

GREEN SHIPPING POLICY

H A N D B O O K

**Global rules, Indian policy, and the demand
outlook for green fuels in maritime transport**

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About this handbook

GH2 India publishes this handbook under its Green Ports & Shipping Network to give Indian industry, port authorities, policymakers, researchers, and the interested public a single, rigorous reference on the policies now reshaping global and Indian shipping. Shipping moves over 90 percent of India's trade by volume. The rules governing what fuels ships burn are changing faster than at any point in the industry's modern history, and India, as both a maritime nation and a prospective large-scale producer of green hydrogen, green ammonia, and green methanol, sits at the centre of that change.

The handbook does four things. It explains the rules already in force, principally FuelEU Maritime and the EU Emissions Trading System as applied to shipping. It explains the IMO Net-Zero Framework, what happened to it in October 2025 and April 2026, and what to expect at the decisive meetings in late 2026. It maps India's own policy architecture, from the National Green Hydrogen Mission's shipping pilots to the Ministry of Ports, Shipping and Waterways' port, fleet, and shipbuilding programmes. And it translates all of this into demand: how much green fuel these policies will require, and what that means for Indian producers, ports, and shipowners.

All figures are drawn from official sources, primary regulation, and published research from institutions including the IMO, the European Commission, MoPSW, MNRE, the Maersk Mc-Kinney Moller Center for Zero Carbon Shipping, the Global Maritime Forum, RMI, DNV, and Climate Analytics. A source guide appears in the annex. Figures are stated as at July 2026; the regulatory picture will move again in December 2026, and GH2 India will issue an updated edition after the IMO's resumed extraordinary session.

GH2 India is a Section 8 industry association advancing India's National Green Hydrogen Mission through knowledge, advocacy, and institutional green intelligence. The Green Ports & Shipping Network convenes ports, fuel producers, shipowners, and government to accelerate green fuel adoption in Indian maritime transport.

Leadership Messages



Message from the Chair of the Governance Board, GH2 India

Shri Bhupinder S. Bhalla IAS Retd. Chair, Governance board, GH2 India. Former Secretary, MNRE

The value of an industry body is measured by whether it improves the decisions of its members and its government. This handbook exists for that purpose. Green shipping regulation has moved faster than most Indian boardrooms have tracked, and the cost of misreading it, whether by overestimating delay at the IMO or underestimating the European rules already in force, is now measured in real money and lost market position. GH2 India's Governance Board asked the secretariat to produce a single reference that states the rules as they are, the demand as it can be credibly estimated, and India's position without exaggeration. What follows meets that standard. Every figure is sourced, every assessment is labelled as ours, and the edition will be updated and reissued as the December 2026 decisions land. I commend this handbook to members, policymakers, and every institution invested in India's maritime and hydrogen future.



Message from the Chairman, Deendayal Port Authority

Shri Sushil Kumar Singh, Chairman, Deendayal Port Authority

"On 2 April 2026, Deendayal Port conducted India's first shore-to-ship methanol bunkering, certified by DNV, on the Rotterdam-Singapore trade lane. That trial was not a ceremony. It was proof that an Indian major port can deliver the fuel infrastructure the global energy transition requires, to international standards, on an operating corridor. Kandla today anchors approximately 3,400 acres of green hydrogen and ammonia production commitments, a common-user storage and bunkering partnership, and the first leg of India's domestic green corridor to Tuticorin. Our ambition is straightforward: every ship that calls at Kandla should be able to bunker green fuel here before the decade is out. This handbook sets out the rules and the demand that make that ambition commercially sound, and Deendayal Port Authority is pleased to be associated with it. I invite industry to build with us."

Executive summary

Green shipping has moved from ambition to regulation. The essential facts, as they stand in July 2026, are these.

The EU rules are live and enforced

FuelEU Maritime has completed its first full compliance cycle. Ships above 5,000 GT calling at EU and EEA ports have been subject to binding well-to-wake greenhouse gas intensity limits since 1 January 2025. The first ship-level reports were due to verifiers by 31 January 2026, compliance balances were fixed by 30 April 2026, and penalties, priced at EUR 2,400 per tonne of VLSFO-equivalent energy shortfall, fell due between May and June 2026. In parallel, the EU ETS reached full phase-in for shipping in 2026, now covering methane and nitrous oxide alongside CO₂. Any Indian exporter, charterer, or shipowner trading to Europe is already paying for carbon.

The global rule is one vote away

The IMO Net-Zero Framework, approved at MEPC 83 in April 2025, could be the first ever binding global fuel-intensity and compliance framework for international shipping: a declining greenhouse gas fuel intensity standard for ships above 5,000 GT, backed by a two-tier compliance pricing mechanism of USD 100 and USD 380 per tonne of CO₂-equivalent and an IMO Net-Zero Fund that rewards zero and near-zero emission fuels. Adoption was blocked in October 2025 after intense political pressure, principally from the United States and Saudi Arabia, and the vote was adjourned by one year. MEPC 84 in April 2026 stabilised support and agreed a work plan toward the decision point: MEPC 85 runs 30 November to 3 December 2026, with the resumed extraordinary session on 4 December 2026. If adopted then, the framework would enter into force in 2028 and take effect from 2029.

Demand for green fuels grows under every scenario

The IMO's 2023 strategy targets 5 to 10 percent zero or near-zero emission energy in international shipping by 2030, against a global fuel base of roughly 300 million tonnes a year. The Global Maritime Forum estimated the 2025 order book will generate only about a third of the vessel demand needed for the 5 percent floor, a shortfall of roughly 9 million tonnes of fuel oil equivalent. DNV projects 70 to 100 Mtoe of low-GHG fuel supply across all sectors by 2030, with shipping competing against aviation and industry for it. Whoever produces certified green molecules at scale and at credible cost will find buyers. India's auctions have now discovered green ammonia prices of Rs 49.75 to Rs 64.74 per kg for 724,000 tonnes a year of supply, among the most competitive benchmarks recorded anywhere.

India has built the policy scaffolding

Under the National Green Hydrogen Mission, MNRE and MoPSW are funding vessel retrofits and port bunkering pilots, and have designated Deendayal (Kandla), Paradip, and V.O. Chidambaranar (Tuticorin) as green hydrogen hub ports, which now anchor over 12 million tonnes a year of announced production projects. Harit Sagar green port guidelines set renewable energy and electrification targets to 2047. The Green Tug Transition Programme has electric tug orders at four major ports and a 100-tug pipeline valued at about Rs 12,000 crore. A Rs 69,725 crore shipbuilding and maritime finance package, five new maritime Acts passed in 2025, and infrastructure status for large vessels complete the platform. On 2 April 2026, Deendayal Port conducted India's first DNV-certified shore-to-ship methanol bunkering trial on the Rotterdam-

Singapore trade lane, making Kandla the only Indian port with demonstrated methanol bunkering capability.

Corridors are the delivery mechanism

India and the European Union are developing green shipping corridors under the EU-India Connectivity Partnership, within the EU's Global Gateway strategy. RMI analysis puts potential e-fuel bunkering demand on a Rotterdam-India-Singapore corridor above 1 million tonnes a year by 2030, anchored on India's estimated export potential of 7 million tonnes a year of green methanol and 11 million tonnes a year of green ammonia. A domestic coastal corridor beginning with the Kandla-Tuticorin route is under development.

The strategic conclusion: regulation-driven demand for green marine fuels is arriving on two tracks, the European track already in force and the global track one vote away. India's cost position, port programme, and production pipeline give it a genuine claim on this market. The window to convert announcements into bankable supply is 2026 to 2030.



Message from the Director & CEO, GH2 India

Nishaanth Balashanmugam, Director & CEO, GH2 India

“India has spent three years building the supply side of the green hydrogen story: allocations, auctions, hub ports, and some of the most competitive prices discovered anywhere in the world. Shipping is where the demand side arrives first. European regulation is already pricing carbon on every voyage to the EEA, and the IMO's global framework is one vote away. The producers, ports, and shipowners who treat 2026 to 2030 as an execution window, not a waiting period, will define India's share of a market that grows under every scenario. GH2 India publishes this handbook through our Green Ports & Shipping Network so that no Indian stakeholder makes these decisions on incomplete information. Read Part VII first if you read nothing else. Then call us. Convening the value chain this transition requires is precisely what we exist to do.”

Part I. The global regulatory landscape

1.1 Why shipping, and why now

International shipping accounts for roughly 3 percent of global greenhouse gas emissions and consumes in the region of 300 million tonnes of fuel each year across a world fleet of about 100,000 commercial vessels. Because ships are long-lived assets, typically 20 to 30 years, and because marine fuel supply chains are global, decarbonisation cannot proceed ship by ship or port by port. It requires rules that change the economics of fuel itself.

The turning point was the 2023 IMO Strategy on Reduction of GHG Emissions from Ships, adopted unanimously at MEPC 80 in July 2023. It commits international shipping to net-zero emissions by or around 2050, with indicative checkpoints of at least 20 percent (striving for 30 percent) total emission reductions by 2030 and at least 70 percent (striving for 80 percent) by 2040, both against 2008 levels. Critically for fuel producers, it also sets a target for zero or near-zero GHG emission fuels, technologies, and energy sources to supply at least 5 percent, striving for 10 percent, of the energy used by international shipping by 2030. Every policy described in this handbook exists to deliver that strategy or to anticipate it.

Two regulatory tracks now run in parallel. The regional track, led by the European Union, is in force and being enforced. The global track, the IMO Net-Zero Framework, has been agreed in substance but awaits adoption. Understanding both, and the interaction between them, is the core competence this handbook aims to build.

1.2 FuelEU Maritime: the implemented benchmark

FuelEU Maritime, Regulation (EU) 2023/1805, is the most consequential green fuel regulation in force anywhere. It would apply to ships above 5,000 GT calling at EU and EEA ports, covering 100 percent of the energy used on voyages between EEA ports and at berth, and 50 percent of energy on voyages into or out of the EEA. It has applied since 1 January 2025.

The regulation does not price emissions directly. Instead it caps the well-to-wake greenhouse gas intensity of the energy used on board, measured in grams of CO₂-equivalent per megajoule and covering CO₂, methane, and nitrous oxide across the full fuel life cycle from production to propeller. The cap starts at 2 percent below the 2020 fleet baseline of 91.16 gCO₂e/MJ and tightens on a fixed schedule to 80 percent by 2050.

Period	Required reduction	Approx. GHG intensity limit	Practical meaning
2025-2029	2%	89.34 gCO ₂ e/MJ	Achievable with small bio-blends and LNG
2030-2034	6%	85.69 gCO ₂ e/MJ	Structural blending of renewable fuels begins
2035-2039	14.5%	77.94 gCO ₂ e/MJ	Fossil-only strategies become uneconomic
2040-2044	31%	62.90 gCO ₂ e/MJ	Deep uptake of e-fuels and biofuels required
2045-2049	62%	34.64 gCO ₂ e/MJ	Majority zero and near-zero energy

Period	Required reduction	Approx. GHG intensity limit	Practical meaning
From 2050	80%	18.23 gCO ₂ e/MJ	Near-full transition of energy used

Table 1. FuelEU Maritime GHG intensity reduction schedule, relative to the 2020 baseline of 91.16 gCO₂e/MJ (well-to-wake).

Compliance is managed annually per ship, with flexibility mechanisms that reward early movers. A ship that beats its target generates a surplus that can be banked for future years or pooled with deficit ships, including ships under different owners; a deficit can also be borrowed against the following year within limits. The penalty for an uncovered deficit is EUR 2,400 per tonne of VLSFO-equivalent energy, deliberately priced above every compliance alternative. Pooling has created a genuine market: surplus generated by dual-fuel vessels running on renewable fuels is now a tradable, revenue-generating asset.

Two provisions matter especially for green hydrogen derivatives. First, renewable fuels of non-biological origin, RFNBOs, which include e-methanol and e-ammonia produced from renewable electricity, count double toward compliance until the end of 2033, a multiplier that materially improves their effective cost position. Second, the regulation contains a conditional RFNBO sub-target: if RFNBOs account for less than 1 percent of the fuel mix in 2031, a mandatory 2 percent RFNBO quota applies from 2034. Producers should treat 2031 as a market-defining measurement year.

From 2030, container ships and passenger ships must additionally use onshore power supply or zero-emission technologies at berth in major EU ports, extending to all EU ports with OPS by 2035.

The first compliance cycle: what 2026 revealed

The 2025 reporting year closed on 31 December 2025 and the compliance machinery ran through the first half of 2026: verified ship reports by 31 January, verifier confirmation of each ship's compliance balance by 31 March, banking, borrowing, and pooling decisions recorded in the FuelEU database by 30 April, penalties paid between 1 May and 30 June, and FuelEU Documents of Compliance issued by 30 June. The cycle established the template every ship trading to Europe will now follow annually, and it converted GHG intensity from a projection into a line item on operating statements. The lesson operators drew, as compliance advisers have documented, is that fuel strategy, charterparty drafting, and emissions data quality now determine real financial outcomes.

Annual deadline	Obligation
31 January	FuelEU report for the previous year submitted to the verifier
31 March	Verified report and compliance balance recorded in the FuelEU database
30 April	Banking, borrowing, and pooling elections finalised; uncovered deficits crystallise
1 May - 30 June	Penalties paid where due
30 June	FuelEU Document of Compliance issued and carried on board

Table 2. The FuelEU Maritime annual compliance calendar, first executed January to June 2026.

1.3 EU ETS for shipping, and the widening regional patchwork

Alongside FuelEU, shipping entered the EU Emissions Trading System in 2024. Companies surrendered allowances for 40 percent of verified 2024 emissions, 70 percent of 2025 emissions, and from January 2026 the system is at full phase-in: 100 percent of covered emissions, now calculated in CO₂-equivalent terms including methane and nitrous oxide. Coverage mirrors FuelEU geography: all emissions between EEA ports and at berth, half of emissions on voyages in or out. EU MRV coverage expanded from 1 January 2025 to include general cargo ships of 400–4,999 GT and offshore ships of 400 GT and above. Separately, offshore ships of 5,000 GT and above will enter the EU ETS from the 2027 reporting period. General cargo and offshore ships of 400–4,999 GT are not currently included in the EU ETS; their possible inclusion remains subject to review and further legislation. The UK ETS for maritime launched on 1 July 2026, and new IMO emission control areas, including the North-East Atlantic ECA adopted at MEPC 84, add further regional layers. The practical consequence is that a globally uniform rule, whatever its imperfections, is now cheaper for industry than the accumulating patchwork.

1.4 The IMO Net-Zero Framework: architecture

The Net-Zero Framework, NZF, is the IMO's proposed regulatory instrument for delivering the 2023 strategy. It was approved at MEPC 83 in April 2025 as a new Chapter 5 of MARPOL Annex VI, whose 100-plus parties cover roughly 97 percent of world merchant tonnage. It applies to ships above 5,000 GT engaged in international trade, the segment responsible for about 85 percent of international shipping's CO₂. The framework's proposed architecture is outlined below, while Section 1.5 examines its political and procedural status in greater detail.

The framework combines two linked elements: a global greenhouse-gas fuel-intensity standard and a tiered compliance mechanism.

The global fuel standard. Covered ships would calculate an attained annual greenhouse gas fuel intensity, GFI, the weighted average well-to-wake emissions per megajoule of all energy used on board, including shore power and wind or solar assistance, measured against a 2008 reference of 93.3 gCO₂e/MJ. The attained GFI is compared against two declining targets: a Base Target and a stricter Direct Compliance Target.

The pricing mechanism. A ship whose GFI lands between the two targets carries a Tier 1 deficit, remediable at USD 100 per tonne of CO₂-equivalent. A ship above the Base Target additionally carries a Tier 2 deficit at USD 380 per tonne. Ships that beat the Direct Compliance Target earn Surplus Units, which are valid for two years and can be banked, or sold to ships needing to cover Tier 2 deficits. Remedial unit prices are fixed for 2028 to 2030 and subject to review thereafter. Revenues would flow to a new IMO Net-Zero Fund, which will finance rewards for zero and near-zero emission fuels, ZNZs, defined as fuels below 19 gCO₂e/MJ well-to-wake until 2034 and below 14 gCO₂e/MJ from 2035, and support a just and equitable transition, including for developing countries, small island states, and seafarer training.

Year	Base Target reduction	Direct Compliance reduction	Reading
2028	4%	17%	Fossil-only ships face Tier 1 costs from day one
2029	6%	19%	Compliance gap widens

Year	Base Target reduction	Direct Compliance reduction	Reading
2030	8%	21%	Aligned with the 2030 checkpoint and ZNZ target
2031	12%	25%	RU prices reset from this year, subject to MEPC review
2032	17%	30%	Blending becomes structural, not marginal
2033	21%	34%	
2034	26%	39%	Last year of the 19 gCO ₂ e/MJ ZNZ threshold
2035	30%	43%	ZNZ threshold tightens to 14 gCO ₂ e/MJ

Table 3. NZF GHG fuel intensity targets, expressed as reductions from the 2008 baseline of 93.3 gCO₂e/MJ. Targets beyond 2035 are to be set by future MEPC decisions.

The framework is technology neutral. It does not mandate any fuel; it prices greenhouse gas intensity and lets ammonia, methanol, hydrogen, advanced biofuels, onboard carbon capture, wind assistance, and efficiency compete on measured performance. Supporting guidelines, on fuel life cycle assessment and certification, the GFI registry, ZNZ reward levels, and Net-Zero Fund disbursement, are being developed in parallel and are examined in the commentary below.

1.5 Commentary: the NZF, what happened, and what to expect

This section is GH2 India's assessment. It draws on the meeting record, published analysis, and our engagement with industry, and it is written for decision-makers who need to know what the turbulence of the past year actually means.

What happened in October 2025

Adoption at the second extraordinary session of the MEPC, held 14 to 17 October 2025, was widely expected to be procedural. A clear majority had approved the framework at MEPC 83 six months earlier. Instead, the session collapsed under political pressure of a kind the consensus-driven IMO had not previously experienced. The United States, which had walked out of MEPC 83 midway, campaigned openly against adoption, with reported pressure on vulnerable states in the Caribbean, Africa, and the Pacific; Saudi Arabia pursued procedural delay. Member states voted 57 to 49, with 21 abstentions, to adjourn the session for twelve months rather than force adoption on a narrow and politically contested majority. The postponement was a setback for the EU, Brazil, and the large coalition of states and industry that had backed the deal, and it pushed the earliest realistic entry into force from 2027 toward 2028-2029.

Two things did not happen, and both matter. The framework was not defeated: no majority existed to kill it. And the technical work did not stop: the intersessional working group met one week later as scheduled and has continued through informal groups since.

What happened between October 2025 and mid-2026

Work on the implementation guidelines advanced materially. Draft texts now exist for the global fuel standard, zero and near-zero fuel rewards, and fuel pathway certification; the life cycle

emission factors are under review by GESAMP, the UN's joint scientific expert group. The least developed element remains the IMO Net-Zero Fund, whose disbursement architecture is central to securing Global South support, and where key submissions were made to MEPC 84.

MEPC 84, held in London from 27 April to 1 May 2026 immediately after the ISWG-GHG 21 intersessional, was the first formal test of sentiment after the adjournment. At MEPC 84, the United States continued to oppose the Net-Zero Framework in its approved form but signalled a willingness to explore alternative approaches. Following the session, the US delegation presented the discussions as constructive engagement aimed at identifying a different path forward. This did not amount to support for the existing framework, but it suggested a shift from outright opposition towards seeking an alternative compromise.

Liberia and Panama, flag states for roughly a third of world tonnage, tabled a counter-proposal with Argentina that would have stripped the pricing mechanism from the framework. Small island developing states and least developed countries pressed in the opposite direction, for adoption and in some cases strengthening; an analysis by Climate Analytics and the Climate Action Tracker proposed converting the Tier 1 mechanism into a de facto levy at USD 300 per tonne to close the transition financing gap, which it estimates at around USD 95 billion annually. After a difficult week, the committee agreed late on the final day on a forward work plan, the J7 document, keeping the agreed MEPC 83 text as the basis and directing intersessional work through to November. Observers, including the ammonia energy community and classification societies, read the outcome as support stabilising: bruised, but back on track.

The industry position hardened in favour of adoption. A coalition of 87 signatories, including ports handling over 340 million tonnes of cargo annually and listed companies with a combined market value of around USD 140 billion, formally called on member states to adopt the framework in 2026, on the argument that the business case for e-fuel investment is materially weaker without it. The International Chamber of Shipping and the World Shipping Council have jointly backed a global framework over a regulatory patchwork. Opposition remains concentrated among some oil producers, parts of the US administration, and a flag-state coalition arguing the framework is unworkable as drafted.

What to expect: December 2026 and the scenarios that follow

The decision point is now fixed. MEPC 85 meets from 30 November to 3 December 2026, and the adjourned extraordinary session resumes on 4 December 2026. Four scenarios frame the outcome.

Adoption, potentially with amendments. Parties adopt a text based on the framework approved at MEPC 83, potentially incorporating amendments negotiated during the resumed extraordinary session. The extent of changes that can be accommodated during adoption without restarting the approval and circulation process will ultimately be determined by the participating parties. If adopted, the amendments would proceed through MARPOL's tacit-acceptance process before entering into force.

A second adjournment. A majority again votes to postpone rather than decide. The framework survives but in suspension, and each further delay erodes its credibility, accelerates the regional patchwork, and defers investment decisions across fuel production and fleet renewal. Lloyd's List has aptly called this the "coma scenario".

Substantial reopening of the text. Substantive amendment, whether to weaken pricing as the flag-state proposal sought or to strengthen it, would procedurally restart the approval-then-adoption cycle and add at least six months, likely more. Most member states have shown little appetite for this, precisely because the MEPC 83 text was itself a hard-won compromise; no alternative text has demonstrated the capacity to command a majority.

Failure to adopt. Adoption requires the support of two-thirds of MARPOL Annex VI parties present and voting. More than one-third voting against the amendments would therefore be sufficient to prevent adoption. Even following adoption, the amendments could be prevented from reaching acceptance if, during the tacit-acceptance period, objections were submitted by at least one-third of the parties or by parties representing at least 50 percent of world merchant-fleet tonnage.

GH2 India's assessment

Three judgements follow for Indian stakeholders. First, plan on the demand signal, not the vote. European regulation already prices greenhouse gas intensity for a large share of long-haul trade, the UK system is live, and the direction of the IMO process, whatever its speed, is not in serious doubt. Green fuel demand grows under every scenario above; the NZF changes its scale and timing, not its existence.

Second, the guidelines are where India's commercial interests are decided. Fuel certification rules, life cycle emission factors, the ZNZ reward level, and Net-Zero Fund disbursement criteria will determine whether Indian green ammonia and e-methanol are certifiable, bankable, and rewarded in the global system. India's delegation, industry, and research institutions should treat the intersessional work between now and November 2026, and the guideline finalisation expected through 2027, as a first-order national economic interest.

Third, the postponement bought India time it should not waste. Adoption in December 2026 remains uncertain and is likely to depend on whether a compromise can be reached that addresses US objections while retaining sufficient support among MARPOL Annex VI parties. If the framework is adopted in December 2026, the first compliance year could follow in 2029, and the proposed ZNZ rewards would favour fuels below 19 gCO₂e/MJ. Projects reaching final investment decision in 2026-2027 will be the ones selling into that market. The window is real, and it is short.

1.6 The three regimes compared

Feature	FuelEU Maritime	EU ETS (maritime)	IMO Net-Zero Framework*
Status	In force since 1 Jan 2025; first cycle completed 2026	In force; 100% phase-in from 2026	Approved Apr 2025; adoption vote 4 Dec 2026
Instrument	Well-to-wake GHG intensity cap on energy used	Cap-and-trade on emissions (allowances)	Well-to-wake GHG fuel intensity standard plus tiered pricing
Scope	Ships >5,000 GT at EEA ports; 100% intra-EEA, 50% in/out	Same geography; CO ₂ , CH ₄ and N ₂ O from 2026; offshore ships ≥5,000 GT from 2027	Ships >5,000 GT in international trade, ~85% of sector CO ₂

Feature	FuelEU Maritime	EU ETS (maritime)	IMO Net-Zero Framework*
Price signal	Penalty EUR 2,400/t VLSFO-eq; surplus trading via pooling	Market allowance price (EUA)	Tier 1 USD 100/tCO ₂ e; Tier 2 USD 380/tCO ₂ e (2028-2030)
Green fuel incentive	RFNBO 2x multiplier to 2033; possible 2% RFNBO quota from 2034	None fuel-specific; cost avoidance only	ZNZ rewards for fuels <19 gCO ₂ e/MJ (then <14 from 2035), funded by Net-Zero Fund
Revenue use	Penalties to member states, earmarked for maritime decarbonisation	ETS revenues incl. Innovation Fund	IMO Net-Zero Fund: ZNZ rewards and just transition support
First binding year	2025	2024 (40% phase-in)	2028 entry into force, 2029 first compliance year, if adopted Dec 2026

*Table 4. Comparison of the principal emissions regimes affecting international shipping. * The targets, thresholds, prices and implementation dates shown are based on the text approved at MEPC 83. They remain subject to formal adoption and possible amendment.*

The regimes interact. FuelEU and the NZF both regulate well-to-wake intensity, but with different baselines, targets, and flexibility rules; the EU has indicated that it will review its regional measures following the adoption of a global IMO framework, including to reduce overlapping compliance obligations, avoid duplicative carbon costs and improve consistency between regional and international rules, and MEPC 84's life cycle assessment methodology work feeds directly into FuelEU's certification chain. For a fuel producer, one discipline covers all three: rigorous, third-party-certified well-to-wake carbon accounting from renewable power source to delivered molecule.

Part II. The demand outlook for green marine fuels

2.1 The global picture: a supply-constrained decade

International shipping consumes roughly 300 million tonnes of fuel oil equivalent annually, within a 200-300 million tonnes of oil equivalent (hereafter Mtoe) range depending on measurement basis. The IMO's 5 to 10 percent zero and near-zero target for 2030 therefore implies demand in the order of 15 to 30 Mtoe of ZNZ energy within four years, before counting the pull from FuelEU compliance, ETS cost avoidance, and voluntary corporate commitments.

The supply and demand sides are both off track, but asymmetrically. On demand, the Global Maritime Forum's 2025 progress assessment found that the current order book of vessels capable of running on scalable zero-emission fuels would deliver only around a third of the demand needed for the 5 percent floor, a shortfall of roughly 9 million tonnes of fuel oil equivalent, equivalent to about 400 large container ships. On supply, announced projects could in principle exceed the 5 percent requirement and even reach 10 percent in optimistic scenarios, but conversion to financed capacity is the binding constraint: DNV's Maritime Forecast reports that only about 4 percent of hydrogen-derived fuel projects worldwide have reached final investment decision and roughly 1 percent are operational. DNV projects total low-GHG fuel supply of 70 to 100 Mtoe by 2030 across all sectors, with shipping competing against aviation, trucking, and industry for a small share of it.

The structural conclusion is that credible, certified, competitively priced green fuel will be demand-long through 2030 and probably well beyond. The commercial question is not whether buyers exist but which producers can deliver certified molecules at bankable cost, at ports where ships actually call.

2.2 What each policy converts into demand

FuelEU Maritime creates immediate, priced demand. Every percentage point of intensity reduction across the EEA-touching fleet must be met with lower-carbon energy or paid for at EUR 2,400 per tonne of VLSFO-equivalent. The RFNBO double-counting multiplier to 2033 effectively halves the compliance quantity an e-fuel must displace, a direct subsidy to green hydrogen derivatives, and the conditional 2 percent RFNBO quota from 2034 puts a floor scenario of several million tonnes of e-fuel demand on European trades alone.

The EU ETS adds a carbon cost on every tonne of fossil fuel burned on covered voyages, at full scope from 2026. It does not distinguish among compliant fuels, but it widens the cost gap that green fuels must close.

The IMO NZF, if adopted in December 2026, globalises the signal from 2028-2029. The two remedial unit prices function as the world's first universal reference prices for shipping carbon: USD 100 per tonne for marginal non-compliance and USD 380 for fuels above the Base Target. The ZNZ reward mechanism, funded from those revenues, is designed specifically to close the cost gap for fuels below 19 gCO_{2e}/MJ, which in practice means renewable ammonia, renewable methanol and hydrogen, and the most rigorous biofuel pathways. Climate Action Tracker modelling finds the framework as drafted would hold shipping emissions near a 2 degree trajectory against roughly 4 degrees under business as usual, and its financing analyses point to a transition investment need of about USD 95 billion annually.

2.3 India's position in the demand equation

India enters this market with three demonstrated advantages: cost, coastline, and policy depth.

Cost. SECI's green ammonia auction under SIGHT Mode 2A, concluded in 2025 with agreements signing through 2026, discovered prices of Rs 49.75 to Rs 64.74 per kg for 724,000 tonnes per annum across 13 fertiliser plants on ten-year contracts, roughly half of prevailing global benchmark prices and among the most competitive discovered anywhere. By March 2026, agreements covering 670,000 tpa had been signed by ACME Cleantech, Jakson Green, NTPC Green Energy, Oriana Power, and an SCC Infrastructure-InSolare consortium. These fertiliser- sector prices are the credibility benchmark maritime buyers will reference when Indian bunker fuel offers reach the market.

Production pipeline. Under the SIGHT programme, 19 companies hold cumulative allocations of 862,000 tonnes per annum of green hydrogen production, and 15 firms hold awards for 3,000 MW per annum of electrolyser manufacturing capacity. Announced projects anchored at the three hub ports alone exceed 12 million tonnes a year of green hydrogen and derivatives, per RMI analysis. Commissioned production stood at approximately 8,000 tonnes per annum as of February 2026, a reminder that the gap between allocation and steel in the ground is the central execution challenge of the mission's second phase. GH2 India's own market tracking, maintained for our members, records announced Indian green hydrogen and derivative offtake momentum of approximately 446,000 to 493,000 tonnes of hydrogen equivalent, a figure we fact-check line by line and update as agreements firm.

Export potential. RMI's Sailing Towards Net Zero analysis estimates Indian export potential of 7 million tonnes a year of green methanol and 11 million tonnes a year of green ammonia by 2030, and finds that a Rotterdam-India-Singapore green corridor could aggregate more than 1 million tonnes a year of e-fuel bunkering demand by 2030, anchored at V.O. Chidambaranar Port. India's stated ambition of building capacity to export around 5 million tonnes of green hydrogen and derivatives annually by 2030 sits within these estimates.

Demand or supply signal	Quantum	Source
Global marine fuel consumption	~300 Mt fuel oil eq. per year	MMMCZCS; Global Maritime Forum
IMO 2030 ZNZ energy target	5-10% of energy used	2023 IMO GHG Strategy
SZEF demand gap to the 5% floor	~9 Mt fuel oil eq. (order book delivers ~1/3 of need)	Global Maritime Forum, 2025
Low-GHG fuel supply, all sectors, 2030	70-100 Mtoe projected	DNV Maritime Forecast to 2050
Hydrogen-derived fuel projects at FID	~4% of announced projects	DNV Maritime Forecast to 2050
India green ammonia auction (SIGHT 2A)	724,000 tpa at Rs 49.75-64.74/kg; 670,000 tpa contracted	SECI, 2025-2026
India green H2 production allocations	862,000 tpa across 19 companies	MNRE/SECI, SIGHT
Announced projects at Indian hub ports	>12 Mt/y H2 and derivatives	RMI, 2026

Demand or supply signal	Quantum	Source
India export potential by 2030	7 Mt/y green methanol; 11 Mt/y green ammonia	RMI, Sailing Towards Net Zero
Rotterdam-India-Singapore corridor bunkering	>1 Mt/y e-fuel demand by 2030	RMI, 2026
Contracted Indian offtake momentum	~493,000 t H2-equivalent (July 2026)	GH2 India market tracking, 2026

Table 5. Key demand and supply reference points for green marine fuels, as at July 2026.

Part III. India's policy architecture for green shipping

3.1 The institutional map

Four institutions carry the Indian green shipping agenda. The Ministry of New and Renewable Energy, MNRE, owns the National Green Hydrogen Mission and its budget. The Ministry of Ports, Shipping and Waterways, MoPSW, owns port policy, fleet policy, shipbuilding, and the implementation of the mission's shipping components. The Directorate General of Shipping, restyled the Director General of Maritime Administration under the Merchant Shipping Act 2025, is the maritime regulator and India's technical interface with the IMO. The major port authorities, statutory bodies under MoPSW, are the delivery agents on the ground, with Deendayal, Paradip, and V.O. Chidambaranar carrying the designated hub mandates.

3.2 National Green Hydrogen Mission support for shipping

The National Green Hydrogen Mission, approved in January 2023 with an outlay of Rs 19,744 crore through FY 2029-30, targets at least 5 million tonnes per annum of green hydrogen production capacity by 2030, supported by about 125 GW of dedicated renewable capacity and investment expectations exceeding Rs 8 lakh crore. Shipping is one of its designated end-use sectors, supported through three channels.

Shipping pilot scheme. Guidelines issued by MNRE on 1 February 2024 provide Rs 115 crore to FY 2025-26 for pilot projects implemented through MoPSW and nominated scheme implementing agencies. Component A, at Rs 80 crore, funds retrofitting of existing ocean-going and inland or coastal vessels with green methanol, green ammonia, or hydrogen fuel-cell propulsion; the Shipping Corporation of India is committed to retrofitting at least two ships to run on green hydrogen or its derivatives by 2027. Component B, at Rs 35 crore, funds bunkering and refuelling facilities for green hydrogen-based fuels at a port on an international shipping lane. Central assistance covers capital expenditure only, disbursed 20 percent on award, 70 percent against milestones, and 10 percent on completion, with outcomes to be published for industry learning.

Hub port designation. MNRE has recognised Deendayal Port Authority in Gujarat, Paradip Port Authority in Odisha, and V.O. Chidambaranar Port Authority in Tamil Nadu as green hydrogen hubs. Recognition under Component B2 of the hub guidelines carries no direct financial assistance, but projects within the hubs qualify for benefits across central and state schemes, and the designation has visibly catalysed land allocation and private commitment, detailed in Part IV.

SIGHT and the demand-side auctions. The Strategic Interventions for Green Hydrogen Transition programme provides production and electrolyser manufacturing incentives, and through SECI's aggregated ten-year offtake auctions has created the price discovery on which maritime fuel offers will build. The fertiliser-sector green ammonia auction is the template most directly transferable to bunker fuel procurement.

3.3 MoPSW policy: implemented

Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047 set the planning frame: MIV 2030 across ports, shipping, and waterways, and MAKV 2047 extending the horizon to port-led green industrialisation, green hydrogen hub ports, and net-zero alignment consistent with India's 2070 commitment.

Harit Sagar Green Port Guidelines, May 2023. The operative green port framework for major ports. Headline targets include over 60 percent renewable energy in port operations by 2030 rising to 90 percent by 2047, electrification of over 50 percent of port vehicles and cargo-handling equipment by 2030 rising to 90 percent by 2047, a 33 percent increase in green cover by 2047, and adoption of green hydrogen and ammonia as port fuels. The guidelines direct ports to incentivise cleaner ships and craft: priority berthing or rebates on berth dues for vessels using cleaner fuels or shore power, and incentives for private craft and truck operators running on methanol, ethanol, hydrogen, or electric drive. MoPSW reporting to Parliament in March 2026 credits the framework, together with the tug and shore power programmes, with measurable reductions in carbon intensity at major ports.

Green Tug Transition Programme. GTTP replaces conventional diesel harbour tugs with electric and hybrid tugs built in India. Four major ports, Deendayal, Jawaharlal Nehru, Visakhapatnam, and V.O. Chidambaranar, have placed work orders for electric tugs, and MoPSW reported at Singapore Maritime Week 2026 a procurement pipeline of 100 green tugs worth about Rs 12,000 crore, drawing strong bids at Indian shipyards. The programme doubles as industrial policy: it creates the first serial domestic order book for green vessels.

Harit Nauka, January 2024. Guidelines for the green transition of inland vessels, directing states toward electric and green-fuel inland fleets, the same logic as GTTP applied to India's National Waterways.

Onshore power supply and port electrification. OPS installation for berthed vessels, electrification of port equipment and railway lines, deployment of zero-emission trucks, and renewable procurement across major ports, implemented under Harit Sagar and MIV 2030.

The 2025 legislative reset. Parliament passed five maritime statutes in 2025: the Merchant Shipping Act 2025, assented on 18 August 2025, replacing the 1958 Act, aligning Indian law with IMO conventions and strengthening environmental and seafarer provisions; the Indian Ports Act 2025, replacing the 1908 Act and embedding environmental obligations including MARPOL compliance in port governance; the Coastal Shipping Act 2025, with green port provisions, a zero-discharge goal, cleaner-fuel mandates for coastal tonnage, and a coastal cargo target of 230 million tonnes by 2030; and the Carriage of Goods by Sea Act 2025 and Bills of Lading Act 2025 modernising commercial law. Together they give the green transition a statute-level foundation it previously lacked.

The shipbuilding and maritime finance package, September 2025. The Union Cabinet approved a Rs 69,725 crore package on a four-pillar design: the Shipbuilding Financial Assistance Scheme at Rs 24,736 crore, extended to 31 March 2036, to offset the cost disadvantage of Indian yards; the Maritime Development Fund at Rs 25,000 crore for long-tenor maritime financing, with guidelines issued on 20 February 2026 and SBI Ventures appointed fund manager for the Maritime Investment Fund on 26 May 2026; and the Shipbuilding Development Scheme at Rs 19,989 crore targeting 4.5 million GT of annual build capacity, under which three greenfield clusters in Andhra Pradesh, Gujarat, and Tamil Nadu hold in-principle approval alongside brownfield expansion at four yards. Supporting reforms include infrastructure status, notified 19 September 2025, for Indian-flagged vessels of 10,000 GT and above and India-built vessels of 1,500 GT and above; a demand-aggregation fleet acquisition plan of over 400 vessels; and the India Ship Technology Centre for design and R&D. UNCTAD data records Indian shipbuilding output rising 41 percent from 40,923 GT in 2024 to 57,637 GT in 2025. For green

shipping the significance is direct: assistance structures reward specialised and green tonnage, and the 400-vessel pipeline plus the 100-tug programme are the natural home for dual-fuel and electric newbuild specifications.

3.4 MoPSW policy: upcoming and in development

A national maritime decarbonisation framework. The Director General of Shipping outlined in June 2026 a National Maritime Decarbonization Policy Framework under MoPSW's direction, built on eight pillars, beginning with green shipping, covering energy efficiency and conversion of existing tonnage to net-zero fuel propulsion, and green ports, covering ecosystem greening across major ports in line with Harit Sagar and the Maritime India Vision. Formal notification and implementation detail should be watched through 2026-27; it is the likely vehicle for aligning Indian regulation with whatever the IMO adopts in December 2026.

Coastal green shipping corridor. MoPSW has announced development of a domestic green corridor beginning with the Kandla-Tuticorin route, pairing the two hub ports on a working coastal trade lane. Corridor design, fuel choice, and vessel commitments are the open questions; GH2 India's view is that pairing the corridor with GTTP tugs and SCI retrofit tonnage would give it early, visible traffic.

Bunkering infrastructure build-out. Following the Kandla methanol trial, expect commissioning of methanol and ammonia storage and bunkering at the hub ports through 2026-2028, including the Paradip dedicated green jetty approved in February 2026 and the Aegis Vopak facilities at VOC and Kandla, detailed in Part IV, and the Component B pilot facility under the NGHM.

Deployment of the finance stack. MDF and MIF capital deployment, SBFAS in-principle approvals converting to contracts, in the last two years financial assistance approvals under the assistance schemes cover contract value of Rs 15,234 crore, and greenfield cluster construction are the 2026-2028 execution agenda.

Policy instrument	Status	What it does	Green fuel relevance
NGHM (Jan 2023)	In force	Rs 19,744 cr mission; 5 MMT/y green H2 by 2030	Creates the fuel supply base and hub ports
NGHM shipping pilots (Feb 2024)	In force	Rs 115 cr: vessel retrofits (A), port bunkering (B)	First funded green vessels and bunkering
Hub port designation	In force	Deendayal, Paradip, VOC recognised by MNRE	Anchors >12 Mt/y announced projects
Harit Sagar (May 2023)	In force	Green port targets to 2030/2047; ship incentives	Berth-dues rebates for green-fuel vessels
GTTP	In force	Electric/hybrid tugs; orders at 4 major ports	100-tug, ~Rs 12,000 cr green vessel pipeline
Harit Nauka (Jan 2024)	In force	Green transition of inland vessels	Extends demand to waterways fleets
Merchant Shipping Act 2025	In force	Replaces 1958 Act; IMO alignment; DGMA	Statutory base for adopting IMO green rules
Indian Ports Act 2025	In force	Replaces 1908 Act; environmental obligations	Green governance across all ports

Policy instrument	Status	What it does	Green fuel relevance
Coastal Shipping Act 2025	In force	Coastal licensing; 230 Mt coastal cargo by 2030	Cleaner-fuel mandates for coastal tonnage
Shipbuilding package (Sep 2025)	Rolling out	Rs 69,725 cr: SBFAS, MDF, SbDS, skilling	Finances green newbuilds and yards
Infrastructure status (Sep 2025)	In force	Large and India-built vessels as infrastructure	Cheaper, longer-tenor vessel finance
Maritime decarbonisation framework	Upcoming	Eight-pillar national framework (DGS, 2026)	Vehicle for NZF-aligned national rules
Kandla-Tuticorin green corridor	Upcoming	First domestic coastal green corridor	Guaranteed first demand for Indian green fuel

Table 6. India's green shipping policy matrix, July 2026.

Part IV. Pilots and first movers on the ground

Policy is credible when steel moves. The following are the projects that make India's green shipping programme tangible as of July 2026.

Kandla: India's first methanol bunkering

On 2 April 2026, Deendayal Port at Kandla conducted India's first shore-to-ship methanol bunkering trial, certified by DNV, on the Rotterdam-Singapore corridor. Kandla is currently the only Indian port with demonstrated methanol bunkering capability. The trial converts Kandla from a prospective hub into an operating node on the world's flagship green corridor, and it is the proof point on which Indian methanol bunkering offers will be marketed. At the same port, industry partners L&T, Reliance, Welspun, and AM Green have collectively taken approximately 3,400 acres for green hydrogen and ammonia production facilities, and Deendayal Port Authority has signed with Aegis Vopak to develop an e-methanol bunkering facility with shared, common-user storage enabling storage, export, and coastal movement of green ammonia and green methanol.

Paradip: the dedicated green jetty

MoPSW approved in February 2026 a dedicated jetty with allied facilities at Paradip Port for handling up to 4 million tonnes per annum of green hydrogen, green ammonia, and other liquid cargo, purpose-built export infrastructure at the eastern hub.

V.O. Chidambaranar: the corridor anchor

VOC Port has allocated about 500 acres for its green hydrogen hub and has signed with Aegis Vopak to develop large-scale green fuel storage and bunkering infrastructure to global standards. RMI's corridor analysis positions VOC as the anchor for the Rotterdam-India-Singapore route, India's most commercially credible international green corridor entry.

Vessel-side pilots

Under the NGHM shipping pilot scheme, the Shipping Corporation of India is to retrofit at least two vessels to green methanol, green ammonia, or hydrogen fuel-cell propulsion by 2027, with executing agencies mandated to publish findings on safety, operations, and cost. Under GTTP, electric tug work orders stand at Deendayal, Jawaharlal Nehru, Visakhapatnam, and VOC ports, with the 100-tug pipeline in procurement. AM Green's Kakinada complex, the repurposed 495-acre former Nagarjuna Fertilizers site on the Kakinada deep-water port, took FID in August 2024 and is in execution as India's first commercial-scale green ammonia and hydrogen facility, with an offtake memorandum with the Port of Rotterdam for an India-Europe green energy supply chain.

Project	Location	Status (Jul 2026)	Why it matters
Shore-to-ship methanol bunkering trial	Deendayal Port, Kandla	Completed 2 Apr 2026, DNV-certified	India's first; on Rotterdam-Singapore corridor
Green H ₂ /ammonia production land	Kandla	~3,400 acres to L&T, Reliance, Welspun, AM Green	Hub-scale production adjacent to berth
e-Methanol bunkering + common storage	Kandla (DPA + Aegis Vopak)	MoU signed 2026	Storage, export, coastal movement of green fuels

Project	Location	Status (Jul 2026)	Why it matters
Dedicated green jetty, 4 mtpa	Paradip	Approved Feb 2026	Purpose-built green export infrastructure
Green fuel storage and bunkering	VOC, Tuticorin (Aegis Vopak)	MoU signed 2026	Anchor of Rotterdam-India-Singapore corridor
Green H2 hub land	VOC, Tuticorin	~500 acres allocated	Southern hub production base
SCI vessel retrofits (NGHM Component A)	Fleet	At least 2 ships by 2027	India's first green-fuel ocean tonnage
Port bunkering pilot (NGHM Component B)	Port on international lane	Rs 35 cr CFA; implementation	First funded green bunkering facility
GTTP electric tugs	Deendayal, JNPA, Visakhapatnam, VOC	Work orders placed; 100-tug pipeline ~Rs 12,000 cr	Serial domestic green vessel order book
AM Green ammonia complex	Kakinada	FID Aug 2024; in execution	First commercial-scale plant; Rotterdam offtake MoU

Table 7. Flagship Indian green shipping pilots and projects.

Pattern to note: every entry above pairs a public instrument, hub designation, pilot funding, or port authority land, with private capital. That pairing, not either element alone, is what has moved these projects.

Part V. Green shipping corridors and international cooperation

5.1 The corridor concept

A green shipping corridor is a specific trade route on which ports, shipowners, fuel suppliers, and governments coordinate so that vessels can run on zero or near-zero emission fuels. The concept, catalysed by the 2021 Clydebank Declaration at COP26, seeks to overcome the chicken-and-egg problem of the transition where demand won't grow without supply, and vice versa. Therefore, actors come together to enable the whole value chain to move at once on a route where volumes and demand justify it. The operating example is Rotterdam-Singapore, launched in 2022, where both ports are building storage for ammonia and methanol and on which the first green-fuelled services will run.

5.2 India and the European Union: corridors under the Global Gateway

India and the EU are developing green shipping corridors as part of the EU-India Connectivity Partnership and bilateral transport cooperation, the maritime arm of the EU's Global Gateway investment strategy. Analysis from the Institute of South Asian Studies notes that the corridors institutionalise climate cooperation alongside the EU-India trade negotiations, and identifies the hard problems candidly: bunkering and storage infrastructure at both ends, internal transport, large capital requirements, and the dependence of private port investment on demonstrated demand from global lines. The building blocks are moving into place: Maersk and MSC dual-fuel fleets on Europe-Asia trades, the Port of Rotterdam's green fuel import ambitions, its offtake memorandum with AM Green, and India's hub ports.

The commercially decisive configuration, per RMI, is Rotterdam-India-Singapore: aggregating demand across three major hubs could unlock more than 1 million tonnes a year of e-fuel bunkering demand by 2030, anchored at VOC and drawing on India's methanol and ammonia export potential. Its lessons, shared infrastructure, standardised certification, harmonised policy with early-mover partners, are designed to cascade to domestic routes.

5.3 Singapore, and the domestic corridor

India and Singapore have been developing cooperation on a green and digital shipping corridor since 2025, pairing India's fuel production potential with the world's largest bunkering hub and its established frameworks for methanol and ammonia bunkering trials. Domestically, MoPSW's coastal green corridor beginning with Kandla-Tuticorin links the western and southern hub ports on an operating cabotage lane; RMI's assessment is that domestic corridors such as VOC-Deendayal are essential learning platforms even where scale initially constrains their standalone economics, and that they inherit cost efficiencies from the international route.

GH2 India's position: India should pursue the international and domestic corridors as one programme, with common fuel standards, common certification, and shared bunkering assets, so that every tonne of storage and every trained crew serves both.

Part VI. The research landscape: who to read, and what they argue

Green shipping policy is unusually well served by independent research. This section maps the institutions GH2 India tracks continuously, their viewpoints, and their most decision-relevant recent output.

6.1 Maersk Mc-Kinney Moller Center for Zero Carbon Shipping (MMMCZCS)

The Copenhagen-based, not-for-profit centre is the maritime transition's de facto applied research institution, founded in 2020 with partners including ABS, A.P. Moller-Maersk, Cargill, Everllence (formerly MAN Energy Solutions), Mitsubishi Heavy Industries, NYK Line, and Siemens Energy. Its consistent position across publications and newsletters: decarbonisation requires multiple parallel fuel pathways rather than a single winner; the cost gap between fossil and zero-emission fuels is the binding constraint and must be closed by regulation; and credible life cycle assessment and fuel certification are preconditions for everything else, a position it has advanced formally in the IMO's LCA workstream since MEPC 81.

Output GH2 India flags for members: the Fuel Pathway Maturity Map, an interactive readiness assessment of every major fuel value chain; the NZF explainers and the Countdown series tracking the framework negotiations, with an updated compliance cost calculator reflecting the agreed tier prices; the ammonia safety programme, including crew risk recommendations and a survey of over 2,000 maritime workers finding willingness to sail on ammonia-fuelled vessels contingent on comprehensive training; Katalist, the not-for-profit book-and-claim registry launched with RMI, already used by the Zero Emission Maritime Buyers Alliance to claim sustainable marine fuel from its first tenders; a 2026 project on removing barriers to energy efficiency technology adoption; and an IMO DCS dashboard for fuel consumption reporting. For Indian producers, the centre's certification and LCA advocacy is the technical agenda to align with; for Indian ports, its ammonia safety work is the reference for bunkering readiness.

6.2 Global Maritime Forum and the Getting to Zero Coalition

The Global Maritime Forum convenes the industry-policy interface and publishes the definitive annual tracking of the 2030 ZNZ target. Its 2025 assessment: technology is progressing well, methanol engines commercial and ammonia engines in final testing; supply could exceed the 5 percent target if announced projects deliver; demand and finance are off track, with the order book generating only about a third of required SZE demand and funding flowing disproportionately to conventional tonnage. Its NZF guide and scenarios work, quoted throughout Part I, is the clearest public account of where the framework stands. The Getting to Zero Coalition's book-and-claim workstream feeds the Katalist system.

Through the Getting to Zero Coalition, GMF also brings together first movers from shipping, ports, fuel and energy, cargo, finance and supporting organisations to advance commercially viable zero-emission shipping. Its membership includes Indian hub ports Deendayal Port Authority and V.O. Chidambaranar Port Authority, providing a direct connection between India's port-led green- fuel programme and the wider international transition. The Coalition's 2026 Action Framework documents member progress across enabling conditions, market creation, transition investment and early deployment.

6.3 RMI

RMI is the most India-engaged of the global energy institutes on shipping. Sailing Towards Net Zero and its 2026 corridor analysis argue that green corridors are the mechanism by which India's hydrogen ecosystem reaches scale, quantify export potential at 7 Mt/y methanol and 11 Mt/y ammonia by 2030, identify the Rotterdam-India-Singapore route as transformative, and treat domestic corridors as learning platforms. RMI co-built Katalist with MMMCZCS.

6.4 DNV

A classification society rather than a think tank, but its Maritime Forecast to 2050 is the industry's standard scenario reference: 70-100 Mtoe of low-GHG fuel supply by 2030 across sectors, the FID gap in hydrogen-derived projects, near-doubling of the alternative-fuel fleet between 2024 and 2028 on the current order book, and quantified contributions from onboard carbon capture and wind-assisted propulsion. Its MEPC briefings are the fastest reliable read-out of IMO sessions.

6.5 Climate Analytics and the Climate Action Tracker

The climate-science flank of the debate. Their April 2026 briefing, Rescuing Shipping's Net Zero Framework, finds the NZF as drafted consistent with holding shipping near a 2 degree pathway against roughly 4 degrees business as usual, argues it under-delivers against 1.5 degrees because of flexibility mechanisms, and proposes strengthening: converting Tier 1 into an effective levy at USD 300 per tonne with full coverage from 2029, and designing Net-Zero Fund disbursement to strategically drive zero-emission fuel uptake against an estimated USD 95 billion annual transition financing need.

6.6 Others GH2 India tracks

Opportunity Green publishes accessible legal and equity-focused analysis of the NZF, including the factsheets cited in Part I. UMAS and UCL provide the quantitative modelling underpinning much IMO negotiation analysis. The International Council on Clean Transportation covers fuel life cycle science and regional regulation. Transport & Environment is the leading European civil-society voice on FuelEU and ETS design. In India, TERI convenes the green ports track at the World Sustainable Development Summit and works with MoPSW's National Centre of Excellence for Green Port and Shipping, and the Institute of South Asian Studies in Singapore publishes on India-EU maritime cooperation.

Institution	Core viewpoint	Flagship recent output
MMMCZCS	Multiple fuel pathways; close the cost gap; LCA and certification first	Fuel Pathway Maturity Map; NZF Countdown series; ammonia safety programme; Katalist (with RMI)
Global Maritime Forum	Track the 2030 ZNZ target; demand and finance are the gaps	2025 progress report (~9 Mt foe SZEFG gap); NZF guide and scenarios
RMI	Corridors scale India's hydrogen ecosystem	Sailing Towards Net Zero; 2026 India corridor analysis

Institution	Core viewpoint	Flagship recent output
DNV	Scenario planning under regulatory uncertainty	Maritime Forecast to 2050; MEPC 84 briefing
Climate Analytics / CAT	NZF is necessary but should be strengthened toward 1.5C	Rescuing Shipping's Net Zero Framework (Apr 2026)
Opportunity Green	Legal clarity and equity in IMO measures	NZF factsheet and in-depth guide
TERI / NCoEGPS	Operationalising Harit Sagar in Indian ports	WSDS 2026 green ports thematic track
ISAS (NUS)	India-EU corridors as strategic connectivity	India-EU Green Shipping Corridors brief (Feb 2026)

Table 8. The research landscape GH2 India monitors for its members.

Part VII. What this means for you

For shipowners and operators

Treat FuelEU as an operating condition, not a compliance project: the January-June cycle now recurs annually, and pooling strategy, charterparty allocation clauses, and verified data quality are worth real money. Model NZF exposure now using the Table 3 targets and the USD 100 and USD 380 reference prices; fossil-only operation of ships above 5,000 GT carries priced deficits from the first compliance year if the framework is adopted in December 2026. Specify newbuilds and major retrofits for fuel flexibility, and note that Indian yards now carry financial assistance, infrastructure status, and a growing green order book.

For fuel producers and project developers

Certification is the product. Well-to-wake carbon intensity, documented under frameworks compatible with FuelEU's RFNBO rules and the emerging IMO fuel certification guidelines, determines whether a molecule earns the 2x multiplier, ZNZ rewards, and premium offtake. Target the sub-19 gCO₂e/MJ threshold that defines ZNZ eligibility to 2034. Watch 2031: the FuelEU RFNBO review year that can trigger the 2 percent quota from 2034. And use the SECI auction template, aggregated demand, ten-year tenor, payment security, when structuring maritime offtake; it is the mechanism that made Indian green ammonia bankable at Rs 49.75- 64.74 per kg.

For ports and terminal operators

The hub port playbook is now demonstrated at Kandla: land allocation to anchor producers, common-user storage with an experienced terminal partner, a certified bunkering trial, and corridor alignment. Harit Sagar's incentive provisions, priority berthing and berth-dues rebates for green vessels, are available levers today. Ammonia bunkering readiness, using MMMCZCS safety recommendations and Singapore's trial frameworks as references, is the next capability gap worth closing early.

For policymakers

India's interests at the IMO through December 2026 are concrete: guideline outcomes on fuel certification, LCA factors, ZNZ reward levels, and Net-Zero Fund disbursement that recognise Indian production pathways and developing-country transition needs. Domestically, the highest-leverage moves visible from industry are notifying the national maritime decarbonisation framework with NZF-aligned metrics, extending SIGHT-style aggregated offtake to marine fuel procurement, funding the Kandla-Tuticorin corridor to first sailing, and holding the 2027 SCI retrofit and Component B bunkering milestones.

For cargo owners and the public

Freight buyers can contract green transport today through book-and-claim systems such as Katalist without waiting for green vessels on their specific routes, and their tenders, as ZEMBA's demonstrate, pull the market forward. For the public and for students: shipping is on course to become the first industry with a binding global emissions regime, India is positioned as a principal fuel supplier to it, and the decisions of 2026-2030 will settle how much of that value chain is built on Indian coasts.

Annex

A. Key dates to watch

Date	Event
1 July 2026	UK ETS for maritime launches
30 Sep 2026	EU ETS surrender deadline for 2025 emissions (70%)
30 Nov - 3 Dec 2026	IMO MEPC 85, London
4 Dec 2026	Resumed MEPC extraordinary session: NZF adoption decision
31 Jan 2027	FuelEU reports for 2026 due to verifiers; second compliance cycle begins
2027	SCI retrofit milestone: at least two green-fuel vessels (NGHM Component A)
1 Mar 2027	Target date for further IMO guidance on ZNZ rewards
2028	NZF entry into force (if adopted Dec 2026); MRV threshold extends to 400 GT (from 2027)
2029	First NZF compliance year (if adopted Dec 2026)
2030	FuelEU steps to 6%; OPS at berth mandatory for container and passenger ships; IMO 2030 checkpoints; NGHM 5 MMT target year
2031	FuelEU RFNBO review year; NZF remedial unit prices reset from this year
2034/2035	Possible 2% RFNBO quota begins; ZNZ threshold tightens to 14 gCO ₂ e/MJ; FuelEU steps to 14.5%

Table 9. Regulatory and programme calendar, 2026-2035.

B. Abbreviations

Term	Meaning
CII / EEXI	Carbon Intensity Indicator / Energy Efficiency Existing Ship Index (earlier IMO measures)
DGMA	Director General of Maritime Administration (formerly DG Shipping)
GFI	Greenhouse gas fuel intensity, gCO ₂ e/MJ, well-to-wake
GTTP	Green Tug Transition Programme
MAKV 2047	Maritime Amrit Kaal Vision 2047
MDF / MIF	Maritime Development Fund / Maritime Investment Fund
MEPC	Marine Environment Protection Committee of the IMO
MIV 2030	Maritime India Vision 2030
MMMCZCS	Maersk Mc-Kinney Moller Center for Zero Carbon Shipping
Mtoe	Million tonnes of oil equivalent
NGHM	National Green Hydrogen Mission
NZF	IMO Net-Zero Framework
OPS	Onshore power supply (shore power)

Term	Meaning
RFNBO	Renewable fuel of non-biological origin (e-fuels from renewable electricity)
RU / SU	Remedial Unit / Surplus Unit under the NZF
SBFAS / SbDS	Shipbuilding Financial Assistance Scheme / Shipbuilding Development Scheme
SIGHT	Strategic Interventions for Green Hydrogen Transition
SZEF / ZNZ	Scalable zero-emission fuel / Zero or near-zero GHG emission fuel or technology
VLSFO	Very low sulphur fuel oil
Well-to-wake	Full fuel life cycle, from production to onboard use

Table 10. Abbreviations used in this handbook.

C. Sources and further reading

Primary regulation and official sources: Regulation (EU) 2023/1805 (FuelEU Maritime) and European Commission implementation pages; EU ETS Directive as applied to maritime; IMO MEPC 83, MEPC ES.2, ISWG-GHG 20/21, and MEPC 84 outcome documents and the IMO NZF FAQ; MNRE scheme guidelines for pilot projects on the use of green hydrogen in the shipping sector (1 February 2024) and SIGHT documentation; MoPSW: Harit Sagar Green Port Guidelines (2023), Harit Nauka (2024), GTTP materials, Maritime India Vision 2030, Maritime Amrit Kaal Vision 2047, Lok Sabha replies of March and July 2026, and the September 2025 Cabinet decisions on the shipbuilding package; the Merchant Shipping Act 2025, Indian Ports Act 2025, Coastal Shipping Act 2025, Carriage of Goods by Sea Act 2025, and Bills of Lading Act 2025.

Research and analysis: MMMCZCS, IMO Net-Zero Framework explainer, Countdown series, Fuel Pathway Maturity Map, ammonia safety publications; Global Maritime Forum, A Guide to the IMO's Net-Zero Framework (April 2026) and the 2025 progress report on the 2030 fuel target; RMI, Sailing Towards Net Zero and Green Shipping Corridors Can Help Scale India's Green Hydrogen Ecosystem (February 2026); DNV, Maritime Forecast to 2050 and MEPC 84 briefing; Climate Analytics and Climate Action Tracker, Rescuing Shipping's Net Zero Framework (April 2026); Opportunity Green NZF factsheets; European Parliament briefing on MEPC 84 (2026); ISAS, India-European Union Collaboration: Green Shipping Corridors (February 2026); Lloyd's List, Carbon Brief, and Argus Media reporting on the IMO negotiations; UNCTAD Review of Maritime Transport data on Indian shipbuilding output.

US Federal Maritime Commission, *Chairman DiBella's Statement on IMO Consideration of Alternatives to Net Zero Framework*, 30 April 2026.

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