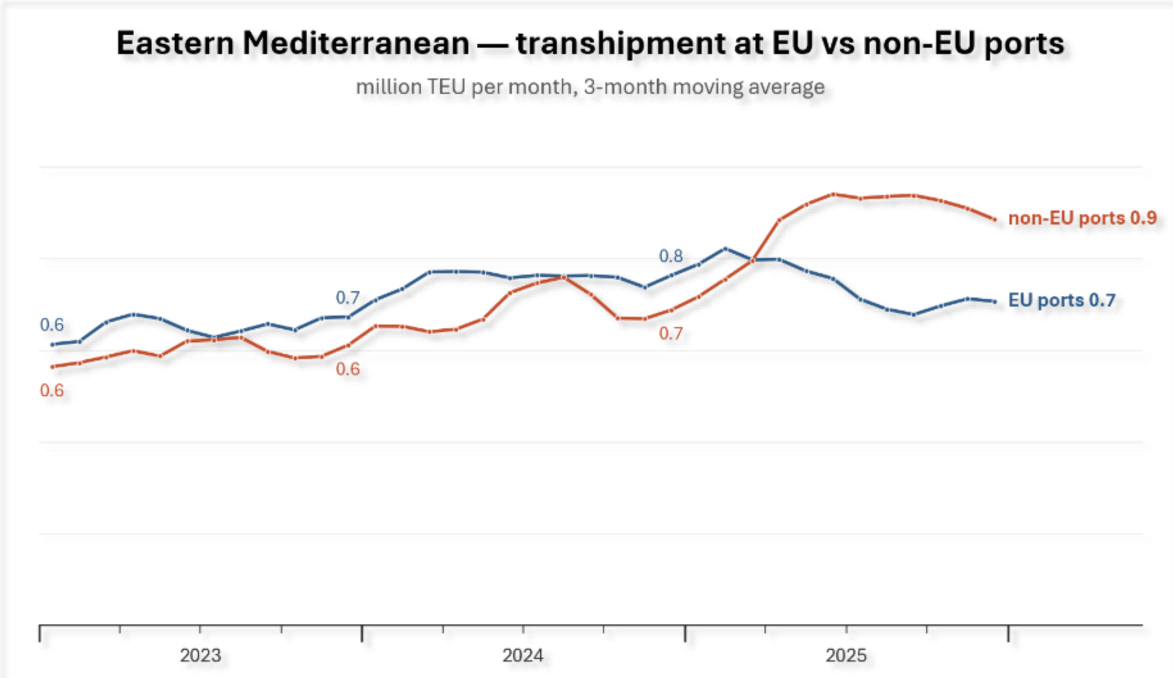
DEEP-SEA CONTAINER SHIPPING ROUTES

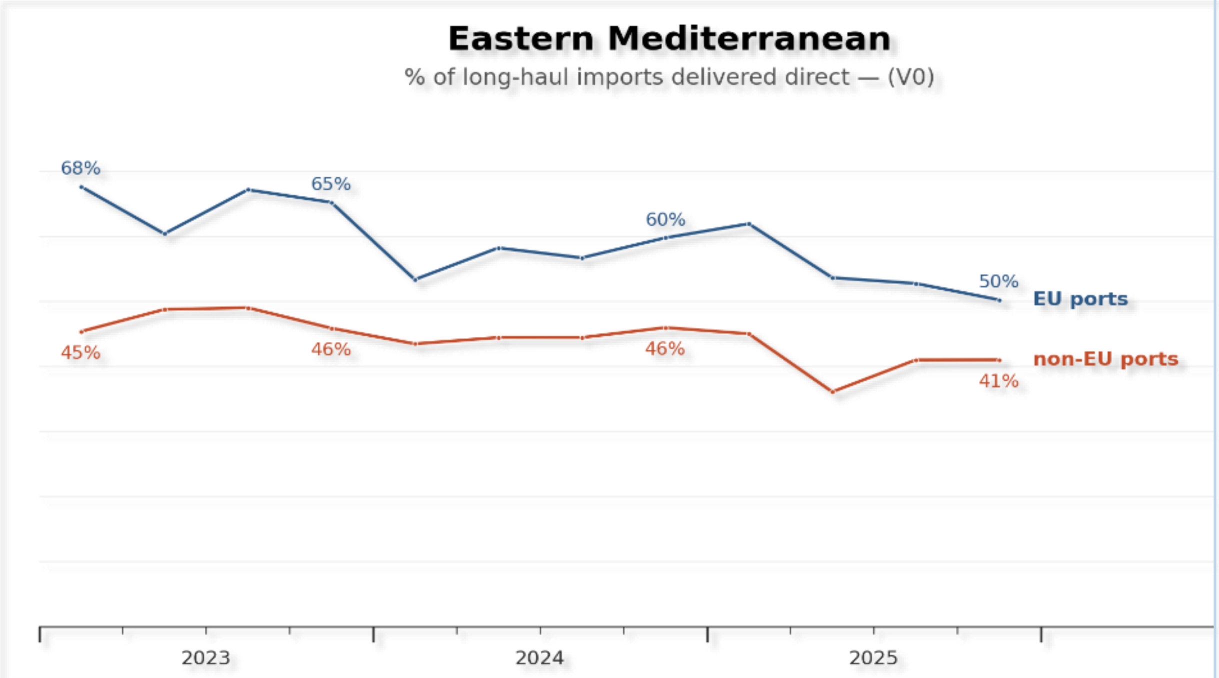


Port Said overtakes Piraeus as the leading Eastern Mediterranean gateway from 2024 onwards, maintaining a share above 20% through 2026. At the same time, Damietta and Ashdod gain relevance, while Piraeus falls sharply from 34% in 2022–23 to 13% in 2026. Overall, the figures show a clear redistribution of deep-sea transport work from EEA ports towards EEA+ gateways.

EAST-MED. Evolution over time of transhipment and *direct connectivity*.

Transhipment and Direct Connectivity based on cargo flow analysis using *container tracking dataset**





Traffic reorganisation in the Eastern Mediterranean has shifted transhipment activity from EU to non-EU ports, **with non-EU hubs overtaking EU ports in March 2025**, shortly after the Gemini alliance began operations.

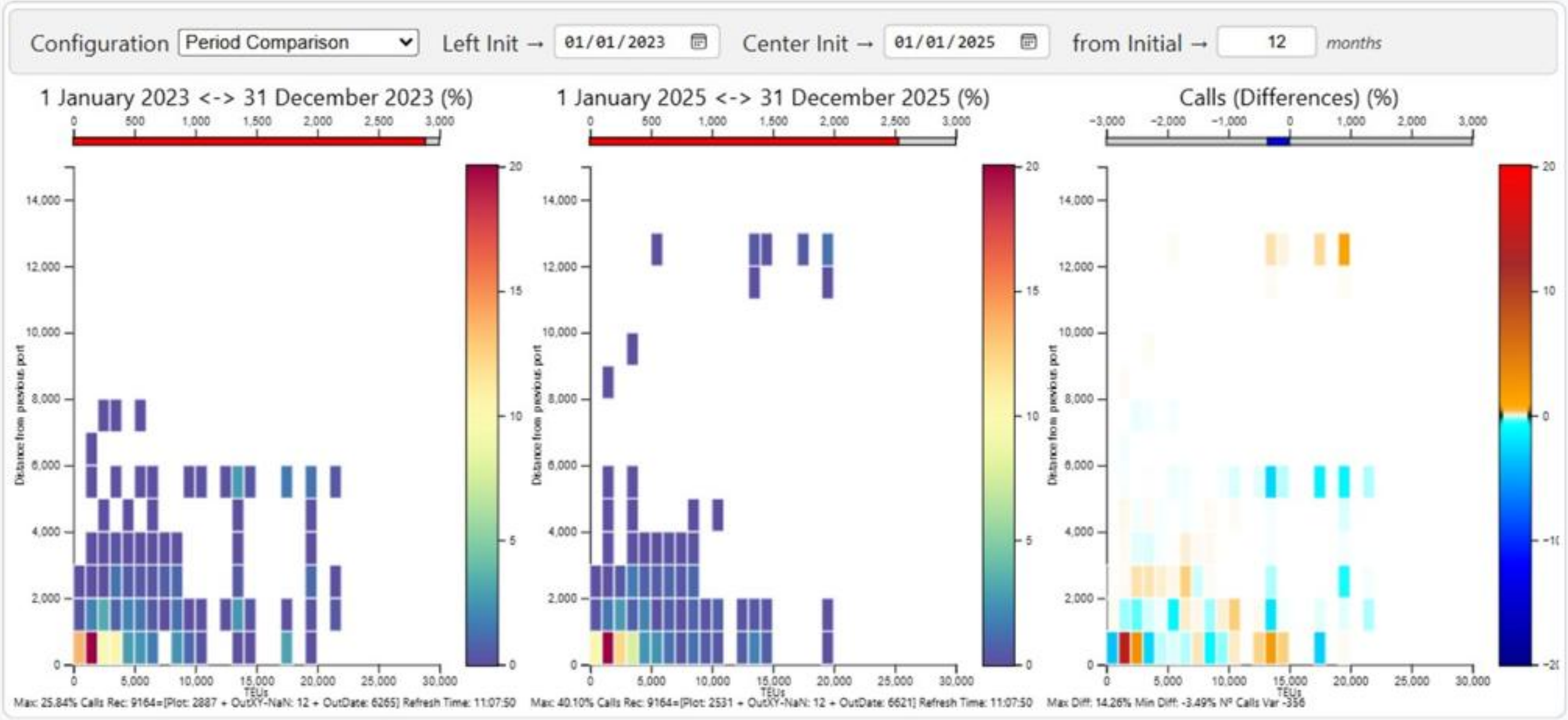
The **direct connectivity ratio to EU destinations has weakened** markedly: the share of long-haul import volume delivered direct **fell from ~68% to 50% over 2023–2025**. Non-EU ports eased more gently, from ~48% to 41%.

Overall, ***the results show it's very likely that direct services to EU ports are being split***, relying on neighbouring non-EU ports transhipment.

* Source: EconDB

EAST-MED. Evolution over time of the container traffic pattern.

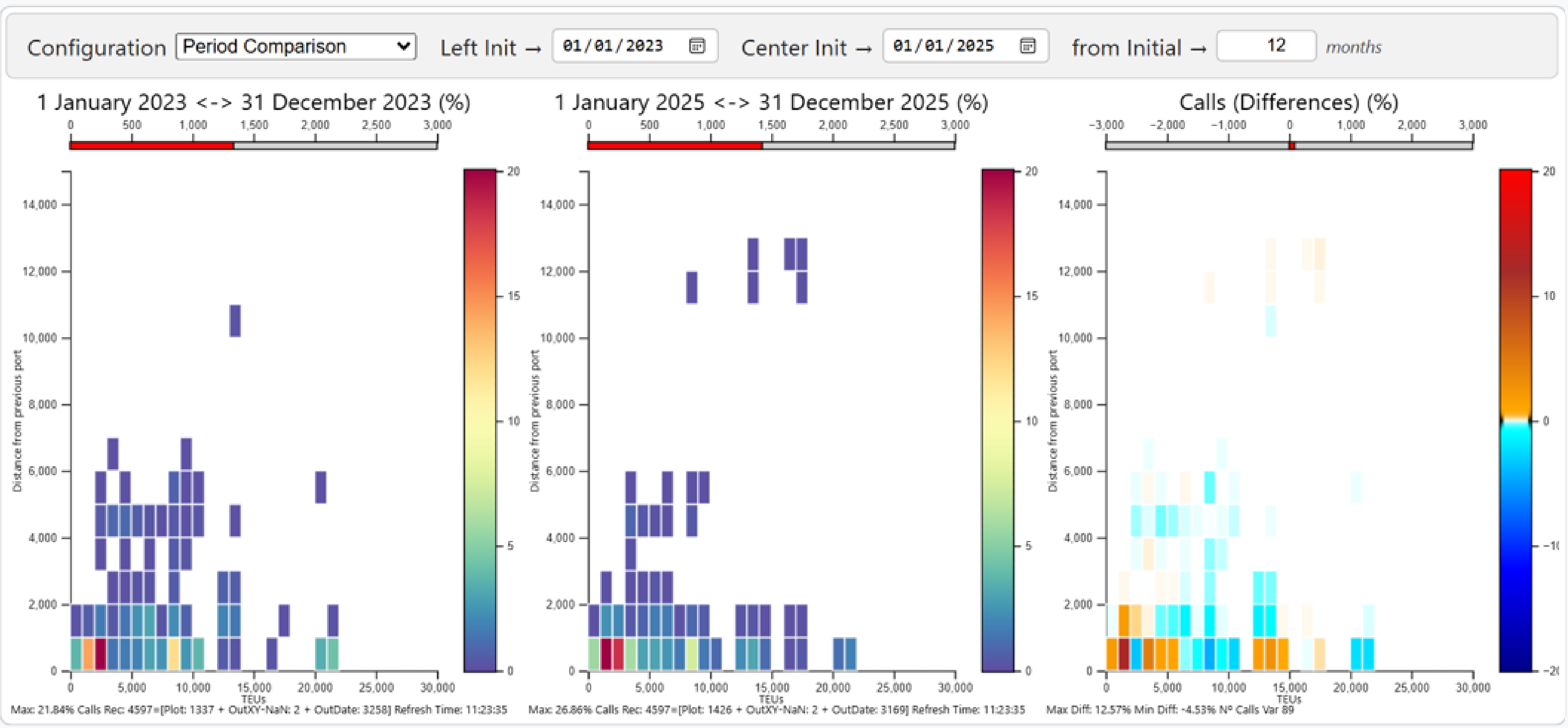
Evolution over time of route configurations at the Port of Piraeus. The X-axis represents vessel capacity, the Y-axis the distance traveled, the color scale the frequency of each configuration, and the vertical bar the number of port calls.



In 2025, the share of port calls by vessels with capacities between 1,000 and 2,000 TEUs traveling less than 1,000 miles **increased by 14 percentage points** compared to 2023, *showing a clear increase of feeder activity on Piraeus.*

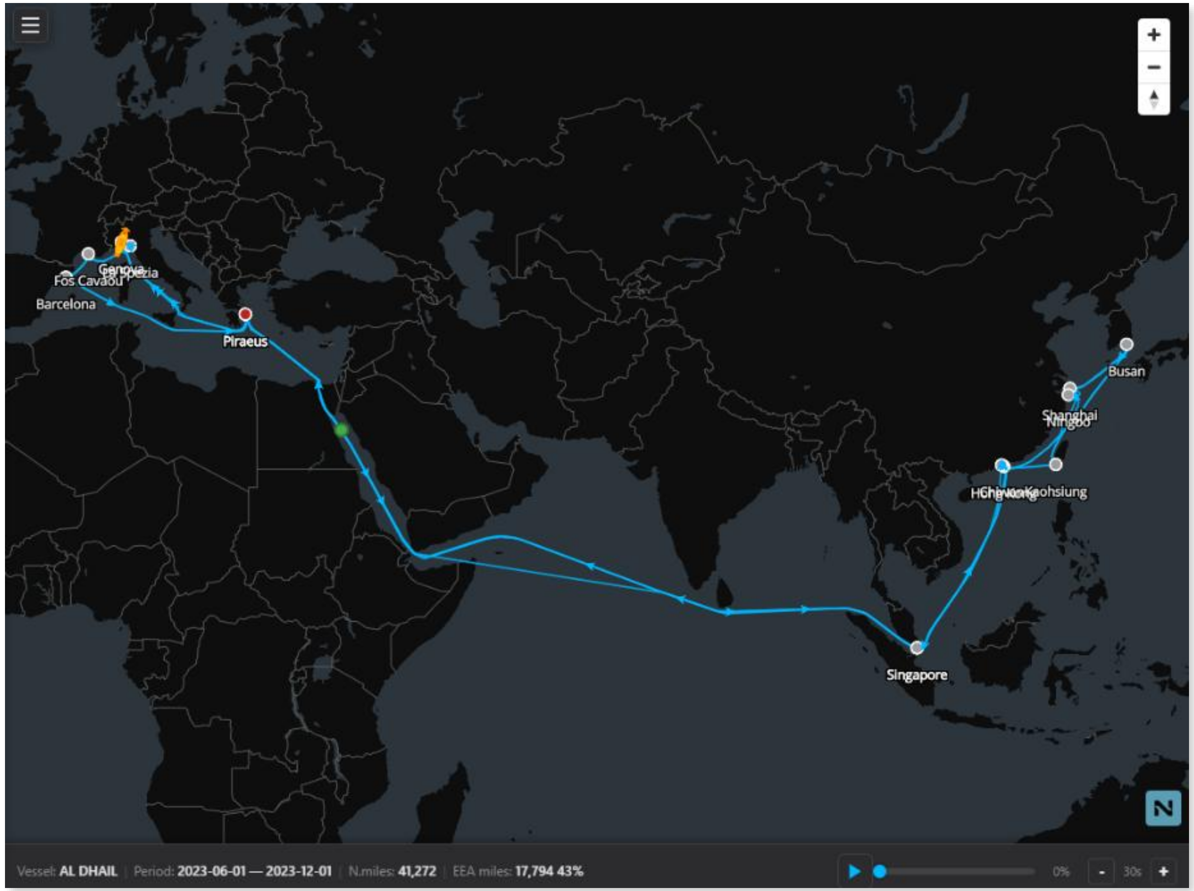
EAST-MED. Evolution over time of the container traffic pattern.

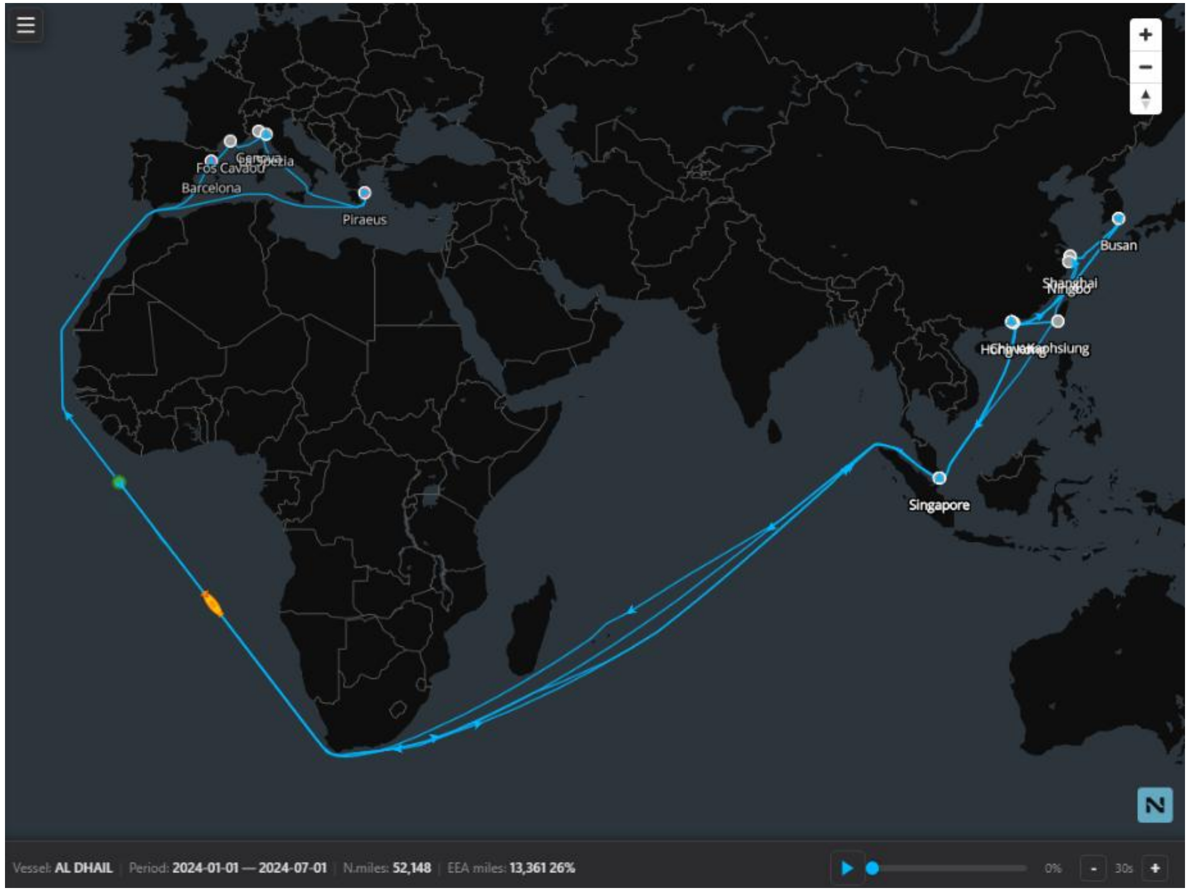
Evolution over time of route configurations at the Port of Gioia Tauro. The X-axis represents vessel capacity, the Y-axis the distance traveled, the color scale the frequency of each configuration, and the vertical bar the number of port calls.



In 2025, the share of port calls by vessels with capacities between 1,000 and 2,000 TEUs traveling less than 1,000 miles **increased by 12 percentage points** compared to 2023, *showing a clear increase of feeder activity on Gioia Tauro.*

EAST - MED. Maritime service transformation and splitting (1/2)





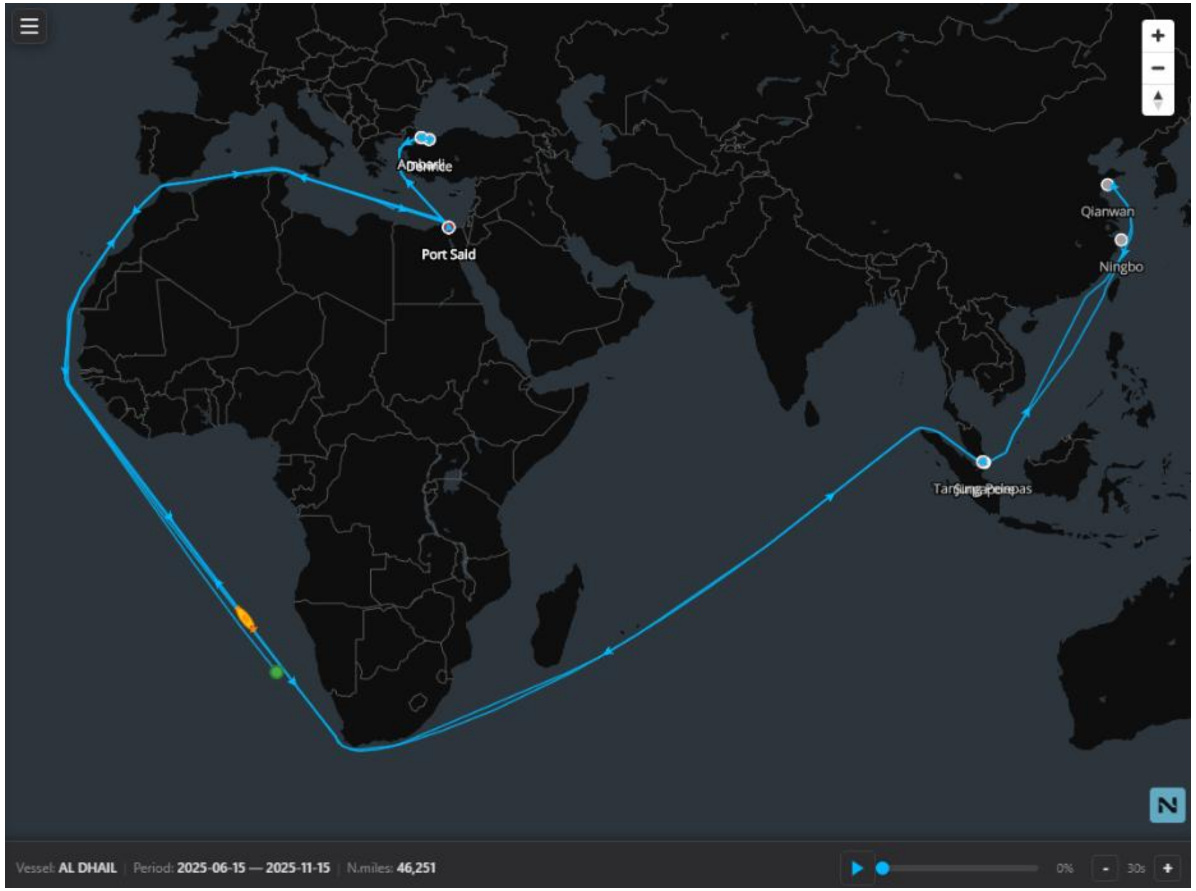
2023

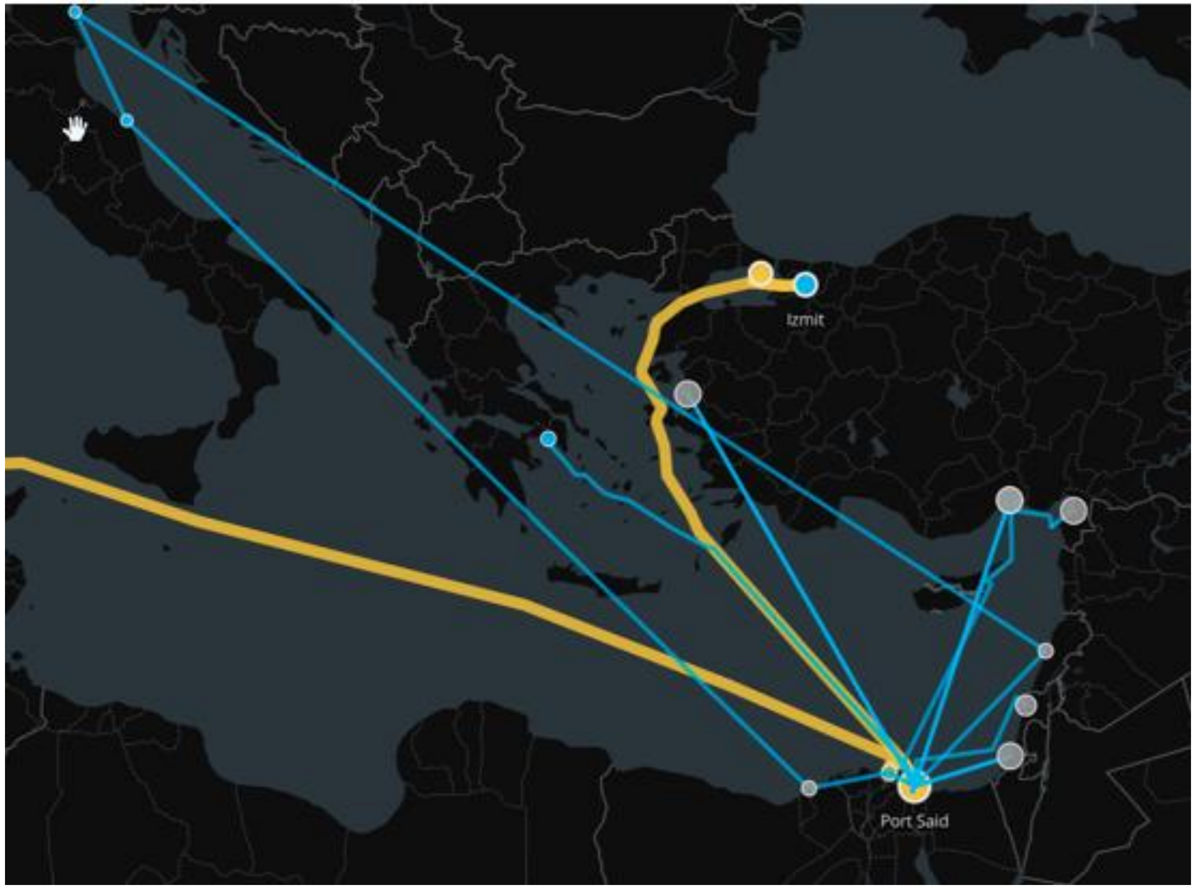
Suez-based loop → Piraeus as first Med hub

2024

Cape of Good Hope loop → Piraeus retained but with reduced frequency

EAST - MED. Maritime service transformation and splitting (2/2)





2025 (deep sea service)

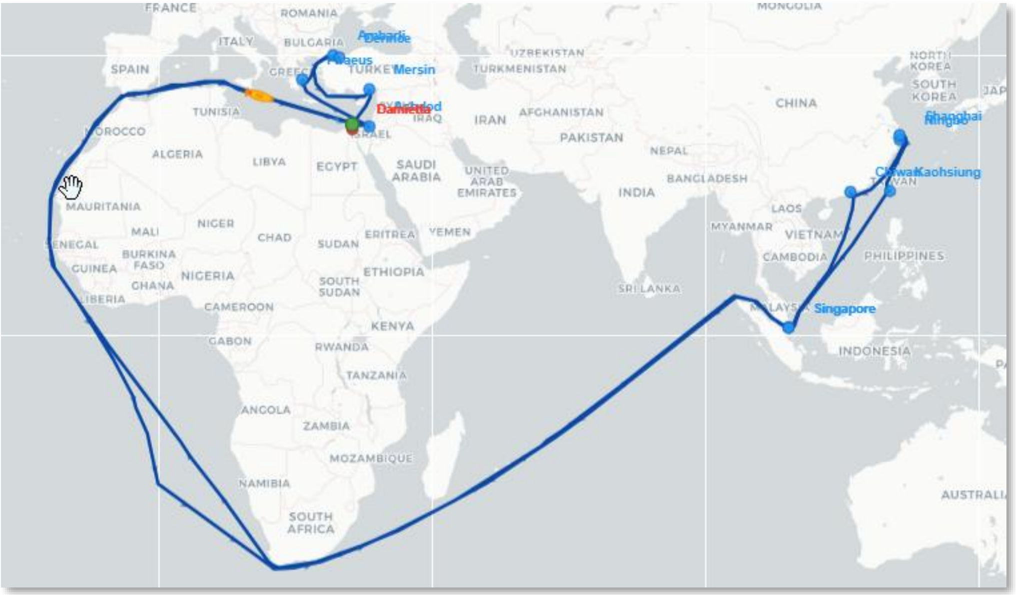
Hub shift → increased relay via Egypt/Turkey; Piraeus hub role lost, replaced by Port Said

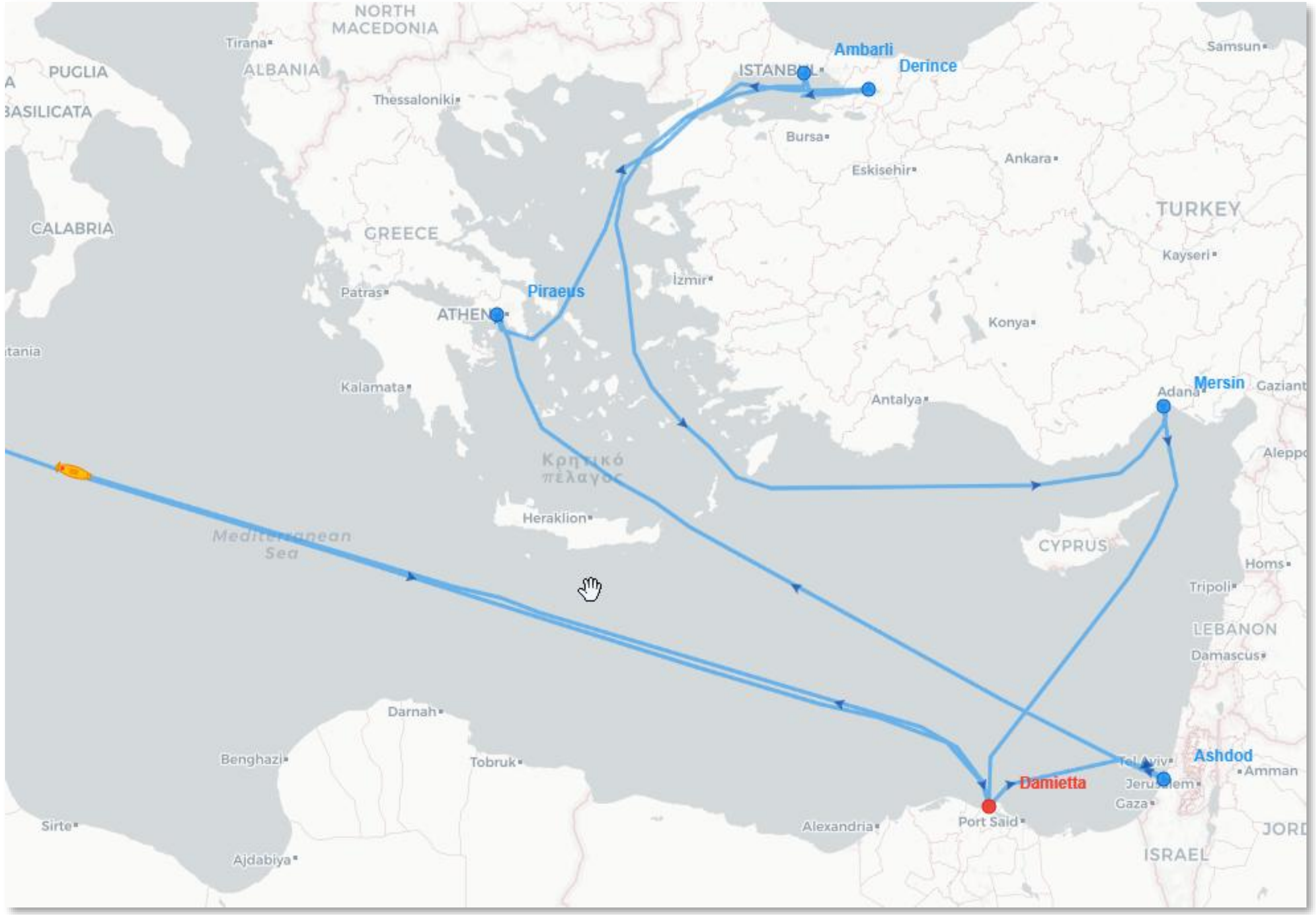
2025 (deep-sea + feeder services)

Route splitting: Piraeus now connects indirectly to the original deep-sea service via a feeder service through Port Said.

EAST – MED. Maritime service transformation

New maritime service in the Mediterranean with 14 Panamax vessels, using the port of Damietta as the regional gateway. The service includes a call at Piraeus as an intermediate port on its Mediterranean route

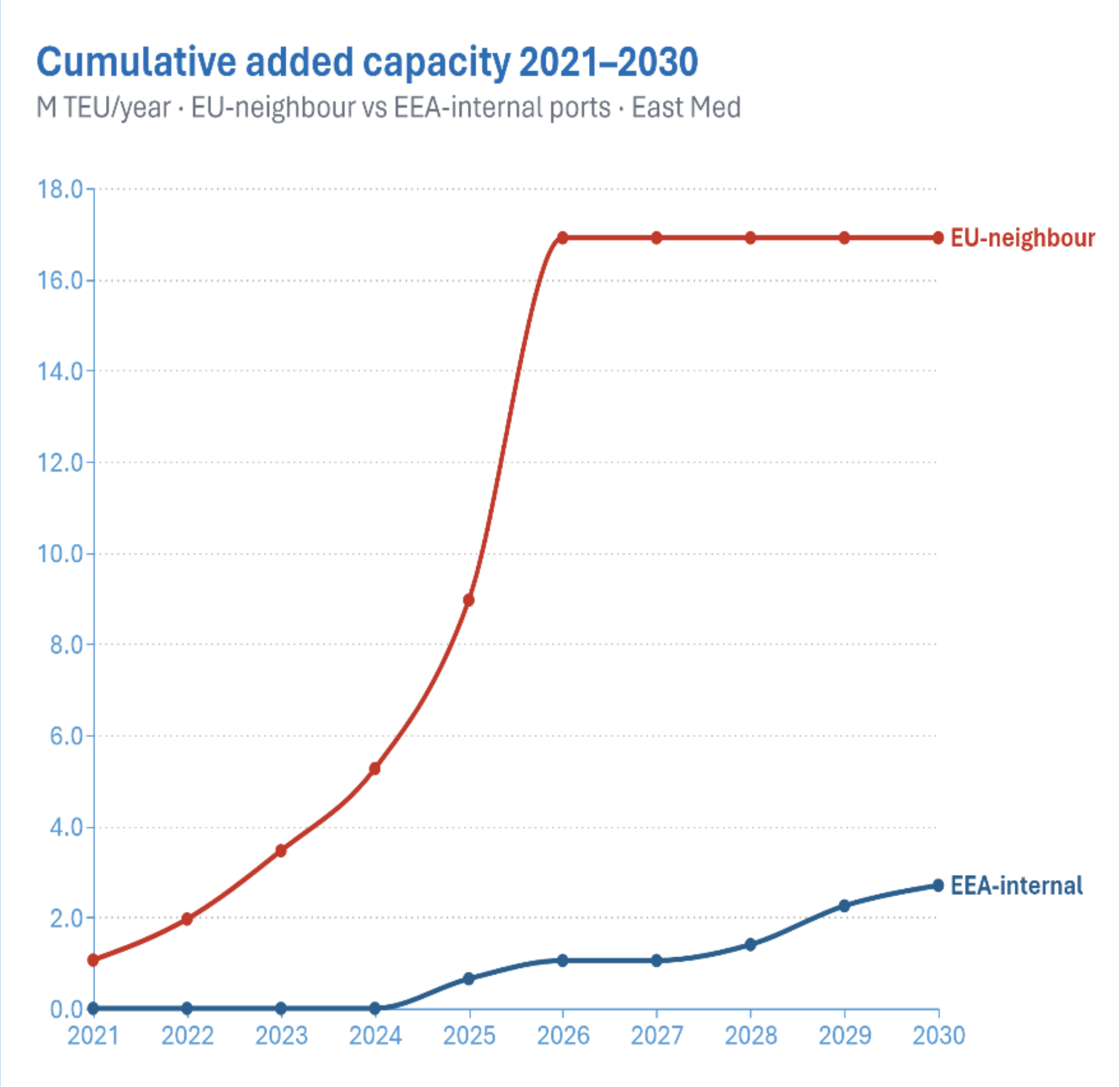




EAST – MED. What could be the causes of the increase in Egypt's activity?

Has there been a significant improvement in Egypt's economic activity?	Egypt has not experienced economic growth that would explain higher import–export traffic.
Has there been a reduction in operating costs at Egyptian ports?	In the current inflationary environment, there is no evidence that operating costs have fallen.
Are there structural congestion problems in EU ports in the Eastern Mediterranean?	EU ports in this region have not shown congestion problems; Piraeus has available capacity.
Do Egyptian ports have better infrastructure or greater capacity?	The Port of Piraeus has available capacity. Egyptian ports have undergone investment and upgrades.
Could the closure of the Suez Canal have given Egyptian ports any advantage?	The Port of Piraeus is now on the shortest route from Asia to the central Mediterranean.
Could the expiration of the CBER have given Egyptian ports any advantage?	In Egypt there are laws and authorities aimed at protecting competition and prohibiting monopolistic practices.
Can the ETS explain Egypt's higher activity compared to Greece, considering Port Said is a "transshipment port of a neighbouring country"?	This measure is not effective in the case of a route disruption such as that occurring in a Hub-and-Spoke system. Moreover, ports such as Abu Qir, Alexandria and Damietta operate without this constraint.

EAST-MED. Investments on container terminals in EU ports vs non-EU ports



Ctry.	Port	Terminal	Inv. €M	Expected Date	Throughput M TEU per year
EG	El-Dekheila	Tahya Misr 2 (Pier 100)	n.d.	2025	1,5
EG	Abu Qir	Hutchison terminal	694	2024	1,6
EG	Ain Sokhna	Hutchison terminal	625	2026	1,7
EG	Damietta	DACT Terminal 2	554	2026	3,3
EG	Port Said	SCCT Phase II	430	2025	2,2
EG	Alexandria	Tahya Misr 1 (CMA)	300	2023	1,5
IL	Haifa	SIPG Bayport	1.438	2021	1,1
IL	Ashdod	Quay 21	400	2022	0,9
TR	Asyaport	Phase 3 quay extension	n.d.	2026	1,5
TR	Mersin	EMH2T expansion	390	2026	1,0
TR	Ambarli	Marport	170	2024	0,2
Total non-EU			5.108		16,91
HR	Rijeka	Rijeka Gateway Phase 1	380	2025	0,6
MT	Marsaxlokk	T2 Squaring Off	56	2026	0,4
HR	Rijeka	Rijeka Gateway Phase 2	n.d.	2028	0,35
GR	Thessaloniki	Pier 6 expansion	196	2029	0,85
IT	Trieste	Pier VIII (HHLA PLT)	316	2030	0,45
Total EEA			948		2,70

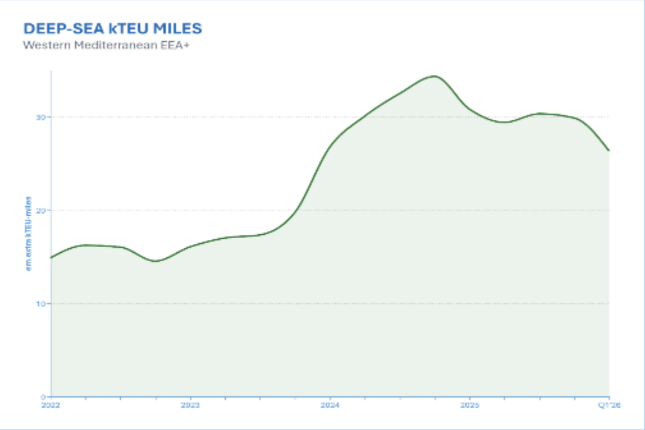
WEST MED.

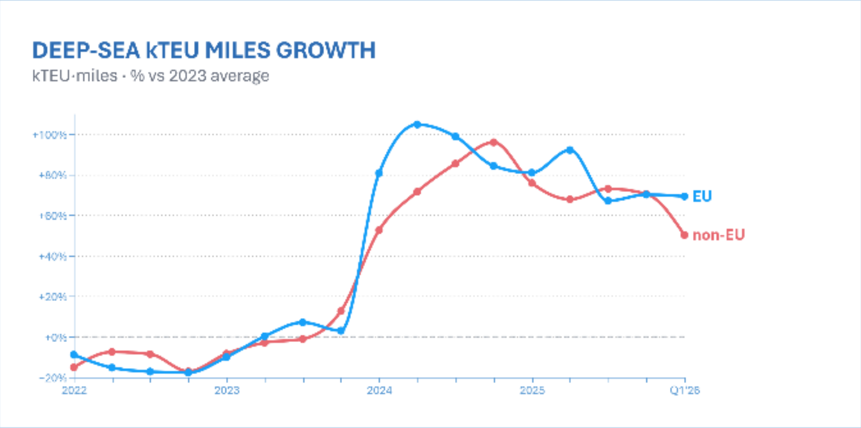
EEA Ports of EEA countries

EEA+ Ports of neighbouring countries.
All neighbouring ports are within 300 miles.

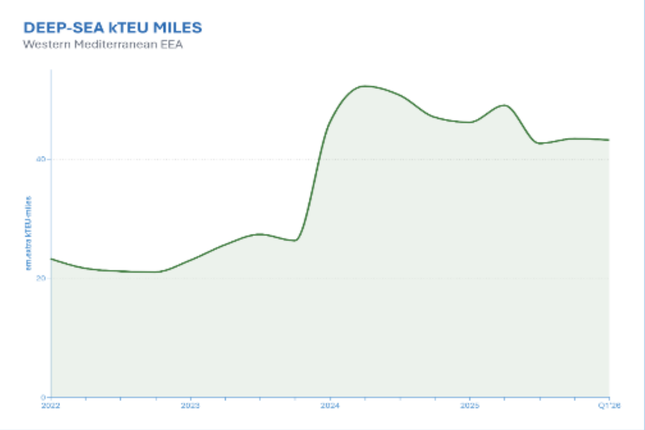
WEST - MED. Evolution over time of the TEU_Mile indicator.

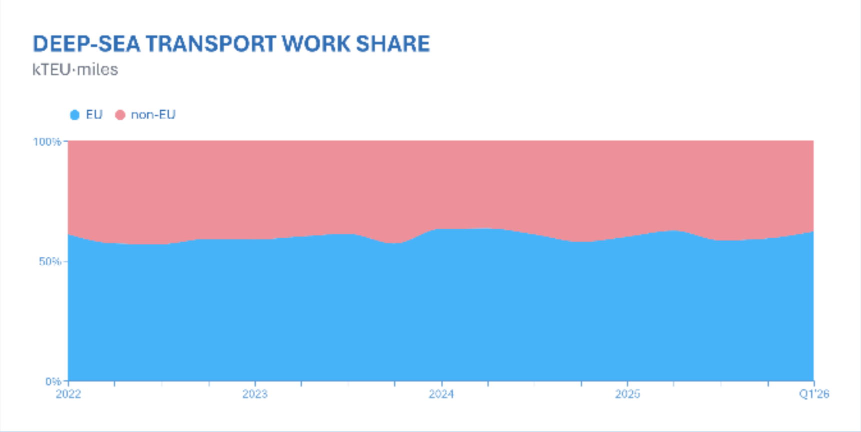
DEEP-SEA CONTAINER SHIPPING ROUTES





Percentage growth of the TEU-mile indicator relative to Q1 2022. The parameter shows a similar pattern both on non-EU region and on EU region.



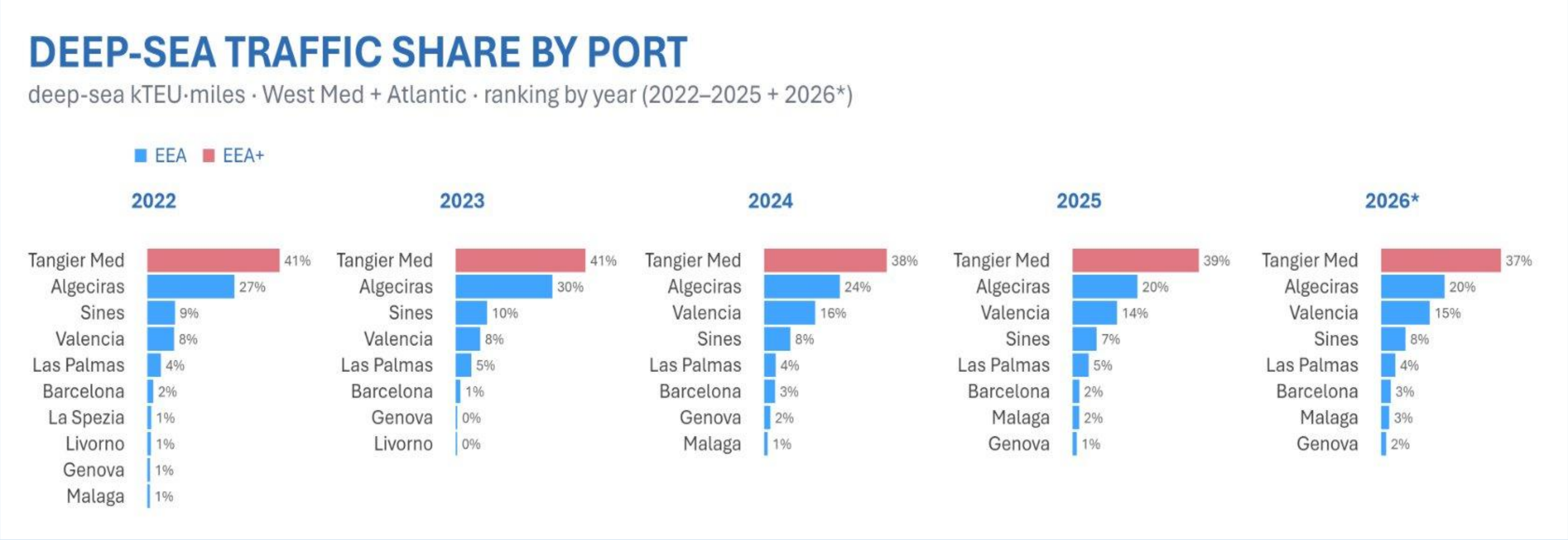


The TEU_Mile_share between non-EU ports and EU ports shows no clear change over the period.

The k_TEU_Mile parameter follow a similar time evolution pattern on EU ports and on non-EU ports. There is not a clear change on relative connectivity between the two set of ports.

WEST - MED. Evolution over time of the share TEU_Mile indicator by port.

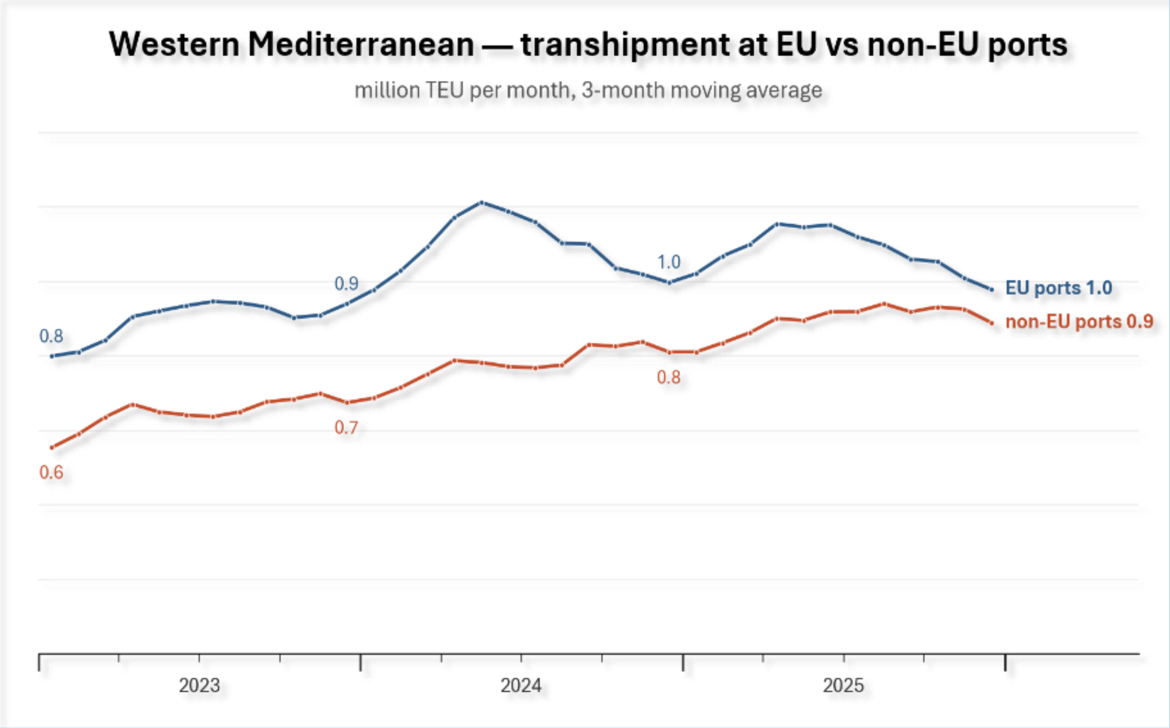
DEEP-SEA CONTAINER SHIPPING ROUTES

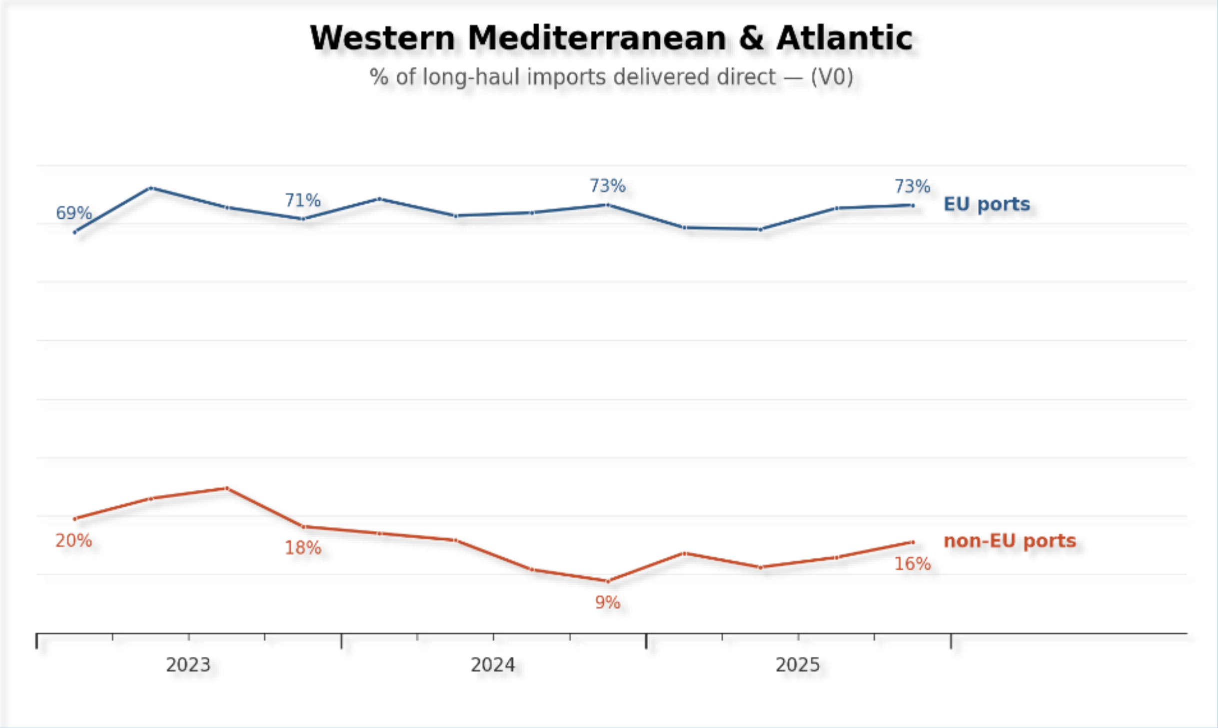


Tangier Med remains the leading Western Mediterranean gateway throughout the period, although its share declines slightly from 41% in 2022 to 37% in 2026. Algeciras also loses relative weight, while Valencia strengthens markedly, rising from 8% to 15%.

WEST-MED. Evolution over time o transhipment and direct connectivity

Transhipment and Direct Connectivity based on cargo flow analysis using *container tracking dataset**





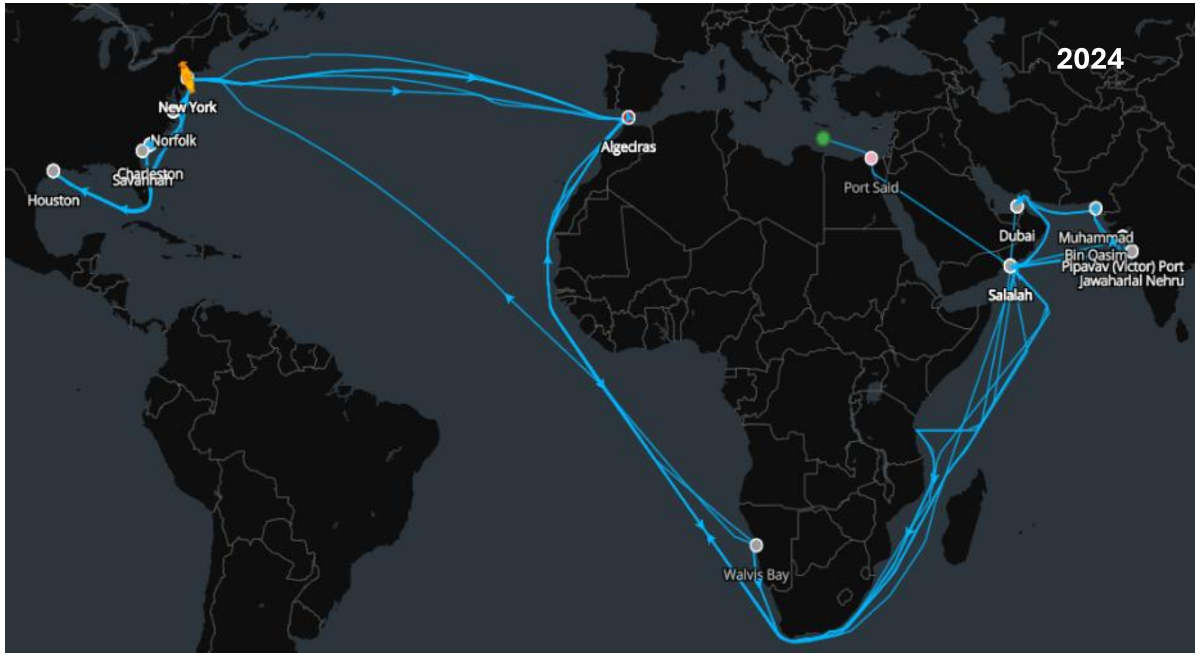
Non-EU transhipment has grown by around 60% since early 2023, while EU volumes — after peaking in mid-2024 — have remained broadly flat at around 1.0 million. EU ports have not lost transshipment traffic in absolute terms, **but they are gradually losing their share of the region's total transshipment traffic.**

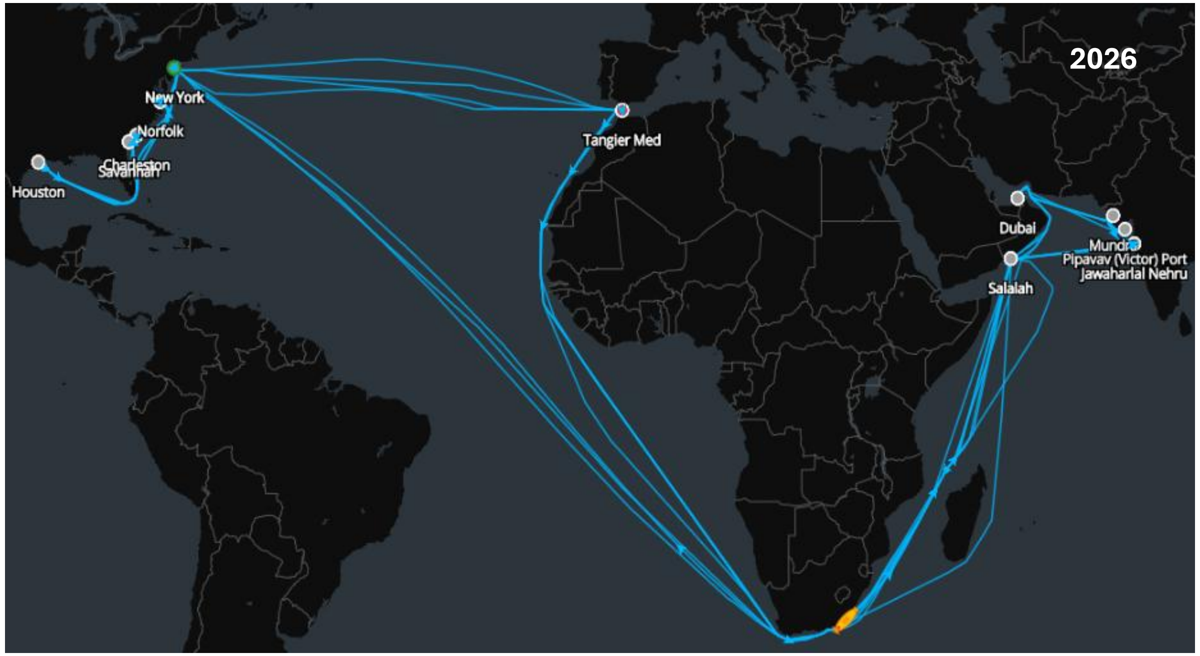
The Western Mediterranean and the Atlantic show the widest and most stable gap between the blocks across the three basins. EU gateway ports have increased their direct connectivity ratio from 69% to 73%, while non-EU ports—Morocco and Algeria—operate under a different dynamic, and Tangier Med functions mainly as a transshipment port (approximately 97%).

* Source: EconDB

WEST - MED. Maritime service transformation

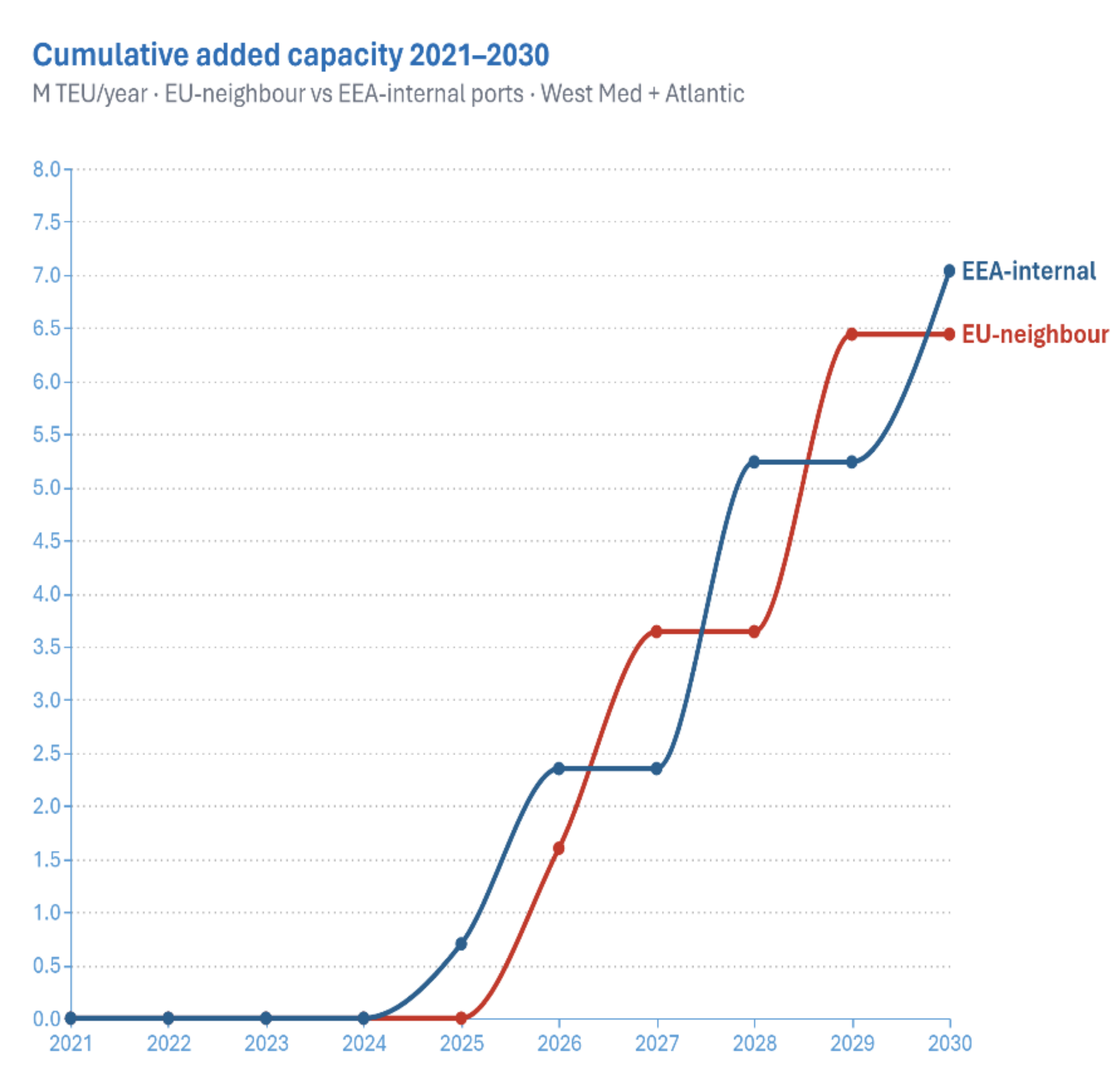
Maersk's MECL service links the US East Coast with the Middle East and India, historically calling at Algeciras in both directions as its European relay hub. In late 2024 the westbound call was moved from Algeciras to Tangier Med, halving the ETS cost. In 2025 the eastbound leg became direct, and the remaining Algeciras call was dropped,— leaving a service that once generated €33M in annual ETS revenues with no European exposure at all.





Since maritime transport was included in the EU ETS, relay connections at EU ports between deep-sea services linking Asia and the Americas have shifted to non-EU ports.

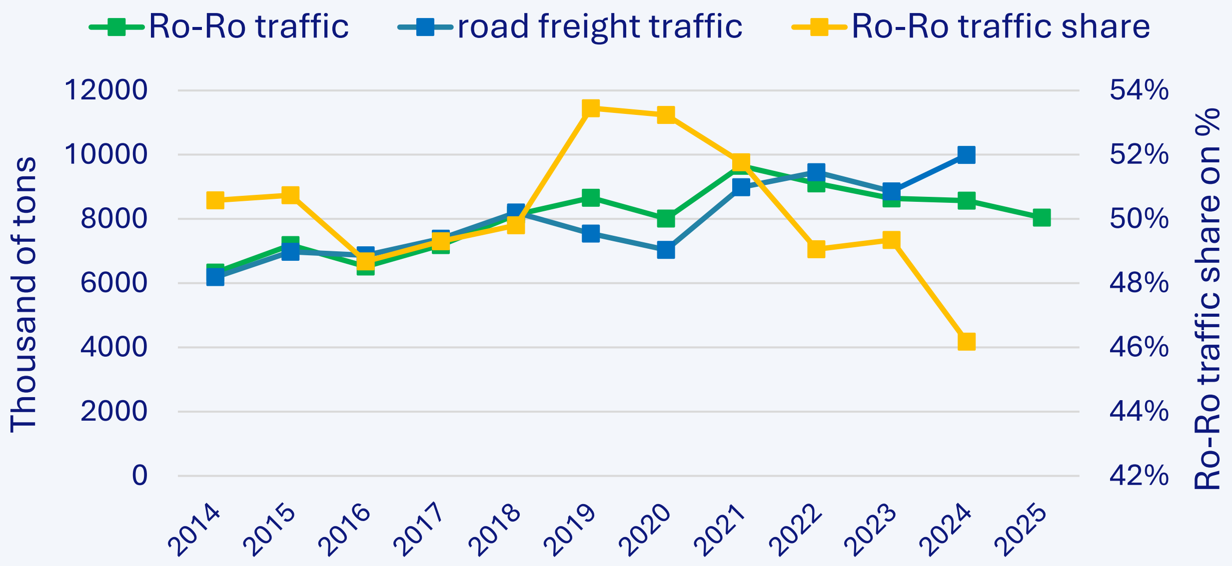
WEST-MED. Investments on container terminals in EU ports vs non-EU ports



Ctry.	Port	Terminal	Inv. €M	Expected Date	Throghput M TEU per year
MA	Nador West Med	Port infrastructure (greenfield)	893	2026	
MA	Nador West Med	East Terminal Ph.1 (Marsa Maroc/TIL-MSC)	253	2026	1,6
MA	Nador West Med	West Terminal (Marsa Maroc/CMA CGM)	250	2027	1,8
DZ	Skikda	New container terminal	n.d.	2027	0,2
MA	Nador West Med	East Terminal Ph.2	n.d.	2029	1,8
MA	Dakhla Atlantique	New Atlantic port	1.400	2029	1
Total non-EU			2.796		6,4
ES	Barcelona	Hutchison BEST expansion	60	2025	0,7
FR	Marseille	Fos 2XL Nord extension	217	2026	0,5
IT	La Spezia	LSCT expansion	200	2026	1,1
ES	Valencia	Terminal Norte (MSC-TIL)	1.564	2028	2,4
ES	Algeciras	TTI Phase 1 (Isla Verde)	150	2028	0,5
PT	Sines	Terminal XXI expansion	547	2030	1,8
Total EU			2.738		7,04

Risk of modal backshift from sea to road

Trends over time in Ro-Ro traffic, road freight traffic, and the Ro-Ro traffic share between Spain and Italy *



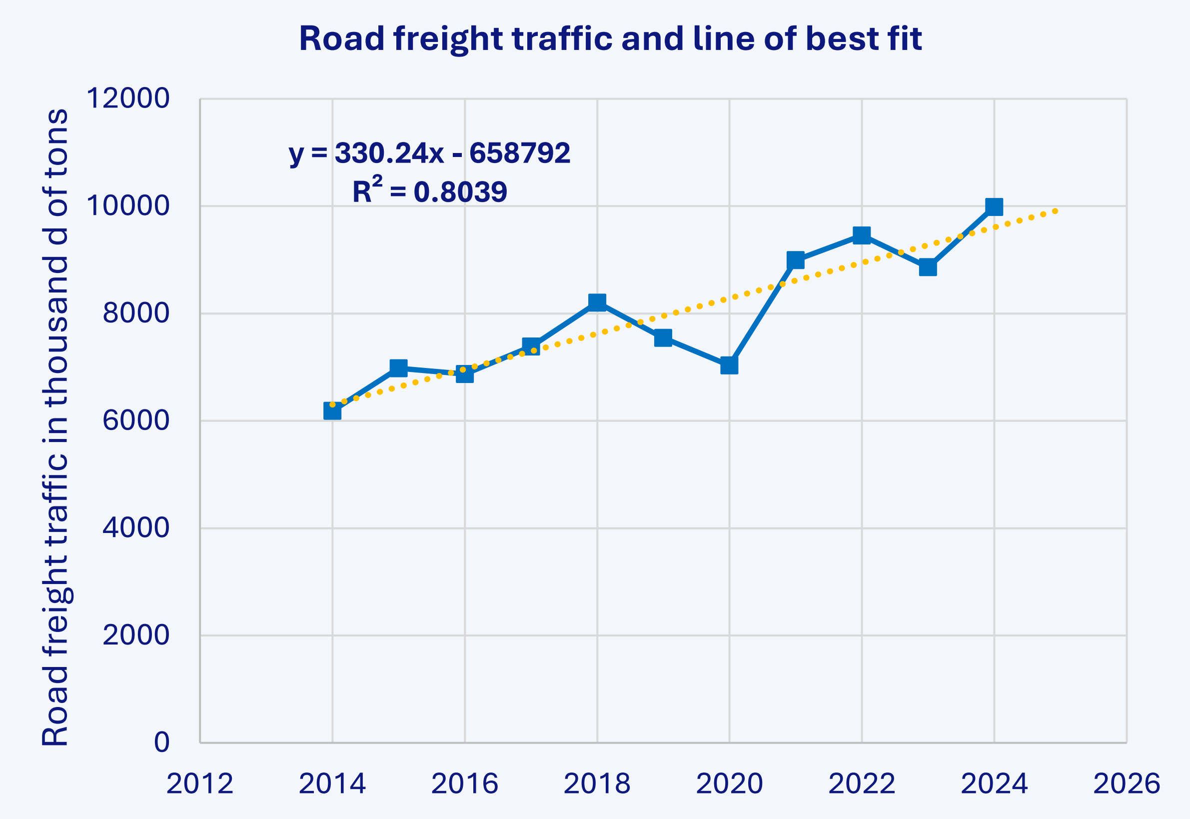
** Data provided by the Spanish Shortsea Promotion Center (SPC-Spain)*

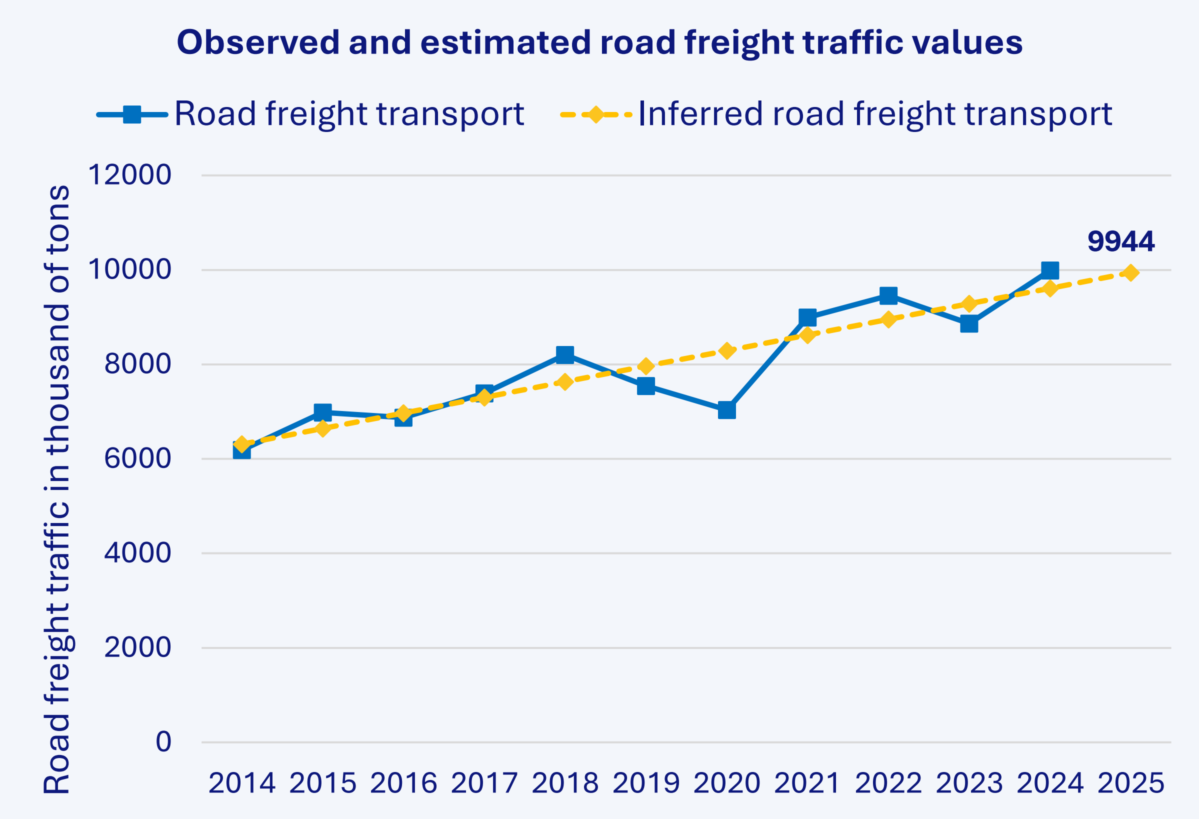
During the 2019–2020 period, the modal share of ro-ro traffic increased by four percentage points. However, between 2020 and 2021, this indicator declined by six percentage points. This marked upward and downward fluctuation was likely influenced by the effects of the COVID-19 crisis.

Nevertheless, a slight recovery in the ro-ro traffic share was observed during 2023. This was followed by a sharp decline of three percentage points in 2024. At present, it is not possible to assess either the persistence or the magnitude of this downward trend due to the unavailability of road freight transport data for 2025.

In this context, until observed data for 2025 become available, it is proposed that the likely value of the indicator be estimated using two complementary approaches. The first is based on an analysis of the growth trend in the historical road freight traffic time series. The second relies on the strong correlation between this indicator and the average chain-linked gross domestic product of Spain and Italy.

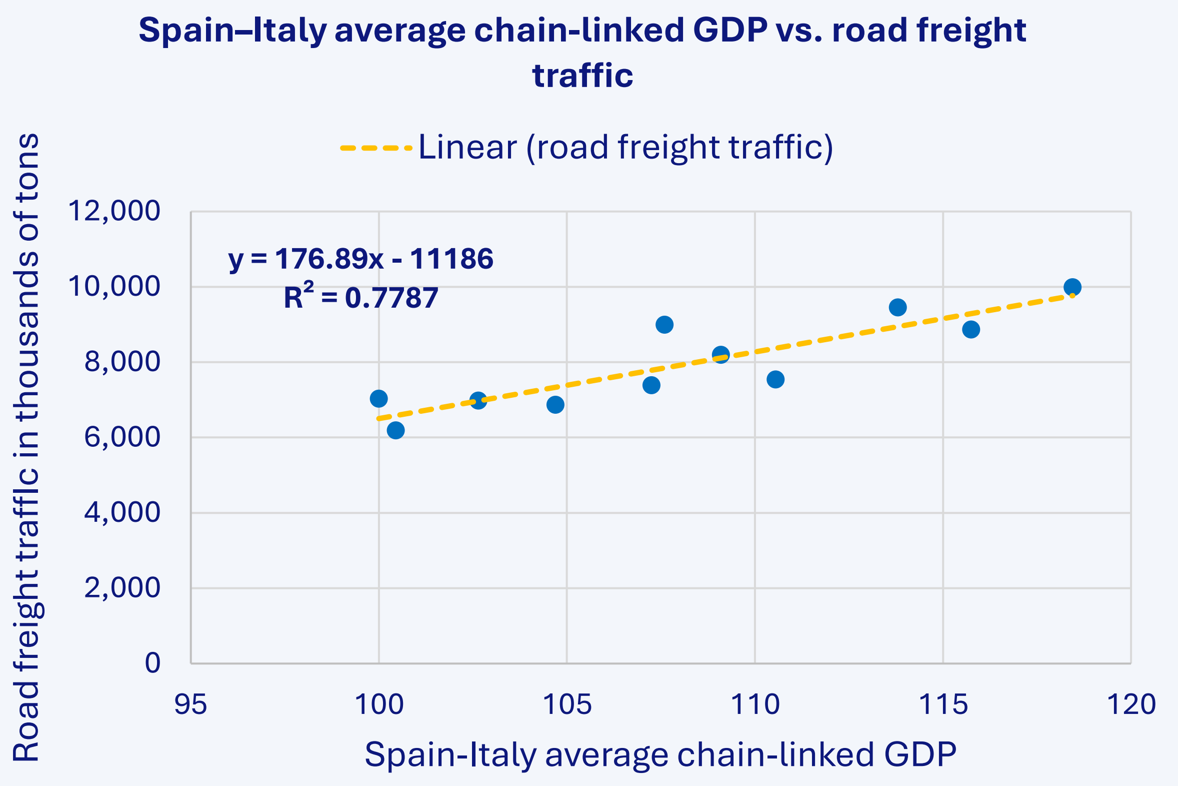
Variation over time of Ro-Ro traffic between Spain and Italy.

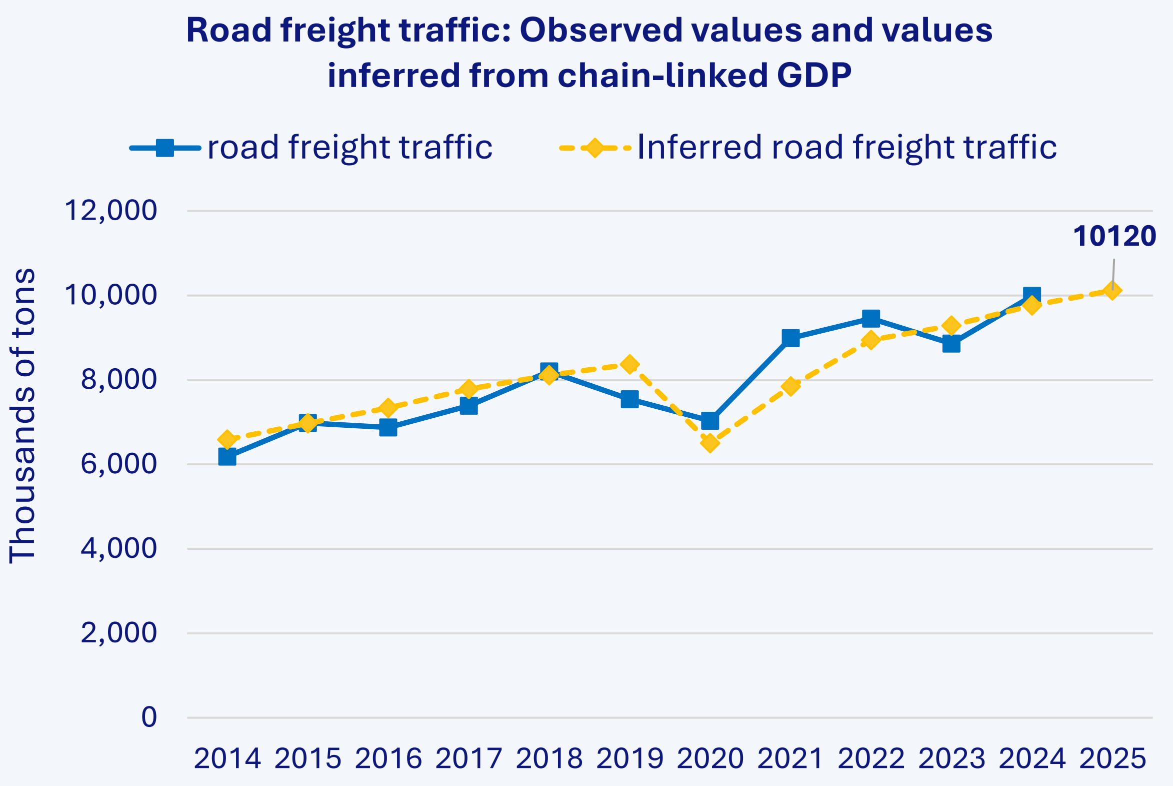




The road freight transport time series exhibits a clear upward trend, which can be appropriately modelled using a linear regression, with a coefficient of determination (R^2) of 0.80. Based on the resulting regression line, the volume of goods transported by road in 2025 is estimated to reach approximately 9.9 million tons.

Variation over time of Ro-Ro traffic between Spain and Italy.

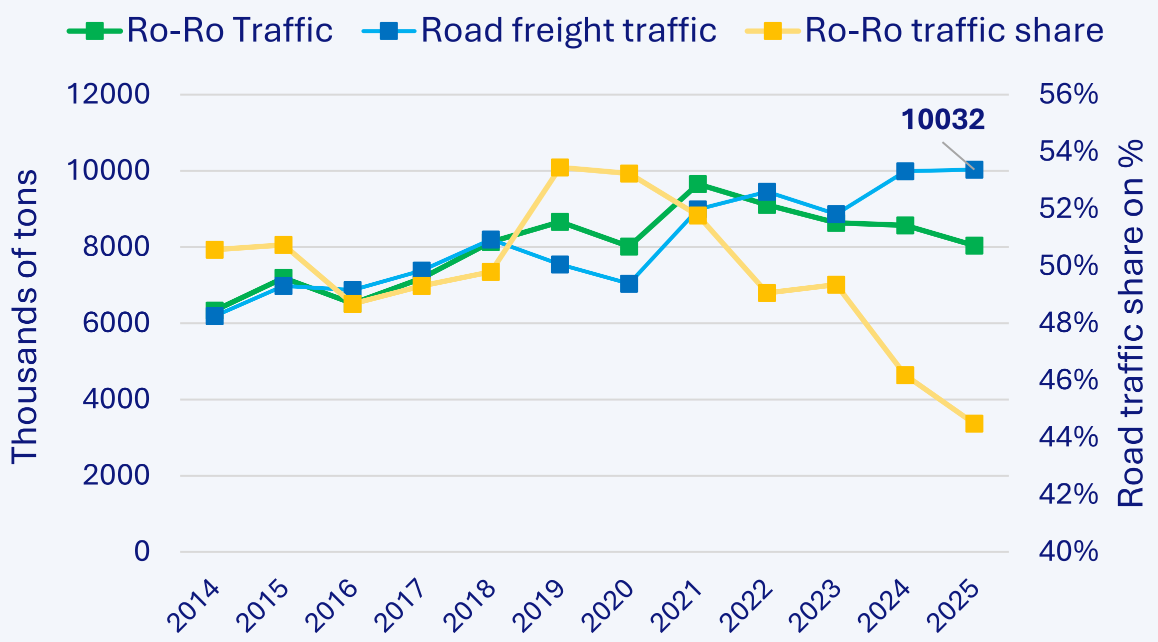




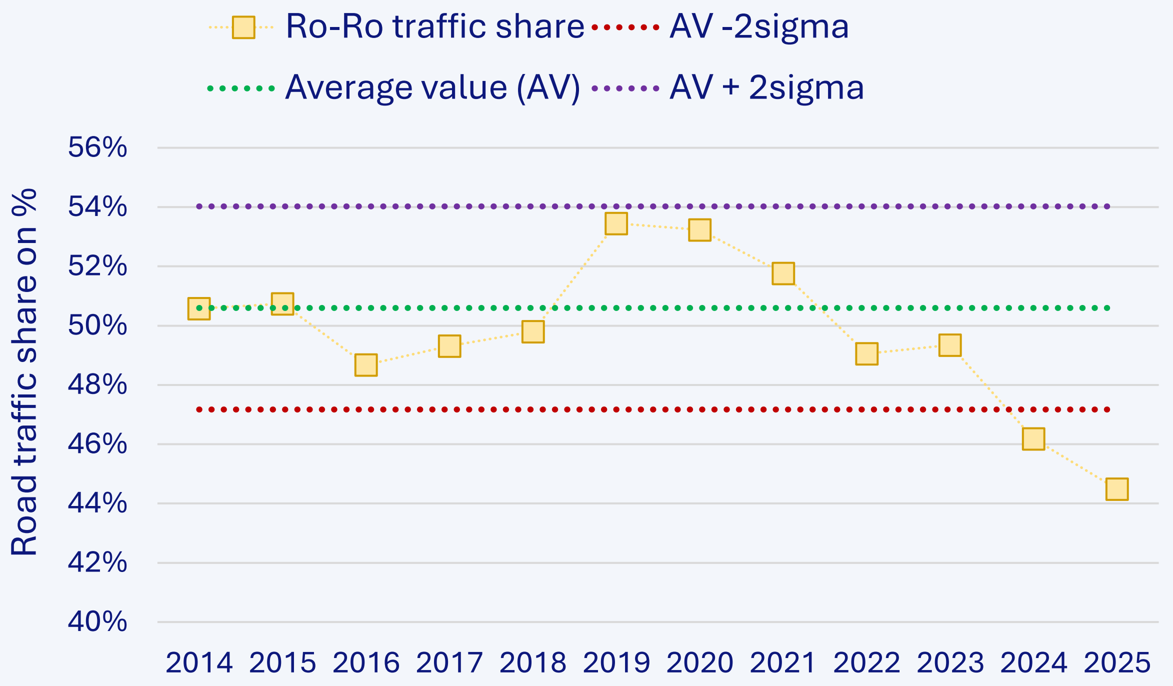
The chart on the left illustrates the relationship between road freight traffic and gross domestic product (GDP). Based on this relationship, a linear regression model has been fitted, yielding a coefficient of determination (R^2) of 0.8. Based on the resulting regression line, the volume of goods transported by road in 2025 is estimated to reach approximately 10.1 million tons, shown on the chart on the right.

Variation over time of Ro-Ro traffic between Spain and Italy.

Trends over time in Ro-Ro traffic, road freight traffic, and the Ro-Ro traffic share between Spain and Italy



Assessment of the change in the Ro-Ro traffic share.



Based on the two estimates of road freight traffic for 2025, an average value of 10 million tons is obtained. This figure, in turn, supports an estimated ro-ro traffic share of 44.5% for that year. The observed ro-ro traffic share in 2024 and the estimated value for 2025 indicates a significant decline for this indicator, whose reduction exceeds the threshold equivalent to two standard deviations, making it unlikely that the observed decrease is attributable solely to random fluctuation. ***It is therefore highly possible that the reduction in the ro-ro traffic share may be attributable to the application of the EU ETS to maritime transport.***

Containership service route choice model

Model

$$\text{Probability (route change)} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 CFUEL + \beta_2 \cdot \text{CETS})}}$$

where:
CFUEL = Fuel cost for a service (€).
CETS = EU-ETS emissions cost for a service (€).

Evaluation of alternative routes: If the decision is made to change the route, the model will calculate the probabilities of choosing different alternative routes, enabling an informed assessment.

Threshold Sensitivity Analysis: When the model gives a probability greater than 0.5, there is a risk of reconfiguration. In this case, the model correctly identifies 77 % of the current reconfigured routes.

Numeric variables considered in the model

- **CFUEL**: fuel cost for a service.
- **CETS**: EU-ETS emissions cost for a service
- **CTAX**: cost of port tax for a service
- **Category**: ship type (select Post Panamax, New Panamax, ULCV)
- **Total Services**: 250
  - 148 Services have not changed routes
  - 102 Service have changed routes

Main findings

- CFUEL and CETS are statistically significant ($p < 0.01$).
- CTAX: is not statistically significant ($p > 0.01$). Under the current assumptions (a uniform fee of 60,000€ assigned to all ports), it does not provide additional explanatory power for route reconfiguration.
- CETS: is the dominant explanatory variable, representing 76% of the model's relative importance.
- CFUE : Fuel costs also contribute, although with a smaller influence (24%).
- Higher regulatory and operational costs are associated with a greater probability of route reconfiguration.

Conclusions (1/2)

CONTAINER TRAFFIC IN THE NORTH SEA

- **Transhipment.** Since early 2024, there has been sustained growth in the number of calls at UK ports by vessels operating deep-sea services. As a result, British ports are becoming increasingly important as gateways into and out of the region. However, this increase in connectivity has not been matched by a comparable rise in transhipment activity or in import and export volumes. ***This suggests that the observed changes in service patterns are likely to be aimed at reducing the costs associated with the EU ETS.***

- **Direct connectivity.** Since early 2024, the direct connectivity ratio of EU ports in the region has fallen by five percentage points. This trend warrants particularly close monitoring, as a loss of direct connectivity may indicate the use of strategies designed to reduce exposure to the EU ETS through the fragmentation of direct services.

CONTAINER TRAFFIC IN THE EAST-MED

- **Transhipment.** Since early 2024, transhipment activity at non-EU ports has grown progressively. This increase has not been matched by a similar development at EU ports. ***Consequently, EU ports are failing to capture the growth taking place in the region's transhipment market.***

- **Direct connectivity.** Since early 2024, the direct connectivity ratio of EU ports in the region has fallen from 68% to 50%. At the same time, feeder connections between Greece and hub ports in Egypt and Türkiye have increased significantly. An analysis of service patterns and container flows suggests that some deep-sea services previously calling directly at EU ports are being replaced by feeder services connecting through hub ports in neighbouring countries. ***Such a reconfiguration is consistent with strategies aimed at reducing the proportion of maritime activity exposed to the EU ETS.***

Conclusions (2/2)

CONTAINER TRAFFIC IN THE WEST-MED

- **Transhipment.** EU ports have not lost transhipment traffic in absolute terms, but their share of the region's total transhipment activity is gradually declining. As in the Eastern Mediterranean, ***EU ports are therefore failing to benefit fully from the expansion of the regional transhipment market.*** The additional costs incurred by EU ports as a result of the EU ETS may be a decisive factor in explaining this difference in growth. Furthermore, ***virtually all relay connections at EU ports between transoceanic services linking Asia and Europe have been transferred to ports in neighbouring countries.***

- **Direct connectivity.** During the period under review, EU ports did not experience any deterioration in their direct connectivity.

RO-RO TRAFFIC ON THE SPAIN-ITALY CORRIDOR

The share of freight carried by ro-ro services relative to total road freight traffic between Spain and Italy fell from 49.4% in 2023 to 44.5% in 2025. The analysis indicates that this decline cannot be explained by random fluctuations. Both the scale of the reduction and the period over which it occurred suggest that ***the fall in the ro-ro share may be associated with the inclusion of maritime transport within the EU ETS***. No equivalent measure has been applied to road freight transport, potentially altering the relative competitiveness of the two modes.

INVESTMENTS ON PORTS IN NON-EU COUNTRIES

During the 2021–2030 period, **€9.054 millions** has been invested or is expected to be invested in the development of new port infrastructure for container traffic, as well as in the upgrade of existing facilities. As a result, the total port capacity of countries neighbouring the EU—mainly the United Kingdom, Morocco, Egypt, Israel, Türkiye and Algeria—is expected to increase **by 26,11 million TEU per year.**

Measures to prevent EU ETS avoidance strategies

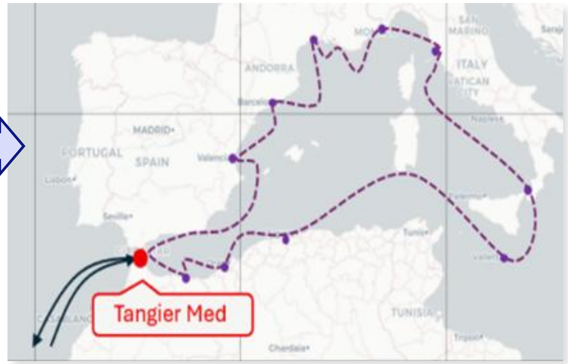
Measures: EU ETS avoidance strategies

Route Transformation: Port calls at neighbouring-country ports when entering or exiting the EU maritime area. This strategy do not break the continuity of the service, as the same vessel covers both the transoceanic leg and the EU access or exit leg.

The "neighboring container transhipment ports" measure, as currently formulated, is not effective if the level of transhipment at the port of entry or exit is low.

Route splitting: The strategy consists of splitting the original route into two distinct legs. Transoceanic vessels call at hub ports in neighbouring countries. From these locations, cargo is distributed to or consolidated from neighbouring countries via feeder routes.

This strategy allows transoceanic (deep-sea) services to operate entirely outside the scope of the EU. This form of evasion cannot be neutralized through the designation of "neighboring container transhipment ports".



Measures

Measure 1 — Extension of the criteria for the designation of “neighbouring container transhipment ports”.

This measure aims to prevent route transformation by broadening the criteria used to designate “neighbouring container transhipment ports”.

The current designation is based on the level of transhipment activity at neighbouring ports. However, this definition is not fully effective, as there are neighbouring ports with infrastructure suitable for calls by large container vessels which nevertheless display a low transhipment ratio. Moreover, the parameter relating to the level of transhipment is not always available and cannot always be reliably estimated on the basis of information reported under the MRV system or in port call manifests.

It is therefore proposed to introduce the possibility of designating a port as a “neighbouring container transhipment port” on the basis of its level of connectivity, measured in TEU-miles.

Measure 2 — Carbon leakage factor for deep-sea routes at splitting risk

This measure aims to prevent route splitting, that is, the segmentation of direct long-haul maritime services calling at EU ports into services structured around transhipment hubs located outside the EU. These services would consist of deep-sea routes operated outside the scope of the Union framework, complemented by feeder services connecting those hubs with EU ports.

The measure is based on applying a discount to the percentage of CO_2 emissions that must be covered through the surrender of emission allowances. This discount takes the form of a reduction factor **(Carbon Leakage Factor)** applied to the percentage of emissions to be reported by vessels operating on deep-sea routes. The reduction in the volume of CO_2 subject to the purchase of emission allowances is proportional to the savings that would be achieved by splitting the route on which those vessels operate.

Measure 1. Designation of “neighbouring container transhipment ports”

Methodology

It is proposed to broaden the criterion for classifying a port as a “neighboring container transhipment port”, in accordance with the following process:

1. Identify **ports** with the infrastructure and equipment **capable of handling vessels** with a capacity of more than **10,000 TEUs**. This classification may be based either on infrastructure characteristics—such as draught, quay length, and crane outreach—or on port activity data.
2. Calculate the next parameters:
   - **kTEU_miles Total:** For each port call, it is computed as the vessel's capacity in thousands of TEU multiplied by the half-sum of the inbound and outbound leg distances,
   - **kTEU_miles Deep Sea**: kTEU_miles calculated only for container ships operating on deep-sea routes, defined as those whose inbound or outbound voyage from the port exceeds 3,000 nautical miles.
   - **Deep Sea Ratio (DS%)** = Σ kTM Deep Sea / Σ kTM Total

3. Classify as “neighboring container transhipment ports” those ports that meet the following two conditions:
   - They have infrastructure and equipment **capable of handling vessels** with a capacity of more than **10,000 TEU**.
   - The **Deep Sea Ratio (DS%)** is equal to, or exceeds, **60%** over the two-year review period.

Measure 1. Designation of “neighbouring container transhipment ports”

Designation of "neighboring container transhipment ports” based on Kteu_miles

Port	Country	KTM DS 24+25	kTM 24+25	DS Ratio	Esc DS	Esc Total	% Esc DS
Felixstowe	UK	38.705.115	44.810.526	86,4%	602	1.816	33,1%
Ashdod	Israel	15.629.198	18.706.535	83,5%	272	2.685	10,1%
Damietta	Egypt	16.538.083	20.122.877	82,2%	444	1.989	22,3%
Tangier Med	Morocco	116.247.900	141.987.301	81,9%	2.956	7.592	38,9%
Southampton	UK	19.612.015	24.132.835	81,3%	765	1.696	45,1%
Abu Qir	Egypt	5.181.125	6.710.379	77,2%	79	544	14,5%
Port Said	Egypt	29.414.853	39.900.654	73,7%	520	3.558	14,6%
London	UK	21.402.454	29.391.461	72,8%	628	2.367	26,5%
Ambarli	Turkey	4.856.489	9.229.934	52,6%	213	5.687	3,7%
Tekirdag	Turkey	2.784.652	5.307.358	52,5%	121	2.021	6,0%
Alexandria	Egypt	3.259.035	7.318.389	44,5%	220	2.918	7,5%
Derince	Turkey	1.405.887	4.751.200	29,6%	102	2.005	5,1%
Mersin	Turkey	1.862.790	6.451.616	28,9%	167	2.852	5,9%
Aliaga	Turkey	2.258.674	8.254.186	27,4%	301	4.106	7,3%
Ain El Mraisse _El Manara	Lebanon	439.867	2.148.079	20,5%	21	1.770	1,2%

Choice of 60% threshold on transport work

Observed DS ratios show a clear rupture between ports above 72% and below 52%. A similar pattern emerges in the Suez-operative simulation

KTM DS 24+25: deep-sea thousand TEU·miles, 2024+2025
KTM 24+25: total thousand TEU·miles, 2024+2025
DS Ratio: KTM DS / KTM (total)
Esc DS: deep-sea port calls
Esc Total: total port calls
% Esc DS: Esc DS / Esc Total

Measure 1. Designation of "neighbouring container transhipment ports"

Simulation of the effect of the measure

Suez closed scenario

Port	Country	Calls	ETS CO_2 (50%)	ETS **Revenue Captured** (€*)	ETS Current (€*)	Factor
Felixstowe	UK	922	1.417.366	113.389.240	7.856.283	14,4x
London	UK	1.146	1.339.952	107.196.160	10.726.062	10,0x
Southampton	UK	972	1.192.066	95.365.280	5.625.036	17,0x
Damietta	Egypt	977	263.904	21.112.320	4.019.652	5,3x
Abu Qir	Egypt	339	122.446	9.795.640	2.525.544	3,9x
Ashdod	Israel	1.286	104.815	8.385.200	5.981.011	1,4x
TOTAL		5.642	4.440.548	355.243.840	36.733.588	9,7x

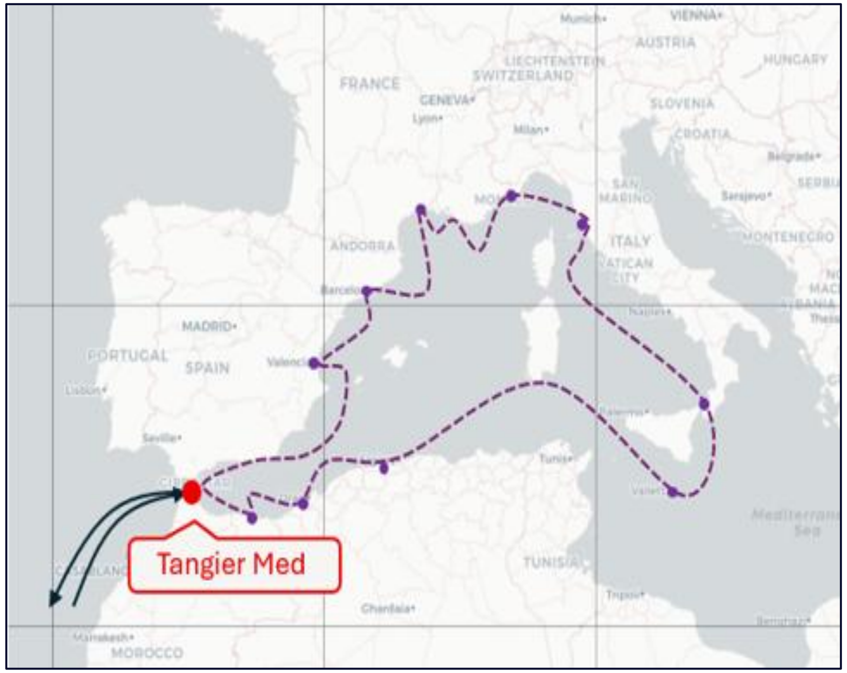
Simulated Suez open scenario

Port	Country	Calls	ETS CO_2 (50%)	ETS Revenue Captured (€*)	ETS Current (€*)	Factor
Felixstowe	UK	282	910.123	72.809.801	7.856.283	9,3x
London	UK	404	1.041.083	83.286.638	10.726.062	7,8x
Southampton	UK	553	990.253	79.220.224	5.625.036	14,1x
Damietta	Egypt	72	99.872	7.989.731	4.019.652	2,0x
Abu Qir	Egypt	58	67.095	5.367.543	2.525.544	2,1x
Ashdod	Israel	46	104.507	8.360.523	5.981.011	1,4x
TOTAL		1.415	3.212.933	257.034.460	36.733.588	7,0x

Calls: *Deep sea (≥ 3,000) port calls (2025) in ea*
ETS CO_2 (50%) : *50% of total CO2 emissions leaked, brought under the ETS maritime*
ETS Revenue Captured (€*): *ETS revenue recovered under transhipment port designation*
ETS Current (€*): *ETS revenue under current rules*
Factor: *ETS Revenue caputured / ETS Current*
** Based on 80€/tCO2*

Measure 2: Carbon leakage factor for deep-sea routes

Fragmentation risk of direct maritime services



- Non-EU-HUB
- Feeder service
- Deep-sea service

The EU ETS creates an economic incentive to split direct transoceanic services to the EU into two separate services:

- **Deep-sea service:** Operated by vessels sailing on transoceanic routes between a neighbouring non-EU hub port and distant ports.
- **Feeder service:** Operated by vessels sailing on short-sea routes between a neighbouring non-EU hub port and EU ports.

The implementation of this avoidance strategy depends on the following factors:

D — ETS cost saved by service splitting

Annual EU ETS savings generated by the inbound and outbound voyages of the deep-sea route which is outside the scope of the EU ETS.

N — Cost of service splitting

Annual operating cost associated with splitting the direct service. This includes the cost of transhipment at a non-EU hub port, as well as the cost of an additional port call.

D/N — Carbon leakage risk ratio

When the D/N ratio is greater than 1, there is a risk that the route will be restructured. The level of risk is proportional to the **D/N carbon leakage risk ratio**.

Measure 2: Carbon leakage factor for deep-sea routes

Methodology

The measure: *To prevent direct container shipping services to the EU from being split in order to circumvent the EU ETS, it is proposed that a discount be applied to the percentage of CO_2 emissions that must be covered by the surrender of emission allowances. As not all services are exposed to the same level of risk, the discount would be calculated in proportion to that risk.*

- **Service-level framework:** The discount to be applied to a service in order to prevent its fragmentation is estimated using a simplified cost model of the service, which makes it possible to compare the savings resulting from splitting the service with the costs associated with such reorganisation.
- **Vessel-level framework:** However, the proposed discount cannot be implemented in practice at shipping-service level and must instead be applied at vessel level, for the following reasons:
  - The carbon footprint is not worked out at shipping-service level, but on a vessel-by-vessel and voyage-by-voyage basis.
  - Vessels are not generally assigned permanently to a single service.
  - The metric reported under the MRV system is not the economic cost, but CO_2 emissions.

  Accordingly, it is proposed to establish a CO_2 emissions discount mechanism that can be applied at vessel level while producing an effect equivalent to that of the economic discount designed for shipping services.

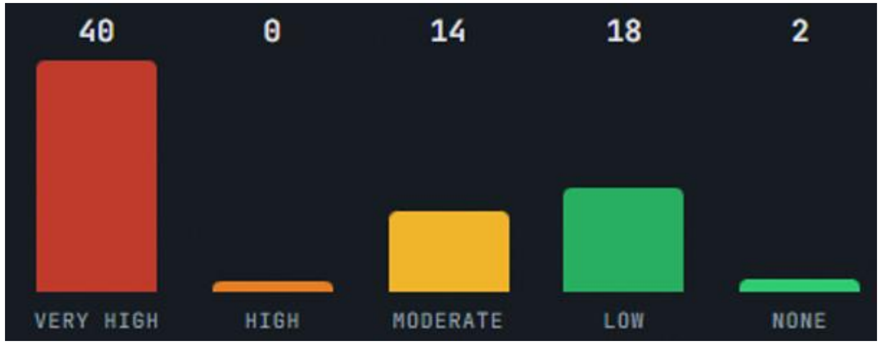
  These discounts are determined by means of a factor, referred to as the **carbon leakage factor**, which depends exclusively on the distance sailed on each voyage performed by the vessel.

Measure 2: Carbon leakage factor for deep-sea routes

Service-level framework. The D/N carbon leakage risk ratio

Services are **grouped into** five risk levels. Only the top three (D/N ≥ 1.5) qualify for a ETS discount:

- **D/N ≥ 3.0 —** **very strong incentive** to restructuring
- **2.0 < D/N < 3.0 —** **strong incentive** to restructuring
- **1.5 < D/N < 2.0 —** **incentive** to restructuring. Cut-off threshold
- **1.0 < D/N < 1.5 —** **low incentive** to restructuring
- **0 < D/N < 1.0 —** **very low incentive** to restructuring



Number of maritime services in each of the risk levels listed in the table on the left. There is a "gap" for values of k close to 2 due to the closure of the Suez Canal.

In order to reduce the risk of restructuring a maritime service, a **financial discount** (F_Discount) to the EU-ETS cost is applied so that **the carbon leakage risk ratio (D/N)** is reduced to the cut-off threshold of 1.5. Accordingly, the financial discount must satisfy the following condition:

$$\frac{\text{Route reorganisation savings} - \text{F\_Discount}}{\text{Route reorganisation cost}} = \frac{D - \text{F\_Discount}}{N} = 1.5$$

or F_Discount = max(0, D − k · N) where k = 1.5

Measure 2: Carbon leakage factor for deep-sea routes

Vessel-level framework: The carbon leakage factor for deep-sea routes

Service-level framework: For each direct deep-sea service calling at EU ports, an economic discount is estimated with the aim of reducing the **carbon leakage risk ratio to 1.5**. This estimate is based on representative values for vessel operating costs and port-related costs.

Vessel-level framework: A Reduction Factor is applied to the emissions associated with each voyage performed by vessels deployed on deep-sea services calling at EU ports, with the aim of reducing the amount of CO_2 emissions in respect of which emission allowances must be surrendered.

This Reduction Factor referred as **Carbon Leakage Factor** is adjusted and calibrated so as to meet the following conditions:

- On average, the aggregate discount resulting from the application of the Carbon Leakage Factor to all vessels deployed on a given service is equal to the F_Discount value calculated for that service using the cost-balancing methodology (service-level framework);
- It does not depend on the service or services on which each vessel is deployed;
- It can be calculated exclusively on the basis of parameters available to verification bodies, namely voyage distance and vessel capacity.

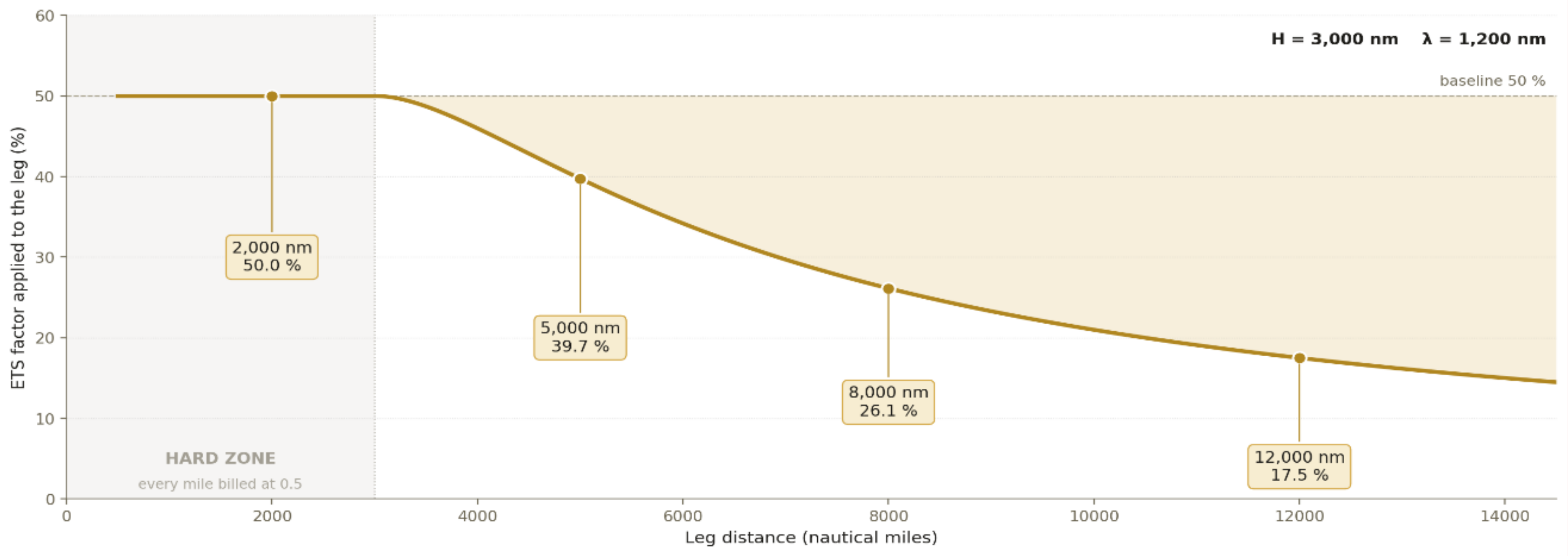
Measure 2: Carbon leakage factor for deep-sea routes

Vessel-level framework: The carbon leakage factor for deep-sea routes

The F_Discount value calculated for each direct deep-sea service using the cost-balancing methodology (service-level framework) can be replicated by applying a reduction factor to the emissions from each voyage performed by the vessels deployed on that service. This reduction factor, referred to as the **Carbon Leakage Factor**, is defined by the following expression:

$$\textbf{Carbon Leakage Factor } (L) = \frac{[0.5 \cdot \min(L, H) + 0.5 \cdot \lambda \cdot (1 - \exp(-m/\lambda))]}{L}, \quad m = \max(0, L - H)$$

*The **Carbon Leakage Factor** determines the percentage of emissions from each voyage that is subject to surrender emission allowances.*

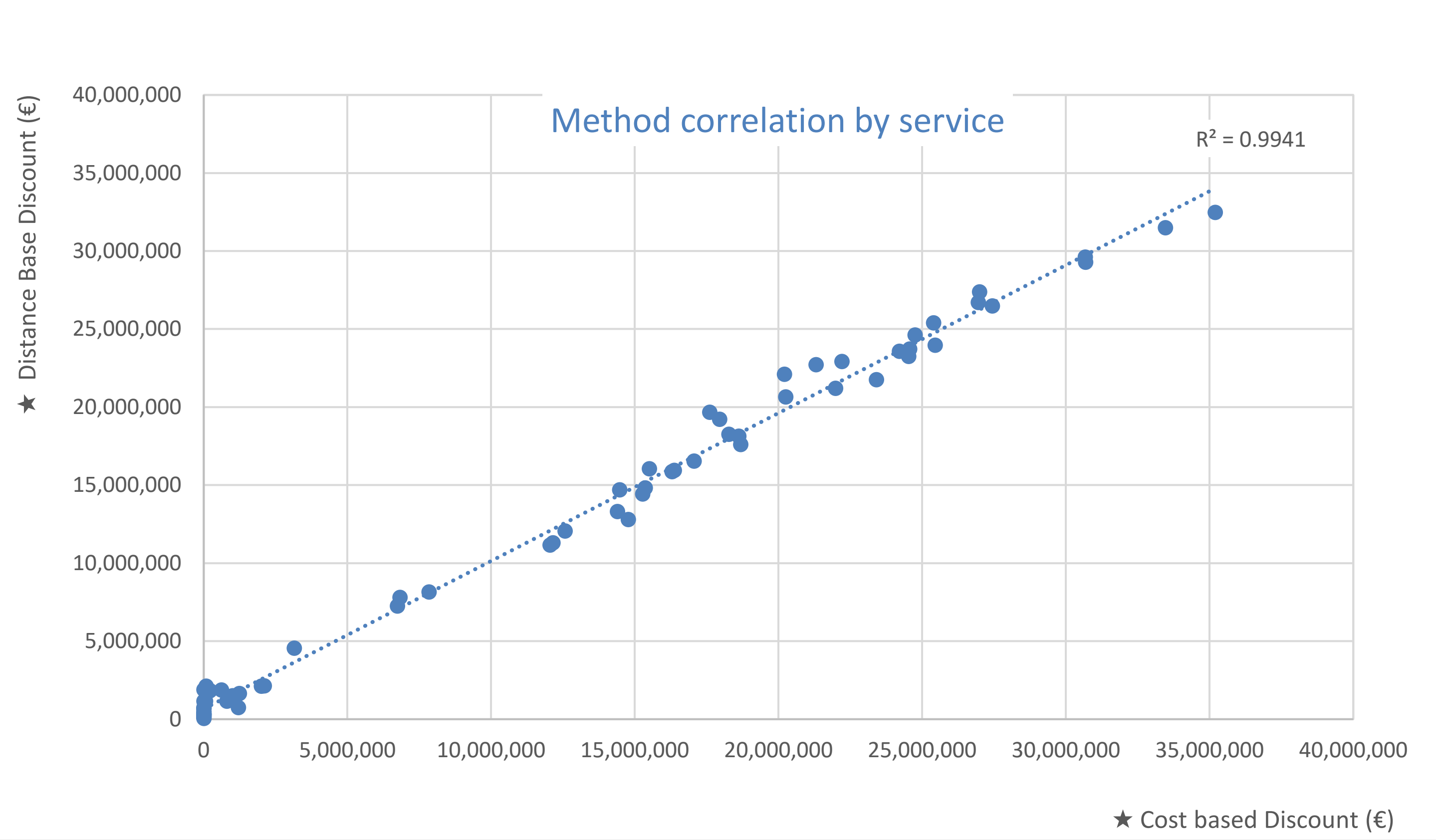


- **L** = Leg distance in nautical miles
- **H = 3,000 nm** - Below this distance every mile computed at the current 0.5 factor (short legs are not discounted)
- **λ = 1,200 nm** - Decay scale. Each additional λ miles cuts the excess factor by ≈ 2.72 (long legs converge to near 15%)

Measure 2: Carbon leakage factor for deep-sea routes

Service-level framework vs Vessel-level framework:

The following chart illustrates the relationship between the economic discount (**F_discount**) that would be applied to a maritime service under the cost-balancing methodology (service-level framework) and the discount achieved by applying the **Carbon Leakage Factor** (vessel-level framework) to the vessels operating within that service.



As can be seen, both methods produce very similar financial discounts. With the coefficient of determination of the regression line between the two methods being equal to R^2 = 0,99.

Therefore, applying the Carbon Leakage Factor to the emissions reported by vessels operating on transoceanic routes makes it possible to grant a financial discount to maritime services exposed to the risk of route splitting, ***without having to identify each service individually or analyse, in detail, the balance between the benefits of route reconfiguration and the costs associated with splitting each service.***

Measure 2: Carbon leakage factor for deep-sea routes

Service-level framework vs Vessel-level framework: Simulating the effect of the measure.

Overall effect of applying this measure: conceptual framework -> **blue square;** operational framework -> **green square**

Suez closed scenario

Corridors via CAPE	ETS in/out (D)	F_Discount	Discount %	effective ETS%	Operational Discount	Discount %	effective ETS%
Europe-Asia	1.036 M€	657 M€	63,4%	18,3%	646 M€	62,4%	18,8%
Europe-Middle East & India	157 M€	90 M€	57,3%	21,3%	84 M€	53,3%	23,3%
Europe-Americas	250 M€	6 M€	2,5%	48,8%	26 M€	10,4%	44,8%
Europe-Africa	36 M€	5 M€	14,6%	42,7%	7 M€	19,3%	40,4%
Other	60 M€	37 M€	61,7%	19,2%	36 M€	59,0%	20,5%
TOTAL	**1.539 M€**	**795 M€**	**51,7%**	**24,2%**	**798 M€**	**51,9%**	**24,1%**

Suez open scenario

Corridors via SUEZ	ETS in/out (D)	F_Discount	Discount %	effective ETS%	Operational Discount	Discount %	effective ETS%
Europe-Asia	622 M€	242 M€	38,9%	30,6%	238 M€	38,2%	30,9%
Europe-Middle East & India	60 M€	5 M€	8,0%	46,0%	3 M€	4,2%	47,9%
Europe-Americas	250 M€	6 M€	2,5%	48,8%	26 M€	10,4%	44,8%
Europe-Africa	36 M€	5 M€	14,6%	42,7%	7 M€	19,3%	40,4%
Other	37 M€	14 M€	36,9%	31,5%	13 M€	35,1%	32,4%
TOTAL	**1.004 M€**	**272 M€**	**27,0%**	**36,5%**	**286 M€**	**28,5%**	**35,8%**

F_Discount (€): ETS revenue forgone — corridor discount (left) / operational discount (right)
Effective ETS%: factor to multiply voyage CO2 tonnes to obtain tons subject to surrender allowances

ETS in/out (D): ETS cost for all incoming/outgoing legs
Discount %: Discount / D

Measure 2: Carbon leakage factor for deep-sea routes at rupture risk

Implementation

1. The Commission, by means of a delegated act, reviews and, where appropriate, adjusts the discount curves in line with cost developments—every two years—when significant differences in navigation costs arise. Such an adjustment will be particularly relevant when there are significant changes in the price of carbon emission allowances compared with the price of €75 per tonne used to calibrate the proposed Carbon Leakage Factor for Deep-Sea routes.
2. This curves are used by the shipping company , an would be asserted by an ETS MRV verifier to calculate ETS obligations as follows:

For each leg calling an EEA or neighbor transhipment port from a non-EEA port beyond 3.000 nm (or departing from an EEA or neighbor transhipment towards a non-EEA port beyond 3.000 nm)

- Calculate the Carbon Leakage Factor derived applying the curve function to the distance with the curve formula:

$$\mathit{Carbon\ Leakage\ Factor}\ (L) = \frac{[0.5 \cdot \mathit{min}(\mathrm{L}, \mathrm{H}) + 0.5 \cdot \lambda \cdot (1 - \mathit{exp}(-\mathrm{m}/\lambda))]}{L},$$

$$\mathrm{m} = \mathit{max}(0, \mathrm{L} - \mathrm{H})$$

- Report carbon allowances for the total leg carbon emissions **multiplied** by the Carbon Leakage Factor

Measures

Conclusions (1/2)

- **Measure 1:** Implementing this measure would increase the amount of CO2 and revenues under the EU-ETS scope as follows:

	Additional CO2 included in the EU-ETS (million tonnes)	Additional revenue (€ million)
Suez Canal closed	4,4	355
Suez Canal open	3,2	257

- **Measure 2:** Implementing this measure would reduce the volume of CO_2 emissions reported under the system and would therefore result in a loss of revenue. Nevertheless, it would help prevent avoidance strategies that could substantially reduce both the CO_2 emissions reported under the EU ETS and the revenues generated by the system over the medium term.

  The estimated impact of this measure in terms of CO_2 emissions and revenues included in the system would be as follows:

	CO2 excluded from the EU-ETS (million tonnes)	Reduction in revenue (€ million)
Suez Canal closed	10,6	795
Suez Canal open	3,6	272

  Therefore, the ***cost of implementing Measure 2 under the Suez Canal open scenario would be very similar to the additional revenue generated by implementing Measure 1.***

  Measure 2 not only helps to reduce the risk of route splitting but also contributes significantly to lowering the additional cost that the closure of the canal has introduced into the application of the EU ETS to maritime transport.

Measures

Conclusions (2/2)

- **Complementarity of the Measures**
  - **Risks associated with measure 1**

    Measure 1 helps reduce the likelihood that shipping companies will divert their routes in order to circumvent the application of the EU ETS. ***However, its implementation also increases the overall emissions-related costs borne by shipping companies. This increase in costs could strengthen the incentive to split direct deep-sea services***.

  - **Complementarity between the two measures**

    To mitigate this risk, ***Measure 1 should be implemented alongside Measure 2***.

    The two measures should therefore be regarded as complementary. Measure 1 reduces the incentive to make evasive port calls at certain ports, although it may increase the risk of route fragmentation. Measure 2, in turn, helps reduce the likelihood of service reconfigurations or splitting.

  - **Economic Balance**

    Once maritime traffic through the Suez Canal has been restored, ***the cost associated with implementing Measure 2 would be similar to the additional revenue generated by Measure 1.***

    Consequently, the combined implementation of both measures would reduce the risk of avoidance strategies being developed without causing a significant loss of revenue within the EU ETS.

Annex I. The carbon leakage risk ratio

Cost of splitting a maritime service

To estimate the cost of splitting a deep-sea service, the first step is to identify the closest neighbouring hub port to the area served by the route. The original deep-sea route is then decomposed into a deep-sea route starting and ending at that hub, together with a feeder route — usually circular in nature — serving the same ports at the same frequency as the original service.

Deep-sea: Algeciras, Marsaxlokk, Livorno, Genova, Marseille-Fos,Barcelona, Valencia, Pointe-a-Pitre, Fort-de-France, Caucedo, Cartagena (Col), Kingston, Houston, VeraCruz, Manzanillo(Pan), Puerto Limon, Cartagena (Col), Algeciras (8 vessels)

Feeder: Tanger, Marsaxlokk, Livorno, Genova, Marseille-Fos,Barcelona, Valencia, Tanger (2 vessels)

Deep-sea: Tanger, Pointe-a-Pitre, Fort-de-France, Caucedo, Cartagena (Col), Kingston, Houston, VeraCruz, Manzanillo(Pan), Puerto Limon, Cartagena (Col), Tanger (6 vessels)

The reorganisation of the route is carried out while maintaining the same type and number of vessels as in the original route. This approach provides an upper-bound estimate of the cost, since, in an actual reorganisation, the shipping company may rely on existing feeder services to distribute the cargo, thereby reducing the costs associated with the reorganisation.

An example of the reorganisation of the CMA CGM / Marfret Med–Caribbean–NCSA–US Gulf joint service — MedCar route is shown on the left

Annex I. The carbon leakage risk ratio

Cost of splitting a maritime service

- $\boldsymbol{Cost\ of\ splitting\ a\ maritime\ service = Port_{fees} + Cost_{handlings,transhipment}}$

$$\boldsymbol{Cost\_(handlings, transhipment)} = C_{nonEU} \cdot (1 - T) \cdot Q \cdot TEUS - (HC_{EU} - HC_{nonEU}) \cdot T \cdot Q \cdot TEUS = 5 \cdot TEUS \cdot Q$$

Variable		Assigned average value
Carbon price (€/tCO2)		75
Q	% of the vessel's capacity used	0.9 (90%)
T	% of cargo from EU transhipment to non-EU Transhipment	0.4 (40%)
1-T	% of cargo from EU Import/Export to non-EU Transhipment	0.6 (60%)
$\boldsymbol{HC_{EU}}$	Handling cost in EU ports (€/TEU)	100
$\boldsymbol{HC_{nonEU}}$	Handling cost in non-EU ports (€/TEU)	45
$\boldsymbol{Port_{fees}}$	Port call cost (€)	60,000

Assumptions on cargo volumes:

- **Slot utilization rate:** Vessels do not operate at full capacity, but at Q= 90% of their nominal capacity.
- **EU import/export ratio:** only part of the cargo, corresponding to (1–T)=60%, has its origin or destination in ports located within the area served by the EU hub port.
- **Pure transhipment ratio:** The remaining share of cargo, T=40%, is assumed to be intended for transhipment to other regions. Such transhipment may take place either at the EU hub port or at an alternative hub port located in a neighbouring third country.

THANK YOU FOR YOUR ATTENTION