GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.2706
ANSWERED ON 24.03.2025

STABILITY OF POWER GRIDS

2706 SHRI ASHOKRAO SHANKARRAO CHAVAN:

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

(a) whether clouds over vast swathes of North India has resulted in sudden dip in solar power production capacity in the country during the last few months, if so, the details thereof;

(b) whether sudden dip due to low production and surge in power due to overproduction can damage the power grid;

(c) if so, preventive measures taken in this regard;

(d) whether Grid India is working with several stakeholders to improve weather forecast required for renewable power generation, if so, the details thereof; and

(e) steps taken to strike balance between renewable source of energy and other conventional source of energy?

A N S W E R

THE MINISTER OF STATE IN THE MINISTRY OF POWER

(SHRI SHRIPAD NAIK)

(a): There have been few instances of sudden dip in solar power generation in Northern Region in recent months. The details of dip in Solar Power generation during past three months (December, 2024 to February, 2025) are given at **Annexure.**

(b) & (c): Sudden dip in solar generation leads to demand-supply gap resulting in low frequency & localised high voltages in grid. Similarly, sudden ramp up in solar generation after clearance of cloud cover may lead to high frequency & localised low voltages in grid. The demand supply gap due to change in renewable generation have to be compensated by other generating resources for frequency control and reactive power support. In this regard, following preventive measures have been taken :

(i) Automatic Generation Control (AGC) maintains frequency stability by sending Secondary Reserve Ancillary Services (SRAS) Up or Down signals every 4 seconds to AGC-enabled thermal and hydro power plants.

(ii) During dip in RE generation, additional generation from thermal based power plants under Tertiary Reserve Ancillary Services (TRAS) is provided to maintain frequency in the band as defined in the Indian Electricity Grid Code (IEGC).

(iii) Mode of Pump Storage plants are also changed to support active power.

(iv) The generators with high ramp rate viz hydro/ gas are also brought on bar to maintain load generation balance.

(v) Renewable Energy (RE) Plants are also instructed to revise schedule promptly.

(vi) Reactor switching is done so as to keep Voltages in RE plants within desired range for secure & reliable grid operation.

(vii) Mode of operation of RE Plants/Reactive Power compensation devices are also changed as per Reactive Power requirement of the grid.

(viii) Reactive Power support is also taken from on bar thermal, hydro and nuclear generators.

(d): Ministry of Power (MoP) and Ministry of Earth Sciences (MoES) have been interacting very closely and regularly to ensure sharing of accurate weather data with stakeholders for RE generation forecasting. As a result of close coordination between the two Ministries, India Meteorological Department (IMD), National Centre for Medium Range Weather Forecasting (NCMRWF) and Indian Space Research Organisation (ISRO) are sharing weather forecast data with various stakeholders which is being utilised for Renewable Energy (RE) and demand forecasting. Further, Weather data of all Inter State Transmission System (ISTS) connected RE Plants is being shared by Grid-India with NCMRWF four times a day through secure API (Application Programming Interface) for improving weather forecast.

Ministry of Power has modified bidding guidelines to include the installation of Automatic Weather System (AWS) at all RE plants. Sharing of AWS data will further enhance the quality of weather forecasting for all stake holders.

In addition, IIT Bombay has been engaged for development of indigenous RE Forecasting Tool.

(e): The Government of India has recognised the need for striking a balance between Renewable Source of Energy and Conventional source of energy. To achieve this objective, following measures have been taken to ensure reliability and stability of the National Grid: -

(i) Development of intra-state transmission network is being planned to keep pace with RE capacity addition. Strong inter connection of ISTS RE schemes with the intra-state network to ensure better reliability in terms of anchoring voltage stability, angular stability, losses reduction etc. is being done.

(ii) Central Financial Assistance (CFA) is being provided to the States for setting up Transmission infrastructure for RE integration within their State under the Green Energy Corridor Scheme.

(iii) Encouraging setting up of RE projects with storage facilities for optimal utilisation of transmission facilities.

(iv) Flexibilization of thermal generation is mandated to address the variability of RE generation.

(v) CEA (Technical Standards for Connectivity to the Grid) Regulations lay down the minimum technical requirements for the RE generating plants to ensure the safe, secure and reliable operation of the grid. The compliances to the said regulations by RE plants are verified jointly by Central Transmission Utility (CTUIL) and Grid-India/RLDCs before granting connectivity/interconnection to the national grid. Robust compliances verification is done before interconnection of any new plant to the grid.

(vi) Indian Electricity Grid Code mandates that RE plants participate in the primary and secondary frequency control in case of contingencies. Hybrid RE power plants, Energy Storage Systems such as BESS (Battery Energy Storage System) and PSP (Pump Storage Project) are being promoted for mitigating variability in RE generation and provide adequate frequency support to the grid.

(vii) Establishment of 13 No. of Renewable Energy Management Centres (REMC) in RE rich States and Regions for dedicated monitoring, forecasting and scheduling of Solar and Wind plants.

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ANNEXURE

ANNEXURE REFERRED IN REPLY TO PART (a) OF UNSTARRED QUESTION NO. 2706 ANSWERED IN THE RAJYA SABHA ON 24.03.2025

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The details of dip in Solar Power generation during past three months (December, 2024 to February, 2025)

Date	**Northern region Solar generation (MU)**	**% Dip from previous day**
26-Dec-2024	95	-21.49
27-Dec-2024	79	-16.84
11-Jan-2025	126	-17.11
12-Jan-2025	103	-18.25
18-Feb-2025	173	-5.98
19-Feb-2025	137	-20.81
25-Feb-225	126	-33.33

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