

Webinar on

“Alternate Energy Landscape in India Focusing on Green Hydrogen and its Derivatives, Green Ammonia”

Date: 7th March 2023,

Time: 11:00 -13:00 (IST), 14:30-16:30 (JST)

Venue: Virtual

Concept Note

India ranks third globally in greenhouse gas (GHG) emissions, following China and the USA. This status is largely attributed to its heavy reliance on coal for energy production. Approximately 7% of the world's emissions come from India, with fossil fuels—coal, oil, and gas—accounting for 89% of its total energy consumption. In 2020, India's emissions totaled around 2500 million tons, with over 40% stemming from the electricity sector, and coal being responsible for nearly three-quarters of energy-related emissions. The transport sector, fueled mainly by oil, is the second-largest contributor to emissions.

Despite these challenges, India has committed to reducing its emissions. It aims to achieve 50% of its energy capacity from renewable sources (including hydro) by 2031-32 and net-zero emissions by 2070. However, it is a formidable task, especially considering the country's anticipated economic growth and population increase, which will drive up energy demands and potentially pose energy security risks resulting from fulfilling the energy requirements.

Despite significant strides in renewable energy, India reasonably relies on fossil fuels. While renewables can tackle emissions in electricity and transport (through EV/Fuel Cell), "hard-to-abate" industries need to shift towards greener fuels/feedstock in its process, and India is progressing towards adoption of such practices to decarbonize the energy use. Green hydrogen and its derivatives, particularly ammonia, offer promise for deep decarbonization in these sectors. Sectors including fertilizers, refineries, steel, transportation, and conventional power currently rely on hydrogen (often "grey hydrogen" derived from fossil fuels) for its feedstock or thermal energy needs which offers potential to shift towards green hydrogen economy. Green hydrogen and its derivatives can:

1

Reduce dependence on grey hydrogen: by replacing a significant portion of its use in these sectors

2

Decarbonize "hard-to-abate" sectors: by becoming a commercially viable energy source in areas where electrification isn't practical.

Within the spectrum of green hydrogen uses, green ammonia production has emerged as a frontrunner for early commercial feasibility. With this context, NEDO through Grant Thornton Bharat LLP, has commissioned a market study on “Alternate energy landscape in India focusing on green hydrogen and its derivatives, green ammonia” covering the following aspects:

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| <div style="border: 1px solid purple; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">1</div> | <p>Supply side survey: GNH_3 producers, supply chain partners – storage, transportation & distribution, production forecasts (capacity, pricing and import) till 2035, import cost of GNH_3 from Middle East</p> | <div style="border: 1px solid purple; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">3</div> | <p>Ecosystem activities: Existing & planned activities by IDAs/MDBs for GNH_3 market development, R&D trends and focus areas, G2G partnerships for market development, policy & regulations for GH_2 & GNH_3 across value-chain</p> |
| <div style="border: 1px solid purple; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">2</div> | <p>Grid assessment: Transmission & distribution infrastructure (STU, CTU & DISCOMs), grid decarbonization roadmap, policy & regulations for grid connectivity and evacuation</p> | <div style="border: 1px solid purple; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">4</div> | <p>Demand side survey: Focus sectors/areas - Fertilizer, Iron & Steel, Power Sector, Refinery, Textile, Long haul mobility, Mining, Remote Islands; drivers for decarbonization & application of GNH_3/GH_2 in each sector</p> |

The market study puts special emphasis on green ammonia applications across various sectors while also analyzing the entire value chain to evaluate potential energy transition opportunities in India. The focus area of this study covers:

- **Value chain mapping** – producers, storage, transportation & distribution - existing & upcoming players
- **Capacity outlook** (import & export) & **forecasts till 2035** – production, import, pricing
- **Policy & regulatory framework** for production (incl. RE), storage & transportation of GH_2 & GNH_3
- **Subsidies / Incentives** for GH_2 & GNH_3 vis-à-vis grey and its impact on landed cost
- **GH_2 / GNH_3 use cases** and **demand** estimation sectors across identified sectors
- **Decarbonization drivers** and **impact of internal** (GH_2 mission, Indian carbon market, GH_2/GNH_3 purchase obligation, etc.) & **external** factors (CBAM, IRA, RED II, etc) on the overall **forecasts**
- **Landed cost** of GNH_3 incl. storage & transportation
- **Partnership areas** across value chain for Japan – technology transfer, co-financing, off-take agreement, etc.

As part of knowledge dissemination and deliberating the outcome of inducted study, NEDO is organizing a webinar to delve into green hydrogen and green ammonia market in India, and partnership opportunities/areas where India and Japan can collaborate. This webinar will bring together a wide range of green hydrogen and derivatives stakeholders from India and Japan, notably policy makers, key domestic & international market players, end-users and financial institutions. The tentative agenda of the webinar is as below:

Time (IST)	Program	Speaker
11:00 – 11:05	Welcome & Opening Remarks	Yoshiro Kaku, Chief Representative NEDO, New Delhi Office
11:05 – 11:30	Session 1: Presentation on “Alternate Energy Landscape in India Focusing on Green Hydrogen and its Derivatives, Green Ammonia” – Key Findings & Recommendations	Mr. Amit Kumar, Partner-Energy & Climate, GTBL/ Mr. Vineet Bhatia, Executive Director – Energy & Climate, GTBL
11:30 – 12:30	Session 2: India Green Ammonia Market Landscape and Outlook Moderator – Mr. J. Elamathi Raja, Associate Director – New Energies and Transition Finance, GTBL	
	Panelist 1	New Energy Finance (IREDA and others*)
	Panelist 2	Supply Market - Developers (Greenko, Acme and others*)
	Panelist 3	End- Use Market - Demand / consumer (JSW, Tata, JSPL, Paradeep Phosphates, and others*)
	Panelist 4	Initiatives by State Government in India (Government of Karnataka/Uttar Pradesh/Odisha/TN or other*)
	Panelist 5	Green Hydrogen and Derivatives Technology (from Japan)

12:30 – 12:55	Q&A	
12:55 - 1300	Closing Remarks	A M Siddiqui, Representative NEDO

*Subject to confirmation