Strategic Analysis of India's Green Ammonia Market: From Domestic Price Discovery to Global Export Leadership

1.0 The Strategic Imperative for Green Ammonia in India

India stands at a pivotal juncture in the global energy transition, with a strategic focus on green ammonia as a cornerstone of its national energy and industrial policy. Driven by a confluence of global decarbonization mandates and a national imperative for greater energy security, green ammonia represents a multi-faceted opportunity. It offers a pathway to decarbonize hard-to-abate sectors, a method for storing and transporting vast renewable energy resources, and a strategic entry point into the nascent global market for low-carbon fuels. This analysis examines the foundations of India's green ammonia strategy, from the policy landscape that has enabled competitive price discovery to the infrastructure and investment frameworks required to secure a position as a global export leader.

1.1 Global Decarbonization and Energy Security Context

The global momentum towards a green hydrogen and ammonia economy is accelerating, underpinned by key international climate and energy security goals. The Paris Agreement's targets have created a structural demand for deep decarbonization, while recent geopolitical shifts have intensified the push to reduce dependency on fossil fuels. A prime example is the European Union's REPowerEU plan, which explicitly targets the import of 10 million tonnes of renewable hydrogen by 2030, with green ammonia identified as a primary carrier.

In this context, green ammonia has emerged as a critical vector for the new energy economy. Produced from renewable electricity and atmospheric nitrogen, it serves as a dense, stable, and transportable medium for renewable energy, allowing solar and wind resources from geographies like India to be delivered to demand centers in Europe and Asia. This capability is crucial for decarbonizing sectors where direct electrification is challenging, such as maritime shipping, heavy industry (steel and chemicals), and as a clean fuel for power generation. The development of a global green ammonia market is therefore not just an environmental objective but a strategic imperative for nations seeking to enhance energy security and participate in the next generation of energy trade.

1.2 India's National Hydrogen Mission and Policy Landscape

To capitalize on this global shift, the Government of India launched the National Hydrogen Mission in 2021. The mission's headline target is to establish a minimum of 5 million metric tonnes per annum (MMTPA) of green hydrogen production capacity by 2030, a goal for which green ammonia is a critical end-product.

To catalyze investment and ensure cost-competitiveness, the mission is supported by a robust policy framework offering significant incentives to producers. Key provisions include:

- **Waiver of Interstate Transmission System (ISTS) Charges:** Producers are exempt from ISTS charges for 25 years for projects commissioned before 2030, significantly lowering the cost of wheeling renewable power from generation sites to production facilities.

- **Prioritized Grid Connectivity:** Green hydrogen and ammonia projects are granted priority access to the electricity grid, simplifying project development and reducing timelines.
- **Establishment of Green Hydrogen Hubs:** The government is facilitating the development of integrated manufacturing and export hubs in key coastal states to streamline infrastructure and logistics.

The strategic impact of these incentives cannot be overstated. The waiver of ISTS charges, for instance, is critical as it directly lowers the delivered cost of renewable electricity—the single largest cost component (over 60-70%) in green hydrogen production—thus making Indian ammonia fundamentally more competitive. These foundational policies have successfully created the conditions for a competitive domestic market, a framework recently tested and validated through large-scale auctions that have provided the first clear, market-driven benchmarks for the cost of green ammonia in India.

2.0 Market Dynamics & Price Discovery: Insights from the SECI Auctions

The recent auctions conducted by the Solar Energy Corporation of India (SECI) represent a landmark moment for India's green ammonia sector. Designed as a strategic mechanism for transparent price discovery, these auctions moved the industry beyond theoretical cost models to real, bankable price points. By guaranteeing offtake through long-term contracts with the domestic fertilizer industry, the auction framework was engineered to de-risk initial investments, lower the cost of capital, and create a competitive environment that revealed the true market price for green ammonia production in India.

2.1 Auction Framework and Risk Allocation

The SECI auctions were structured as a competitive reverse auction, a model that has been successfully used to drive down costs in India's renewable energy sector. A crucial design feature was the direct linkage of winning developers with fertilizer offtakers through ten-year supply agreements. This structure provides a powerful de-risking mechanism for both sides of the transaction.

The risk allocation was clearly defined:

- **Developers** bear the production and delivery risk, including responsibility for renewable power procurement, electrolyzer installation, ammonia synthesis, and last-mile logistics to the offtaker's facility.
- **Offtakers** are shielded from demand risk, as they commit to purchasing fixed annual volumes at the competitively discovered tariff, ensuring revenue certainty for the developer over a ten-year horizon.

By eliminating demand uncertainty, this structure significantly lowers the weighted average cost of capital (WACC) for projects, enabling developers to submit more aggressive bids and accelerating the path to commercial viability.

2.2 Landmark Auction Outcomes and Price Benchmarks

The first tranche of auctions awarded nearly 724,000 tonnes per annum of green ammonia supply contracts, providing a clear and comprehensive benchmark for the sector. The winning

bids demonstrated a remarkable degree of cost-competitiveness, with prices falling significantly below pre-auction estimates.

The range of winning bids spanned from **₹49.75/kg** to **₹64.74/kg**. The resulting weighted average price of **₹54.4/kg (USD 615/t)** delivered a powerful market signal, landing well below pre-auction estimates that had suggested delivered costs in the **₹70–85/kg** range. This outcome dramatically quantifies the success of the competitive auction process in discovering the most efficient price points.

Offtaker & Location	Annual Quantity (tonnes)	Winning Developer	Winning Bid (₹/kg)	Winning Bid (USD/t)
Paradeep Phosphates – Odisha	345,000	ACME Cleantech	₹49.75	$569
IFFCO – Kandla, Gujarat	185,000	ACME Cleantech	₹52.44	$602
GNFC – Bharuch, Gujarat	50,000	Onix Renewable	₹52.50	$603
MB Agro Products – MP	60,000	Oriana Power	₹52.25	$600
MB Agro Products – Maharashtra	70,000	SCC Infrastructure	₹53.05	$609
Krishna Phoschem – MP	70,000	NTPC Renewable Energy	₹51.80	$595
Paradeep Phosphates – Goa	25,000	ACME Cleantech	₹62.84	$720
Indorama India – Haldia, WB	20,000	ACME Cleantech	₹64.74	$739
Mangalore Chemicals – Karnataka	15,000	SCC Infrastructure	₹57.65	$658
Madras Fertilizers – Chennai, TN	4,000	Suryam International	₹50.00	$572

Note: USD/t conversion based on contemporaneous exchange rates during the auction period.

2.3 Analysis of Winning Bidders and Strategies

The auction results revealed a diverse set of winners, from large, established renewable energy players to emerging specialists, each employing strategies tailored to geographic and logistical advantages. ACME Cleantech emerged as the dominant force, securing the largest capacity through aggressive bidding across multiple regions.

Developer	Capacity Awarded (tpa)	No. of Contracts	Key Strategic Positioning
ACME Cleantech	575,000	4	Dominant winner, securing largest volumes across multiple geographies to demonstrate scale and versatility.
SCC Infrastructure	85,000	2	Successful in securing mid-scale contracts, indicating a focus on specific regional markets.
NTPC RE Ltd.	70,000	1	Major public sector utility leveraging its national portfolio to enter the green ammonia market.
Oriana Power	60,000	1	Specialized player successful in securing a targeted, mid-scale contract.
Onix Renewable	50,000	1	Specialized player successful in securing a targeted, mid-scale contract.
Suryam International	4,000	1	Niche player winning a smaller contract, highlighting a diverse and competitive landscape.

A common characteristic among the most competitive bids was the **co-location of renewable energy generation, ammonia production, and end-user demand**. The prime example is ACME's winning bid of ₹49.75/kg for the Paradeep Phosphates contract in Odisha, where close proximity minimized transmission, wheeling, and logistics costs, which can account for 10–15 percent of the final delivered price.

These auction results are more than just price points; they are a robust, data-driven foundation for assessing India's competitive standing in the emerging global green ammonia market.

3.0 India's Global Competitive Positioning

Armed with the empirical data from the SECI auctions, India's standing in the global green ammonia market can be assessed with a new level of confidence. The results provide compelling evidence that India has the potential to become one of the world's lowest-cost, highest-volume producers, positioning it as a key supplier to meet burgeoning international demand.

3.1 Cost Competitiveness Analysis

The weighted average delivered cost of **USD 615 per tonne** achieved in the SECI auctions is highly competitive on the global stage. This is not a theoretical projection but a demonstrated, bankable price point. It provides hard evidence of India's cost leadership, standing as competitive against projected Levelized Cost of Ammonia (LCOA) for the **USA (USD 700-800/t)** and on par with the most optimistic forecasts for the **MENA region**.

India's cost leadership is underpinned by several structural advantages:

1. **Low Renewable Energy Costs:** India is one of the world's lowest-cost markets for solar power generation, with a levelized cost of energy (LCOE) that provides a significant competitive edge. The cost of renewable electricity is the single largest input for green ammonia production.
2. **Economies of Scale:** The large, anchored domestic demand from the fertilizer sector, as demonstrated in the SECI auctions, underwrites the development of large-scale projects from the outset. This allows developers to achieve economies of scale more quickly than in markets reliant on smaller, speculative projects.
3. **Mature Renewable Energy Ecosystem:** India has a proven track record of deploying renewable energy at scale through competitive auctions. With over 25 active and experienced renewable energy companies, the country possesses a mature ecosystem capable of executing complex, integrated projects efficiently.

3.2 Proximity to Key Asian and European Markets

India's geographic location provides a distinct logistical advantage for supplying key demand centers in both Europe and Asia. Seaborne transport costs are a critical component of the final delivered price for green ammonia, and India's proximity to major markets reduces this cost significantly.

Based on analysis from the GIZ/RWE study, the estimated cost of shipping green ammonia from an Indian port like Kandla to a major European hub such as Hamburg is approximately **USD 85 per tonne** for a large gas carrier transiting the Suez Canal. This positions India favorably against more distant potential suppliers in Australia or Chile. Furthermore, India is strategically located to serve the high-demand markets of Japan, South Korea, and the growing economies of Southeast Asia.

Realizing this competitive potential, however, is contingent on the parallel development of both anchored domestic demand and dedicated export-oriented infrastructure.

4.0 Demand Trajectory and Market Opportunities

While the initial SECI auctions were strategically anchored to the fertilizer industry to establish a baseload demand, the long-term growth of India's green ammonia market will be driven by diversification into other domestic sectors and a significant push into the global export market. This dual-track approach allows India to build a resilient domestic ecosystem while simultaneously capturing a share of a multi-billion-dollar international trade opportunity.

4.1 The Domestic Market Anchor

The domestic market provides a large, stable foundation for scaling up production. Projections indicate a potential domestic demand for green ammonia reaching **4.8 million tonnes by 2030** and **6.3 million tonnes by 2035**. This demand is spread across several key industrial sectors:

- **Fertilizers:** The primary consumer, with potential for large-scale substitution of imported grey ammonia.
- **Steel:** Use in Direct Reduced Iron (DRI) processes to decarbonize steel manufacturing.

- **Refining & Chemicals:** As a source of hydrogen for refining processes and as a chemical feedstock.

A critical finding from recent market analysis is that green ammonia can achieve cost parity with imported grey ammonia within a narrow **10–15 percent gap**. This small premium is a game-changer for policy. It means that policy interventions designed to bridge this gap—such as **blending mandates**, **Viability Gap Funding (VGF)**, and **Production-Linked Incentives (PLI)**—become highly effective and financially feasible. Furthermore, this narrow gap provides a powerful hedge against the price volatility of imported grey ammonia, which is inextricably linked to fluctuating global natural gas prices, framing domestic green ammonia as a benefit to energy security, not just a decarbonization cost.

4.2 The Global Export Prize

The international export market represents a massive opportunity for India. Major industrialized economies, particularly in the EU, Japan, and South Korea, have set ambitious import targets for green hydrogen and its derivatives. The EU's **REPowerEU plan alone calls for 10 MMTPA of renewable hydrogen imports by 2030**, creating a substantial and bankable source of demand for producers like India.

Capturing this prize requires strict adherence to international standards and certification schemes. To ensure market access, Indian producers must align with frameworks such as the EU's Renewable Energy Directive (RED II), CertifHy, and guidelines from the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE). These schemes include rigorous criteria to prevent "greenwashing," most notably:

- **Additionality:** The renewable electricity used for hydrogen production must come from new, dedicated renewable energy assets.
- **Temporal and Geographical Correlation:** Producers must demonstrate a close match between the time of renewable electricity generation and its consumption by the electrolyzer, and that the assets are located within the same grid bidding zone.

Successfully navigating these requirements and developing the necessary infrastructure will be the key to unlocking India's vast export potential.

5.0 Critical Success Factors: Value Chain and Infrastructure Readiness

Translating competitive auction prices into a portfolio of bankable, operational projects hinges on the development of a fully integrated and robust green ammonia value chain. This ecosystem must encompass everything from reliable, low-cost renewable power generation and efficient electrolysis to world-class port infrastructure and export logistics. Building this value chain is the critical next step in cementing India's market leadership.

5.1 Renewable Power and PPA Models

The economics of green ammonia are fundamentally tied to the cost and reliability of renewable electricity. Developers in India can leverage several Power Purchase Agreement (PPA) models to optimize their energy sourcing strategy. The choice of PPA model has a significant impact on the final delivered cost of electricity to the electrolyzer.

Component	Onsite Captive RE (₹/kWh)	Wheeled Physical PPA (₹/kWh)	Virtual PPA (₹/kWh)
Effective Delivered Cost	3.2 – 3.4	3.8 – 4.3	3.2 – 3.4 (+market risk)

As the table shows, onsite captive renewable energy (RE) generation offers a clear cost advantage by avoiding transmission and wheeling charges. To ensure the high-capacity-factor, round-the-clock (RTC) power supply required for capital-intensive ammonia synthesis plants, developers are increasingly turning to hybrid **solar-wind renewable energy systems**. These systems, combined with grid flexibility mechanisms like **grid banking**, are essential for maximizing electrolyzer utilization and minimizing the levelized cost of hydrogen production.

5.2 Port Infrastructure and Export Logistics

While India has a head start in ammonia handling, significant upgrades are required to transition from an import-focused model to a large-scale export hub. A key finding from the GIZ/RWE study is that **12 Indian seaports** already handle ammonia imports, providing a foundation of existing marine infrastructure and operational expertise.

However, to meet export ambitions, targeted investments are critical in the following areas:

- **Jetty Retrofitting:** Modifying existing berths to accommodate large gas carriers for export.
- **Dedicated Bunkering Facilities:** Building infrastructure for ship-to-ship transfer of ammonia as a marine fuel.
- **Expanded Cryogenic Storage:** Increasing port-side storage capacity from the current typical of **15,000–25,000 tonnes** to over **400,000 tonnes** to support bulk exports, a build-out of staggering scale.
- **Coastal Pipelines:** Connecting production hubs to port facilities for efficient transfer.

Alongside physical infrastructure, India must develop and harmonize its **port safety regulations and ammonia bunkering guidelines** to align with international standards set by bodies like the International Maritime Organization (IMO) and the Society of International Gas Tanker and Terminal Operators (SIGTTO).

5.3 Safety, Standards, and Quality Infrastructure

A robust Quality Infrastructure (QI) ecosystem is non-negotiable for ensuring safety, securing investor confidence, and guaranteeing international market acceptance. Given ammonia's toxicity and corrosive properties, a world-class safety culture supported by rigorous standards is paramount.

The essential components of this QI framework include:

- **Standardization:** Adopting globally recognized standards is crucial. This includes ISO and IEC standards for electrolyzer quality, ISO 14687 for hydrogen purity, and ASME B31.12 for pipeline safety and construction.

- **Conformity Assessment:** Projects must utilize certification schemes like IECEx for equipment used in potentially explosive atmospheres. Furthermore, the "green" credentials of the ammonia must be verified by accredited third-party bodies to satisfy international buyers and regulators.
- **Safety Protocols:** Implementing comprehensive safety procedures for bunkering, transport, and storage is critical. These protocols should draw from established guidelines, such as those from the European Maritime Safety Agency (EMSA) and the American Bureau of Shipping (ABS) on using ammonia as a marine fuel, which explicitly address its hazards.

Developing this comprehensive QI ecosystem is a direct enabler of the industry's growth, as it provides the assurance that investors, financiers, and international offtakers require.

6.0 Investment Landscape and Financing Mechanisms

Building India's green ammonia sector to meet its national targets will require an estimated **USD 15–20 billion** in capital investment by 2035. The capital-intensive nature of these integrated projects—spanning renewable energy generation, electrolysis, and ammonia synthesis—necessitates a sophisticated approach to financing, combining private capital with innovative public and concessional financial instruments to ensure projects are bankable and risks are appropriately mitigated.

6.1 Production Economics and Capital Intensity

The capital expenditure (CAPEX) for a green ammonia project is substantial, with a typical capital intensity of **USD 3–4 billion per million tonnes per annum (MTPA)** of production capacity. The cost is distributed across several key components.

Component	Typical CAPEX Range
Electrolyzer	$500 – $700/kW
Renewable Energy (Solar/Wind)	$550 – $650/kW (Solar); $1,000 – $1,200/kW (Wind)
Ammonia Synthesis Unit	$900 – $1,100/tonne NH_3
Balance of Plant (BoP)	$200 – $400/kW

6.2 The Role of Blended Finance in Enhancing Project Bankability

Blended finance—the strategic use of public or concessional capital to mobilize private sector investment—is a crucial tool for making green ammonia projects financially viable. Analysis of project economics shows that a typical project, even with a long-term offtake agreement secured through the SECI auctions, may only generate an Internal Rate of Return (IRR) of around 9%. This is often below the threshold required by private investors and commercial lenders.

By "stacking" various financial instruments, this baseline IRR can be elevated to a bankable level of 13-15% or higher.

1. **Baseline Project:** Relies on long-term offtake agreements (from SECI auctions).

- **Resulting IRR: ~9%**

2. **With SIGHT + CfD Support:** Adds government incentives (like the Strategic Interventions for Green Hydrogen Transition programme) and revenue stabilization through a Contract-for-Difference.
    - **Resulting IRR: ~13%**
3. **Full Blended Finance Model:** Combines the above with low-cost, long-tenor concessional finance from Multilateral Development Banks (MDBs), which de-risks the project further and enhances returns.
    - **Resulting IRR: >15%**

This stacked approach demonstrates that a combination of supportive policy and targeted financial instruments can effectively bridge the viability gap and unlock the necessary private investment at scale.

6.3 Key Financial Instruments and De-risking Policies

A structured framework of financial instruments and policies is needed to address the specific risks inherent in large-scale green ammonia projects. By targeting risk categories with tailored instruments, policymakers can create a more attractive and secure investment environment.

Risk Category	Primary De-risking Instrument	Mechanism/Impact
Market Risk	Contracts-for-Difference (CfD), SIGHT Programme	Mitigates price volatility relative to grey ammonia by guaranteeing a fixed revenue stream or providing direct production incentives.
Policy/Regulatory Risk	Sovereign Green Bonds, MDB Guarantees	De-risks policy uncertainty by financing projects under a national registry aligned with global standards (IPHE/CertifHy), enhancing credibility.
Supply Chain Risk	Production-Linked Incentives (PLI), Infrastructure Bonds	Reduces dependency on imported components (e.g., electrolyzers) and helps finance critical port and logistics infrastructure upgrades.

7.0 Risk Assessment and Mitigation Framework

While the opportunities in India's green ammonia sector are substantial, they are accompanied by a complex risk landscape. A proactive and comprehensive risk management strategy is essential for investors, developers, and policymakers to navigate the challenges associated with technology, policy, supply chains, and market dynamics. Successfully mitigating these risks will be critical to sustaining project momentum and ensuring long-term success.

7.1 Key Risk Categories

Investors and developers must contend with several primary risk categories:

- **Technological and Operational Risks:** The long-term reliability and performance of large-scale electrolyzers have yet to be proven over extended operational lifetimes. Moreover, the handling, storage, and transport of ammonia require stringent safety protocols due to its high toxicity and corrosive nature. Any operational failure could have severe safety and environmental consequences.
- **Policy and Regulatory Risks:** The global standards for certifying hydrogen and ammonia as "green" are still evolving and not yet fully harmonized. This creates uncertainty for exporters, who may face challenges meeting the specific requirements of different import markets. The potential imposition of Carbon Border Adjustment Mechanisms (CBAM) in key markets like the EU adds another layer of regulatory risk.
- **Supply Chain Risks:** The rapid global scale-up of green hydrogen projects could create bottlenecks in the supply of critical components, particularly electrolyzers. Securing a reliable supply of these components and the critical minerals required for their manufacture is a significant challenge that could lead to project delays and cost overruns.
- **Market Risks:** The price of green ammonia remains at a premium to conventional grey ammonia, making it vulnerable to fluctuations in natural gas prices. The financial viability of projects is therefore highly dependent on securing long-term, fixed-price offtake agreements or government support mechanisms like Contracts-for-Difference (CfDs) to mitigate this price volatility risk.

7.2 Strategic Mitigation Measures

A comprehensive risk mitigation framework must address each of these categories with targeted strategies. The following table outlines recommended measures to manage the key risks facing the sector.

Risk Category	Recommended Mitigation Strategy
Technological & Operational	Implement robust safety management systems based on international best practices (e.g., EMSA, ABS). Prioritize partnerships with experienced Engineering, Procurement, and Construction (EPC) contractors and proven technology suppliers.
Policy & Regulatory	Establish a national green hydrogen/ammonia registry that is fully aligned with global standards (e.g., IPHE, CertifHy). Actively pursue bilateral agreements for mutual recognition of certification schemes with key trading partners like the EU and Japan.
Supply Chain	Leverage the Production-Linked Incentive (PLI) scheme to build domestic electrolyzer manufacturing capacity, reducing import dependency. Develop a national strategy for sourcing critical minerals through international partnerships and recycling initiatives.
Market	Diversify offtake strategies to include a mix of domestic fertilizer contracts, industrial agreements, and international export contracts. Actively lobby for

	and participate in government-backed revenue support mechanisms like CfDs to stabilize long-term cash flows.

By implementing such a dynamic and comprehensive risk mitigation framework, India can foster greater investor confidence, ensure the bankability of its project pipeline, and maintain its competitive momentum in the global market.

8.0 Strategic Outlook and Actionable Recommendations

India is at a pivotal moment in its energy transition journey. The success of the SECI auctions has provided definitive proof of its ability to produce green ammonia at globally competitive prices. This achievement lays the groundwork for India to become a dominant force in both the domestic decarbonization of its industrial base and the emerging international market for low-carbon fuels. However, capitalizing on this potential requires immediate and concerted strategic actions from both the private and public sectors. The following recommendations outline a clear path forward for securing India's leadership in the green ammonia economy.

8.1 Recommendations for Investors and Developers

1. **Prioritize Integrated Project Structures:** The most competitive projects will be those that co-locate or tightly integrate renewable energy generation, electrolysis, and ammonia synthesis. This approach minimizes logistical costs, reduces transmission losses, and optimizes the use of capital-intensive assets.
2. **Secure Long-Term Offtake Early:** Project bankability is fundamentally dependent on long-term (10-15 year) offtake agreements. Developers should proactively engage with domestic industrial users and international buyers to secure these contracts, as they are essential for de-risking projects and attracting debt financing.
3. **Invest in "Future-Proof" Certification:** Early adoption of robust monitoring, reporting, and verification (MRV) systems is critical. These systems should be designed to comply with the most stringent international standards, such as the EU's RED II, to ensure eligibility for premium export markets and avoid future compliance risks.
4. **Form Strategic Partnerships:** Success in this complex sector requires a multi-disciplinary approach. Developers should form strategic consortia that bring together expertise in renewable energy, chemical processing, port logistics, and international commodity trading to build resilient and efficient value chains.

8.2 Recommendations for Policymakers

1. **Scale and Diversify Domestic Demand:** To build a resilient domestic market, the government should move beyond the fertilizer sector by implementing green ammonia blending mandates for steel and refining. Targeted incentives can accelerate adoption in these hard-to-abate industries, creating a stable baseload of demand.
2. **Establish a National Green Ammonia Registry:** A credible, transparent, and digitally enabled national registry is essential to facilitate exports and prevent "greenwashing." This registry must be aligned with leading global certification schemes (e.g., CertifHy, IPHE) to ensure Indian ammonia is accepted in international markets.

3. **Launch an "Ammonia Port Infrastructure Mission":** A targeted public-private partnership (PPP) program should be established to fund the critical infrastructure upgrades needed at key ports like **Paradip and Kandla**. This mission should focus on developing large-scale storage, dedicated export jetties, and ammonia bunkering facilities.
4. **Champion International Standards Harmonization:** India should take a leadership role in global forums like the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE) and the Clean Energy Ministerial. By actively shaping and promoting the harmonization of international standards for green ammonia trade, India can ensure a level playing field and facilitate the growth of a seamless global market.