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CASE STUDY

2025

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Season XII 2025

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Case Title

Navigating through Green Horizon – Tata Steel's Sustainability Challenge in evolving maritime landscape

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The Evolving Landscape of Sustainable Shipping

The international shipping industry is undergoing a profound transformation primarily driven by increasingly stringent sustainability regulations. This is being led by International Maritime Organization (IMO) and is reinforced by regional groups like European Union (EU) and UK. The sustainability focus has shifted from managing specific pollutants to achieving comprehensive decarbonization through market-based mechanisms.

A Timeline of Key Regulatory Shifts:

Regulatory framework on sustainable shipping has evolved over time and some of the key milestones are listed below:-

- **Early Focus (1997-2010s):** Initial regulations, such as MARPOL Annex VI (1997) and its 2005 enforcement, set mandatory global limits on sulfur oxide (SOx) and nitrogen oxide (NOx) emissions. Subsequent updates (2008) introduced more stringent Tier II and III standards, particularly for Emission Control Areas (ECAs). The introduction of the Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Management Plan (SEEMP) in 2011 marked the first global measures for energy efficiency to combat greenhouse gas (GHG) emissions.
- **Emergence of Decarbonization Goals (2018-2023):** The IMO's Initial GHG Strategy (2018) set ambitious targets: a 50% reduction in total annual GHG emissions by 2050 and a 40% reduction in carbon intensity by 2030 (vs. 2008). The IMO 2020 Sulphur Cap significantly reduced marine fuel sulfur content. Further measures like the EEXI (technical efficiency) and CII (operational carbon intensity) were adopted in 2021, becoming effective in 2023. This period culminated in the Revised IMO GHG Strategy (2023), aiming for net-zero GHG emissions by or around 2050 with critical intermediate goals for 2030 and 2040.
- **Current & Future Regulatory Milestones (2024-2028):**
    - **2024:** EU Emissions Trading System (ETS) extended to shipping, requiring carbon allowance purchases to offset emissions.
    - **Jan 2025:** FuelEU Maritime begins, imposing declining limits on GHG intensity for ships in EU ports.
    - **May 2025:** New SOx ECA implemented in the Mediterranean Sea.
    - **Oct 2025:** IMO expected to adopt a Net-Zero Framework, including a global fuel standard and GHG emissions pricing.
    - **Mar 2026/2027:** New NOx and SOx ECAs planned for the Canadian Arctic and Norwegian Sea.
    - **2028:** IMO Net-Zero Framework anticipated to be legally binding, with the GHG emissions pricing mechanism commencing.

Key Regulatory Trends:

Trends have emerged over time and are essentially cantered towards below points:-

- **Decarbonization at the Core:** A clear shift towards reducing global GHG emissions, integrating energy efficiency and market-based pricing.
- **Dual Approach:** Both global (IMO) and regional (EU) initiatives are driving change, with the EU often leading with ambitious action.

- **Market-Based Mechanisms:** Carbon pricing is becoming central to incentivizing cleaner fuels and technologies.
- **Fuel & Technology Diversification:** Regulations are accelerating the development and adoption of alternative fuels.
- **Lifecycle Assessment:** A "well-to-wake" approach is gaining traction, evaluating emissions across the entire fuel lifecycle.

Tata Steel's Commitment to a Greener Supply Chain

At Tata Steel, our vision is rooted in responsible actions and creating value through a greener supply chain. We are deeply committed to aligning our ship hiring activities with responsible environmental behaviour. Some of those activities are shown below:-

- **Sea Cargo Charter Pioneer:** As the first in the steel manufacturing industry to join the Sea Cargo Charter, we demonstrate our commitment to global sustainable shipping practices and active carbon footprint reduction. Our partnership with IHS Markit (since 2022) enhances our Sustainability Dashboard, ensuring transparent, data-driven decision-making.
- **GHG Policy for Vessel Acceptance:** We proactively set a benchmark by accepting only A-C rated vessels (on Rightship's A-E scale). This incentivizes the use of energy-efficient vessels, directly contributing to emission reductions.
- **Alternative Fuels Exploration:** Tata Steel became the first Indian steel company in FY2024-25 to execute a full laden leg on B24 biofuel for raw material shipment from Australia to India. In total, 39 biofuel and 5 Liquefied Natural Gas (LNG) vessels were utilized in FY2024-25, accounting for almost 18% of imported shipments. This has resulted in a significant CO_2 emission reduction, with the MV Cape Excel voyage achieving a 20% reduction from Gladstone, Australia. The overall impact over the last two years is a reduction of approximately 24,100 Tons of CO_2e.
- **Measurable Impact (KPI: EEOI):** Our Annual Energy Efficiency Operational Indicator (EEOI), which quantifies a ship's fuel efficiency in moving cargo, stands at 6.93 $gCO_2e/t.nm$ for 2024 representing a 7% reduction from baseline 2022.

Practical Impact in Business and Society:

Our sustainability initiatives have given intangible benefits across business and Society as explained below:-

- **Business:** Enhanced brand reputation positions us as a leader in sustainable practices, strengthening market competitiveness. We've successfully established alternate supply chains via coastal and inland waterways, aligning with government initiatives and optimizing logistics for finished goods from ECI to major destinations like Mumbai, Kandla, Katupalli, and Guwahati.
- **Societal:** We actively contribute to environmental health, reduce carbon footprints, and stimulate broader industry discussions on sustainable practices. These efforts foster a culture of responsibility and innovation, resonating with stakeholders and encouraging wider industry shifts.

The "Evergreen" Fleet's Dilemma: Balancing Cost to Serve and Supply chain reliability with Sustainability

With IMO's 2030/2050 decarbonization targets and the EU ETS now in effect, the bulk carriers aging fleet (average 15 years) would be underperforming on the Carbon Intensity Indicator (CII) and faces imminent penalties.

We have identified two potential sustainability strategies, each presenting significant financial and operational challenges:

1. **Fleet Modernization & Newbuilds:** Contracting in new, dual-fuel vessels (e.g., LNG, ammonia, methanol compatible). This represents a massive operational expenditure compared to available existing fleet. The green fuel availability and costs are still not ready and are projected to be quite high.

2. **Retrofitting Existing Fleet & Utilising blended Biofuels:** Focusing on existing fleet with better emission ratings which is achieved through installing energy-saving technologies (e.g., air lubrication, optimized propellers, low-friction hull coatings) and utilising blended biofuel during the voyage. A relatively less expensive option, but with limited long-term decarbonization potential.

The critical decision ahead is how to effectively balance Cost & reliability with accelerated transition to a sustainable business model.

Challenging Questions for Deeper Analysis:

This situation presents complex challenges that require thorough strategic consideration on below parameters:-

Financial & Strategic challenge:

- Beyond direct costs and fines, how can we quantify the value of "brand reputation" and "client retention" in the changing scenario? How might we model the financial impact of losing major clients to more sustainable competitors?

Operational & Technological challenge:

- Considering fuel availability, bunkering infrastructure, safety protocols, and the risk of "greenwashing," what are the key non-financial trade-offs for each alternative fuel (LNG, ammonia, methanol)?

Governance & Stakeholder challenge:

- How can we effectively communicate our sustainability journey to diverse stakeholders (investors, clients, employees, public)? What are the risks of an inauthentic or overly optimistic communication strategy?
- Given the global nature of shipping, how should we manage varying and potentially conflicting regulatory requirements across jurisdictions like the EU, IMO, and national governments?
- Beyond environmental aspects, what are Tata Steel's social and governance responsibilities in this transition?