20 YEARS Integrated Research and IRADe Action for Development

Workshop on Discussion on India's Green Hydrogen Supply Scenarios

Date & Time: August 17th, 2023 (Thursday) , 3:00-6:00 PM IST

Venue: Mahogany Hall, India Habitat Centre, Delhi (Hybrid mode)

Draft Agenda

Time	Session Details
3:00 PM – 3:30 PM	**Registration and Tea**
3:30 PM – 3:35 PM	Welcome and Opening Remarks by **Dr. Jyoti K Parikh**, Executive Director, IRADe
3:35 PM – 3:45 PM	Opening Address by **Shri. Ajay Yadav**, Joint Secretary, Ministry of New and Renewable Energy (MNRE)
3:45 PM – 3:55 PM	Keynote address by **Shri Alok Kumar, Former Secretary, Ministry of Power**
3:55 PM – 4:30 PM	**Technical Session:** Chaired and Moderated by **Prof Kirit Parikh,** Chairman IRADe
3:55 PM – 4:10 PM	Chairman's Opening Remark
4:10 PM – 4:30 PM	Presentation by **Dr Anjana Das,** Senior Consultant**,** IRADe on **"India's Green Hydrogen Supply Scenarios"**
4:30 PM – 5:15 PM	**Panel Discussion on Green hydrogen scenarios under India and international context**
	Session Chair: Dr Kirit Parikh, Chairman, IRADe **Panellists** ▪ **Shri D.M.R Panda, General Manager (Hydrogen, RE), NTPC Limited** ▪ **Shri A.K. Saxena, Senior Fellow and Director, TERI** ▪ **Mr. Vivek Singla, Head, Green Hydrogen, ReNew Power*** ▪ **Dr Raul Miranda, International Renewable Energy Agency (IRENA)** ▪ **Mr. Rolf Behrndt, Senior Advisor, Green Hydrogen, GIZ** ▪ **Mr. Martin Lambert*, Head of Hydrogen Research, Oxford Institute** ▪ **Ms RUTA BALTAUSE, European Commission**
5:15 PM – 5:25 PM	**Q&A Session and Feedback**
5:25 PM – 5:30 PM	Closing Session and Vote of Thanks **Dr. Jyoti Parikh**, Executive Director, IRADe
5:30 PM -6:00 PM	**High tea and networking**

*TBC

Click here for Registration

Background Note

Recently, the Indian Union Cabinet has approved the National Green Hydrogen Mission (NHM) which aims to provide a conducive ecosystem for developing the Green Hydrogen industry in the country. It targets 5 million tonnes of Green hydrogen production by 2030. With its vast renewable energy resources, Indian policymakers also consider the export possibility.

IRADe's project assesses the potential of green hydrogen production with water electrolysis method in various scenarios given although large but limited green resources (solar, wind onshore and offshore, large hydro etc), also need to be used to meet the country's rapidly growing electricity demand as power system needs to be decarbonized over time. It applies IAEA's energy system modelling tool **MESSAGE** (in dynamic linear optimization framework), and the time frame is 2020-2070. It projects optimal electrolyser capacity requirement, electrolyser technology, electricity requirement, investment in electrolyser and power and storage infrastructure of hydrogen production, in addition to the optimal capacity, generation and technology mix, storage needs, investment of the Indian power system in various scenarios. It also assesses green hydrogen export potential under different prices. Project results would be useful for stakeholders such as the Government, industries, financial organisations, research communities, etc.

Green Grid scenario, where solar PV, wind onshore plants supported with battery storage are exclusively connected with electrolysers, needs 62 GW of electrolyser capacity and a renewable power capacity of 162 GW (89 GW of solar PV and 74 GW of wind onshore) to supply 5 mt of green hydrogen by 2030 as NHM's target. In SITEH2 scenario, electrolyser is installed at demand site connected with solar PV, electrolyser capacity requirement is much higher at 105 GW, as usage of electrolyser aligned with solar PV plant is low. GRIDH2 scenario, electricity in the electrolyser is supplied from grid which is not necessarily green (in the beginning), electrolyser capacity requirement is 85 GW, as load factor is lower since grid needs to meet electricity demand as well; however, that reduces curtailment of electricity from solar and wind and needs less additional power capacity to supply electricity to the electrolyser. PEM technology will dominate. Electricity requirement is around 272 TWh to produce 5 MT. An investment of 168 billion USD would be needed to build electrolyser + Power infrastructure between 2021-30 to supply 5 mt of green hydrogen. To meet the NITI Aayog projected demand of hydrogen (16 million tonnes) in 2040, electrolyser capacity needs would be in the range of 235-342 GW, electricity requirement of 738 TWh. Export potentials exist in the medium term, such as at USD 2.5+/kg in 2035 of about 4 mt, however, also depends upon the available renewable resources (Solar and Wind).