



भारत सरकार/ Government of India  
विद्युत मंत्रालय/ Ministry of Power  
केन्द्रीय विद्युत प्राधिकरण/Central Electricity Authority  
ग्रिड प्रबंधन प्रभाग/Grid Management Division  
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सं.: 12/X/STD(CONN)/GM/2023/ 613

दिनांक: 18.05.2023

विषय: दिनांक 16.05.2023 (मंगलवार) को दोपहर 12:00 बजे मुख्य अभियंता (ग्रिड प्रबंधन), सीईए द्वारा वीसी के माध्यम से ग्रीन हाइड्रोजन (जीएच2)/ग्रीन अमोनिया (जीएनएच3) डेवलपर्स की विद्युत के साथ कनेक्टिविटी के लिए आवश्यकताओं पर आयोजित बैठक का कार्यवृत्त।

Minutes of the Meeting held on 16.05.2023 (Tuesday) at 12:00 PM through VC by Chief Engineer (Grid Management), CEA to discuss the requirements of Green Hydrogen (GH2)/ Green Ammonia (GNH3) developers for connectivity with the electrical Grid.

मुख्य अभियन्ता ( ग्रिड प्रबंधन प्रभाग ) द्वारा दिनांक 16.05.2023 (मंगलवार) को 12:00 बजे आयोजित बैठक के कार्यवृत्त आपकी जानकारी एवं आवश्यक कार्यवाही हेतु संलग्न है। यह पत्र सक्षम अधिकारी द्वारा अनुमोदित है।

Please find enclosed the minutes of the meeting taken by Chief Engineer (Grid Management) on 16th May 2023 at 12:00 PM. It is issued with the approval of Competent Authority.

संलग्नक: यथोपरि।

संदीप कुमार  
18/5/23  
(संदीप कुमार)  
उप निदेशक

बैठक के सभी प्रतिभागियों को ई-मेल द्वारा प्रेषित

**Minutes of the Meeting held on 16.05.2023 (Tuesday) at 12:00 PM through VC by Chief Engineer (Grid Management), CEA to discuss the requirements of Green Hydrogen (GH<sub>2</sub>)/ Green Ammonia (GNH<sub>3</sub>) developers for connectivity with the electrical Grid.**

Chief Engineer (GM), CEA welcomed all the participants in the meeting. He stated that this meeting has been held to discuss the need for technical requirements for Green Hydrogen/ Ammonia Plants for connectivity with the electrical Grid. Green Hydrogen/ Ammonia plants are high capacity concentrated loads and it can present a stability problem in the grid if the load of such quantum suddenly throws off due to problem within the plant. He requested all the Green Hydrogen/ Ammonia developers to give a brief overview of their proposed plants capacity and requirements for connectivity with the Grid along with salient details. The list of the participants is enclosed at **Annexure-I**

2. The Representative of Indian Oil Corporation Ltd., stated that IOCL is in the process of setting up a plant in Panipat with a capacity of 7 kilo Tonne Per Annum (kTA) which would have power requirement of about 56 MW continuously. CTU connection at 220 kV level with capacity of 150 MW is envisaged considering future expansion plan. This plant will support only 1% of their requirement of 700 kTA hydrogen and another 70 kTA plant is also planned by 2030 which will be requiring 560 MW power supply. He also added that they have also envisaged 170 MW Solar and Wind Power through third party arrangement for the 7 kTA Green Hydrogen Plant.

3. The Representative of Greenko stated that 1 Million Tonne Per Annum (MTA) Green Ammonia plant is planned at Kakinada which would have a power requirement of 1300 - 1400 MW and other plants will come subsequently. From the load perspective of the plant there are two parts, one is Electrolyser load which is roughly 90% of the total load and is modular in nature of 5MW each capacity and the other is air separation unit, ammonia storage tanks, etc. The plant would be running the round the clock (RTC) from Wind, Solar and Battery Energy Storage System (BESS), thereby expecting constant power supply with very less of swing or seasonal variations.

4. The Representative of ReNew stated that ReNew is planning for export oriented green ammonia plants at coastal locations in the country. Total 3300 Tonne Per Day (TPD) capacity plants would be developed in three phases and there is a requirement of 3000 MW at each of the 5 different locations. Details of the same is attached in the **Annexure - II**.

5. The Representative of ACME stated that ACME is planning Green Hydrogen/ Ammonia plants at 5 different locations in four phases. They would require power in the range of 5000 MW at each location. He added that they have also conducted a pilot project at Bikaner and agreed to provide the same with updated details of the power demand.

6. The representative of Larsen & Toubro (L&T) stated they would submit firm plans for tentative Green Hydrogen/ Ammonia plant.

7. The representative of MNRE stated that the Green Hydrogen/ Ammonia plants would come up based on some firm demands locally and the export oriented plants would depend on how the global market evolves. He stated that the technical discussion would be helpful in framing some guidelines or regulations for connectivity regarding these plants which would facilitate developers.

8. The representative of CTUIL stated that such plants are essentially a Bulk Consumer and they shall be governed as per Part-IV of the Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations. As the plants are coming in huge quantum, modelling and compliances of same needs to be looked into. The requirements and compliances is attached at **Annexure III**.

9. The developers were requested to submit the details about the proposed plants/ any pilots undertaken to CEA expeditiously. MNRE was requested to provide the details from association available with them to CEA.

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**Annexure-I**

**List of participants in the meeting on 10/05/2023 at 03:00 PM**

**Central Electricity Authority (CEA)**

1. Sh. Chandra Prakash, Chief Engineer (Grid Management)
2. Sh. Himalaya Shubham, Deputy Director (Grid Management)
3. Sh. Sandeep Kumar, Deputy Director (Grid Management)
4. Sh. Shubhender Singh, Assistant Director (Grid Management)
5. Sh. Dhruv Kawat, Assistant Director (Grid Management)
6. Sh. Sakil Ahmad, Assistant Director (Grid Management)

**Ministry of New and Renewable Energy (MNRE)**

1. Sh. Dipesh Pherwani, Scientist C

**Grid-India**

1. Sh. Vivek Pandey, GM
2. Sh. Pritam Jain, Manager
3. Sh. Rahul Shukla

**Central Transmission Utility of India Limited (CTUIL)**

1. Sh. P.S. Das, Sr. GM
2. Sh. Ajay Kumar, Asst. Manager

**Indian Oil Corporation of India (IOCL)**

1. Sh. T.P Mishra, CGM

**Renew**

1. Sh. Anupam Sawhney
2. Sh. Navdeep Gupta
3. Sh. Shivmohan S

**Greenko**

1. Sh. Pushpinder Hira

**Larsen & Toubro (L&T)**

1. Sh. Jayank Pandya
2. Sh. Thomas Abraham

**ACME**

1. Sh. Yogesh Kumar
2. Sh. Meghna Chandra
3. Sh. Virendra Kumar
4. Sh. Rajat Sangwan

**Annexure-II****Grid Requirement for GH<sub>2</sub> and GNH<sub>3</sub> production facility**

Location of GH <sub>2</sub> and GNH <sub>3</sub> production facility (name of Village, District, State)	Electricity demand (year-wise)					Requirement under intra-state network (MW)	Requirement under inter-state network (ISTS) (MW)
	2025-26	2026-27	2027-28	2028-29	2029-30		
Paradip, Odisha		250	250	1500	1500	3,000	3,000
Gopalpur, Odisha			250	250	1500	3,000	3,000
Kakinada, A.P.			250	250	1500	3,000	3,000
Tuticorin, TN			250	250	1500	3,000	3,000
Mangalore, Karnataka				250	250	3,000	3,000

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**ReNew**
**Annexure-III****Green Hydrogen/Green Ammonia Grid Interconnection requirements**

Green Hydrogen/Green Ammonia production at ISTS level is essentially a bulk consumer activity in nature and shall be governed as per Part-IV "Bulk Consumer" of CEA Technical Standards for Connectivity to Grid. From planning point of view, following minimum information is required:

1. Peak Load requirement (MW)
2. Average Load requirement (MW)
3. Reactive power requirement (MVar)
4. Time phasing of load
5. Coordinates of plant
6. Nature of load (continuous / fluctuating)

From compliance point of view, following are major requirements (CEA Technical Standards) are to be fulfilled by Bulk consumers:

1. Reactive power requirements
2. Power quality requirements
3. Voltage unbalance requirements
4. Voltage fluctuations requirements