

GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY
LOK SABHA
UNSTARRED QUESTION NO. 472
ANSWERED ON 03.12.2025

ADVANCE CLEAN ENERGY TECHNOLOGIES

472. DR. AMAR SINGH

Will the Minister of NEW AND RENEWABLE ENERGY be pleased to state:

- (a) the comprehensive plans of the Government to advance clean energy technologies through public-private partnerships, investment incentives and skill development aimed at achieving 500 GW of non-fossil fuel electricity capacity by 2030;
- (b) the initiatives taken by the Government to promote emerging technologies such as green hydrogen and advanced energy storage including efforts to foster innovation, commercialization and large-scale deployment; and
- (c) the strategy to integrate clean energy solutions with pollution reduction efforts, supported by data on recent renewable capacity additions, environmental impact along with Government's plans to further accelerate adoption across sectors?

ANSWER

THE MINISTER OF STATE FOR NEW & RENEWABLE ENERGY AND POWER

(SHRI SHRIPAD YESSO NAIK)

- (a) Most of the utility-scale renewable energy projects in the country are being set up by private sector developers, selected through a transparent bidding process. The Government has also taken several steps and initiatives to promote and accelerate renewable energy capacity in the country to realize the commitment of 500 GW non-fossil energy capacity by 2030 as given at **Annexure-I**.

The Ministry has also launched various capacity building and skill development programmes to create a skilled workforce across different segments of the renewable energy sector. The Ministry's skill development programmes—Suryamitra, Vayumitra, Varunmitra, and Jal Urja Mitra—provide fully funded, residential training for renewable energy projects installation, operation, and maintenance. Further, capacity building and skilling initiatives are also being implemented under PM Surya Ghar Muft Bijli Yojana and National Green Hydrogen Mission.

- (b) The initiatives taken by the Government to promote emerging technologies such as green hydrogen and advanced energy storage are given at **Annexure-II**.

- (c) The Ministry of Power, through its Gazette Notification dated 20th October 2023 and further through its amendment dated 27th September 2025, has specified the minimum share of electrical energy consumption from renewable energy for designated consumers, who are electricity distribution licensees, open access consumers and captive users, pursuant to the Energy Conservation (Amendment) Act, 2022. As per the notification following year wise Renewable Consumption Obligations (RCO) were notified upto FY 2029-30 starting from FY 2024-25 under the provisions of Energy Conservation (Amendment) Act 2022.

Sl. No.	Year	Wind energy	Hydro energy	Distributed renewable energy	Other renewable energy	Total renewable energy
1.	2024-25	0.67%	0.38%	1.50%	27.36%	29.91%
2.	2025-26	1.45%	1.22%	2.10%	28.24%	33.01%
3.	2026-27	1.97%	1.34%	2.70%	29.94%	35.95%
4.	2027-28	2.45%	1.42%	3.30%	31.64%	38.81%
5.	2028-29	2.95%	1.42%	3.90%	33.09%	41.36%
6.	2029-30	3.48%	1.33%	4.50%	34.02%	43.33%

Achievement of the said targets by designated consumers through renewable capacity additions will integrate clean energy solutions.

**Annexure-I referred to in reply of part (a) of the Lok Sabha Unstarred Question
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The Government of India has taken several steps and initiatives to promote and accelerate renewable energy capacity in the country to realize the commitment of 500 GW non-fossil energy capacity by 2030. These include, inter-alia, the following:

- Standard Bidding Guidelines for tariff based competitive bidding process for procurement of Power from Grid Connected Solar, Wind, Wind-Solar Hybrid and Firm & Dispatchable Renewable Energy (FDRE) projects have been issued.
- To boost RE consumption, Renewable Purchase Obligation (RPO) followed by Renewable Consumption Obligation (RCO) trajectory has been notified till 2029-30. The RCO which is applicable to all designated consumers under the Energy Conservation Act 2001 will attract penalties on non-compliance. RCO also includes specified quantum of consumption from Decentralized Renewable Energy sources.
- Foreign Direct Investment (FDI) has been permitted up to 100 percent under the automatic route.
- Schemes such as Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM), PM Surya Ghar Muft Bijli Yojana, National Programme on High Efficiency Solar PV Modules, New Solar Power Scheme (for Tribal and PVTG Habitations/Villages) under Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM JANMAN) and Dharti Aabha Janjatiya Gram Utkarsh Abhiyan (DA JGUA), National Green Hydrogen Mission, Viability Gap Funding (VGF) Scheme for Offshore Wind Energy Projects have been launched.
- Scheme for setting up of Solar Parks and Ultra Mega Solar Power projects is being implemented to provide land and transmission to RE developers for installation of RE projects at large scale.
- Inter State Transmission System (ISTS) charges were waived for inter-state sale of solar and wind power for projects commissioned by 30th June 2025, for Green Hydrogen Projects till December 2030 and for offshore wind projects till December 2032.
- Laying of new transmission lines and creating new sub-station capacity has been funded under the Green Energy Corridor Scheme for evacuation of renewable power.
- Quality Control Orders for Solar Photovoltaic products (i.e., Solar PV Modules, Solar PV Inverters & Storage Battery) and Solar Water Heating systems notified.
- Issued National Framework for promoting & developing Energy Storage Systems.
- Issued Guidelines for Resource Adequacy Planning Framework for India.
- Electricity (Rights of Consumers) Rules, 2020 has been issued for net-metering up to five hundred Kilowatt or up to the electrical sanctioned load, whichever is lower.
- “National Repowering and Life Extension Policy for Wind Power Projects, 2023” has been issued.

- The Offshore Wind Energy Lease Rules, 2023 have been notified vide Ministry of External Affairs notification dated 19th December 2023, to regulate the grant of lease of offshore areas for development of offshore wind energy projects.
- The Revised Guidelines for installation of prototype wind turbine models issued on 12th June 2025.
- Procedure for inclusion/updating Wind Turbine Model in the Revised List of Models and Manufacturers of Wind Turbines (RLMM) issued on 31st July 2025. The amendment renames RLMM as Approved List of Models and Manufacturers [ALMM (Wind)] and mandates usage of listed components such as Blade, Tower, Generator, Gearbox and Special Bearings (Main, Pitch and Yaw Bearing) along with mandatory relocation of data centres within India and prohibition of real-time data transfer outside India.
- The Standard Operating Procedure (SOP) for ALMM-Wind and ALMM – Wind Turbine Components (ALMM-WTC) issued on 29th October 2025, detailing the end-to-end process for application, verification, factory inspection, component evaluation and model enlistment.
- Standard & Labelling (S&L) programs for Solar Photovoltaic modules and Grid-connected Solar Inverters have been launched.
- To augment transmission infrastructure needed for steep RE trajectory, transmission plan has been prepared till 2030.
- “The Electricity (Late Payment Surcharge and related matters) Rules (LPS rules) have been notified.
- Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022, notified on 06th June 2022 with objective of ensuring access to affordable, reliable, and sustainable green energy for all. Green Energy Open Access is allowed to any consumer with contract demand of 100 kW or above through single or multiple single connection aggregating Hundred kW or more located in same electricity division of a distribution licensee.
- Green Term Ahead Market (GTAM) has been launched to facilitate sale of Renewable Power through exchanges.
- Government has issued orders that power shall be dispatched against Letter of Credit (LC) or advance payment to ensure timely payment by distribution licensees to RE generators.

**Annexure-II referred to in reply of part (b) of the Lok Sabha Unstarred Question
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Initiatives for Green Hydrogen:

The Government of India is implementing the National Green Hydrogen Mission (NGHM), with an objective to make India a global hub of production, usage and export of green hydrogen and its derivatives.

Strategic Interventions for Green Hydrogen Transition (SIGHT) is a key component of the Mission which provides financial incentives for production of green hydrogen and electrolyser manufacturing.

- Incentive for Electrolyser Manufacturing: 3000 MW per annum electrolyser manufacturing capacity has been awarded
- Incentives for production of Green Hydrogen and its derivatives:
 - 8,62,000 tonnes per annum of green hydrogen production capacity has been awarded.
 - Prices have been discovered by SECI for the production and supply of 7,24,000 tonnes per annum of green ammonia
 - Indian Oil & Gas Companies have awarded projects to produce and deliver 20,000 tonnes per annum of Green Hydrogen to their refineries.

Pilot projects for utilization of green hydrogen in steel production, shipping and road transport sectors are also being supported under the Mission.

MNRE has also sanctioned four Hydrogen Valley Innovation Clusters (HVIC) namely Jodhpur HVIC, Pune HVIC, Bhubaneswar HVIC and Kerala HVIC.

Research and development projects are also being supported under the Mission, with 23 projects sanctioned under the R&D scheme of the Mission so far.

Initiative for Energy Storage Systems:

As per the National Electricity Plan (NEP) 2023 of the Central Electricity Authority (CEA), the energy storage capacity requirement is projected to be 82.37 GWh (47.65 GWh from PSP and 34.72 GWh from BESS) in the year 2026-27. This requirement is further expected to increase to 411.4 GWh (175.18 GWh from PSP and 236.22 GWh from BESS) in the year 2031-32. Various initiatives have been taken to develop the energy storage capacity in the country, including the following:

- The Ministry of Power has issued guidelines to promote the development of Pump Storage Projects (PSP) in the country. As per data from the Central Electricity Authority (CEA), at present, 10 PSP plants (above 25 MW capacity) are operational in the country with a total cumulative capacity of

6685.60 MW. In addition, 11 PSP plants totaling 12110 MW are under various stages of implementation.

- The Ministry of Heavy Industries (MHI), in June 2021, came out with a Production Linked Incentive (PLI) scheme, 'National Programme on Advanced Chemistry Cell (ACC) Battery Storage,' for the implementation of giga-scale ACC manufacturing facilities in India, with the aim of establishing a competitive domestic manufacturing ecosystem for 50 GWh with a total budgetary outlay of ₹18,100 crore. 40 GWh capacity has been allocated to bidders through the Quality and Cost Based Selection (QCBS) process, and the remaining 10 GWh has been earmarked for the Ministry of New & Renewable Energy for grid-scale stationary storage applications.
- The Ministry of Power is having a Viability Gap Funding (VGF) scheme for the development of 4000 MWh capacity of Battery Energy Storage Systems (BESS) in the country. The total outlay for this scheme is ₹9,400 crore, including a budgetary support of ₹3,760 crore. Due to the decline in BESS prices, the VGF support has been extended up to 13,200 MWh BESS capacity, within the same sanctioned financial outlay. The Ministry of Power further extended this scheme for the development of an additional BESS capacity of 30,000 MWh with a total financial support of ₹5,400 crore through the Power System Development Fund (PSDF).
- The Central Electricity Authority (CEA) has issued an advisory on co-locating energy storage systems with solar power projects to enhance grid stability and cost efficiency. As per the Advisory, all Renewable Energy Implementing Agencies (REIAs) and state utilities are advised to incorporate a minimum of 2-hour co-located Energy Storage Systems (ESS), equivalent to 10% of the installed solar project capacity, in future solar tenders.

At present, around 505 MWh of BESS projects (≥ 1 MWh) have been installed in the country, while about 75 GWh of capacity is under various stages of tendering/construction.

Further, the Ministry of New & Renewable Energy is having a Renewable Energy Research and Technology Development (RE-RTD) Programme for promoting indigenous technology development for widespread deployment of new and renewable energy in an efficient and cost-effective manner across the country. The thematic research topics/areas include all types of energy storage.

In addition, Department of Science & Technology (DST), under the Clean Energy Material Initiative (CEMI), is also funding R&D projects in the area of energy storage materials and devices.