GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.2557
ANSWERED ON 11.08.2025

INTEGRATION OF RENEWABLE ENERGY INTO POWER GRID

2557 SHRI RATANJIT PRATAP NARAIN SINGH:

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 Government has undertaken several measures to integrate renewable energy (RE) into the national grid. These include:

(i) Development of an Inter-State Transmission System (ISTS) network in line with RE capacity expansion, along with strong interconnections between ISTS and intra-state networks to improve reliability.

(ii) Preparation of the National Electricity Plan (Transmission) for integrating over 500 GW of non-fossil capacity by 2030, with phased implementation of projects aligned with RE capacity addition timelines.

(iii) Waiver of ISTS charges for electricity generated from solar, wind (onshore and offshore), hydro, and storage projects.

(iv) Central Financial Assistance to States under the Green Energy Corridor Scheme for establishing intra-state transmission infrastructure for RE integration.

(v) Promotion of innovative RE solutions such as solar-wind hybrid projects, RE projects coupled with storage systems etc.

(vi) Operationalization of Green Term Ahead Market (GTAM) and Green Day Ahead Market (GDAM) to facilitate market-based sale of renewable energy.

(vii) Flexibilization of thermal power generation to accommodate variability in RE generation.

(viii) Issuance of CEA’s Technical Standards for Grid Connectivity to ensure minimum technical compliance by RE generating stations for safe and stable grid operation.

(ix) Mandating participation of RE plants in primary and secondary frequency control through the Indian Electricity Grid Code.

(x) Promoting use of hybrid RE systems, battery storage, and pumped storage projects (to manage RE variability and support grid frequency.

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(b) : The installed capacity of Renewable Energy as on 30.06.2025 is 233.99 GW. The source wise break up is at **Annexure**.

(c) : Wind and solar power are inherently variable and intermittent. To manage this variability and ensure reliable power supply, the Government has taken several measures:

i. Thirteen Renewable Energy Management Centres (REMCs) have been set up for accurate forecasting and real-time monitoring of renewable energy generation.

ii. Load Dispatch Centres manage grid operations to ensure uninterrupted power supply by relying on dispatchable sources like hydro and thermal power when wind or solar output is low.

iii. Static Synchronous Compensators (STATCOMs) have been installed to enhance grid reliability and voltage stability by quickly injecting or absorbing reactive power.

iv. The Central Electricity Authority's technical standards for grid connectivity specify minimum technical requirements for RE generating plants to ensure safe and secure grid operation.

To promote Energy Storage Systems (ESS), the following steps have been taken:

i. ESS has been recognised as a part of the power system under the Electricity Rules.

ii. Guidelines have been issued for the procurement and use of Battery Energy Storage Systems (BESS) as part of generation, transmission, and distribution assets, including their use in providing ancillary services.

iii. Separate guidelines have been issued for procurement of storage capacity from Pumped Storage Projects (PSPs).

iv. ESS has been integrated into resource adequacy guidelines to ensure long-term power system planning.

v. A National Framework has been published to promote and develop energy storage systems in the country.

vi. Waiver of Inter-State Transmission System (ISTS) charges for 12 years for BESS and 25 years for Pumped Hydro Storage has been granted.

vii. Viability Gap Funding (VGF) support has been approved for developing approximately 43 GWh of BESS capacity.

viii. Budgetary support is being provided for enabling infrastructure such as roads and transmission lines for the development of Pumped Storage Projects.

(d) : India fulfilled its COP 21 – Paris Summit commitment of achieving 40% of installed power capacity from non-fossil fuel sources nine years ahead of schedule. The country subsequently updated its Nationally Determined Contribution (NDC) target to achieve 50% of cumulative installed electric power capacity from non-fossil fuel-based sources by 2030. As on 30.06.2025, non-fossil fuel sources account for approximately 50% of India's total installed power capacity.

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ANNEXURE

ANNEXURE REFERRED IN REPLY TO PARTS (b) OF UNSTARRED QUESTION NO. 2557 ANSWERED IN THE RAJYA SABHA ON 11.08.2025

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The source-wise break-up of the current installed capacity of Renewable energy as on 30.06.2025

Renewable energy Source	**Renewable energy Installed capacity (GW) as on 30.06.2025**
Hydro	49.38
Small Hydro	5.10
Solar*	116.25
Wind	51.67
Biomass & Waste to Energy	10.74
Others	0.85
Total Installed Capacity	**233.99**

*Includes Ground Mounted Solar, Rooftop Solar, Off-grid Solar.

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