COMARSEM 26

Directorate General of Shipping

30th January 2026 | Vivanta, Kochi

India's Economic Growth and the Significance of Maritime Domain

$4.19 Trillion

Indian GDP

World's 4th largest economy

6.5 %
(FY 25)

GDP Growth

projected 6.3–6.7% annual growth through coming years

$5 Trillion
by 2027-28

GDP Target

IMF projects India will surpass Germany by 2028, becoming the world's 3rd largest economy

The Maritime sector facilitates

95%
Trade by Volume

70%
Trade by Value

Maritime sector contributes to 4-5% of the GDP

Contribution of the Blue Economy

Towards Viksit Bharat 2047

India and its Blue Economy

95%
By trade volume

70%
By trade value

India's Infrastructure Leverages

12
Major Ports

200+
Non-major Ports

11,098 km
Total length of India's coastline

India's Vessel Advantage

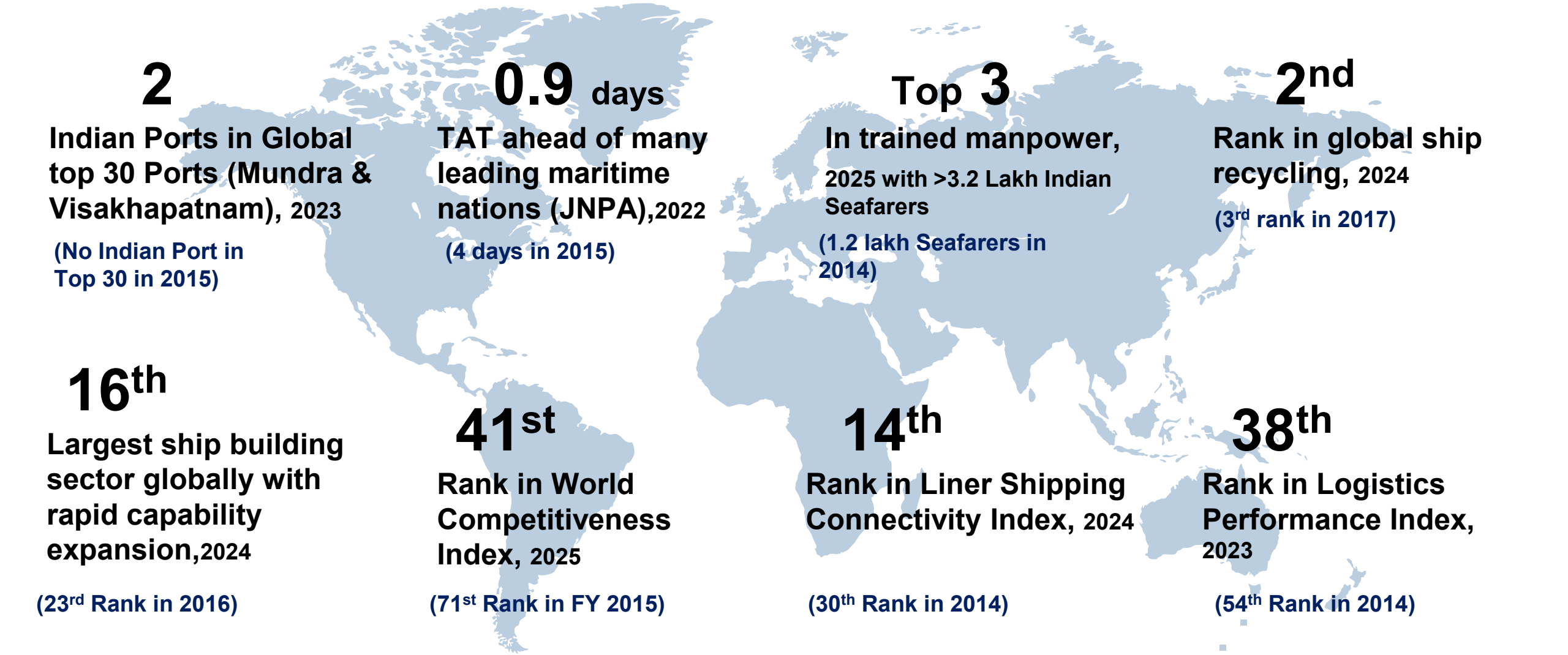
India has 1,520+ merchant vessels with 13 mn+ GT capacity

India ranks 18th globally in flag registration and 19th globally in carrying capacity

India is emerging as the leader of the Blue Economy in the world with multiple initiatives focusing on infrastructure, business and the overall economy

- Port-led Development
- Ports for Prosperity
- Policy reforms driving EoDB, modern infrastructure and multi-modal logistics

Global Competitiveness



2

Indian Ports in Global top 30 Ports (Mundra & Visakhapatnam), 2023

(No Indian Port in Top 30 in 2015)

0.9 days

TAT ahead of many leading maritime nations (JNPA),2022

(4 days in 2015)

Top 3

In trained manpower, 2025 with >3.2 Lakh Indian Seafarers

(1.2 lakh Seafarers in 2014)

2nd

Rank in global ship recycling, 2024

(3rd rank in 2017)

16th

Largest ship building sector globally with rapid capability expansion,2024

(23rd Rank in 2016)

41st

Rank in World Competitiveness Index, 2025

(71st Rank in FY 2015)

14th

Rank in Liner Shipping Connectivity Index, 2024

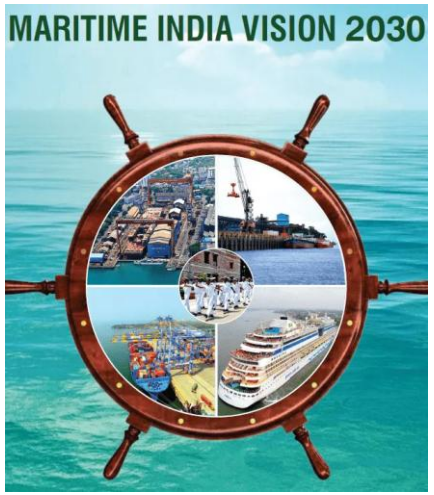
(30th Rank in 2014)

38th

Rank in Logistics Performance Index, 2023

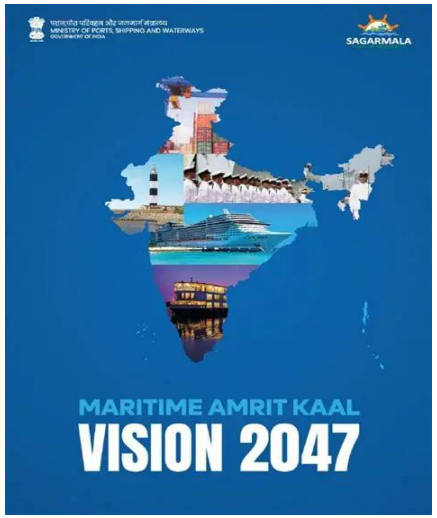
(54th Rank in 2014)

India’s Vision for the Maritime Sector



Maritime India Vision (MIV) 2030

- Position India Globally in the Top 10 Shipbuilding, repair nations (from 30k GT to 500k + GT.
- Renewable Energy Share at Major Ports : >60%
- Promote Waste to Wealth through ship recycling. India from #2 to #1 ship recycling nation.
- Encourage green belt development (plantations) : Atleast 33% of port area
- Investment: INR 20,000+ Crores
- Employment Generation: 1,00,000+ additional jobs (direct and indirect)

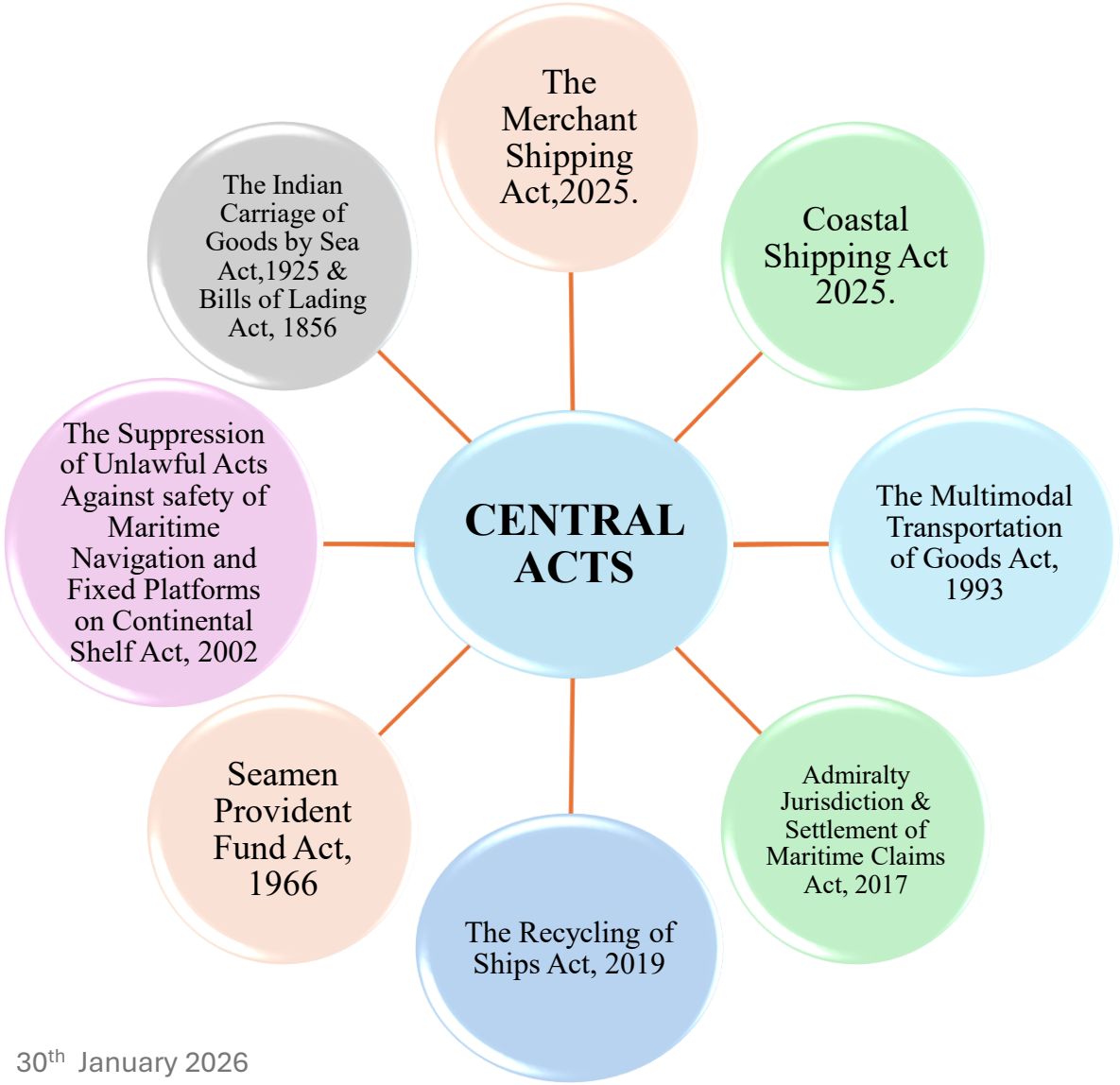


Maritime Amrit Kaal Vision 2047

- Advanced phase targeting Top 5 global position in shipbuilding and maintaining 1 position in ship recycling
- Carbon neutral ports (green fuel, electrification, SPS). ≥ 60 % renewable-energy share, create hydrogen hubs, emission & resource monitoring toolkits for ports.
- Promote Alternate/ Green Fuels, Bunkering infrastructure, green framework for terminal operations, introduce incentives in port duties for low emission vessels .
- 300+ Strategic Initiatives across 11 key maritime areas
- Financial Assistance: 20-30% assistance for green vessels (including retrofitting)

Mercantile Marine Legislation

Overview



Mercantile Marine Legislation

New Shipping Laws 2025

Modernizing India's maritime legal framework to align with global standards & boost ease of doing business

Five Key Acts (2025):

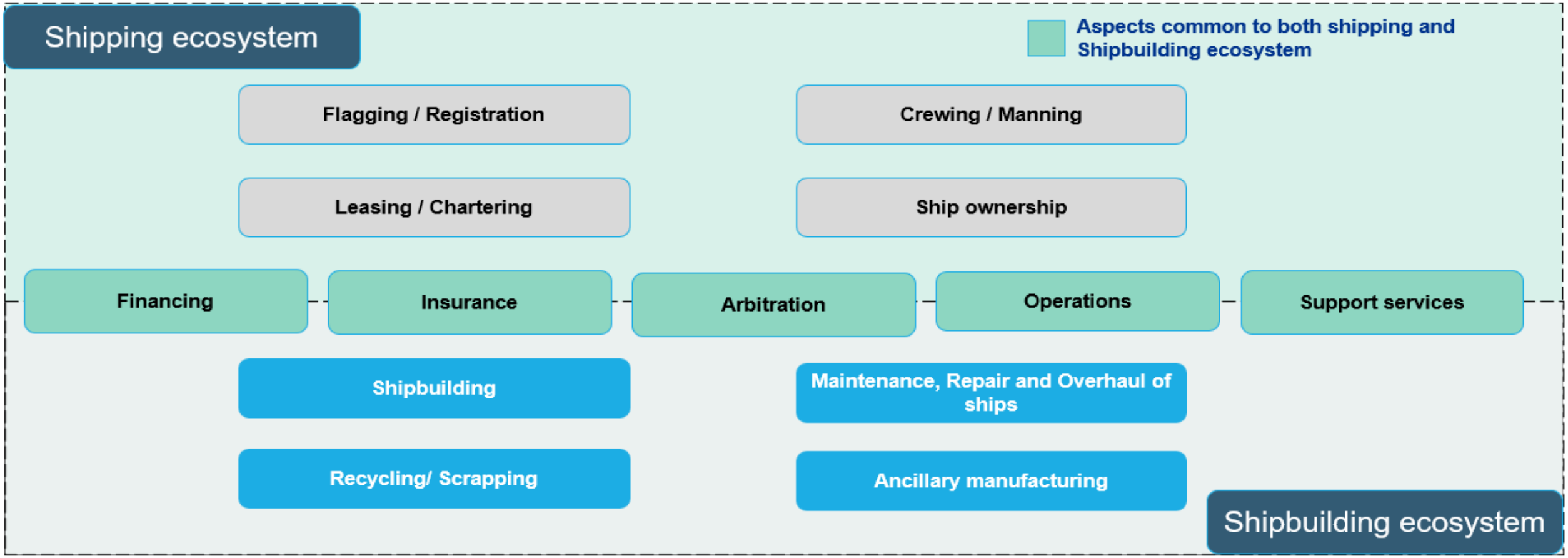
- Bills of Lading Act, 2025
  - Replaces the 1856 law with a modern framework for bills of lading (shipping documents) that reduces disputes and supports electronic documentation.
- Carriage of Goods by Sea Act, 2025
  - Updates the 1925 statute governing cargo transport by sea, aligning with international rules (like Hague-Visby), clarifying carrier/shipper liabilities.
- Coastal Shipping Act, 2025
  - Establishes a dedicated legal framework for coastal shipping to increase its market share, cut logistics costs, ease congestion and reduce emissions.
- Merchant Shipping Act, 2025 –
  - Modernizes the 1958 law governing ship safety, seafarer welfare, pollution control, registration, and compliance with IMO conventions.
- Indian Ports Act, 2025 –
  - Replaces the 1908 colonial act to promote integrated port development, digital integration, environmental safeguards, and state-center coordination

Main Takeaway's

- Total 48 Rules under MS Act and 2 Rules under Costal Act in various stages of drafting, consultation, and vetting
- Consultations and stakeholder engagements are being done on going draft Rules

Overview of Shipping and Ship Building Ecosystem

The shipbuilding ecosystem forms a subset of the larger shipping ecosystem, that also covers management, financing/leasing, ownership, repair, insurance, recycling and support services.



Indian Maritime Sector

Ship ownership, 2024

1.7% Share of global fleet

16th Global rank in ownership

27 Million GT owned tonnage

EXIM cargo on Indian ships dropped from 41% in 1988 to **5% in 2024; USD 75 Bn** forex paid to foreign shipping companies in **2022**

Target

10th Rank globally by 2030

5th Rank globally by 2047

Ship building, 2024

<1% Share of global shipyard output

16th Global rank in shipyard output

Only **7%** of Indian owned ships are built in India

Target

10th Rank globally by 2030

5th Rank globally by 2047

Shipbuilding Scenario in India

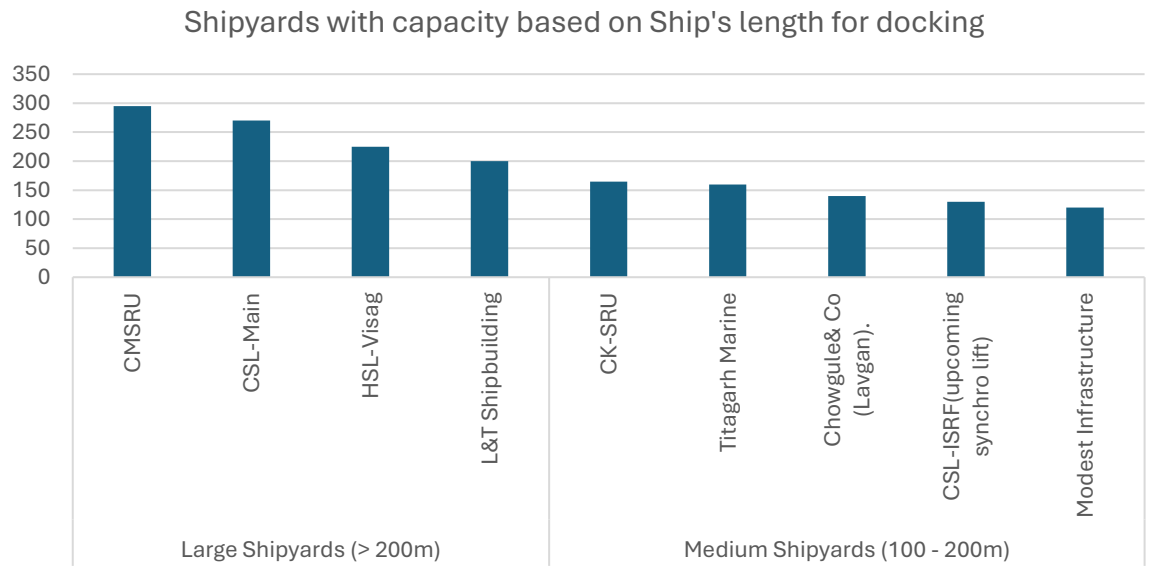
30,000 GT

Current Annual Tonnage Produced

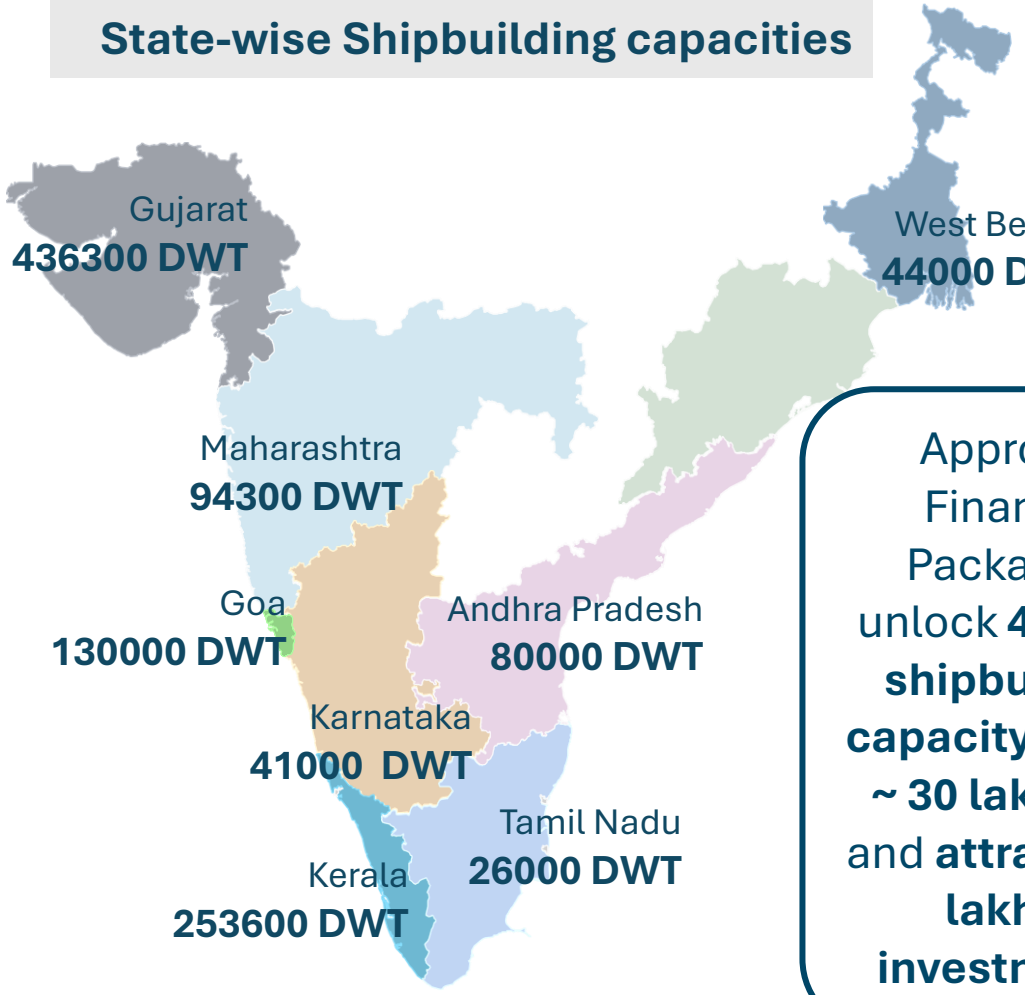
53*

Total Number of Shipyards

**Annual Report, MoPSW*



State-wise Shipbuilding capacities



Approved Financial Package to unlock **4.5M GT shipbuilding capacity, create ~ 30 lakh jobs** and **attract ₹ 4.5 lakh cr investments.**

Four Pillar Approach

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

01

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
- Establish National Shipbuilding Mission

02

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

03

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

04

Legal, Policy and Process Reforms

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

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

Pillar 1 : Shipbuilding Financial Assistance

₹ 24,736 Cr.

01

Shipbuilding Financial Assistance scheme

- **01** ₹ 20,554 Cr. — **Extension of Shipbuilding financial assistance scheme**
- **02** ₹ 4,001 Cr. — **Shipbreaking credit note**
- **03** ₹ 181 Cr. — **Establishment of National Shipbuilding Mission**

Shipbreaking credit note

40% of ship's scrap value to be issued to the ship-owner when the vessel is scrapped in an Indian yard. Credit note would be reimbursable against cost of construction of new vessel at an Indian shipyard.

Assistance Rate Structure

Non-specialized – Small Vessel
- Up to ₹100 crore → 15% of actual value

Non-specialized – Large Vessel
- First ₹100 crore → 15%
- Value above ₹100 crore → 20%

Specialized Vessel
- First ₹100 crore → 15%
- Value above ₹100 crore → 25%

Domestic Content Requirement

< 30% Domestic Content
- No SBFAS support

30% to < 40% Domestic Content
- Pro-rata support

≥ 40% Domestic Content
- Full support

Pillar 2 – Maritime Development Fund (MDF)

Maritime Development Fund (MDF)
INR **25,000 crore** (budgetary support from FY 2026 to FY 2036)

Maritime Investment Fund (MIF)

i. **Initial corpus**: INR 20,000 crore

ii. **Budgetary support**: 49%, i.e., INR 9,800 crore

iii. Largely supports **equity financing** for maritime sector

Interest Incentivization Fund (IIF)

i. **Corpus**: INR 5,000 crore

ii. **Budgetary support**: 100%

iii. Supports **debt financing** by reducing the cost of financing

Pillar 3 – Shipbuilding Development Scheme (SBdS)

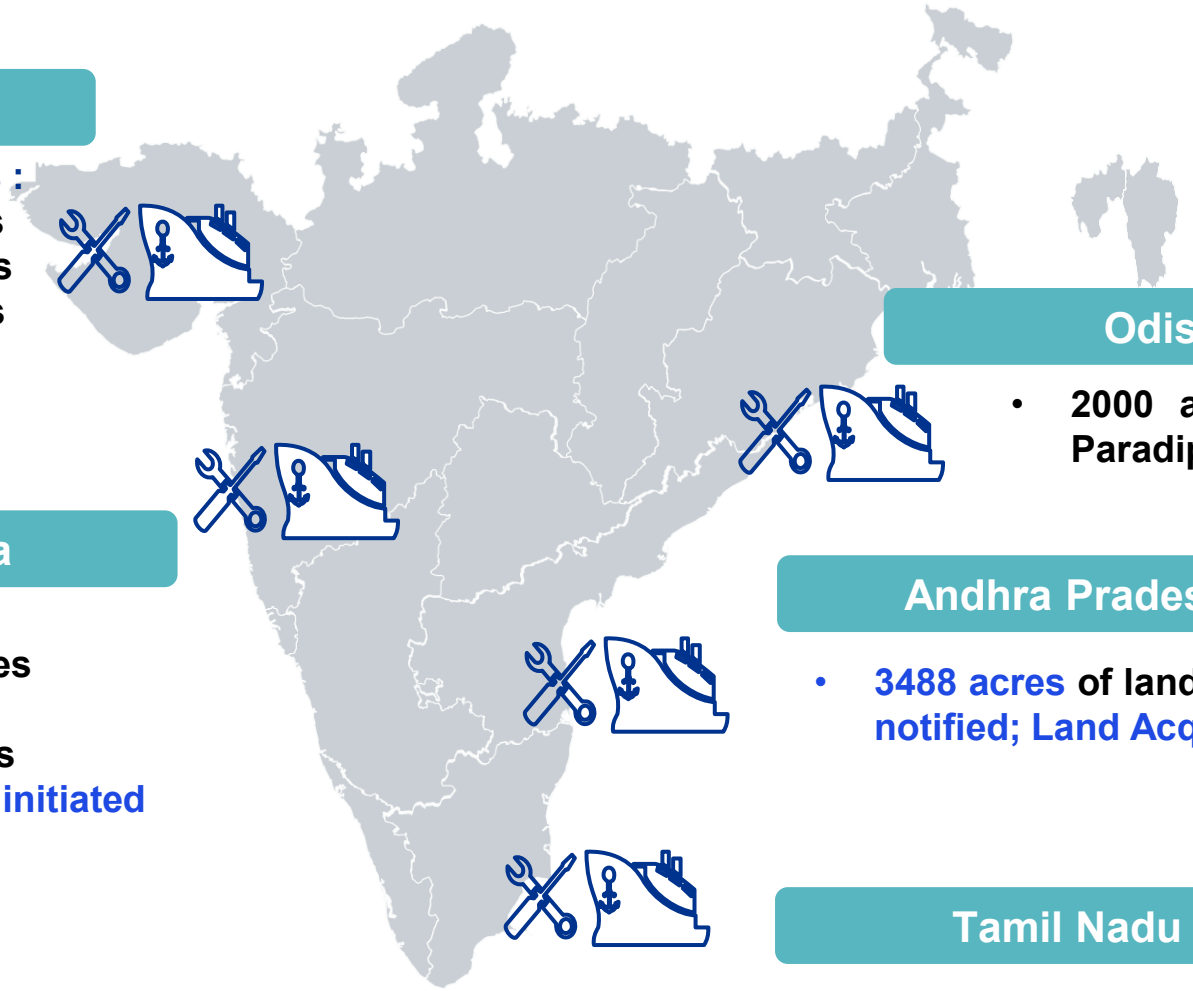
₹ 19,989 Cr.

Shipbuilding Development Scheme

(Capacity & capability development and credit risk coverage)

01	₹ 9,930 Cr.	Capital support for greenfield capacity expansion
02	₹ 8,261 Cr.	Capital assistance to existing/ brownfield shipyards towards the expansion of production capacity
03	₹ 305 Cr.	Capability development initiatives: set up the India Ship Technology Centre (ISTC)
04	₹ 1,443 Cr.	Shipbuilding risk coverage: Pre-Shipment Insurance, Post-Shipment Insurance and Vendor Default Insurance
05	₹ 50 Cr.	Administrative Expenses

A. Greenfield capacity creation, Potential Cluster Locations



Gujarat

Locations identified as :

- Chhachi – **2446 acres**
- Kuchhadi –**1556 acres**
- Kandia – **2000+ acres**

Odisha

- **2000 acres of land identified in Kendrapara near Paradip Port; Land Acquisition to be initiated**

Maharashtra

Locations identified as

- Nandgaon – **2669 acres**
- Dighi – **2550 acres**
- Vijaydurg – **1371 acres**

Land Acquisition to be initiated

Andhra Pradesh

- **3488 acres of land identified; Andhra Pradesh state maritime policy notified; Land Acquisition to be initiated**

Tamil Nadu

- **2900 acres of land identified in Tuticorin district ;**
- **1200 acres to be acquired.**

Note: Locations selected/ shortlisted by respective state governments, matter of discovery between shipyard partner and respective states.

B. Brown Field Capacity Expansion

Capital assistance of 25% to existing shipyards for capacity expansion and for creation of new shipbuilding infrastructure

Following Infrastructure components to be supported:

1	Floating dock	6	Dry dock
2	Ship lift	7	Cranes
3	Slipway	8	Outfitting Jetty/ Pier
4	Modular hull construction	9	Channel and basin development,
5	Automation	10	Other Facilities

C. Apex capability development centres

Indian Ship Technology Centre (ISTC)

Grants for R&D – USD 1 Bn (INR 100 Cr.)	Hardware requirements – USD 0.5 Bn (INR 50 Cr.)
Software as a Service – USD 0.02 Bn (INR 135 Cr.)	Civil works (including contingencies) USD 2.2 Mn (INR 20 crore)

- Establishment and operations of new test facilities
- Co-ordinate with industry, research labs, academia for test facility use.
- Set up initially at IMU (Vizag)/ one of the shipbuilding clusters as a CoE.

Cluster 1 – USD 0.01 Bn (INR 110 Cr.)

Regional capability centre 1

Cluster 2 – USD 0.01 Bn (INR 110 Cr.)

Regional capability centre 2

Cluster 3 – USD 0.01 Bn (INR 110 Cr.)

Regional capability centre 3

D. Ship Building Risk Coverage

S.No	Description	Remarks	Liability of Insurance in terms of vessel value
1	Buyer's Default Insurance (Pre-Shipment Insurance)	Protection against buyer default on vessel payment post ship construction order	75%
2	Post-Shipment Insurance	Protection against buyer default on last tranche of vessel payment post delivery of vessel.	10%
3	Vendor Advance Default Insurance	Protection against vendor delay/ default on imported items/ components/ systems for shipboard installation	35%

National Shipbuilding Mission to oversee the implementation of the risk covers, ensuring that the funds are used effectively, and the objectives are met.

Pillar 4 - Legal, Policy and Process Reforms

Legal, Policy and Process Reforms

Ships as Infrastructure

- Indian owned and flagged Commercial Ships >10,000 GT
- Indian built, owned & flagged Ships >1,500 GT
- Notified on 19th Sept 2025
- Infrastructure status allows ship owners access to infra lending institutions for better terms

Demand aggregation

- Government fleet expansion and domestic shipbuilding plan: worth ~ **INR 2.2 lakh Cr.** for **350+** vessels, to be built domestically
- Reclaim freight, scale ownership, and drive domestic shipbuilding.
- Reduce forex outgo to foreign shipping companies for Indian cargo

Legal and policy reforms

5 Major Maritime Legislations passed by Parliament

- Bills of Lading Act, 2025
- Carriage of Goods by Sea Act, 2025
- Coastal Shipping Act, 2025
- Merchant Shipping Act, 2025
- Indian Ports Act, 2025

Envisaged benefits of reforms:

- Improve Ease of Doing business (EoDB) in Indian maritime sector
- Creation of sustainable demand for Indian shipbuilding industry and easier access to maritime financing

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 came into force on **26 June 2025**.
- Integral to the **circular economy**, reducing the demand for virgin raw materials.

India's Role & Importance

- Handles **30% - 35% of global ship recycling tonnage** 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. [115 HKC Compliant Yards at Alang]**
- 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 Portal

An upcoming unified national digital platform under DGS to implement the Hong Kong Convention (HKC) and Recycling of Ships Act (2019), ensuring real-time, transparent and accountable governance of India's ship recycling ecosystem.

Importance of Portal

- **Transparency** : Digitally traceable inspections, certifications & audits
- **Accountability** : Role-based actions with time-stamped compliance trails
- **Real-time Monitoring** : Central oversight by DGS & State Authorities
- **Global Credibility** : Auditable records for IMO, foreign Flag States & shipowners
- **Stakeholder Integration** : Connects DGS, GMB, ROs, yards, service suppliers

Core Functional Modules

- Yard Registration & Licensing
- **Inventory of Hazardous Materials Inventory**
- **RRC Certification Registry**
- SRP Submission & Approval
- **Inspection, Audit & ISO Compliance Tracking (ISO 9001, 14001, 30000, 45001)**
- Incident & Non-Conformity Reporting
- Worker Training & Competency Records
- GISIS / IMO Reporting Integration

ISO 9001
Quality Management System (QMS)

ISO 14001
Environmental Management System (EMS)

ISO 30000
Ship Recycling Management System (RSMS)

ISO 45001
Occupational Health & Safety Management System (OHSMS)

Ship Recycling Credit Note

- Introduced under **Ship Building Financial Assistance Scheme 2.0 (SBFA 2.0)**
- Incentivizes ship owners to **recycle in India** and **build new ships in Indian shipyards**

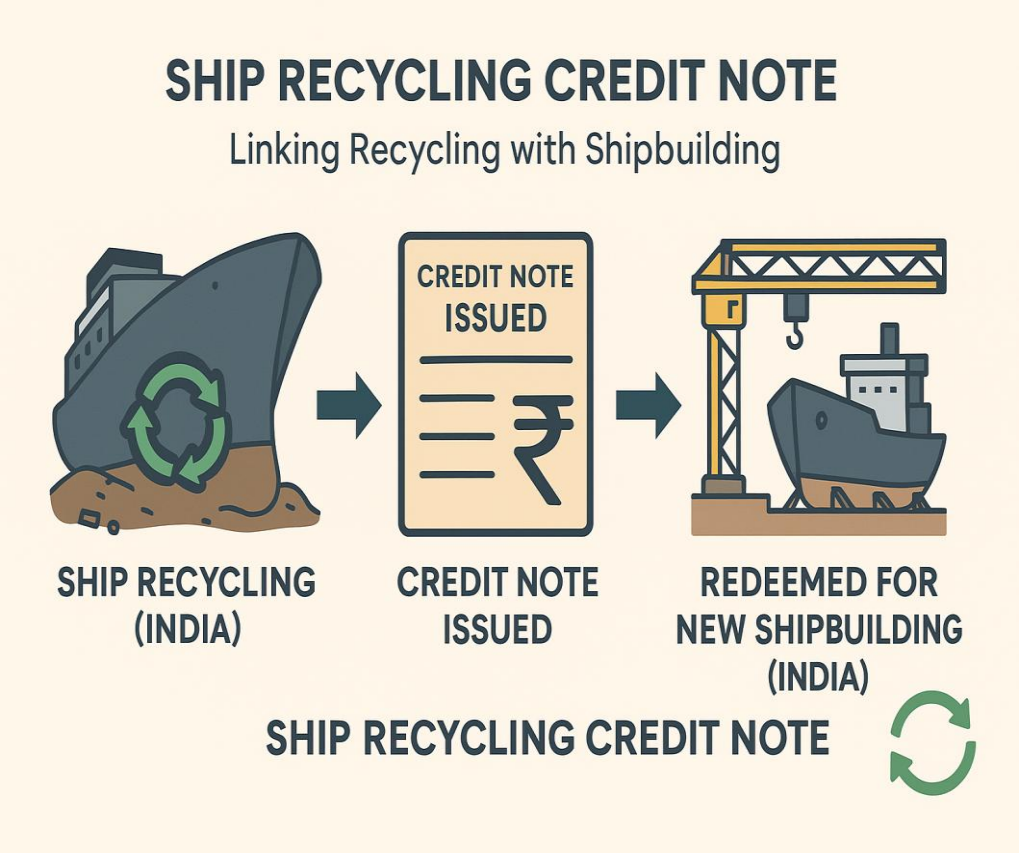
Allocation of : ₹ 4,001 crore
(under SBFA)

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 until the owner builds a new vessel/ ship in an Indian shipyard
- Redeemed as **financial assistance/ subsidy** under SBFA 2.0

Expected 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**



Green Steel

- "Green Steel" is defined by its CO_2 emission intensity — less than 2.2 tonnes CO_2 emission per tonne of finished steel (tfs).

- Greenness is expressed as a percentage reduction below the threshold of 2.2 2.2 tonnes CO_2 emission per tonne of finished steel

- The certification done via NISST (National Institute of Secondary Steel Technology) under the Bureau of Energy Efficiency (BEE) Measurement, Reporting and Verification (MRV) methodology.

Star Rating System

- Five-Star: < 1.6 tCO_2e/tfs ★★★★★
- Four-Star: 1.6 – 2.0 tCO_2e/tfs ★★★★
- Three-Star: 2.0 – 2.2 tCO_2e/tfs ★★★
- > 2.2 tCO_2e/tfs → Not eligible for green rating
  (Threshold reviewed every 3 years)

Two Pillars of Maritime Transformation

Technology & Sustainability

Technology Integration - Digital Platforms

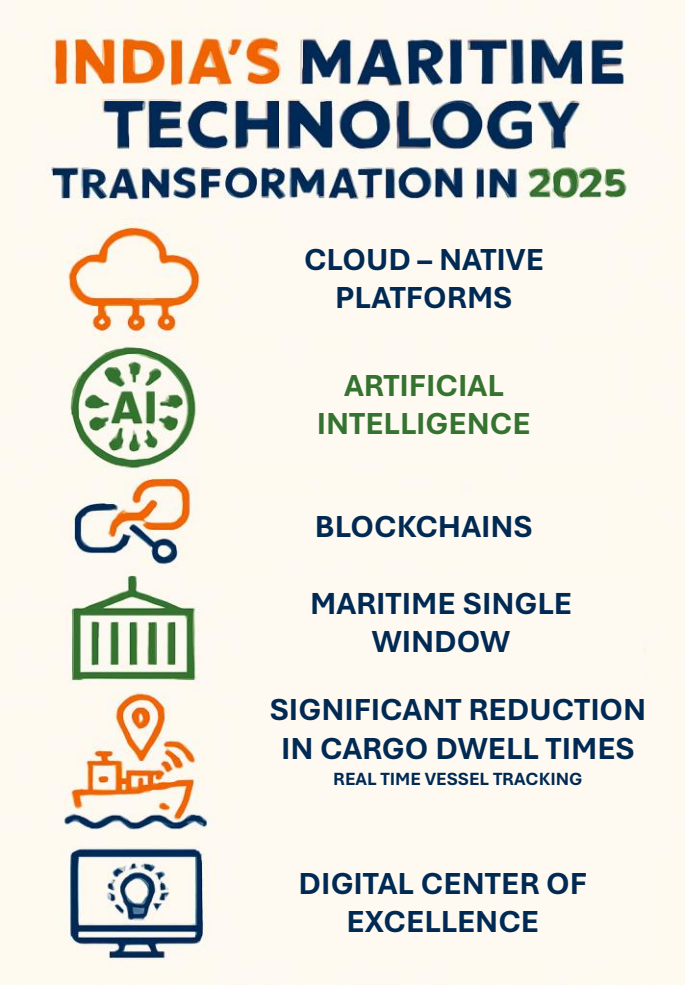
1. Flagship platforms: e-Samudra, SAGAR SETU, Maritime Single Window (MSW).
2. e-Samudra integrates 60+ maritime services (MTO registration, shipbuilding aid).
3. AI-powered exams & simulations for seafarer training.
4. Real-time vessel/cargo monitoring via Command & Control Centre.
5. Digital Centre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

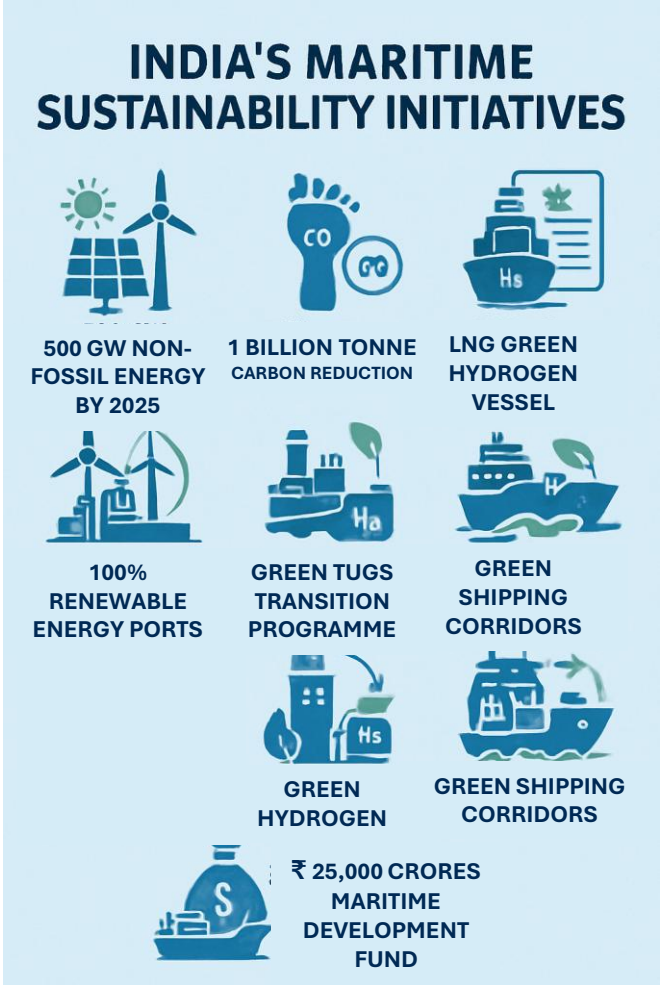
Sustainability Initiatives - Green Shipping Agenda

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.





Green Shipping – The Big Picture

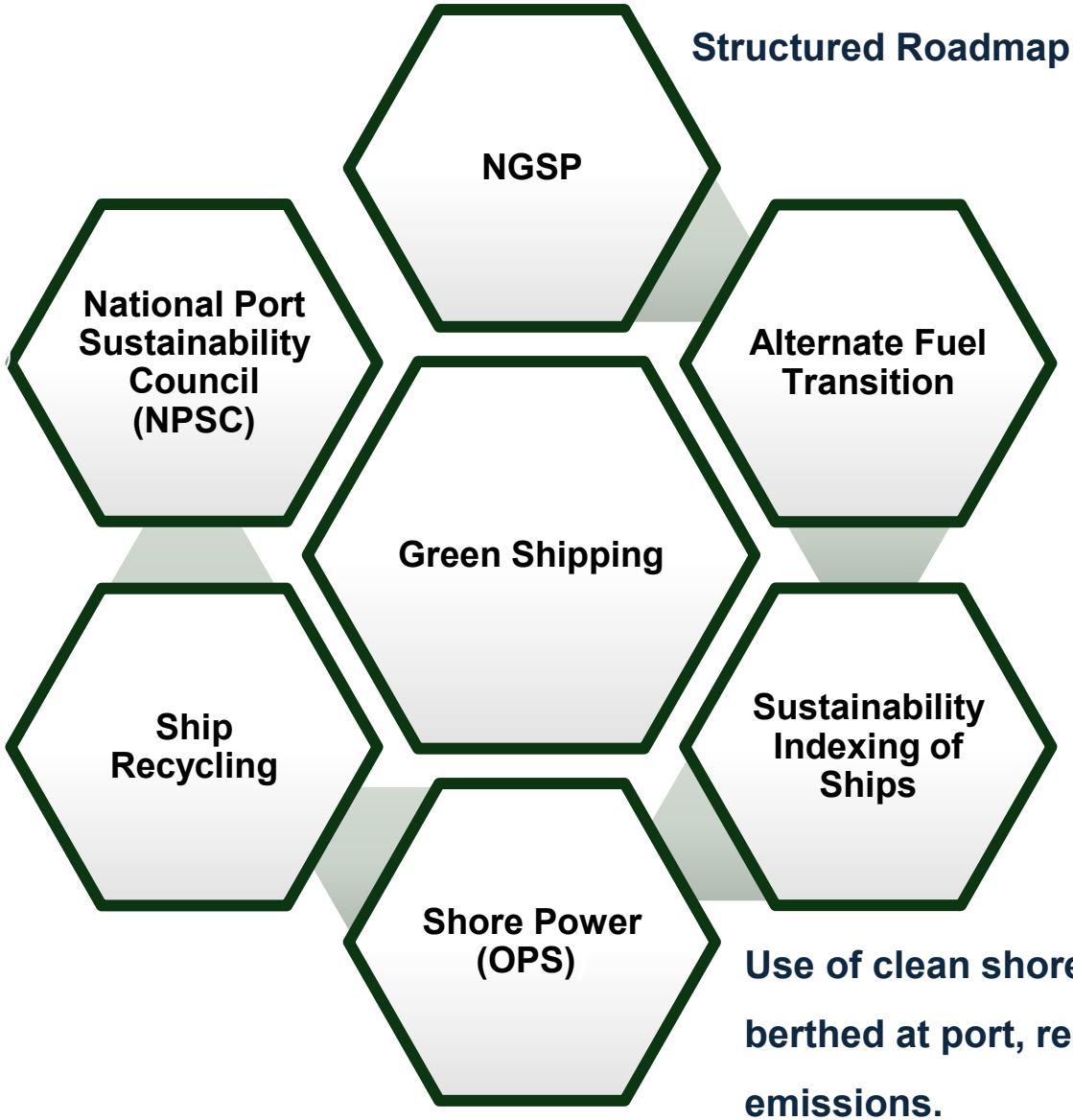
- Shipping is the **backbone of global trade** – carrying 80% of goods worldwide.
- Shipping contributes to ~3% of global CO_2 emissions.
- Green Shipping = *making ships, ports, and supply chains cleaner, smarter, and future-ready.*
- It's not just about compliance — it's about **staying competitive in a low-carbon economy.**
- **Vision & Commitments:**
  - Aligned with *Maritime India Vision 2030 & Maritime Amrit Kal Vission 2047*.
  - Supports IMO's **Net Zero 2050** ambition.
  - Anchored in India's **Panchamrit Pledge** – 500 GW non-fossil capacity by 2030, Net Zero by 2070.

"The future of shipping is green — by necessity, not by choice."

Green Shipping Initiatives

NPSC metrics include **Green Port Index (GPI), Port Readiness Level (PRL), Smart Port Shore Power Index (SPSPI), Environmental Ship Index (ESI), and GHG Emissions Inventory** to benchmark sustainability and readiness of Indian ports

With the Hong Kong Convention now in force, India leads globally with 115 compliant yards at Alang.



Structured Roadmap for decarbonization

Guidelines for LNG, Biofuels, Methanol, Ammonia

Structure to rate ships on their environmental performance, linked to age norms.

Use of clean shore electricity by ships while berthed at port, reducing fuel combustion & emissions.

National Green Shipping Policy

Maritime Vision for a Green Future

The NGSP is India's strategic response to the global decarbonisation mandate, a policy blueprint designed to secure maritime growth while transitioning towards clean energy, sustainable ships and climate-resilient ports.

Key Transition Pillars:

- Green Ships
- Green Ports
- Green Fuels
- Green Technology
- Green Recycling
- Green Financing
- Green Skill Development & Capacity Building

Maritime INDIA @ Net Zero – Multi Stakeholder Workshop convened on 14 -1 5 January 2026 at India Habitat Centre, New Delhi

Pillar 1 : Green Ships

Decarbonising India's fleet through lifecycle-based transition

Key Focus

- Reducing greenhouse gas emissions across the **entire vessel lifecycle** — from design and construction to operation, retrofitting and end-of-life
- Promoting **energy-efficient, fuel-flexible and low- to zero-emission vessels**, aligned with evolving international standards
- Enabling a **balanced transition**, combining retrofitting of the existing fleet with future-ready newbuilds

Key Enablers

- National **green ship definitions and certification framework** applicable to both newbuilds and retrofits
- **Lifecycle emissions accounting and MRV systems** to ensure credibility and transparency
- Alignment of **regulatory, financial and operational incentives** to support early adoption and scale-up

Moving Indian shipping from compliance-driven efficiency to globally competitive, low-carbon fleets

Pillar 2 : Green Ports

Port-led decarbonisation through infrastructure, energy transition and operational efficiency

Key Focus

- Reducing **port-side emissions** by integrating renewable energy, electrification and low-emission port operations
- Embedding sustainability across **port infrastructure, cargo handling, marine services and terminal operations**
- Aligning port development with India's climate commitments while safeguarding competitiveness and efficiency

Key Enablers

- Phased adoption of **shore power, electrified equipment, green tug operations and clean energy systems**
- Sustainability benchmarking and performance monitoring through **standardised indices and MRV frameworks**
- Capacity building for **port authorities and operators** to plan, implement and monitor decarbonisation actions

Positioning Indian ports as clean energy and logistics gateways enabling low-carbon shipping

Pillar 3 : Green Fuels

Enabling a safe, phased and lifecycle-based transition to alternative marine fuels

Key Focus

- Transitioning maritime operations away from fossil fuels through **alternative and low-carbon marine fuels**
- Adopting a **lifecycle (well-to-wake) and technology-neutral approach**, avoiding premature fuel lock-in
- Ensuring fuel transition is **safe, regulated and operationally feasible** across shipping segments

Key Enablers

- Recognition of multiple fuel pathways such as **biofuels, green hydrogen, green methanol and green ammonia**, subject to lifecycle performance
- Integration of fuel transition with **bunkering safety, storage standards and port infrastructure readiness**
- Alignment with **national energy missions and regulatory frameworks** to support phased deployment

Shifting maritime fuel transition from isolated pilots to a safe, scalable and system-wide pathway

Pillar 4 : Green Ship Recycling

Advancing safe, environmentally sound and circular ship recycling

Key Focus

- Ensuring **safe and environmentally sound recycling of end-of-life vessels**, aligned with the Hong Kong Convention
- Strengthening **worker safety, environmental protection and material recovery** across recycling operations
- Embedding ship recycling within the **circular economy**, supporting resource efficiency and green steel linkages

Key Enablers

- Mandatory compliance with **HKC requirements, IHM implementation and approved recycling practices**
- Digital transparency through **monitoring, reporting and traceability systems** for recycling activities
- Phased modernisation of yards, including **waste management systems and safety infrastructure**

Positioning ship recycling as a sustainability and industrial strength, not merely an end-of-life activity.

Pillar 5 : Green Finance

De-risking maritime decarbonisation and mobilising long-term capital

Key Focus

- Enabling access to **affordable and long-term finance** for green maritime projects across ships, ports, fuels and recycling
- Reducing perceived and real risks associated with **first-of-a-kind and transition technologies**
- Aligning maritime investments with **ESG, climate and sustainability frameworks**

Key Enablers

- Deployment of **blended finance, risk-sharing instruments and targeted incentives** to crowd in private capital
- Linking **monitoring, reporting and verification (MRV)** with finance eligibility and performance-based support
- Integration with domestic and international **green finance and capital market frameworks**

Shifting from subsidy-driven support to bankable, market-aligned green maritime investments

Pillar 6 : Green Skill Development & Capacity Building

Building human and institutional readiness for effective implementation

Key Focus

- Preparing the maritime workforce for **new fuels, emerging technologies and evolving regulatory requirements**
- Strengthening **institutional and regulatory capacity** to safely implement green shipping measures
- Ensuring a **just and inclusive transition**, covering seafarers, port workers, recyclers and allied sectors

Key Enablers

- Structured **national skilling and certification frameworks** for ships, ports, fuels, recycling and compliance
- Role-based training in **fuel handling, safety systems, digital MRV and environmental management**
- Integration of skills and capacity requirements with **licensing, compliance and operational approvals**

Moving from policy intent to execution-ready human capital across the maritime ecosystem

Pillar 7 : Green Technology and Innovation

Accelerating technology adoption and indigenization for a future-ready maritime sector

Key Focus

- Promoting adoption of **advanced maritime technologies** to improve energy efficiency, safety and environmental performance
- Enabling **digitalisation and data-driven operations** across ships, ports and regulatory systems
- Supporting **indigenisation and domestic capability development** in green maritime technologies

Key Enablers

- Deployment of technologies such as **hybrid and electric propulsion, energy-saving devices and digital optimisation tools**
- Use of **digital platforms, real-time monitoring and analytics** to strengthen compliance and performance tracking
- Support for **pilot projects, innovation sandboxes and technology validation** through collaboration with industry and academia

Using technology and innovation as cross-cutting enablers of scale, safety and global competitiveness

Maritime INDIA @ Net Zero

14 – 15 January 2026, India Habitat Centre (Hybrid)

Maritime INDIA @ Net Zero was jointly organised by the Directorate General of Shipping (DGS) and NCoEGPS at TERI as a **high-level multi-ministerial action plan and governance workshop** to translate the National Green Shipping Policy (NGSP) vision into **phased, implementation-ready national pathways** aligned with India's climate commitments.

MARITIME INDIA @NET ZERO

Way Forward

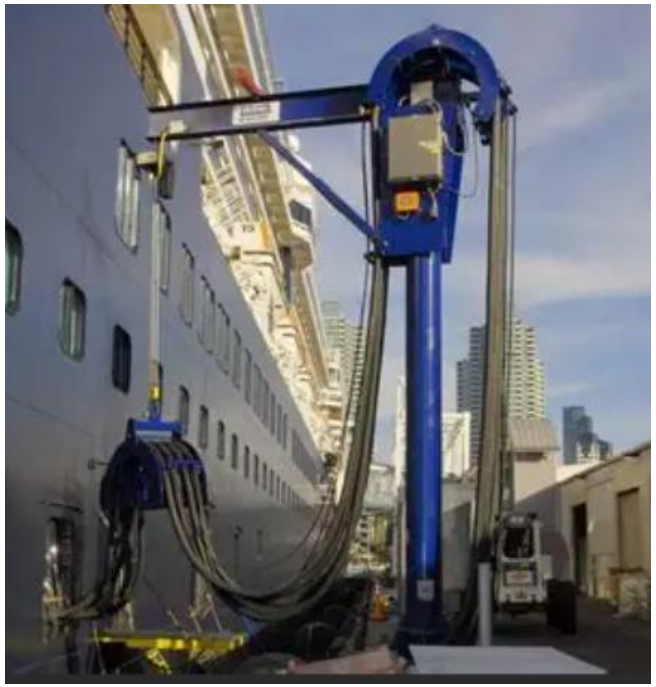
- **Conduct focused stakeholder webinars** to validate priority actions and implementation sequencing
- **Undertake inter-ministerial consultations** to finalise roles, timelines and coordination mechanism
- **Final submission of consolidated roadmap and action matrix to NITI Aayog** for strategic guidance and national rollout
- **Operationalise the governance and monitoring framework** for coordinated execution and reporting

NCoEGPS

teri | THE ENERGY AND RESOURCES INSTITUTE
Creating Innovative Solutions for a Sustainable Future

Shore to Ship

What is Shore Power?
Electricity supplied from the shore to berthed ships, allowing engines to be switched off and eliminating fuel combustion while docked.



Why It Matters

- Cuts **CO_2, NOx, SOx and Particulate Matter** emissions in port zones
- Improves **Air Quality and ESG scores** for Indian ports
- Supports compliance with **IMO CII, GHG & Green Port Index**

Implementation Status in Indian Ports

- **Kamarajar Port** - 500 kW, 400V, 50-60 Hz in Coal Berth 1 & 2
- **VO Chidambaranar Port** - 305 kW, 400V 60Hz in VOC Berth 2 & 3
- **Jawaharlal Nehru Port Authority** - SPS used for Tugs. SPS for all terminals planned (45MVA; INR 600 crore expected)
- **Paradip Port** - Newly commissioned. Delivered full load power to MV APJ Indrani at CB1 Berth.

Possible Financing options

Blended finance → *govt + MDBs + private capital.*

Green/blue bonds → *specifically earmarked for OPS infra.*

PPP models → *private players co-invest in OPS roll-out.*

Alternative Fuels for Maritime (1/2)

LNG

- **Current Use:** Operational for select Indian coastal and LNG carriers; IGF Code compliant
- **Infrastructure:** LNG terminals at **Dahej, Hazira, Kochi**; feasibility for bunkering at JNPA
- **Maritime Role:** Transition fuel till 2035 under IMO GHG transition
- **Limitation:** Methane slip & future carbon costs reduce long-term advantage

Biofuel

- **Marine Trials:** Successfully tested on marine engines
- **Supply Base:** Drop in Blends. Domestic production. **Blending with FAME, HVO**
- **Distribution:** Can use existing bunkering infrastructure without port redesign
- **Advantage:** Short-term compliance option for Indian fleet under CII/GHG without retrofits

Ammonia

- **Export Positioning: Kandla to produce green ammonia** (L&T + Itochu JV) for **Singapore bunkering**
- **Maritime Use:** Target fuel for deep-sea vessels (tankers, bulk carriers) post-2035
- **Challenges:** High Toxicity, safety standards, crew training, IMO safety code under development
- **Strategic Role:** India positioning as **future fuel exporter**, not just consumer

Methanol

- **Marine Use**: Dual-fuel methanol engines already ordered by global majors
- **Breakthrough: India's first Green Methanol Bunkering Hub** under construction at **VOC Port (Tuticorin)** – 750 m^3 terminal (SOPAN Group)
- **Production Shift:** India transitioning from coal-based brown methanol to green methanol (hydrogen + CO_2 capture)
- **Maritime Suitability:** Engine-ready (Maersk, MAN ES technology) – early adopter fuel under IMO
- **Role:** Likely first large-scale alternative fuel to enter Indian ports post-2030

Hydrogen

- **Port Pilot: VOC Port launched India's first Green Hydrogen Pilot Plant** (5 Sep 2025)
- **Use in Maritime:** Not direct – used to produce ammonia/methanol as bunkering fuels
- **Infrastructure Need:** Electrolysers, Liquefaction, port pipelines; **High CAPEX**

Long-Term Role: Backbone fuel for synthetic maritime fuels; export market focus

Alternative Fuels for Maritime (2/2)

Shipping today contributes around **3% of global CO_2 emissions**. The IMO has locked in a target of **net-zero by 2050** → which means fuels like HFO and MDO are on their way out.

For India, the next 25 years are about **switching the fuel mix**:

Fuel	Demand in 2030	Demand in 2050
Hydrogen	**0.026 MT**	**0.3 MT**
Ammonia	**0.025 MT**	**4.4 MT**
Methanol	**0.037 MT**	**0.272 MT**
LNG	**0.66 MT**	**0.3 MT** (to be replaced by bio/e-LNG).

India can produce these fuels cheaper than almost anyone.
Green Hydrogen cost by 2030:
India $1.5–2.0/kg.
Middle East: $2.0–2.5/kg.
Europe/East Asia: $3.0–6.0/kg.
This is the base case for India becoming **the lowest-cost Global hub for Green Maritime Fuels and an Energy Surplus Nation.**

Nuclear – Long Term Option

- **Current Readiness :** No commercial maritime Nuclear vessel. Only Indian Navy operates Nuclear vessels.
- **No policy framework** yet for nuclear fuel for maritime.
- **Strategic Potential :** Ultra long endurance fuel, zero CO2 emission
- **Financial : Very High CAPEX** Estimate **$700-900 million per vessel (3x cost of LNG vessel)**
- **No IMO civilian Nuclear code** (under development)

Alternative Fuels Properties Comparison

Parameter	E-LNG	Methanol	Ammonia	Hydrogen
Physical properties for storage	Liquid at −162 °C	Liquid (up to 65 °C)	Liquid at −33 °C	Compressed gas at > 250 bar or liquid at −253 °C
Fuel tank size for same energy content as MDO	1.8 times	2.5 times	3 times	5–7 times
Flammability limits in air (%V/V)	5%–15% (Methane)	6%–36.5%	15%–28%	4%–75%
Ignition temperature (°C)	595	464	630	560
Flashpoint (°C)	−188	12	132	—
Density of liquid phase (kg/m^3)	450	790	696	71
LCV (MJ/kg)	50	19.9	18.6	120
Energy density (MJ/L)	21.2	15.7	12.7	8.5

Data Source : MARIKO (2022) Ammonia as ship fuel, DLR (2023) PtX Fuels in Shipping

Alternative Fuels Comparison

Hydrogen

Pros

- High gravimetric energy density
- Very pure hydrogen
- Only emits water

Cons

- Highly flammable
- Cryogenic temperature
- Complex storage necessary
- Difficult to handle
- No IMO rules available

E-Ammonia

Pros

- Carbon free
- Experience as cargo or refrigerant
- Higher energy density than hydrogen
- Since Dec 2024 IMO guidelines

Cons

- Toxic
- Not commercially available yet
- Highly trained personal needed
- High cost

E-Methanol

Pros

- Liquid at room temperature
- Easy to handle
- Mature technology
- Rules exist
- Higher energy density than hydrogen

Cons

- Toxic
- Highly flammable
- Still contains carbon
- High cost

E-LNG

Pros

- Mature technology
- Rules exist
- Higher energy density than hydrogen

Cons

- Not commercially available yet (fuel production)
- Cryogenic temperature
- Complex storage necessary
- High cost
- Risk of methane leakage / slip

Swachh Sagar Portal

India's digital platform for clean seas and maritime decarbonization. Developed and Managed by IRS on behalf of DGS.

Port Reception Facility	Fuel Consumption Reporting	Single Use Plastics	E- BDN & Bunker Suppliers	Ballast Water Reporting
• Module for vessel waste declaration, vendor linkages and disposal coordination	• Enables MARPOL Annex VI fuel consumption reporting for vessels.	• Enables ships to report plastic usage and disposal via SEP plans, ensuring compliance with National sustainability mandates	• Central database of approved bunker suppliers with electronic BDN records for transparency and fuel quality assurance	• Real time Ballast Water data submission by all ships and compliance oversight

India as a Net Green Energy Exporter & Bunkering Destination

From energy importer to future maritime fuel hub

Strategic Advantage

- Long coastline with major ports on **East–West shipping lanes**
- Abundant renewable energy for **green hydrogen, ammonia, methanol**
- Cost advantage in **solar + wind production**, lowering fuel export price

Fuel Export Readiness

- **Green Ammonia :** Kandla supply to Singapore (L&T–Itochu JV)
- **Green Methanol :** VOC Port bunkering hub under development
- **Hydrogen Derivatives :** Mission to export through maritime corridors

Port Infrastructure Transformation

- Dedicated **Green Bunkering Terminals** (VOC Port, Kandla, JNPA)
- Upcoming **Green Shipping Corridors**: Tuticorin – Kandla – Singapore – Rotterdam
- Integration of **renewable power, storage & safety systems**

Economic & Diplomatic Impact

- Reduces dependency on oil imports
- Positions India as **fuel supplier to global shipping lines**
- Enhances maritime influence under **Global South leadership**

Policy Backing

- Supported by **National Green Hydrogen Mission & NGSP**
- Incentivized by **Harit Sagar & MIV 2030**
- Aligned with **Make in India & Energy Security Vision 2047**

India is not just preparing for Green Fuels — it is preparing to Fuel The World.

Green Ports

Driving Sustainable Maritime Growth

Concept of Green Ports

- Ports designed & operated with minimal environmental impact.
- Integration of clean energy, efficiency, and circular economy practices.

Key Initiatives in India

- Harit Sagar Guidelines (2023): National framework for green port development.
- Proposed National Port Sustainability Council (NPSC): Metrics for emissions, energy, waste, and community impact.
- Onshore Power Supply (OPS): Cut ship emissions at berth by connecting to shore electricity.
- Waste & Plastics Management: Port reception facilities for MARPOL Annex V compliance.

Benefits

- Reduces GHG emissions & pollution.
- Improves air quality in port cities.
- Promotes India's Blue Economy & Green Economy transition.
- Aligns with IMO decarbonization goals & India's Viksit Bharat 2047 vision.

Sustainable Indicators for Indian Ports

Green Port Index (GPI)

Evaluates ports based on carbon footprint, alternative fuels adoption, energy efficiency, sustainable logistics, and waste management practices.

Port Readiness Level (PRL)

Assesses ports' preparedness for energy transition, digitalization, and compliance with global environmental regulations.

Shore Power Readiness Indicator (SPRI)

Measures infrastructure for cold ironing and renewable energy integration to reduce emissions from berthed ships.

Environmental Ship Index (ESI)

Incentivizes ship operators to reduce emissions through a rating system that evaluates NOx, SOx, and CO_2 emissions.

These indicators create a robust framework to measure and enhance the environmental performance of Indian ports. By institutionalizing them, India positions itself as a global frontrunner in green maritime logistics & unlocks access to international green shipping corridors and drive long-term net-zero ambitions.

GHG Emission Scope at Ports

Scope 1 : Direct Emissions

- From port owned/controlled sources
- Diesel generators, cranes, dredgers, tugs, vehicles, fuel machinery

Scope 2 : Indirect Emissions (Purchased Electricity)

- Power consumed but generated elsewhere (state grid)
- Lighting, pumps, reefer containers, terminal operations
- Coal-based power grid

Scope 3 : Other Indirect Emissions (Value Chain)

- Ships at berth using auxiliary engines
- Trucks, trains, barges transporting cargo
- Business travel, investments, waste treatment

Green Tug Transition Program

To replace/retrofit conventional diesel-powered tugs with *green tugs* powered by **alternative fuels** (like LNG, methanol, hydrogen, or hybrid-electric systems).

- At least **50% of all tugs in major ports to be green tugs by 2030**.
- 100% transition by 2047

Current Status

~ 400 + tugs are operating in Indian Waters (Coastal & Offshore Tugs)
~ 45% of tugs are 20 + years
~ 20% of tugs are 30 + years

Problem

Older tugs generate higher emissions and operate with lower efficiency compared to modern green tugs.

Opportunity and Way Forward

- Replacing / retrofitting old fleet
- Deployment of hybrid & green-fuel powered tugs
- Incentivize adoption of LNG, Methanol, Hydrogen & Electric tugs

Training Ecosystem

A Digital Transformation for Maritime Education

Training Ecosystem Vision is to create a unified, cloud-based digital platform to regulate and modernize maritime training, certification, and skill development.

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.

Objectives

- Strengthen training delivery and assessment integrity.
- Enhance transparency in certification services.

Impact

- Transition from paper-based to secure digital platforms.
- Eliminate fraud, bridge academia–industry gaps, and align with modern shipboard technologies.
- Ensure Indian seafarers remain globally competitive.

Implementation

- Available as a integrated solution with modular approach.
- Represents a strategic shift toward modernized maritime education and continuous professional development.

Maritime Training & Certification Lifecycle

Problems

There is no single digital platform to aggregate MTI pre-sea training seats, enabling illegal institutes and unmonitored enrolments.

Quality of Maritime Training and Skilling, Competency of Seafarers

There is no structured linkage between MTI pass-out students and the availability of shipboard training berths.

The Training Assessment Record (TAR) is not digitized; shipboard training completion is certified manually by MTI/RPSL/Shipping Companies, causing delays and inefficiencies in issuing completion certificates.

Maritime Training & Certification Lifecycle

Candidate applies to authorized DGS approved MTI to enroll in a pre-sea course → MTI generates INDoS and enrolled in the batch of the course → MTI conduct exit exam as per affiliation (IMU etc.) → Mandatory ship on-board training on training berth → Tar book details uploaded and certificate for the base Competency course → The Ship contract and the professional career commence with the sign-on contract

Solutions

Implement a **Common Admission Portal** after IMU-CET/JEE, where only DGS-approved institutions admit candidates, with all admissions digitally approved, tracked, and certified—eliminating fake institutes.

Integration with **Centralized Attendance System**

Common Job Portal

Provide preference to MTI candidates by establishing formal MoUs between MTIs and RPSLs, wherein RPSLs commit to employing and placing candidates from designated MTIs for shipboard training.

Digital Training and Assessment Record

Digitize the TAR and map it to specific shipboard berths, enabling online tracking, verification, and digital certification of shipboard training and pre-sea course completion.

Sagar Mein Yog

Sagar Mein Yog is a **comprehensive wellness program** built on the integration of yoga, mindfulness, emotional resilience, physical health, and spiritual well-being.

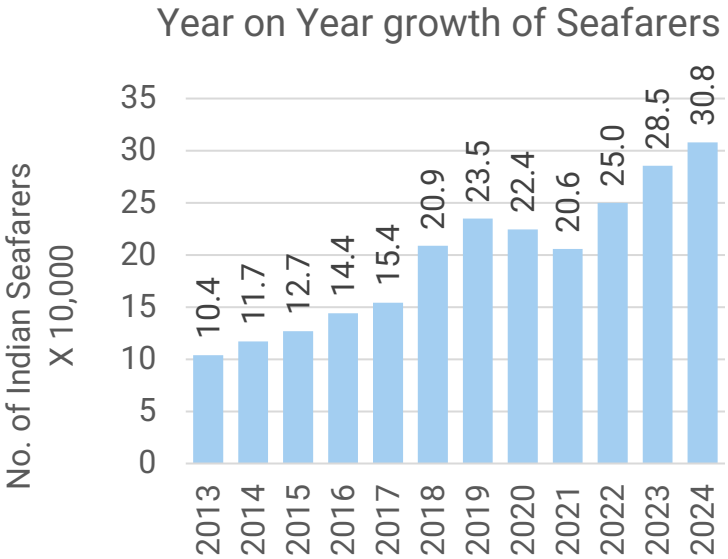
- In partnership with **NUSI** and knowledge partner Trijog
- Linked with MIV 2030 **Deliverable 10.16.3**
- SMY is being presented at 136th IMO Council

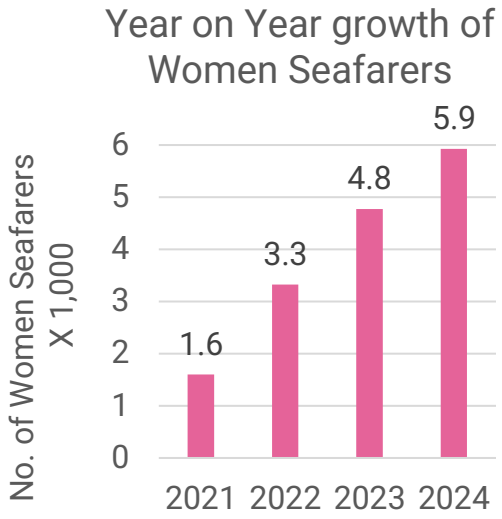
Way Ahead

- **Formal STCW Approvals** for ToT and Yoga curriculum.
- **Conduct of ToT courses** for MTIs (pre-sea and post-sea phases).
- **Integration of Yoga modules** into all maritime training programmes.
- **Phased implementation plan:** Pre-sea → Post-sea → At-sea.
- **Monitoring & evaluation** mechanism for impact assessment and course correction.

Sagar Mein Samman

Gender Inclusion in Maritime





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.

Initiatives of DG Shipping to promote women seafarers : **₹1,00,000 are offered** via the Maritime Training Trust to encourage women cadets and ratings in pre-sea courses.

Sagar Mein Samman (Honor at Sea) is the flagship initiative, **designed to transform India's maritime sector into a more inclusive, equitable, and aspirational ecosystem.**

- **Goal:** Build a resilient, diverse, and future-ready maritime workforce.
- These six pillars form the structural foundation of the initiative, ensuring a comprehensive and sustainable approach to empowering women across all layers of the maritime ecosystem.

Digital Transformation and Governance

Technological Interventions/adoption in the Maritime Training Sector

Empowering trainers and trainees to achieve excellence beyond traditional boundaries

MTI Modules- 3 + helpline and escalation matrix

Learning Management System

Web based simulation

Digitization of Training and Assessment Record (TAR)

Centralized Attendance system CAS 2.0

Use of new analytics tools for insight building and effective decision making

Dynamic Batch sizing

Placement portal and authentic job portal

AI & Immersive technology strategy

Faculty development Program

Transparency and Zero Tolerance for Fraud

A Digital Transformation for Maritime Education

Raising issue over the Call/SMS/WhatsApp

Helpline between 09:00 AM – 06.00 PM

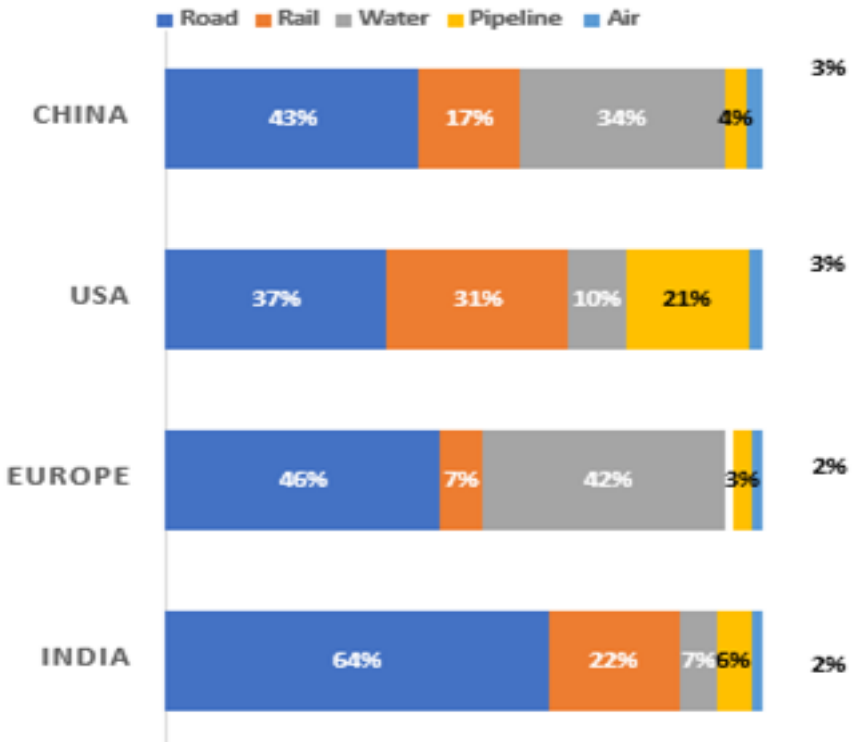
Escalation mechanism for resolving query

Follow-up
Support and right guidance

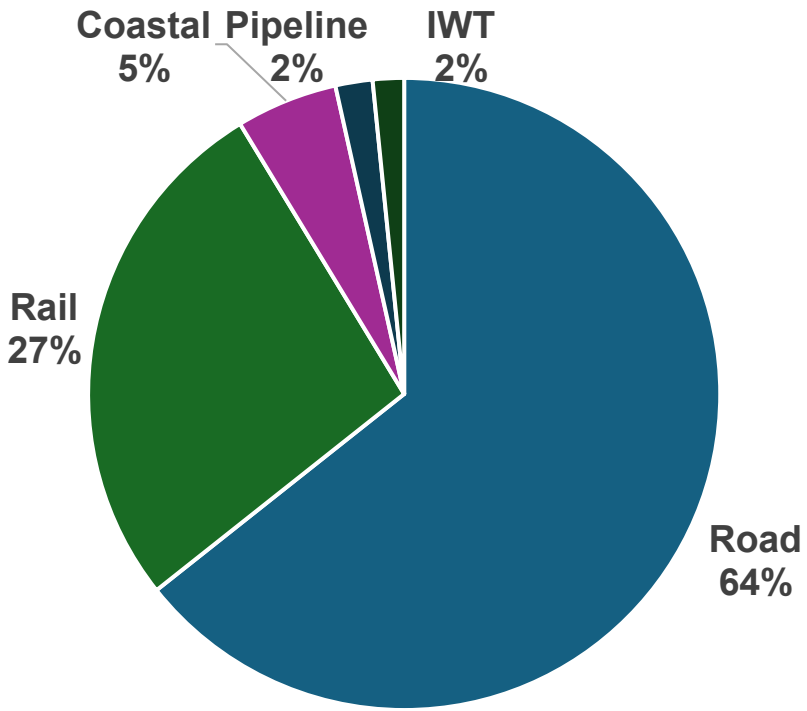
Analysis & Correction and recurrence

Modal Share of Transport

Global Modal split of Freight Transport by tonne km



Modal Share of Transport - Major Ports



Logistic Cost per tonne per km

Road:
₹3.78

Rail:
₹1.96

Air:
₹72

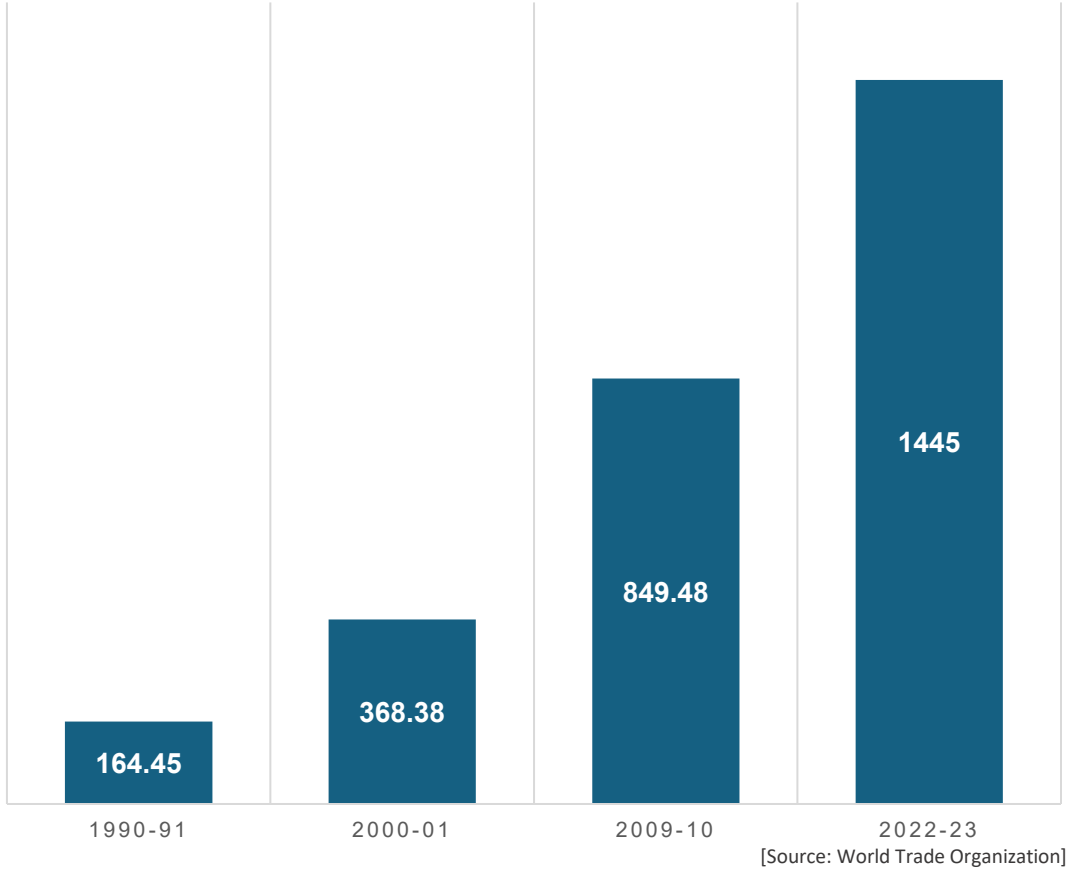
Waterways (average):
₹2.30

Coastal:
₹1.80

Inland:
₹3.30

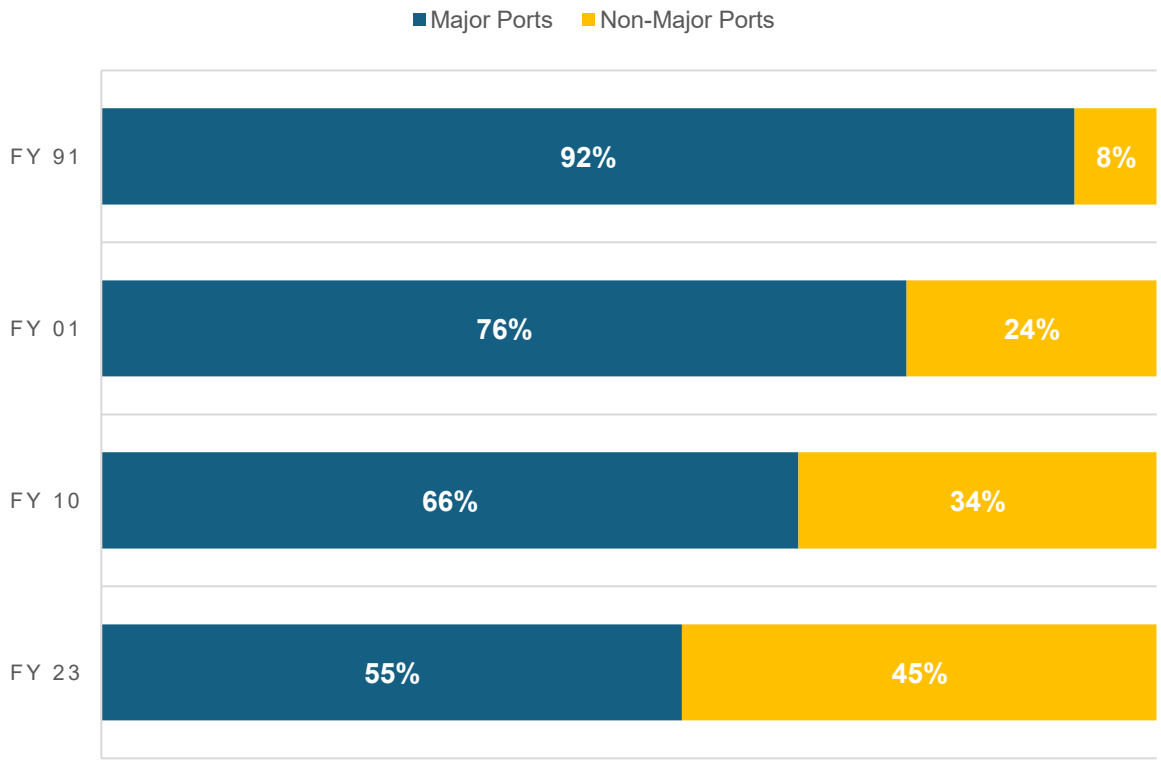
Cargo through Indian Ports

Decreasing share of Major Ports as compared to Non-Major Ports over the years



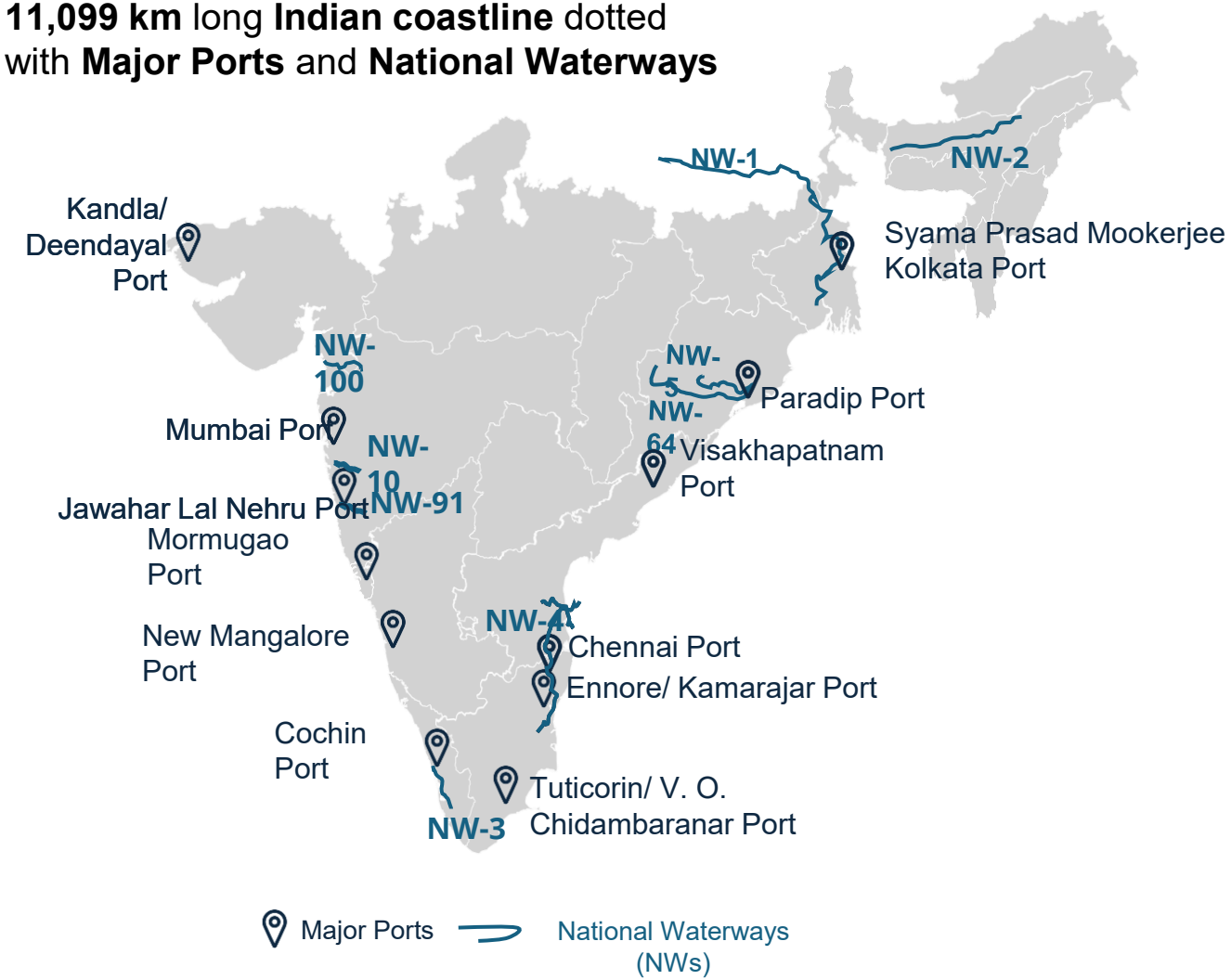
[Source: World Trade Organization]

Cargo Handled in MMT



Multi Component Ecosystem for Indian Maritime Sector

11,099 km long **Indian coastline** dotted with **Major Ports** and **National Waterways**



Key components of the Indian Maritime Sector

EXIM Ports	55
Non- EXIM Ports	23
Total cargo handling ports	78

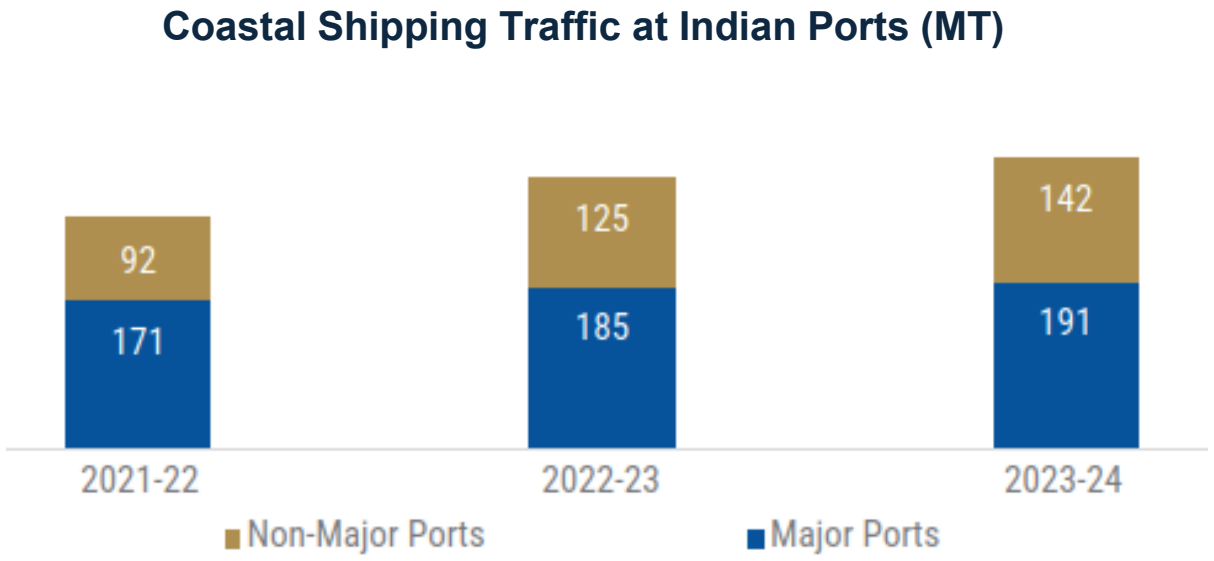
Cargo type	Cargo handled-Ports MMT (FY25)
Coastal	331
Overseas	1,262
Total	**1,593**

Ship type	No. of Ships (FY24)	Capacity Mn GT (FY24)
Coastal	1,056	1.6
Overseas	489	11.8
Total	**1,545**	**13.5**

Number of Waterways	Cargo handled MMT (FY25)
111 (29 operational)	**145**

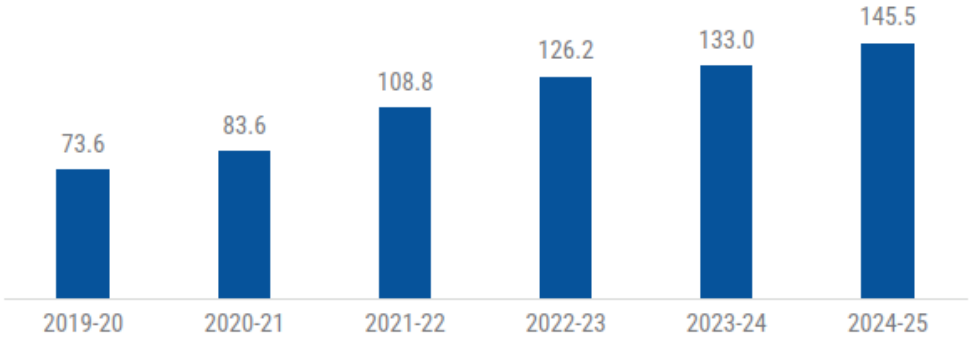
Coastal Shipping - Traffic

1. Coastal shipping is in its early stages but showing promising growth.
2. Traffic increased 26% from 264 million tonnes in 2021-22 to 333 million tonnes in 2023-24.
3. Non-major ports saw 54% growth; major ports grew by 11% during this period.
4. Government aims to scale coastal cargo to 1,300 million tonnes by 2047 under Maritime Amrit Kaal.
5. Recent policies and dedicated coastal berths promote sustainable and efficient domestic shipping.
6. Key commodities include petroleum, oil, lubricants, coal, cotton, tiles, soda, ash, wheat, and containerized cargo (especially on the west coast).
7. Challenges include limited handling capacity and vessel availability.
8. Greater push from government and private sectors can unlock huge sustainable and economic potential.



Inland Waterways

Cargo Movement Through IWT (million MT)



Key Inland Waterways

NW-1 (Ganga – Haldia to Allahabad):

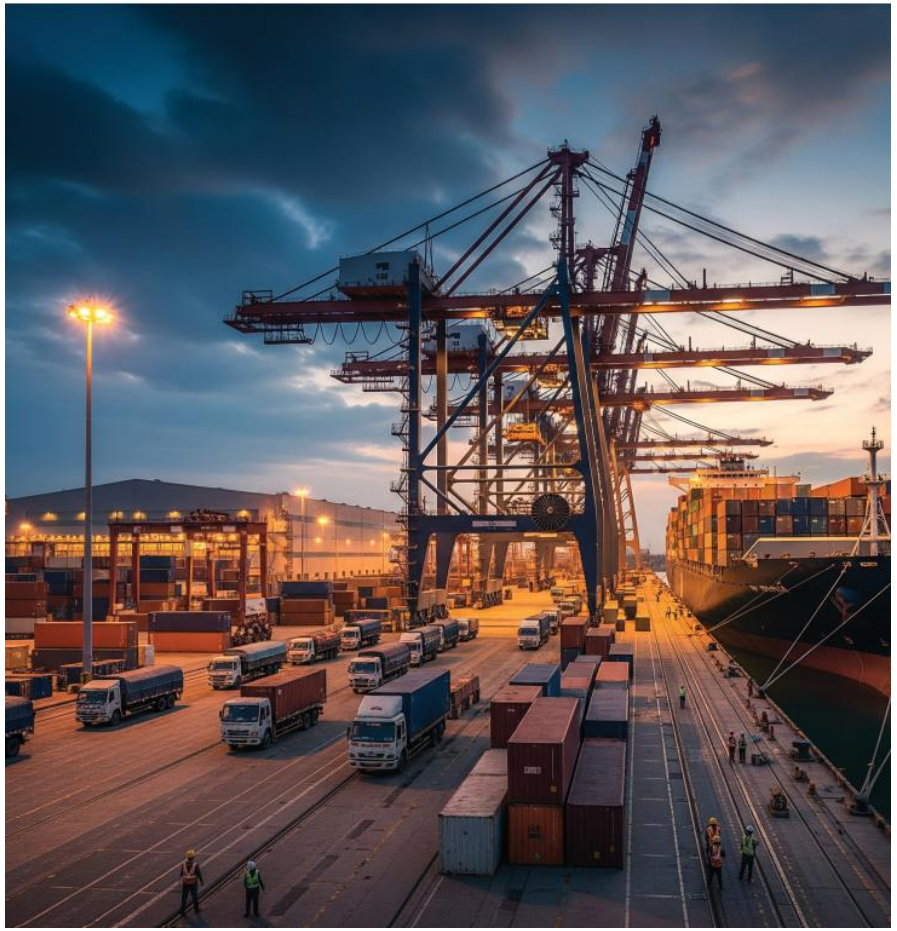
- Majority (~90%) cargo movement involves lighterage operations at Kolkata, transferring cargo to smaller vessels via port's outer reaches.
- Minimal actual long-haul cargo movement upstream due to draft restrictions and infrastructure limitations.

NW-2 (Brahmaputra – Dhubri to Sadiya):

- Limited cargo movement because of shallow depths beyond Narayanganj, causing vessels to run aground and incur losses.
- Navigation is considered safe only up to Chandpur; beyond that, operators lack reliable depth info.
- High risks and uncertain conditions reduce usage for long-haul cargo.

NW-3 (West Coast Canal – Kerala):

- Short, mostly horizontal waterway serving regional transport in Kerala.
- Serves as local cargo route due to limited length and stable road network. Remains niche, not a large-scale cargo corridor.



संगच्छध्वं संवदध्वं सं वो मनांसि जानताम्।

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

सत्यमेव जयते
Ministry of Ports, Shipping & Waterways
Government of India

सागराः सुपन्थानः सन्तु