

GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.676
ANSWERED ON 10.02.2025

INTEGRATION OF RENEWABLE ENERGY INTO POWER GRID

676 SMT. REKHA SHARMA:

Will the Minister of **POWER** be pleased to state:

- (a) the steps taken by Government to integrate renewable energy into the national grid;
- (b) the current capacity of renewable energy connected to the grid, source-wise (solar, wind, etc.);
- (c) the measures being taken to address grid stability and storage challenges; and
- (d) the role of renewable energy in meeting the country's energy transition goals?

A N S W E R

THE MINISTER OF STATE IN THE MINISTRY OF POWER

(SHRI SHRIPAD NAIK)

(a) : The steps taken by Government to integrate renewable energy into the grid include, *inter-alia*, the following:

- (i) A transmission plan for connecting 500 GW RE Capacity by 2030 has been prepared.
- (ii) Development of Inter-state Transmission System (ISTS) for evacuation of RE.
- (iii) Waiver of inter-state transmission charges on transmission of electricity generated from solar and wind projects.
- (iv) Central Financial Assistance to States for setting up transmission infrastructure for RE integration within their State.
- (v) Aggregation of demand and procurement of RE through intermediary procurers (RE Implementing Agencies) like SECI, NTPC, etc. for Distribution Companies.
- (vi) Mandating minimum prescribed flexibility in coal and lignite power plants.
- (vii) Implementation of Green Term Ahead Market (GTAM) and Green Day Ahead Market (GDAM) for sale of renewable energy.

(b) : As of 31.12.2024, the total installed RE capacity stands at 209.44 GW. The source-wise break-up is as follows:

Capacity in GW					
Small Hydro Power	Wind Power	Bio Energy#	Solar Power*	Large ^Hydro	Total Capacity
5.10	48.16	11.35	97.86	46.97	209.44
# Includes Waste to Energy off grid capacity of 0.37 GW * Includes 75.19 GW from Ground Mounted and 15.67 GW of Rooftop. 2.77 GW of Solar Component of hybrid Projects and 4.23 GW from Off-Grid Solar ^ Large Hydro includes 4.745 GW of Pump Storage Source- MNRE/CEA					

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(c) : Wind and Solar energy are variable and intermittent sources of power. To address the issue of variability in power supply the measures taken include:

- (i) Government has set up thirteen Renewable Energy Management Centres (REMCs) for better forecasting and real time monitoring of RE generation.
- (ii) Load dispatch centres ensure that electricity demand is fully met using dispatchable sources such as hydro and thermal power when the wind does not blow and sun does not shine.
- (iii) installation of Static Synchronous Compensators (STATCOMs) to improve the grid reliability and voltage stability limit. A STATCOM acts as a voltage controller for the electricity grid, quickly adding or removing extra power to keep the system running smoothly.
- (iv) Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations lay down the minimum technical requirements for RE generating plants to ensure the safe, secure and reliable operation of the grid.

The measures taken by the Government to promote Energy Storage Systems (ESS) include the following:

- (i) ESS a part of the power system as defined under clause (50) of Section 2 of the Electricity Act, 2003.
- (ii) Issuing guidelines for the procurement and utilization of Battery Energy Storage Systems (BESS) as part of generation, transmission, and distribution assets, along with ancillary services.
- (iii) Issuing Energy Storage Obligation (ESO) trajectory for the period until 2029-30, starting at 1.0% in FY 2023-24 and increasing to 4% by FY 2029-30.
- (iv) Incorporating ESS in the Guidelines for assessment of resource adequacy as an element of planning in the power sector planning process.
- (v) Publishing a National Framework for promoting & developing Energy Storage Systems.
- (vi) Providing waiver on ISTS charges for a period of 12 years for Battery Energy Storage System and 25 years for Pumped Hydro Storage System from the date of the award of the construction work.
- (vii) Providing Viability Gap Funding for development of approximately 13 GWh of BESS
- (viii) Providing budgetary support for enabling infrastructure. (Roads, Transmission lines etc.) for development of Pumped Storage Projects.

(d) : India has achieved its commitment made at COP 21- Paris Summit by meeting 40% of its installed power capacity from non-fossil fuel nine years ahead of its commitment. As on 31.12.2024, the non-fossil fuel installed capacity is about 47.10% (217.62 GW out of total 462.00 GW) against updated NDC target of achieving about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030.
