



The conference theme, "Transforming Maritime Education: Fuels, Faculty & Digital Tools," underscores the industry's transition to alternative fuels, the empowerment of faculty, and the integration of digital innovations. It highlights how maritime education must evolve to prepare seafarers for sustainability, innovation, and operational excellence in a rapidly changing environment

The programme will feature:

1. Panel Forum 1 - Preparing Seafarers for Multi-Fuel Operations: Exploring training strategies for ammonia, methanol, LNG, and other transition fuels.
2. Panel Forum 2 - Faculty, Simulators & Training Resources: Strengthening training capacity through faculty development and advanced simulators
3. Keynote Insights: AI-enhanced training and Adapting to changing technologies in maritime education.

Maritime Security Incidents Across Key High-Risk Regions-2026

Security Incidents in Black Sea Region

18 Total Incidents

05 Fatalities

02 Injuries

02 Missing (SAR Operations ongoing)

Security Incidents in Red Sea Region

02 Total Incidents

00 Fatalities

00 Injuries

Piracy Incidents in Gulf of Aden Region

05 Total Incidents

00 Fatalities

00 Injuries

Security Incidents in Persian Gulf Region

35 Total Incidents

10 Fatalities

10 Injuries

Analysis of Security Incidents and Geopolitical Concerns Meeting | 28 July 2026

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Inception of the Bharat Maritime Insurance Pool (BMIP)



Launched 12 May 2026 by Dept. of Financial Services, Ministry of Finance. Cabinet approved on 18 April 2026

USD 1.5B
 Total Pool Capacity

₹12,980 Cr
 Sovereign Guarantee (≈
 USD 1.4B)

USD 100M
 Claims Threshold
 Pool's Own Resources

Coverage Scope for Indian flagged or controlled vessels or vessels destined to or starting from India:



01

Hull & Machinery



02

Cargo



03

P&I Liability



04

War Risk

First policies issued under BMIP

- **H&M War Policy:** M/s Hoger Offshore & Marine Pvt Ltd
- **Marine Cargo War Policy:** M/s Vedanta Sterlite Copper Ltd (cable wire imports) and M/s Balrampur Chini Mills Ltd

Source: Press Information Bureau. (2026, May 12). DFS launches 'Bharat Maritime Insurance Pool' of USD 1.5 billion, with a sovereign guarantee of USD 1.4 billion to facilitate continuous maritime insurance coverages. Government of India, Ministry of Finance. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2260413>

Inception of the Bharat Maritime Insurance Pool (BMIP)

The Bharat Maritime Insurance Pool (BMIP) was launched on 12 May 2026 by the Department of Financial Services, Ministry of Finance, following Cabinet approval on 18 April 2026. The initiative was established to create a dedicated national mechanism for providing maritime insurance coverage to Indian shipping and trade interests, particularly in situations where access to international insurance markets may be constrained due to geopolitical tensions, conflicts, sanctions, or disruptions in global insurance capacity. The pool represents a strategic effort to strengthen India's maritime resilience and reduce dependence on overseas insurance arrangements for critical maritime risks

BMIP has been created with a total insurance capacity of **USD 1.5 billion**. To support the financial viability and credibility of the arrangement, the Government of India has provided a **sovereign guarantee of ₹12,980 crore (approximately USD 1.4 billion)**. The pool is structured to absorb claims through its own resources up to a threshold of **USD 100 million**, after which the sovereign support mechanism provides additional financial backing. This structure ensures that large maritime risks can be underwritten while

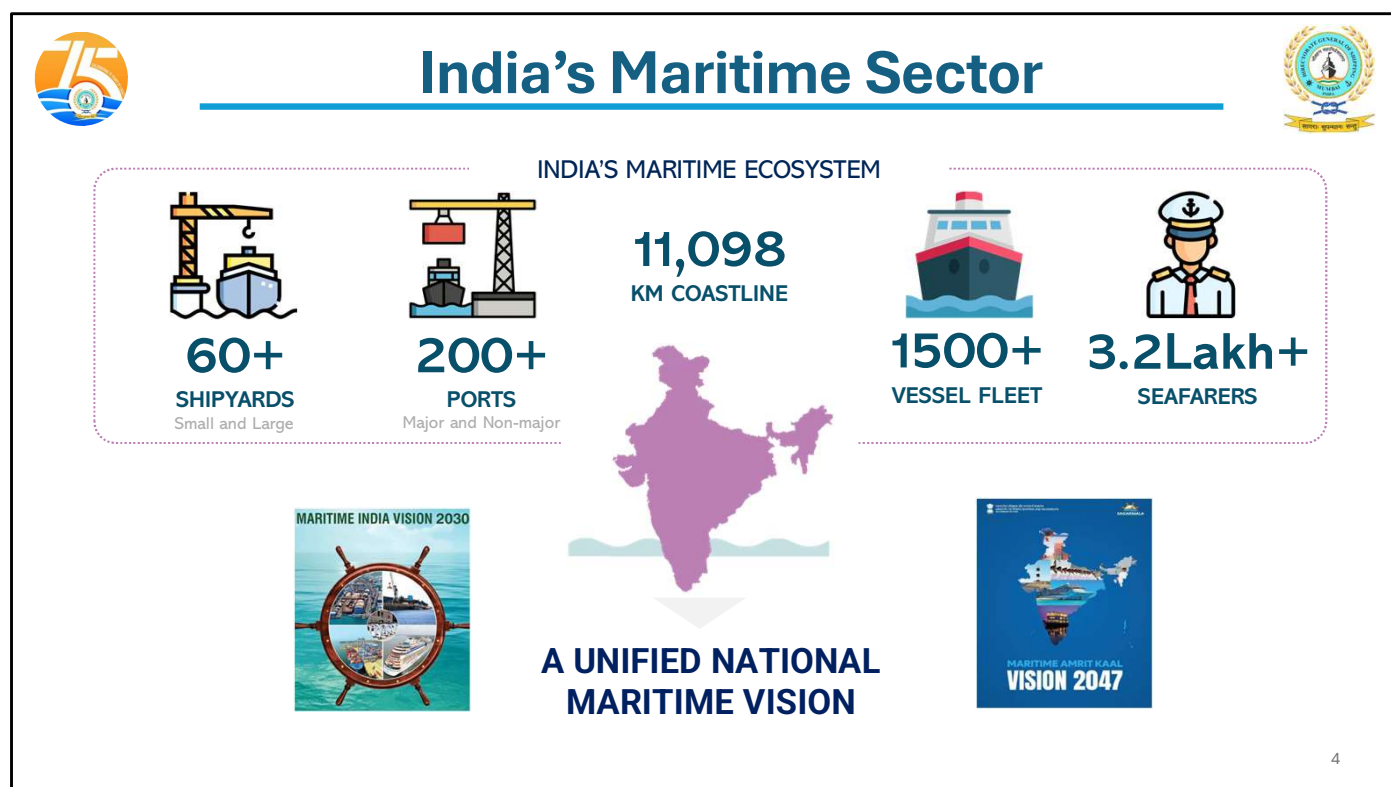
maintaining confidence among shipowners, cargo owners, insurers, and other stakeholders.

The scope of the pool extends to **Indian-flagged vessels, Indian-controlled vessels, and vessels either destined for or originating from India**. By covering India-linked maritime activity rather than only Indian-flagged ships, the framework seeks to safeguard broader national trade interests and ensure continuity of insurance support across the maritime logistics chain.

BMIP provides coverage across key maritime insurance segments. Hull and Machinery (H&M) insurance protects vessels against physical damage to the hull, machinery, and associated equipment arising from accidents and operational incidents. Cargo insurance protects goods transported by sea against loss or damage during transit. Protection and Indemnity (P&I) coverage addresses liabilities arising from third-party claims, including personal injury, pollution, property damage, and other legal obligations of shipowners and operators. The pool also provides war risk coverage, which protects against losses resulting from war, armed conflict, hostile acts, terrorism, and other extraordinary security-related risks that may affect maritime operations.

The operationalization of BMIP was demonstrated through the issuance of its first insurance policies shortly after launch. A Hull and Machinery War Policy was issued to **M/s Hoger Offshore & Marine Pvt. Ltd.**, while Marine Cargo War Policies were issued to **M/s Vedanta Sterlite Copper Ltd.** for cable wire imports and **M/s Balrampur Chini Mills Ltd.** These initial policies signaled industry confidence in the pool and demonstrated its readiness to support both shipping and cargo interests under the new framework.

The establishment of BMIP represents an important milestone in India's broader maritime development agenda. By ensuring the availability of maritime insurance coverage during periods of global uncertainty, the pool enhances national supply chain security, supports uninterrupted maritime trade, strengthens risk-management capabilities within the domestic insurance sector, and contributes to India's objective of becoming a more self-reliant maritime nation. The initiative also complements wider efforts to expand India's shipping capacity, strengthen port-led development, and increase the resilience of the country's maritime ecosystem.



India's Maritime Sector

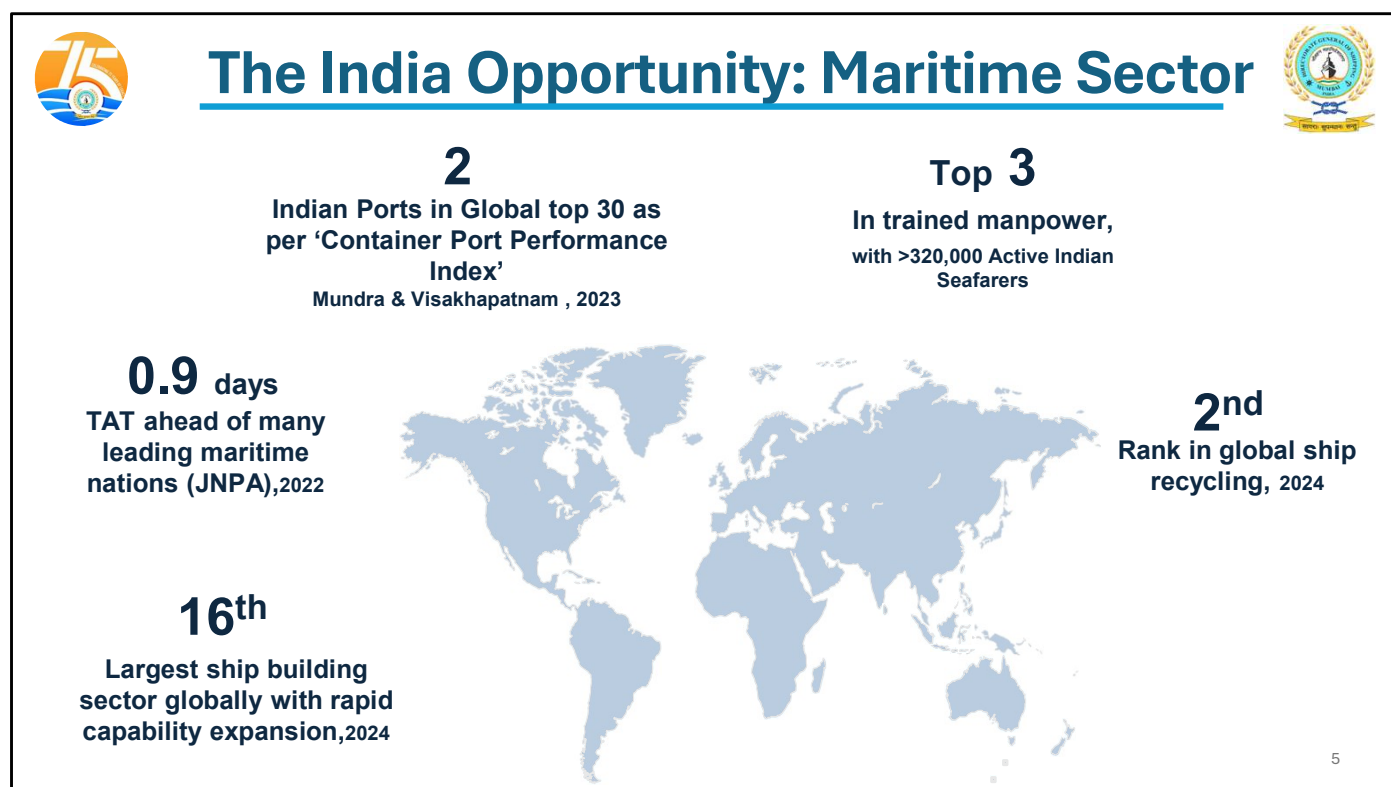
India's maritime sector represents a strategic national asset, anchored by a coastline of approximately 11,098 km, a network of 12 major ports and around 217 other major, intermediate and non-major ports, and a sizeable shipping base reflected in more than 1,500 Indian flagged vessels. The maritime sector continues to serve as a critical enabler of India's trade and economic growth, with MoPSW noting that around 95% of India's trade by volume and 68% by value is moved through maritime transport.

The ecosystem is not limited to ports and vessels alone. It extends across shipbuilding, ship repair, inland waterways, coastal shipping, maritime services, logistics, cruise tourism, training and seafarer employment. India's shipbuilding and repair base is supported by more than 60 shipyards, while the seafaring workforce has become a major global strength, with internal DGMA materials placing the active Indian seafarer base at 3.2 lakh+. This human capital dimension is central to India's maritime competitiveness and to the sector's future growth.

The Government's approach is being driven through two linked national frameworks: Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047. The official MIV 2030 document identifies 150+ initiatives across the maritime sector, covering port capacity, logistics efficiency, shipbuilding, inland waterways, cruise development,

sustainability and world-class maritime education and training. MAKV 2047 builds on this foundation and expands the long-term agenda through initiatives in port modernization, mega ports, shipbuilding and repair clusters, green hydrogen and ammonia hubs, green tugs, digital platforms and skill development.

Taken together, these frameworks provide a unified national maritime vision. The policy direction is to move India from a large maritime nation to a globally competitive maritime power, with modern ports, efficient logistics, stronger domestic shipbuilding, sustainable shipping, expanded inland and coastal movement, and a future-ready maritime workforce. The slide therefore captures not only the scale of India's maritime ecosystem, but also the direction of travel: integration, modernization, sustainability and global leadership.



The India Opportunity: Maritime Sector

Overview

India's maritime sector is emerging as a key pillar of economic growth and global trade integration. With strong port performance, a growing skilled workforce, and rising global rankings across multiple maritime indicators, India is positioning itself as a major force in international shipping, logistics, and shipbuilding. The sector reflects both operational efficiency and long-term expansion potential.

Global Port Performance

India has demonstrated notable progress in port efficiency and global competitiveness. As per the Container Port Performance Index (2023), two Indian ports—Mundra and Visakhapatnam—are ranked among the top 30 globally.

This achievement reflects improvements in infrastructure, digitalization, and operational turnaround efficiency. High-performing ports are critical for facilitating trade, reducing logistics costs, and strengthening India's role in global supply chains.

Efficient Turnaround Time

India has achieved a turnaround time (TAT) of 0.9 days, which is ahead of many leading maritime nations, according to the United Nations Conference on Trade and Development (UNCTAD) / UNPA (2022).

A lower turnaround time indicates faster loading and unloading, reduced congestion, and

better port management practices. This efficiency enhances competitiveness and attracts more global shipping traffic to Indian ports.

Skilled Maritime Workforce

India ranks among the top 3 countries globally in trained maritime manpower, with over 320,000 active Indian seafarers.

This large, skilled workforce highlights India's strength as a global supplier of maritime professionals. Indian seafarers are widely employed across international fleets, contributing significantly to global shipping operations and reinforcing India's reputation as a "crew capital."

Shipbuilding and Recycling Industry

India is steadily expanding its capabilities in shipbuilding and recycling:

It ranks 16th globally in shipbuilding, with rapid growth and increasing infrastructure investments.

India holds the 2nd position globally in ship recycling (2024), demonstrating its leadership in dismantling and reprocessing ships in an environmentally compliant manner.

These sectors not only generate employment but also support sustainability and circular economy practices.

Global Connectivity and Trade Integration

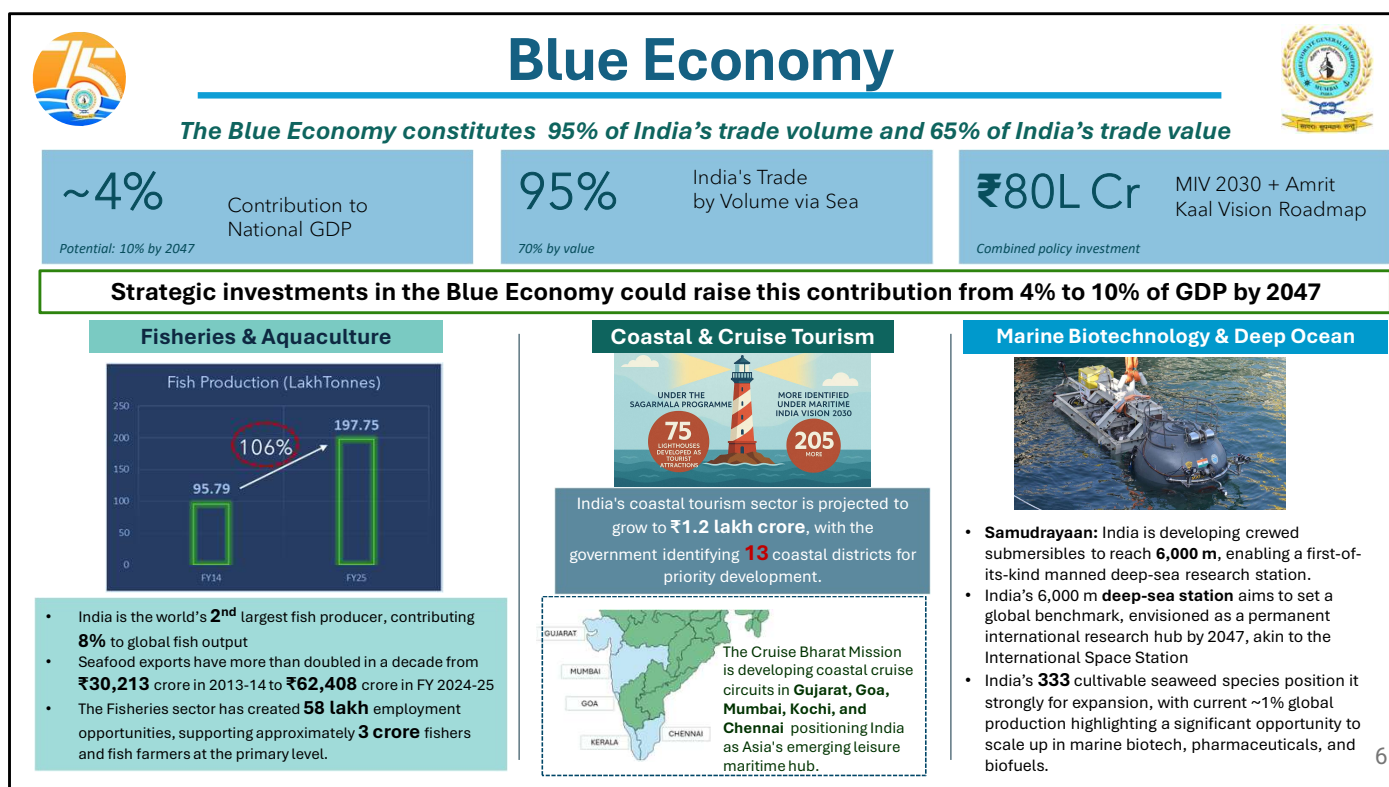
India is ranked 9th in the Liner Shipping Connectivity Index (Q1 2026), reflecting strong integration into global shipping networks.

Improved connectivity enhances trade efficiency, increases export-import opportunities, and strengthens India's position as a global logistics hub.

Conclusion: A Strategic Maritime Advantage

India's maritime sector presents a **compelling growth story**, backed by strong port performance, efficient operations, and a large pool of skilled manpower. With rising global rankings in shipbuilding, recycling, and connectivity, India is increasingly becoming a central player in global maritime trade.

These developments, combined with continuous policy support and infrastructure expansion, position the sector as a key enabler of India's long-term economic growth and international competitiveness.



Blue Economy

India's Blue Economy plays a central role in the country's growth, accounting for 95% of trade volume and 65% of trade value, showing strong global trade integration. It currently contributes around 4% to GDP, with the potential to rise to 10% by 2047 through strategic investments of ₹80 lakh crore under long-term maritime visions.

The fisheries sector highlights India's global strength, as the country is the second-largest fish producer, contributing 8% of global output. Exports have more than doubled, and the sector supports 58 lakh jobs and nearly 3 crore livelihoods, strengthening both economic and social foundations.

Coastal and cruise tourism is another major growth driver, projected to reach ₹1.2 lakh crore, supported by lighthouse tourism, identified coastal districts, and cruise circuits across major cities. This positions India as an emerging maritime tourism hub in Asia.

In advanced sectors, initiatives like Samudrayaan and deep-sea research at 6,000 meters highlight India's technological progress. With 333 cultivable seaweed species, India also has strong potential in marine biotechnology, pharmaceuticals, and biofuels.

Global Significance

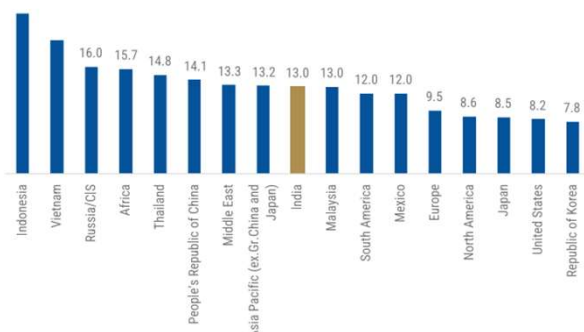
India stands out globally due to its dominance in sea-based trade, strong fisheries output, growing tourism sector, and advancements in deep-sea technology. Combined with long-term planning and large investments, this makes India a rising global leader in the Blue Economy.



India's Logistics and Maritime Performance



Logistics Costs for Key Regions and Countries (as per cent to GDP, 2016)



Source: Armstrong and Associates report (2017)

Logistics Costs for India has **now reduced to 7.97 %** as per the current assessment prepared by NCAER for DPIIT

Source: Rankings - Agility-Emerging-Markets-Logistics-Index-2025.pdf

Source: Rankings - emergingmarketsindex.agility.com/wp-content/uploads/2026/02/Agility-Emerging-Markets-Index-2026-Final.pdf

Agility Emerging Markets Logistics Index 2025

Rank 2: India

Rank	Rank Change	Country	Overall Score	Last Year's Score	Domestic Opportunities	International Opportunities	Business Fundamentals	Digital Readiness
1	0	China	8.58	8.61	8.58	9.65	6.37	8.47
2	0	India	6.94	7.21	7.59	7.49	6.03	5.76
3	0	UAE	6.31	6.49	5.53	5.90	8.53	6.55
4	2	Saudi Arabia	6.08	6.05	5.61	6.07	7.45	5.82
5	1	Malaysia	6.04	6.17	5.26	5.78	7.72	6.41
6	1	Indonesia	5.94	6.16	6.16	6.12	5.85	5.41
7	2	Mexico	5.77	5.60	5.49	6.45	5.61	5.25
8	1	Qatar	5.64	5.85	5.36	4.92	6.97	6.25
9	1	Thailand	5.61	5.59	5.05	5.86	5.94	5.82
10	2	Vietnam	5.52	5.73	5.09	5.81	6.01	5.37

Agility Emerging Markets Logistics Index 2026

Rank 2: India

Rank	Rank Change	Country	Overall Score	Last Year's Score
1	0	China	8.44	8.58
2	0	India	6.99	6.94
3	0	UAE	6.40	6.31
4	0	Saudi Arabia	6.25	6.08
5	0	Malaysia	6.03	6.04

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India's Logistics and Maritime Performance

India's logistics sector has shown notable improvement in efficiency and global competitiveness in recent years, supported by policy reforms, infrastructure investments, and digital advancements.

1. Reduction in Logistics Costs

Historically, India's logistics costs were relatively high at around **13% of GDP (2016)**, compared to **8–10% in developed economies**.

As per the latest assessment by **NCAER for DPIIT**, India's logistics costs have **reduced significantly to 7.97% of GDP**, indicating improved operational efficiency, better multimodal integration, and cost optimization.

This decline enhances India's competitiveness in global trade and supports the "Make in India" initiative.

2. Comparative Global Position

In 2016, India's logistics costs (13%) were comparable to countries such as Malaysia, Mexico, and China, but higher than advanced economies like the United States (around 8.2%) and Korea (7.8%).

The recent reduction places India closer to global benchmarks, narrowing the cost disadvantage.

3. Performance in Emerging Markets Logistics Index

According to the **Agility Emerging Markets Logistics Index 2025**, India ranks **2nd globally among emerging markets**, maintaining its position from the previous year.

In the **2026 Index**, India continues to hold **Rank 2**, with an improved overall score of **6.99 (up from 6.94 in 2025)**.

India performs strongly in:

Domestic opportunities (7.59 in 2025)

International opportunities (7.49 in 2025)

However, relatively lower scores in **digital readiness (5.76 in 2025)** and **business fundamentals (6.03)** suggest areas for further improvement.

4. Key Drivers of Improvement

Implementation of **GST**, reducing interstate logistics barriers

Development of **Dedicated Freight Corridors (DFCs)**

Expansion and modernization of **ports and maritime infrastructure**

Adoption of **digital logistics platforms and tracking systems**

Government initiatives such as the **National Logistics Policy and PM Gati Shakti**

5. Implications

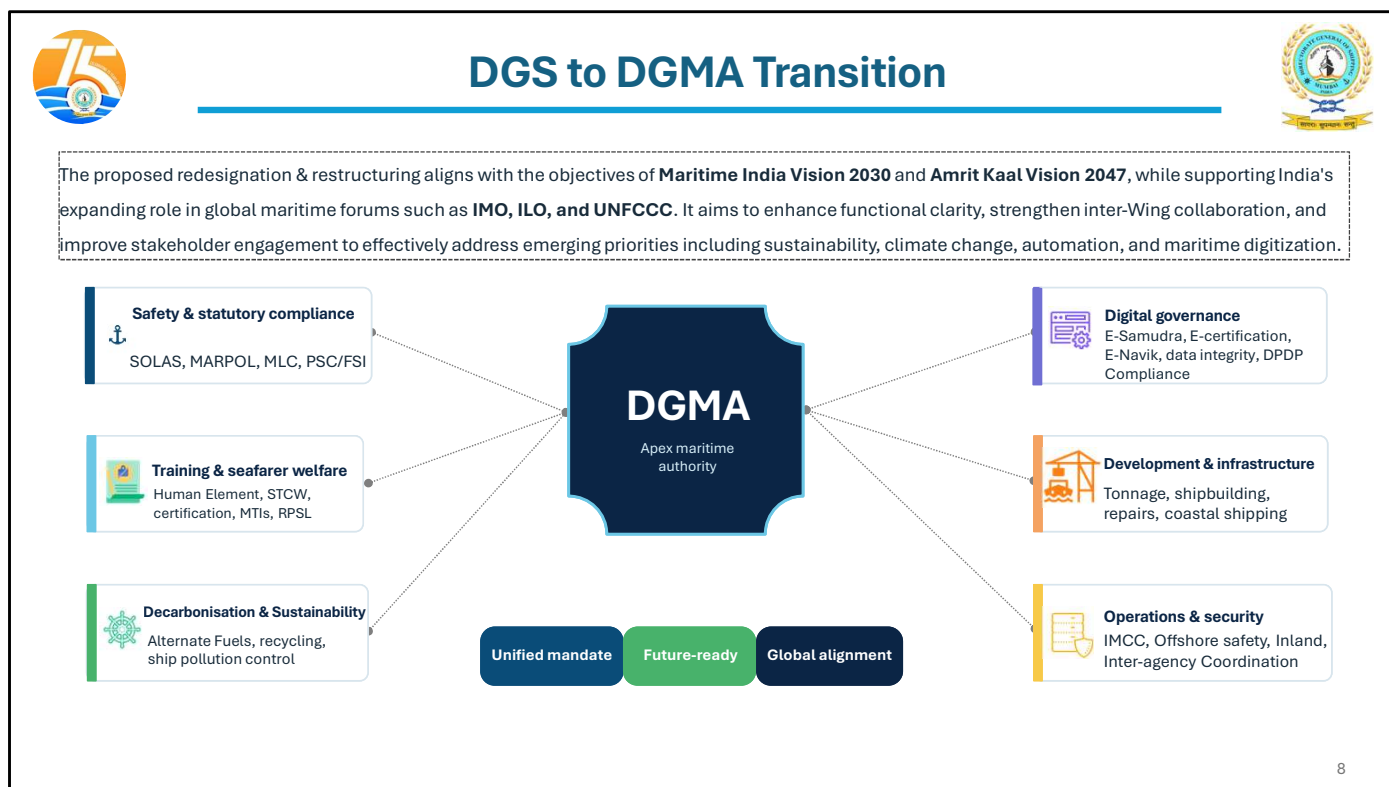
Lower logistics costs improve **export competitiveness and supply chain efficiency**

High ranking in global indices reflects **investor confidence and market attractiveness**

Continued focus on **digitalization and regulatory reforms** is essential to sustain progress

Conclusion:

India's logistics landscape is undergoing a structural transformation, marked by declining costs and improved global rankings. While the country has emerged as a leading logistics market among emerging economies, sustained policy support and technological adoption will be crucial to further enhance efficiency and competitiveness.



DGS to DGMA

The transition from the **Directorate General of Shipping (DGS)** to the **Directorate General of Maritime Administration (DGMA)** represents a strategic institutional reform intended to modernize India's maritime governance framework and align it with emerging national and international maritime priorities. The transition is designed to support the objectives of **Maritime India Vision 2030** and **Amrit Kaal Vision 2047**, while strengthening India's ability to engage effectively with global maritime institutions such as the **International Maritime Organization (IMO)**, **International Labour Organization (ILO)**, and United Nations climate-related frameworks. The restructuring seeks to create a more integrated, future-oriented maritime authority capable of addressing evolving challenges in sustainability, decarbonization, digitalization, maritime safety, and industry development.

The proposed DGMA would serve as India's apex maritime authority with a broader mandate than the traditional regulatory role historically associated with DGS. The transition recognizes that the maritime sector has expanded significantly beyond ship registration, certification, and statutory compliance functions and now encompasses strategic areas such as green shipping, alternative fuels, maritime infrastructure development, offshore operations, cybersecurity, digital governance, and maritime sustainability. By bringing these diverse functions under a unified institutional framework, the proposed structure aims to enhance coordination, improve decision-making, and reduce organizational fragmentation.

A key pillar of the transition is the continued emphasis on **maritime safety and statutory compliance**. DGMA would retain responsibility for implementing and enforcing major international conventions and standards, including SOLAS, MARPOL, MLC, and port state control and flag state inspection obligations. However, the objective is not merely regulatory

compliance but also strengthening India's capacity to proactively shape international maritime policy discussions and ensure that domestic regulations remain aligned with evolving global standards.

The restructuring also places significant emphasis on **training, certification, and seafarer welfare**. India's position as one of the world's largest suppliers of maritime manpower requires a governance framework capable of overseeing the complete lifecycle of human resource development in the maritime sector. Under DGMA, functions relating to STCW implementation, seafarer certification, maritime training institutes, recruitment and placement services, competency development, and welfare initiatives would operate within a stronger, integrated framework. This approach seeks to ensure that Indian seafarers remain globally competitive while meeting emerging skill demands associated with technological advancements and environmentally sustainable shipping.

Another major area of focus is **decarbonisation and sustainability**, reflecting the growing prominence of climate-related obligations within the maritime sector. The proposed institution would be better positioned to lead initiatives related to alternative fuels, green shipping corridors, emissions reduction, ship recycling, marine environmental protection, and pollution control. Establishing sustainability as a core function rather than a peripheral responsibility acknowledges the increasing importance of environmental considerations in international maritime governance and trade competitiveness.

The transition also expands the institutional focus toward **maritime development and infrastructure growth**. In addition to regulatory oversight, DGMA would contribute to policy development related to shipping tonnage growth, shipbuilding, ship repair ecosystems, coastal shipping promotion, and other strategic areas supporting India's maritime economy. This broader development-oriented mandate reflects the need for maritime governance institutions to actively facilitate industry growth while maintaining appropriate regulatory safeguards.

Strengthening **operations, security, and inter-agency coordination** forms another important component of the proposed framework. Maritime administration today requires extensive coordination among central ministries, state governments, ports, security agencies, environmental authorities, and international organizations. DGMA would provide a unified platform for addressing operational challenges relating to offshore activities, inland waterways interfaces, emergency response mechanisms, maritime security coordination, and incident management. Such integration is expected to improve responsiveness and reduce administrative overlaps.

The transition is also intended to improve organizational effectiveness through greater functional clarity and stronger collaboration across traditionally separate domains. Maritime issues are increasingly interdisciplinary, requiring inputs from regulatory, environmental, technological, economic, and human resource perspectives. The proposed structure seeks to facilitate these interactions through a more cohesive institutional design capable of addressing complex policy issues in a coordinated manner.

From a strategic perspective, the DGMA framework embodies three core principles. First, it establishes a **unified mandate** under which diverse maritime functions can be governed through a single apex authority. Second, it creates a **future-ready institution** capable of responding to emerging developments such as automation, digital transformation, alternative fuels, climate regulations, autonomous shipping, and evolving workforce requirements. Third, it promotes **global alignment** by ensuring that India's maritime governance architecture reflects contemporary international best practices and supports a

more influential role in global maritime policymaking.

Overall, the proposed transition from DGS to DGMA is not merely a change in nomenclature but a broader administrative and strategic transformation. It seeks to reposition India's maritime administration from a predominantly regulatory organization into a comprehensive maritime authority capable of simultaneously advancing safety, sustainability, industry development, seafarer welfare, innovation, and international engagement. In doing so, it aims to provide an institutional foundation capable of supporting India's long-term maritime ambitions and its emergence as a leading maritime nation by 2047.



Maritime Transformation – 2 Foundational Pillars



Technology & Sustainability

Technology Integration - Digital Platforms

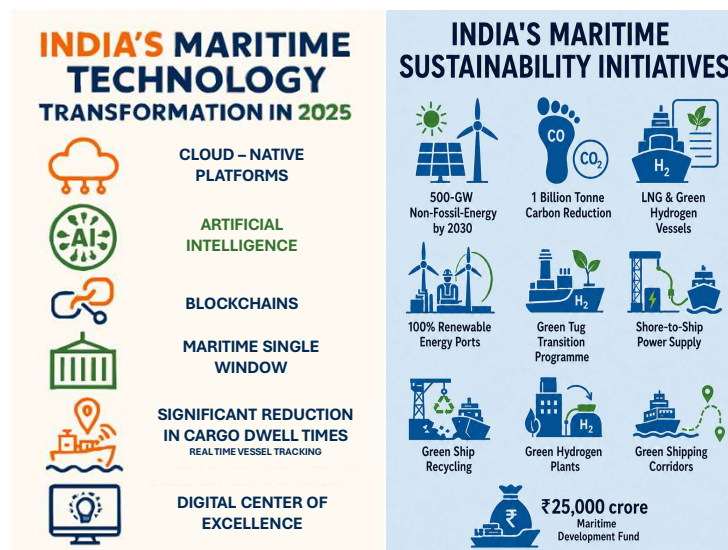
1. Flagship platforms: e-Samudra, SAGAR SETU, Maritime Single Window (MSW).
2. e-Samudra integrates 60+ maritime services (MTO registration, shipbuilding aid).
3. AI-powered exams & simulations for seafarer training.
4. Real-time vessel/cargo monitoring via Command & Control Centre.
5. Digital Centre of Excellence (DCoE) promotes AI, IoT, blockchain.
6. Reduced cargo dwell time; enhanced port efficiency.
7. Swachh Sagar Portal

Sustainability Initiatives - Green Shipping Agenda

1. Targets: 500 GW non-fossil energy (2030), 1 billion-ton carbon cut, net-zero by 2070.
2. Policies encourage LNG, green hydrogen, biofuel vessels.
3. Mandates shore power, waste, and renewable port integration.

Sustainability Initiatives - Key Programmes

1. Harit Sagar Guidelines support 100% renewable energy, AI/IoT logistics in ports.
2. Green Tug Transition: 50% hybrid/electric tugs by 2030.
3. Green hydrogen plant at Deendayal Port scaling to 10 MW; 5 million tonnes by 2030 goal.



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Maritime Transformation through Technology and Sustainability

India's maritime sector is undergoing a significant transformation driven by two foundational pillars—**technology integration** and **sustainability**. Aligned with the objectives of Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047, these pillars aim to improve operational efficiency, enhance global competitiveness, and support environmentally responsible growth across the maritime ecosystem.

Technology Integration and Digitalization

The Government of India has accelerated the adoption of digital technologies across ports, shipping, and maritime services. Key digital platforms such as **e-Samudra**, **SAGAR SETU**, and the **Maritime Single Window (MSW)** have streamlined service delivery and regulatory processes. e-Samudra integrates more than 60 maritime services, including merchant shipping registration, certification, and shipbuilding-related services.

Advanced technologies such as **Artificial Intelligence (AI)**, **Internet of Things (IoT)**, **blockchain**, **cloud-native platforms**, and **real-time vessel tracking systems** are being deployed to modernize maritime operations. A dedicated **Digital Centre of Excellence (DCoE)** promotes innovation and the adoption of emerging technologies, while Command and Control Centres facilitate real-time monitoring of vessel and cargo movements. These initiatives have contributed to reduced cargo dwell times, improved port efficiency, and enhanced transparency and stakeholder coordination.

Sustainability and Green Shipping Agenda

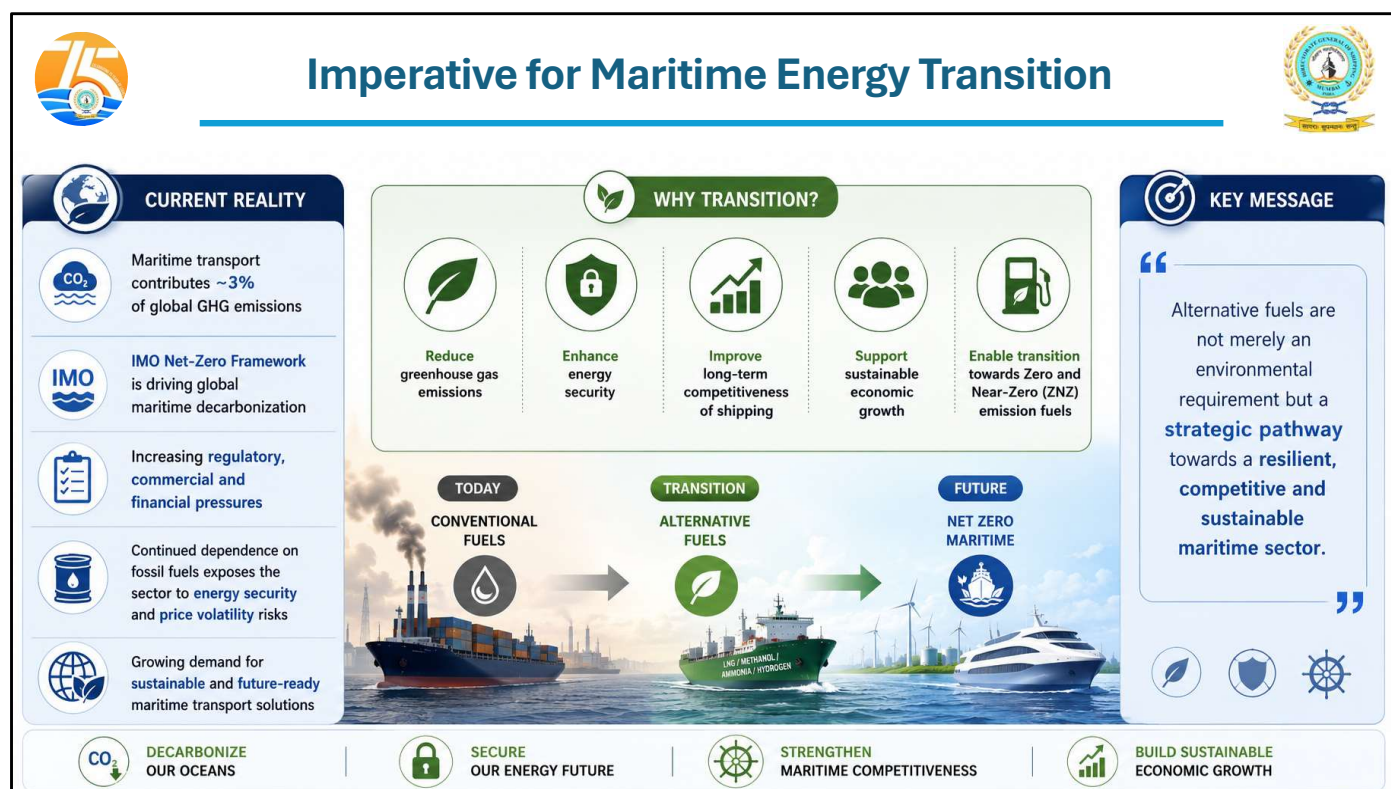
Sustainability forms the second pillar of India's maritime transformation strategy. The sector is aligned with India's broader climate commitments, including the targets of **500 GW of non-fossil fuel energy capacity by 2030**, significant carbon emission reductions, and achieving **net-zero emissions by 2070**.

To promote green shipping, policies encourage the adoption of **LNG-fuelled, green hydrogen-powered, and biofuel-based vessels**, while ports are being mandated to enhance shore power facilities, waste management systems, and renewable energy integration. Sustainability efforts are also focused on reducing emissions from port operations and encouraging cleaner maritime logistics.

Key Green Maritime Programmes

Several flagship programmes support the green transition. The **Harit Sagar Guidelines** aim to develop environmentally sustainable and energy-efficient ports through renewable energy adoption and AI/IoT-enabled logistics solutions. The **Green Tug Transition Programme** seeks to achieve 50% hybrid or electric tug deployment by 2030. In addition, initiatives such as the development of **green hydrogen facilities**, establishment of **green shipping corridors**, promotion of **green ship recycling**, and expansion of renewable-energy-powered ports underline India's commitment to decarbonizing the maritime sector.

Together, technology-driven modernization and sustainability-focused initiatives are creating a resilient, efficient, and future-ready maritime ecosystem, positioning India as a leading global maritime nation in the decades ahead.



Imperative for Maritime Energy Transition

Maritime transport is central to global trade, supply chains and economic development. At the same time, the sector is increasingly required to address greenhouse gas emissions, improve energy efficiency and prepare for a future in which low and zero-emission operations become commercially and operationally necessary. Maritime energy transition, therefore, is not merely an environmental agenda. It is a strategic requirement for ensuring the long-term resilience, competitiveness and sustainability of the maritime ecosystem.

Shipping has traditionally depended on conventional fossil fuels such as heavy fuel oil, marine gas oil and diesel. While these fuels have supported the growth of global trade, continued dependence creates exposure to volatile fuel prices, supply disruptions, import dependence and future compliance risks. It also places the sector under increasing pressure to reduce its greenhouse gas footprint and align with evolving international expectations on cleaner shipping.

The global maritime sector is moving towards decarbonisation through a combination of regulatory measures, market expectations, technological innovation and financial signals. The 2023 IMO GHG Strategy seeks net-zero GHG emissions from international shipping by or around 2050 and includes interim ambitions for 2030 and 2040. It also envisages increasing uptake of zero and near-zero GHG emission technologies, fuels and energy sources. Discussions on the proposed IMO Net-Zero Framework are continuing, including on a global fuel standard and a GHG-pricing mechanism.

This evolving international environment is likely to influence vessel design, fuel selection, ship operations, chartering decisions, access to finance, port infrastructure and future trade competitiveness. Shipping companies that are unable to adapt may face higher operating costs, reduced market access and greater exposure to regulatory and commercial risks. Conversely, early preparedness can create opportunities for greener fleets, efficient ports, domestic manufacturing, fuel production and new maritime services.

The transition is necessary for five broad reasons.

First, it is essential to reduce greenhouse gas emissions from shipping and associated maritime activities. This includes not only emissions from onboard fuel use but also lifecycle emissions associated with fuel production, transportation, storage and use. A lifecycle approach is important to ensure that emissions are genuinely reduced rather than shifted from ships to other parts of the energy system.

Second, maritime energy transition can strengthen energy security. Diversifying fuel options through sustainable biofuels, green methanol, green ammonia, hydrogen, battery-electric systems and other cleaner technologies can reduce dependence on conventional imported fuels. This is particularly relevant for India, where maritime growth, energy security and domestic green-energy capability must progress together.

Third, the transition is necessary to safeguard the long-term competitiveness of Indian shipping. Future competitiveness will increasingly depend on the ability of vessels and ports to meet efficiency standards, access cleaner fuels, comply with carbon-related requirements and respond to changing expectations from cargo owners, charterers, financiers and international supply chains.

Fourth, the transition can support sustainable economic growth. Development of green-fuel ecosystems, bunkering infrastructure, renewable-energy integration, shipbuilding capability, retrofitting capacity, port electrification, digital systems and specialised skills can generate new economic activity and strengthen domestic maritime capability. It can also create opportunities for Indian ports and coastal regions to emerge as green-fuel production, storage, bunkering and maritime-service hubs.

Fifth, maritime energy transition is necessary to enable a progressive shift towards zero and near-zero emission fuels and technologies. The transition will not follow one uniform pathway. Different vessel segments, routes, operating profiles and port conditions will require different solutions. Energy-efficiency measures, operational optimisation, hull and propulsion improvements, wind-assist technologies, shore power, batteries, hybrid systems and multiple alternative fuels will need to be adopted in a phased and practical manner.

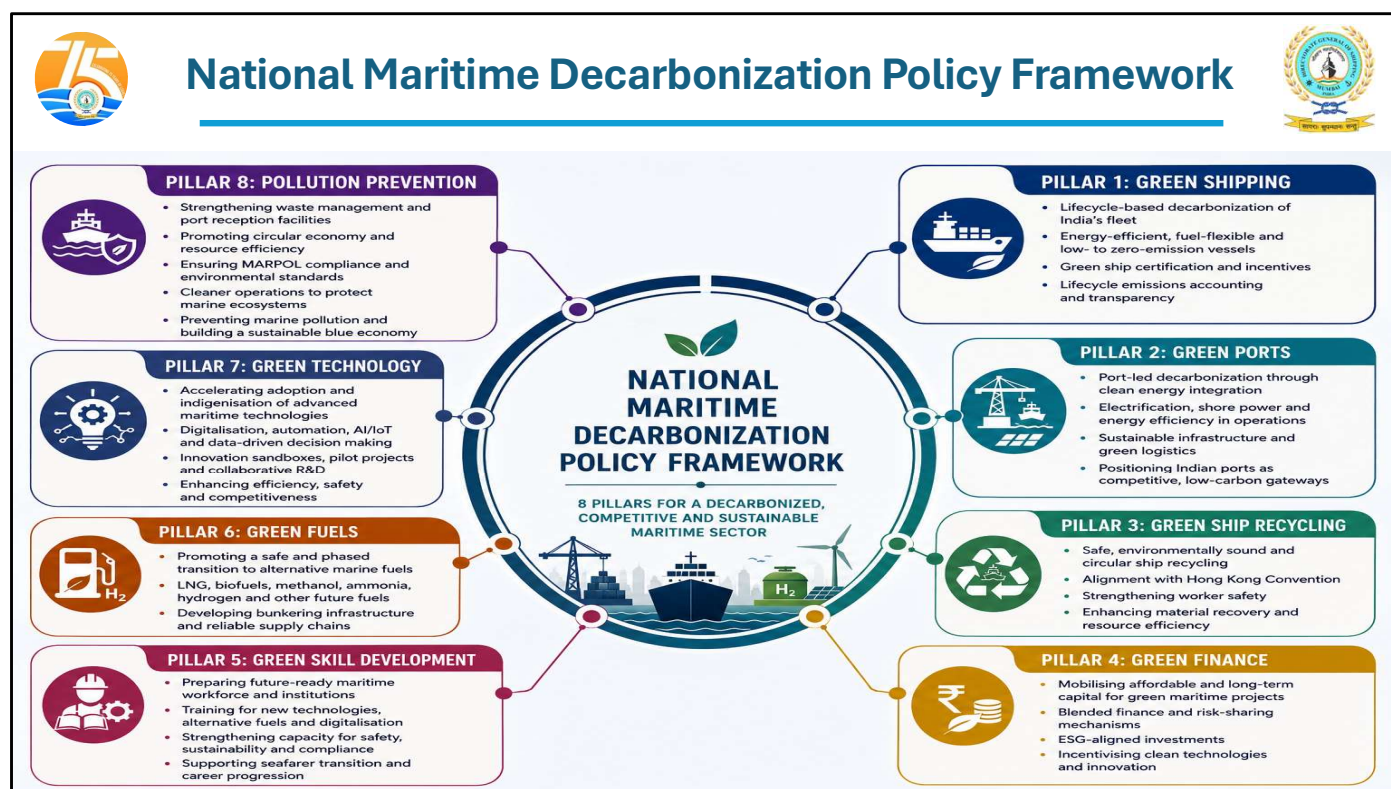
The pathway for transition can broadly be understood in three stages. In the immediate term, the focus should be on improving energy efficiency, optimising operations, reducing fuel consumption and preparing vessels and ports for future requirements. In the medium term, greater deployment of alternative fuels, retrofits,

green bunkering facilities, shore power and digital optimisation systems will be required. In the long term, the objective is to create a net-zero maritime ecosystem supported by cleaner fuels, efficient ships, green ports, reliable infrastructure, skilled personnel and appropriate safety and regulatory frameworks.

Alternative fuels are an important component of this journey, but they are not a standalone solution. Their successful adoption will depend on availability, affordability, safety, lifecycle emissions, storage and bunkering arrangements, vessel compatibility, engine technology, crew training and international standards. The transition must therefore be supported by coordinated action across shipping, ports, shipbuilding, energy, finance, technology, skill development and regulation.

For India, maritime energy transition presents an opportunity to align climate responsibility with national priorities of energy security, Atmanirbhar Bharat, industrial development, port-led growth and Viksit Bharat. It provides a pathway to develop a resilient and future-ready maritime sector that can support trade growth while progressively reducing environmental impact.

The central message is that maritime energy transition should be viewed not as a compliance burden but as a strategic opportunity. A well-planned transition can help decarbonise maritime operations, strengthen energy resilience, improve competitiveness, support innovation and create sustainable economic growth across the maritime value chain.



National Maritime Decarbonization Policy Framework

The maritime sector is central to global trade and economic growth, but it also faces increasing pressure to reduce greenhouse gas emissions and transition towards a sustainable future. In alignment with international climate commitments, the International Maritime Organization's (IMO) decarbonization agenda, and India's national sustainability objectives, a comprehensive **National Maritime Decarbonization Policy Framework** is essential to guide the transformation of the maritime ecosystem towards a low-carbon, competitive, and resilient future.

The proposed framework adopts a holistic approach built around **eight strategic pillars** that collectively address shipping, port operations, fuels, technology, workforce development, finance, and environmental protection. Together, these pillars create an integrated roadmap for achieving maritime decarbonization while ensuring economic growth, energy security, and global competitiveness.

Pillar 1: Green Shipping

The transition to green shipping focuses on the lifecycle-based decarbonization of India's shipping fleet through the adoption of energy-efficient, fuel-flexible, and low- to zero-emission vessels. Key measures include promoting green ship certification, incentivizing clean vessel technologies, strengthening emissions accounting systems, and enhancing transparency throughout the shipping value chain.

Pillar 2: Green Ports

Ports will play a pivotal role in maritime decarbonization by integrating renewable and clean energy sources into port operations. This includes electrification, shore power infrastructure, energy-efficient operations, sustainable logistics systems, and green port infrastructure development. The objective is to position Indian ports as globally competitive, low-carbon gateways that support sustainable maritime trade.

Pillar 3: Green Ship Recycling

Environmentally sound ship recycling is an important component of a circular maritime economy. The framework seeks to strengthen compliance with the Hong Kong International Convention, enhance worker safety, improve material recovery and recycling efficiency, and establish sustainable ship recycling practices that reduce environmental impacts while generating economic value.

Pillar 4: Green Finance

Achieving decarbonization will require significant investments in clean technologies, infrastructure, and innovation. The framework emphasizes mobilizing affordable and long-term capital through blended finance mechanisms, risk-sharing instruments, ESG-aligned investments, and targeted incentives for green maritime projects. Green finance will serve as an enabling factor for accelerating sector-wide transformation.

Pillar 5: Green Skill Development

Human capital remains central to the success of maritime decarbonization. As the sector adopts alternative fuels and advanced technologies, the workforce will require new skills and competencies. The framework promotes investment in maritime education and training, capacity building for safety and compliance, digital literacy, and programmes that support seafarer transition and career progression in a changing industry environment.

Pillar 6: Green Fuels

The transition to alternative fuels is a cornerstone of maritime decarbonization. The framework supports a safe and phased adoption of LNG, biofuels, methanol, ammonia, hydrogen, and other future sustainable fuels. Priority will be given to developing bunkering infrastructure, strengthening fuel supply chains, and establishing regulatory and safety frameworks that facilitate fuel diversification and energy security.

Pillar 7: Green Technology

Technological innovation will drive efficiency gains and emissions reduction across the maritime sector. The framework promotes the adoption and indigenization of advanced maritime technologies, including digitalization,

automation, Artificial Intelligence (AI), Internet of Things (IoT), data-driven decision-making tools, and energy-efficient vessel and port technologies. Innovation ecosystems, pilot projects, and collaborative research and development initiatives will support technology deployment and commercialization.

Pillar 8: Pollution Prevention

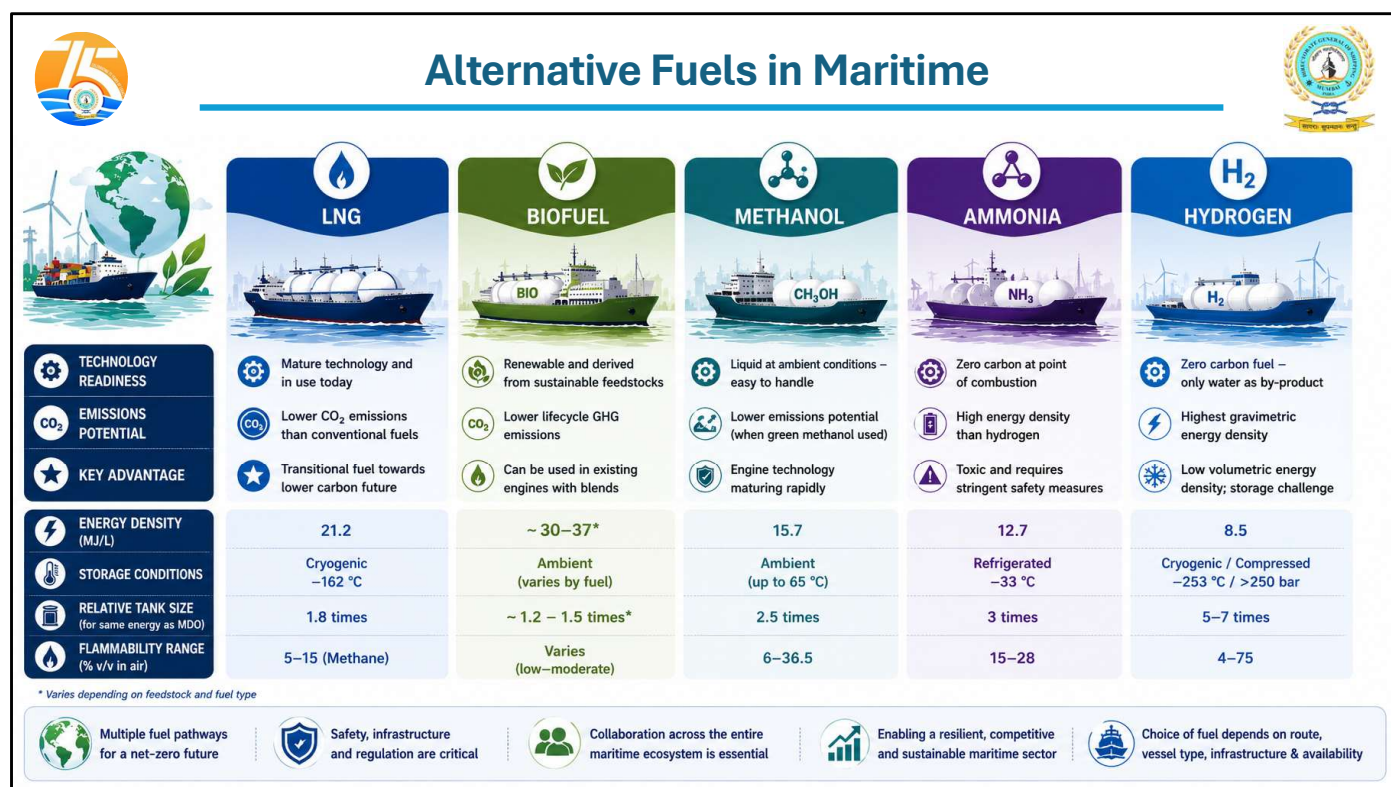
Maritime sustainability extends beyond carbon emissions to the broader protection of marine ecosystems. The framework strengthens waste management systems, port reception facilities, resource efficiency practices, and compliance with MARPOL requirements. Efforts will focus on preventing marine pollution, promoting cleaner port operations, supporting circular economy principles, and safeguarding the health of coastal and marine environments.

Strategic Significance

The National Maritime Decarbonization Policy Framework provides a comprehensive roadmap for transforming India's maritime sector into a cleaner, more efficient, and globally competitive industry. By integrating green shipping, sustainable ports, clean fuels, innovation, workforce development, financing mechanisms, and environmental stewardship, the framework aims to balance economic growth with climate responsibility.

The framework supports the objectives of **Maritime India Vision 2030**, **Maritime Amrit Kaal Vision 2047**, and India's broader net-zero ambitions. It seeks to enhance energy security, strengthen supply chain resilience, create green jobs, foster technological leadership, and position India as a leading global maritime nation committed to sustainable development.

Ultimately, the eight-pillar framework provides a structured pathway for achieving a **decarbonized, competitive, and sustainable maritime sector**, ensuring that India remains at the forefront of the global maritime energy transition.



Alternative Fuels in the Maritime Sector

The global maritime industry is transitioning towards cleaner and more sustainable energy sources to meet decarbonization goals and achieve net-zero emissions. As international shipping contributes approximately 3% of global greenhouse gas emissions, the adoption of alternative marine fuels has become a central component of the maritime energy transition. No single fuel is likely to dominate the future maritime energy mix; instead, multiple fuel pathways are expected to coexist based on vessel type, trade routes, technological maturity, fuel availability, and economic considerations.

India's maritime decarbonization strategy recognizes the importance of developing a diversified fuel ecosystem that balances environmental objectives, operational requirements, energy security, and commercial viability.

Liquefied Natural Gas (LNG)

LNG is currently the most mature alternative marine fuel and has been widely adopted across global shipping fleets. It offers lower carbon dioxide emissions compared to conventional marine fuels and serves as a transitional fuel on the pathway towards a low-carbon future. LNG benefits from established technologies and growing bunkering infrastructure, making it a practical near-term solution for emission reduction. However, as a fossil-based fuel, its long-term role will depend on advancements in methane emission management and the availability of lower-

carbon alternatives.

Biofuels

Biofuels represent a renewable fuel option derived from sustainable feedstocks such as agricultural residues, waste oils, and biomass. One of their major advantages is their compatibility with existing engines and fuel infrastructure, often requiring limited modifications when used in blends. Biofuels can significantly reduce lifecycle greenhouse gas emissions, though their sustainability depends on feedstock availability, production methods, and land-use considerations.

Methanol

Methanol has emerged as a promising marine fuel owing to its ease of handling and storage under ambient conditions. Green methanol, produced from renewable sources, offers substantial emission reduction potential and has gained increasing industry attention. Engine technologies capable of operating on methanol are advancing rapidly, and several shipowners have already placed orders for methanol-fuelled vessels. Methanol's relatively simple storage requirements provide operational advantages compared to some other alternative fuels.

Ammonia

Ammonia is widely viewed as a potential long-term zero-carbon marine fuel because it does not emit carbon dioxide during combustion. It offers higher energy density than hydrogen and can be transported and stored using established industrial systems. However, ammonia is toxic and requires stringent safety measures for handling, storage, and onboard use. Significant technological development and regulatory frameworks will be necessary before widespread adoption can occur.

Hydrogen

Hydrogen is considered one of the cleanest future marine fuels, producing only water as a by-product when used in fuel cells. It offers significant potential for complete decarbonization of maritime transport when produced using renewable energy sources. However, hydrogen faces considerable storage and transportation challenges due to its low volumetric energy density and the need for cryogenic or high-pressure storage systems. Continued technological innovation and infrastructure development will be critical for large-scale deployment.

Key Considerations for Fuel Adoption

The transition towards alternative fuels involves several technical, economic, and operational considerations:

- Development of bunkering and fuel supply infrastructure.

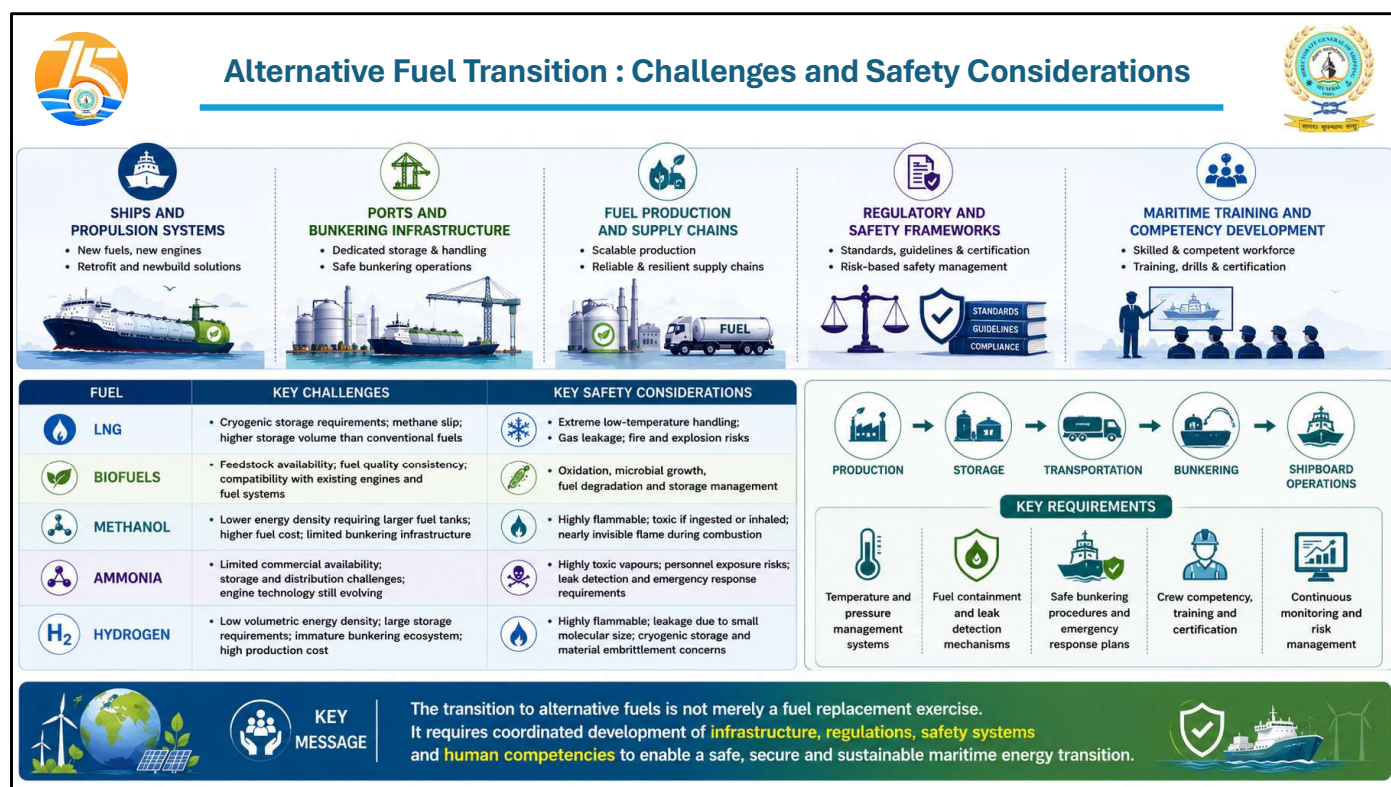
- Establishment of comprehensive safety standards and regulatory frameworks.
- Investment in vessel retrofitting and new fuel-compatible ship designs.
- Training and upskilling of seafarers for safe fuel handling and operations.
- Collaboration among governments, ports, shipowners, fuel producers, technology providers, and financial institutions.
- Availability and affordability of fuel across major shipping routes.

Indian Perspective

India's maritime decarbonization agenda promotes a phased and technology-neutral approach toward alternative fuels. The country is actively exploring opportunities in LNG, biofuels, methanol, green ammonia, and green hydrogen while simultaneously developing supporting port infrastructure, bunkering facilities, regulatory frameworks, and skill development programmes. These efforts align with the objectives of **Maritime India Vision 2030**, **Maritime Amrit Kaal Vision 2047**, and India's broader net-zero ambitions.

Conclusion

Alternative fuels will form the foundation of the maritime sector's transition to a low-carbon future. While each fuel presents distinct advantages and challenges, a combination of multiple fuel pathways is likely to support the industry's decarbonization journey. Success will depend on technological innovation, infrastructure readiness, safety standards, workforce development, and strong collaboration across the maritime ecosystem. By embracing a diverse portfolio of sustainable fuels, the maritime sector can enhance energy security, reduce emissions, strengthen competitiveness, and contribute to a resilient and sustainable global shipping industry.



Alternative Fuel Transition – Challenges and Safety Considerations in Maritime

The global maritime sector is steadily transitioning towards alternative fuels to meet decarbonization targets and achieve the International Maritime Organization's (IMO) long-term greenhouse gas reduction goals. Fuels such as **LNG, biofuels, methanol, ammonia, and hydrogen** are increasingly being considered as viable alternatives to conventional marine fuels. However, the transition represents far more than a simple fuel substitution exercise; it requires extensive investments in infrastructure, technology, regulatory frameworks, safety systems, and human capital to ensure a safe and sustainable maritime energy transition.

Transition Challenges Across the Maritime Ecosystem

The adoption of alternative fuels requires significant changes throughout the maritime value chain.

Ships and Propulsion Systems

The transition necessitates the development and deployment of new propulsion technologies, fuel systems, and vessel designs. Existing vessels may require costly retrofitting, while new-build ships must be designed to accommodate specific fuel storage, handling, and propulsion requirements. Different fuels present distinct operational and engineering challenges that influence vessel design and performance.

Ports and Bunkering Infrastructure

Ports play a critical role in supporting alternative fuels through dedicated storage, distribution, and bunkering facilities. Significant investments are required to establish safe fuel handling systems, specialized terminals, emergency response capabilities, and bunkering infrastructure tailored to the characteristics of each fuel.

Fuel Production and Supply Chains

The availability of alternative fuels depends on the development of scalable production capacities and reliable supply chains. Ensuring consistent fuel quality, affordability, and accessibility across major maritime routes remains a key challenge. Establishing resilient production, transportation, storage, and distribution networks will be essential to supporting widespread fuel adoption.

Regulatory and Safety Frameworks

The introduction of new fuels requires the development of robust regulations, standards, certification systems, and risk management protocols. Regulatory frameworks must evolve to address specific operational hazards, fuel handling procedures, emergency response measures, and environmental considerations associated with alternative fuels.

Maritime Training and Competency Development

Alternative fuels introduce new technical, operational, and safety challenges for seafarers and shore-based personnel. Comprehensive training, certification programmes, simulation exercises, and competency development initiatives are essential to prepare the maritime workforce for handling emerging fuel technologies safely and efficiently.

Fuel-Specific Challenges and Safety Considerations

Liquefied Natural Gas (LNG)

LNG is currently the most commercially mature alternative marine fuel. However, it requires cryogenic storage at approximately **-162°C**, larger storage volumes compared to conventional marine fuels, and careful management of methane emissions.

- Key safety concerns include:
- Extreme low-temperature handling.
- Gas leakage risks.
- Fire and explosion hazards in enclosed spaces.

Biofuels

Biofuels offer the advantage of compatibility with existing engines and infrastructure but face challenges related to feedstock availability, fuel quality consistency, and sustainable sourcing.

- Key safety considerations include:
- Fuel degradation during storage.
- Oxidation and microbial contamination.
- Storage and fuel management requirements.

Methanol

Methanol is easier to store and handle under ambient conditions and is increasingly being adopted by global shipping operators. However, its lower energy density requires larger fuel tanks, and bunkering infrastructure remains limited in many locations.

Key safety concerns include:

- High flammability.
- Toxicity if ingested or inhaled.
- Nearly invisible flames, which can complicate fire detection and response.

Ammonia

Ammonia is widely viewed as a promising zero-carbon fuel due to the absence of carbon emissions during combustion. Nevertheless, challenges remain regarding fuel availability, engine development, storage, and safe handling.

Key safety concerns include:

- Highly toxic vapours.
- Significant personnel exposure risks.
- Requirement for advanced leak detection systems and emergency response procedures.

Hydrogen

Hydrogen offers the potential for complete decarbonization when produced from renewable sources. However, it presents substantial challenges related to storage, transportation, and fuel supply infrastructure due to its low volumetric energy density.

Key safety concerns include:

- High flammability.
- Risk of leakage due to small molecular size.
- Cryogenic storage requirements and material embrittlement issues.

Critical Safety Requirements

To enable the safe deployment of alternative fuels, the maritime sector must establish comprehensive safety systems covering the entire fuel lifecycle—from production and storage to transportation, bunkering, and onboard operations. Key requirements include:

- Effective temperature and pressure management systems.
- Fuel containment and leak detection mechanisms.
- Safe bunkering procedures and emergency response plans.
- Workforce training, competency development, and certification.

- Continuous monitoring, auditing, and risk management systems.

Strategic Importance

The transition to alternative fuels presents an opportunity to reduce greenhouse gas emissions, improve energy security, enhance maritime competitiveness, and support sustainable economic growth. However, successful implementation depends on coordinated efforts among governments, ports, shipowners, fuel producers, technology developers, training institutions, and regulatory bodies.

Conclusion

Alternative fuel adoption represents one of the most significant transformations in the history of maritime transport. While fuels such as LNG, biofuels, methanol, ammonia, and hydrogen offer pathways towards decarbonization, each brings unique technical, infrastructure, operational, and safety challenges. A successful transition will require the integrated development of **infrastructure, regulations, safety frameworks, fuel supply chains, and human competencies**. By prioritizing safety and preparedness alongside innovation, the maritime sector can achieve a secure, resilient, and sustainable energy transition while advancing global decarbonization objectives.



Green Ports – Driving Sustainable Maritime Growth

Ports are critical enablers of global trade and economic development, serving as key interfaces between maritime and land-based transport systems. As the maritime sector advances towards decarbonization and sustainability, ports are increasingly expected to minimize their environmental footprint while enhancing operational efficiency and competitiveness. In this context, the concept of **Green Ports** has emerged as a strategic approach to achieving cleaner, more resilient, and sustainable maritime infrastructure.

A Green Port is designed and operated to reduce environmental impacts through the integration of clean energy solutions, energy-efficient technologies, sustainable logistics practices, and circular economy principles. Green Ports seek to lower emissions, optimize resource utilization, enhance environmental performance, and contribute to the well-being of surrounding communities while supporting economic growth.

Environmental Performance and Sustainable Port Operations

The environmental performance of ports is typically assessed through a range of sustainability indicators that measure operational efficiency, emissions reduction, energy use, and environmental management.

Key indicators include:

Green Port Index (GPI) – Measures the overall environmental performance of ports.

Port Readiness Level (PRL) – Assesses preparedness for sustainable and green port operations.

Shore Power Readiness Indicator (SPRI) – Evaluates readiness for Onshore Power Supply (OPS) infrastructure.

Environmental Ship Index (ESI) – Assesses the environmental performance of vessels calling at ports and encourages cleaner shipping practices.

These indicators provide benchmarks for monitoring progress and supporting evidence-based decision-making in port sustainability initiatives.

Port Emission Management

Effective decarbonization requires ports to identify, measure, and manage emissions across their operational boundaries. Port emissions are generally categorized into three scopes:

Scope 1 (Direct Emissions): Emissions from port-owned equipment, vehicles, vessels, and onsite fuel combustion.

Scope 2 (Indirect Energy Emissions): Emissions associated with purchased electricity, heating, cooling, and steam consumption.

Scope 3 (Other Indirect Emissions): Emissions from ships at berth, cargo handling activities, waste and wastewater management, employee travel, and logistics supply chains.

Monitoring and mitigating emissions across all three scopes are essential for achieving a low-carbon port ecosystem and meeting national and international sustainability targets.

Shore-to-Ship Power (Onshore Power Supply)

One of the most significant measures for reducing port emissions is the implementation of **Onshore Power Supply (OPS)** or shore-to-ship power systems. OPS enables berthed vessels to switch off onboard auxiliary engines and draw electricity directly from the shore.

The benefits of OPS include:

- Reduction in carbon dioxide (CO₂), nitrogen oxides (NO_x), sulphur oxides (SO_x), and particulate matter emissions.
- Improved air quality in port areas and surrounding communities.
- Enhanced compliance with international environmental regulations.
- Improved Environmental, Social, and Governance (ESG) performance of ports.
- India has initiated OPS implementation at several major ports, including Kamarajar Port, V.O. Chidambaranar Port, Jawaharlal Nehru Port Authority (JNPA), and Paradip Port, reflecting the country's commitment to cleaner port operations.

Green Tug Transition Programme (GTTP)

The Green Tug Transition Programme (GTTP) is a flagship initiative aimed at transitioning harbour tug operations from conventional diesel propulsion to cleaner alternatives. The programme seeks to gradually replace existing diesel-powered tugs with battery-electric, hybrid, methanol, hydrogen, and other low-emission propulsion systems.

The phased implementation strategy includes:

- Deployment of battery-electric tugs at major ports.
- Introduction of hybrid and alternative-fuel-powered tug technologies.
- Progressive transition toward 100 percent green harbour tug operations over the long term.
- The programme supports emissions reduction, energy efficiency, technological innovation, and sustainable port operations.

Broader Benefits of Green Ports

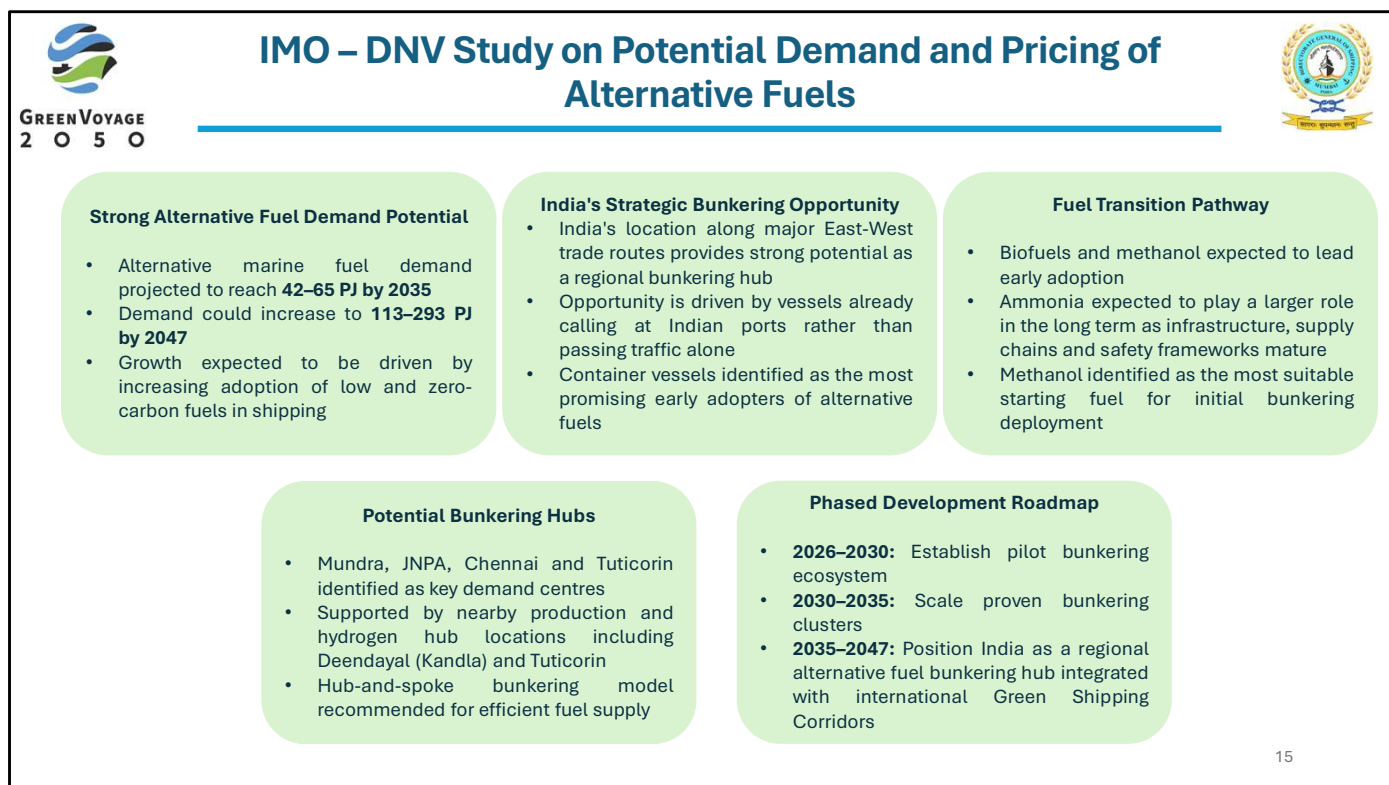
The development of Green Ports delivers multiple environmental, economic, and social benefits, including:

- Promotion of clean energy adoption.
- Improved energy efficiency and operational performance.
- Support for circular economy practices.
- Reduction of greenhouse gas emissions and air pollutants.
- Enhanced resilience to climate-related risks.
- Strengthened global competitiveness of Indian ports.
- Creation of sustainable economic growth opportunities.

Conclusion

Green Ports form a critical component of India's maritime decarbonization strategy and its broader vision for sustainable maritime development. By integrating renewable energy, shore power systems, green logistics, clean harbour craft, and advanced environmental management practices, ports can become key drivers of a low-carbon maritime economy.

Aligned with the objectives of **Maritime India Vision 2030**, **Maritime Amrit Kaal Vision 2047**, and India's climate commitments, the Green Ports agenda seeks to create cleaner ports, greener operations, and a sustainable maritime future. Through continued investments in infrastructure, technology, and policy support, Indian ports can emerge as globally competitive, environmentally responsible, and future-ready maritime gateways.



IMO–DNV Study on Potential Demand and Pricing of Alternative Fuels

The transition to low- and zero-carbon fuels is a critical component of global maritime decarbonization efforts. To support evidence-based policy development and investment planning, the International Maritime Organization (IMO) under the **GreenVoyage2050 Programme**, in collaboration with **DNV**, undertook a study to assess the potential demand, pricing dynamics, and bunkering opportunities for alternative marine fuels in India. The study highlights India's growing potential to emerge as a regional hub for alternative fuel bunkering and supply in the evolving global maritime energy landscape.

Alternative Fuel Demand Outlook

The study projects a significant increase in demand for alternative marine fuels as the shipping industry accelerates its transition towards low- and zero-carbon operations. Alternative fuel demand in India is estimated to reach approximately **42–65 PJ by 2035**, with further growth to **113–293 PJ by 2047**. This increase is expected to be driven by rising adoption of biofuels, methanol, ammonia, hydrogen, and other sustainable fuels as shipowners respond to decarbonization targets, market expectations, and evolving regulatory requirements.

India's Strategic Bunkering Opportunity

India's geographical position along major East–West shipping routes provides a

strong foundation for developing a regional alternative fuel bunkering ecosystem. The study notes that the opportunity is driven not only by passing international traffic but also by vessels already calling at Indian ports for trade and cargo operations.

Container shipping has been identified as one of the most promising early adopters of alternative fuels, making major Indian container ports strategically well placed to support the initial development of bunkering infrastructure and associated supply chains.

Fuel Transition Pathway

The study suggests that different fuels are likely to dominate at different stages of the maritime energy transition.

Biofuels and methanol are expected to drive early adoption due to their relative technological maturity, operational flexibility, and lower infrastructure requirements.

Methanol is identified as a particularly suitable starting fuel for initial bunkering deployment owing to its ease of storage, handling, and growing global acceptance.

Ammonia is expected to play a larger role in the longer term as production capacity, bunkering infrastructure, supply chains, engine technologies, and safety frameworks mature.

This phased fuel transition reflects the industry's expectation that multiple alternative fuels will coexist rather than a single fuel becoming the dominant solution.

Potential Bunkering Hubs

The study identifies several Indian ports with strong potential to develop into alternative fuel bunkering centres, including:

- **Mundra**
- **Jawaharlal Nehru Port Authority (JNPA)**
- **Chennai**
- **V.O. Chidambaranar Port (Tuticorin)**

These locations benefit from existing maritime traffic, industrial infrastructure, and proximity to emerging clean fuel production centres. The study also highlights the importance of integrating bunkering facilities with nearby green hydrogen and alternative fuel production hubs, particularly around **Deendayal (Kandla)** and **Tuticorin**.

To ensure efficient fuel distribution, a **hub-and-spoke model** is recommended, whereby major ports function as primary bunkering hubs while supporting regional ports through connected supply networks.

Phased Development Roadmap

The study proposes a gradual and structured development pathway for India's alternative fuel bunkering ecosystem:

Phase I (2026–2030): Pilot Development

Establish pilot alternative fuel bunkering facilities.

Develop regulatory and safety frameworks.

Build initial fuel supply chains and operational expertise.

Phase II (2030–2035): Scaling Up

Expand successful bunkering clusters.

Strengthen fuel production and distribution networks.

Increase adoption among domestic and international shipping operators.

Phase III (2035–2047): Regional Leadership

Position India as a major regional alternative fuel bunkering hub.

Integrate bunkering infrastructure with international Green Shipping Corridors.

Support large-scale adoption of low- and zero-carbon maritime fuels across the region.

Strategic Implications for India

The study indicates that alternative fuel bunkering presents a significant opportunity for India to strengthen its maritime competitiveness, support national decarbonization objectives, enhance energy security, and attract investments across fuel production, port infrastructure, logistics, and shipping services. The development of a robust alternative fuel ecosystem can also create new employment opportunities and support India's ambitions under **Maritime India Vision 2030** and **Maritime Amrit Kaal Vision 2047**.

Conclusion

The IMO–DNV study underscores that India is well positioned to play a leading role in the emerging global market for alternative marine fuels. With growing fuel demand, strategic geographic advantages, strong port infrastructure, and a phased development approach, India has the potential to evolve into a regional hub for sustainable maritime energy. Realizing this opportunity will require coordinated action across government, ports, fuel producers, shipowners, financial institutions, and technology providers to develop the infrastructure, regulations, and supply chains necessary for a successful maritime energy transition.



India Green Corridors Pre-Feasibility Study

By Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping



Key Outcomes

- Assessed 14 Indian ports across inland, coastal and international shipping segments
- Screened **230+ potential routes** and identified a **first suite of 40 Green Shipping Corridors**
- Corridor portfolio includes:
 - 8 Inland Waterway Corridors
 - 8 Coastal & Domestic Corridors
 - 8 Deep-Sea International Corridors
 - 8 Strategic Opportunity Corridors
 - 8 Emerging Corridors
- E-ammonia identified as the most credible scalable fuel pathway for early corridor deployment
- VOC, Kandla, Paradip and Mundra identified as leading corridor anchor ports
- Gujarat and Odisha emerged as key green fuel production hubs supporting future corridor development

Consortium Incubation Workshop conducted on May 28, 2026 at New Delhi

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India Green Corridors Pre-Feasibility Study

The **India Green Corridors Pre-Feasibility Study**, conducted by the **Maersk Mc-Kinney Møller Center for Zero Carbon Shipping** in collaboration with the **Directorate General of Shipping, Government of India**, is a strategic initiative aimed at accelerating the decarbonization of India's maritime sector. The study evaluates the potential for establishing Green Shipping Corridors that support the transition to low- and zero-emission maritime transport.

The assessment covered **14 Indian ports** across inland waterways, coastal shipping, and international deep-sea trade routes. More than **230 potential shipping routes** were screened, resulting in the identification of an initial portfolio of **40 Green Shipping Corridors**. These corridors are categorized into **inland waterways, coastal and domestic routes, deep-sea international routes, strategic opportunity corridors, and emerging corridors**, reflecting a broad spectrum of decarbonization opportunities.

A key finding of the study is the identification of **e-ammonia as the most credible and scalable alternative fuel pathway** for early deployment of green shipping corridors. The study also highlights **VOC Port, Kandla, Paradip, and Mundra** as leading anchor ports for future corridor development, while **Gujarat and Odisha** emerge as strategic hubs for green fuel production and supply.

To advance implementation, a **Consortium Incubation Workshop** was held in **New**

Delhi on 28 May 2026, bringing together stakeholders from government, ports, shipping lines, fuel producers, and industry partners. The workshop marked an important step toward developing collaborative partnerships and actionable roadmaps for establishing India's first Green Shipping Corridors and supporting the country's maritime decarbonization objectives.



National Green Hydrogen Mission – Green Hydrogen Hubs



The **National Green Hydrogen Mission (NGHM)** aims to position India as a **global hub for green hydrogen production, utilisation and export**, with a target of **5 MMT annual production by 2030**, supporting decarbonisation and energy transition.

Deendayal Port Authority (Kandla) – Western Hub	Paradip Port Authority – Eastern Hub	V.O. Chidambaranar Port (Tuticorin) – Southern Hub
1 MW green hydrogen plant commissioned (electrolyser-based)  3,400 acres land allocated for Green Hydrogen / Ammonia projects 3.5 MMTPA jetty compatible for Green Ammonia handling - Port Readiness Level 6 (7) for green fuel / methanol bunkering  - Advancing methanol bunkering ecosystem and alternative fuel transition  - Western gateway for green fuel production + bunkering + export corridors	₹797 crore Green Hydrogen / Ammonia jetty approved  4.0 MTPA handling capacity for green energy cargo - Development includes jetty, storage, pipelines and handling systems - Implemented under PPP / BOT  - Designed to connect eastern hydrogen clusters to global markets - Anchor hub for bulk handling, storage and export logistics 	10 Nm³/hr Green Hydrogen pilot plant commissioned (Apr 2025) at cost of INR 3.87 Crore  - Pilot supports port operations (lighting, EV charging) 205.72 acres land allocated for GH2 / Ammonia projects  - Developing Green Methanol Bunkering Facility (2 × 750 m³) - Emerging as green fuel + digital + renewable integrated port  - Southern hub for pilot deployment, innovation and green bunkering

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National Green Hydrogen Mission – Green Hydrogen Hubs

The **National Green Hydrogen Mission (NGHM)** is a flagship Government of India initiative aimed at positioning India as a **global hub for the production, utilization, and export of green hydrogen and its derivatives**. The Mission targets **5 million metric tonnes (MMT) of annual green hydrogen production by 2030**, supporting India's decarbonization objectives, energy security, and transition to a low-carbon economy. As part of this effort, major ports are being developed as **Green Hydrogen Hubs** to facilitate production, storage, bunkering, handling, and export of green fuels.

Three major ports have emerged as strategic regional hubs:

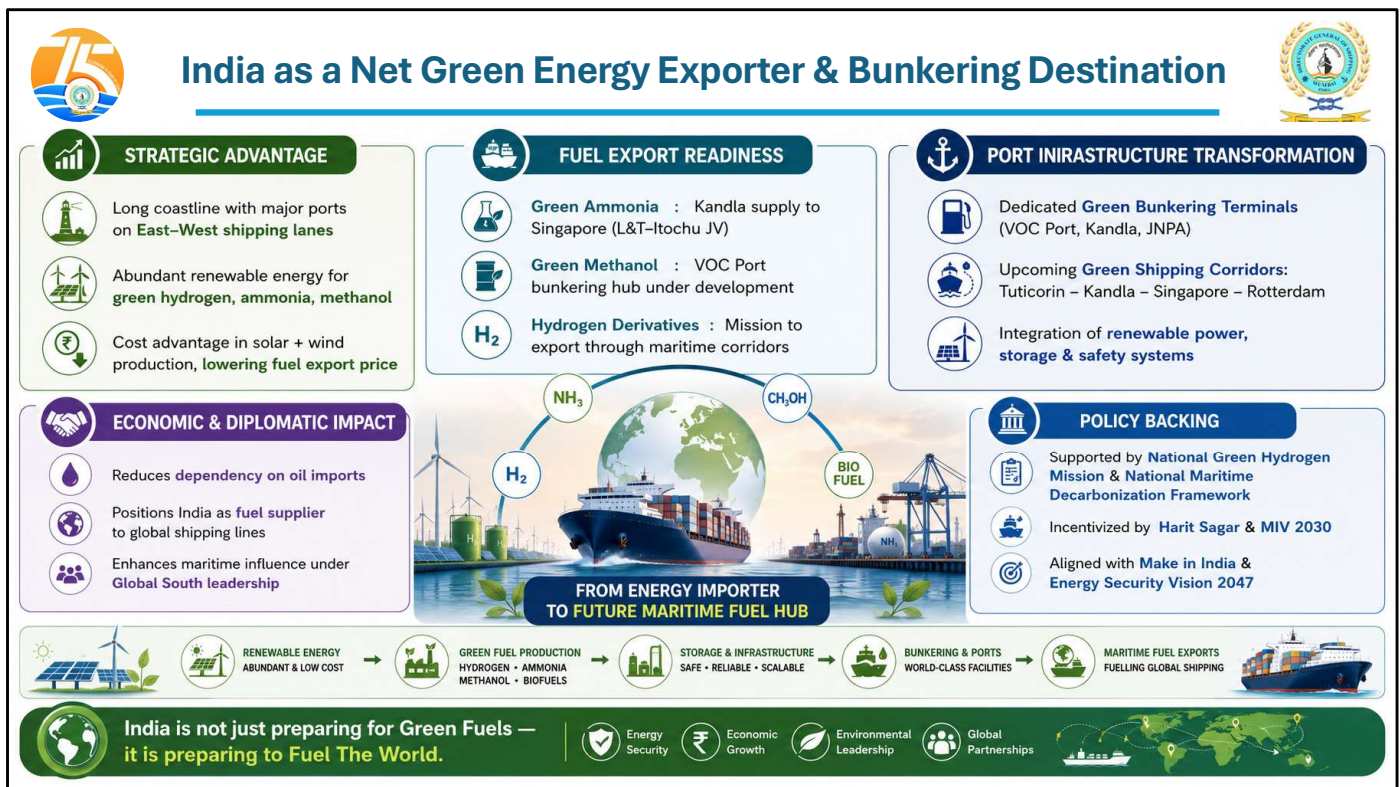
Deendayal Port Authority (Kandla) is being developed as the Western Green Hydrogen Hub. The port has commissioned a 1 MW electrolyser-based green hydrogen plant, allocated 3,400 acres for green hydrogen and ammonia projects, and established infrastructure capable of handling 3.5 MMTPA of green ammonia. The port is advancing methanol bunkering and alternative fuel ecosystems, positioning itself as a key gateway for green fuel production, bunkering, and export corridors.

Paradip Port Authority serves as the Eastern Green Hydrogen Hub, with approval for

a ₹797 crore Green Hydrogen/Ammonia Jetty Project. Designed with a handling capacity of 4.0 MTPA, the project includes jetty, storage, pipeline, and cargo handling infrastructure. The hub is expected to connect eastern hydrogen production clusters with domestic and global markets, serving as a major center for bulk handling, storage, and export logistics.

V.O. Chidambaranar Port (Tuticorin) is being developed as the Southern Green Hydrogen Hub. The port has commissioned a 10 Nm³/hr Green Hydrogen pilot plant to support port operations and clean energy applications. It has allocated 205.72 acres for green hydrogen and ammonia projects and is developing a Green Methanol Bunkering Facility. The port is emerging as a center for pilot deployment, innovation, renewable energy integration, and green fuel bunkering.

Collectively, these port-based hubs form a critical component of India's green maritime and energy transition strategy. By integrating green fuel production, storage, bunkering, and export infrastructure, they are expected to support future **Green Shipping Corridors**, strengthen India's position in global clean energy supply chains, and contribute significantly to achieving the objectives of the National Green Hydrogen Mission.



India as a Net Green Energy Exporter & Bunkering Destination

India is at the crossroads of a major strategic shift, from being one of the world's largest **importers of fossil fuels** to emerging as a **future global supplier of green maritime fuels** such as **green ammonia, green methanol, and hydrogen derivatives**. This transition is not isolated; it is rooted in domestic policy reforms, renewable energy leadership, and a geopolitical push for *energy independence by 2047* and *Net Zero by 2070*.

1. Strategic Maritime Advantage

With its extensive coastline and central position on **major East-West shipping corridors**, India is geographically primed to become a bunkering and refueling hub for global shipping.

India has one of the world's largest solar and wind power expansion programmes, which provides a **cost advantage in producing green fuels**, making exports competitive.

2. Fuel Export Capacity in Motion

India is already laying the groundwork for maritime fuel exports:

Green Ammonia (Export-Oriented Production)

At **Kandla**, a JV between **L&T and Itochu (Japan)** is setting up a large-scale green ammonia plant (~300 KTPA), with committed offtake to Singapore's bunkering market.

Green Methanol (First Bunkering Hub in India)

At **VOC Port, Tuticorin**, construction of a **750 m³ green methanol bunkering terminal** is underway (SOPAN Group). This is India's first dedicated alternative fuel facility for shipping.

Hydrogen Derivatives for Maritime Corridors

Under the **National Green Hydrogen Mission**, India targets **5 MMT green hydrogen** by 2030, largely to convert into **exportable derivatives** (ammonia/methanol) through maritime corridors like **Kandla–Singapore, Tuticorin–Rotterdam**, etc.

3. Port Infrastructure Transformation

Ports are evolving from cargo hubs to **energy export platforms**:

Dedicated **green fuel terminals** at **VOC Port, Kandla, JNPA**

Coastal **Green Shipping Corridors** being piloted (Tuticorin–Kandla–Singapore–Rotterdam)

Integration of **renewable power, desalination, safety systems**, and bunkering pipelines into port estates under **Harit Sagar Guidelines** and **NGSP**

4. Economic & Diplomatic Impact

India's leadership in green fuel exports has a threefold strategic impact:

Reduces dependence on crude oil imports (currently 85% import-driven energy market)

Positions India as a fuel supplier to global shipping lines transitioning under IMO Net-Zero framework

Strengthens India's diplomatic role as a provider of clean energy to the **Global South**, reinforcing leadership at forums such as OPEC, G20, and COP

5. Strong Policy Backing

Backed by **National Green Hydrogen Mission** and **Draft National Green Shipping Policy (NGSP)**

Incentives via **Harit Sagar, Maritime India Vision 2030**, and **Make in India–Energy Security 2047**

PIB statements (July 2025, OPEC Summit):

“India will not only be energy independent by 2047, but will also fuel the world with green energy exports.”

Conclusion

India is not simply decarbonizing its ports and ships, it is **building a green energy export economy** around its maritime sector. With methanol bunkering, ammonia export hubs, and hydrogen corridors already initiated, India is setting the stage to become the **refuelling station of a net-zero maritime world**.

India is not just preparing for Green Fuels..... It is preparing to Fuel the World.



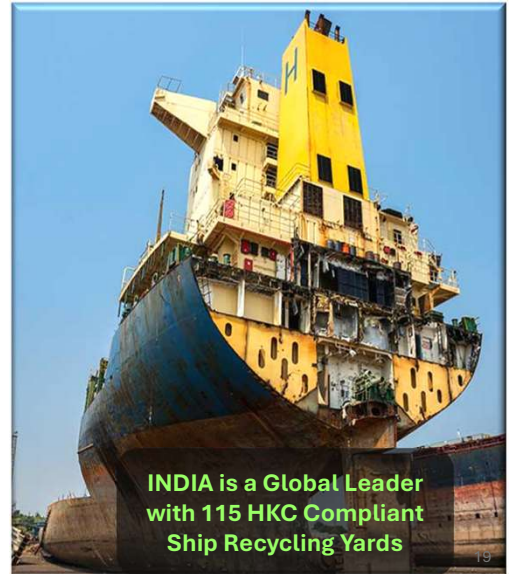
Ship Recycling



- Process of dismantling end-of-life ships to recover **steel and other valuable materials**.
- India is a **global leader**, with Alang–Sosiya in Gujarat being the **world's largest ship recycling cluster**.
- Governed internationally by the **Hong Kong Convention (HKC)**, which entered into force on **26 June 2025**.
- Integral to the **circular economy**, reducing the demand for virgin raw materials. 97-98% Materials recoverable

India's Role & Importance

- Handles **30% - 35% of global ship recycling tonnage** annually. (~500 vessels annually)
- Provides **20 - 25% of India's ferrous scrap requirement**, reducing dependence on imports.
- India is the **only country with 100+ HKC Compliant Recycling Yards**. Supplies input material for the **Green Steel ecosystem**, boosting India's low-carbon transition.
- Generates **direct employment for 15000+ workers** and **indirect livelihood opportunities** for thousands more in logistics, scrap processing, and allied services.
- Strengthens India's position in **global maritime sustainability**.



Ship Recycling – India's Global Leadership

Ship recycling is not just an industry - it is a **strategic pillar of India's maritime economy** and the global circular economy. The process dismantles end-of-life ships to recover steel and other valuable materials, reducing the demand for virgin raw inputs while cutting costs and emissions.

India today stands as the **global leader in ship recycling**, with the Alang–Sosiya cluster in Gujarat being the world's largest ship recycling facility. The entry into force of the **Hong Kong Convention (HKC) on 26 June 2025** has further elevated India's role, as it is the **only nation with more than 100 HKC-compliant yards (115 facilities)**.

This sector contributes significantly to India's industrial ecosystem by:

Handling **30–35% of global ship recycling tonnage annually**, consolidating India's leadership.

Meeting **20–25% of India's ferrous scrap demand**, reducing import dependency and saving valuable forex.

Feeding the **Green Steel ecosystem**, providing low-carbon inputs that align with India's net-zero ambitions.

The impact is equally socio-economic. Ship recycling directly employs **15,000+ workers**, while creating indirect livelihood opportunities for thousands more in logistics, scrap processing, and allied services. The industry has become a driver of **inclusive growth**, while embedding high safety and environmental standards under HKC compliance.

By anchoring itself as the hub of HKC-compliant recycling, India not only ensures **sustainable resource recovery** but also strengthens its position as a **global leader in maritime sustainability**.



Ship Recycling Credit Note



- Introduced under **Ship Building Financial Assistance Scheme**
- Incentivizes ship owners to **recycle in India** and **build new ships in Indian shipyards**

Allocation of : ₹ 4,001 crore
(under SBFA)

How It Works

- When a vessel is recycled in a certified Indian yard, the ship owner receives a **Credit Note for 40% of scrap value**.
- The Credit Note remains valid for 3 years.
- The credit note can be redeemed up to 5% of the fair price of the new vessel being built in an Indian shipyard

Benefits

- Encourages **safe and HKC compliant ship recycling** in India
- Provides direct **business boost for Indian shipyards**
- Attracts **new players** to India's ship recycling and shipbuilding ecosystem
- Strengthens India's **circular economy** : recycling feeds into new shipbuilding
- Positions India as a leader in **Green and Sustainable Maritime Growth**

13th March 2025



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Ship Recycling Credit Note

The **Ship Recycling Credit Note (SRCN)** is one of the most innovative financial instruments introduced under the **Shipbuilding Financial Assistance Scheme 2.0 (SBFA 2.0)** with an allocation of **₹4,001 crore**. It directly links India's ship recycling strength with the growth of its shipbuilding industry.

How It Works

When a vessel is dismantled in a **certified Indian ship recycling yard**, the shipowner is issued a **Credit Note worth 40% of the vessel's scrap value**.

This Credit Note remains valid until the shipowner invests in building a **new vessel in an Indian shipyard**.

The note is then **redeemed as financial assistance/subsidy** under SBFA 2.0, lowering the effective cost of new builds in India.

Expected Benefits

Boosts HKC-compliant recycling: Encourages safe, environmentally sound, and **Hong Kong Convention (HKC) aligned ship recycling** practices.

Strengthens shipbuilding: Directly channels recycling activity into **new orders for Indian shipyards**, ensuring business continuity.

Expands ecosystem participation: Incentivizes **new players**—both domestic and foreign—to engage with India's recycling and shipbuilding ecosystem.

Promotes circular economy: Scrap steel and materials from recycling feed into the production of new ships, cutting raw material dependence.

Sustainability leadership: Positions India as a **global leader in green and sustainable maritime growth**, combining recycling, green steel, and shipbuilding.

Strategic Importance

SRCN acts as a **bridge policy**, ensuring that India's dominance in recycling (30–35% of global share) translates into a **thriving shipbuilding industry**.

It enhances India's image as the **only country with over 100 HKC-compliant yards** while simultaneously supporting its ambition to become a **shipbuilding hub**.

By tying together **scrap recovery, circular economy, and green shipbuilding**, it creates a **self-sustaining maritime growth cycle**.

The Ship Recycling Credit Note is a **game-changer**, as it uniquely integrates recycling with new construction, creating a **virtuous cycle of sustainability, industrial growth, and employment**.



Four Pillar Approach



Cabinet approves ₹ 69,725 crore Package to Revitalize India's Shipbuilding and Maritime Sector



Shipbuilding Financial Assistance scheme

Allocation: ₹24,736 crore

- Overcome cost differential vis-a-vis foreign shipyards.
- Credit note for new builds against ship scrapping in India ₹ 4001 crore allocated
- Establish National Shipbuilding Mission



Maritime Development Fund

Allocation: ₹25,000 crore

- Enable long-term financing to maritime sector through equity & debt-based funding:
- Maritime Investment Fund
 - Interest Incentivization Fund
 - Credit Guarantee Fund



Shipbuilding Development Scheme (SbDS)

Allocation: ₹19,989 crore

- Greenfield cluster creation
- Brownfield capacity expansion to **4.5 million GT**
- Risk outlay for shipyards
- Setting up of India Ship Technology Centre (ISTC) as Apex body under IMU



Legal, Policy and Process Reforms

- Demand aggregation
- Large Ships as infrastructure
- Taxation issues
- Flagging reforms

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Data Source : PIB Press Release 24 SEP 2025 3:08PM

Four Pillar Approach

The Government of India has approved a **₹69,725 crore revitalization package** for the shipbuilding and maritime sector. This approach rests on **four strategic pillars**, each addressing a critical gap in India's maritime ecosystem- finance, infrastructure, capacity building, and regulatory reform.

Pillar 1: Shipbuilding Financial Assistance Scheme (₹24,736 crore)

Designed to **bridge the cost differential** between Indian and foreign shipyards, ensuring domestic yards remain competitive.

Provides **credit notes** for new shipbuilding linked to ship recycling in India, integrating sustainability with incentives.

Includes the establishment of a **National Shipbuilding Mission** to provide long-term policy continuity.

Pillar 2: Maritime Development Fund (₹25,000 crore)

Aims to enable **long-term, low-cost financing** for the maritime sector via equity and debt funding.

Includes sub-funds such as:

Maritime Investment Fund – to channel capital into greenfield projects.

Interest Incentivization Fund – to reduce borrowing costs for shipyards.

Credit Guarantee Fund – to reduce lender risk and unlock financing for vessel owners and builders.

Pillar 3: Shipbuilding Development Scheme (SbDS) (₹19,989 crore)

Focused on **capacity expansion and technology development**:

Establishment of **greenfield shipbuilding clusters**.

Brownfield expansion to raise capacity to **4.5 million GT**.

Risk outlay provision to protect shipyards from financial exposure.

Setting up the **India Ship Technology Centre (ISTC)** under IMU as an apex R&D and training body for advanced shipbuilding technologies.

Pillar 4: Legal, Policy, and Process Reforms

Demand aggregation across PSU, defence, and private shipping to secure consistent order books for Indian shipyards.

Recognition of **large ships as infrastructure**, unlocking easier access to long-term credit and incentives.

Addressing **taxation anomalies** and simplifying GST/customs regimes for shipbuilders.

Flagging reforms to incentivize Indian ownership of ships and reduce outflow of foreign exchange.

The four-pillar approach provides a **holistic framework** for India's shipbuilding revival. With financing support, capacity expansion, institutional R&D, and regulatory reforms, the package seeks to transform India into a **globally competitive shipbuilding hub**, aligned with Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047.



Just Transition in Maritime



Human element is of paramount importance in the maritime industry as human skills, judgement and welfare drive maritime safety.

Just Transition: Putting People at the Core of Decarbonisation

A people-centred pathway for a safe, inclusive and resilient maritime transition



Decarbonisation is not only a fuel shift. It is a workforce shift.

- ~3.23 lakh Indian seafarers (as of 2025)
- ~12% of global maritime workforce
- Alternative fuels introduce new safety risks
- New technologies demand new competencies
- Transition must **protect jobs, safety and dignity**

1. Skills & Training

- Large-scale upskilling for green fuels and technologies
- Modernised STCW-aligned training standards
- Investment in maritime training infrastructure

2. Safety & Standards

- Health-and-safety-first approach
- Safe handling of ammonia, hydrogen and low-flashpoint fuels
- Alignment with MLC 2006 and global labour norms

3. Equity & Inclusion

- Avoid widening global skills gaps
- Support developing maritime nations
- Promote diversity and gender inclusion

4. Well-being & Social Protection

- Seafarer welfare and mental well-being
- Fair transition with social protection
- No one left behind

Cleaner Oceans

Safer Workplaces

Stronger Economies

Resilient Communities

Sustainable Future

A green transition must also be a fair transition.

Just Transition in Maritime

As the global maritime industry advances towards decarbonization and the adoption of cleaner fuels and technologies, ensuring a **just transition** has become a critical policy priority. A just transition emphasizes that the shift to a low-carbon maritime future must be people-centric, ensuring that seafarers, maritime workers, and coastal communities are adequately prepared, protected, and empowered throughout the transformation process.

The maritime sector is highly dependent on human expertise, operational judgment, and workforce competence. Therefore, decarbonization is not merely a technological or fuel transition; it is also a significant **workforce transition**. With over **3.23 lakh Indian seafarers**, accounting for approximately **12% of the global maritime workforce**, India has a pivotal role in ensuring that its maritime workforce remains competitive, safe, and resilient in the evolving maritime landscape.

Skills Development and Capacity Building

The adoption of alternative fuels such as green hydrogen, ammonia, methanol, and other low-carbon technologies will require new operational competencies and technical expertise. Large-scale upskilling and reskilling programmes are essential to prepare seafarers and maritime professionals for handling emerging technologies and fuel systems. Modernized training standards aligned with international conventions, enhanced maritime training infrastructure, simulation-based learning,

and continuous professional development will be critical to building future-ready maritime human capital.

Safety and Regulatory Frameworks

The introduction of alternative fuels presents new operational and safety challenges. A just transition requires a strong safety-first approach, supported by updated regulations, risk management protocols, and training standards. Ensuring safe handling and operation of low-flashpoint and alternative fuels, while maintaining compliance with international labour and maritime conventions such as the Maritime Labour Convention (MLC), 2006, is essential to protecting seafarers and preserving maritime safety.

Equity, Inclusion and Workforce Protection

Maritime decarbonization should be inclusive and equitable, ensuring that no segment of the workforce is disadvantaged by technological change. Efforts are needed to address emerging skill gaps, support developing maritime nations, and promote diversity and gender inclusion within the sector. Policies should ensure equitable access to training opportunities and career advancement pathways across all stakeholder groups.

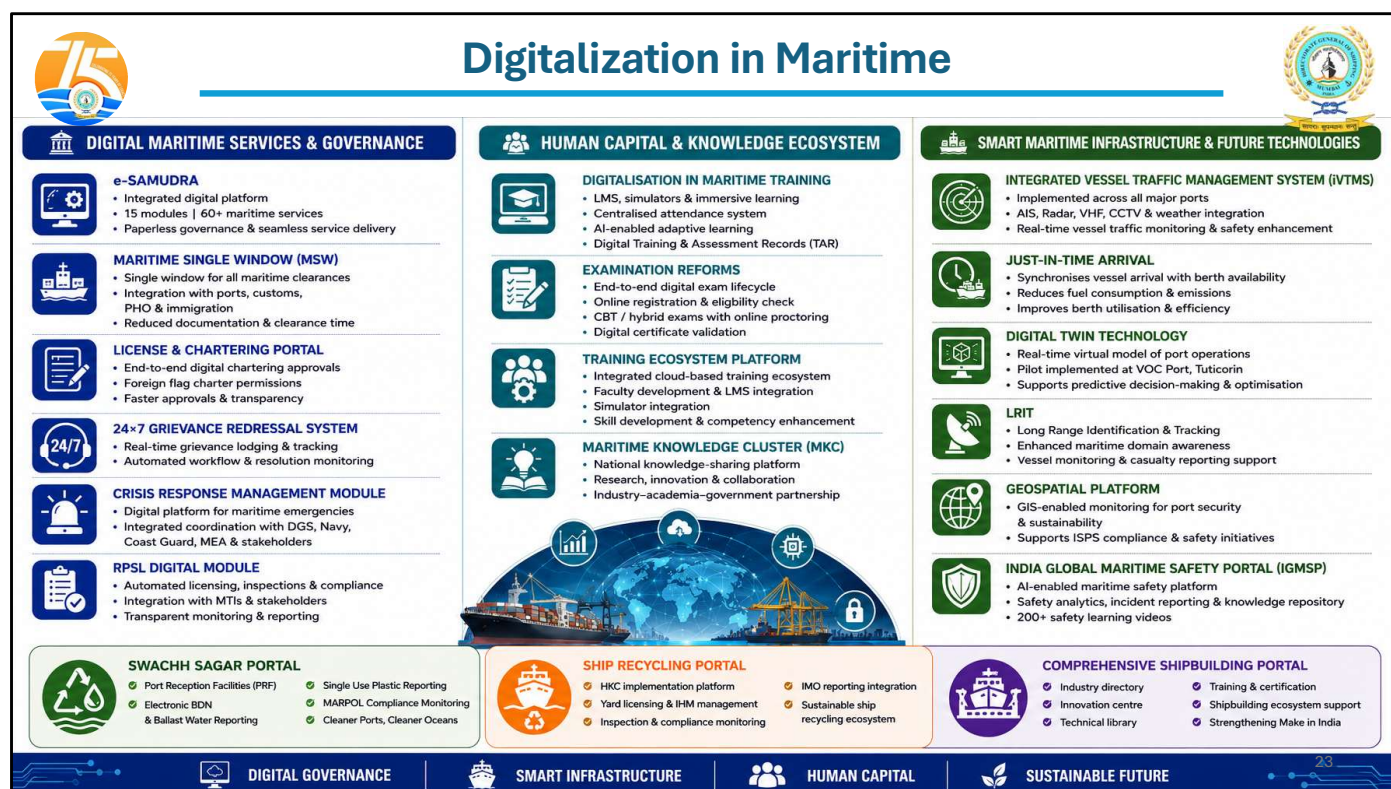
Well-being and Social Protection

A successful maritime transition must safeguard the welfare, dignity, and livelihoods of seafarers and maritime workers. Social protection mechanisms, fair labour practices, mental health support, and workforce welfare programmes are critical components of a just transition framework. These measures help ensure that workers benefit from the opportunities created by green shipping while mitigating potential disruptions associated with technological and operational change.

Strategic Importance

A people-centred approach to maritime decarbonization contributes to cleaner oceans, safer workplaces, stronger maritime economies, resilient coastal communities, and long-term sustainability. By placing seafarers and maritime workers at the core of policy and decision-making, India can ensure that its transition towards a green and low-carbon maritime future is both environmentally sustainable and socially inclusive.

Ultimately, a successful maritime transformation requires recognition that **a green transition must also be a fair transition**, balancing environmental objectives with the welfare, skills, safety, and aspirations of the people who drive the maritime industry.



Digitalization in the Maritime Sector

Digitalization has emerged as a key enabler of transformation in India's maritime sector, supporting the objectives of efficient governance, smart infrastructure development, capacity building, and sustainable growth. Through the adoption of advanced digital technologies and integrated platforms, India is modernizing maritime administration, streamlining regulatory processes, enhancing safety, and improving operational efficiency across ports and shipping services.

Digital Maritime Services and Governance

The Directorate General of Shipping and other maritime stakeholders have developed several digital platforms to simplify service delivery and strengthen governance. e-Samudra, an integrated maritime digital platform, provides access to more than 60 maritime services through a paperless and transparent interface. The Maritime Single Window (MSW) facilitates seamless coordination among ports, customs, immigration, and public health authorities, significantly reducing documentation requirements and vessel clearance times.

Additional digital initiatives include online licensing and chartering portals, 24x7 grievance redressal systems, digital crisis response management platforms, and integrated compliance monitoring systems. Specialized portals such as the Swachh Sagar Portal, Ship Recycling Portal, and Comprehensive Shipbuilding Portal support environmental compliance, ship recycling management, and the growth of India's

shipbuilding ecosystem.

Human Capital and Knowledge Ecosystem

Digital transformation is also enhancing maritime education, training, and skill development. Modern learning management systems, simulation-based training, immersive learning technologies, AI-enabled adaptive learning tools, and digital assessment platforms are being integrated into maritime training institutions. Examination processes have been digitized through online registrations, eligibility verification, computer-based testing, and digital certification systems.

A cloud-based training ecosystem and the establishment of a **Maritime Knowledge Cluster (MKC)** are fostering collaboration among industry, academia, and government institutions. These initiatives support continuous learning, research, innovation, and workforce readiness in an increasingly technology-driven maritime environment.

Smart Maritime Infrastructure and Future Technologies

The adoption of advanced technologies is transforming port and vessel operations. An **Integrated Vessel Traffic Management System (iVTMS)** is being implemented across major ports, incorporating AIS, radar, CCTV, VHF communication systems, and weather data for enhanced vessel monitoring and navigational safety.

Innovative concepts such as **Just-in-Time Arrival Systems** help synchronize vessel arrivals with berth availability, reducing fuel consumption, emissions, and port congestion. **Digital Twin Technology**, currently being piloted at selected ports, creates virtual models of port operations that support real-time monitoring, predictive analytics, and data-driven decision-making.

Other digital infrastructure initiatives include **Long-Range Identification and Tracking (LRIT) systems**, geospatial platforms for maritime security and sustainability monitoring, and the **India Global Maritime Safety Portal (IGMSP)**, which leverages artificial intelligence for safety analytics, incident reporting, and knowledge sharing.

Strategic Significance

The digitalization of the maritime sector is contributing to improved ease of doing business, enhanced transparency, greater operational efficiency, and stronger maritime safety and security. By integrating digital governance, smart infrastructure, advanced analytics, and technology-enabled capacity building, India is creating a future-ready maritime ecosystem aligned with the goals of **Maritime India Vision 2030** and **Maritime Amrit Kaal Vision 2047**. These initiatives position India to emerge as a globally competitive maritime nation driven by innovation, sustainability, and digital excellence.



The Maritime Single Window

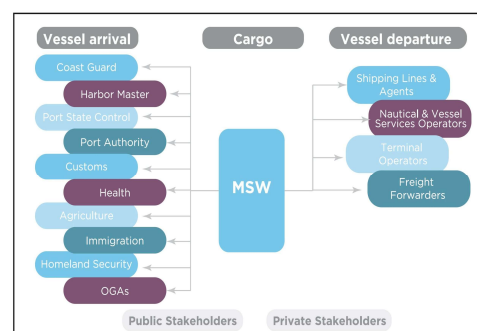


The maritime single window (MSW) is a digital platform designed to streamline and simplify the submission of maritime-related documentation for ships arriving at or departing from ports, as per IMO's mandate.

IT SERVES AS A SINGLE-ENTRY POINT WHERE SHIP-OWNERS, OPERATORS, AND AGENTS CAN ELECTRONICALLY SUBMIT ALL THE REQUIRED INFORMATION (FAL FORMS) TO VARIOUS AUTHORITIES INVOLVED IN MARITIME OPERATIONS.

MARITIME SINGLE WINDOW CAME INTO FORCE FROM 01.01.2024. THE IMPLEMENTATION OF THE MSW ALIGNS WITH THE INTERNATIONAL MARITIME ORGANIZATION (IMO) AND ITS FACILITATION (FAL) CONVENTION, WHICH MANDATES THE ELECTRONIC EXCHANGE OF INFORMATION RELATED TO SHIP ARRIVALS, DEPARTURES, AND CARGO MOVEMENTS.

BY DIGITALIZING THE SUBMISSION AND PROCESSING OF REGULATORY DOCUMENTS, MSW SIGNIFICANTLY REDUCES MANUAL INTERVENTION, THEREBY INCREASING THE SPEED AND ACCURACY OF PORT CLEARANCES AND PROMOTES EASE OF DOING BUSINESS. UPGRADEMENT IS BEING PURSUED AND HAS BEEN MENTIONED IN THE UPCOMING SLIDES.



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The Maritime Single Window

The Maritime Single Window, or MSW, is a transformative digital initiative aligned with the IMO's facilitation convention, aimed at streamlining maritime documentation. This platform, operational since 1 January 2024, acts as a single electronic entry point for ship owners, operators, and agents to submit all required information to the various authorities involved in port operations.

The MSW covers every aspect of a vessel's journey—arrival, cargo operations, and departure—integrating inputs from stakeholders such as the Coast Guard, customs, immigration, and port authorities, as well as shipping lines and terminal operators. By digitizing the submission and processing of regulatory documents, it significantly reduces manual intervention, accelerates port clearances, and promotes ease of doing business.

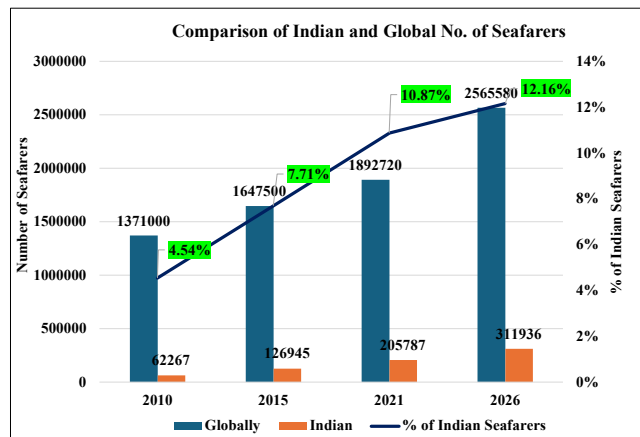
Most importantly, MSW marks a major leap forward for Indian maritime administration, enabling more accurate, efficient, and transparent port operations. Continuous upgradation is underway, reinforcing India's aspirations to meet international best practices and facilitate seamless global maritime trade.



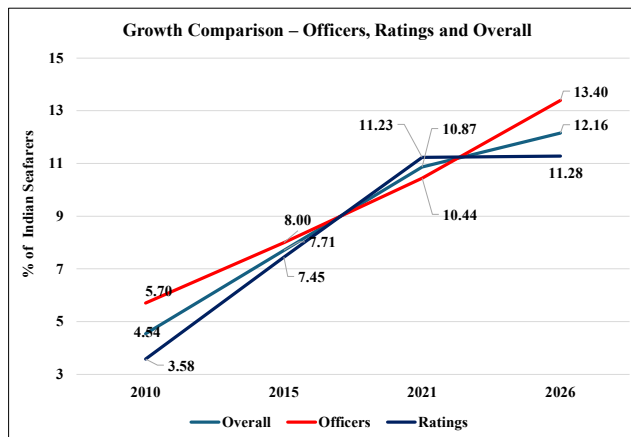
Global Position



India's share of the global **seafarer** workforce has risen consistently over time by **4.54 %** in 2010 to **12.16 %** of global workforce.



India's share of the global **ratings** exhibits the fastest and most pronounced growth, increasing sharply from **3.58 %** in 2010 to **12.16 % of the ratings** in 2026.



India's share of the global **officers** share has grown more gradually, rising from 5.70% in 2010 to **11.28 % of the officers** in 2026

Global Position

The BIMCO/ICS Seafarer Workforce Report 2026 confirms India's emergence as one of the world's leading suppliers of maritime manpower. India's share of the global seafarer workforce has increased significantly from **4.54% in 2010 to 12.16% in 2026**, reflecting sustained growth in the country's maritime training capacity, certification framework and employability of Indian seafarers in the international merchant fleet.

India is now estimated to be the **second-largest supplier of seafarers globally**, with approximately **311,936 Indian seafarers** serving the international fleet, comprising **140,718 officers and 171,218 ratings**. Only the Philippines contributes a larger number of seafarers to the global workforce.

The most notable growth has been in the ratings segment, where India's share of global ratings has increased from **3.58% in 2010 to 11.28% in 2026**, demonstrating India's growing competitiveness across all categories of maritime manpower. At the officer level, India's share has grown from **5.70% to 13.40%** during the same period, highlighting the increasing presence of Indian officers in key operational and leadership positions on board merchant vessels worldwide. The overall growth trajectory is substantially higher than global averages and underscores international confidence in Indian maritime education, training and certification systems.

The findings reinforce India's strategic importance to global shipping at a time when the industry faces a worldwide shortage of qualified officers. As fleet expansion, decarbonisation and digital transformation drive demand for skilled maritime professionals, India is well positioned to play an increasingly important role in meeting global workforce requirements through its extensive network of maritime training institutions and continuous supply of competent seafarer



Gender Inclusivity for Seafarers



Sagar Mein Samman

- Introduced under DGS Order 18 of 2024 to promote gender-inclusive maritime workforce.
- Establishes policy-backed norms for women's safety, equal opportunity, and career advancement.
- Strengthens governance through industry-wide compliance standards and workplace reforms aligned with IMO and UN SDG-5.
- Implemented in collaboration with MUI, supporting a joint framework to empower and protect women seafarers.

Initiatives of DG Shipping to promote women seafarers : ₹1,00,000 are offered via the Maritime Training Trust

Sagar Mein Samman enhance India's maritime regulatory framework by setting structured standards for inclusivity, and safety across the crewing ecosystem

Year on Year growth of Women Seafarers



Year	No. of Women Seafarers (X 1,000)
2021	1.6
2022	3.3
2023	4.8
2024	5.9
2025	7.0

Registered women seafarers increased by **739% from 1,699 in 2015 to 14,255 in 2024** reflecting significant progress in gender inclusion and transformation within the Indian maritime sector.

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Gender Inclusivity for Seafarer's

The concept of gender inclusivity in the seafaring workforce is reflected through policy intervention, financial support, and measurable growth in the participation of women seafarers. The initiative titled **“Sagar Mein Samman”** was introduced under DGS Order 18 of 2024 with the objective of promoting a gender-inclusive maritime workforce. The framework establishes structured norms addressing safety, equal opportunity, and career advancement for women within the maritime sector. It aligns governance and compliance mechanisms with international standards such as the International Maritime Organization guidelines and the United Nations Sustainable Development Goal 5, ensuring that inclusivity is embedded within regulatory and operational practices. The implementation is carried out in collaboration with the Maritime Union of India, thereby integrating institutional support and industry participation to strengthen protection and empowerment measures.

Financial and institutional support mechanisms supplement the policy framework. An allocation of ₹1,00,000 is provided through the Maritime Training Trust to encourage and support women entering the seafaring profession. This financial initiative acts as an enabling factor that reduces

entry barriers and promotes sustained participation in maritime careers.

The growth trend in the number of women seafarers shows a consistent year-on-year increase. The number of women seafarers, measured in thousands, rises from 1.6 in 2021 to 3.3 in 2022, marking a significant increase within one year. This upward trend continues in 2023 with a figure of 4.8, followed by further growth to 5.9 in 2024, and reaching 7.0 in 2025. The steady increase over this five-year period indicates continuous expansion without any decline, reflecting sustained improvement in participation levels.

In terms of long-term growth, registered women seafarers increased from 1,699 in 2015 to 14,255 in 2024. This represents a growth of 739 percent over the period, indicating a substantial expansion in women's representation in the maritime workforce. The increase reflects both policy-driven inclusion and broader structural changes within the sector that support gender diversity.

The combined effect of regulatory intervention, financial assistance, and measurable growth trends indicates a structural shift towards inclusivity. The policy framework under “Sagar Mein Samman” establishes compliance-driven standards, while financial incentives support entry and retention. The year-on-year increase and long-term growth figures demonstrate a consistent rise in participation, indicating that gender inclusivity in the seafaring workforce is being reinforced through coordinated policy, governance, and institutional efforts.



Holistic Wellness For Seafarers



"Sagar Mein Yog" is an initiative by the DGS, Govt. of India, aimed at promoting physical and mental well-being among seafarers through yoga and mindfulness practices.

Sagar Mein Yog

- Introduced under DGS Order 19 of 2024, focusing on mental, physical, and emotional well-being of seafarers.
- Standardizes wellness practices across training institutes via MoU with NUSI.
- Helps reduce stress, fatigue, and medical emergencies enhancing safety compliance.
- Integrates structured wellness modules into Pre-Sea, At-Sea, and Post-Sea stages



[LMS Link](#)

Sagar Mein Yog enhance India's maritime regulatory framework by setting structured standards for wellness across the crewing ecosystem.

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Holistic Wellness For Seafarers

The concept of holistic wellness for seafarers is institutionalized through the initiative "Sagar Mein Yog," introduced under DGS Order 19 of 2024. The framework is designed to address multiple dimensions of well-being, specifically mental, physical, and emotional health, and integrates these aspects into the regulatory structure governing maritime operations. The initiative establishes standardised wellness practices across maritime training institutions through formal collaboration with the Nautical Institute of Shipping (NUSI), ensuring uniform implementation across the training ecosystem.

The structure of the initiative includes the incorporation of wellness modules at all stages of a seafarer's career cycle, including pre-sea training, at-sea service, and post-sea phases. This integration ensures continuity in wellness practices and aligns them with operational requirements and training processes. The framework also addresses operational risks by targeting reductions in stress, fatigue, and medical emergencies, thereby contributing to improved compliance with safety standards and enhancing overall operational efficiency.

The wellness model is multidimensional and covers ten distinct categories. These include physical wellness, which focuses on maintaining bodily health and fitness; emotional wellness, which addresses psychological stability and stress management; and intellectual wellness, which supports cognitive development and learning. In addition, occupational wellness is included to align job satisfaction and work conditions with well-being outcomes, while social wellness emphasises interpersonal relationships and community interaction within the maritime environment.

The model further incorporates environmental wellness, which relates to the seafarer's interaction with surroundings and sustainable practices, and cultural wellness, which acknowledges diversity and cultural inclusion within the workforce. Economic wellness is included to address financial stability and security, while climatic wellness focuses on adaptation to varying environmental and weather conditions experienced at sea. Spiritual wellness is also integrated, contributing to inner balance and mental resilience.

These ten dimensions collectively represent a structured and comprehensive approach to well-being, extending beyond conventional health measures. The framework is supported by digital access through a Learning Management System link, enabling standardized delivery, monitoring, and scalability of wellness programmes across institutions.

The initiative establishes a regulatory and operational linkage between wellness and maritime governance. By embedding these structured standards across the crewing ecosystem, "Sagar Mein Yog" strengthens the overall maritime regulatory framework and ensures that wellness is treated as an essential component of safety, training, and workforce sustainability rather than as an isolated or optional practice.



Ensuring Zero Tolerance to Fraud in Training



Raising issue over the
Call/SMS/WhatsApp

Helpline 24x7

Escalation mechanism
for resolving query

Follow-up
Support and right
guidance

Analysis
& Correction
and recurrence

Efforts to provide awareness through Social Media



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Zero Tolerance in Training

The Directorate's Zero Tolerance initiative aims to strengthen integrity, accountability, and grievance-resolution mechanisms across the maritime training ecosystem. A structured reporting framework enables candidates and stakeholders to raise issues through calls, SMS, or WhatsApp, supported by a dedicated helpline available during defined working hours. Reported concerns follow an escalation pathway that ensures timely resolution, followed by guidance and support to prevent recurrence. Each case undergoes systematic analysis to identify corrective actions and strengthen processes.

To reinforce awareness and transparency, the Directorate actively disseminates information through social media platforms, highlighting regulatory updates, training guidelines, industry initiatives, and best practices. This sustained outreach helps create an informed training environment and encourages candidates to report concerns responsibly, thereby reinforcing a culture of compliance and zero tolerance toward misconduct in maritime training.



Ensuring Zero Tolerance to Corruption in Crewing



- DG Shipping upholds a strict Zero Tolerance policy against corruption, fraud, and unethical practices in all operations.
- Robust systems are implemented to ensure transparency, accountability, and integrity in recruitment and welfare processes:
 - Strict monitoring of RPSL agencies
 - Digital verification mechanisms
 - Clear compliance guidelines
- Awareness initiatives conducted to educate stakeholders on:
 - Identifying corrupt and fraudulent practices
 - Avoiding illegal payments and middlemen
 - Rights and protections of seafarers
 - Reporting mechanisms and grievance redressal
- Strong grievance redressal framework:
 - 24x7 support channels
 - Time-bound resolution of complaints
 - Whistleblower protection measures
- Continuous audits and inspections to:
 - Detect irregularities
 - Enforce compliance standards
 - Strengthen systemic quality assurance
- DG Shipping ensures that quality and integrity go hand-in-hand, creating a corruption-free ecosystem for seafarers' welfare.



Beware of Fake Indian Seafarers Jobs | 5 Red Flags Explained by DG Shippi...



Seafarers' Rights—Know and Protect Yourself | Capt. Nitin...

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Ensuring Zero Tolerance In Crewing

Ensuring fairness, transparency, and ethical conduct in seafarer recruitment and crewing is a core priority of India's maritime administration. The Directorate General of Shipping (DG Shipping) follows a strict zero-tolerance policy against fraud, cheating, and illegal recruitment practices to safeguard the rights, welfare, and professional interests of seafarers. To strengthen awareness and preventive action, a nationwide digital outreach campaign has been launched through DG Shipping's official communication channels. The campaign focuses on educating seafarers about fraudulent agents and job offers, unauthorized payments to recruitment and placement service providers, statutory rights and entitlements, and the availability of 24x7 grievance redressal mechanisms. These initiatives are designed to empower seafarers with accurate information and enable informed decision-making. In addition to digital engagement, DG Shipping has complemented the campaign with on-ground symposia and stakeholder interactions focused on seafarer recruitment and welfare.

By combining policy enforcement, awareness generation, and structured grievance redressal, the initiative aims to prevent exploitation, promote ethical crewing practices, and reinforce confidence in India's maritime regulatory framework



24 x 7 Grievance Redressal System



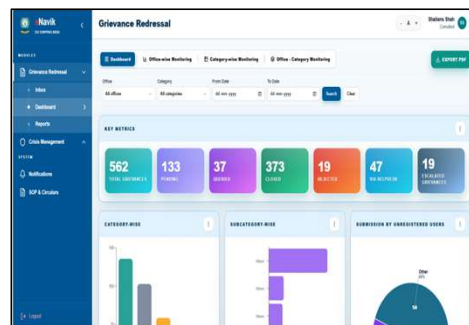
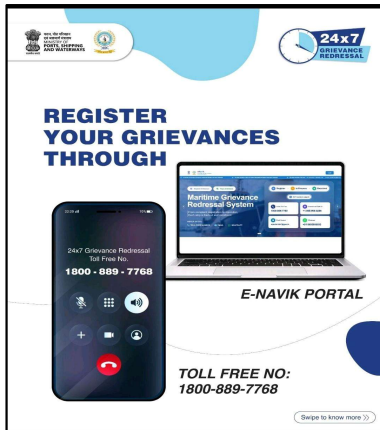
DGS System to provide a single digital platform for 24x7 effective lodging, tracking, and resolution of seafarer grievances.

Aim

- Streamlined and transparent grievance management
- Enhanced accountability and efficiency
- Timely redressal of issues
- Centralized database for analytics and improvement

Current Status

- eNavik Portal has went live for beta release on 15.05.2026. (<https://beta-enavik.dgma.gov.in/>)
- Extensive Social Media Campaign is currently ongoing since 15.05.2026 and will be live till 23.06.2026
- Go-live is expected for August 2026



24x7 Grievance Redressal Module



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24×7 Grievance Redressal System

The 24×7 Grievance Redressal System is designed as a centralized digital platform developed by the Directorate General of Shipping to enable continuous, end-to-end handling of seafarer grievances. The system supports round-the-clock lodging, tracking, and resolution of complaints through a unified interface, ensuring uninterrupted accessibility and operational continuity.

The primary objective of the system is to streamline grievance management by introducing a transparent and structured mechanism. It enables improved accountability by recording each stage of complaint handling within a centralized database. The system enhances efficiency by minimizing manual processes and allows timely redressal through defined workflows and monitoring features. In addition, the centralized repository of grievance data supports analytics, enabling identification of recurring issues and facilitating policy-level improvements.

The platform operates through the eNavik portal, which serves as the digital interface for users to register and monitor grievances. The portal has been

launched in a beta version on 15 May 2026, with a dedicated online access link for users. A social media outreach campaign commenced on the same date and is scheduled to continue until 23 June 2026 to promote awareness and adoption of the system. Full-scale operational deployment is expected in August 2026, marking the transition from beta testing to complete implementation.

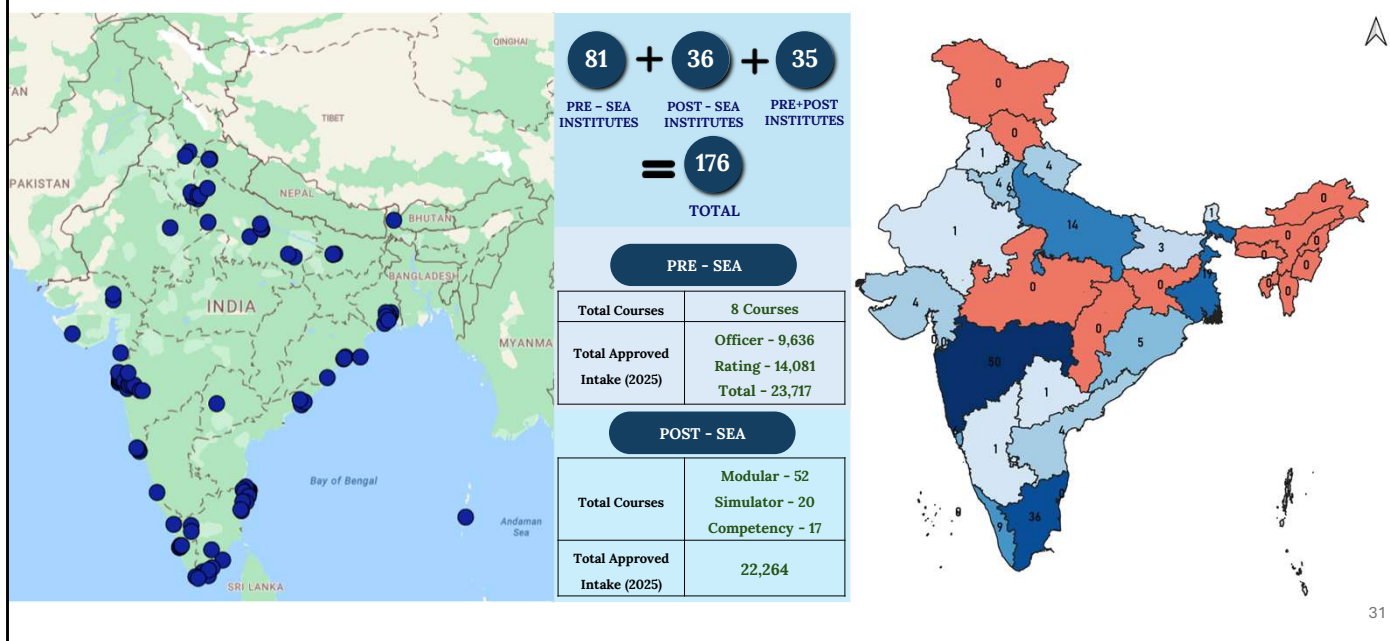
The grievance redressal process is supported by multiple access channels. Users can register complaints digitally through the portal interface, while additional support is provided via a 24×7 toll-free helpline number, 1800-889-7768. The interface allows for real-time tracking of complaint status and progress, ensuring visibility at each stage of resolution. The system also integrates backend dashboards that display key operational metrics, including the number of grievances received, pending cases, resolved cases, rejected cases, and escalations, enabling performance monitoring and administrative oversight.

The system emphasizes continuous availability and responsiveness, highlighted by the operational model of “always on” and “always responsive.” It ensures that grievances can be submitted and processed at any time without dependency on manual office hours. The integration of digital tools enables automated routing, categorization, and escalation of complaints, ensuring structured handling and timely intervention where required.

Overall, the 24×7 Grievance Redressal System establishes a comprehensive framework for grievance management within the maritime sector. By integrating digital access, centralized monitoring, real-time tracking, and structured workflows, the system strengthens transparency, accountability, and efficiency in addressing seafarer concerns while supporting data-driven improvements in governance and service delivery.



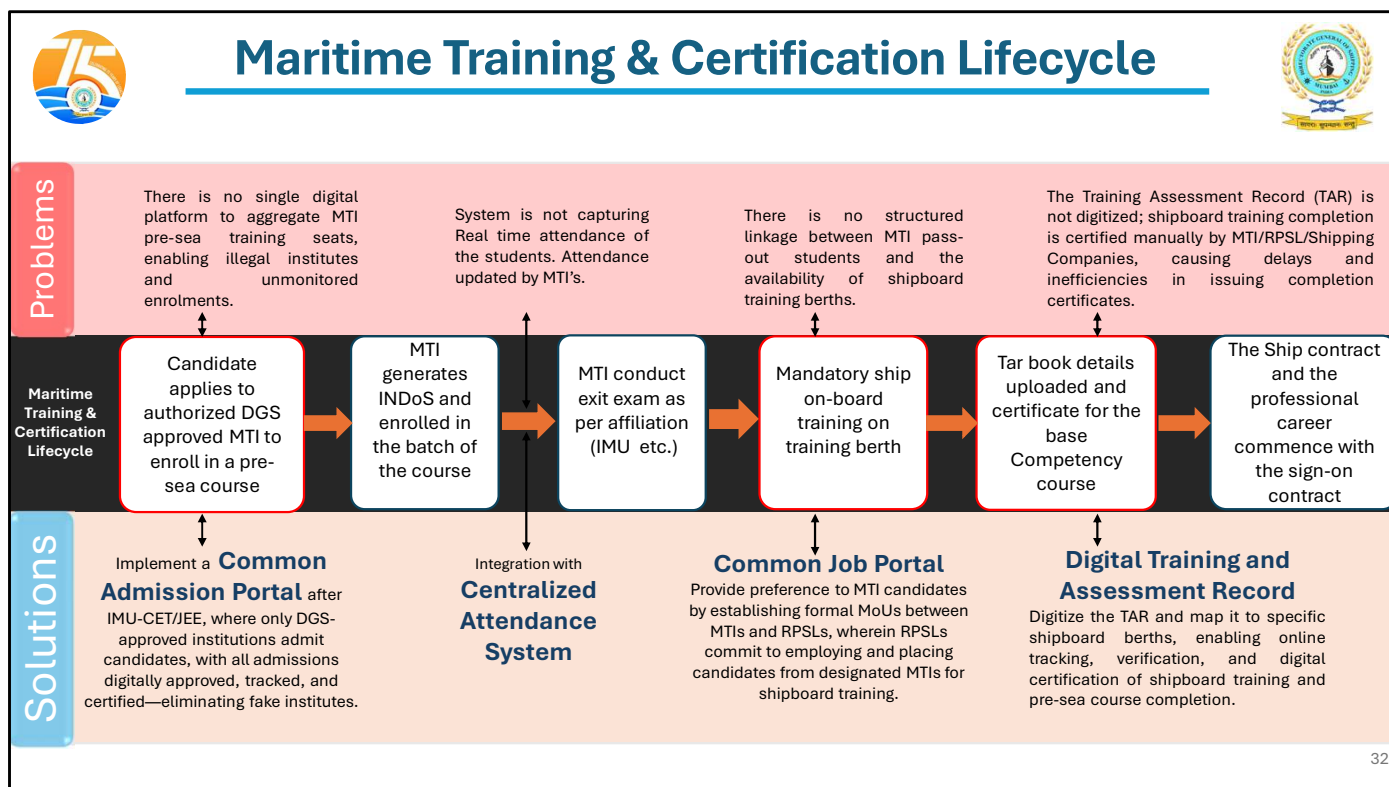
Maritime Training Institutes in India



Maritime Training Institutes (MTIs)

India currently has a total of 176 MTIs, comprising 81 pre-sea institutes, 36 post-sea institutes, and 35 institutes offering both pre- and post-sea training. The geographical distribution indicates a strong concentration of institutes along coastal states, particularly in Maharashtra, Tamil Nadu, and Kerala, reflecting proximity to maritime operations, ports, and industry demand. Inland states have comparatively fewer institutes, though their presence supports wider national participation in maritime careers.

In terms of training capacity, pre-sea institutes offer 8 courses with an approved annual intake of 23,717 candidates, including 9,636 officer trainees and 14,081 ratings, forming the primary pipeline for new entrants into the sector. On the other hand, post-sea training focuses on skill upgradation and certification, with 89 specialized courses (modular, simulator, and competency-based) and an approved intake of 22,264 candidates.



Maritime Training & Certification Lifecycle

The maritime training and certification ecosystem currently faces several challenges, including the lack of a unified digital platform for aggregating MTI pre-sea training seats, absence of real-time attendance tracking, weak linkage between MTIs and shipping berths for onboard training availability, and a manual, non-digitized Training Assessment Record (TAR) system that delays certification. These issues lead to unregulated admissions, inefficiencies, and gaps in tracking candidate progress across the training lifecycle.

To address these challenges, a structured digital lifecycle has been proposed. The process begins with candidates applying only through a centralized Common Admission Portal, ensuring admissions are restricted to DGS-approved MTIs. Once enrolled, MTIs digitally generate INDoS numbers and manage course batches. Attendance is recorded through an integrated Centralized Attendance System, while exit examinations are conducted as per institutional affiliations. A Common Job Portal strengthens industry linkage by enabling RPSLs to prioritize candidates from approved MTIs for shipboard training. Digitizing the Training and Assessment Record further ensures accurate tracking of onboard training, timely verification by shipping

companies, and faster issuance of competency certifications.

Together, these reforms aim to establish a transparent, digitally connected, and efficient maritime training pathway from admission to certification enhancing oversight, accountability, and career progression for seafarers.



STCW Compliance Board



- The Merchant Shipping (STCW) Rules 2026 introduce updated national standards for training, certification, and watchkeeping of seafarers, fully aligned with the latest IMO and STCW Code amendments.
- These rules strengthen competency requirements, integrate new safety and anti-harassment training mandates effective from 2026, and ensure Indian seafarers meet globally harmonized qualification benchmarks.

The new chapter includes the following key provisions:

- **Authority to Approve and Administer MTIs & Training Programs:** Establishes formal powers for approving MTIs, regulating their operations, and overseeing all STCW-related training activities.
- **Provisions for Suspension or Withdrawal of Approval:** Enables corrective action against MTIs that fail to meet prescribed standards, ensuring compliance and safeguarding training quality.
- **Constitution of an STCW Compliance Board:** Introduces a structured body responsible for monitoring adherence to STCW requirements and recommending disciplinary or corrective measures.
- **Action Against Unauthorized Institutions or Individuals:** Empowers authorities to take strict action against unapproved entities or persons conducting maritime training or examinations unlawfully.
- **Support from Police or Law-Enforcement Agencies:** Provides legal backing to seek assistance from law-enforcement bodies for investigations, enforcement, and closure of unauthorized activities.

- India has the opportunity to host the STCW Comprehensive Review Diplomatic Conference in 2031-32 where the 22 identified areas for revision around technological advancements, seafarer well-being, and operational flexibility shall be amended.

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STCW Compliance Board

The Merchant Shipping (STCW) Rules, 2026 introduce updated national standards governing the training, certification, and watchkeeping of seafarers in India. These rules are fully aligned with the latest amendments to the International Maritime Organization (IMO) and STCW Code, ensuring global consistency and recognition. The revised framework strengthens competency requirements and incorporates new mandates on safety and anti-harassment training, effective from 2026. It aims to ensure that Indian seafarers meet internationally harmonized qualification benchmarks and maintain high professional and ethical standards.

A key feature of the new rules is the establishment of a structured **STCW Compliance Board** to oversee adherence and enhance regulatory effectiveness. The major provisions include:

- 1. Authority to Approve and Administer MTIs & Training Programs:**
Grants formal powers to approve Maritime Training Institutes (MTIs), regulate their functioning, and supervise all STCW-related training activities.
- 2. Provisions for Suspension or Withdrawal of Approval:**
Enables corrective actions against MTIs that fail to comply with prescribed standards, ensuring quality and accountability in training delivery.
- 3. Constitution of an STCW Compliance Board:**

Establishes a dedicated body responsible for monitoring compliance with STCW requirements and recommending disciplinary or corrective measures where necessary.

4. Action Against Unauthorized Institutions or Individuals:

Empowers authorities to take strict action against unapproved entities or persons conducting maritime training or examinations unlawfully.

5. Support from Police or Law-Enforcement Agencies:

Provides legal backing to seek assistance from enforcement agencies for investigation, compliance enforcement, and closure of unauthorized activities.

Overall, these measures reinforce regulatory oversight, improve training quality, and support India's commitment to maintaining globally competitive maritime standards

Strategic Outlook

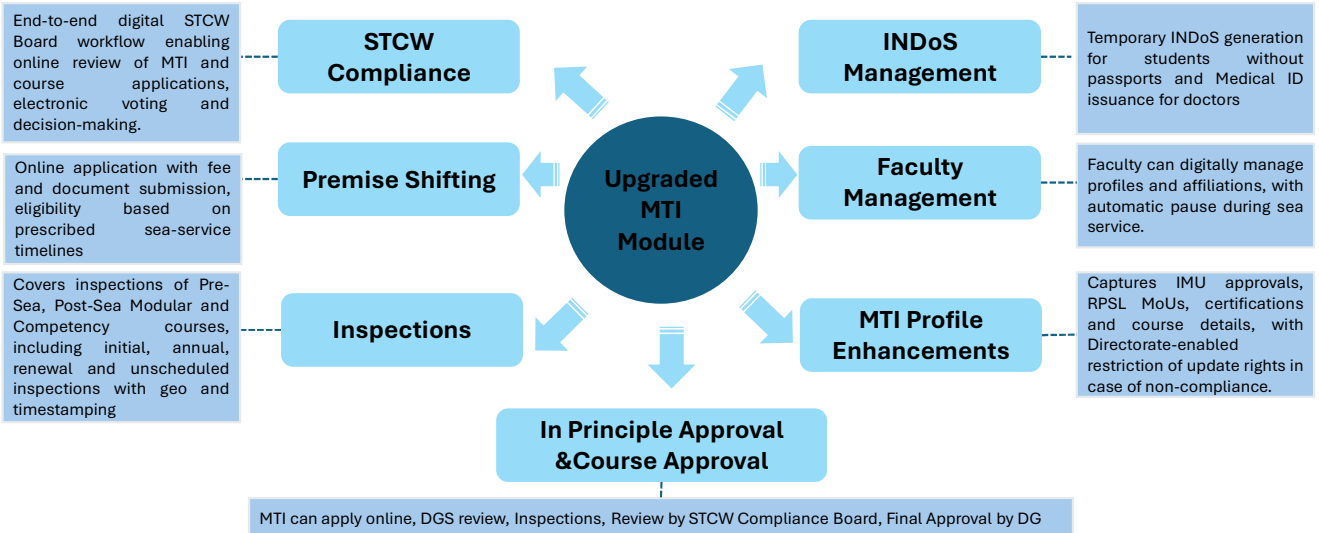
India is positioned to host the STCW Comprehensive Review Diplomatic Conference in 2031–2032. This presents an opportunity to contribute to global maritime regulatory reforms, including updates related to technological advancements, seafarer welfare, and operational flexibility.



Maritime Training Institute Module



Aims to enhance efficiency, compliance, and transparency in the **Maritime Training Institutes (MTI)** ecosystem through digital automation and seamless integration.



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MTI Module

The Maritime Training Institute (MTI) Module is designed to improve efficiency, compliance, and transparency across the MTI ecosystem through digital automation and seamless integration of processes. The system operates as an upgraded, centrally connected module that integrates multiple functional areas into a single digital workflow, ensuring standardization and traceability across all stages of institutional management and regulatory oversight.

The module incorporates STCW compliance through an end-to-end digital workflow managed by the STCW Compliance Board. This enables online review of Maritime Training Institutes and course applications, supported by electronic documentation, digital voting mechanisms, and structured decision-making processes. The shift to a digital framework reduces manual intervention and ensures consistency in evaluation and approval procedures. The premise shifting function operates through an online application system that facilitates submission of fees and documents, with eligibility determined based on prescribed sea-service timelines. This feature introduces a rule-based validation mechanism, ensuring that applications adhere strictly to defined regulatory criteria and timelines before being processed further.

The inspections component covers pre-sea, post-sea modular, and competency courses, and includes multiple inspection types such as initial, annual, renewal, and unscheduled inspections. The process is supported by geo-tagging and time-stamping, allowing accurate recording of inspection

activities and strengthening accountability and monitoring within the system.

The INDoS management function supports temporary INDoS generation for students without passports and enables the issuance of Medical ID for doctors. This ensures continuity in candidate processing and reduces delays arising from documentation gaps, thereby maintaining workflow efficiency.

Faculty management is handled digitally through profile and affiliation management systems. The module allows automatic pausing of faculty records during sea service, ensuring accurate representation of active teaching staff and maintaining compliance with institutional requirements.

MTI profile enhancements include centralized capture of IMU approvals, RPSL Memorandums of Understanding, certifications, and detailed course information. The system incorporates Directorate-level controls that restrict the ability to update records in cases of non-compliance, ensuring that regulatory enforcement is embedded directly into the platform.

The module also integrates the process for in-principle approval and course approval within a unified workflow. Maritime Training Institutes can submit applications online, followed by Directorate General of Shipping review, inspection stages, evaluation by the STCW Compliance Board, and final approval by the Director General. This structured process ensures continuity, transparency, and accountability at every stage of approval.

Overall, the upgraded MTI Module establishes a comprehensive digital framework that connects compliance, inspections, institutional management, and approval processes into a single system. The integration of automated workflows, validation mechanisms, and centralized data management enhances operational efficiency while ensuring adherence to regulatory standards across the maritime training

ecosystem.



Common Admission Portal



What is a Common Admission Portal ?

- A single, centralized digital platform for all students seeking admission to DG Shipping–approved Maritime Training Institutes (MTIs).
- Enables a uniform, transparent, and merit-based admission process for pre-sea maritime courses across India.
- Provides standardized eligibility checks, online applications, document verification, and merit ranking.
- Ensures admissions only to approved MTIs, courses, and sanctioned intake capacities, maintaining regulatory compliance.
- Offers real-time visibility to DG Shipping on admissions, seat allocation, and institute performance.

Stakeholder	Key Responsibilities
Students	Apply for courses, upload documents, track admission status
Maritime Training Institutes (MTIs)	Verify applications, manage course intake & batches, approve admissions
DGMA	Monitor institute-wise admissions, ensure compliance with approved intake capacity
Portal Administrators	Manage system operations, control user access

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Common Admission Portal

The Common Admission Portal is structured as a centralized digital system designed to regulate and standardize the admission process for students seeking entry into DG Shipping–approved Maritime Training Institutes across India. The platform operates as a single-point interface through which all admission-related activities are conducted, ensuring consistency, transparency, and uniformity in the selection process for pre-sea maritime courses. It integrates multiple functional components including application submission, eligibility evaluation, document verification, and merit-based ranking within a unified digital workflow.

The system enables students to apply for courses through an online interface, where they can upload required documents and track the status of their applications in real time. The process is governed by predefined eligibility criteria, ensuring that only qualified candidates are considered for admission. The inclusion of merit-based ranking ensures that admissions are determined objectively, based on standardized evaluation parameters rather than manual or decentralized decision-making.

Maritime Training Institutes are assigned defined operational responsibilities within the system, including verification of student applications, management of course intake and batch allocation, and approval of admissions in alignment with institutional capacity. The platform enforces adherence to sanctioned intake limits, ensuring that admissions do not exceed approved capacities for each course and institute. This mechanism ensures regulatory compliance and prevents over-enrolment.

DG Shipping functions as the central monitoring authority within the portal, with real-time visibility over institute-wise admissions, seat allocation, and overall system activity. This oversight capability enables continuous monitoring of compliance with regulatory guidelines and approved capacities, while also supporting data-driven decision-making and policy enforcement. The availability of centralized data allows for performance tracking and evaluation across institutions.

The system also incorporates administrative controls that allow portal administrators to manage system operations and user access, ensuring secure and efficient functioning of the platform. These controls support governance, maintain system integrity, and regulate access to sensitive information.

Overall, the Common Admission Portal establishes a structured, technology-driven framework for maritime admissions by integrating students, training institutes, and regulatory authorities within a single system. It ensures standardization of procedures, enforcement of compliance requirements, transparency in selection, and continuous monitoring of institutional performance through centralized and automated processes



Examination/Assessment and Certification Reforms: CoC (Written and Oral)



End-To-End Digitized

1. **User Registration**
2. **Eligibility Assessment**
3. **Seat Booking**
4. **Misconduct**
5. **Conduct of Examination**
6. **Evaluation & Re-evaluation**
7. **Data Storage**
8. **Question Bank & Question Paper**



Objective

- To create a secure, transparent, fully digital examination system for the competency assessment and certification of seafarers



Scope

- Covers the full examination lifecycle: from registration to certificate issuance
- Includes both written and oral examinations in hybrid or CBT mode



Core Features

- Biometric verification, CCTV surveillance, online proctoring
- Encrypted question papers & scanned answer scripts and grievance redressal & feedback mechanisms from candidates



Impact

- Uniform candidate experience across all MMDs
- Improved exam integrity, operational efficiency, and transparency

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Examination/Assessment and Certification Reforms: CoC (Written and Oral)

The Examination, Assessment, and Certification reforms for Certificates of Competency (CoC), covering both written and oral examinations, establish a fully digitized and integrated system that encompasses the entire examination lifecycle. The framework operates as an end-to-end digital process beginning with user registration, followed by eligibility assessment, seat booking, monitoring of misconduct, conduct of examinations, evaluation and re-evaluation, data storage, and management of the question bank and question paper generation. Each stage is structured within a unified digital platform, ensuring continuity, traceability, and standardization across all examination-related activities.

The system initiates with user registration, where candidates are onboarded into the digital platform. This is followed by eligibility assessment based on predefined regulatory criteria, ensuring that only qualified candidates proceed to the examination stage. Seat booking is managed digitally, enabling candidates to select examination slots in a structured and transparent manner. The framework also incorporates mechanisms to detect and address

misconduct during the examination process, ensuring adherence to rules and maintaining the integrity of assessments.

The conduct of examinations is managed through digital and hybrid modes, including Computer-Based Testing and structured oral examinations. The evaluation process is also digitized, with provisions for re-evaluation to ensure fairness and accuracy in results. All examination data is stored in a centralized system, enabling secure record-keeping, data retrieval, and audit capabilities. The question bank and question paper generation are integrated into the system, ensuring controlled access, standardization, and security in the preparation and distribution of examination content.

The objective of the reform is to create a secure, transparent, and fully digital examination system for the competency assessment and certification of seafarers. This objective is achieved through the implementation of technology-driven processes that eliminate manual inefficiencies and introduce consistent standards across all stages of examination and certification.

The scope of the system extends across the entire examination lifecycle, from initial registration to the issuance of certificates. It includes both written and oral examinations, conducted through hybrid or computer-based modes, ensuring flexibility while maintaining uniform standards. The system is designed to function across all Maritime Mercantile Departments (MMDs), ensuring nationwide consistency in examination practices.

Core features of the system include biometric verification for candidate authentication, CCTV surveillance, and online proctoring to monitor examination conduct. Question papers are encrypted to ensure confidentiality, while answer scripts are digitized through scanning for secure evaluation. The system also includes mechanisms for grievance redressal and feedback from candidates, ensuring that concerns are addressed within the same digital ecosystem.

The impact of these reforms is reflected in the creation of a uniform candidate experience across all examination centres, reducing regional variations in procedures. The integration of digital tools enhances examination integrity by minimizing the risk of malpractices, while also improving operational efficiency through automated processes.

Transparency is strengthened through real-time monitoring, secure data handling, and traceable workflows, ensuring accountability at each stage of the examination and certification process.



Training Ecosystem



The Training Ecosystem Vision aims to establish a unified, cloud-based digital platform with its components supporting the objectives outlined in MIV-2030 and AKAM-2027, thereby strengthening maritime education and training.

Key Features

- Integration of 7 critical modules (e.g., Faculty Development, LMS, Web-Based Simulators) into one cohesive system.
- Real-time oversight and advanced technology for secure, transparent processes.

Current Status

- The RFP was published on 13th April. Multiple queries have been received from seven vendors in response to the RFP. Response for the queries received is being prepared.

Outcome of the Training Ecosystem RFP

- Selection of a Master System Integrator to deliver an integrated training ecosystem, improving maritime training, skilling, certification, and overall efficiency.



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Training Ecosystem

1. Training Ecosystem Vision

The Training Ecosystem envisions the creation of a unified, cloud-based digital platform to regulate, monitor, and modernize maritime training, certification, and skill development. The objective is to bring all stakeholders—training institutes, faculty, trainees, regulators, and certifying authorities—onto a single integrated system, ensuring consistency, compliance, transparency, and quality enhancement across the maritime training landscape.

2. Key Features

The proposed ecosystem integrates seven critical modules, including Learning Management Systems (LMS), Faculty Development, Web-Based Simulators, AR/VR-based training, centralized attendance, certificate validation, and digital training & assessment records, into one cohesive digital framework. The platform enables real-time oversight, data-driven decision-making, and secure, transparent operational processes through advanced technology and centralized governance.

LMS-The LMS is a secure, DGS-compliant e-learning platform for standardized

maritime training which ensures training integrity through real-time tracking, anti-cheating controls, and assessment access only after full course completion.

Web Based Simulation-A web-based simulator provides an immersive, interactive platform that replicates real-world maritime scenarios for effective learning and assessment.

Digital Tar-The Training and Assessment Record (TAR) Book is a mandatory document that records and verifies a seafarer's structured onboard training and practical competencies.

CAS 2.0-The Centralized Attendance System (CAS) uses facial biometrics to securely verify the presence of candidates, faculty, and administrators across Maritime Training Institutes.

OMCV-Online Marine Certificates Verification (OMCV) is a digital platform that enables secure upload, verification, and digital stamping of maritime certificates to ensure authenticity.

FDP-A Faculty Development Program (FDP) is a structured initiative designed to upgrade teaching skills, subject expertise, and professional competencies of faculty members through continuous learning and assessment.

AR/VR-Augmented Reality (AR) and Virtual Reality (VR) are immersive digital technologies designed to deliver realistic, interactive experiences for training, learning, and operational simulation. These technologies enhance engagement, situational awareness, and skill development.

Outcome of the Training Ecosystem RFP

The RFP aims to facilitate the selection of a **Master System Integrator** responsible for designing, developing, and implementing the integrated Training Ecosystem. The successful implementation is expected to enhance maritime training quality, enable standardized skilling and certification, improve regulatory oversight, and significantly increase overall system efficiency.



Indian Global Maritime Safety Platform

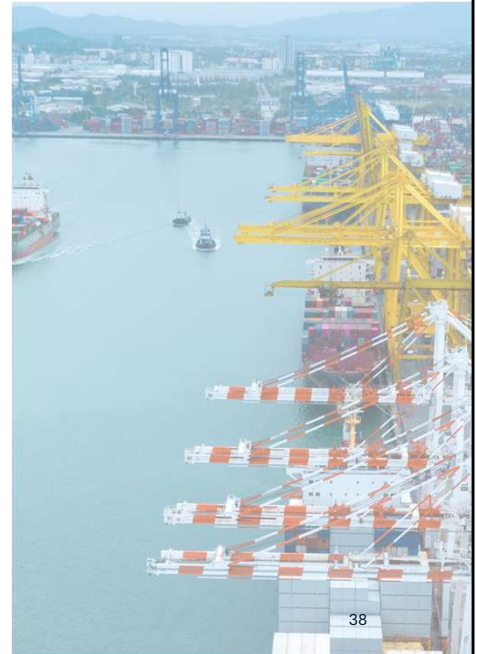


Purpose

To establish a unified digital platform that improves maritime safety, promotes risk-free professional practices, and aligns with international standards and India's maritime vision.

Objective

- 01 Deliver real-time safety dashboards and analytics across devices.
- 02 A multilingual repository for circulars, advisories, and IMO guidelines.
- 03 Host 30–40 animated safety videos over 3 years, integrated into a learning system.
- 04 An AI-driven maritime incident database using tools like Power BI/Tableau.
- 05 Support the “Zero Incident” vision through training, compliance, and real-time monitoring.



Indian Global Maritime Safety Platform – Background Note

Purpose

The Indian Global Maritime Safety Platform is envisioned as a comprehensive and unified digital initiative aimed at strengthening maritime safety across the sector. The platform seeks to enhance operational safety standards by promoting risk-free professional practices while aligning closely with international maritime regulations and India's broader maritime vision. By integrating modern digital capabilities with safety-focused objectives, the initiative aspires to create a centralized ecosystem that supports informed decision-making, knowledge dissemination, and continuous improvement in maritime operations.

Real-Time Safety and Analytics

At its core, the platform is designed to deliver real-time safety dashboards and analytics that can be accessed seamlessly across multiple devices. This capability will enable stakeholders to monitor key safety indicators, respond promptly to emerging risks, and make data-driven decisions that improve operational safety and efficiency across maritime activities.

Centralized Knowledge Repository

The platform will function as a multilingual repository that consolidates essential maritime resources, including circulars, advisories, and guidelines issued by the

International Maritime Organization. This centralized access to critical information will help ensure that maritime professionals, regardless of location or language, can stay informed and compliant with the latest safety standards and regulatory requirements.

Digital Learning and Capacity Building

To strengthen training and awareness, the initiative proposes the development of approximately 30 to 40 animated safety training videos over a period of three years. These resources will be integrated into a structured digital learning system, enabling continuous skill development, improved safety awareness, and better adherence to standard operating procedures across the maritime community.

AI-Driven Incident Management

The platform also incorporates advanced technologies through the creation of an AI-driven maritime incident database. Leveraging tools such as Power BI and Tableau, the system will support data visualization, pattern recognition, and predictive analysis. This will enhance incident reporting, improve safety insights, and enable proactive measures to prevent future occurrences.

Zero Incident Vision

Ultimately, the initiative is aligned with the vision of achieving “Zero Incidents” by fostering a culture of safety across the maritime sector. This will be realized through a combination of continuous training, robust compliance mechanisms, and real-time monitoring, ensuring a safer, more resilient, and future-ready maritime ecosystem.



Safety First – Suraksha Sarvapratham

“Safety is not a procedure; it is a mindset. The Directorate General of Shipping is embedding this mindset across the maritime sector through the Suraksha Sarvapratham campaign — safety, above all else.”

This national safety initiative reflects DGS’s long-term commitment to **zero-incident maritime operations**. The campaign, titled **Suraksha Sarvapratham**, focuses on creating a **proactive and preventive safety culture** among seafarers and port professionals alike.

The objective is :

To reduce accidents and minimise risks aboard ships, by moving from incident response to risk anticipation.

To institutionalise a continuous learning ecosystem, using web-based training and AI-enabled awareness tools.

To strengthen the safety reporting and documentation process, so that every incident, however small, contributes to systemic improvement.

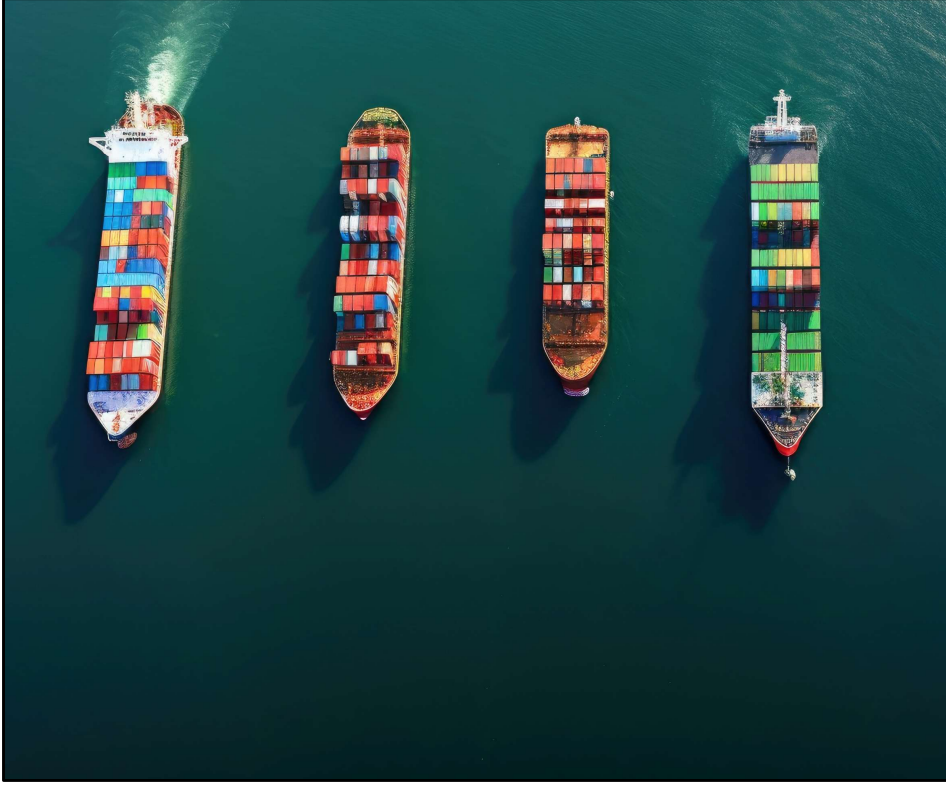
Every accident is now to be **systematically recorded and analysed**. Not only to determine cause, but to identify recurring patterns and areas for early intervention. These insights will feed into **preventive strategies**, emergency preparedness plans, and the upcoming **Maritime Safety Information System**.

On the human-capital side, **free online safety courses** and **LMS-based training modules**

are being developed to ensure accessibility for all ranks of seafarers. This includes visual learning aids, case-based lessons, and **AI-based safety videos** — practical, interactive, and available on-demand.

The larger aim is to **instil safety as a professional value**, rather than as a compliance requirement. When every officer, rating, or pilot treats safety as integral to their duty, we move closer to a self-sustaining safety culture across ships and ports.

“Through Suraksha Sarvpratham, India’s maritime workforce will lead by example — demonstrating that growth and safety are not trade-offs, but partners in progress.”



**संगच्छध्वं
संवदध्वं
सं वो मनांसि
जानताम्।**

*"Move together,
speak together,
may your minds
be in harmony."
(Rigveda 10.191.2)*



Ministry of Ports,
Shipping & Waterways
Government of India

