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TradeWinds Shipowners Forum at Posidonia takes stock of Shipping's Decarbonisation Journey

THE NEW CARGO FRONTIERS

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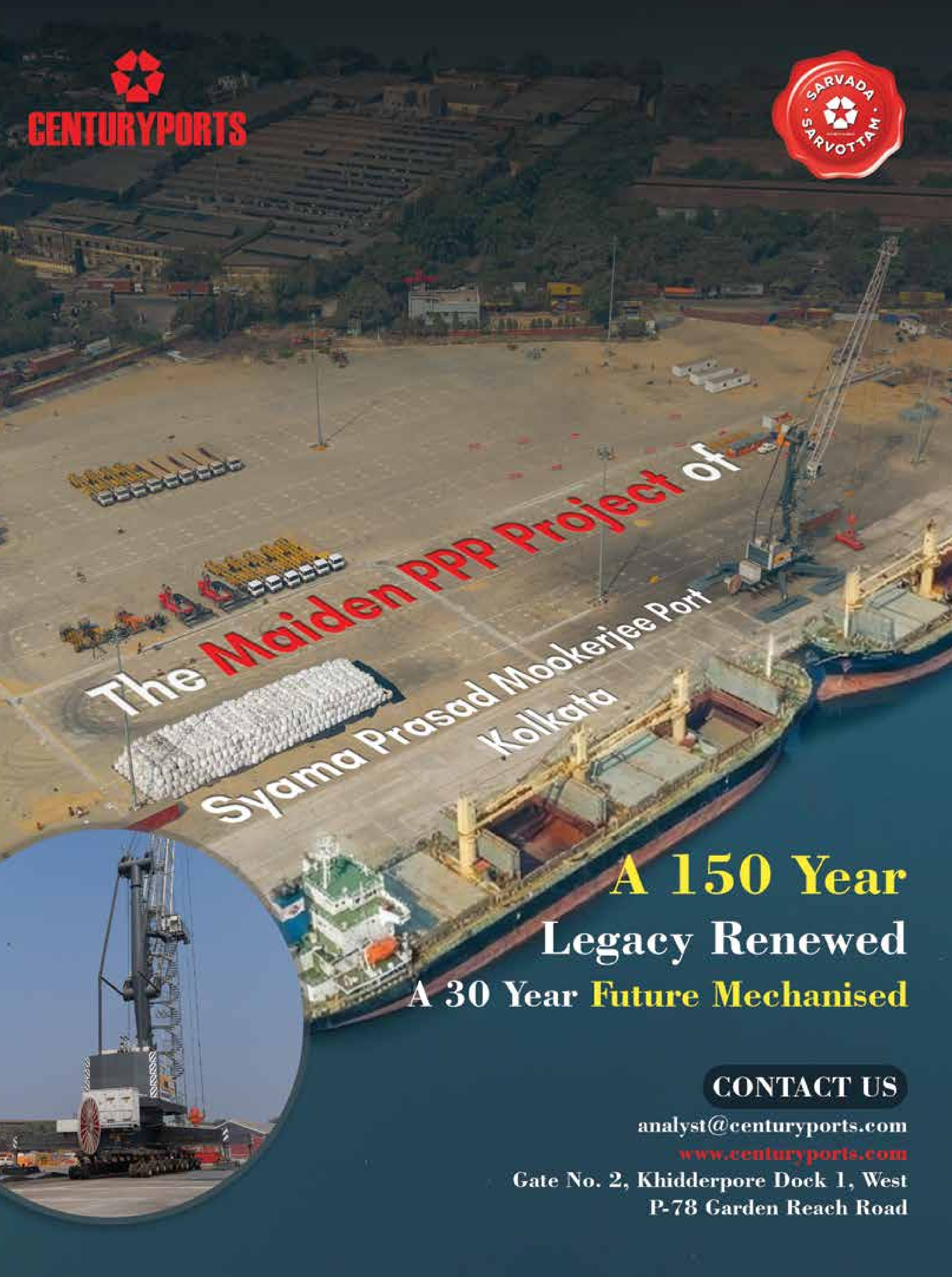

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EDITOR'S NOTE

India's Shipbuilding Push Needs to Match Ambition with Delivery

Shipbuilding has firmly established itself as one of the defining policy conversations in Indian maritime circles this year. Between the Maritime Development Fund, the revamped Shipbuilding Financial Assistance Policy, extended customs duty exemptions, and state-level frameworks such as Tamil Nadu's own shipbuilding policy, the intent from New Delhi and several state capitals is unmistakable: India wants a real, globally competitive shipbuilding industry, not just a defence-heavy one propped up by a handful of public sector yards.

The financial architecture backing this ambition is now substantial. Tens of thousands of crores have been committed across equity support, interest incentives, and cluster-level infrastructure, with an explicit goal of pushing India into the top five global shipbuilding nations by 2047. On paper, few industries have received this level of coordinated policy attention in recent memory. It also comes with an industry-wide responsibility of channeling the resources towards a direction that proves to be worth the backing.

The harder conversation, and the one industry bodies including the Shipyards Association of India, have been right to keep raising, is execution. Ambition is the easy part. Delivering ships on time, at a globally competitive cost, with the engineering depth and component supply chains that commercial shipowners actually demand, is a different order of challenge altogether. Indian yards continue to grapple with thin engineering resources, long negotiation and quotation cycles, working capital costs roughly double those of Korean yards, and a dependence on imported components that leaves order books exposed to global supply disruptions. Much of the sector still carries an institutional culture shaped by decades of naval and public sector work, which does not always translate smoothly into the responsiveness that private commercial contracts require. The gap needs to be bridged via practical inputs on the field, and for that, there has to be a stronger sense of commitment under an umbrella that is able to encapsulate the bygone era and what is on our hands. To build a future, one cannot disregard the journey one had to take, but evolution is the way to go.

None of this diminishes the scale of what has been announced. But policy capital and financial outlay only convert into market share when yards can consistently hit delivery timelines and price points that shipowners are willing to bet contracts on. The gap between a well-funded ambition and a globally trusted shipbuilding nation is built one delivered vessel at a time. That is the test India's shipbuilding ecosystem, yards, ancillary suppliers, and policymakers alike must now turn their attention to. In order to bring in more of everything, in aspects that show in numbers, percentages and charts that show upward growth, one must be ready to show up.

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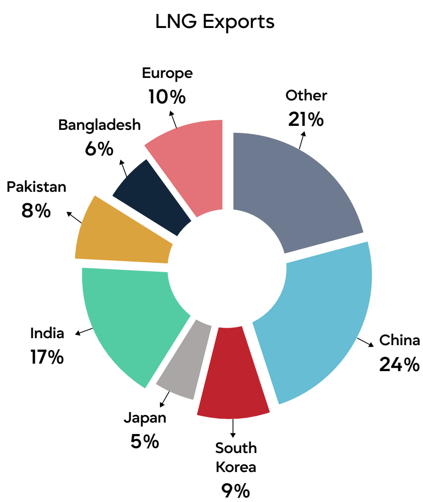

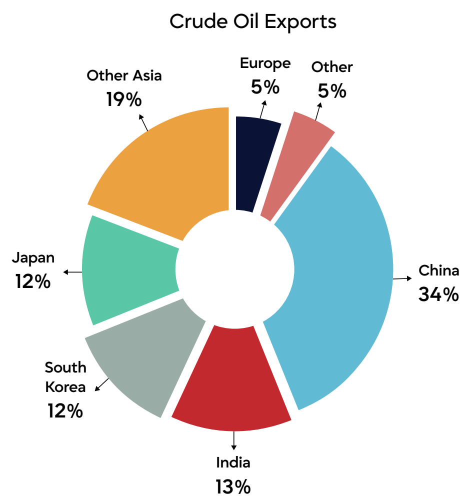

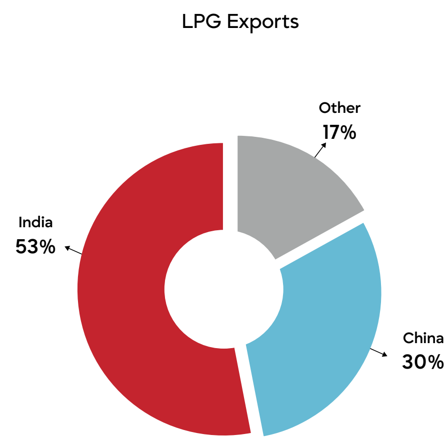

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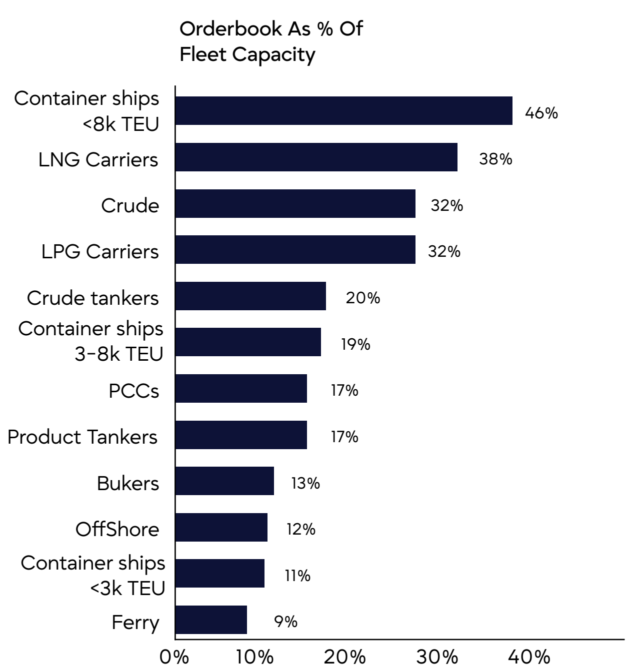

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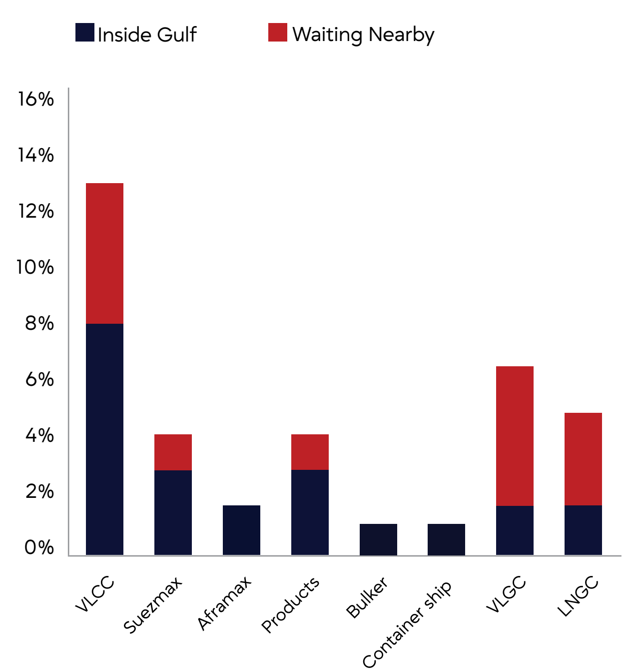

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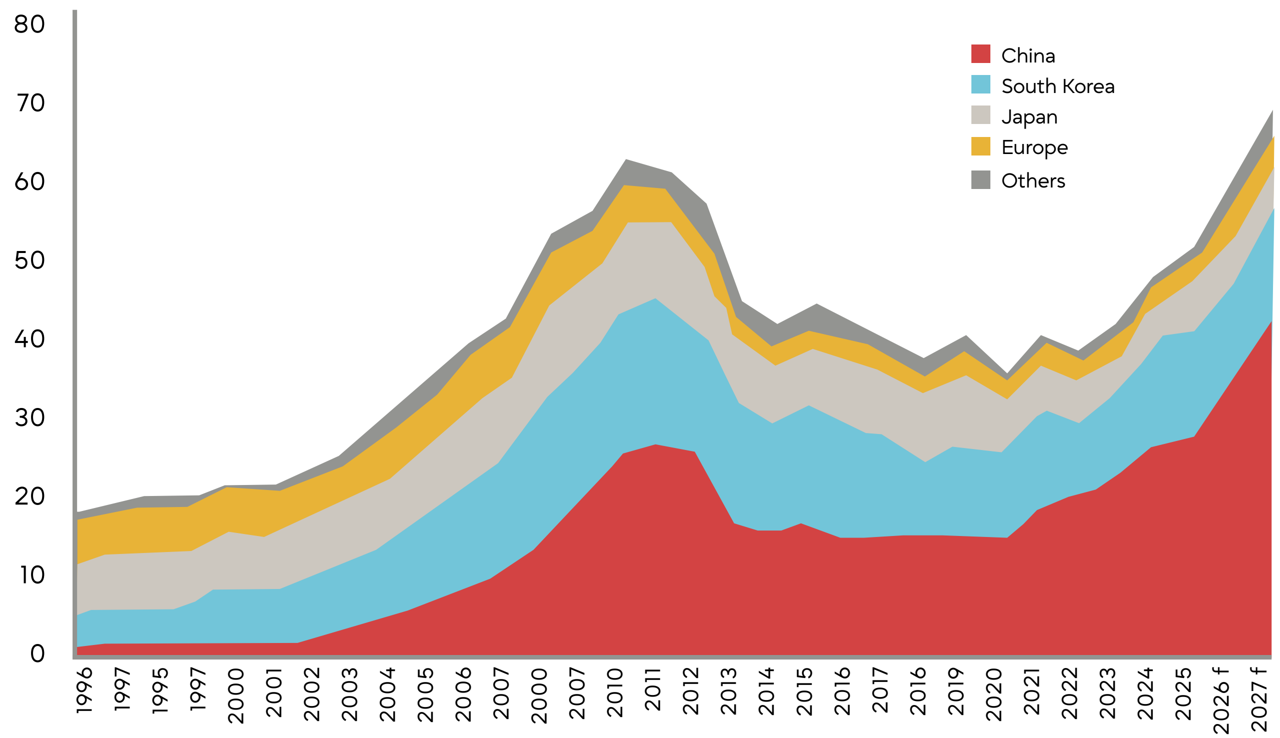

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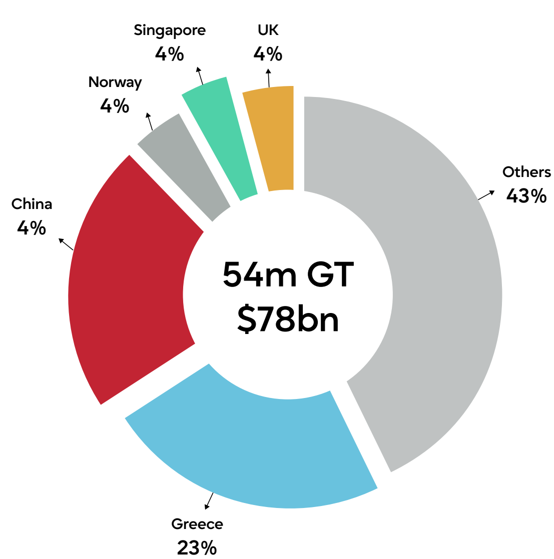
GREEK COMPANIES HAVE INVESTED MORE IN NEWBUILDS AND SOLD MORE TONNAGE SECONDHAND THAN ANY OTHER NATION

Newbuild Orders By Owner Nationality, Jan-Apr 2026 (GT)



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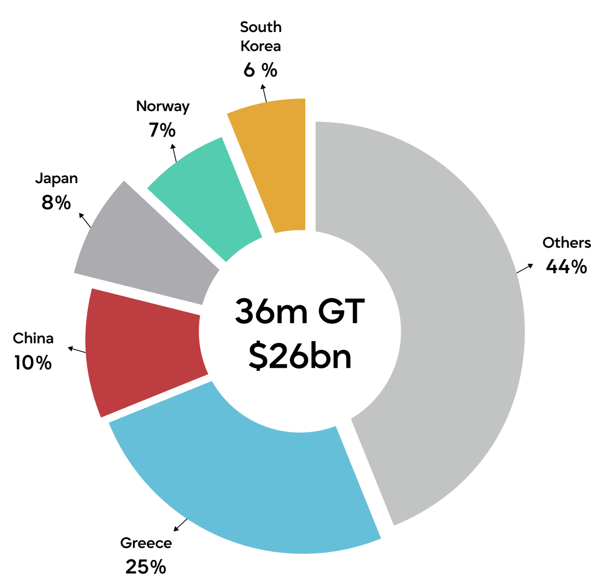


Source : Clarkson's Research

DEALS *Roundup*

From LNG fleet expansions and automated port yards to green hydrogen corridors and AI-powered terminal upgrades, the past few weeks have delivered a slate of landmark deals that underscore the sector's twin drive toward scale and sustainability. Below, we map the transactions that matter — and what they signal for the industry.

RSA Global to develop India's largest automated empty container yard at JN Port with ₹2,580 crore investment

RSA Global has signed a Memorandum of Understanding (MoU) with Jawaharlal Nehru Port Authority (JNPA) to develop India's largest automated empty container yard at JN Port with an investment of ₹2,580 crore. The project will be developed by RSA Logistics and Transportation Pvt. Ltd. on a 62-acre fully paved, technology-driven facility designed to streamline empty container handling, reduce logistics costs, and improve operational efficiency. The state-of-the-art yard is expected to enhance container management capacity, minimize congestion, and strengthen JN Port's position as one of India's most important trade and logistics gateways.

Afcons wins ₹5,301 crore Vadhvan Port breakwater contract

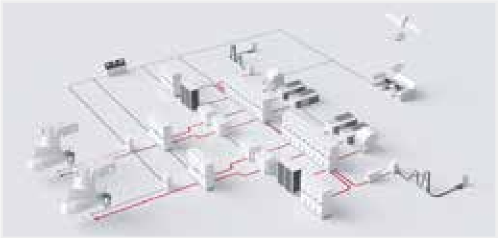
Afcons Infrastructure has secured a ₹5,301 crore contract for the construction of a major breakwater at the upcoming Vadhvan Port in Maharashtra. The project involves building one of the world's longest port breakwaters, a critical component of the greenfield mega port being developed to enhance India's maritime capacity and global trade competitiveness. The contract marks a significant milestone in the development of Vadhvan Port, which is expected to emerge as one of the country's largest and most advanced deep-draft ports.

Rourkela steel plant signs deal with GAIL for uninterrupted PNG supply

Rourkela Steel Plant (RSP), a unit of Steel Authority of India Limited (SAIL), has signed a five-year agreement with Gas Authority of India Limited (GAIL) for the supply of piped natural gas (PNG) to ensure uninterrupted fuel availability amid propane supply disruptions caused by the West Asia crisis. Under the agreement, GAIL will develop the necessary pipeline infrastructure, enabling RSP to gradually replace propane with PNG over the next three months. The transition is expected to enhance energy security, improve operational efficiency, lower fuel costs, and reduce carbon emissions at the integrated steel plant. Consuming around 180–200 tonnes of propane monthly, RSP views PNG as a safer, cleaner, and more economical alternative that supports its long-term sustainability and green manufacturing objectives while ensuring continuity in critical steelmaking operations.

ABB partners with Cochin Shipyard to support India's Green Tug Transition Programme

ABB has secured a contract from Cochin Shipyard to supply advanced power and propulsion systems for two electric harbor tugs being built for Polestar Maritime under Phase 1 of India's Green Tug Transition Programme (GTTP). Scheduled for delivery in 2027 and deployment at Jawaharlal Nehru Port Authority (JNPA), the vessels will support India's efforts to transition its harbor tug fleet from conventional diesel-powered vessels to cleaner, more sustainable alternatives. ABB's scope includes electrical, propulsion, automation, and digitalization solutions, featuring its Onboard DC Grid™ and PEMS™ systems to optimize battery performance, improve energy efficiency, and extend operational range. The project also incorporates the ABB Ability™ Remote Diagnostic System for Marine, enabling real-time condition monitoring and remote troubleshooting, thereby enhancing reliability and supporting JNPA's vision of achieving 'Green Port' status.



Devon Energy and Coterra Energy Complete Merger

Devon Energy Corporation and Coterra Energy Inc. have successfully completed their previously announced all-stock merger, creating one of the largest and most competitive shale operators in North America. The transaction, approved by shareholders of both companies on May 4, 2026, combines complementary asset portfolios and establishes a dominant position in the highly productive Delaware Basin. The merged entity will continue operating under the Devon Energy name and trade on the New York Stock Exchange under the ticker symbol DVN.

APSEZ Expands Partnership with US-Based Kaleris to Accelerate AI-Led Transformation

Adani Ports and Special Economic Zone Ltd. (APSEZ) has expanded its strategic partnership with US-based Kaleris to accelerate AI-driven transformation across its ports and logistics network. Under a multi-year agreement, Kaleris will deploy its advanced terminal operating system and AI-powered optimisation solutions across 15 container terminals in nine ports, supporting APSEZ's 2030 vision of handling one billion tonnes of cargo annually. The initiative, part of APSEZ's USD 850 million investment in technology and decarbonisation, is expected to improve operational efficiency, including up to 20% higher RTG crane productivity and 14% better terminal truck productivity, while enhancing cargo visibility, vessel turnaround times, and customer experience.

JSW Infrastructure bags Kolkata Dock container terminal project from SMPA

JSW Infrastructure has secured the Kolkata Dock System container terminal project from the Syama Prasad Mookerjee Port Authority (SMPA). The project will strengthen container handling capabilities at Kolkata Port and enhance trade efficiency in eastern India. Through this development, JSW Infrastructure aims to modernize terminal operations, improve cargo movement, and support the growing demand for containerized trade in the region.

IMEC PROGRESS STALLS AMID MIDDLE EAST CONFLICT

Geopolitical turbulence has frozen the corridor's most critical segment even as bilateral projects advance quietly on the ground

Ramprasad Ravi

The India-Middle East-Europe Economic Corridor (IMEC), launched with considerable fanfare at the G20 Summit in New Delhi in September 2023, has made limited headway as a functioning trade route, with the ongoing conflict involving Iran, Israel and the United States casting a long shadow over its most critical western segment.

A recent US Congressional Research Service report has noted that Operation Epic Fury — the American military campaign against Iran — has resulted in the loss or damage of 42 US aircraft, including fifth-generation F-35 stealth fighters, while more than half of the combined Patriot, Tomahawk and THAAD missile inventory has been expended. With a fragile ceasefire currently holding but no political resolution in sight, regional stability remains elusive — and with it, the investment confidence required to advance large-scale infrastructure of the kind IMEC demands.

The Israeli Bottleneck

The corridor's planned land route passes through Jordan before terminating at the Port of Haifa on Israel's Mediterranean coast. That segment has been effectively frozen. Arab public opinion remains deeply opposed to visible Saudi-Israeli transit cooperation while the Gaza conflict continues, leaving the corridor's western anchor in limbo despite active infrastructure preparation on the Israeli side. Recently, 53 local authorities across northern Israel — spanning Haifa Bay, the Galilee and the Beit She'an Valley — formally established the Next Bay 53-City Alliance, a regional body specifically created to position northern Israel as IMEC's Mediterranean gateway.

The alliance, representing over two million residents across Jewish, Arab, Druze and Bedouin communities, signed a founding charter and has appointed a dedicated international ambassador. The move signals that Israeli stakeholders are preparing infrastructure and governance frameworks in anticipation of the corridor becoming operational — even as the timeline remains uncertain.

Bilateral Progress Continues

Away from the headline stalemate, member states have been advancing quieter, bilateral building blocks. India and the UAE have launched a Virtual Trade Corridor aimed at simplifying customs procedures and reducing transit times. Gulf railway networks and port upgrades are seeing gradual financing. France and Italy have each appointed special envoys to maintain European engagement with the project. IMEC's non-physical components — green hydrogen pipelines, electricity grid interconnections and undersea data cables — continue to attract separate streams of investment as part of broader global decarbonisation efforts, and are seen as more immediately deliverable than the physical rail and road infrastructure.

India's Strategic Exposure

For India, the corridor's delays carry a particular cost. The recent crises in the Red Sea and the Strait of Hormuz have repeatedly exposed Indian shipping's dependence on chokepoints beyond its control. IMEC was designed precisely to reduce that exposure by offering a land-and-sea alternative that bypasses both vulnerable straits. Member states are now exploring modified, phased approaches to the corridor, including the use of Omani ports as alternative eastern entry points to sidestep the Persian Gulf-Red Sea bottleneck, and western routing options through Egypt.

Official assessments suggest IMEC continues to function primarily as a diplomatic coalition-building framework rather than an active construction project. Its full realisation,

India and the UAE have launched a Virtual Trade Corridor aimed at simplifying customs procedures and reducing transit times. Gulf railway networks and port upgrades are seeing gradual financing. France and Italy have each appointed special envoys to maintain European engagement with the project.

analysts note, is likely to be measured in decades rather than years — contingent, above all, on a durable political settlement in West Asia that currently appears distant.

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THE NEW CARGO FRONTIERS

Energy, EV Batteries, and Data Centres Reshape Logistics

The world's cargo is changing, and so is the industry built to move it. Energy, EV batteries, and data centre infrastructure are emerging as the defining logistics challenges of this decade, creating generational opportunities for operators willing to specialise.

Ramprasad Ravi

T

The global logistics industry is undergoing a structural transformation. Three high-growth segments are rewriting the rules of cargo movement, warehousing, and supply chain management: energy logistics, electric vehicle (EV) battery logistics, and data centre logistics. Together, they represent hundreds of billions of dollars in opportunity and are drawing the world's largest freight and infrastructure players into new, specialised territory.

Energy Logistics: A Trillion-Dollar Foundation

The global energy logistics market stood at approximately USD 538 billion in 2025 and is projected to cross USD 1 trillion by 2030, expanding at a CAGR of around 13 per cent. Historically anchored in oil, gas, and coal transportation, the sector is now evolving rapidly as renewable energy enters the equation. Growth in the coming years will be driven by renewable energy distribution, smart grid expansion, digital tracking adoption, and cross-border energy trade. Asia-Pacific was the largest region in the energy logistics market in 2025, powered by China, India, and Southeast Asia's surging energy demand and infrastructure build-out. Major players in this space include Saudi Aramco, ExxonMobil, Shell, TotalEnergies, BP, Chevron, DHL, and Kuehne + Nagel, each managing complex, multi-modal supply chains across pipelines, tankers, rail, and road.

EV Battery Logistics: The Green Gold Rush

The electrification of transport is creating one of the most demanding logistics challenges of this decade. EV batteries are heavy, chemically sensitive, temperature-dependent, and subject to stringent safety regulations across borders. This complexity is itself a market. The EV battery pack market is expected to grow from USD 166 billion in 2025 to USD 265 billion by 2031, at a CAGR of over 8 per cent.

Asia-Pacific dominates with a 62 per cent share of the global market, driven by China's integrated supply chain that spans mineral refining, cell production, and vehicle assembly. Europe is the fastest-growing geography, expanding at a CAGR of over 9 per cent through 2031, as Fit-for-55 regulations and the European Battery Alliance channel capital into domestic gigafactories. Key players managing EV battery logistics include DHL, DB Schenker, Kuehne + Nagel, CEVA Logistics, and specialised operators building cold-chain and hazmat-compliant infrastructure. Battery gigafactories from CATL, LG Energy Solution, Panasonic, and Samsung SDI are anchoring new logistics corridors across China, Europe, and North America.

The global energy logistics market stood at approximately USD 538 billion in 2025 and is projected to cross USD 1 trillion by 2030, expanding at a CAGR of around 13 per cent. Historically anchored in oil, gas, and coal transportation, the sector is now evolving rapidly as renewable energy enters the equation. Growth in the coming years will be driven by renewable energy distribution, smart grid expansion, digital tracking adoption, and cross-border energy trade.

The electrification of transport is creating one of the most demanding logistics challenges of this decade. EV batteries are heavy, chemically sensitive, temperature-dependent, and subject to stringent safety regulations across borders. This complexity is itself a market.

Data Centre Logistics: The AI Effect

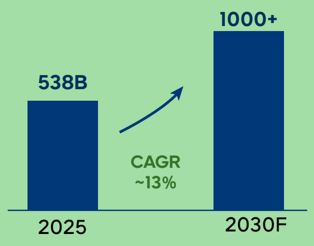
The artificial intelligence boom has super-charged demand for data centre infrastructure, and with it, a highly specialised logistics segment. The data centre logistics market is expected to reach USD 22.68 billion in 2025 and grow to USD 34.84 billion by 2030 at a CAGR of nearly 9 per cent.

In March 2026, DHL Group announced a major expansion of its North America data centre logistics infrastructure, adding 10 dedicated warehouse sites with over 7 million square feet of capacity to support the rapid deployment of hyperscale and colocation data centres. The Americas hold the largest market share, while Europe is estimated to grow at the highest CAGR through 2030. Notable players include Iron Mountain, Schneider Electric, Digital Realty, and DHL, each competing to provide secure transport, staged delivery, and precision installation of high-value server and cooling infrastructure.

The Common Thread

All three segments demand more than conventional freight expertise. They require regulatory knowledge, specialised handling, real-time visibility, and deep coordination between infrastructure and supply chain teams. For logistics companies willing to invest in these capabilities, the opportunity is not incremental. It is generational.

Energy Logistics
A Trillion-Dollar Foundation



Key Growth Drivers

- Renewable energy distribution
- Smart grid expansion
- Digital tracking adoption
- Cross-border energy trade

Leading Region (2025)

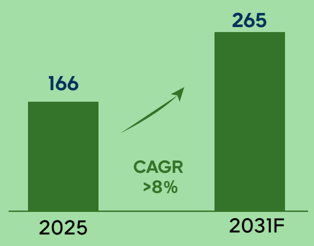
Asia-Pacific Driven by China, India and Southeast Asia's growing energy demand and infrastructure expansion.

From oil, gas, and coal to renewables, the sector is evolving with renewable energy distribution, smart grids, digital tracking, and cross-border energy trade.

Major Players

aramco, ExxonMobil, Shell, TotalEnergies, bp, Chevron, DHL, KUEHNE+NAGEL

Ev Battery Logistics
The Green Gold Rush



Market Highlights

- Asia-Pacific accounts for **62%** of the global market.
- Europe is the fastest-growing region with a CAGR of over **9%.**

Battery Gigafactories Driving New Corridors

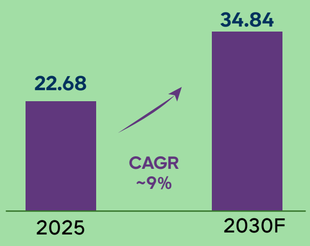
- CATL
- LG Energy Solution
- Panasonic
- Samsung SDI

EV batteries are heavy, chemically sensitive, temperature-dependent, and highly regulated—creating one of the most complex logistics challenges of the decade.

Major Players

DHL, DB SCHENKER, KUEHNE+NAGEL, CEVA LOGISTICS

Data Centre Logistics
The AI Effect



Market Insights

- The Americas hold the largest market share.
- Europe is expected to record the fastest growth through **2030.**

Core Services

- Secure Transport
- Staged Delivery
- Precision Installation
- Temperature & Environmental Control

The AI boom is driving explosive demand for data centre infrastructure—powering a highly specialised logistics segment.

Major Players

IRON MOUNTAIN, Schneider Electric, DIGITAL REALTY, DHL

EV BATTERIES AND THE NEXT GREAT CARGO BOOM

Building the logistics of electrification: as battery capacity races past 4 TWh, ports, carriers and freight networks — with India angling for a seat at both ends of the trade — are racing to build the specialised systems this new cargo demands.

Kalpana Pandey

Global battery manufacturing capacity crossed more than 4 TWh by the end of 2025, up roughly 30 per cent year-on-year, according to the International Energy Agency's Global EV is not confined to factories. Every gigawatt-hour of new cell capacity translates into raw minerals moving in, finished packs moving out, and an entirely new category of specialised freight in between — one that is reshaping how ports, shipping lines and freight networks plan for the next decade. Bodies from Wood Mackenzie to the IEA now describe 2026 as a turning point: the year the EV and battery sector moves from subsidy-driven growth to organic, commercially self-sustaining scale.

A freight category built from scratch

Battery logistics looks nothing like traditional automotive freight. Matthias Braun, senior vice-president of logistics at Volkswagen's battery arm PowerCo, has described the challenge as connecting distributed suppliers across continents while managing both conventional and hazardous materials in the same network. PowerCo's response — standardising cell designs, building resilient logistics partnerships from the ground up rather than retrofitting legacy automotive supply chains — is a preview of how the whole industry is approaching the problem. Standardisation, Braun notes, is what allows manufacturers to scale efficiently and harmonise operations across multiple sites and geographies at once.

This is creating real commercial opportunity for logistics providers willing to specialise. Hazmat-certified ocean and air freight, temperature-controlled transport, dedicated compliance documentation, and purpose-built packaging are all growing service lines. The lithium-ion battery market itself was valued at roughly US$87 billion in 2025 and is projected to reach US$377.6 billion by 2035 — a 15.8 percent compound annual growth rate — which gives a sense of the volume of goods that logistics networks will need to absorb.

India's rising role in the chain

India is positioning itself on both ends of this trade. The country remains a significant importer of battery-grade minerals and cells, but a genuine manufacturing base is now taking shape: Gujarat hosts LG Energy Solution's 20 GWh joint venture and Tata Motors' upcoming gigafactory, Tamil Nadu is integrating pack assembly into its Chennai and Hosur auto clusters, and Karnataka's New Mangalore Port already serves as a gateway for mineral imports and processed exports alike. The Union Budget for 2026-27 extended customs duty exemptions on capital goods for lithium-ion cell manufacturing and continued sustained investment in freight corridors, port connectivity and inland waterways — moves the IEEFA reads as a deliberate shift from adoption-led EV policy toward ecosystem-building and reduced import dependence.

Ports themselves are becoming part of the electrification story rather than just conduits for it. Indian ports are steadily replacing diesel-powered gantry cranes, yard tractors and forklifts with battery-electric equipment, supported by falling battery costs and improving operating economics.

India's EV battery manufacturing hubs and port linkages

State	Manufacturing focus	Port linkage
Gujarat	LG Energy Solution joint venture (20 GWh); Tata Motors gigafactory under construction	Coastal ports handle cathode and anode raw-material imports
Tamil Nadu	Battery pack assembly integrated with Chennai and Hosur auto clusters	Chennai Port and Ennore serve component and finished-vehicle trade
Karnataka	Cathode manufacturing and R&D; cell-chemistry start-ups	New Mangalore Port serves as a gateway for mineral imports and processed exports
Telangana	Large-scale cell plant backed by twenty-year power-tariff incentives	Feeds into east-coast port corridors via road and rail freight

Key 2026 regulatory changes supporting safer battery shipping

Regulation	Key change	Effective
IMDG Code, Amendment 42-24	New UN numbers (3556, 3557) for battery-powered vehicles; tighter stacking and segregation rules for lithium cargo	Mandatory from 1 Jan 2026
SOLAS Ch. II-2/20 (MSC.550(108))	Mandatory smoke/heat detection and fire-alarm systems on vehicle carriers, with defined safe distances from vehicle lanes	New vessels from 1 Jan 2026; existing vessels by first survey after 1 Jan 2028
Fire Safety Systems Code (MSC.555(108))	Enhanced fire-suppression requirements for newly built vehicle carriers	Vessels built from 1 Jan 2026
IATA / ICAO / DOT rules (air and ground)	State-of-charge capped at 30% for most lithium-ion shipments; standardised UN38.3 test summaries required	In force from 1 Jan 2026

Notable maritime incidents that shaped current safety standards

Year	Vessel	What happened	Outcome
2022	Felicity Ace	Lithium-ion battery fire aboard a car carrier in the Atlantic	Burned for a week; sank with ~4,000 vehicles
2023	Fremantle Highway	Fire broke out in the North Sea carrying 3,000+ cars, including ~500 EVs	Vessel salvaged; one crew fatality
2023	Genius Star XI	Two cargo-hold fires south of Alaska, traced to battery energy storage cargo	NTSB (2025) found improper stowage as root cause
2025	Morning Midas	Fire aboard a RoRo carrying 3,000 cars (~800 EVs) from China to Mexico	Burned for weeks; sank off Alaska, ~US$60 million loss

Ports themselves are becoming part of the electrification story rather than just conduits for it. Indian ports are steadily replacing diesel-powered gantry cranes, yard tractors and forklifts with battery-electric equipment, supported by falling battery costs and improving operating economics, according to a recent Indian Infrastructure analysis of green corridors at major ports. Onshore power supply for berthed vessels is moving from an optional feature to a standard expectation. Port operators are, in effect, becoming both handlers of battery cargo and adopters of battery technology in their own operations — a dual role that positions India's maritime sector to benefit from electrification on more than one front.

The next frontier: reverse logistics

Perhaps the most interesting growth opportunity lies ahead rather than behind. As the first generation of EV batteries approaches end-of-life from the early 2030s, a substantial reverse-logistics industry is taking shape around collection, health assessment, second-life deployment and recycling.

Industry analysts at CXTMS project this reverse freight category could be worth more than US$14 billion by 2031, driven in part by regulations such as the EU Battery Regulation, which mandates minimum recycled content in new batteries and effectively guarantees freight volumes flowing back through the system. India, with its early investments in black-mass processing and recycling infrastructure, is well placed to capture a share of this emerging trade rather than simply importing raw minerals and exporting finished packs.

Managing the risks along the way

None of this growth is without its challenges. A string of vessel fires in recent years — including the 2025 sinking of the car carrier Morning Midas and the 2023 Fremantle Highway blaze — has prompted the International Maritime Organization to tighten the rules governing battery cargo, with the updated IMDG Code becoming mandatory from 1 January 2026 alongside new SOLAS fire-safety requirements for vehicle carriers. Insurers and shipping lines have responded with stricter cargo declarations, upgraded fire-suppression systems and, in some cases, temporary shipment pauses.

These measures are best understood not as obstacles but as the normal growing pains of a fast-scaling freight category — the kind of safety maturation that has accompanied every major shift in what the world ships, from bulk fuel to containerised cargo.

The road ahead

Two forces will define battery logistics through the rest of the decade: the sheer scale of new EV and storage production moving through global supply chains, and the parallel build-out of reverse-logistics infrastructure to handle batteries at end of life. For ports, carriers and freight networks that invest early in the specialised handling, compliance and infrastructure this cargo demands, EV batteries represent one of the largest and most durable growth opportunities in global logistics for years to come.

For India specifically, building capability across both the forward and reverse battery trade could prove just as consequential as its manufacturing ambitions.

4 TWH+
GLOBAL BATTERY MANUFACTURING CAPACITY, END-2025

$377.6B
PROJECTED LI-ION BATTERY MARKET SIZE BY 2035

$14B+
REVERSE-LOGISTICS MARKET VALUE BY 2031

1 JAN '26
NEW IMDG & SOLAS FIRESAFETY RULES TAKE EFFECT

DIVERSIFY, DE-RISK, DELIVER

The road to zero-emission shipping is neither straight nor short, but it is being built, plank by plank, fuel by fuel, regulation and regulation. That was the broad consensus emerging from one of Posidonia 2026's most wide-ranging panel discussions, which brought together voices from energy majors, shipbuilders, research institutions, industry associations and the rapidly advancing world of nuclear marine propulsion.

A high-level panel of shipping industry leaders — representing owners, charterers, operators and industry associations — debated how the sector can sustain investment discipline and operational resilience in an increasingly fragmented and volatile world.

Asset Values and Investment Discipline

The panel opened with a frank assessment of the current market paradox: high asset prices coexisting with earnings that do not justify them. One owner noted that his company's share price was "trading at a discount to NAV because the earnings in the travel sector do not justify the level of asset prices." The response has been deliberate caution — avoiding speculative newbuilding orders, preferring resale vessels with prompt delivery and keeping cash on hand. "Cash is king once again," was the blunt summary. The philosophy: maintain strong balance sheets now, so that when asset prices normalise, companies are positioned to invest from a position of strength.

Geopolitical Risk and Employment Discipline

A Greek owner described the near-impossibility of fully insulating shipping from geopolitical risk, given that trade is inherently global. "In shipping, it's very difficult to avoid these countries because ships travel all over the world." Even when operators complete all KYC clearances scrupulously, overnight political changes — additional sanctions, new tariff regimes — can leave a vessel suddenly holding problematic cargo. On financing, he cautioned against over-reliance on Chinese leasing given US tariff dynamics, adding: "I think shipping has to remain silent. It's a very complex business."

East vs. West: A Bipolar Shipping World?

The moderator posed a pointed question: is the world drifting toward a bipolar shipping order, split between East and West? The responses were nuanced but broadly optimistic. A major charterer described the whiplash of market sentiment: "Last year was a tremendously challenging period. We spent years building modern fleets, particularly Japanese-built ships. We felt very good. Suddenly the next day we didn't want them — we wanted Chinese ships; suddenly they said we want Japanese ships." His conclusion: flexibility and optionality are essential survival tools.

A Canadian industry leader offered a more bullish view. "China is business focused. The United States is business focused. At the end of the day, money talks." He argued that both powers are ultimately capitalistic in orientation and that shipping would not be forced to choose sides permanently, though "regional and temporary conflicts of a year or three or four or five" remain a real risk.

Match the risk to the reward, diversify, and apply conservative financial management. A lot of businesses tend to misalign their risk-reward ratios, which leads to failure.

The Dark Fleet: Security and Regulatory Integrity

The panel addressed the dark fleet with notable gravity. One operator called it "a great threat to international shipping," warning that tighter regulation in the compliant sector paradoxically pushes more tonnage outside it. He called for stronger enforcement and more consistent port state controls, noting that even ad hoc detentions add operational risk that will eventually deter investment in the shadow sector.

The BIMCO President framed it as a level playing field issue: "If you have a portion of the world's fleet that is kind of not following the rules, that is highly detrimental to the rest of the world's fleet."

The Fragmented Regulatory Landscape

On sanctions and compliance complexity, one panellist made a candid observation about the structural challenges: "We live in an era where might makes right." He acknowledged that industry organisations like BIMCO and INTERCARGO play a valuable role helping companies navigate through a fragmented environment, but cautioned that realistic expectations are needed. "The more information we have, the more guidance we have, the better position we will be in to try to operate as efficiently as possible."

Decarbonisation and the Sea Cargo Charter

The newly appointed chair of the Sea Cargo Charter reported genuine enthusiasm among its thirty-two participating companies for transparent emissions reporting.

"Without transparency, we can't get anywhere in terms of improvement," he said, making the commercial case plainly: "Efficiencies are often leading to savings, which is leading to the bottom line." The panel's view was that collaboration, while difficult to sustain at scale, is still the most viable pathway on shared challenges like decarbonisation.

Final Counsel: One Piece of Advice Each

The moderator closed by asking each panellist

Even when operators complete all KYC clearances scrupulously, overnight political changes — additional sanctions, new tariff regimes — can leave a vessel suddenly holding problematic cargo

for their single most important piece of advice. The responses amounted to a compact playbook for turbulent times.

The BIMCO President urged owners to manage their businesses like investment portfolios: "Match the risk to the reward, diversify, and apply conservative financial management. A lot of businesses tend to misalign their risk-reward ratios, which leads to failure." The charterer called for flexibility built into everything — customer base, asset mix, people. "The pace of change is only going to accelerate, so you need to build into your strategy the ability to change quickly."

The operator highlighted the growing importance of contractual flexibility: "Push-pull clauses, tariff clauses — these things are becoming much more important. If the framework suddenly changes, you need wiggle room." The owner placed modern, efficient tonnage at the centre: "With new, efficient designs, we can balance all the risks. The cargo is king — you need to be next to the cargo."

And the lead owner panellist returned to fundamentals: "A strong balance sheet. Low debt ratio, strong liquidity, competitive costs. This will give you the luxury to hold your breath during market downturns — and the ability to invest heavily when asset prices normalise."

Asset Values & Investment Discipline

Geopolitical Risk & Employment Discipline

Dark Fleet & Security Threats

Fragmented Regulatory Landscape

Decarbonisation & Sea Cargo Charter

Asset Values & Investment Discipline

TURNING EFFICIENCY INTO REVENUE

Aderco is giving ship owners a way to monetise the dry dock investments. In this interactive feature, **Esteve Sarvajean, Head of Marine, Aderco**, talks to **Ramprasad Ravi** about how the approach is straightforward, the methodology is certified, and the numbers are compelling.

In the crowded and compliance-heavy world of maritime decarbonisation, most conversations begin with cost. The cost of new technology. The cost of compliance. The cost of retrofitting a fleet that was built for a different regulatory era. Aderco begins the conversation differently. It begins with revenue.

The 2055G+ programme combines advanced fuel treatment with a carbon monitoring and verification service designed to generate measurable financial value.
Aderco brings more than 45 years of experience in developing and supplying liquid fuel treatment solutions to the global maritime industry. Through its partnership with Adi Terra, a specialist in MRV (Monitoring, Reporting and Verification) services for energy efficiency and carbon credit projects, operational performance data can be transformed into independently verified emissions reductions that are eligible for certification under recognised carbon standards.
Esteve Servajean, Aderco's Head of Marine says that the 2055G+ programme was built directly using observations made over decades of operational deployment across thousands of vessels.

"We provide a range of additives and treatments for any kind of liquid fuels, from distillate, residual, and even biofuels. They include Aderco 2055G, whose main purpose is to homogenise the fuel, clean and protect components, maximise the energy potential and minimise emissions, and to solve fuel-related problems before, during and after combustion."

Introducing Aderco 2055G fuel additive helps shipowners make fuel savings and improve vessel performance in ways that also align with regulatory goals for decarbonisation, says Esteve. The additional opportunities to realise benefits as carbon credits are verified using the 2055G+ programme.

The Carbon Project

Esteve, describes the platform as a way to systematically convert operational efficiency gains into certified financial instruments. "Greater fuel efficiency is always desirable but owners can also monetise their retrofit using 2055G+, with the first step involving

> **We provide a range of additives and treatments for any kind of liquid fuels, from distillate, residual, and even biofuels. They include Aderco 2055G, whose main purpose is to homogenise the fuel, clean and protect components, maximise the energy potential and minimise emissions, and to solve fuel-related problems before, during and after combustion.**

Esteve Sarvajean
Head of Marine, Aderco

establishing a dry dock cycle of historical consumption data based on noon reports. Once we have this data - what we call the baseline of the ship - we can then establish the average consumption of that ship."

The baseline is constructed from five years of noon report data, the same data source that ship operators already generate for EU ETS compliance and IMO DCS reporting. There is no new reporting burden.

Once the baseline is established, the 2055G+ project period begins. After Aderco's 2055G fuel additive is introduced, actual fuel consumption is monitored, with improvements in efficiency expressed as a percentage reduction against the established average consumption. A minimum of six months of monitoring is required before results can be assessed, but the programme is designed for long-term continuous monitoring. Esteve explains why this deliberate preference for longer windows is a methodological advantage, rather than a limitation.

"Our goal is to run the programme for enough time to deliver evidence even when the margins of gains are very small, because for a ship owner these gains also accumulate over time. By doing so, we also allow the ship owner to start the project with a lot of flexibility, and with the assurance that trends have time to mature."

To ensure integrity, strict operational filters are applied to the noon report data. The vessel must be underway for at least 23 hours in any given day for that day to count. Only laden voyage conditions are included. Any day on which the Beaufort sea state exceeds Force 6 is excluded. These filters eliminate outlier operating conditions and ensure that only genuinely comparable sailing data is used to calculate the efficiency ratio.

Certification And Credibility

The fuel-efficiency gains achieved through the 2055G+ programme are independently analysed and reported by Adi Terra, converting operational performance data into verified emissions reductions that can be monetised as carbon credits. For Aderco clients, this data is assessed against the requirements of the Gold Standard, one of the most respected and widely recognised certification bodies in the voluntary carbon market. Credits certified under the Gold Standard typically command premium pricing and benefit from stronger market demand and liquidity than lower-tier voluntary credits.

Aderco's collaboration with Adi Terra has already gained significant traction in the retrofit market. The underlying methodology has also undergone independent validation by leading classification societies. Data from two vessels within Adi Terra's monitoring programme was submitted to RINA and ABS respectively, with both organisations validating the methodology and certifying the results. This provides a critical layer of independent technical assurance and credibility.

According to Esteve, the first full certification cycle is now nearing completion. Thanks to the programme's retroactive structure, vessels enrolled in 2055G+ are already accumulating carbon credits prior to final certification. "We are finalising the certification, and once we have it, ships enrolled in the programme will already have generated carbon credits virtually, thanks to the two-year retroactive period. Vessels that have been using the product or participating in the programme for the past year are already building up a carbon credit position."

The Financial Case

The numbers that sets out for a standard Capesize bulk carrier make the commercial argument with little need for elaboration. "A standard Capesize vessel, the new generated carbon credits will be in the range of 30,000 to 40,000 dollars per year in new revenue. Plus, let us say three percent fuel savings over 220 sailing days per year at current HFO prices, which is around 270,000 dollars in fuel savings. So in total, around 300,000 dollars per year."

Critically, this entire benefit accrues to the ship owner at no direct cash cost. The 2055G+ programme covers the monitoring, data analysis, and certification service, with a portion of the generated carbon credits retained as fees. "Virtually there is no cost," Esteve explains. "The ship owner is getting the carbon credits. with a portion withheld to cover all the costs. So virtually there is no money going outside. There are only benefits."

Scale And Ambition

Aderco currently operates with over 100 vessels in its 2055G+ monitoring pool, concentrated in VLCCs, Capesize bulk carriers, and large container ships. Where fuel treatment is concerned, Aderco offers support to approximately 4,000 to 5,000 vessels globally, working with Anglo-Eastern, Bernard Schulte, Fleet Management, Synergy Marine, Hafnia, Bergshav, and Evergreen, among others. That commercial footprint represents an immediate pipeline for growth.

One of the other important aspects of the 2055G+ methodology is its breadth. Because noon report data cannot isolate the impact of any single device or upgrade in isolation, the methodology takes a holistic view and captures the aggregate efficiency improvement from all retrofit measures implemented since the last dry dock.

"We are on the market for 45 years. We work with the big guys, but we are treating today, in total, something like 4,000 to 5,000 vessels. We can do much more. We are a simple drop in the ocean of shipping." The ambition is to triple or quadruple the monitoring pool within the next twelve months. As the first certification cycle completes and credits begin to be issued and traded, the company expects the demonstration effect to accelerate commercial uptake significantly.

For an industry searching for decarbonisation solutions that add financial value rather than simply adding cost, the 2055G+ retrofit proposition arrives at precisely the right moment. Ship owners are already doing the work. Aderco is simply making sure they secure a return on investment.

NAVIGATING THE GREY ZONES

Legal Complexity, Casualty Pitfalls and the Future of Maritime Contracts

Will Pyle is a Director at Campbell Johnston Clark's Singapore office, where his practice is focused almost exclusively on maritime disputes. He represents ship owners, P&I clubs, charterers, and cargo interests across a wide spectrum of cases, including casualties, charter party disputes, and cargo claims. In this interview with Ramprasad Ravi, Editor in Chief, Maritime Gateway, Pyle speaks candidly about the legal risks that keep the shipping industry up at night.

Will, can you start by giving us a sense of the nature of your practice in Singapore and the kinds of disputes your team handles?
My practice in Singapore focuses on maritime disputes. We represent ship owners and their P&I clubs most frequently, but also charterers and sometimes cargo interests. Roughly half of my work involves casualty matters, fires, collisions, groundings, and other incidents at sea, while the other half covers contractual disputes, including charter party claims, cargo claims, and ship management-related issues. We also see some shipbuilding and offshore services disputes. In terms of sector exposure, container shipping features prominently, whether that is cargo damage claims, fire incidents on container vessels, or claims by terminals against vessels for damage to port infrastructure.

There is growing complexity around compliance in shipping, whether that is decarbonisation, geopolitical tensions, or sanctions exposure. What categories of legal risk do you see most sharply in this space?
From a lawyer's perspective, you always come back to the contractual framework. When owners are navigating new compliance territory, whether that is fuel specification changes driven by decarbonisation requirements or the geopolitical constraints affecting trading areas, their primary concern has to be how risk is allocated in the charter party. An owner on a time charter will naturally want to push compliance risk onto the time charterer to the extent possible. BIMCO has been at the forefront of developing standard clauses to address new fuel specifications and decarbonisation obligations, and those have been widely adopted. But the quality of protection always depends on whose interest you represent. What is drafted as a balanced clause often contains words like 'reasonable' or 'reasonable view', and as soon as that language appears, there is scope for lawyers on both sides to argue about what those words actually mean in a commercial context. That ambiguity is where disputes are born.

You mentioned casualty work as a significant part of your practice. From your experience handling some of the industry's more serious casualties, what are the most common mistakes ship owners and P&I clubs make in the immediate aftermath of an incident?
There are two patterns I see repeatedly. The first is a failure to appreciate the severity of an incident at an early stage. Container ship fires are a good example. A smouldering container on deck might look contained; perhaps the crew can see smoke but no visible flames, and there is a temptation for the owner and the P&I club to treat it as a manageable situation rather than a potential total loss. Therefore, there is a risk that resource mobilisation is insufficient; the resource mobilisation is not commensurate with the risk, and then when the fire spreads and engulfs the entire vessel, the response infrastructure is simply not in place.

The second issue, and this is arguably more pervasive, is the failure to properly collect and preserve evidence in the early stages of smaller casualties. Say there is a minor collision, some limited damage between two vessels, or a small fire that the crew successfully suppresses. The owner decides not to instruct lawyers, not to commission a specialist fire expert, because the anticipated losses seem modest and the cost of investigation seems disproportionate. What they do not see at that point is that delay claims or significant cargo claims may materialise months later. By then, we are brought in a year after the casualty to defend a substantial claim, and when we ask whether crew statements were taken, whether a fire investigation expert went on board to preserve evidence, the answer is invariably no. There is a surveyor report, but nothing more. That is a very difficult position from which to mount a defence.

With market volatility, freight rate swings, port congestion, and war risk rerouting creating enormous pressure on standard charter parties right now, which categories of disputes have risen most sharply?
The Persian Gulf situation is generating a

Will Pyle
Director, Campbell Johnston Clark (CJC), Singapore

BIMCO has been at the forefront of developing standard clauses to address new fuel specifications and decarbonisation obligations, and those have been widely adopted. But the quality of protection always depends on whose interest you represent.

significant volume of disputes at present. Time charterers operating vessels in that region are paying hire to owners but are struggling to recover equivalent detention or waiting time costs from voyage charterers down the chain. They are caught in a commercial squeeze. At the same time, owners themselves face exposure around whether their vessels should enter or remain in the region at all, and what the contractual position is for vessels that become operationally constrained or stuck. These are live disputes with real commercial consequences and they will keep generating litigation for some years to come.

Which brings us naturally to the drafting of force majeure and sanctions clauses. Are today's contracts being drafted with sufficient precision to handle these scenarios?

That is a broad question, and an honest answer requires acknowledging the structural challenge. Clauses are typically drafted well before the specific conflict or regulatory change they end up being tested against. A clause negotiated five years ago was not necessarily drafted with today's Strait of Hormuz dynamics or the current sanctions architecture in mind. So there will always be interpretive gaps when reality outpaces the drafting.

The more interesting tension is the one that bodies like BIMCO face when they try to produce balanced standard clauses for time charter use. If they protect owners too strongly, charterers will not accept the clause. If they lean the other way, owners resist. That compromise produces clauses where certain obligations or thresholds are expressed in qualified terms, such as 'reasonable steps' or 'in the owner's reasonable judgment', and those qualifications, while necessary for commercial acceptance, are precisely where disputes concentrate. The grey areas are not accidental. They are the price of achieving a clause that both sides will sign.

Finally, tell us about CJC's positioning as a firm. What sets you apart in the Singapore maritime disputes market?
We are a specialist firm. In our Singapore practice, we are one hundred percent focused on marine disputes. That focus matters because maritime disputes require deep technical knowledge, an understanding of how vessels actually operate, how casualty investigation works, how P&I and hull insurance interact, and how maritime arbitration in London or Singapore functions in practice. Our team in Singapore is sizeable by the standards of international firms practising shipping law here, which means we can bring appropriate resources to complex, multi-party casualties or high-value charter party disputes without stretching the team. We also have a partner handling non-contentious work, including ship sale and purchase and ship finance, which gives clients a more complete service when they need it.

Shore-based support models become more important as vessels adopt more complex systems, particularly in dual-fuel and hybrid configurations. Onboard electrification and hybrid solutions are gaining traction, particularly in ports and coastal segments, where operational profiles and local regulations make them more viable.

CLEARING THE DECKS

Shipping Charts a Course Toward Sustainable Plastic Procurement

A landmark stakeholder roundtable convened by the Maritime Association for Clean Seas has produced the industry's most detailed roadmap yet for cutting single-use plastic from commercial shipping — and the path forward is both practical and urgent.

Kalpana Pandey

The Maritime Association for Clean Seas (MACS) is an industry initiative built and operated by Seven Clean Seas, an ocean impact organisation headquartered in Singapore. MACS exists to mobilise the commercial shipping industry as an active force against plastic pollution — empowering shipowners, operators, ports and supply chain stakeholders to recover ocean plastic, strengthen circular systems and embed sustainable procurement practices across maritime operations.

The association brings together members from across the global maritime value chain, including shipowners, ship managers, classification societies, ports, industry associations and sustainability professionals. Its work is supported by knowledge partners such as BIMCO, IMPA, INTERTANKO, and the Control Union and is powered by Howden. On the ground, Seven Clean Seas, the organisation behind MACS, operates more than four plastic recovery projects across Indonesia and Thailand, employing over 100 local crew members. To date, these efforts have removed more than 6 million kilograms of ocean plastic and positively impacted the lives of nearly 20,000 people in coastal communities.

In 2026, MACS convened its first Stakeholder Roundtable on Sustainable Plastic Procurement, bringing together 45 participants from 28 organisations to develop shared standards and decision-making tools to reduce plastic in commercial shipping — a milestone in translating industry ambition into coordinated, practical action.

On governance, Procurement and ESG/ Sustainability combined for 53.3% of lead-function selections, though the session was clear that no single department can deliver results without cross-functional input. Safety and hygiene fit (7.84/10) and compliance (7.74/10) ranked as the top evaluation criteria for alternative materials, above environmental metrics.

Part 1: A Common Language for Plastics

The roundtable's opening session confirmed that the industry lacks even basic shared terminology. Terms such as recyclable, compostable, and sustainable mean different things to different buyers and suppliers. Participants ranked this as the most urgent knowledge gap to close. A close second: how recyclability varies by port -- a product technically recyclable in one region may go to landfill in another. Any future guidance must distinguish between technical and practical recyclability.

Where would a shared taxonomy add the most value? Evaluating supplier claims and reporting plastic use or waste each scored 17.4%, followed by comparing products across suppliers (15.9%), crew sorting decisions (14.5%), and crew training (13.0%). The taxonomy needs to work across the buying side, supply side, and port interface alike.

Part 2: A Phase-Out Framework

MACS presented a tiered framework for sequencing plastic reduction by substitutability and operational criticality. 82.4% of participants said the tier structure was fully or mostly accurate. On timelines, the Balanced option -- Tier 1 within 18 months, Tier 2 within four years, Tier 3 thereafter -- achieved 82% approval with the strongest tier-by-tier support.

Part 3: Decision-Support Tools

The final session focused on what procurement teams actually need to act on. Two tools were proposed: a supplier disclosure toolkit for embedding plastic requirements into RFQs and RFPs, and an alternative-evaluation framework that balances environmental impact with operational fit. All five supplier information types tested scored above 3.5 out of 5 for reasonableness to request. Participants strongly preferred verifiable evidence over self-declaration: product specification sheets and third-party certification each drew 25.9% of evidence-type selections versus 11.1% for self-declaration alone. On governance, Procurement and ESG/Sustainability combined for 53.3% of lead-function selections, though the session was clear that no single department can deliver results without cross-functional input. Safety and hygiene fit (7.84/10) and compliance (7.74/10) ranked as the top evaluation criteria for alternative materials, above environmental metrics.

Option	Tier 1	Tier 2	Tier 3	Approval
Balanced	0-18 months	18 months - 4 yrs	4 yrs+	82%
Aggressive	0-12 months	1-3 years	3 yrs+	74%
Front-loaded	0-12 months	1-4 years	4 yrs+	75%
Conservative	0-24 months	2-5 years	5 yrs+	82%

Phase-out timeline options and overall approval ratings

Plastic cutlery and straws were the clear early-action priorities within Tier 1.

Tier 1 Item	Top-2 Selections	Share of Respondents
Plastic cutlery	22 of 31	71.0%
Straws and stirrers	20 of 31	64.5%
Beverage plastic bottles	9 of 31	29.0%
Disposable food containers	4 of 31	12.9%

Tier 1 items ranked by ease of phase-out

Cost led the barriers to phase-out (20.5%), followed by lack of viable alternatives (16.4%) and supplier dependency (12.3%). Operational constraints, safety and hygiene, and crew acceptance each added 11.5% —together these six barriers accounted for 83.6% of all selections.

Supplier Information Request	Reasonableness Score (0-5)
Type of plastic used: polymer and format	4.10
Potential to be recycled	3.86
Potential to be reused / take-back available	3.85
Plastic weight in packaging	3.68
Recycled content	3.51

Reasonableness scores for supplier information requests (0-5)

What Comes Next

By July 2026, MACS will deliver three outputs: a common plastic taxonomy for maritime, a priority phase-out framework, and a decision-support and supplier engagement toolkit. A waste audit example shared at the roundtable underscored why targeted action matters – 80% of plastic waste across three vessels traced back to just six suppliers. The framework is on its way; the smartest operators will start mapping their own supply chains now.

FROM GREY MARKET TO GLOBAL NETWORK

HOW PELAGUS IS REINVENTING MARINE SPARE PARTS

Pelagus 3D started as a side project for one shipping company and has since grown into a manufacturing network spanning more than 25 OEM partners worldwide. **Scott Harding, Vice President, Engineering of Pelagus** explains how the company made a decisive pivot, why trust is harder to build than technology, and what geopolitical disruption is doing for the on-demand parts business.

Ramprasad Ravi

When Wilhelmsen set out to solve its spare parts problem through additive manufacturing, it began with a single site in Singapore. The logic was sound: 3D printing could produce components on demand, close to where ships actually operated, eliminating the delays and costs of a traditional supply chain. But a single site could not serve a global fleet, and replicating the model across multiple owned locations would have required enormous capital investment in machinery and facilities.

The answer, it turned out, was not to build more sites. It was to stop building them altogether. Instead of investing in owned capacity, Wilhelmsen recognised that manufacturing infrastructure already existed around the world, much of it sitting underutilised in the additive and conventional manufacturing sector. The result was Pelagus 3D: a platform-based manufacturing network that connects engineering data to available capacity wherever it is needed. Scott Harding, VP Engineering at Pelagus, spoke to Maritime Gateway on the sidelines of Singapore Maritime Week about the journey from that first site to a global operation, and the strategic decisions that shaped the company along the way.

The Pivot That Changed Everything

For Pelagus, the most consequential moment was not a technology breakthrough. It was a customer rethink. For its first period of operation, the company was focused on serving Wilhelmsen directly: identifying parts, digitising them, manufacturing on demand, and delivering to the fleet. The model worked, but the scale was bounded by one company's requirements.

About eighteen months ago, Pelagus made what Harding describes as a critical shift. Wilhelmsen, despite having the pain point and the commercial appetite to solve it, was not the right primary customer. The reason was intellectual property. The original equipment manufacturers hold the design drawings, the CAD files and the genuine engineering understanding of the parts they produce. Working with OEMs rather than operators meant Pelagus could access that knowledge directly, rather than reverse-engineering specifications from physical components case by case. It also meant that solving the problem for one OEM unlocked access to every asset in the world carrying that equipment.

Today, Pelagus wo rks with more than 25 OEM partners, including Kawasaki Heavy Industries as an early anchor customer. The company sells manufactured parts to the OEM, who in turn sells to ship owners and operators through their existing commercial relationships. Pelagus does not disrupt the OEM's route to market. It enables them to serve customers they would otherwise have stopped supporting.

Scott Harding
VP - Engineering, Pelagus

The Legacy Portfolio Opportunity

The part of the market Pelagus has deliberately targeted is one that most OEMs have quietly walked away from: the legacy portfolio. Once a product line passes the fifteen to twenty-year mark, OEMs typically redirect their engineering resource and manufacturing capacity towards new product introductions. Demand for older parts becomes sporadic and harder to forecast. Support becomes commercially marginal. The grey market fills the gap. Harding is direct about

By 3D printing the sand mould rather than investing in traditional tooling, Pelagus can reduce the minimum order quantity to a single part. For legacy portfolios where demand arrives unpredictably, this flexibility is precisely what both OEMs and end users need.

the opportunity this creates. For the OEM, Pelagus provides a way to continue honouring commitments to customers without diverting attention from the new products that drive growth. For the end user, it means access to properly specified, quality-assured parts instead of grey market alternatives of uncertain provenance.

Not a 3D Printing Company

Despite its origins in additive manufacturing, Pelagus is deliberate about not defining itself as a 3D printing business. The company takes what Harding calls an application-led approach: the manufacturing technology is selected based on the geometry, material requirements, location and specific needs of each part. By his estimate, 3D printing accounts for thirty to fifty percent of output. Conventional CNC machining and casting make up the rest. "We are not trying to shove 3D printing down everyone's throats," Harding says. "Conventional manufacturing is still good enough for many applications, and often it is the right answer. CNC machining is responsive, agile and widely available."

Where additive does offer a clear advantage is in low-volume casting applications. By 3D printing the sand mould rather than investing in traditional tooling, Pelagus can reduce the minimum order quantity to a single part. For legacy portfolios where demand arrives unpredictably, this flexibility is precisely what both OEMs and end users need. A tooling investment sitting on a shelf waiting for a sporadic order is, as Harding puts it, simply wasteful.

The Trust Barrier

If the technology is increasingly mature, what is holding broader adoption back? For Harding, the answer is straightforward: trust, and the organisational processes that govern it.

"A lot of our OEM partners are the biggest name brands in the industry, with reputations built over tens, sometimes hundreds of years," he says. "For them to build trust in Pelagus, in our manufacturing quality controls and our assurance processes, that is probably our biggest challenge. They have internal change control procedures, their own supplier quality assurance frameworks. Qualifying Pelagus, and sometimes our manufacturing partners, takes time."

On the question of whether additive manufacturing meets classification and regulatory standards, Harding pushes back on the premise. The technology has been qualified for use in nuclear submarines, commercial aircraft and space applications. In the marine sector, DNV and ABS both publish guidelines for additive manufacturing, including the B203 and ABSAM standards, which specify material testing, non-destructive evaluation and process controls. The standards exist. The question is whether organisations have the internal will to go through the qualification process to use them.

Geopolitics as Accelerant

The disruption to shipping routes through the Strait of Hormuz has brought the resilience argument for localised manufacturing into sharp relief. Pelagus has suppliers and customers in the Middle East, and Harding is clear that supply chain shocks of this kind strengthen the case for distributed, on-demand production.

"When these routes are held up, it only increases the voice for localised manufacturing," he says. "It is not always the answer. But in these geopolitical conditions, you need to have the availability so that when those situations arise, you can call on an alternative supply chain."

On lead times, the company promises four weeks for any repeat order, covering a wide range of parts and technologies. Cast parts can be delivered in as little as two weeks. CNC machined components from a local shop can be ready within days.

Looking further ahead, Harding identifies India as a market with significant untapped potential, both as a manufacturing base and as an end-user market. Current OEM customers are concentrated in Europe, Japan and Korea, but the country's dry docks, ship repair facilities and growing shipyard sector represent a natural fit for on-demand parts supply.

WHERE TECHNICAL MEETS COMMERCIAL

As regulation fragments and the energy transition accelerates, Lloyd's Register is repositioning itself at the intersection of deep technical knowledge and strategic commercial counsel. **Taylor Wamberg, Regional Advisory Lead for Singapore, Southeast Asia and Australasia**, speaks to Maritime Gateway on the sidelines of Singapore Maritime Week.

Ramprasad Ravi

Your role spans eight advisory disciplines, from technical engineering to management consultancy. Where does Lloyd's Register find the most value in that breadth?
The combination, really. We do very technical work, engineering analysis, risk assessment, regulatory compliance, but where we find the greatest impact is when we overlay that with techno-economic studies. Knowing that something is technically the right thing to do is only half the story. You also need to demonstrate a return on investment and communicate it in a way that gets decisions made at board level. That is what actually moves things forward for our customers. Risk and asset management is also a growing part of what we do, which makes particular sense given everything that is changing in our industry right now.

What are customers typically requesting from the advisory business right now?
One of the interesting things about working in advisory is that there is no typical request any more. Charterers, traders, banks, insurers, ports, even flag states: each approaches us with a different problem. But what we are seeing across almost all of them is a significant appetite for scenario planning. Things are genuinely unclear right now. Where regulation is going, which fuels will prevail, what infrastructure will be in place. An owner wants to know what a new regulation means for their fleet. A port wants to know how to plan infrastructure investment across multiple possible futures. That is a large part of what we are doing: being the technical advisor with the marine-specific knowledge and regulatory proximity to help clients unpick what different scenarios might mean for their business.

Regulation is becoming more complex and more fragmented simultaneously. How challenging is it for operators?
It is genuinely difficult. I have watched the layers accumulate from the inside, coming through LR from surveyor to commercial manager to advisory. The compliance burden is growing, the data demands are multiplying, and consistency between regulatory frameworks is not always there. On the advisory side, we contribute to the development of new regulations and then go out to the market to explain what they actually mean for individual businesses. Not just here is what the regulation says, but here is what it means for your operation, what levers you have, and when to pull them. That timing question is often the most commercially significant.

CII ratings are now directly affecting charter negotiations and vessel valuations. How is Lloyd's Register helping owners make the business case for decarbonisation investment, not just as a regulatory necessity but as a commercial proposition?
Being more efficient is not always primarily about compliance. If you use less fuel, there is a direct cost saving. Charter party agreements then determine who captures that saving, which is why cooperation and data-sharing between owners and charterers matters so much. CII is also highly sensitive to operational factors: a technically efficient vessel trading erratically or sitting idle will still produce a poor rating. At LR, we support owners from understanding the regulation, through validating the data used to calculate CII scores, to identifying strategies for improvement. But for any of that to be effective at a strategic level, it needs to reach decision-makers in commercial terms. More and more, we are presenting technical solutions through a techno-eco-

Taylor Wamberg
Regional Advisory Lead for Singapore, Southeast Asia, and Australasia

> **The compliance burden is growing, the data demands are multiplying, and consistency between regulatory frameworks is not always there. On the advisory side, we contribute to the development of new regulations and then go out to the market to explain what they actually mean for individual businesses.**

nomic lens, translating engineering into the language of investment returns and long-term asset positioning.

Certification of vessels for new fuel types involves standards that are still being written. How does Lloyd's Register navigate that?

We are operating on two tracks simultaneously. We have guidelines and are actively developing rule sets for all future fuel types. But we can also fall back on risk-based certification where prescriptive rules do not yet exist.

That approach evaluates an engineering solution through hazard identification and HAZOP studies, then overlays the classification lens on top. It brings our risk engineering and advisory expertise together with our classification function, allowing the industry to move at pace and learn from early deployments. That is a good place to be for now. But to scale from individual projects to broad industry adoption, we do need more prescriptive frameworks.
Shipping likes to follow clear rules. That is actually a strength of this industry, not a limitation.

What guidance is Lloyd's Register giving owners facing newbuild or retrofit decisions in an environment where fuel availability and regulatory direction remain uncertain?

Lloyd's Register is fuel-agnostic, and I think that is the right position. We start not with the fuel question but with the asset question: what do you want to do with this vessel? From there, we draw on our technology knowledge, our energy transition teams' modelling of fuel availability pathways, and the commercial realities facing the owner or charterer. We look at unit freight costs early in the process.

What are the fundamental operational requirements given the specific trade this vessel will serve?

We then follow an iterative process, examining solutions from multiple angles, to identify what will have the greatest impact and what makes the most commercial sense. The answer we reach may not be exactly what gets specified at a shipyard, but it gives owners a disciplined framework for understanding where value lies.

Where is the industry landing on fuel choice? Are we seeing convergence?

Lloyd's Register is fuel-agnostic, and I think that is the right position. We start not with the fuel question but with the asset question: what do you want to do with this vessel? From there, we draw on our technology.

What we are observing is owners and operators becoming increasingly open-minded, and I think that is exactly the right response. Ammonia and methanol have attracted enormous attention, but serious conversations around ethanol are growing. Biofuels can function almost as a drop-in fuel for existing fleets. And LNG remains a very significant player in the transition. Rather than converging on a single winner, the industry is adding more fuels and more optionality. Infrastructure investment will follow demonstrated demand, and demonstrated demand will follow clearer regulation and commercial incentives.

NAVIGATING THE WIND IN THE SAILS OF MARITIME DECARBONISATION AND SUSTAINABILITY

TradeWinds Shipowners Forum at Posidonia takes stock of Shipping's Decarbonisation Journey

The road to zero-emission shipping is neither straight nor short — but it is being built, plank by plank, fuel by fuel, regulation by regulation. That was the broad consensus emerging from one of Posidonia 2026's most wide-ranging panel discussions, which brought together voices from energy majors, shipbuilders, research institutions, industry associations and the rapidly advancing world of nuclear marine propulsion.

The LNG Question

Dr Alexandra Ebbinghaus, GM Decarbonisation, Marine Sector, Shell opened the debate by framing the central commercial dilemma facing ship owners who are weighing the merits of dual-fuel LNG newbuilds against conventional vessels. The economics, she acknowledged, are genuinely difficult to navigate. "LNG has the only advantage of all other options in that the fossil version can be competitive just on an energy basis," she said, "but you take a risk and you have a higher cost." She noted that Greek tanker and bulker owners face a particular structural challenge, given their asset-trading model, where a vessel's resale value matters as much as its operational profile. "Is there safety in being conventional and being the same as everyone? That's one of the challenges we see, especially in the tanker sector." Yet Dr Alexandra was careful not to dismiss the longer-term logic of the LNG pathway.

She pointed to bio-LNG as an easier-to-produce bridging fuel compared with synthetic alternatives, and outlined a trajectory that could eventually lead through synthetic methane toward net zero. "You have high energy. You have synthetic. To actually get to net zero, you need that pathway," she argued. The challenge, she suggested, is not the destination but the business case for each step of the journey, particularly for owners whose planning horizons are measured in market cycles rather than decades.

From Fuel Transition to Operational Resilience

Claire Wright, Managing Director, Hanwha Ocean, Europe offered a perspective shaped by daily conversations with ship owners across segments. she suggested that the nature of those conversations has quietly but meaningfully shifted. "The talk has moved from energy transition to resilience and flexibility in operation — but fundamentally it was saving fuel," she said. Energy efficiency technologies, where the return on investment is clear and the installation pathway is established, continue to attract strong owner interest. The more complex picture, she noted, lies in how multiple technologies interact once deployed together on a single vessel. "When

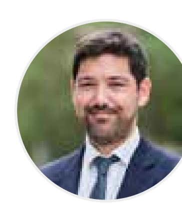
Craig Eason
Technical Editor
TradeWinds

Baroness Charlotte Vere
Group Head Market Development
CORE POWER

Claire Wright
Managing Director
Hanwha Ocean Europe

Bo Cerup-Simonsen
CEO, Maersk Mc-Kinney Moller Center for Zero Carbon Shipping

Alexandra Ebbinghaus
GM, Decarbonisation, Marine Sector
Shell



Sotiris Raptis
Secretary General
ECSA

you have turbine optimisation, air lubrication and wind you can run a storm model. The crew needs training to optimise performance with all those technologies in the operational conditions they face."

Digital solutions onboard, she added, are increasingly seen as the integrating layer that makes efficiency investments actually deliver. On alternative fuels, she acknowledged that ammonia development continues at Hanwha but conceded that commercial timelines had extended, particularly outside car carriers and a small number of pioneering segments. For a company straddling many markets, the R&D challenge is one of prioritisation. "The challenge is timing — what do we accelerate, what do we decelerate?"

Five Years of Progress, and a Re-Strategy

Bo Cerup-Simonsen, CEO of Maersk Mc-Kinney Moller Center for Zero Carbon Shipping offered a longer view, reflecting on what five or six years of focused research and collaboration have actually produced. The scale of change is striking when viewed against what was possible at the Centre's founding. "At that time we were hoping that ammonia would one day be enabled as a fuel for shipping. Now here we are in 2026 and we have engine builders putting big two-stroke engines in commercial ships," he observed.

The Centre, he explained, has recently undergone a re-strategising process to reflect the changed landscape — one where technologies have matured, regulatory frameworks have firmed up and owner appetite for action has grown. He pushed back gently against the more pessimistic commentary that had surfaced elsewhere at Posidonia, where some Greek owners had questioned whether the decarbonisation drive had produced anything beyond glossy publications. "Our industry wants to decarbonise. There's questioning about the net zero framework, the availability of fuels, the risks — but a lot of work going on shows it is possible." He pointed to EU ETS as already driving real behavioural change, and to the Catalyst book-and-claim platform as a practical mechanism enabling cargo owners to access green transportation certificates even where direct fuel access is limited. "It provides real flexibility, particularly at the beginning of the transition, before global fuel supply infrastructure is in place."

Energy efficiency technologies, where the return on investment is clear and the installation pathway is established, continue to attract strong owner interest. The more complex picture lies in how multiple technologies interact once deployed together on a single vessel. When you have turbine optimisation, air lubrication and wind you can run a storm model.

Where Is the Nine Billion Going?

European Community Shipowners' Association (ECSA) Secretary General Sotiris Raptis struck the most impatient note of the session, directing his frustration squarely at the pace and clarity of EU policy. Despite a message from the European Commissioner earlier in the week that the industry would not be made to "pay twice" under both the ETS and FuelEU Maritime, Sotiris was unequivocal that this fell well short of what is needed. "Not paying twice is not the same as withdrawing," he said flatly. "We need a clear commitment that when we have an IMO agreement, the European measures will be withdrawn. This message hasn't been delivered yet."

The numbers he cited underlined the stakes. European shipping currently contributes nine billion euros annually under the ETS — a figure that dwarfs most sectoral climate funds — yet the majority of that revenue flows into national government budgets rather than back into clean fuel infrastructure or technology deployment. "We need to go from resolutions to urgent action," he said. He called for a mandatory requirement on fuel suppliers to make sustainable fuels available in European markets, pointing out that shipping remains the only major European economic sector without such an obligation. "Aviation has it. The power sector has it. Shipping does not."

The Nuclear Wild Card

The session's final and perhaps most forward-looking thread concerned nuclear propulsion, a topic that has moved from the fringes of maritime conversation to something approaching mainstream discussion with notable speed. Core Power's Group Head, Market Development, Baroness Charlotte Vere attributed much of this momentum to the global energy security environment, arguing that national-level investment in nuclear technology was creating conditions that would ultimately benefit marine applications. "It is national security and it is energy security," she said. "And there are lots of nations out there who want to get involved in nuclear — they will need technology."

She outlined a staged pathway, beginning with floating nuclear power plants — essentially small modular reactors on barges generating electricity — using already-proven technology, before progressing to propulsion applications. The timeline she put forward was ambitious but not fanciful. "I think we could see reactors on ships within five years," she said, echoing assessments from Norwegian research institutions.

The broader ecosystem — regulations, marinization standards, licensing frameworks, yard capability — remains the critical constraint, she acknowledged, but insisted that work on all those elements is advancing in parallel. The IAEA's Atlas initiative and the UK's nuclear regulator consultation on maritime nuclear were among the concrete milestones she cited as evidence of genuine institutional momentum.

The panel left no illusions about the complexity ahead. Fuel availability, regulatory coherence, financing structures and technology maturity all remain live and contested questions. But it also left no serious doubt about the industry's direction of travel — or about the fact that the decisions being made today, in shipyards and boardrooms and negotiating chambers, will define what global shipping looks like for the next half century.

Bo Cerup-Simonsen
CEO, Maersk Mc-Kinney Moller Center for Zero Carbon Shipping

Our industry wants to decarbonise. There's questioning about the net zero framework, the availability of fuels, the risks — but a lot of work going on shows it is possible.

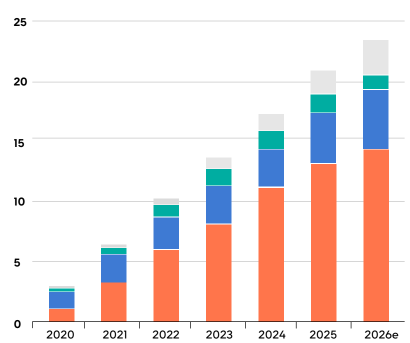
THE ENERGY TRANSITION IS REWRITING SHIPPING — ARE YOU ON BOARD OR UNDERWATER?

Insights drawn from **Jayendu Krishna, Director & Head of Maritime Advisors at Drewry Maritime Services (Asia)**, and his analysis published on Substack.

The loudest critics of the energy transition happen to be some of the world's most economically and militarily powerful voices. It is easy, then, to mistake volume for momentum. But the data does not lie, and what it shows is an industry in the midst of a structural shift that no amount of political rhetoric can reverse. The numbers from 2025 and early 2026 make the picture clear. Electric vehicles now account for roughly 25% of global car sales, with around 5% of the entire global car fleet electrified. That alone displaced approximately 1.2 million barrels of oil per day last year — with some estimates placing the figure closer to 2 million. To put it plainly: EV adoption may already be shaving 1–2% off global oil demand annually. For tanker operators who have long built their business cases on steady crude demand growth, this is not a footnote. It is a flashing warning light.

But transport fuels are only part of the story. Renewables have accounted for more than 80% of new global power capacity installations every year since 2020 — not because governments mandated it, but because the economics became undeniable. Solar generation costs have fallen by roughly 90% since 2010. Wind is down by more than 60%. Battery storage has followed the same trajectory. In many markets, renewables are now simply the cheapest option on the table. China and the EU are generating around 25% of their electricity from renewables today; the United States is at 20%; India at 14% and climbing fast. The cumulative displacement of fossil fuels is no longer a projection, it is a measurable reality. China alone is displacing over 400 million tonnes of coal equivalent annually. The EU and India together account for another 100–200 million tonnes per year. For dry bulk markets, this is a slow-moving but very real headwind. The coal trade that underpinned so many Capesize and Panamax revenue models is not going to recover. It is going to shrink.

Global Electric Car Sales 2020-2026



What makes the current moment particularly significant for shipping is that China has shifted from being a consumer of the energy transition to being its manufacturer and exporter. In the first quarter of 2026 alone, Chinese photovoltaic module exports rose 23% year-on-year, while fully electric vehicle exports surged 53%. China is not merely participating in decarbonisation; it is industrialising it and shipping it around the world. This creates new cargo flows, new trade lanes, and new opportunities for the operators agile enough to follow them.

Those opportunities are real and growing. Demand is rising for chemical tankers, LNG carriers, multipurpose vessels, and the specialist logistics that serve offshore wind construction and maintenance. Supply chains for clean energy components such as solar panels, wind turbine parts, battery systems, electrolysers require shipping, and lots of it. The transition that threatens one part of the fleet is simultaneously building demand for another. Regulatory frameworks are locking these changes in. The EU's RED III, REPowerEU, and AccelerateEU directives, China's 15th Five-Year Plan, India's PM Surya Ghar scheme, and broader initiatives across Africa and the Gulf are not going to be unwound by a change of government or a bad quarter for renewables investment. The architecture is in place. The momentum is structural. For maritime operators, investors, and port authorities, the strategic question is no longer whether the transition will reshape their markets. It will. The question is whether your fleet, your terminals, and your long-term capital allocation reflect that reality — or whether they are quietly becoming a portfolio of stranded assets.

Jayendu Krishna
Director & Head of Maritime Advisors at Drewry Maritime Services (Asia), Singapore

Transport fuels are only part of the story. Renewables have accounted for more than 80% of new global power capacity installations every year since 2020.

VIETNAM'S $6 BILLION GAMBIT

Can it be the alternative to the well-established ports?

At the mouth of the Saigon River, on a sliver of land still officially designated a UNESCO biosphere reserve, Vietnam is attempting one of the most audacious port plays in Southeast Asian history. The Can Gio International Transshipment Port — a proposed $5.5–6 billion greenfield development in Ho Chi Minh City's Can Gio district — has moved from bureaucratic blueprint to live project, with the Vietnamese government granting in-principle approval and global terminal operators circling with interest. The ambition is explicit: to pull transshipment volumes away from Singapore and Port Klang and establish Vietnam as a credible hub in its own right. Whether Vietnam can actually pull it off is a more complicated question.

Kalpana Pandey

The Strategic Logic

Vietnam's pitch for Can Gio rests on three interlocking arguments: geography, manufacturing gravity, and cost.

On geography, the case is surprisingly strong. Can Gio sits at the junction of the Long Tau and Soirap rivers, within easy reach of the main South China Sea shipping lanes connecting Northeast Asia to Europe and the Indian subcontinent. Ships calling at Can Gio would, for certain route configurations, sail fewer miles than they would diverting to Singapore — a meaningful consideration when vessel operating costs on an ultra-large container ship (ULCS) can exceed $100,000 per day.

Vietnam, known for its manufacturing culture, is the argument that is driving the point home. The country has been one of Asia's fastest growing export economies in the past decade. Its container throughput has expanded at a rate of 15% annually; global chains diversifying away from China has been a key factor. Ho Chi Minh City and its surrounding industrial zones including Binh Duong, Dong Nai, Long An form one of Southeast Asia's most productive manufacturing clusters, producing electronics, footwear, textiles, and furniture destined for markets in Europe, the United States, and increasingly, India. Today, a significant portion of this cargo is first trucked to feeder ports and then transshipped through Singapore, enriching PSA International while adding time and cost. A deep-water port at Can Gio could capture that cargo before it ever leaves Vietnamese waters.

The cost angle follows naturally. Vietnam's port labour costs, land costs, and regulatory overheads are substantially lower than Singapore's. If Can Gio can offer comparable reliability at meaningfully lower tariffs, price-sensitive feeder operators will pay attention.

The Players

PSA International, the Temasek-linked operator that runs Singapore's own port empire and holds stakes in terminals across India, Belgium, Brazil, and beyond, has been reported as one of the parties in discussions with Vietnamese authorities. The involvement of PSA is strategic: an involvement right now means they are planning carefully for the future. The optics from a commercial point of view are clear enough for anybody to see: if transshipment volumes are going to shift, why not have control over the infrastructure? Vietnamese state enterprise Saigon Newport Corporation (SNP), which already operates the bulk of Ho Chi Minh City's existing container capacity, is also central to the project's domestic ownership structure. The Vietnamese government has signalled that it wants a controlling interest to remain in Vietnamese hands, which will shape how foreign operators can participate and on what terms.

The Obstacles Are Formidable

For all the strategic logic, the obstacles facing Can Gio are

Vietnam's port labour costs, land costs, and regulatory overheads are substantially lower than Singapore's. If Can Gio can offer comparable reliability at meaningfully lower tariffs, price-sensitive feeder operators will pay attention.

substantial — and each one is load-bearing.

Dredging: The Soirap channel, through which vessels would approach Can Gio, currently cannot accommodate ultra-large container ships at full draft. Achieving the 15–16 metre water depth needed for modern ULCS

vessels requires a sustained and expensive dredging programme, with ongoing maintenance thereafter. Vietnam's track record on major maritime infrastructure is improving but is not yet at the level of Singapore's engineering certainty.

Hinterland connectivity: A transshipment hub's value depends not just on its berths but on what surrounds them. Ho Chi Minh City's road network is chronically congested, and Vietnam lacks the high-capacity rail freight corridors that would allow inland cargo to move efficiently to the port. Without serious investment in multimodal connectivity, Can Gio risks becoming a terminal that can receive large ships but struggles to distribute cargo at speed.

Singapore's network effects: This is perhaps the deepest structural challenge. Singapore's transshipment dominance is not merely a function of geography or price — it is a function of connectivity. PSA Singapore calls at over 600 ports in more than 120 countries. Shipping lines concentrate volumes at Singapore precisely because other shipping lines concentrate volumes at Singapore; the hub is self-reinforcing. Dislodging that network gravity with a greenfield port, however well-engineered, requires years of patient relationship-building with carriers, freight forwarders, and beneficial cargo owners. Port Klang has spent decades at this task and still handles less than half of Singapore's throughput.

The greenfield premium: Attracting major shipping lines to a new port requires certainty: certainty about berth availability, turnaround times, crane productivity, and tariff stability. Singapore offers all of this with decades of operational proof. Can Gio is, at this stage, a set of approvals and projections. Bridging that credibility gap will require anchor tenants, likely major liner alliances, to commit capacity before the port is built, a chicken-and-egg problem that has stalled many ambitious port projects across the region.

What It Means for India

For Indian shipping interests, Can Gio deserves close attention. India-Vietnam bilateral trade has grown rapidly, crossing $14 billion in 2023–24, and much of it moves through Singapore's transshipment network. A competitive Can Gio could offer Indian feeder operators and exporters a more direct routing — potentially shortening transit times and reducing costs on the HCMC–Indian subcontinent corridor. Indian port developers, several of whom have been expanding their regional footprints, may also find Can Gio worth watching as a co-investment or technical services opportunity.

More broadly, Can Gio is a signal of the restructuring underway across Southeast Asian port geography. Vietnam is not the only country reassessing its transshipment dependence on Singapore. If Can Gio succeeds, it will not just capture volumes — it will demonstrate that Singapore's hub status, long treated as a near-permanent feature of regional trade, is in fact contestable.

The port is not built yet. The dredging contracts are not signed. The carrier commitments are not inked. But the approvals are real, the capital interest is real, and the strategic logic is sound. Hurdles will always exist, but to take a risk at this level, means to have confidence. Vietnam is placing a very large bet. The region's shipping community should watch Can Gio carefully.

Can Gio Vietnam Port developments

Location: The port will be developed on the Gò Con Chó islet in HCM City's Cần Giờ District

Area: approximately 571 hectares.

Capacity: The port is designed to handle 4.8 million TEUs by 2030, with a potential to reach 16.9 million TEUs by 2047.

Investment: The total investment is estimated at around VND 128.87 trillion (approximately USD 5.1 billion).

Investor Consortium: The consortium includes Vietnam Maritime Corporation (VIMC), Saigon Port JSC, and Terminal Investment Limited Holding S.A.

Operational Terms: The project will operate for 50 years and has strict conditions for investors, including a minimum investment of VND 50 trillion (approximately USD 2 billion) within the first decade.

Impact: Once completed, the port is expected to generate annual revenues of VND 34-40 trillion (approximately USD 1.3-1.6 billion) and create between 6,000 and 8,000 direct jobs, along with tens of thousands of indirect positions.

Bridging the Digital Divide at Sea

BW Group's Patric Desanti-Fettkenheuer, talks to Kalpana Pandey, on closing the gap between vessel intelligence and shore-side enterprise and why security should feel like confidence, not constraint.

Patric Desanti Fettkenheuer
Head, Group IT & Digitalisation (VP) at BW Group

Security that ignores operational reality ultimately fails. Good security is felt as confidence, not constraint.

Digital adoption on the vessel side has accelerated, but shore systems and commercial platforms often lag behind. Where do you see the biggest integration gaps at BW Group, and what's your approach to closing them?
The biggest integration gaps typically don't sit on the vessel anymore—they sit between operational systems at sea and commercial and enterprise platforms ashore. Ships have become data-rich environments, but historically, that data hasn't flowed cleanly into planning, commercial, maintenance, and decision-support systems on land.

The challenge can be amplified by scale and diversity across business units, asset classes, and legacy systems. The gap is not just technical; it's about ownership, data definitions, and decision rights.

Our approach is to treat integration as a business capability rather than an IT project. We focus on:
- Clear system-of-record principles for core domains
- Event-driven integration rather than point-to-point interfaces
- Architectural patterns that couple vessel systems with cloud platforms so the vessel can become a full integral part of the business data concept

Closing the gap is less about connecting everything and more about connecting the right things in the right way.

Connectivity at sea is still constrained by bandwidth, latency, and cost. How do you prioritise what data actually needs to flow in real time versus what can be batched — and how does that shape your architecture decisions?
We start from a simple principle: real-time data is expensive, both technically and financially, so it must earn its place.

We classify ship-to-shore data into three broad categories:
- Safety-critical and operational information that must move near real time
- Operational analytics data that can tolerate delay
- Contextual and historical data that is best batched and optimised for cost

That classification directly shapes the architecture, which recently saw the fleet-wide deployment of Starlink, while VSAT remains a strong redundancy everywhere Starlink cannot be used.

Ship IT systems are designed to operate autonomously first, with store-and-forward patterns, edge processing, and resilience built in. Real-time connectivity enhances operations—it is not a dependency for basic safety or continuity. This mindset avoids over-engineering and keeps connectivity spending aligned with actual business value.

A tightly locked-down vessel network is safer but can frustrate crews and slow operations. How do you strike the right balance between robust cyber resilience and keeping systems flexible enough for day-to-day use?
This is one of the most misunderstood areas of maritime cybersecurity. Security that ignores operational reality ultimately fails. Vessel design provides inbuilt security through segmentation and containment. The need for blanket restrictions is very low. Most modern ships come with a strong separation between

OT, IT, and crew networks. faces rather than open access. The crew user experience is quite predictable and clear.

From a cyber-resilience perspective, we protect crew mail communication the same way on shore and on ship. If controls frustrate users or slow operations, people will find work-arounds—so usability and security have to be designed together. Good security is felt as confidence, not constraint.

You can connect every system on a ship, but if the underlying data is inconsistent or poorly structured, the value is limited. What's your strategy for governing data quality across a mixed fleet with vessels of different ages and systems?

The question is: do you really need the same level of governance for every vertical? Our answer is no. Data quality is not solved by uniformity—but by addressing the challenges specific to each vertical.

We accept that not every ship will produce the same level of usable data. A bulker may have around 700 measurement points, while an LNG tanker will have between 7,000 and 8,000, and an FSRU even more. On top of that, the possibilities to access and process those data points differ widely. Creating commonalities where there is no value for it slows down your digital transformation. Defining common standard data models and semantics across very different asset classes would overstretch one segment and slow down another, while they all compete in different markets. Data governance should not become a limiting administrative framework.

BW Group spans multiple shipping segments. When you're rolling out a digital initiative, how do you avoid ending up with siloed solutions across business units—and what does "good" standardisation look like without stifling individual teams?

Standardisation should never mean uniformity for its own sake. Within BW Group, there is great variety across architectural principles, core platforms and foundations, and security, data, and integration patterns.

Our strength lies in our diversity and in creating the space where all those different approaches can be shared and challenged. We deliberately do not standardise unless there is a real need for it. Shipping segments differ for good reasons, and forcing identical solutions often destroys value. Our governance model is federated: shared foundations with local ownership at the edge. Teams are free to innovate within agreed security guardrails—it reduces friction, accelerates adoption, and leaves room for the business-specific differentiation required at the speed of the markets.

> **Creating commonalities where there is no value for it slows down your digital transformation. Defining common standard data models and semantics across very different asset classes would overstretch one segment and slow down another, while they all compete in different markets. Data governance should not become a limiting administrative framework.**

FUTURE PROOFING MARINE ENGINEERING

Dr Rajoo Balaji, Pro Vice Chancellor at Indian Maritime University (IMU) and Sukanya Rajalakshmi, Senior Research Fellow with the Centre for Policy Research in Maritime Studies at Indian Maritime University talk about the future skills required for a career in marine engineering

The Naval Architect in Noah built the Ark (believed to have taken over 100 days), but the Marine Engineer in him managed his sojourn for over a year, along with the clean/unclean animals and birds. Fast forward four thousand years plus, the same 'cattle carrier class' would possibly have taken a bit more time, but would have sailed, not just floated. And the marine engineer in Noah would have managed many more machines in the life-sustainment vessel. While steel replaced wood for hulls, the propeller replaced the sails, and the steam engines powered the vessel and the electrics, the marine engineer arrived as the child of the Industrial Revolution.

The operation and maintenance of auxiliaries and the main engines needed a specialised caregiver. The all-welded ships, the world wars and the specialised trades (oil tankers, bulkers, containers, etc.) made the marine engineer's portfolio bulkier, and engineers became indispensable on board ships. Any modern ship, though purpose-built, will have the features of a micro to a small township. The cruise liners will have entertainment elements and hospitality support as prioritised purposes. Aptitude to sea life, problem-solving intelligence and safety above all became the hallmarks of a trained marine engineer. The galloping electronics, computing speeds, automation and data-based decision making, etc., are demanding more from the onboard engineer than ever.

The modern marine engineer must possess far broader competencies than previous generations. Systems thinking, automation, data interpretation, cybersecurity awareness, risk management and interdisciplinary problem-solving have become as important as traditional mechanical engineering knowledge. Engineers are increasingly expected to understand how multiple systems interact rather than focusing solely on individual machinery. Beyond machinery operation and maintenance, modern marine engineers must also appreciate safety management, design principles, cost engineering, maritime laws and international conventions, and these in turn help them as they eye a shore career. Marine engineering education in India has evolved in response to these changing industry requirements. From the early training of cadets aboard the Training Ship Dufferin in the 1920s to the establishment of DMET, MERI [subsequently the Indian Maritime

Dr Rajoo Balaji
Pro Vice Chancellor at Indian Maritime University (IMU)

For marine engineers, 'yesterday's logic' has held true. From steam engines to smart ships, every technological transition has generated new skill requirements, and every new skill has created new career opportunities.

Sukanya Rajalakshmi
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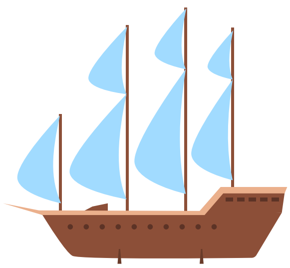
The digitalisation of shipping has created new career pathways in data analytics, digital twins, predictive maintenance, artificial intelligence and autonomous vessel operations.

Before 20th Century
(Tradtional/Management Focus)



Ship Manager Chief Engineer Ship Repair Ship Yard Classification Society Ship Super

20th Century
(Heavy industry & Sector Growth)

Ship Management Entrepreneur Naval Docks Allied Engineering Sectors Power Plants Boiler Installations Manufacturing Maritime Law Civil Services

From 21th Century onwards
(Future & Digital Innovation)

Data Analysts Digital Twins Reliability Engineer Fuel Specialists Ai/ Ml (Cbm) Coding Predictive Maintenance And Troubleshooting Unmanned Vessel Operations

University (IMU)] and the proliferation of Maritime Training Institutes (MTIs), the emphasis has gradually shifted to competency-based education along with the middle-class aspiration of an academic degree.

Globally, more than 400 universities and colleges offer marine engineering programmes. While earlier training focused primarily on seamanship and mechanical systems, contemporary programmes incorporate automation, environmental regulations, digital technologies and simulator-based learning, possibly across all levels (support/operational/management). The academic scope has also accommodated the marine engineering discipline with minor degree options, micro-credit courses and interdisciplinary learning. These reflect not only the design of India's new education policies but also the industry's growing demand for engineers who can operate at the intersection of engineering, technology and management.

The marine engineering skills and career opportunities over the past century have evolved mostly in a vertical fashion, but there are also outliers that have gained popularity (Figure 1 – illustrative careers). Traditionally, marine engineers progressed from sea-going roles to shore-based positions such as Chief Engineer, technical superintendent, shipyard specialist, marine surveyor, fleet manager and teaching positions. Their broad engineering expertise also enabled careers in shipbuilding, repair, power generation, manufacturing and other allied industries.

Today, the maritime industry is experiencing another major technological revolution driven by decarbonisation, digitalisation and automation. Environmental challenges are accelerating investments in alternative fuels, energy-efficient technologies and low-carbon vessel designs, creating entirely new areas of specialisation for marine engineers. Many decarbonisation initiatives depend upon digital technologies, advanced automation and data analytics for monitoring, optimisation and regulatory compliance. Alternative fuels such as LNG, methanol, hydrogen and ammonia are creating demand for specialists in fuel systems, emissions management and sustainability. Ships have become floating data centres, generating vast quantities of operational information.

The digitalisation of shipping has created new career pathways in data analytics, digital twins, predictive maintenance, artificial intelligence and autonomous vessel operations. The expansion of offshore renewable energy, smart ports and digital logistics networks is creating opportunities in offshore wind energy, energy transition projects, climate-resilient infrastructure and integrated maritime systems.

Preparing for this future requires a commitment to lifelong learning. Traditional engineering fundamentals remain essential, but they are no longer sufficient on their own. The broad skill spectrum required of modern marine engineers is illustrated in Figure 2, under three regular pedagogic domains. The skill-intensities can vary from medium to high with relative significance to changing technologies. Presently, AI driven diagnostics, condition-based monitoring, predictive/preventive maintenance protocols, etc., are finding more space in applications. Continuous professional development through specialised certificate programmes, postgraduate diplomas and executive training courses will become increasingly important, particularly in AI, data analytics, maritime informatics, project management and green shipping technologies.

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Peter Drucker once observed that "the greatest danger in times of turbulence is not the turbulence; it is to act with yesterday's logic." For marine engineers, 'yesterday's logic' has held true. From steam engines to smart ships, every technological transition has generated new skill requirements, and every new skill has created new career opportunities. While future marine engineers will remain rooted in engineering fundamentals, they will be as comfortable in analysing and interpreting data and optimising algorithms as well as maintaining the machines. It is certain that, climbing the continuous learning curve, the marine engineer of today and any day will stay relevant and ready.

India's Liquid Gas Trade in the Shadow of the Strait

How the Hormuz Crisis Reshaped LPG and LNG Flows

Maritime Gateway Research Bureau

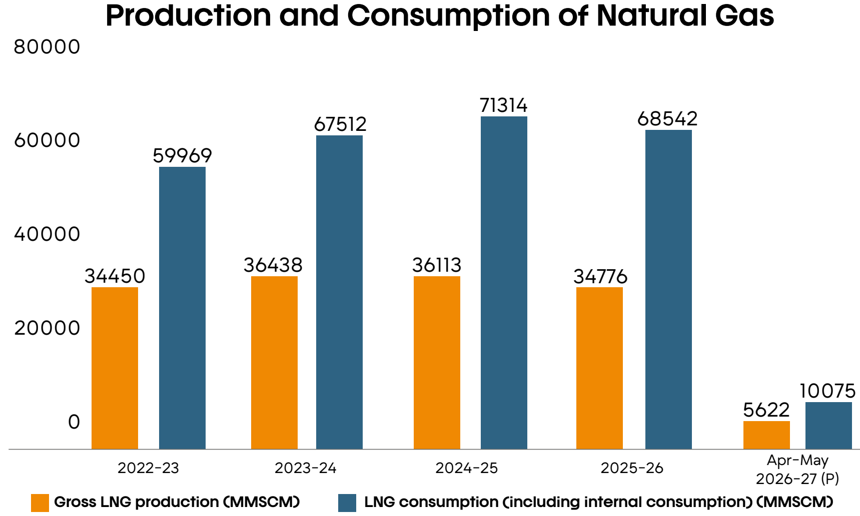
India's liquid gas trade has just lived through one of its most turbulent stretches in recent memory. A flare-up in the US-Iran conflict in late February 2026 effectively shut down the Strait of Hormuz. The narrow waterway that carries roughly a fifth of the world's oil trade and is the indispensable export route for crude, LNG, and LPG out of the Gulf. For an economy as exposed as India's, where close to half of crude imports, 60-65% of LNG, and nearly 90% of LPG move through this single chokepoint, the disruption was never going to be a distant headline. It became, almost overnight, a domestic cost-of-living and supply- security story.

A Market Under Siege

The numbers from the conflict's peak illustrate the scale of the shock. Around 14 million barrels per day of oil production, roughly 14% of global demand was knocked offline across Saudi Arabia, Iraq, Kuwait, and the UAE. Refining capacity equivalent to 3.5 million barrels per day was disrupted, and Qatar was forced to curtail LNG production following missile attacks on its facilities, including the catastrophic April 2026 strike on QatarEnergy's Ras Laffan complex, a single event that wiped out close to 20% of the world's LNG supply in one stroke. With LNG having no viable overland alternative out of the Persian Gulf, shipping fleets were forced onto the long detour around the Cape of Good Hope, and freight and insurance costs spiked in tandem.

Brent crude, hovering near pre-conflict levels, surged toward the USD 120/bbl mark at the height of the crisis before beginning its retreat. In India, the pass-through was immediate and tangible: petrol and diesel prices rose by approximately ₹7.5 per litre, LPG and CNG prices climbed, and state-owned oil marketing companies are reported to have

Production and Consumption of Natural Gas



absorbed losses approaching ₹650 crore per day during the worst of the disruption. The rupee weakened under the weight of a costlier import bill, inflation crept higher as transport and manufacturing costs rose, and even aviation felt the squeeze through longer flight paths and higher ATF costs as regional airspace tightened.

New Delhi's response was a mix of triage and structural pivot. Household LPG supplies were prioritised, natural gas allocation was rationalised, and fuel inventories were monitored more closely. But the more consequential move was a rapid diversification of crude and gas sourcing toward Russia, Africa, the United States, and Latin America. A realignment that has outlasted the crisis itself. The United States, in particular, has emerged as India's leading LNG supplier, with its market share climbing from roughly 8% to 25.86% as Indian buyers doubled spot cargo tenders and leaned more heavily on domestic coal to bridge the gas deficit.

Trade Flows Through the Disruption

Despite the turmoil, India's port-level trade data for April-May 2026 tells a story of resilience layered over contraction. LPG imports for the two-month window stood at around 2.36 MMT, down sharply from 4.09 MMT in the same period a year earlier, reminder that even as supply chains adapted, volumes still took a hit. Haldia held its position as India's leading LPG gateway, handling 0.47 MMT, with Mangalore close behind at 0.42 MMT. Total LPG consumption during the period reached 4.3 MMT, underscoring the gap that imports alone could not fill.

On the buyer side, Indian Oil Corporation led LPG procurement with 0.63 MMT, trailed by Hindustan Petroleum (0.50 MMT) and Bharat Petroleum (0.34 MMT), with Reliance Industries, Confidence Petroleum, and others rounding out a list that together imported 2.45 MMT. Sourcing patterns reflected the geopolitical reality of the moment: the United States topped the list of origin countries at 0.79 MMT, ahead of the UAE (0.21 MMT), Saudi Arabia (0.18 MMT), and Qatar (0.13 MMT) — a clear signal that American supply was already absorbing demand that might otherwise have leaned more heavily on Gulf producers.

A Fragile Recovery

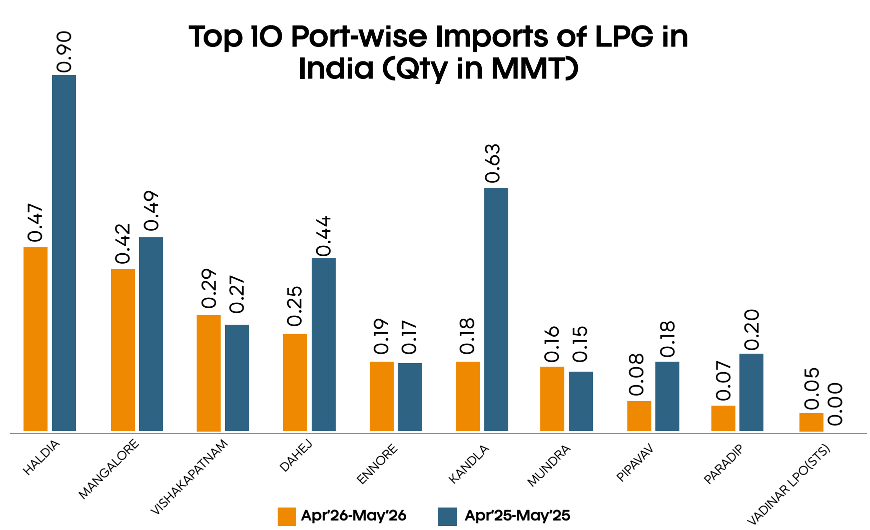
The announcement of a 60-day US-Iran ceasefire has begun to unwind some of the damage. Brent crude has eased back to around

The implications for India, if the de-escalation holds, lean favourable: lower crude, LNG, and LPG prices, reduced shipping and insurance costs, improved fuel availability, easing inflationary pressure, a lighter import bill, a steadier rupee, and improved profitability for oil marketing companies that absorbed heavy losses during the disruption.

USD 84/bbl, shipping activity is cautiously resuming, and freight and marine insurance costs are starting to soften. In a symbolically important moment, the Indian LNG carrier Disha became the first Indian merchant vessel to transit the Strait of Hormuz after the peace announcement. Small but telling marker of normalisation. Yet the recovery curve is uneven across sectors. Oil production is expected to claw back to around 70% of pre-conflict levels within three months and 90% within six, while refining capacity should reach 90-95% within 40-60 days. LNG production is the laggard: only around 50% recovery is expected within a month, 80% within two months, and full recovery given the extent of physical damage to facilities like Ras Laffan, could take years rather than months. The implications for India, if the de-escalation holds, lean favourable: lower crude, LNG, and LPG prices, reduced shipping and insurance costs, improved fuel availability, easing inflationary pressure, a lighter import bill, a steadier rupee, and improved profitability for oil marketing companies that absorbed heavy losses during the disruption. Globally, the picture is more mixed. Europe has leaned on winter storage buffers and Norwegian gas to stay insulated, even as it faces the prospect of long-term price increases, while Japan and South Korea remain locked in an aggressive spot-market bidding war with Europe for US and Australian cargoes. China, meanwhile, has quietly strengthened its position by ramping up overland pipeline imports from Russia, a reminder that geography not just diplomacy, continues to shape who wins and who loses in a disrupted energy order. Gulf exporters, for their part, are reassessing their near total dependence on maritime routes, with multi-year plans for cross-border pipelines now on the table as a hedge against any future closure of the Strait.

The Takeaway

The Hormuz crisis was a stress test that India's liquid gas trade largely passed not without cost, but without collapse. Import volumes dipped, prices spiked, and the exchequer absorbed real pain, but the system adapted: sourcing diversified toward the US and other non-Gulf suppliers, domestic coal filled part of the gap, and key terminals like Dahej continued to run near full tilt. As the ceasefire holds and recovery slowly takes shape, the more durable lesson may be structural rather than cyclical. India's energy security now depends as much on the breadth of its supplier base as on the capacity of any single terminal or pipeline. Whether that diversification outlasts the crisis that forced it will be one of the more important energy stories to watch through the remainder of 2026.



ALPHABET SOUP AT SEA

Uncertain Arrival of India's Port Digitalisation?

Surendra Lingareddy, Chief Executive at Volteo Maritime, writes about how digitalisation in the industry should look within and improve, instead of adding on new things that all go through a trial period, and nothing more.

Since 2016, every port conference in India has come with its own vocabulary lesson. PCS 1.x gave way to PCS 2.x. The National Logistics Portal promised end-to-end visibility. Sagar Manthan offered dashboards; Sagar Setu promised seamless business. PM Gati Shakti overlaid infrastructure with GIS precision. Maritime India Vision 2030 described a tech-enabled logistics ecosystem. One Nation One Port, Digi Bandar, the Maritime Single Window — each was presented as a plug-and-play framework where data would simply flow. And whenever a port stumbled, the Digital Centre of Excellence under IPA stood ready to shepherd them toward digital maturity.

Surendra Lingareddy

Chief Executive at Volteo Maritime

> **Despite India's customs processes rapidly moving towards paperlessness, cargo and maritime activities remain subject to protracted inspections and scrutiny.**

A decade of conference keynotes later, the honest question is: how much of this was architecture, and how much was aspiration dressed in API language? The answer is frustratingly both. There has been genuine, measurable progress — and it deserves acknowledgement before it gets buried under legitimate critique. India's average container dwell time has come down to approximately 3 days, which compares favourably with the UAE and South Africa at 4 days, the USA at 7 days, and Germany at 10 days. Average Turnaround Time at major ports improved by 48% over the decade, falling from 96 hours in FY 2014-15 to 49.5 hours in FY 2024-25. Nine Indian ports now rank among the global top 100, up from just three in 2020. The Economic Survey 2024-25 noted that average container turnaround time at major ports dropped from 48.1 hours in FY24 to 30.4 hours in the April–November period of FY25. These are not trivial numbers. They are the result of sustained investment, private sector participation, and genuine operational reform at major ports. But here is where the celebration needs to pause and sit with some discomfort. Average capacity utilisation at most major ports remained at around 49.1% as of FY23. And while digitisation has improved regulatory processes, implementation differs sharply across ports — creating an inconsistent procedural environment. Export dwell times, for instance, vary from 46.3 hours to 149.4 hours across different ports.That range — a three-fold difference — is not a minor operational variation. It is a structural indictment of how unevenly the transformation has landed. When a shipper's experience depends on which port they happen to use, the system has not transformed; it has fragmented more elegantly. ICEGATE 2.0 continues to evolve on Customs' own timeline.

Terminal operators and shipping lines plug into platforms selectively, where it serves them, not where it completes the chain. Despite India's customs processes rapidly moving towards paperlessness, cargo and maritime activities remain subject to protracted inspections and scrutiny. Technology gaps and inadequate infrastructure persist in non-major ports. The 200-odd minor ports that handle a growing share of India's coastal and EXIM traffic remain, in many cases, structurally outside the reform conversation entirely. Major and minor ports operate under different administrations — the former under the Union government, the latter under state maritime boards — with a regulatory framework that remains rigid at the seams. This is the core tension that no dashboard has resolved: India is not one port system. It is dozens of parallel systems, some of which happen to share a coastline. The Indian Ports Act 2025, passed by Parliament, attempts to address this by replacing the century-old 1908 Act with a modern framework covering governance, digitalisation, environmental compliance, and disaster readiness — and critically, by granting statutory status to State Maritime Boards and strengthening Centre-State coordination. This is an important legislative step. But legislation, as India's port sector knows well, is the beginning of a process, not its conclusion. What the sector keeps reaching for is a grand unified theory of port technology — one platform to rule all flows, one framework to dissolve all friction. Integration is imagined as a grand unveiling rather than a continuous, unglamorous practice. And in chasing that perfect future architecture, momentum at the margin slows. Cargo still queues because one interface does not quite speak to another. The future is always about to begin once everything aligns.

The more productive frame is not perfection, but persistence. India's ports do not need to wait for immaculate synchrony across ministries, states, terminal operators, customs, and shipping lines before they can show measurable results. rating a little better each quarter, and accepting that in a system as complex as India's maritime trade infrastructure, persistent presence beats perfect design every time. The language of ports has indeed shifted from files and stamps to APIs and dashboards. Now the work is making sure the dashboards actually reflect what is happening on the ground, and not remain an add on in our computer systems.

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