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ADVANCING GREEN TRANSITION AND MARITIME SECURITY

ARSENIO DOMINGUEZ, IMO SECRETARY GENERAL

CONTAINER TRAIN OPERATORS

Not on Smooth Tracks

As India's economy continues its robust growth and its logistics sector evolves, container rail freight has emerged as a critical component in the nation's supply chain. At the forefront of this transformation is the container rail logistics sector—poised for growth yet grappling with persistent operational and financial challenges.

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Clearing the tracks for container train operators

Nearly two decades after the Indian Railways opened its doors to private Container Train Operators (CTOs), the sector is still stuck in low gear. The promise of vibrant competition and improved freight efficiency remains largely unfulfilled, with growth stagnating and private players grappling with a host of regulatory, operational, and infrastructural challenges.

February 2025's container volume data reflects this malaise–at 7.11 million tonnes, volumes remained flat year-on-year and dropped 12 per cent month-on-month. Behind these numbers lies a deeper story of policy instability, opaque pricing, high operational costs, and a regulatory framework that appears to treat CTOs more as rivals than collaborators.

The original 2006 policy that welcomed private participation did spark initial enthusiasm, but optimism has since waned. Today, private CTOs are burdened by inflexible haulage rates, unpredictable locomotive supply, poor rake maintenance, and unreliable service levels, particularly in tier-two regions. Compounding their woes is the absence of guaranteed transit timelines, a critical factor in attracting high-value and time-sensitive cargo.

Terminal infrastructure, or the lack thereof, remains another bottleneck. Many terminals are small and inadequately equipped, making operations expensive and inefficient. Land acquisition challenges and poor connectivity further slowdown the development of new facilities. As a result, most CTOs–barring the dominant state-run CONCOR–struggle to compete with road transport, especially in terms of pricing and reliability.

It's time for Indian Railways to adopt a more enabling stance. Rationalising haulage charges, improving infrastructure access, ensuring fair treatment, and establishing a transparent pricing regime will go a long way in revitalising this critical segment. CTOs must be seen as strategic partners in the logistics ecosystem–not just revenue sources.

With the right policy tweaks and a collaborative mindset, containerised rail transport in India can emerge as a reliable, scalable, and sustainable backbone for the country's growing trade and supply chain demands.

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CONTENTS

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WOMEN OF SUBSTANCE

In an industry long considered a male preserve, these seven women are navigating the tides of change with resilience, leadership, and vision. As the shipping and logistics sector undergoes technological disruption, geopolitical shifts, and sustainability transitions, women are increasingly taking the helm—not just steering vessels or warehouses, but reshaping the narrative itself.

On the occasion of International Women's Day, we feature seven exceptional women who've defied stereotypes, broken glass ceilings, and are paving the way for a more inclusive, innovative future in global trade and transport.

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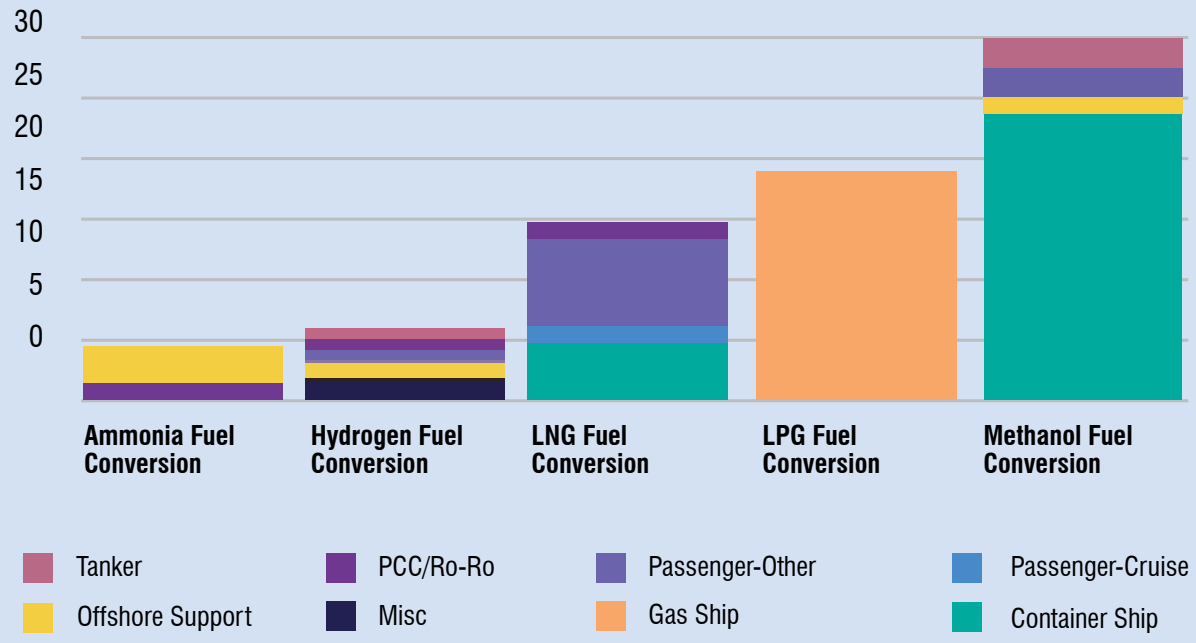
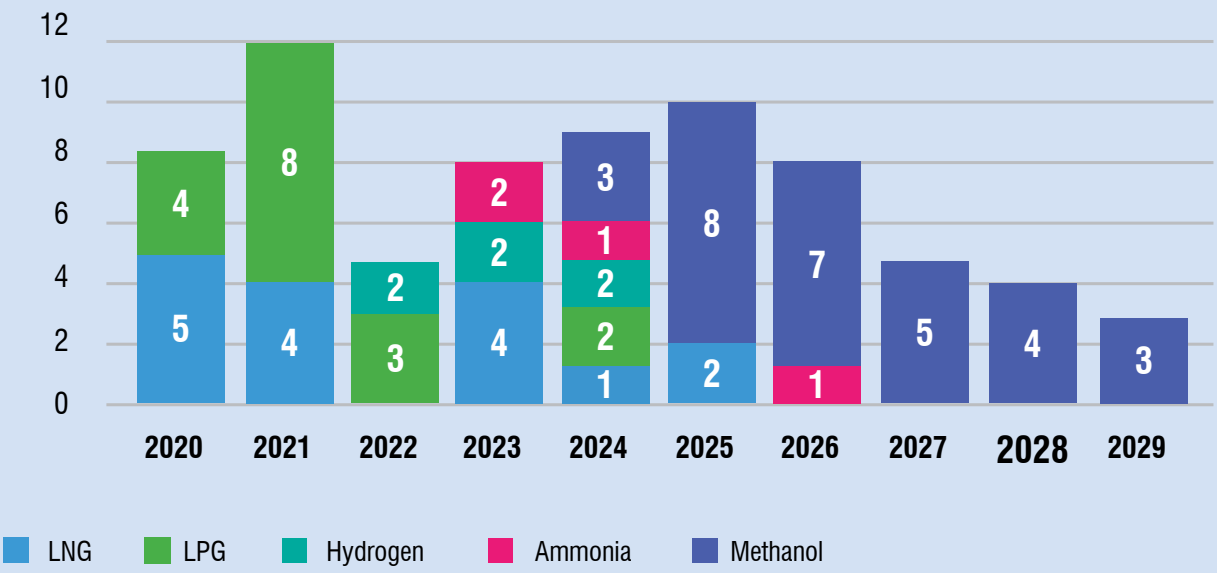
Ship segment-wise fuel conversions completed & planned for 2020-2029



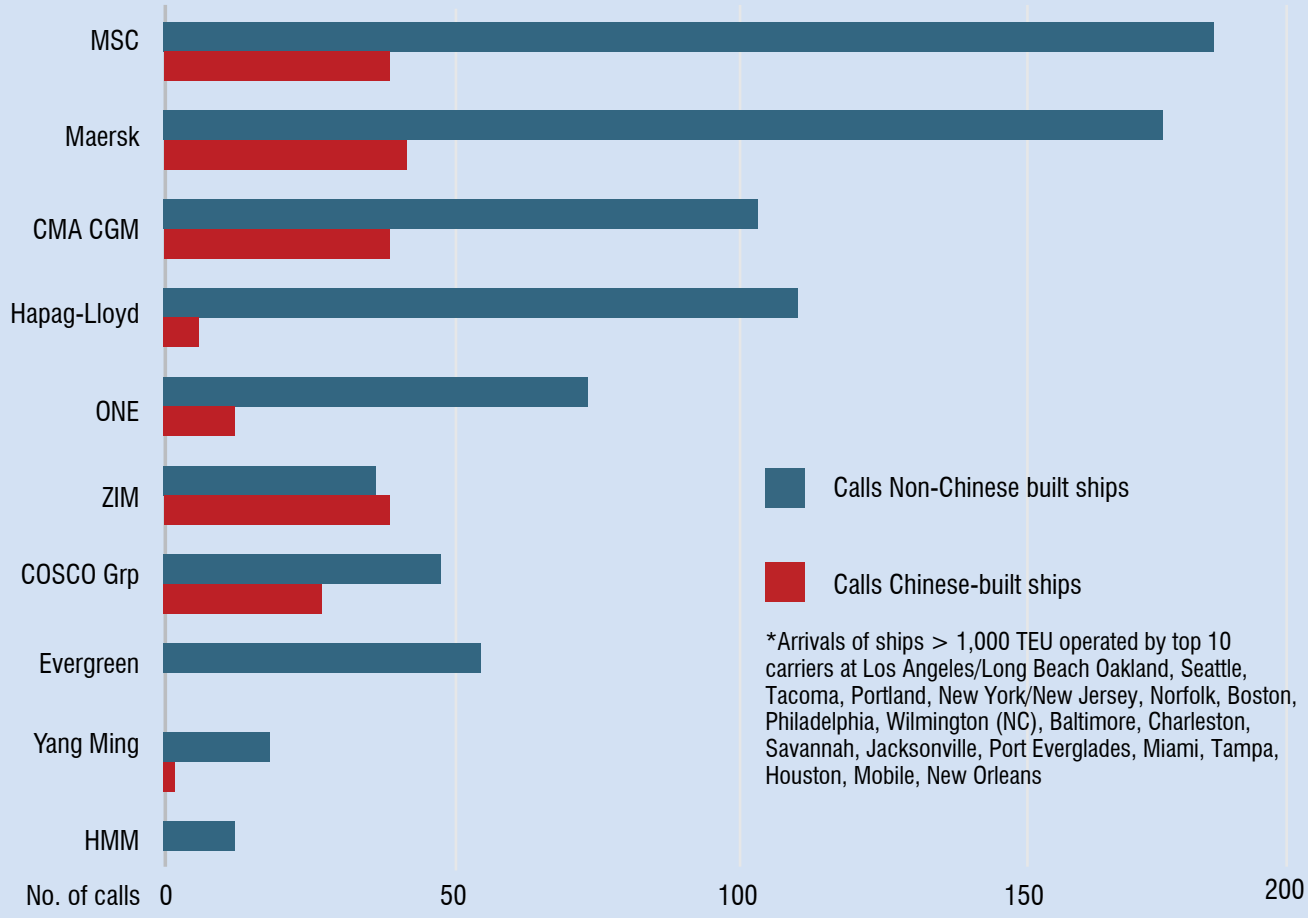
Source: Clarksons/IHS/Lloyd's Register

Ship fuel conversions completed and planned, 2020-2029



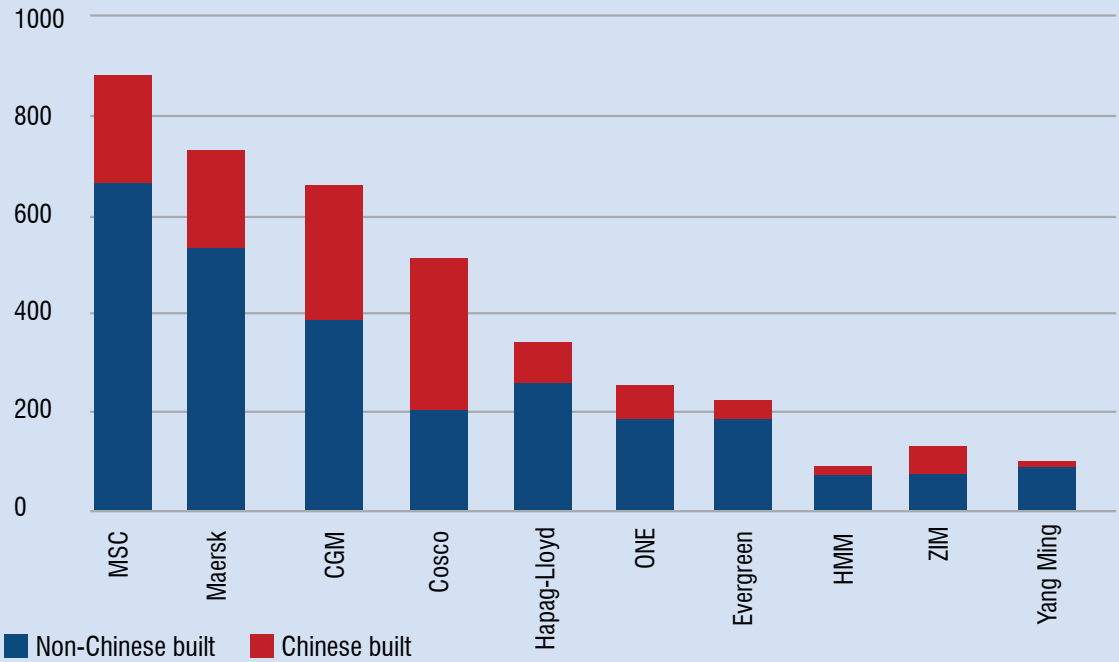
Source: Clarksons/IHS/Lloyd's Register

Number of calls by top 10 carriers at 20 US ports* in February 2025



Source: Alphaliner

Top 10 Operators and Their Current Fleets



Source: Alphaliner

India, Singapore agree for developing green shipping corridor

India and Singapore will develop a Green and Digital Shipping Corridor (GDSC). An official statement said the two countries have signed a Letter of Intent (LOI) to collaborate for the same. Both sides will work together on maritime digitalisation and decarbonisation projects, including identifying relevant stakeholders who could contribute to the effort. Commenting on the development, Union Ports, Shipping, and Waterways Minister, Sarbananda Sonowal said, this corridor will drive innovation, accelerate adoption of low-emission technologies, and strengthen digital integration in the sector. The two nations explored the possibility of developing a Green Shipping Corridor between the Port of Rotterdam and India's major ports, such as Deendayal Port (Kandla) and VoC Port (Tuticorin).

Damen teams up with Yeoman Marine to build tugboats

Dutch shipbuilder Damen has teamed up with Yeoman Marine Services Pvt Ltd to construct tugboats in India, a move that will offer strong competition to Robert Allan Ltd, whose tugboat design is widely used by local yards. Robert Allan and Damen are specialists in tugboat design and construction, but local shipowners and shipbuilders have expressed concern over the government's Green Tug Transition Programme (GTTP), which they claim was drafted keeping the Canadian naval architect and marine engineer in mind. Damen and Yeoman Marine have signed a memorandum of understanding (MoU) under which the Dutch firm will 'provide advanced and reliable know-how in design, engineering and supply chain' whereas Yeoman Marine will construct the tugboats at its yard located in Ratnagiri 'using modern modular techniques for sustained quality and faster turnaround. This partnership is expected to expand national capacity in shipbuilding and shall fulfil the demand of high-quality tugboats by Indian customers.
Harbor tugs form an indispensable part of port operations. Around 350-400 tugs operate in Indian ports in both public and private sectors.

Kandla port to launch first green hydrogen plant in India

Kandla Port in Gujarat is on the brink of becoming India's first Green Hydrogen production facility, marking a significant milestone in the country's renewable energy journey. This ambitious project aligns with India's vision of promoting sustainable energy solutions and contributing to the global shift towards cleaner fuels. The port authorities, in collaboration with key stakeholders, aim to successfully implement this initiative and strengthen India's hydrogen economy. By utilizing renewable energy sources like wind and solar power, the Green Hydrogen plant will produce hydrogen suitable for various industrial processes, supporting advancements in the transportation and manufacturing sectors. This initiative reflects a broader governmental effort to champion green energy and reduce carbon emissions.

India to contribute 6% to global trade growth: Report

India will make a significant stride in the global trade over the next five years, contributing about 6 per cent in the world's trade growth, just behind China at 12 per cent and the United States at 10 per cent, as per a joint report by DHL and the New York University Stern School of Business. The latest DHL Trade Atlas 2025 anticipates that in five years, India will retain its third-place rank on the scale dimension as well as jump 15 spots to the 17th position on the speed dimension as its compound annual trade volume growth rate rises from 5.2 per cent to 7.2 per cent. The report highlighted that India was only the 13th largest participant in international trade in 2024, but its trade volume grew at a 5.2 per cent compound annual rate from 2019 to 2024, while global trade grew at only a 2 per cent rate.

MPA and Port of Rotterdam to collaborate on shipping corridor initiative

The Maritime and Port Authority of Singapore (MPA) and the Port of Rotterdam have signed an agreement to expand their collaboration on the Rotterdam-Singapore Green and Digital Shipping Corridor. The two ports have united 28 partners across the container shipping value chain to advance sustainable fuels and digital solutions along the 15,000-kilometre route, boosting efficiency. Their goal is to cut GHG emissions from large container vessels by 20-30 per cent by 2030 while promoting global standards for efficient, paperless port operations. The collaboration focuses on testing and scaling sustainable fuels—bio and e-variants of ammonia, methanol, and methane—making them accessible, accepted, and affordable for large-scale use, with dedicated working groups for each fuel type.

India overtakes Sri Lanka as second largest tea exporter

According to data released by the Tea Board of India, India has exported 254 million kgs of tea in 2024, thus becoming the second-highest exporter in the world. While Kenya retained the first spot in global tea exports, India surpassed Sri Lanka to take the second spot. Kenya exported over 500 million kgs of tea in 2024. In 2023, India and Sri Lanka were neck-in-neck in tea exports with around 231 million kgs, but in 2024 India overtook the island nation with 24 million kgs more exports. India's 2024 figures were also its second-best export margins behind 2018 when it exported around 256 million kgs of tea. India's 2024 tea exports amounted to Rs 7,112 crore. While India's export figures hovered around 200-225 million kg for the last several years, barring 2018, this impressive growth has provided the tea industry with the hope to touch the 300 million kgs mark by 2030. India, on average, produces 1,400 million kgs of tea every year. The bulk of the export has come from the orthodox segment, the growth of which has been supported by various schemes launched by the Union and state governments in recent times.

CAG and IIM Mumbai join forces to enhance supply chain management

The Comptroller and Auditor General (CAG) of India and the Indian Institute of Management, Mumbai, signed an agreement to enhance the efficiency and transparency of public sector logistics, supply chain and inventory management. The MoU focuses on leveraging IIM Mumbai's academic expertise to support the CAG in refining audit methodologies for logistics, supply chains, and inventory management. Through this collaboration, IIM Mumbai will provide research, advisory services, and specialised training aimed at optimising logistics and supply chain practices in the public sector. Additionally, the partnership will help develop new audit frameworks to improve the assessment and management of public sector operations.

CMA CGM poised to take over Maersk as second largest liner operator

CMA CGM is poised to surpass Maersk to the second spot on the liner rankings when including its huge orderbook. The latest data from Alphaliner shows CMA CGM's fleet – including ships on order – stands at 5.42m slots, some 140,000 TEU more than Maersk. Mediterranean Shipping Co (MSC) remains far out in the lead, however, its fleet – including ships on order – is now at 8.47m slots, larger than the extant fleets of CMA CGM and Maersk combined. Being the largest buyer of second-hand boxships in the opening months of 2025, CMA CGM has been busy ordering newbuilds.

DP World and Reliance Industries partner on innovative rail solution

DP World and India's Reliance Industries have teamed up to launch an innovative logistics solution for the petrochemicals industry, shifting product transport from road to rail, significantly cutting carbon emissions while enhancing operational efficiency. The new solution connects Reliance Industries' Jamnagar plant in Gujarat to DP World's inland container depot (ICD) in Ahmedabad and onward to the port of Mundra. Previously, the Mundra-Jamnagar-Mundra round trip involved approximately 700km of road transport for each container. With the new solution, the Ahmedabad-Jamnagar-Mundra route, also approximately 700km, has been converted to rail. This transition eliminates the environmental and operational challenges associated with long-distance road transport while maintaining the same coverage. The integrated rail service enables the transport of up to 1260 tonnes of cargo and consolidates up to 45 containers in a single movement, streamlining logistics and reducing the need for multiple trailers and drivers.

CMA CGM to invest $20 bn in America's maritime transportation, logistics

CMA CGM Group, owner of the U.S. flag carrier American President Lines (APL), announced a $20 billion investment to contribute to US maritime economy and support the transformation of America's domestic supply chain over the next four years. This announcement builds on CMA CGM Group's 35-year presence in the US. The Group operates in 40 states and employs 15,000 Americans. As a leading partner in US trade, CMA CGM transports over 5 million shipping containers to and from the country each year. As part of this new program, CMA CGM Group will contribute to the development of American maritime capabilities through a range of targeted investments. It advances the U.S. Administration's recently-announced priority to strengthen American shipbuilding capabilities. This includes bolstering APL's US flag capacity and enhancing maritime resources with new jobs, skills, and technologies.

Regional container trade imbalances increase 33%: BIMCO

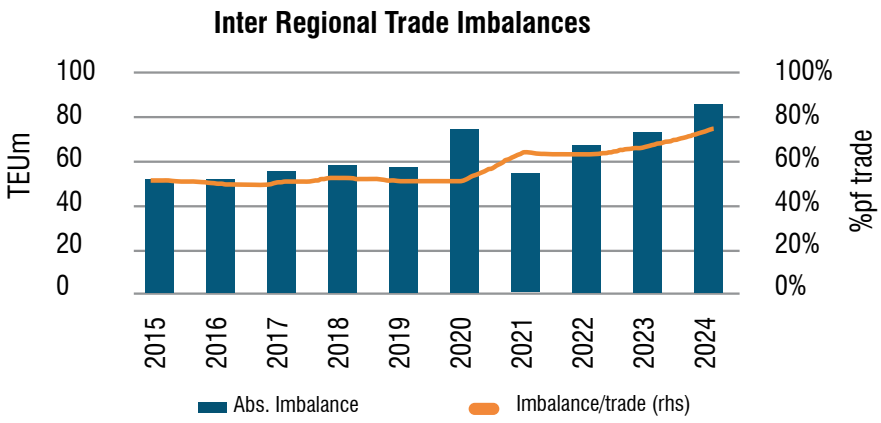
Since 2019, Asian exports rose by 10.9 million TEU, outpacing the total inter-regional market growth of 9.5 million TEU. Notably, East and Southeast Asian imports declined by 9 per cent during this period, leading to reduced exports from Europe, the Mediterranean, and North America

Global container volumes reached 183.2 million TEU in 2024, reflecting an 8 per cent growth since 2019, according to Container Trade Statistics. However, growth has been uneven, and regional export-import imbalances have surged by 33 per cent, as noted by BIMCO's chief shipping analyst, Niels Rasmussen.

In 2019, regional imbalances accounted for 58.8 million TEU (52 per cent of inter-regional trade), but this increased to 84.9 million TEU (70 per cent) in 2024. East and Southeast Asia remained the most imbalanced region, with 42.4 million TEU in 2024 compared to 29.4 million in 2019, exporting three TEU for every TEU imported. This makes the region a potential target for tariff measures amidst rising global trade tensions. Meanwhile, North America displayed the largest imbalance in 2024, importing 2.5 TEU for every TEU exported, surpassing Sub-Saharan Africa's 2.3 import-to-export ratio.

Regional imbalances grew in Europe, the Mediterranean, and South and Central America, while they declined in Oceania, Sub-Saharan Africa, the Indian Subcontinent, and the Middle East. Rasmussen highlighted that the increase in imbalances stems from East and Southeast Asia's faster export growth compared to other regions, except Sub-Saharan Africa. Since 2019, Asian exports rose by 10.9 million TEU, outpacing the total inter-regional market growth of 9.5 million TEU. Notably, East and Southeast Asian imports declined by 9 per cent during this period, leading to reduced exports from Europe, the Mediterranean, and North America.

Inter-regional trade imbalances began climbing in 2021 as Asian exports surged by 11 per cent, culminating in a 21 per cent rise by 2024 compared to 2019. However, the total inter-regional market grew only 8 per cent during this time. While BIMCO did not address potential trade impacts, Rasmussen pointed to challenges for container lines, such as increased costs for repositioning empty containers. Moreover, he noted that rising regional imbalances require liner operators to deploy larger or additional ships for head-haul trades, despite lower revenue prospects in back-haul trades.



Source: Container Trades Statistics

Is methanol facing a slowdown? Exploring shifts in consumption patterns

Methanol, once a promising alternative fuel backed by Maersk, has lost its momentum. Maersk's pivot to bio-LNG-powered vessels reflects this shift, compounded by several challenges: limited availability of green methanol, global economic uncertainty, competition from LNG and biofuels, and insufficient infrastructure for methanol storage and distribution.

The global shipping sector faces formidable challenges on its path to achieving net-zero emissions by 2050. The latest analysis by class society DNV sheds light on both the progress made and the obstacles that lie ahead. While dual-fuel capable engines make up nearly half of the current vessel orderbook, the fact that 93 per cent of the global fleet still relies on conventional fuels highlights the scale of the transition required.

In this context, methanol, once heralded as a promising alternative fuel in the decarbonisation drive, has been losing its appeal. Initially buoyed by significant backing from shipping giant Maersk, which invested heavily in methanol-ready vessels and partnerships with producers, methanol's momentum has recently waned. Maersk's shift of focus to bio-LNG-powered vessels further reflects the diminished enthusiasm for methanol. DNV's report underscores this trend, pointing out that while methanol remains a potential option, excitement around it has notably faded. Supporting this observation, the Methanol Institute reports that around 70 per cent of planned methanol production facilities are yet to secure final investment decisions.

Factors behind the methanol slowdown

A combination of challenges contributes to methanol's declining uptake:

- Limited availability of e-fuels like green methanol may delay its adoption in maritime engines.
- Global economic uncertainty and a slowdown in the petrochemical sector dampen demand for methanol, a key chemical feedstock.
- Competition from alternative fuels, such as LNG and biofuels, impacts methanol's market share.
- Some reports suggest a shift in focus toward energy efficiency as a primary strategy for decarbonisation, rather than relying solely on alternative fuels.
- Technical hurdles in developing methanol-based technologies, including fuel cells and methanol-to-olefins processes, slow progress.
- Slower-than-expected growth in methanol demand from industries such as automotive, construction, and plastics further weighs on its adoption.
- Insufficient infrastructure for methanol storage, transportation, and distribution poses significant barriers, especially in regions where alternative fuels are more entrenched.
- Inconsistent or inadequate government policies and regulatory support for methanol as a fuel or feedstock may also hinder its uptake.

Broader challenges in alternative fuels

The maritime industry's push for alternative fuels has been hampered by broader issues, including high costs, limited shipyard capacity for retrofitting, elevated interest rates for renewable infrastructure projects, and macroeconomic pressures such as geopolitical tensions and rising freight rates. These factors collectively impede progress toward decarbonising global shipping.

Prioritizing energy-efficiency measures

DNV's report advocates for prioritizing energy-efficiency innovations to address immediate challenges. Batteries, hybrid solutions, fuel cells, shore power, and digital performance optimisation are highlighted as essential strategies to enhance fuel efficiency. As the maritime sector navigates this complex journey, embracing energy-efficiency advancements alongside alternative fuels will be crucial for steering toward a sustainable future.

IMO's vision for 2025:

Advancing green transition and maritime security

In this exclusive interview with Maritime Gateway **Arsenio Dominguez, IMO Secretary General** sheds light on how International Maritime Organization (IMO) is set to face significant challenges in 2025, including geopolitical tensions, maritime security issues, digitalisation, and decarbonisation.

What should we expect from IMO in 2025 when it comes to policy developments?

This will be a busy year for IMO as the industry navigates its way through geopolitical tensions, maritime security challenges, digitalisation and decarbonisation. Our core mandate is to support safe, secure, efficient and sustainable shipping through robust international regulations, supported by technical assistance to Member States. Among the many milestones we are anticipating this year, is the entry into force of the Hong Kong Convention on safe ship recycling, the anticipated fulfilment of criteria for the entry into force of the Cape Town Agreement on fishing vessel safety, and the adoption of new amendments to the MARPOL Convention to reduce greenhouse gas emissions from ships.

What are the long-term strategies for achieving the 2050 decarbonisation targets and how the member states are supported in this?

IMO Member States adopted a Revised GHG Strategy in 2023, with ambitious aims to reach net zero greenhouse gas emissions from international shipping by or around 2050. Mandatory regulations have already been set to improve energy efficiency of ships in the short-term. mid-term measures are currently under discussion, which include a global fuel standard mandating the reduction of GHG intensity in marine fuels, and a global pricing mechanism for GHG emissions. We expect these to be adopted in October 2025. We have also launched major programmes such as IMO's GreenVoyage2050 programme and Future Fuels project to support Member States in reaching these goals.

How is IMO adapting its regulatory framework to keep pace with rapid technologies and environmental changes?

IMO updates its regulations often in order to keep up with the changes in the industry – including technological shifts and enhanced climate action. We then assist the Member States that need support to implement the regulations. For example, the Maritime Single Window became mandatory for all countries last year, marking a great leap forward for maritime digitalisation. We conducted various trainings and workshops on the Maritime Single Window around the world to help countries digitalise their shipping sectors, which also helps to increase efficiency and lower GHG emissions. At the same time, we are aware of cybersecurity risks and emerging uses of artificial intelligence, including in autonomous vessels. IMO is already working on developing a Code to regulate autonomous ships.

The IMO has been exploring alternative fuels such as ammonia, hydrogen, biofuels, and methanol. Which alternative fuels do you see as the most viable and scalable for the shipping industry in the near future? How does IMO plan to facilitate the adoption of alternate fuels such as hydrogen, ammonia or bio-fuels in the maritime sector?

IMO is technology and fuel agnostic - the Organization adopts regulations allowing the market to deliver and develop fuels. That said, there are several alternative marine fuels and new technologies currently being explored, including ammonia, hydrogen, biofuels, methanol, wind propulsion, among others. For all of these, there is a need to consider issues such as safety, regulation, pricing, infrastructural availability, lifecycle emissions, supply chain constraints, barriers to adoption and more.

We continue to encourage early movers in the sector, and support Member States through initiatives such

IMO to develop global strategy for maritime digitalisation

During its 49th session in London from 10 to 14 March, IMO's Facilitation Committee (FAL) outlined a work plan for developing the IMO Strategy on Maritime Digitalisation, which is set to be adopted by the Organization's highest governing body – the IMO Assembly – by the end of 2027. The cross-cutting strategy will span different areas of IMO's work, fostering a fully interconnected, harmonised and automated global maritime sector.

To guide this process, the Facilitation Committee established a Correspondence Group to define the strategy's scope, key objectives and implementation framework. The Group will work over the coming year to identify existing and emerging technologies, standards and methodologies that can support maritime digitalisation, while ensuring alignment across IMO's various committees.

The Facilitation Committee invited the Marine Environment Protection Committee (MEPC) and Maritime Safety Committee (MSC) to encourage Member States and international organisations to join the Correspondence Group, to ensure the early involvement of all stakeholders in shaping the IMO digitalisation strategy.

The Correspondence Group will table a report to the next session of the Facilitation Committee (FAL 50) in 2026, before a final submission is made to the Assembly session scheduled for the end of 2027. IMO Secretary-General Arsenio Dominguez emphasized the transformative potential of cutting-edge technologies such as AI and autonomous navigation, while recognising related challenges, including cybersecurity risks and the global digital divide.

as the GreenVoyage2050 project, which focuses on piloting and trialing new GHG reduction technologies. We are also working on various regulations to ensure the safe utilisation of these fuels on ships.

Safety remains a key concern with new fuel technologies. What regulatory measures is the IMO taking to ensure the safe handling and operation of vessels powered by alternative fuels?

A just and fair transition means seafarer safety is of utmost importance in the journey to decarbonisation. That's why IMO has developed interim safety guidance for ships using ammonia, LPG, methyl/ethyl alcohol and hydrogen fuel cell powered ships, while continuing to work on guidance for hydrogen-fueled ships.

This month, IMO finalised generic interim guidelines for the training of seafarers working on alternative fuel-powered ships, to be approved in June, and will continue to develop other fuel-specific interim training guidelines. It is a serious issue for us and the energy transition will certainly be taken into account during the ongoing review of the STCW Convention and Code.

Many developing countries rely heavily on maritime trade, yet they may face higher costs and technical challenges in complying with IMO's emission regulations. How does the IMO ensure that these new regulations are implemented fairly and equitably across all member states?

The green transition must be just and fair for all. And while it is true that the decarbonisation journey will have a cost, there is a higher cost if we miss the window to act, innovate and secure a more sustainable future. While developing the mid-term measures to reduce GHG emissions from ships, IMO conducted a comprehensive impact assessment to analyse the potential impacts of the proposed regulations on Member States, including Least Developed Countries and Small Island Developing States, as well as the world fleet. The outcomes will guide the ongoing discussions. It is also important to note that the green transition brings a range of opportunities especially for developing countries, such as in the production and supply of zero and near zero fuels, produced through renewable power such as wind, solar and hydrogen, as we have seen in parts of Africa and Asia. India could play a significant role in this regard.

What collaborations does the IMO have with private sector stakeholders, including shipowners, fuel providers, and technology developers, to ensure effective and practical adoption of new regulations?

The input of industry organisations is vital to IMO's decision-making process. In addition to 176 Member States, there are 89 non-governmental organisations in consultative status and 66 intergovernmental organisations that follow IMO activities very closely and contribute their technical expertise to discussions. This ensures that any regulations that are developed take into account operational realities on the ground, technological feasibility and changing needs of the industry.

IMO's processes and structures ensure that technical considerations can be brought to the table, examined, thoroughly debated and incorporated in decisions. This partnership between governments and industry is precisely what makes IMO effective as a global regulator.

The Synergy Marine Group-managed tanker, Effie Maersk, has implemented a hydroponics system, allowing the crew to cultivate fresh vegetables onboard, using Agwa's AI-powered grower units, improving crew welfare.

The revolutionary impact of hydroponics on merchant ship life

Hydroponics, the practice of growing plants in nutrient-rich water without soil, is now being adapted for life at sea using compact, AI-powered units.

Hydroponic growing equipment are being put on commercial ships as part of a subtle but significant change occurring in the maritime sector. This will improve seafarers' nutrition and morale by delivering fresh veggies to sea. The controlled, soilless growing of leafy greens directly onboard is providing a welcome change to life at sea, which has long been criticized for its unforgiving working conditions and restricted access to fresh fruit.

It's not only a gastronomic revolution. Fresh greens have historically been considered a luxury that rarely lasted past the first few days of a voyage for seafarers, particularly vegetarians. Onboard, crops like bok choy, parsley, kale, lettuce, cherry tomatoes, and even chillies are now routinely cultivated and harvested. Some businesses, such as Berge Bulk, based in Singapore, have made the commitment to fully implement hydroponic systems throughout their fleet. In 2024 alone, 150 of their 75 ships will produce more than 1.2 metric tons of veggies.

Compact, AI-powered devices are now being used to adapt hydroponics—the technique of growing plants in nutrient-rich water without soil—for life at sea. Onshore agronomists remotely monitor these refrigerator-sized devices, which regulate light, water, temperature, and nutrient levels using cameras, sensors, and artificial intelligence. Regardless of a ship's location, climate, or weather, this guarantees ideal growing conditions.

This initiative is a “game changer” that enhances nutrition with minimal effort from the crew. It’s also cost-efficient: one system can be installed for around $10,000, with an annual maintenance cost of $3,000, covering everything from seeds to technical support.

The psychological advantages are equally significant. Growing plants offers a much-needed emotional anchor in a world full of steel, cranes, and containers. In order to foster camaraderie and a sense of purpose, crew members frequently get together to sow, tend, and harvest together. The digital aspect of this green revolution is also being embraced by shipping businesses. For Chief Cooks and Messmen, some, like Seaspan, have set up online communities where they can exchange recipes, harvest pictures, and gardening advice. The systems are made to be easy to use; all you need is a freshwater line and Wi-Fi connection, and iPads display the plant growth stage and which racks need to be harvested in real time.

Ships can lessen their dependency on land-based supply networks and reduce transportation-related emissions and food packaging waste by cultivating vegetables on board. Hydroponics is essentially giving the sea a human touch again.

Hydroponics supports the maritime industry's decarbonization objectives in addition to nourishment and morale. Ships can lessen their dependency on land-based supply networks and reduce transportation-related emissions and food packaging waste by cultivating vegetables on board. Hydroponics is essentially giving the sea a human touch again. The sight of fresh greens growing among metal decks is more than simply nourishment for seamen accustomed to months at sea; it is a representation of growth, care, and life.

CONTAINER TRAIN OPERATORS

Not on Smooth Tracks

As India's economy continues its robust growth and its logistics sector evolves, container rail freight has emerged as a critical component in the nation's supply chain. At the forefront of this transformation is the container rail logistics sector—poised for growth yet grappling with persistent operational and financial challenges.

S K Pradhan

India's container rail logistics sector is witnessing significant developments, with approximately 750 container trains in operation. The state-run Container Corporation of India (CONCOR) controls nearly half of this capacity, while private players handle the rest, fostering a competitive landscape. The near-completion of the Dedicated Freight Corridor (DFC) has raised hopes for greater efficiency and capacity enhancement; however, operational hurdles, including irregularities in container transit, continue to impede its full utilization. These challenges present opportunities for innovation and reform, setting the stage for a transformative era in freight transportation across the nation.

Since the sector's liberalisation in 2006–07, a total of 21 licenses have been issued for container train operations, a figure that, at first glance, promised a rapid expansion of services. However, market dynamics have led to a more consolidated industry. Out of the 21 issued licenses, only 16 remain active today, with mergers and acquisitions further narrowing the field to roughly 10 significant players. Among these, a handful of operators have achieved significant scale—running fleets that exceed 10–12 rakes—while many others operate only a limited number of trains per circuit. This consolidation reflects not only the competitive pressures within the sector but also the reality that scale remains crucial for achieving both operational efficiency and economic viability.

The current operational framework includes nearly 750 container trains, with the state-run Container Corporation of India (CONCOR) commanding roughly half of this capacity and the private sector filling the remainder. At the terminal level, where around 100 terminals are in operation—60 to 70 managed by CONCOR and the rest by private players. Such figures, while indicative of significant investment, also underline the challenge of optimizing asset productivity and service reliability.

Infrastructure enhancements and the role of the DFC

One of the most significant developments in recent years has been the near-completion of the Dedicated Freight Corridor (DFC). Designed to boost capacity along key export-import routes—especially between North India and Gujarat—the DFC is expected to dramatically improve transit times. Notably, the corridor is engineered to facilitate double stacking, which theoretically offers substantial cost savings by allowing two containers per wagon instead of one.

Yet, while the DFC has increased capacity, its full potential is curtailed by a host of operational inefficiencies. For instance, even with improved speeds on the DFC part of the EXIM routes, the reliability of container transit remains a major concern. Puri explained that while the DFC has reduced transit times in some instances, variability still plagues the service—trains can take anywhere from two to six days to reach their destination. Such delays, caused by detentions on account of en-route train stabling and crew shortages significantly undermine customer confidence and the overall competitiveness of rail logistics.

The quality of service and pricing challenges

Despite rail's potential cost advantage on paper, the final cost of containerized cargo often ends up being higher than that of road transport. The base rail rate is competitive, however, when the first-mile and last-mile connectivity, terminal handling, and switching costs are added, rail's total cost becomes less attractive—particularly for light cargo. This issue is compounded by the fact that the current pricing mechanism is skewed in favour of heavy cargo. Consequently, light

Strategic Roadmap for Rail Logistics

Dual Strategy:	Incentivising railway transport:	Encouraging Private participation:	Projected demand:	Goal:
Improve operational efficiency and expand infrastructure	Policy reforms for a level playing field against road transport	Private sector to capitalize on government initiatives	10 billion metric tons of cargo movement	Build a sustainable, competitive, and eco-friendly logistics network.

cargo shipments, which represent a significant opportunity in the manufactured goods sector, are often diverted to road transport where pricing is more flexible and reflective of market dynamics such as seasonality and directional imbalances.

The complexity of the pricing structure leaves both operators and customers struggling to develop products that match the potential cost benefits of rail. As Puri pointed out, a shift toward a more unified pricing model—such as a per-train cost structure—could allow operators to better manage market fluctuations and improve service mix, thereby making rail more competitive across different cargo segments.

Asset maintenance and the quest for efficiency

The operational efficiency of rail logistics also lies in the performance and availability of container wagons. Currently, these wagons, while owned by Container Train Operators, are maintained by the railways. However, lack of maintenance capacity, inefficient maintenance practices and insufficient spare parts have led to prolonged downtimes and decreased availability of wagons for commercial operations. This not only erodes asset productivity but also drives up overall costs. Puri advocates for a fundamental shift in this paradigm. Allowing private operators to manage the maintenance of their own fleets could yield significant benefits—not only reducing the maintenance cost from around 5 per cent of freight expenses to potentially as low as 1–2 per cent, but also enhancing overall asset reliability and turnaround times.

The government's recent announcement to set up dedicated container terminals under the ECRT policy represents another crucial step in bolstering domestic container traffic.

Double stacking, another innovation intended to improve efficiency, has also fallen short of expectations. Although double stacking can theoretically reduce the cost per container by as much as 25 per cent, stringent safety regulations and operational restrictions—limiting the weight combination of containers that can be double stacked—have dramatically curtailed these benefits. As a result, the realized savings have dropped to less than 5 per cent, thereby limiting the competitive edge that double stacking was meant to provide.

Renewing concessions amidst changing dynamics

The concession agreement between container train operators and the railways, signed in 2006–07, is now coming up for renewal. Initially, operators paid a license fee that varied based on the category of operations—ranging from 10 to 50 crores. However, in the ensuing years, both CONCOR and private operators have made substantial investments, collectively exceeding a ten thousand crores, in expanding their train fleets and terminal infrastructure. Given these significant investments, Puri reasons that the renewal of the concession agreement should come with an automatic extension for an additional ten years, without the imposition of a fresh fee. Such an arrangement would recognize the sector's proven commitment and capacity for growth, and it would provide the stability needed for further investment. This argument is further supported by the fact that other private wagon ownership policies of the Indian Railways now do not seek any licence fee for participation in such policies.

Boosting domestic connectivity through dedicated terminals

The government's recent announcement to set up dedicated container terminals under the ECRT policy represents another crucial step in bolstering domestic container traffic. Historically, containerized cargo on rail has been dominated by export-import (EXIM) traffic, with domestic movement lagging behind. The ECRT policy aims to change that by repurposing existing railway infrastructure—such as returned CONCOR terminals—and upgrading them to handle larger volumes of domestic containerized cargo. By identifying 24 strategic locations and permitting container storage, stability in access charges, and hub-and-spoke operations, with the potential to add another 30–40 terminals in the future, the policy is designed to make rail an attractive option for shippers looking to capitalize on the cost efficiencies of rail over longer distances.

In parallel, there is a recognition of the need for improved connectivity between different regions. While Western ports have robust links with northern India, there remains untapped potential in Eastern and Southern India, particularly for domestic cargo. Strengthening rail connectivity in these regions is

expected to not only diversify the rail freight mix but also reduce the nation's over-reliance on road transport—a move that could significantly lower overall logistics costs.

Expanding the dedicated freight corridor network

The current DFC, focused primarily on the northwestern corridor, has already demonstrated its capacity to support double stacking and heavy freight. However, Puri stressed the necessity of expanding the DFC network to other key regions, including the south, east, and even diagonal corridors that connect various parts of the country. Such expansion is critical if India is to shift a larger proportion of its freight—currently around 26–27 per cent of total cargo—from road to rail. In the long term, a comprehensive network of dedicated freight corridors could boost rail's share of the market to 40 per cent or more, while simultaneously reducing the logistics burden on already congested road networks.

The long-term vision calls for the DFCs to be constructed with double stack capability across the board, ensuring that the additional capacity generated is not merely a function of volume but also of cost efficiency. As rail freight continues to gain traction, building corridors that accommodate both heavy loads and double stacking will be essential to meet the projected demand for cargo movement, which is expected to reach as high as 10 billion metric tons in the coming years.

ACTO: A catalyst for change

Over the past five years, ACTO has emerged as a key stakeholder and thought leader within the rail logistics sector. The association's proactive engagement with governmental bodies—such as the Indian Railways, Department of Logistics, and Customs authorities—has been instrumental in shaping policy and driving operational reforms. By establishing an advisory board tasked with interfacing with various stakeholders, ACTO is hopeful that the sector's voice is heard at the highest levels of decision-making.

The association's efforts extend beyond advocacy; ACTO is actively working to resolve industry-wide issues such as pricing flexibility, asset maintenance, and service reliability. Puri emphasized that while market forces are gradually driving consolidation—with major players absorbing smaller operators—the underlying operational challenges must be addressed to ensure long-term profitability. Without improvements in productivity, even the largest operators struggle to maintain healthy margins. ACTO's mission, therefore, is not only to champion the interests of its members but also to facilitate a more efficient, responsive, and competitive rail logistics ecosystem in India.

A strategic roadmap for the future

Looking ahead, the evolution of container rail logistics in India hinges on a dual strategy: increasing operational efficiency and expanding infrastructure. On one front, a shift in asset management—by permitting private maintenance—could unlock significant cost savings and boost asset productivity. On the other hand, policy reforms such as a revamped concession agreement and a more streamlined pricing mechanism are essential to create a level playing field against road transport.

The government's initiatives, including the ECRT policy and planned DFC expansions, signal a strong commitment to enhancing the rail logistics framework. For the private sector, the challenge is to leverage these improvements to capture a larger share of the container market—particularly in domestic segments where untapped potential remains vast. Achieving a higher modal share for rail not only promises to reduce logistics costs but also to ease the environmental and infrastructural pressures associated with road transport.

As the sector continues to mature, industry consolidation is expected to drive further efficiencies. While larger players currently enjoy a marginal advantage in terms of profitability, sustained improvements in service reliability and asset utilization will be critical in ensuring that rail freight can compete on a level playing field with road transport. Ultimately, the success of India's container rail revolution will depend on the collective efforts of government agencies, private operators, and industry associations like ACTO to create a resilient, efficient, and forward-looking logistics network.

Dedicated Freight Corridors (DFCs) in India

Eastern Dedicated Freight Corridor (EDFC):
Route: From Ludhiana to Sonnagar
Total Length: 1337 Km

Western Dedicated Freight Corridor (WDFC)
Route: From Jawaharlal Nehru Port Terminal (JNPT) to Dadri
Total Length: 1506 Km

Out of total 2843 Km DFCs, 2741 route kilometers (96.4%) has been commissioned and operational

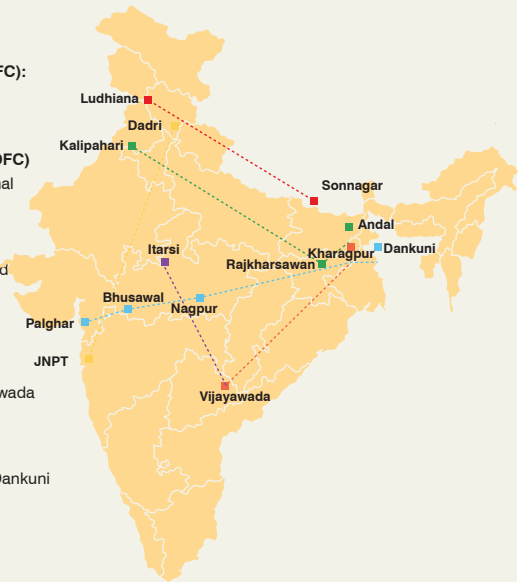
Detailed Project Reports (DPRs) currently underway for following:

East Coast Corridor: Kharagpur to Vijayawada

East-West Corridor:

(a) Palghar-Bhusawal-Nagpur-Kharagpur-Dankuni
(b) Rajkharsawan - Kalipahari – Andal

North-South Sub-Corridor:
Vijayawada to Itarsi



Shifting gears in rail freight: Addressing key challenges

In this interview, **Manish Puri, President of the Association of Container Train Operators (ACTO),** highlights the challenges faced by container train operators in the domestic market, including inconsistent service quality, slower speeds compared to road transport, unreliable delivery timelines, and the absence of transit guarantees.

Can you walk us through the current challenges of the container train operators?

Since 2006 when the sector was thrown open to private players, a total of 21 licenses have been given. In the first shot, 15 were given and subsequently over the next two decades the rest were added. Obviously, it has been far below the initial expectations. Now, there are 16 active players. Of them, only 5 to 6 are serious players, operating more than 10-12 rakes.

Domestic container business has not grown despite an inherent potential. The reasons are poor quality of service, inability of the railways to catch up with the speed of the road transport sector, poor reliability in terms of delivery timelines, absence of transit guarantee. Another big issue is pricing.

The problem is that the railway's pricing does not allow any flexibility in dealing with the market conditions, unlike the road transport option. Secondly, it is biased in favour of heavy cargo. For light cargo, it becomes more expensive than road and a large part of the containerized cargo that we are trying to target is light cargo. We have asked the Railways to give us a price on a per train basis instead of having different prices for different weight slabs and different commodities.

This helps in getting a much better mix of cargo and operators can get a better sort of pricing control over the product in the market, thereby attract more cargo in the market. Poor maintenance of wagons by the Railways is another hindering factor.

When it comes to financial performance, do you need to have the scale of economy in order to be profitable?

Absolutely. If you look at the 16 operators currently functioning, only the larger operators are profitable. Even their profits are marginal. Smaller players have a scale disadvantage.

The Railways has announced setting up dedicated container terminals. What are the implications?

The idea is to boost domestic container business. We have identified 24 locations to begin with, allowing hub and spoke operations at railways terminals. I think over a period of time this approach will allow industry to add about 30-40 extra terminal locations to attract cargo onto the system and that will help both railways and the operators.

With all these developments, do you think we need more rakes coming into operation?

If the Railways is aiming at 35-40 percent of the total cargo share, it needs to take measures to attract more container traffic. It cannot depend solely on coal, cement and steel. In order to increase container traffic, you need more trains. At existing level of productivity we will need close to 3-times the number of trains that exist today to achieve a 10 per cent share of containers. The trade wants to invest in more trains.

We know that western ports are well connected with northern India. Can eastern ports have rail connectivity with northern region?

The practical reality is that between north India and west India, you are sitting on close to 60 to 65 per cent of the containerizable market in this country.

I think for EXIM, the focus remains on the west coast. For domestic, however, the connectivity has to expand in the east. The development of more private container terminals in the east is important because there is a lot of domestic cargo potential waiting to be tapped there.

Do we need more Dedicated Freighted Corridors?

I think we need to expand the DFC network to at least north, south, east, west, and maybe towards the northeast so that it represents about 70 per cent of freight cargo.

What is ACTO doing for its members?

I have now completed five years at the helm of ACTO. We had created a charter, where we wanted ACTO to become a thought leader in the rail logistics sector. I think we have achieved that objective in the sense that almost all the major committees that the government forms or in all the major initiatives that the government takes relating with logistics we are involved.

Make professionalism your visiting card

Dr Malini Shankar, a seasoned bureaucrat, the transformation from being an administrator to an academic as the vice-chancellor of Indian Maritime University (IMU) has been seamless and smooth.

DR MALINI V SHANKAR, IAS

VICE-CHANCELLOR
INDIAN MARITIME UNIVERSITY (IMU)

An IAS officer of the 1984 batch, Dr Shankar had a distinguished record as a civil servant, taking up several challenging tasks, before starting her second innings that involves training and nurturing talent to meet the future needs of maritime industry.

As the Director General of Shipping, her last stint as a civil servant, she undertook several initiatives that had a transformative impact on the sector. Dr Shankar's life journey is a true inspiration for women, aspiring to storm the male bastions, as it truly epitomises the values of grit, determination and dedication.

A doctoral degree in Institutional Economics from the Indian Institute of Technology, Madras, Management degree from the Asian Institute of Management, Manila, Philippines, Master's in Chemistry from Mount Holyoke College, Massachusetts, USA, she has had her professional mid-career training at the IIAP (Institut Internationale d'Administration Publique), in Paris. Dr Shankar has been serving as the Vice Chancellor of the IMU since 2020. She was also the Chairperson of the National Shipping Board from 2019 to 2022.

Here are the excerpts from an interview with her:

What are some of the biggest challenges that women face in maritime industry today?

When I started working in the late 80s, women had to face many challenges including lack of access to basic sanitary facilities. Much has changed over the years, and positively so. As far as the youth go, I find a sea change today.

What barriers do women face when it comes to career progression in shipping & Logistics sector?

I have been told that they are not given sufficient encouragement for training/ refresher courses which would help them advance their career through acquiring skills as well as provide networking opportunities.

What steps companies should take to increase gender diversity in leadership?

A sensitive HR policy! Hiring based on merit, agnostic to gender. And even more important, progressive thinking people to implement the policies.

What initiatives have been most effective in creating an inclusive environment?

We are witnessing an increasing number of women studying Marine Engineering and Nautical Sciences, and getting hired by reputed organisations. They act as role models, and kindle the interest and confidence of women looking to enter the maritime and logistic sector.

What skills and experiences do you think make women particularly suited for leadership roles in maritime industry?

Passion - their choosing an uncharted path stems from their passion for the profession. Their patience and multi-tasking abilities enable them to take leadership roles.

What advice would you give to women who are considering a career in our sector?

Look before you leap, and once having plunged into it, enjoy it! And make professionalism your visiting card.

> I AS FAR AS THE YOUTH GO, I FIND A SEA CHANGE TODAY. WOMEN WHO ENTER THE SEAFARING PROFESSION DO SO TO TAKE UP A CHALLENGING AND EXCITING CAREER, AND THEY DO SO WITH LESS OPPOSITION FROM THEIR FAMILIES.

Anchored in grit, rising with grace

Navigating uncharted paths, **Nafeesa Moloobhoy** rose to prominence as an industry leader, crafting a legacy rooted in resilience and intention. A true Woman of Substance, she exemplifies that with courage and conviction, no dream is out of reach.

NAFEESA A. MOLOOBHOY
MANAGING DIRECTOR
A. S. MOLOOBHOY PVT LTD

For some women, strength isn't a choice—it's a necessity. In 2001, Nafeesa Moloobhoy was thrust into the unfamiliar world of maritime services when her husband fell ill. With young children, a crumbling company, and a 96-year-old family legacy at stake, she had two options: sink or swim. She chose to swim—and soared.

Moloobhoy Marine, founded by her husband's ancestors, was on the verge of closure following a family split and a failed partnership. While her husband was ready to walk away, Nafeesa stepped in. "We cannot shut it at 96," she said. "Let me try."

With no formal training, she left the comfort of South Bombay to lead a company from a small office in Darukhana. She learned everything from scratch—through books, staff, and conversations. Despite skepticism from peers and competitors, her determination never wavered. "I knew nothing about ships, but I knew people were counting on me."

From a turnover of just over a crore, she built the company to nearly 200 crores. Her secret? Integrity. "No shortcuts. We do it honestly or not at all," she says. Her commitment to quality earned industry trust and long-lasting client relationships.

A pivotal moment came in 2005 when she risked 50 lakhs on a tender and flew to Japan to pitch for the Furuno Electric agency. After an uneventful meeting, fate stepped in—she bumped into the company's MD, made her case, and won the exclusive agency. Today, Moloobhoy Marine represents Furuno across India and the Gulf.

She brought her daughters into the business, inspired by the respect she received as a woman in a male-dominated space. "After the initial skepticism, the industry embraced me. I was never made to feel less because I was a woman."

Now, Nafeesa is focused on corporatizing the business through professional leadership and future-ready transformation. "It's like surgery on a beating heart," she says. "But it's time."

Her journey, she says, evolved through anxiety, aggression, bitterness, and now gratitude. "God carried me through my darkest days," she says, attributing her success to divine grace, a loyal team, and hard work. She gives back through employee welfare and ethical practices.

Her advice to women: "Capability is your passport. Gender doesn't limit you—only doubt does."

From unfamiliar waters to industry leader, Nafeesa Moloobhoy built a legacy of resilience and purpose. A true Woman of Substance, she proves that when courage meets conviction, nothing is impossible.

FROM UNFAMILIAR WATERS TO INDUSTRY LEADER, NAFEESA MOLOOBHOY BUILT A LEGACY OF RESILIENCE AND PURPOSE. A TRUE WOMAN OF SUBSTANCE, SHE PROVES THAT WHEN COURAGE MEETS CONVICTION, NOTHING IS IMPOSSIBLE

Industry now rewards intelligence over toughness

Meera Kumar is convinced that the opportunities for women in maritime sector are vast, particularly with AI, EVs, and digitalization redefining the game.

MEERA KUMAR
PRESIDENT & CEO, DIABOS GLOBAL

Some careers are meticulously planned, while others are a providential accident. Meera Kumar's entry into shipping, maritime, and logistics falls into the latter category.

With a submariner Commodore for a father and a Royal Indian Army officer for a grandfather, she was raised on stories of strategy, tactics, and the crucial role of logistics in war. It turned out that her upbringing had been a perfect—albeit unintentional—preparation for the world of shipping.

Her first exposure to the world of shipping came when she joined Maersk's sub-agency sales in Goa. There was no looking back since then. Meera Kumar is now the president and CEO of Diabos Global, driving the company's port cost optimization services. With her visionary leadership, she has successfully transformed the company, introducing lucrative SAAS models and entrenching digital tools for revenue diversification and a stronger global presence.

She became a fellow of the Royal Institute of Chartered Shipbrokers (ICS). After more than 20 years as a port and shipping agent, a stevedore for containers and bulk, and a freight forwarder, she then made an unconventional leap—into the world of maritime technology.

Joining an IT product company as a domain expert and global business development lead, she sought to understand digitalization, the great equalizer, and how technology could revolutionize an industry often resistant to change.

Over the past decade, she has been working on software solutions for container carriers, global leasing companies, port community systems, and private digital maritime ecosystems—helping to make shipping more transparent, efficient, and ethical.

Today, as President and CEO of Diabos, part of the JM Baxi Group, she leads a team delivering a world-class maritime digitization platform. It empowers shipowners and operators with data-driven decision-making, audit-ready voyages, and transparency at every stage.

Reflecting on her journey, she feels deeply grateful for the support she received from the shipping ecosystem, especially from her mentors, who taught her how to navigate the complex web of stakeholders with diplomacy.

In the initial days, she had to face a challenging work environment marked by male prejudices and cultural biases.

Thankfully, the industry is changing now.

At Diabos, women account for over 27 per cent of the total workforce—compared to the industry's overall 12 per cent—with a goal of reaching 30-40 per cent.

Meera Kumar is convinced that the opportunities for women in maritime sector are vast, particularly with AI, EVs, and digitalization redefining the game. The industry now rewards intelligence over toughness, adaptability over rigidity, and lifelong learning over static expertise.

> MEERA KUMAR TOOK TO THE PORT ECOSYSTEM LIKE A FISH TO WATER, RISING SWIFTLY FROM A MANAGEMENT TRAINEE TO A BRANCH HEAD AND EVENTUALLY TO LEADING MULTIPLE SUB-AGENCY OFFICES IN THE FIRST DECADE

DR. DEEPTI MANKAD

FOUNDER - MINDSPEAK
PROFESSIONAL DEVELOPMENT TRAINER
AND CONSULTANT

Clear diversity rules needed to break gender barriers

Dr. Deepti Mankad, a prominent expert in behavioral assessments and simulation evaluation, comes from a family of seafarers, giving her a unique, decades-long perspective on the maritime industry.

Dr Deepti Mankad, a doctorate in psychology and a leading expert in behavioural assessments, brings a unique touch to the maritime sector with her trailblazing efforts in spreading awareness about mental health issues. As a wellness trainer and coordinator for India region at the Sailors Society, Dr Mankad has designed specific counselling models for seafarers.

She founded 'Mindspeak' in 2015 to serve as a hub for quality training programs for professionals and conducted the first-ever research on mental health issues among seafarers in India. What drew her towards the maritime sector was its vast global reach and its incredible potential for creating social change.

Hailing from a family of seafarers gives her a unique perspective on the maritime industry. Her invaluable contributions in wellness training and counselling have earned her several prestigious accolades, including the 'Maharashtra Ratna' from the Education Minister of Maharashtra and the 'Bharat Gaurav' from the Speaker of the Delhi Legislative Assembly. Recently ranked 4th among the 'Top 100 Women in Shipping,' Dr Mankad continues to inspire and lead change in the maritime sector.

"When I decided to leave the academia and join the maritime industry nearly 15 years ago, I noticed several gaps within the sector, particularly in the wellness space, and that's when I founded my company, MINDSPEAK, to address these needs. I then joined Sailors Society UK as a Wellness Trainer and India Region Coordinator, and I was recently promoted to their Global Projects and Clients role," she reminiscences.

Dr Mankad identifies two big challenges faced by women in maritime sector: limited access to mentorship and support and the struggle to maintain work-life balance.

Dr Mankad strongly believes that pro-active support structures, sustained focus on strategic mentorship and relevant organisational changes that foster women's career progression are needed to overcome the gender barriers.

> DR MANKAD IDENTIFIES TWO BIG CHALLENGES FACED BY WOMEN IN MARITIME SECTOR: LIMITED ACCESS TO MENTORSHIP AND SUPPORT AND THE STRUGGLE TO MAINTAIN WORK-LIFE BALANCE.

Dr Mankad roots for flexible work arrangements, mentorship programmes, and diversity training to make women feel more supported and empowered. Encouraging women to take on leadership roles and ensuring they are recognized for their contributions help build a culture of equality and empowerment within the maritime sector, she says.

Companies must take concrete steps to adopt clear diversity policies and ensure equitable access to leadership roles for women. By actively encouraging diverse voices at all levels, organizations can build a more inclusive leadership pipeline, which will benefit the maritime and logistics sectors as a whole.

The maritime industry is undergoing significant shifts towards sustainability, digitalization, and innovation.

Dr Mankad reckons that these trends would open up exciting opportunities for women in roles related to environmental sustainability, tech-driven solutions, and leadership in organizational transformation.

Women can take the lead in shaping the future of the industry by embracing these emerging roles. It's an exciting time for women to drive meaningful change and have a lasting impact on the direction of the maritime sector.

Boldly persist: Turning challenges into opportunities

The professional journey of **Dr Sharmila Amin,** provides a shining example of how a woman of substance can overcome hurdles in a largely male-dominated industry and make a mark with commendable achievements.

DR SHARMILA AMIN
MANAGING DIRECTOR
BERTLING LOGISTICS INDIA PVT LTD

A well-known leader in the Indian transportation sector, Dr Sharmila occupies the top position among the women executives in the Indian logistics industry and is probably the only woman leader in the Projects Logistics business.

A Commerce graduate from Mumbai who went on to complete Ph.D. in Business Administration and Management from Keisie International University, Dr Sharmila had worked as the head of projects (Oil and Gas) at Panalpina from 2006 to 2013 and served briefly as an independent director at Hindustan Oil Exploration Company (HOEC) before joining Bertling Logistics in 2014.

Her journey in the logistics industry has been as challenging as it is inspirational. Executing difficult jobs excites her. Particularly challenging was the oil and gas sector, particularly at a time when not many professionals were keen to work on the HBJ pipeline, India's first cross country gas pipeline.

"I grabbed the chance to prove myself, persevered, remained steadfast, and eventually succeeded," she reminisces.

Dr Sharmila draws inspiration from her father. "My father was one of India's pioneers in the construction industry and his role in shaping my career cannot be underestimated." She recalls.

Having opened the doors of opportunity for women in this field, she encourages the next generation of female professionals to take up careers in this industry.

Dr. Sharmila states that the challenges she faced on her way were numerous. Each challenge has only strengthened her resolve and made her a professional who is driving the future of the industry.

Excerpts from the interview with one of the renowned names in the logistics industry:

What are challenges and opportunities for women in the shipping and logistics industry?

Many roles in shipping and logistics have traditionally been perceived as requiring physical presence in ports, warehouses, and operational sites—leading to fewer opportunities for women. However, the industry is evolving rapidly, presenting new opportunities: Technology-driven logistics is creating more roles in AI, data analytics, and supply chain management where women can excel. Diversity and inclusion initiatives are gaining traction, making workplaces more supportive.

Flexible work arrangements and leadership training programmes are encouraging more women to rise in the industry.

What advice would you give to young women aspiring to enter the sector?

To young women looking to build a career in logistics, my message is simple: be bold, be persistent, and embrace every challenge as an opportunity to grow. The logistics industry is dynamic and constantly evolving, making it an exciting field with immense potential.

Invest in learning, develop expertise in technology, data analytics, and supply chain management and stay adaptable and innovative.

What challenges did you face as a woman working in the cargo and logistics industry? How did you overcome them?

The problem is not really about numbers but about understanding the value — value for shareholders, customers, and society that could be created with greater gender balance in the increasingly critical supply chain function across industries. I have learned to overcome many of the challenges faced by tackling them head-on and not accepting defeat, I must recognise the role of many of my male peers in helping me face them.

We can see rise of women in high-impact leadership roles

Geeta Uppal, has carved out a niche for herself in transportation, supply chain and logistics sectors.

GEETA UPPAL

DIRECTOR OF OPERATIONS - WEST AMAZON

Having worked with leading global companies in supply chain and logistics, she has rich experience in carrying out challenging assignments and has created success stories in a global environment using her expertise in sales, marketing, operations, product development, procurement, cost management and strategic planning through a structured approach to achieve defined objectives.

Geeta has more than three decades of experience in the Shipping & Maritime Industry and previously served in top two global Shipping lines like P&O Nedlloyd, Maersk Line & Damco (AP Moller Maersk Group). She was awarded the "Woman Professional of the year" in September 2015. She had worked for Reliance Industries as senior vice-president before moving to Amazon.

She served as a board member of the Shipping & Logistics Committee at the Indian Merchant Chamber of Commerce & Industry.

Excerpts from the interview with her:

What are some of the biggest challenges that women face in the logistics industry today?

Women in logistics navigate three major hurdles - First, breaking into leadership in a traditionally male-dominated industry. Secondly, operation roles can lack visibility, making career progression more difficult. Lastly, the demanding field operations, with extensive travel, create a constant balancing act between career growth and personal commitments.

Do you think these challenges are unique to e-commerce companies, or do they reflect broader industry trends?

The challenges women face in logistics - leadership barriers, visibility issues, and work-life balance struggles- are not only exclusive to e-commerce but are also deeply embedded in the broader industry. However, e-commerce's agility and data-driven approach offer a better chance to address these challenges.

What barriers do women face when it comes to career progression in logistics and supply chain roles?

Women in logistics face four barriers: underrepresentation in leadership, limited mentorship, persistent stereotypes, and rigid work structures.

What steps companies should take to increase gender diversity and create an inclusive environment?

For women to thrive in logistics, action must go beyond intent. Organisations that set diversity goals, foster inclusive hiring practices, and hold leaders accountable make a real difference.

What skills and experiences do you think make women particularly suited for leadership roles in logistics?

Women bring a unique blend of strengths that make them exceptional leaders. Their ability to multitask, think strategically, and solve problems under pressure is critical in an industry that thrives on agility.

How do you see the role of women in logistics evolving over the next five to ten years?

The future of logistics belongs to those who embrace innovation, and women are set to be key drivers of this transformation. We will see more women leading innovations in automation.

AKANKSHA BATURA PAI

ED, SINODA SHIPPING AGENCY PTE LTD &
IMO GOODWILL MARITIME AMBASSADOR

Empowering women and leading innovation

Akanksha strongly advocates that maritime corporates must invest more in women, and ensure equal representation of women at their workplaces and in the boardrooms.

When Akanksha Batura Pai graduated from the National University of Singapore (NUS), none of her batchmates chose maritime or logistics as a career option. She was an outlier. Years later, Akanksha not only feels vindicated but also looks back with a sense of pride over her decision to join the maritime industry.

She has made a mark in the industry with her commendable achievements and has been ranked number one among Top 100 women in shipping. A tenacious maritime professional with experience in shipping, logistics and transportation, Akanksha is the International Maritime Organization (IMO) Goodwill Maritime Ambassador representing Singapore, council member of Singapore Shipping Association (SSA), chairperson of its Young Executives Group, Executive Director of Sinoda Shipping Agency, overseeing the company's strategy and growth.

She is also strategy head for Raks International and TransAsia Marine Services and Director of Seamind Blue Ocean. In these roles, she is committed to digitising the maritime services industry, building the talent pipeline and developing an inclusive and sustainable strategy for the companies.

To encourage other SME shipping organizations to embark on the digitalization journey, Akanksha has been featured in Singapore's Maritime Port Authority (MPA) and Enterprise Singapore's Go Digital videos and marketing collaterals to share her experience at Sinoda.

Recipient of an Honorary Professional Doctorate from the European International University, Paris, Anushka's career saw her go places and prove her mettle in every responsibility that came her way. She has a proven track record of driving efficiency, improving processes, and leading cross-functional teams. She has also been a very passionate industry volunteer and advocate, driving positive change through community engagement.

A strong community builder, connecting professionals and fostering collaboration to drive sustainability, diversity, and innovation, Akanksha is also the liaison officer for the Honorary Consulate-General of the Republic of Malta in Singapore.

Akanksha strongly believes in giving back to the community – maritime and beyond. She is an active member of the Circle of Digital Officers (CDO) of MPA, and volunteers at events of the Singapore Logistics Association and at NUS. In the past, she has served as secretary of the Young Entrepreneurs Network (YEN) Committee at the Singapore Indian Chambers of Commerce and Industry.

She has won various awards from her alma maters and the industry that validate her work.

She is convinced that the industry will be making rapid changes in the next few years in terms of gender equality, digitalisation and decarbonisation. Akanksha strongly advocates that maritime corporates must invest more in women, and ensure equal representation of women at their workplaces and in the boardrooms.

SHE IS CONVINCED THAT THE INDUSTRY WILL BE MAKING RAPID CHANGES IN THE NEXT FEW YEARS IN TERMS OF GENDER EQUALITY, DIGITALISATION AND DECARBONISATION

RISING LNG DEMAND: OVERCOMING BUNKERING CHALLENGES IN A TRANSITIONING MARITIME INDUSTRY

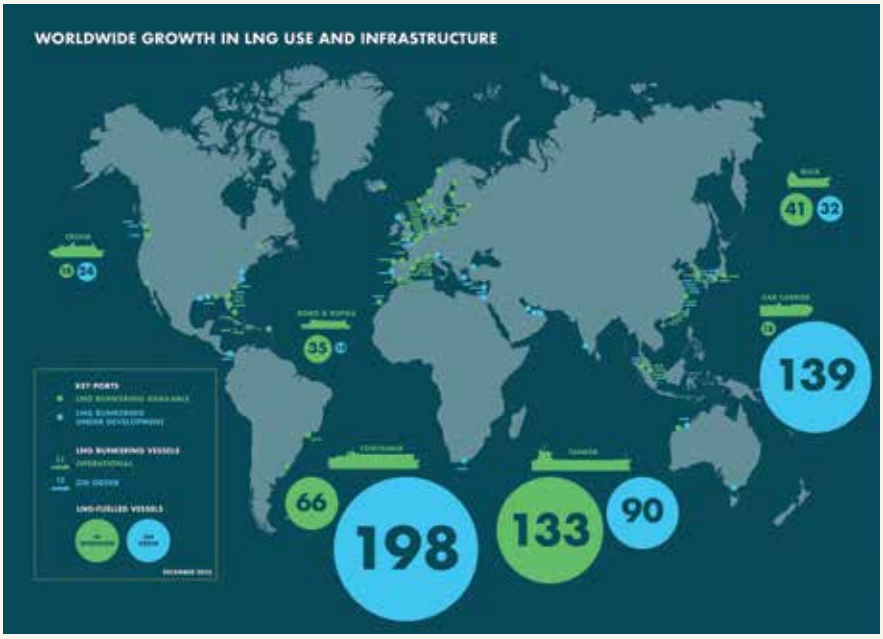
As global energy markets evolve, liquefied natural gas (LNG) is taking centre stage—not just as a key player in the global energy mix but as a transformative marine fuel. The maritime sector, under increasing pressure to decarbonize, has seen an unprecedented surge in LNG adoption.

But while LNG-powered vessels are setting new records, the infrastructure to support them–especially bunkering capacity–is racing to catch up. The success of LNG as a transitional fuel hinges not only on shipbuilding trends and regulations but on our ability to rapidly close the gap between fuel demand and refueling capability.

LNG demand surges amid global upheaval

LNG markets have experienced a dramatic upswing, driven by surging demand–particularly from China–and geopolitical disruptions, including the war in Ukraine. These factors have intensified global efforts to diversify energy sources, positioning LNG as a cleaner, more stable alternative to traditional hydrocarbons.

The ripple effect on marine fuels has been profound. DNV's Alternative Fuels Insights (AFI) platform reports that 642 LNG-fueled vessels–excluding LNG carriers–were in operation as of 2024. A record 169 LNG vessels were delivered in 2024 alone, and 264 new



LNG vessel orders were placed the same year, more than doubling 2023's order volume. If the current trajectory continues, the global LNG-powered fleet is expected to double by the end of this decade.

Bunkering infrastructure struggles to keep pace

As the LNG fleet expands rapidly, so too does the demand for safe, efficient, and reliable LNG bunkering infrastructure. LNG consumption by LNG-fuelled vessels grew by more than 500 per cent from 2020 to 2024, with a similar growth rate projected through 2029. Despite this surge, infrastructure investment hasn't kept pace.

Only 64 LNG bunkering vessels are in operation globally, with 16 more on order. Of the existing fleet, 42 per cent are above 10,000 m^3 in capacity, while another 37 per cent fall between 5,000 and 10,000 m^3. Regionally, Europe accounts for 42 per cent of the fleet, Asia for 28 per cent, and the Americas for 18 per cent.

Yet as demand intensifies, supply bottlenecks are becoming more pronounced—especially in emerging maritime hubs. Although 191 ports had LNG bunkering capabilities by the end of 2024, another 81 ports were still under construction, highlighting the critical gap in global coverage.

Why the supply gap exists

One underlying issue is a shift in shipyard priorities. Many yards previously building small gas carriers have transitioned to constructing larger LNG or LPG carriers, leaving fewer facilities capable of producing small and mid-sized bunkering vessels. This capacity crunch is exacerbated by high infrastructure costs, lack of standardization, and lengthy approval timelines.

Safety at the core of LNG bunkering

As bunkering activities scale up, safety protocols must evolve in tandem. LNG bunkering involves several critical operational challenges:

- Cargo heel management: Maintaining a small volume of LNG to stabilize tank temperatures and minimize boil-off gas (BOG).
- Pressure control: Monitoring tank pressure during loading is essential to prevent overpressure situations.
- Vapour return systems: These systems balance tank pressure by returning displaced vapors, ensuring a smooth, steady transfer.
- Redundancy systems: Safety-critical systems like pumps and valves must have backups in place.

DNV supports this through vessel notations like AP (alternative propulsion), RP (redundant propulsion), and Gas Bunker.

With complexity increasing, training becomes vital. Well-trained personnel—from crew members to port operators—are central to ensuring smooth and safe LNG transfers.

Shore power: A sustainability game-changer

While LNG reduces emissions by up to 20 per cent compared to heavy fuel oil, further decarbonization is necessary. One of the most promising enhancements is shore power—allowing LNG bunker vessels to plug into the grid while docked, eliminating generator emissions.

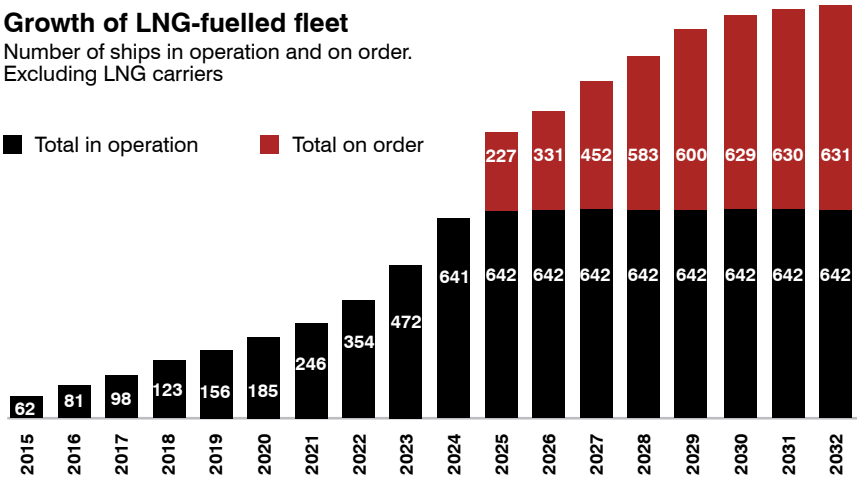
According to DNV's Maritime Forecast to 2050, shore power outperforms on-board fossil fuel generators in almost all well-to-wake emission scenarios. It also reduces noise and particulate matter in local port environments. Ports like Abu Dhabi, Rotterdam, and Los Angeles are leading the charge, with large-scale shore power infrastructure already in place.

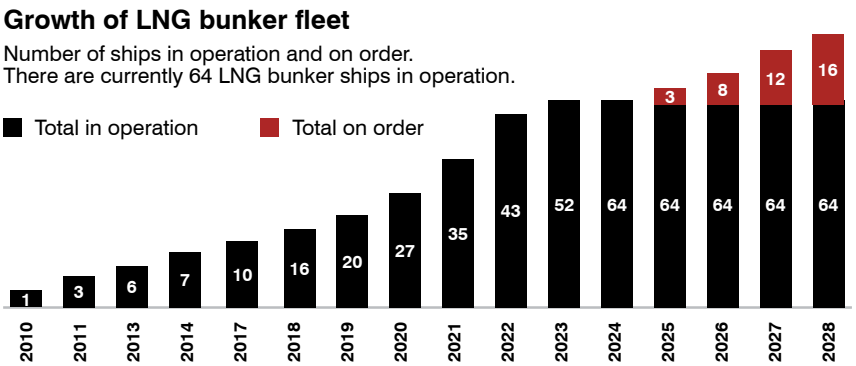
Because bunkering vessels operate on predictable, short port-based routes—much like ferries—they are ideal candidates for electrification, hybrid battery systems, and shore connection technologies.

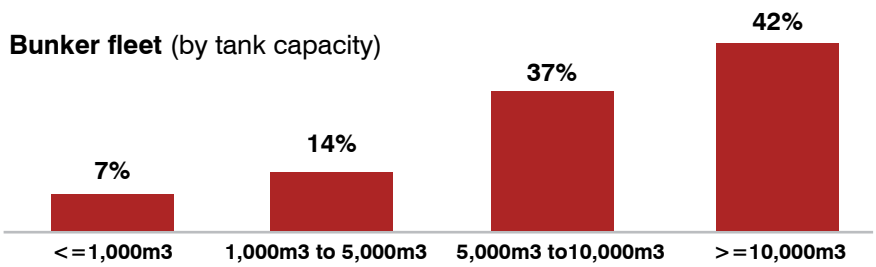
India: An LNG bunkering market poised for take-off

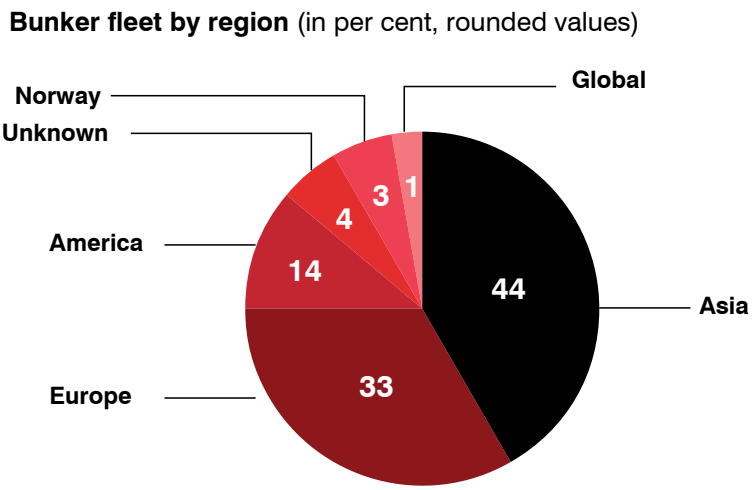
India is emerging as a key LNG bunkering market. Valued at $6.8 billion in 2024, it is projected to reach $36.29 billion by 2030, growing at a CAGR of 32 per cent. This boom is fueled by both regulatory reforms and increased investment in LNG infrastructure across major ports like Mumbai, Chennai, and Visakhapatnam.

These ports are actively developing LNG terminals, storage tanks, and bunkering facilities, supported by government incentives. India's push to lower sulfur and nitrogen oxide emissions is also prompting shipowners to transition to LNG-powered vessels—many of which are being built with LNG-ready designs in domestic shipyards.









Digitalization is another driving force. Real-time monitoring systems, automated transfer procedures, and advanced analytics are being integrated into LNG bunkering operations to enhance transparency, safety, and efficiency.

Coastal and inland waterways: A new frontier

India's maritime future is not limited to deep-sea shipping. Coastal and inland waterway vessels are increasingly adopting LNG, aided by their proximity to ports and the government's inland transport initiatives. These vessels offer a scalable, cost-efficient use case for LNG, making them an attractive segment for future bunkering investment.

A flexible future for bunkering vessels

A major concern has been the long-term viability of LNG bunkering vessels should the market shift toward other fuels. But there's good news: these vessels can be repurposed for small-scale LNG distribution, particularly for interregional trade. They can also be adapted to handle bio-LNG or synthetic LNG, which are fully compatible with existing LNG infrastructure and engines. This flexibility ensures bunkering assets remain valuable long after the peak of LNG's use as a transition fuel.

Market outlook and investment opportunities

With over 400 LNG-powered vessels already operational and more than 500 on order, the bunkering market is projected to grow from $1.2 billion in 2023 at a CAGR of 28.5 per cent through 2030. Europe remains at the forefront, with Rotterdam, Amsterdam, and Barcelona investing heavily in bunkering capacity and supply chain innovation.

Despite high capital costs, regulatory uncertainty, and regional disparities in infrastructure, momentum is building. Mobile bunkering platforms, AI-driven fuel management, and collaborative frameworks among fuel suppliers, ports, and shipping lines are accelerating LNG's adoption as a sustainable fuel.

Bangladesh imports over $3 billion worth of cotton annually, with more than half sourced from India. Indian cotton imports rose from $1.92 billion in FY23 to $2.36 billion in FY24.

Imports from India rise amid shrinking lead times

Bangladesh is increasingly turning to India for its import needs as local manufacturers and exporters grapple with tightening global supply chain deadlines. With lead times for international retailers and brands shrinking rapidly—from 90 days to 45 days—Bangladeshi businesses are seeking faster, more reliable sources for raw materials, and India has emerged as a strategic partner.

A significant factor driving this shift is time. While importing cotton and other essential materials from regions like Africa, Latin America, or the United States can take over 45 days to reach Bangladeshi mills, Indian imports arrive within just two to three days. This drastic reduction in transit time is vital for maintaining competitiveness in the global market, especially in the ready-made garment (RMG) sector, which is the backbone of Bangladesh's exports.

According to Bangladesh Bank data, imports from India rose by 2.09 per cent year-on-year in the October-December quarter of 2024, reaching $2.36 billion, up from $2.04 billion in the same period of 2023. In FY24, total imports from India amounted to $9 billion. Although this marked a slight decrease from the $9.94 billion recorded in FY23, the upward trend has resumed in the current fiscal year, with imports reaching $4.41 billion in the first six months alone.

Cotton is a major driver of this trade. Bangladesh imports over $3 billion worth of cotton annually, with more than half sourced from India. Indian cotton imports rose from $1.92 billion in FY23 to $2.36 billion in FY24. Alongside cotton, Bangladesh also imports significant volumes of yarn, fabrics, textile chemicals, and handloom products from India.

Several factors have contributed to this growing reliance on Indian imports. First, the political and labour unrest that disrupted Bangladeshi factories in mid-2023 led many to seek quicker and more dependable sourcing options. Second, improvements in border security and infrastructure have reduced informal trade and increased the volume of goods transported through official land, rail, air, and sea ports—24 land ports and three rail ports are now in operation.

Additionally, the ongoing US dollar shortage has made it difficult for Bangladeshi banks to open letters of credit (LCs) with distant suppliers, further incentivizing trade with India due to its proximity and easier financial arrangements. Familiarity in language and business culture also supports smoother transactions between the two nations.

Despite the import boom, Bangladesh has struggled to fully capitalize on duty-free trade opportunities with India. Exports from Bangladesh to India declined by 11.63 per cent in FY24, dropping from $1.77 billion to $1.56 billion. Limited product diversification and export readiness are among the key barriers to improving this trade balance.

As global supply chain pressures persist, India's role as a critical trading partner for Bangladesh is likely to expand. However, for a more balanced and resilient trade relationship, Bangladesh must also work on boosting its export capacity to India and diversifying its product offerings.

Digital Twins: Revolutionizing seaports

From virtual replicas to real-time solutions, digital twin technology promises to transform India's ports into smarter, greener hubs of efficiency and innovation, aligning with global standards and national ambitions.

S K Pradhan

Imagine a virtual replica of a bustling seaport–ships gliding in, cranes humming, and cargo containers stacking up-mirrored perfectly in a virtual world all from a computer screen. Every vessel's movement, every crane's lift, and even the shifting tides are tracked in real-time. This isn't science fiction; it's the power of digital twins, a technology poised to redefine how India's ports operate. As the nation aims to bolster its maritime infrastructure, digital twins offer a smarter, greener, and more resilient future.

Digital Twin technology is reshaping the landscape of seaport and container terminal operations by creating virtual replicas of physical assets. This innovation enables real-time monitoring, simulation, and optimization of port activities, ultimately boosting efficiency and safety. Singapore's pioneering digital twin initiative exemplifies the transformative potential of this technology, while India is gearing up to integrate similar advancements into its infrastructure. Think of it as a "SimCity for Ports," where stakeholders experiment with strategies to optimize efficiency, safety, and sustainability.

What are digital twins in seaports!

Digital twin technology, once a concept confined to science fiction, has rapidly emerged as an essential tool for modernizing infrastructure and industrial operations. A digital twin is a virtual, real-time replica of a physical entity–like a seaport or container terminal–built using data, simulations, and advanced modelling. For ports, it's a dynamic digital mirror of the entire ecosystem: ships, cranes, warehouses, and even environmental factors like wind and

waves. Sensors embedded across the port collect live data, feeding it into a software-based Twin that reflects what's happening on the ground–or water–at any moment.

This isn't just a fancy visualization. Powered by artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT), digital twins analyse data to predict outcomes, simulate scenarios, and optimize operations. For example, they can schedule vessel arrivals to avoid traffic jams, predict when a crane might need repairs, or test new processes–all without disrupting the real port. For India's container terminals, this means faster cargo handling, fewer delays, and lower costs.

Singapore's maritime marvel: A lesson for India

Singapore's Tuas Port, set to be the world's largest fully automated terminal by 2040, offers a blueprint for digital twin success. The port's digital twin integrates data from thousands of sensors, GPS trackers, and AI algorithms to simulate scenarios like vessel congestion, crane breakdowns, or storm disruptions. For instance, during a simulated typhoon, the system rerouted ships and adjusted cargo schedules in minutes, preventing $2 million in potential losses.

Singapore, a global maritime leader, shows what's possible with digital twins. Its Maritime Digital Twin (MDT), launched by the Maritime and Port Authority of Singapore (MPA) and GovTech, is a benchmark for smart ports worldwide. The MDT pulls real-time data from ships, port equipment, and environmental sensors into a virtual model of Singapore's port waters and infrastructure.

The results are impressive. AI-driven analytics optimize ship movements, cutting wait times and fuel use. Congestion drops, turnaround times shrink, and service providers thrive. Beyond efficiency, the MDT acts as a testing ground for innovation–think autonomous ships or energy-saving tech–without risking real-world hiccups. It even boosts safety, simulating emergencies like oil spills to sharpen response plans. The twin also enables predictive maintenance: by analysing equipment wear-and-tear data, it schedules repairs before failures occur, reducing downtime by 30 per cent. Such innovations have slashed ship turnaround times by 20 per cent, cementing Singapore's status as a global maritime leader. By slashing emissions, Singapore's digital twin aligns with global green goals, offering India a blueprint to follow.

The government is doubling down on digital twin technology through two landmark initiatives: the PM Gati Shakti Digital Twin and the Sangam Digital Twin Initiative. Launched in 2023, the Gati Shakti program focuses on creating virtual replicas of 12 major ports, including JNPT (Mumbai) and Chennai, by integrating real-time data from shipping lines, customs, and road networks.

How digital twins work at ports

The process begins with IoT sensors embedded across cranes, trucks, and ships, continuously transmitting metrics like location, temperature, and cargo weight to a central system. This data fuels the creation of a dynamic 3D model–a virtual replica of the port–refreshed every second to mirror physical changes. Next, AI-driven analytics take centre stage, with machine learning algorithms predicting delays, optimizing cargo routes, and flagging inefficiencies. Port operators then leverage these insights to run simulations, testing scenarios such as adding new berths or rerouting containers during labour strikes. Finally, actionable solutions–from dashboard alerts to automated crane adjustments–are deployed to enhance efficiency. For instance, Rotterdam Port, Europe's largest, slashed fuel consumption by 13 per cent using its digital twin to optimize ship speeds and docking sequences, showcasing how this technology isn't just futuristic but functionally transformative. By experimenting in this digital sandbox, ports improve performance, slash costs, and innovate–all without real-world risks.

India's bold leap: The Sangam initiative

India isn't just watching from the sidelines. In February 2024, the Department of Telecommunications (DoT) launched the Sangam: Digital Twin initiative, a proof-of-concept project to revolutionize infrastructure, including ports. Blending digital twins with AI, ML, and IoT, Sangam aims to tackle modern challenges with data-driven precision.

The government is doubling down on digital twin technology through two landmark initiatives: the PM Gati Shakti Digital Twin and the Sangam Digital Twin Initiative. Launched in 2023, the Gati Shakti program focuses on creating virtual replicas of 12 major ports, including JNPT (Mumbai) and Chennai, by integrating real-time data from shipping lines, customs, and road networks. This system predicts congestion hotspots and automates cargo clearance–for instance, rerouting trucks in real-time if a checkpoint delay occurs, slashing idle hours by 40 per cent.

Expanding the scope beyond ports, the Sangam Initiative, announced in 2024, aims to deploy digital twins across airports, highways, and railways. A precursor to this vision is already visible at Hyderabad Airport, where an AI-powered digital twin launched in 2023 uses drones and sensors to optimize baggage handling–a model set to be replicated at ports soon.

Why India's ports need digital twins

India's 13 major and 200+ minor ports handle over 90 per cent of the nation's export-import cargo by volume, driving economic growth and global trade. Yet, they face stubborn challenges: clogged terminals, slow processes, and rising environmental demands. Digital twins are the answer.

By mirroring ports virtually, operators can test fixes without guesswork. Congestion plaguing Mumbai's Jawaharlal Nehru Port? Simulate new schedules. Equipment breakdowns at Chennai Port? Predict maintenance needs. The payoff is huge: sharper decisions, higher throughput, lower costs. Virtual testing also opens doors to automation or renewable energy, boosting competitiveness. Plus, with sustainability in focus, digital twins can track and trim carbon footprints–vital as India eyes green goals.

Take Vizag Port, a key trade hub. A digital twin could optimize its coal and iron ore handling, cutting delays and emissions. Or consider Kandla, where virtual models could plan expansions while dodging environmental snags. As India aims to rival global logistics giants, digital twins are a must-have edge.

Transforming Systems with Digital Twin Technology

A digital twin is a virtual, real-time representation of a physical object, system, or process, using data, simulation, and modelling to mirror its behaviour and performance. It allows for simulation, integration, testing, monitoring, and maintenance of the physical twin.

What it is:
A digital twin is a digital replica of a physical entity, such as a product, system, or process, created using real-time data, simulation, and modelling techniques.

Purpose:
It serves as a digital counterpart for purposes like simulation, integration, testing, monitoring, and maintenance of the physical twin.

Key components:

Physical entity: The real-world object, system, or process.

Digital twin: The software-based representation.

Data: The real-time data that links the two together.

How it works:
Digital twins use data from sensors, simulations, and models to create a virtual representation that mirrors the behaviour of the physical twin.

Benefits:

Improved decision-making: By simulating different scenarios, digital twins can help organizations make better decisions.

Enhanced performance: They can be used to optimize performance and identify potential problems.

Reduced costs: By simulating potential problems, digital twins can help reduce costs associated with maintenance and downtime.

Faster innovation: Digital twins can be used to test new designs and processes in a virtual environment.

Challenges and the road ahead

Adopting digital twins isn't without hurdles. High upfront costs–sensors, software, skilled staff–could strain budgets. India's ports, many still modernizing, may lack the tech backbone to start. Data integration is another snag; siloed systems must sync up for the twin to work. And then there's training–port workers need to master this tech to unlock its potential. Cybersecurity risks, highlighted in a 2023 Springer study, warn of vulnerabilities to hacking or data breaches in poorly secured twins. Additionally, the upfront cost of setting up a port twin–₹50–100 crore–raises eyebrows, though experts argue the long-term ROI outweighs initial investments.

Yet, the rewards outweigh the risks. Singapore proves it: early investment pays off in efficiency and innovation. For India, government backing via Sangam and Gati Shakti signals commitment. Public-private partnerships could ease funding woes, while global collaboration–say, with Singapore–could share know-how. An Ericsson report estimates digital twins could boost port efficiency by 35 per cent, saving India $2.1 billion annually, while optimizing ship routes to cut CO2 emissions aligns with the nation's 2070 net-zero goals. Private players like Adani Ports are piloting AI-driven cargo systems, while startups such as Detect Technologies deploy drones for surveillance, signalling a collaborative push toward innovation. The government's Sangam Initiative further aims to establish 50 infrastructure digital twins by 2030.

A smarter, greener maritime future

Digital twins are no longer a futuristic dream–they're here, reshaping ports from Singapore to India. This tech isn't just cool; it's critical. With Sangam leading the charge, India's ports can leap from congested choke points to sleek, sustainable hubs. Better decisions, lower costs, bolder innovations–digital twins deliver it all. As these digital systems become more widespread, they will not only improve the day-to-day operations of seaports but also enhance strategic planning, leading to smarter, more responsive, and more resilient port management systems.

As ships sail into tomorrow, India stands at a crossroads. Embrace this technology, and its ports won't just keep pace with the world–they'll set the pace. A future-ready India starts here, where virtual meets vital, and the maritime map gets a digital makeover.

Rising tensions and policy uncertainty hint at crucial shift in global trade: SM Lee

Singapore's Senior Minister Lee Hsien Loong has warned of the potential transformation of global trade due to geopolitical challenges and strategic tensions.

Global trade is on the brink of transformation, as mounting strategic tensions and policy uncertainties disrupt its historical alignment with gross domestic product (GDP) growth. Speaking at the opening of Singapore Maritime Week, Senior Minister Lee Hsien Loong underscored the far-reaching implications of this shifting dynamic, cautioning that it could mark the dawn of a new era not seen since the aftermath of World War II.

Addressing geopolitical challenges, including changes prompted by the United States' new administration, SM Lee warned of the grave economic and strategic fallout if the trade-to-GDP ratio begins to decline. Such a downturn, he explained, would impede global economic development, creating ripple effects that extend beyond stalling growth. Fragmentation in international relations and amplified tensions between nations could further undermine the cohesion of the global order.

However, the implications stretch far beyond economics and diplomacy. SM Lee highlighted the cascade of social and political challenges likely to emerge, both domestically and internationally, underscoring the urgent need for international cooperation to stabilize the interconnected frameworks that sustain global economies. He called on nations to safeguard the delicate balance between trade, growth, and geopolitical stability, warning that disruption could have wide-ranging consequences.

For Singapore, these turbulent times signal a critical juncture. With trade integral to the Republic's survival and prosperity, the nation is determined to remain a key player in global commerce. Reflecting on six decades of economic growth facilitated by globalization and a stable global order, SM Lee acknowledged the evolving challenges. Multilateral institutions like the United Nations and agreements such as the UN Convention on the Law of the Sea, once the bedrock of international collaboration, are facing new strains as major powers adopt more transactional and coercive approaches.

Singapore's maritime industry, a cornerstone of its economy, must also navigate its environmental impact. With shipping accounting for 3% of global greenhouse gas emissions—comparable to aviation—trade patterns are expected to adapt as the industry transitions to greener fuels and more efficient vessels. Recognizing this shift, Singapore is proactively investing in green technologies, alternative fuels, and workforce training to prepare for the demands of a sustainable future.

On the broader front of climate action, Singapore has committed to ambitious goals, including peaking emissions by 2030 and achieving net-zero emissions by 2050. SM Lee described this as a daunting task for an island nation with limited natural resources. Yet, he emphasized the importance of preparation and adaptability to ensure that Singapore not only withstands but thrives in this era of change.

While globalisation faces significant headwinds, SM Lee expressed cautious optimism, affirming that trade will remain a necessity for nations worldwide. By focusing on innovation, upskilling its workforce, and embracing cutting-edge technologies such as AI, drones, and underwater robotics, Singapore is positioning itself to navigate uncertainty with resilience and foresight.

NAVIGATING THE FUTURE OF CONTAINER SHIPPING:

MACRO HEADWINDS AND DECARBONISATION-DRIVEN OPPORTUNITY

As global trade navigates an era of unprecedented disruption and transition, container shipping finds itself at the centre of multiple converging forces—geopolitics, regulatory overhauls, and the drive toward decarbonisation. Read the summary of the panel discussion held at SMW 2025

Leaders from across the maritime value chain gathered recently to assess these shifting paradigms and share their strategies for adapting and thriving in a volatile world.

Geopolitics and policy: The triple threat on the horizon

Few container industry leaders are as candid and forward-looking as **Jeremy Nixon, CEO of Ocean Network Express (ONE),** who opened his remarks by outlining the top three macro challenges facing container trade today.

"Our immediate three challenges right now are three political processes," Nixon said. "The first one is the immediate short-term one in the US with Section 301—potential penalties on port calls by vessel operators. We're in the consultation phase and we'll find out on the 17th of April whether that's a reality or non-reality."

These proposed tariffs or operational restrictions could significantly reshape container flows into and out of the United States, adding compliance burdens and threatening supply chain continuity.

Secondly, Nixon turned to a simmering crisis that shows no signs of resolution: "The immediate situation with security in the Red Sea and Eastern Mediterranean... developments in Syria, Gaza, Israel, Iran, and the Houthis. So far, we were quite optimistic, hoping to see improvement in the safety and security situation. That doesn't look likely now."

The result is a continued detour around the Cape of Good Hope—a rerouting that adds weeks of transit, stresses capacity, and reshapes cost structures globally. "That has a big impact on our operations, a big impact on supply and demand," Nixon added.

The third and most enduring challenge is decarbonization. "We can build decarbonized ships. We can operate decarbonized ships," Nixon said. "But it's really understanding the regulator and what is going to come. In the next four to six weeks, that's absolutely critical."

This sentiment echoed across the panel, where the uncertainty

around policy timelines and fuel regulations was universally recognized as a limiting factor for long-term investment.

From conflict to volatility: Insights from tanker and bulk operators

While container shipping faces its own set of hurdles, tanker and dry bulk operators are navigating parallel challenges.

"In the short term, continued conflict either in the Middle East or in Europe is not good for global trade," said **Zahid Osman, President and Group CEO of MISC Berhad.** "The new sanctions and restrictions being introduced certainly have a negative impact."

Yet, paradoxically, volatility often brings demand. "In the tanker market, a lot of this trade needs to reroute," Osman explained. "This drives the time on petroleum tankers—supporting the high rates that we are enjoying at the moment."

From a dry bulk perspective, China continues to be the demand anchor. **James Marshall, CEO of Berge Bulk,** painted a more optimistic picture: "Despite a slow start to the year, the market has recovered strongly. Housing prices have stabilized, and so have transaction volumes."

"There are still a lot of projects in terms of supply of commodities coming onstream, and we see China absorbing those," he noted, highlighting a continued bullish view on capesize and larger vessels.

Regulatory game-changers: IMO 2025 and the race for clarity

Looking ahead, 2025 is poised to be a regulatory inflection point.

"We're in the early innings of a decade of change," said **Christopher J. Wiernicki, Chairman and CEO of the American Bureau of Shipping (ABS).** "One of the biggest things in 2025 is what's going to happen at IMO. This industry needs regulatory clarity, consistency, and certainty."

To meet the IMO 2050 goals, Wiernicki estimated the need for "probably 70 per cent zero-carbon fuel, requiring ten times more renewable energy, and 30 per cent carbon-neutral fuel, needing 100 times more carbon capture."

What's emerging is a layered strategy combining fuel innovation, retrofitting, and digital optimization. "About 70 per cent of the answer is in the fuel," Wiernicki said. "But 15 per cent is in energy retrofits and 15 per cent in data and performance optimization."

The maritime Marshall plan: A pragmatic blueprint

Berge Bulk's James Marshall offered one of the most comprehensive approaches to decarbonization, which he dubbed the "Maritime Marshall Plan"—a nod to the massive post-war reconstruction initiative.

"We've tried to take a very practical view on decarbonization. First, improving our existing fleet—it is 45 per cent more efficient than in 2008," he said. "Second, adopting new technology like wind wings, route optimization, and better coatings." Berge Bulk has also embraced ammonia and carbon capture. "We've ordered two ammonia ships under the Singapore flag. We've trialed our first onboard carbon capture system," Marshall shared. "We've also invested in nature-based solutions and carbon capture onshore."

This multi-pronged strategy reflects a growing recognition that no single solution will be enough—and that owners must act even amid regulatory ambiguity.

Ammonia ascending: The fuel of the future?

Takaya Soga, CEO, NYK Group, shared similar optimism around ammonia as a maritime fuel, pointing to its scalability and existing global infrastructure.

"Almost every country has an ammonia factory," Soga noted. "If they can get clean electricity, they can scale up ammonia production for maritime use."

NYK has already launched the world's first ammonia-fuelled tugboat in Yokohama and is planning a mid-class ammonia gas carrier in 2026. "Technology must go first," he said, "but the next step is to create a network."

Jeremy Nixon echoed this view while advocating a diversified fuel approach. "We are making sure all new ships are dual fuel—methanol, ammonia. We can't ignore LNG either, given the EU's current regulatory support," he said. "What comes out of the IMO in the next three months sets the trajectory for the next 30 years."

Digitalization: The unseen accelerator

While fuels and engines dominate headlines, digitalization is fast becoming a cornerstone of maritime decarbonization. "Digitization and data analytics are the low-hanging fruit," said Wiernicki. "They help drive operating costs down and enable predictive maintenance."

James Marshall shared tangible examples of how his fleet is leveraging AI. "We use a sophisticated weather routing system that runs hundreds of simulations," he said. "With better internet, we're also doing more onboard training and safety simulations."

Human capital: The hidden link

Finally, amid all the talk of technology and fuels, Wiernicki emphasized the human factor.

"We need to be investing in seafarer safety and training as much as in next-generation fuels," he said. "People have common sense, a sense of humor, and instincts that machines don't." As vessels become more digitally complex and run on unfamiliar fuels, crew competency becomes paramount. "It's not just about training," Wiernicki added. "It's about designing human-centric systems that reduce cognitive overload."

Conclusion: From reactive to proactive

Container shipping finds itself both besieged by short-term challenges and bolstered by long-term innovation. From geopolitical risks and policy uncertainty to bold bets on ammonia and AI, industry leaders are shifting from reactive risk management to proactive transformation.

The New Maritime Doctrine: Rethinking strategy in a world of flux

As global trade becomes more politically fragmented and environmentally constrained, shipping finds itself at a critical inflection point. From protectionist trade policies to decarbonization mandates and tightening shipyard capacity, maritime leaders are confronting a new doctrine—one that demands strategic agility, technological foresight, and regulatory clarity.

At a recent high-level panel on maritime strategy, a cross-section of industry leaders painted a picture of a sector undergoing deep structural recalibration. The conversation spanned geopolitics, fleet strategy, regulatory disruption, and the long arc of decarbonization—underscoring the unprecedented complexity now shaping maritime decision-making.

The phrase "new maritime doctrine" surfaced frequently throughout the dialogue, not as a theoretical exercise, but as a necessary reframing of how the industry must operate in a world where expectations are continuously upended.

Geopolitics and protectionism are redrawing the trade map

The reemergence of tariffs, particularly from the United States, is forcing shipping companies to confront new operating realities. Proposals under Section 301 that would impose heavy penalties on ships with any Chinese link—whether in construction, ownership, or management—have sent shockwaves across the sector.

Early analysis suggests that if enacted, these rules could effectively penalize large swaths of the global fleet. For container shipping, where consolidation has blurred ownership lines, virtually all vessels could be subject to higher fees. While carriers may be able to absorb some of the cost on a per-container basis, bulk and tanker operators would face much steeper consequences. In these trades, the penalty could amount to tens of dollars per ton—potentially doubling freight rates and rendering some cargoes unviable.

This approach, still under review in Washington, is being closely monitored by both U.S. exporters and global operators. If implemented, it would trigger realignment, including restructuring of fleet ownership, asset divestment, and likely a wave of second-hand vessel transactions aimed at compliance or circumvention.

Red sea closure adds to operational strain

Geopolitical instability in the Red Sea has also created ripple effects across vessel deployment strategies. With threats to safety persisting into 2025, most operators continue routing around the Cape of Good Hope, adding cost, time, and capacity stress to an already strained global network.

Tanker operators noted that while the shift has created inefficiencies, it has also inadvertently supported charter rates, especially in the crude and product segments. However, the implications are broader. Container carriers, in particular, must reposition assets, rebalance services, and reassess capacity planning—actions that further complicate supply chain predictability.

While there was cautious optimism late last year that the situation might stabilize, recent developments have reinforced the view that normal transit through the Red Sea is unlikely in the near term. Even if hostilities subside, operators expect a gradual reopening at best, given the repositioning of assets and reconfiguration of trade flows already underway.

Orderbooks and the fight for fleet relevance

Alongside these geopolitical headwinds, the race to renew fleets with more efficient and lower-carbon ships is creating pressure on shipyards, particularly in China, which now builds nearly 60 per cent of the world's commercial vessels. By contrast, the U.S. accounts for a mere 0.2 per cent, raising questions about resilience and strategic autonomy.

Despite the staggering size of the current container ship orderbook, much of it is focused on replacement tonnage, reflecting the urgent need to modernize aging fleets. In many cases, operators are doubling average vessel capacity within a decade to remain competitive and efficient. However, slots at top yards are becoming increasingly scarce, and operators across all sectors are facing longer lead times for newbuilds.

The definition of "dual fuel" is also becoming more nuanced. While many new vessels are marketed as future-fuel ready, in practice, only those with dual-fuel LNG engines or adaptable fuel systems offer meaningful decarbonization potential in the near term. Even so, LNG remains a transitional option, and its long-term role is being re-evaluated as bio-LNG and synthetic variants develop.

"We all have to learn how to make uncertainty our friend and be comfortable with embracing change. We are clearly in the early innings of a decade of change—both geopolitically and technologically. "

CHRISTOPHER J. WIERNICKI
CHAIRMAN & CEO, ABS

Container trades shift with global manufacturing realignment

The container sector, often seen as the first responder to macroeconomic shifts, has already undergone significant transformation. Trade between the U.S. and China has declined, replaced in part by new corridors between Southeast Asia and North America, as well as increased intra-Asia flows. This reflects a broader movement toward nearshoring and diversification of manufacturing bases.

Operators have responded by becoming more agile in vessel deployment, with assets increasingly repositioned to follow shifting production patterns. This agility is now seen as a strategic asset, allowing carriers to capitalize on pockets of demand while navigating an uncertain macro landscape.

"Let's call it what it is—the dark fleet. These ships have removed themselves from tier-one trades. Even if the Ukraine war ends, they're not coming back quickly. It's a story of many different parts."

LIONEL CHATELET
CHIEF COMMERCIAL OFFICER
PACIFIC INTERNATIONAL LINES

Recent developments in port ownership and terminal operations also hint at strategic moves to reduce Chinese influence in key global chokepoints. For instance, the sale of Hutchison's Panama Canal terminals to a consortium including MSC and BlackRock is being interpreted as part of a broader Indo-Pacific realignment—one that could reshape competitive dynamics in the terminal sector.

The decarbonization marathon and the middle game challenge

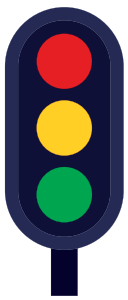
While the short-term environment is shaped by geopolitics, tariffs, and security concerns, the long-term imperative remains decarbonization. Achieving net-zero emissions by 2050 will require a radical transformation in fuel supply chains, propulsion systems, and operational practices.

According to industry projections, approximately 70 per cent of the solution will need to come from zero-carbon fuels, which in turn demand exponential growth in renewable energy and carbon capture infrastructure. The remaining 30 per cent is more immediately actionable—performance optimization, retrofitting, digital tools, and data-driven efficiency.

Which shipping sectors would be worst hit by USTR port fees?

The USTR proposals are designed to penalise what the US government sees as unfair support by China for its shipbuilding sector and to help spur a resurgence of the US shipbuilding sector. However, with China today in a dominant position in shipbuilding globally the impact of port fees on Chinese-built ships would be far reaching.

Chinese yards accounted for 59 per cent of the global newbuilding orderbook, while US yards held just 0.2 per cent. A service fee would cover Chinese service providers, a scaled fee for vessel operators and owners depending on the percentage of Chinese-built vessels in their fleet, and a fee for those with vessels on order at Chinese yards due to be delivered in the next 24 months. The fees per port call are still very vague but would range from $500,000 to $3.5 million.



VLCCs, Aframax, MR clean product tankers, Supramax bulkers, and container vessels.

Panamax and Handysize bulkers, Suezmax tankers, and LNG carriers. For these sectors owners might shift Chinese-built assets to another legal entity, or they could sell off some Chinese-built assets.

Capesize bulkers where only 2% of the fleet serves the US market.

Despite the challenges, many operators are pushing ahead. Some are investing in dual-fuel ammonia-ready vessels, others are piloting onboard carbon capture systems, while others focus on operational enhancements like route optimization and hull coatings. The real constraint is not technology, but regulatory clarity.

The International Maritime Organization (IMO) faces growing pressure to define an investable regulatory framework. With the industry poised to commit capital, clear signals around fuel pathways—whether ammonia, methanol, biofuels, or hydrogen—are critical to de-risking long-term decisions. Until then, many are taking a hedged approach, combining multiple strategies to stay flexible.

A doctrinal shift: From stability to strategic agility

The convergence of these dynamics—geopolitical fragmentation, regulatory unpredictability, and technological transition—has created a new strategic environment for global shipping. What was once a stable, rules-based domain is now an arena of adaptation and calculated bets.

This new maritime doctrine is not just about fuel types or vessel sizes. It is about how the industry navigates a world in which supply chains are weaponized, energy policies are politicized, and capital flows are increasingly tied to sustainability metrics.

Agility, optionality, and scenario planning are now core competencies. Shipping companies must not only track freight rates or fleet efficiency but also interpret policy signals, respond to strategic chokepoint developments, and anticipate regulatory inflection points.

In a world where the only constant is disruption, the industry's resilience will depend on its willingness to adapt faster, invest smarter, and collaborate more openly.

"We tried to assess the potential impact using a traffic light system. In some segments—like Supramax bulkers or VLCCs—the majority of the fleet could be affected. That's a red light. For containers, almost every ship would be affected, but the cost might be absorbable. The penalty could reach up to $3.5 million per port call, a potentially devastating blow to smaller or commodity-driven shipping segments where freight margins are already thin."

DR ROAR ADLAND
GLOBAL HEAD OF RESEARCH, SSY

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Date: 07 April 2025

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R. Ramprasad
Publisher

Singapore Maritime Week 2025

Navigating the future as a global maritime hub

Singapore Maritime Week (SMW) 2025 officially launched with great momentum as it marked its 19th edition and SG60 Signature Event, celebrating the maritime industry's foundational role in Singapore's nation-building journey.

Organised by the Maritime and Port Authority of Singapore (MPA), SMW 2025 was inaugurated by **Murali Pillai,** Minister of State for the Ministry of Law and the Ministry of Transport. Held from 24 to 28 March at Suntec Singapore Convention and Exhibition Centre, the event drew more than 20,000 attendees from close to 80 countries, including government officials, port authorities, industry leaders, and maritime professionals.

This year's event showcased Singapore's role as a leading global maritime hub, offering a platform for strategic dialogue, technological innovation, and international collaboration.

Visionary dialogue and strategic outlook

A key highlight was the Singapore Maritime Lecture, delivered by Senior Minister **Lee Hsien Loong,** followed by a fireside chat moderated by Ambassador **Chan Heng Chee**. Discussions focused on the impact of current geopolitical trends on global trade, the evolution of Singapore's hub port, and how the nation can lead the industry's green transition.

The dialogue underscored Singapore's forward-thinking approach in balancing global uncertainty with innovation-led resilience.

Maritime Digital Twin launched

In a landmark moment, the opening ceremony featured the launch of Singapore's first Maritime Digital Twin, an advanced simulation platform developed by MPA in partnership with the Government Technology Agency of Singapore (GovTech). Integrating real-time data across Singapore's waters, the digital twin enhances maritime situational awareness, decision-making, and operational efficiency—underscoring the nation's smart port ambitions.

Global collaboration and innovation on display

SMW 2025 deepened global maritime collaboration with the renewal of the Letter of Intent between MPA and eight leading Classification Societies, first signed in 2023. The renewed agreement expands cooperation in emerging areas like wind-assisted propulsion, smart ships, and autonomous vessels.

Additionally, over ten new partnerships were signed during the week, highlighting the strength of Singapore's innovation ecosystem and commitment to industry transformation.

EXPO@SMW: Maritime SG in focus

The expanded EXPO@SMW featured nearly 200 exhibitors and nine country pavilions, drawing global interest in maritime technology and services. A central attraction was the Maritime SG Showcase, which traced Singapore's maritime heritage while spotlighting cutting-edge solutions from MarineTech startups across subsea, surface, air, cyber, sustainability, and even space domains.

Visitors engaged with live demonstrations of aerial drones, digital twins, and next-generation technologies that are rapidly reshaping the maritime landscape.

With its blend of strategic foresight, collaborative momentum, and digital innovation, Singapore Maritime Week 2025 reaffirmed the nation's position at the forefront of maritime transformation—steering confidently into a complex, technology-driven future.


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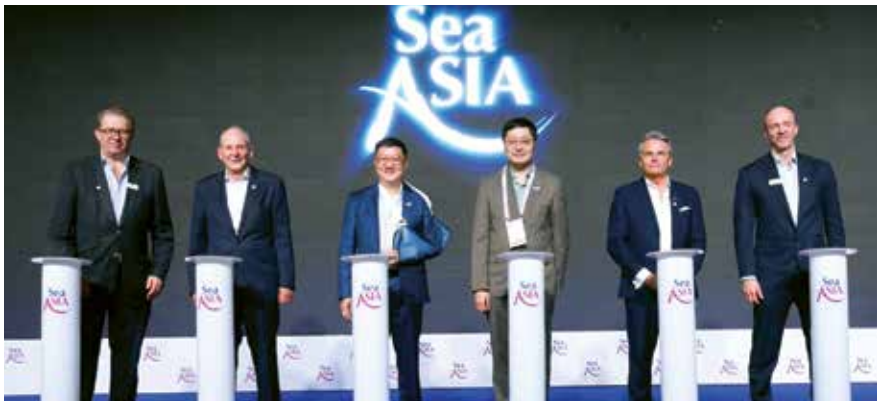
SMW High-Level Industry Dialogue:
Market Outlook for Shipping in 2025 and Beyond

Sea Asia 2025

Driving maritime progress through innovation and collaboration

Marking its 10th edition, Sea Asia 2025 returned to Singapore with renewed ambition and global momentum. Held from March 25 to 27 at the Marina Bay Sands Expo and Convention Centre, the event cemented its role as the flagship maritime event in Asia, attracting over 20,000 attendees from more than 90 countries.



From L to R: **Michael Duck,** EVP - Commercial Development, Informa Markets; **Chris Hayman,** Chairman Emeritus & Maritime Group Advisor, Informa Markets; **Hor Weng Yew,** Chairman, Singapore Maritime Foundation; **Teo Eng Dih,** Chief Executive, Maritime & Port Authority of Singapore; **Andrew Williams,** President, Maritime Group & EVP, Informa Markets; **Ian Roberts,** VP – Asia, Informa Markets

Co-organised by Informa Markets and the Singapore Maritime Foundation (SMF), Sea Asia 2025 was held alongside Singapore Maritime Week, amplifying the region's role as a global maritime hub. With an expanded and more inclusive format, this year's event brought together 500 exhibitors, 13 country pavilions, and over 100 international speakers, offering a comprehensive platform for business, innovation, and policy engagement.

A new era of open collaboration

In a significant first, conference access was made fully complimentary, opening the floor to wider industry participation across all levels. This move reflected Sea Asia's commitment to knowledge sharing and inclusive dialogue at a time when the maritime industry is navigating rapid transformation.

The conference addressed some of the most pressing issues impacting global shipping, including decarbonisation strategies, digital transformation, maritime security, and reshaping trade flows. Notable speakers included C.K. Ong (President, U-Ming Marine Transportation), Sebastian Graf von Hardenberg (CEO, Bernhard Schulte Shipmanagement), and Lionel Chatelet (CCO, Pacific International Lines), among other leaders from shipowners, regulators, and sustainability innovators.

Technology and green innovation at the forefront

The exhibition floor was a hive of activity, featuring dedicated zones like the Decarbonisation Solution Area and the Green Shipping Zone. These sections highlighted emerging technologies that support the shipping industry's net-zero ambitions, from alternative fuels and carbon capture systems to autonomous vessel solutions and digital optimization platforms.

Visitors explored a wide array of solutions from shipyards, classification societies, equipment manufacturers, OEMs, and maritime tech startups. Thirteen national pavilions—including those from China, Denmark, Japan, Norway, Singapore, South Korea, the UK, and the Netherlands—showcased innovations in fleet management, propulsion, and smart port infrastructure.

Leadership perspective

Hor Weng Yew, Chairman of SMF, noted that Sea Asia remains a critical forum for the industry to address both near-term challenges and long-term opportunities. "Sea Asia is a pivotal platform for the maritime community to exchange ideas, address industry challenges, and forge collaborative partnerships," he said.

Sukumar Verma, Managing Director at **Informa Markets Singapore,** added, "Sea Asia has grown in both scale and significance, reflecting the dynamism of the maritime sector and Singapore's strategic importance as a global hub."

Looking ahead

Sea Asia 2025 delivered on its promise of creating a dynamic, future-focused environment where maritime professionals could evaluate solutions, form partnerships, and help chart the course for global shipping. As the industry continues to evolve, Sea Asia remains a powerful catalyst for collaboration, innovation, and progress.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