

GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.1746
ANSWERED ON 03.08.2026

ADEQUATE, AFFORDABLE AND RELIABLE POWER FOR ALL CONSUMERS

1746 DR. M. DHANAPAL:

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

- (a) whether Government has reviewed the increasing electricity requirements of the country arising from economic growth, urbanisation, rising temperatures and expanding domestic consumption patterns;
- (b) the status of systems established for maintaining grid stability, forecasting demand patterns and coordinating power availability among generating, transmission and distribution entities;
- (c) the extent to which additions in generation capacity, transmission infrastructure and renewable energy resources have strengthened reliability of electricity supply across the country; and
- (d) the measures proposed to be taken by Government to address future peak demand requirements and ensure adequate, affordable and reliable power availability for all consumers?

A N S W E R

THE MINISTER OF STATE IN THE MINISTRY OF POWER

(SHRI SHRIPAD NAIK)

(a): Electric Power Survey (EPS) of the country is conducted by Central Electricity Authority (CEA) every five years for estimating the electricity demand of the country, as obligated under Section 73(a) of the Electricity Act-2003. As per the mid-term review of 20th Electric Power Survey (EPS) report, the estimated energy requirement and peak demand of the country (All-India) from the year 2026-27 to 2031-32 is given at **Annexure-I**.

(b) & (c): Government of India has taken several steps for grid stability, forecasting demand patterns and coordinating power availability among generating, transmission and distribution entities: -

- i. Transmission system has been planned for integration of over 500 GW RE (Renewable Energy) capacity by the year 2030. The transmission schemes associated with RE generation projects are being taken up for implementation in a phased manner commensurate with the RE Capacity addition.
- ii. 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.
- iii. 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. Intra State Green Energy Corridor (GEC) scheme is being implemented by the Ministry of New and Renewable Energy (MNRE) in 10 States. The intra state transmission system for evacuation of 24 GW RE under Green Energy Corridor Phase-I (GEC-I) is already commissioned. The transmission system under GEC-II for evacuation of around 20 GW RE is under implementation

- iv. Setting up of Regional Energy Management Centers (REMCs) for better forecasting of renewable power and to assist grid operators to manage variability and intermittency of renewable power.
- v. Innovative products like Solar-Wind Hybrid Projects, RE projects with energy storage systems and supply of RE power balanced with power from non-RE sources launched to reduce intermittency.
- vi. Implementation of Green Term Ahead Market (GTAM) and Green Day Ahead Market (GDAM) for sale of renewable energy.
- vii. Flexibility in generation and Scheduling of Thermal/Hydro Power Stations to address the variability of RE generation.
- viii. 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 / Regional Load Despatch Centres (RLDCs) before granting connectivity/interconnection to the national grid. Robust compliances verification is done before interconnection of any new plant to the grid.
- ix. 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. Considering the requirement of 'Energy Storage' to facilitate integration of renewable energy in the country, Ministry of Power (MOP) is providing Viability Gap funding (VGF) for installation of Battery Energy Storage System (BESS). Through this scheme, development of 43 GWh BESS is envisaged.
- x. Static Synchronous Compensators (STATCOM) and Static VAR Compensator (SVC) are being deployed to dynamically adjust the reactive power flow in the grid for maintaining stable voltage levels. Further, Several Dynamic Compensation devices such as Static Var Compensators (SVCs) Static Compensators (STATCOMs) and Synchronous Condensers (SynCons) in ISTS system are under various stages of Planning and implementation.
- xi. Automatic Generation Control (AGC) is being utilized to maintain frequency stability by sending Secondary Reserve Ancillary Services (SRAS) Up or Down signals every four (04) seconds to AGC-enabled power plants.
- xii. Market-based Tertiary Reserve Ancillary Services (TRAS) for addressing real-time demand-supply imbalances.
- xiii. The generators with high ramp rate (e.g. hydro or gas) are also scheduled optimally to maintain load generation balance.
- xiv. Switching of Reactors is affected to maintain voltage in RE complex within the desired range for secure & reliable grid operation.
- xv. Ministry of Heavy Industries (MHI), is implementing a Production Linked Incentive (PLI) scheme, 'National Programme on Advanced Chemistry Cell (ACC) Battery Storage' for implementation of giga-scale ACC manufacturing facilities in India, with an aim to establish a competitive domestic manufacturing ecosystem for 50 GWh with a total budgetary outlay of ₹18,100 crore. Out of 50 GWh capacity, 10 GWh has been earmarked for grid scale stationary storage applications to MNRE.

- xvi. CEA has issued guidelines dated 07.07.2025 for installation of Automatic Weather Stations (AWS) for Solar and Wind Power Plants to measure critical meteorological parameters for accurate, real-time measurement of weather to enable optimization of RE generation. This would improve overall generation predictability, efficiency, enhance grid reliability and ensure regulatory compliance.

Capacity addition helps the power system to meet the increasing electricity demand, particularly during peak load conditions, which ensures adequate generation availability, minimises the risk of power shortages and outages, and enhances the reliability. Due to measures taken, the energy availability has significantly improved as given at **Annexure-II**.

(d): The Government has taken following measures to address future peak demand requirements and ensure adequate, affordable and reliable power availability for all consumers :

1. Generation and Storage Planning:

- (i) As per National Electricity Plan (Generation), installed generation capacity in 2031-32 is likely to be 874 GW. With a view to ensure generation capacity remains ahead of projected demand, all the States, in consultation with CEA, have prepared their “Resource Adequacy Plans (RAPs)”, which are dynamic 10-year rolling plans and includes power generation as well as power procurement planning.
- (ii) All the States were advised to initiate process for creating/ contracting generation capacities; from all generation sources, as per their Resource Adequacy Plans.
- (iii) In order to augment the power generation capacity, the Government of India has initiated following capacity addition programme:

a. Thermal Capacity Addition: The projected thermal (coal and lignite) capacity requirement by the year 2035–36 is estimated at approximately 3,15,000 MW as against the 2,11,855 MW installed capacity as on 31.03.2023. To meet this requirement, Ministry of Power has envisaged to set up an additional minimum 1,05,000 MW coal and lignite based thermal capacity.

Accordingly, Thermal capacities of around 21,080 MW have been commissioned since April 2023 till 30.06.2026. In addition, 47,545 MW of thermal capacity (including 4,845 MW of stressed thermal power projects) is currently under construction. The contracts of 16,000 MW have been awarded and are due for construction.

b. Central Electricity Authority (CEA) has projected hydro power capacity addition of about 16,448 MW during the period 2026–27 to 2031–32. Of this, 400 MW has been commissioned as on 30.06.2026 and 12,973 MW are presently under construction.

c. Nuclear Capacity Addition: 8,000 MW of Nuclear Capacity is under construction and targeted to be completed by 2031-32. 5,600 MW of Nuclear Capacity is under various stages of planning and approval.

d. Renewables Capacity Addition: 1,47,720 MW Renewable Capacity including 119,580 MW of Solar (including Hybrid-Solar) and 27,720 MW of Wind (including Hybrid-wind) is under construction while 47,830 MW of Renewable Capacity including 44,440 MW of Solar is at various stages of planning and targeted to be completed by 2029-30.

e. Addition of Energy Storage Systems: As on 30.06.2026, 15,870 MW/95,220 MWh Pumped Storage Projects (PSPs) are under construction. Further, a total of 6,580 MW/39,480 MWh capacity of Pumped Storage Projects (PSPs) are concurred and yet to be taken up for construction. As on 30.06.2026, 15,754 MW / 42,530 MWh Battery Energy Storage System (BESS) capacity are under construction, 11,747 MW / 38,425 MWh has been awarded and 19,192 MW / 67,574 MWh BESS capacity are under tendering stage.

2. Promotion of Renewable Energy (RE) Generation:

- (i) 100% Inter State Transmission System (ISTS) charges have been waived for inter-state sale of solar and wind power for projects to be commissioned by 30th June 2025 (with waiver tapering off 25% annually till June 2028), for co-located BESS projects commissioned by June 2028, for Hydro PSP projects where construction work awarded by June 2028, for Green Hydrogen Projects commissioned till December 2030 and for offshore wind projects commissioned till December 2032.
- (ii) Standard Bidding Guidelines for tariff based competitive bidding process for procurement of Power from Grid Connected Solar, Wind, Wind-Solar Hybrid and Firm & Dispatchable RE (FDRE) projects have been issued.
- (iii) Renewable Energy Implementing Agencies (REIAs) are regularly inviting bids for procurement of RE power.
- (iv) Foreign Direct Investment (FDI) has been permitted up to 100 percent under the automatic route.
- (v) To augment transmission infrastructure needed for steep RE trajectory, transmission plan has been prepared till 2032.
- (vi) Laying of new intrastate transmission lines and creating new sub-station capacity has been supported under the Green Energy Corridor Scheme for evacuation of renewable power.
- (vii) 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.
- (viii) 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.
- (ix) To encourage 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.
- (x) “Strategy for Establishment of Offshore Wind Energy Projects” has been issued.
- (xi) Green Term Ahead Market (GTAM) has been launched to facilitate sale of Renewable Energy Power through exchanges.
- (xii) Production Linked Incentive (PLI) scheme has been launched to achieve the objective of localization of supply chain for solar PV Modules.

3. Transmission:

Inter and Intra-State Transmission System has been planned and implementation of the same is taken up in matching time frame of generation capacity addition. As per the National Electricity Plan, about 1,91,474 ckm of transmission lines and 1,274 GVA of transformation capacity is planned to be added (at 220 kV and above voltage level) during the ten-year period from 2022-23 to 2031-32.

In addition to the above, the Ministry of Power has issued guidelines dated 14.06.2024, 21.03.2025 and 15.12.2025 regarding the payment of compensation for Right of Way (RoW) for transmission lines, wherein the land rate has been linked to the prevailing market rate. These guidelines address the key challenges of RoW arising from landowners demanding higher compensation than the rates determined by the State Government

4. Distribution :

Government of India has supplemented the efforts of the States earlier through schemes like Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY), Integrated Power Development Scheme (IPDS), Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA) and currently under Revamped Distribution Sector Scheme (RDSS), to help them achieve the objective of providing quality and reliable supply of power.

Government of India launched RDSS in July 2021 with the objective of improving the quality and reliability of power supply to consumers through a financially sustainable and operationally efficient distribution Sector. The scheme has an outlay of Rs. 3,03,758 Cr. and estimated Gross Budgetary Support (GBS) from Central Government of Rs. 97,631 Cr. Under the scheme, financial assistance is being provided to the Distribution Utilities (excluding Private Sector Utilities) for loss reduction infrastructure works and smart metering works. Projects worth Rs. 1.53 lakh crore for loss reduction infrastructure and Rs. 1.31 lakh crore for smart metering works have been sanctioned under the scheme which would help improve the reliability and quality of power supply in the country.

In addition to above, to support the power distribution utilities to improve their Aggregate Technical and Commercial (AT&C) losses some of the key initiatives taken, in addition to RDSS, are as under:

- (i) Additional Borrowing consent of 0.5% of Gross State Domestic Product (GSDP) to State Governments, which is conditional on them undertaking specific reforms in the power sector.
- (ii) Additional Prudential Norms for sanctioning of loans to State owned power utilities contingent on the performance of power distribution utilities against prescribed conditions.
- (iii) Rules for implementation of Fuel and Power Purchase Cost Adjustment (FPPCA) and cost reflective tariff so as to ensure that all prudent cost for supply of electricity is passed through.
- (iv) Rules and Standard Operating Procedure issued for proper subsidy accounting and their timely payment.

With the concerted efforts of Central and State Government, the average hours of supply in rural areas have increased from 12.5 hours in FY 14 to 22.6 hours in FY 26 and in urban areas the same has increased from 22.1 hours in FY 14 to 23.4 hours in FY 26.

ANNEXURE-I**ANNEXURE REFERRED IN REPLY TO PART (a) OF UNSTARRED QUESTION NO. 1746
ANSWERED IN THE RAJYA SABHA ON 03.08.2026***********

The estimated energy requirement and peak demand of the country (All-India) from the year 2026-27 to 2031-32:

Financial Year (FY)	Energy Requirement [Billion Unit (BU)]	Peak Demand [Gega Watt (GW)]
2026-27	1,929	289
2027-28	2,072	305
2028-29	2,227	325
2029-30	2,388	345
2030-31	2,546	364
2031-32	2,703	388

ANNEXURE-II**ANNEXURE REFERRED IN REPLY TO PARTS (b) & (c) OF UNSTARRED QUESTION NO. 1746 ANSWERED IN THE RAJYA SABHA ON 03.08.2026*************Detail of Energy Requirement and Energy Availability from 2014-15 to 2026-27 (till June, 2026):**

Period	Energy Requirement	Energy Availability	Surplus / Deficit (-)	
	MU	MU	MU	%
2014-15	10,68,923	10,30,785	-38,138	-3.6
2015-16	11,14,408	10,90,850	-23,558	-2.1
2016-17	11,42,929	11,35,334	-7,595	-0.7
2017-18	12,13,326	12,04,697	-8,629	-0.7
2018-19	12,74,595	12,67,526	-7,070	-0.6
2019-20	12,91,010	12,84,444	-6,566	-0.5
2020-21	12,75,534	12,70,663	-4,871	-0.4
2021-22	13,79,812	13,74,024	-5,787	-0.4
2022-23	15,13,497	15,05,914	-7,583	-0.5
2023-24	16,26,132	16,22,020	-4,112	-0.3
2024-25	16,93,959	16,92,369	-1,590	-0.1
2025-26	17,07,493	17,06,985	-508	0.0
2026-27 (Upto June.)	4,83,117	4,82,435	-682	-0.1
