



DAILY EDITORIAL ANALYSIS

TOPIC

**INDIA'S MARITIME AMBITION:
TIME TO BUILD OUR OWN MARINE
ENGINES**

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INDIA'S MARITIME AMBITION: TIME TO BUILD OUR OWN MARINE ENGINES

Context

- **India's shipbuilding industry** needs to develop **indigenous marine engine manufacturing capabilities** to avoid technological chokepoints and strengthen its maritime sector, which remains largely dependent on foreign suppliers.

India's Shipbuilding Industry: Current Status and Growth Trends

- **Market Value Surge:** The industry expanded from a valuation of \$90 million in 2022 to \$1.12 billion in 2024. Projections indicate a leap to \$8 billion by 2033, reflecting a robust compound annual growth rate (CAGR) of 60%.
- **Global Standing:** Despite this growth, India holds a mere 0.06% share in the global shipbuilding market, trailing behind leaders like China, South Korea, and Japan, which collectively dominate 94% of the market.
- **Dependence on Foreign Vessels:** India spends approximately \$90 billion annually on sea freight, primarily utilizing foreign-owned vessels.
- **Marine Engine Dependency:** Over 90% of engines above 6 MW on Indian vessels are sourced from just five global OEMs (Original Equipment Manufacturers).
 - ♦ These marine engines aren't just expensive, they're technologically locked down.
- **India's Future Plan:** India has ambitious plans to become a **top-five shipbuilding nation by 2047**, backed by strategic investments and policy support.

Indian Ship-Building Industry

- It can broadly be categorized into following three categories:
 - ♦ Large ocean-going vessels catering to overseas as well as coastal trade;
 - ♦ Medium size specialized vessels like Port Crafts, Fishing Trawlers, Offshore vessels, Inland and other smaller crafts and;
 - ♦ Defence/Naval crafts and Coast Guard Vessels etc

Major Shipyards & Research and Development Facilities in India

- There are a **total of eight Public Sector** Ship building and ship repairing companies presently functioning in the country.
- **Ministry of Ports Shipping & Waterways (MoPSW):**
 - ♦ Cochin Shipyard Limited, Kochi
 - ♦ Hooghly Cochin Shipyard Limited
- **Ministry of Defence:**
 - ♦ Hindustan Shipyard Limited, Visakhapatnam
 - ♦ Mazagon Dock Limited, Mumbai
 - ♦ Garden Reach Ship-builders and Engineers Limited, Kolkata.
 - ♦ Goa Shipyard Limited, Goa
- **Under Control of State Government:**
 - ♦ Shalimar Works Limited, Kolkata
 - ♦ Alcock Ashdown & (Co Gujarat) Ltd.

India's Challenges in Building Marine Engines

- **Technological Gap:** Modern marine engines are embedded with proprietary Electronic Control Units (ECUs), closed-source software, and IP-restricted components.
 - ♦ It increases procurement dependency and extends it to **diagnostics, updates, and maintenance**.

- **Import Dependencies:** Over 90% of marine engines above 6 MW used in Indian commercial and naval vessels are sourced from a handful of global manufacturers in Germany, Finland, UK, US, and Japan.
 - ♦ Marine engines account for 15–20% of a ship's cost and are central to its performance, emissions, and lifecycle.
- **Export Control Frameworks:** These like EU Dual-Use Regulation, U.S. Export Administration Regulations (EAR), and Japan's METI licensing controls can impose immediate embargoes under national security pretexts.
- **Design Capability Deficit:** Modern marine engine design is a multi-parameter optimization challenge, balancing propulsion efficiency, emissions, structural durability, and hybrid integration.
 - ♦ India's lack of indigenous design capabilities severely hampers its ability.
- **Metallurgical Limitations:** India's limited capacity in producing materials like *high-chromium steels, nickel-based superalloys, and thermally stable composites* at scale has hampered its **aero-engine programs**.
- **Tribology and Surface Engineering Bottlenecks:** Marine engine efficiency is deeply linked to tribology — the science of wear, lubrication, and friction.
 - ♦ India lacks scalable industrial ecosystems for these precision requirements. It requires:
 - Advanced ceramic and composite coatings
 - Precision surface engineering
 - Micron-level machining capability
- **Outdated Training Infrastructure:** India's top engineering institutes still rely on **obsolete training models**.
 - ♦ With **Alang — the world's largest ship-breaking yard** — on Indian soil, **modern decommissioned engines** should be repurposed for training and reverse engineering.

Related Government Initiatives & Efforts

- **Shipbuilding Financial Assistance Policy (SBFAP):** It has been instrumental in encouraging domestic shipyards by providing financial aid for specialized vessels, including wind farm installation ships and advanced dredgers.
- **Financial Assistance:** Up to 30% subsidy for vessels powered by green fuels like methanol, ammonia, and hydrogen fuel cells.
- **Procurement Preference:** Ships costing less than ₹200 crores must be procured from Indian shipyards.
- **Infrastructure Status:** Shipyards now enjoy infrastructure status, enabling access to cheaper long-term capital.
- **Right of First Refusal (RoFR):** Indian shipyards have priority in government tenders, ensuring more domestic contracts.
- **Union Budget 2025:** It has laid the foundation for a maritime resurgence with several transformative initiatives:
 - ♦ Mega shipbuilding clusters
 - ♦ A ₹25,000 crore Maritime Development Fund
 - ♦ Customs duty exemptions for critical imports
 - ♦ Infrastructure status for large vessels
- **Indigenous Engine Initiatives:** In April 2025, the Indian Navy sanctioned ₹270 crore to Kirloskar Oil Engines Ltd to develop a 6 MW medium-speed diesel engine.
 - ♦ But the real contest lies in the **30 MW class**, which powers large commercial and military vessels.

Way Forward

- India needs to diversify its innovation ecosystem. Large public and private firms alone cannot drive this transformation. The key lies in:

- ♦ Encouraging **marine propulsion-focused startups**
- ♦ Supporting them with **design-linked incentives** and **targeted R&D funds**
- ♦ Facilitating lab-to-market transitions through **institutes like IIT Madras**.
- These startups can inject agility, risk tolerance, and interdisciplinary approaches — all critical to engine innovation.
- To empower new ecosystem, India needs to **develop a national framework** that includes:
 - ♦ **Dedicated propulsion innovation missions**
 - ♦ Access to **marine-grade testbeds**
 - ♦ Public procurement guarantees to derisk startup involvement
 - ♦ Development and licensing of **domain-specific software** for combustion and thermodynamic simulation, 3D mechanical design, structural stress analysis, and control system development.

Conclusion

- India's maritime ambitions are real and rapidly materialising. With new shipyards, modernised facilities, and strong government backing, the nation is poised for a shipbuilding renaissance. But without the capability to design and manufacture **indigenous marine engines**, India risks building vessels that are Indian in flag, crew, and steel — but foreign in soul.

Source: IE

Mains Practice Question

[Q] Do you think India's push for indigenous marine engine production is a necessity for national security and economic growth, or could strategic global partnerships be a more effective approach? Justify your stance.

