

ASSESSMENT OF NATIONAL POWER GRID

प्रविष्टि तिथि: 30 JUL 2026 2:53PM by PIB Delhi

To strengthen the transmission infrastructure in line with the growing electricity demand, the Government of India notified the National Electricity Plan (Volume-II: Transmission) in 2024. The plan outlines the transmission system requirements for the period 2023–2032, commensurate with the projected generation capacity additions and anticipated growth in electricity demand across various emerging and conventional sectors of the economy (including electric mobility, data centres and industrial expansion across the country). The transmission planning also takes into account evolving load centres and new categories of electricity demand, while ensuring reliable integration of renewable energy.

The transmission plan includes the addition of central and state transmission systems to meet the projected peak electricity demand of 388 GW by 2032. As per the plan, the transmission network is likely to expand from 5.09 lakh ckm (as on June, 2026) to 6.48 lakh ckm by 2032 and transformation capacity from 1,478 GVA (as on June, 2026) to 2,345 GVA. Also, the inter-regional transmission capacity is planned to increase from 120 GW (as on June, 2026) to 168 GW by the year 2032.

The details of transmission capacity augmentation, grid modernization, deployment of smart grid technologies, battery energy storage systems and cyber security measures initiated during the last three years are as follows:

1. Details of Transmission capacity augmentation:

A total of 35,172 circuit km of transmission lines and 270,174 MVA of transformation capacity (220 kV and above) have been added during the last three years (FY 2023-24 to FY 2025-26). Summary of the transmission lines and transformation capacity augmented is given at **Table-I**.

2. Grid Modernization and deployment of smart grid technologies:

Advanced grid support technologies such as Static Synchronous Compensators (STATCOMs), Synchronous Condensers (SynCONs), and other Flexible AC Transmission System (FACTS) devices are being deployed to enhance voltage stability, improve system strength, and support reliable integration of renewable energy. Further, several measures have been taken to facilitate renewable energy integration, including establishment of Regional Energy Management Centres (REMCs) for renewable forecasting and real-time grid management, implementation of Automatic Generation Control (AGC) and Ancillary Services (SRAS/TRAS) for frequency regulation and balancing etc.

3. Battery energy storage system (BESS):

As on 30.06.2026, the installed capacity of Battery Energy Storage Systems (BESS) with capacity greater than 1 MWh is 2,927.85 MW / 8,660.20 MWh in the country. State wise details are given at **Table-II**.

4. Cyber security measures:

To strengthen the cyber security of Indian electricity grid, the Government of India has established a sector specific cyber security incident response team, namely, Computer Security Incident Response Team – Power (CSIRT-Power) in April, 2023 for coordinating, reporting, and responding to cyber security incidents in power sector. Cyber security measures undertaken during the last three years include approval of funding under Power System Development Fund (PSDF) for establishment of a Security Operations Centre (SOC) and a Network Operations Centre (NOC) to strengthen cyber security monitoring and incident response.

Further, cyber security training programmes, workshops and capacity-building initiatives are being organized regularly in collaboration with the Indian Institutes of Technology (IITs), Rashtriya Raksha University (RRU), the National Critical Information Infrastructure Protection Centre (NCIIPC) and other institutions to enhance cyber security awareness and capabilities across the power sector.

The Government has already initiated several measures to enhance the resilience, reliability and security of the national grid. In this regard, Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution Infrastructure in Coastal Areas has recommended a comprehensive set of measures including, enhanced transmission planning based on higher contingency criteria, Critical Infrastructure Protection Framework, Mapping of Transmission and Distribution (T&D) infrastructure in cyclone affected zones, Designing of Distribution network in Ring or Mesh configuration, emergency restoration systems, Mobile substations, Mobile DGs set, digitalisation of power system assets, deployment of distributed energy resources, Standardization and use of Energy efficient equipment, use of advanced technologies such as Unmanned Aerial Vehicles (UAVs) / Drones for inspection and monitoring, Underground transmission corridor along coastal highway project etc.

Cyber resilience of the National Grid is being strengthened through round-the-clock(RTC) monitoring through the Security Operations Centre (SOC) and Network Operations Centre (NOC) at CSIRT-Power and GRID-INDIA; the system has also continuously been monitored by CERT-IN and National Critical Information Infrastructure Protection Centre (NCIIPC). Periodic Vulnerability Assessment and Penetration Testing (VA/PT) of Information Technology (IT) and Operational Technology (OT) infrastructure, and continuous capacity building in collaboration with reputed technical and national security institutions, so that preparedness keeps pace with the evolving cyber threat landscape.

Table I

A. Transmission Line (Commissioned - 220 kV and above) in ckm:

Year	Inter State Transmission System (ISTS)	Intra State Transmission System (InSTS)	Total (ISTS + InSTS)
2023-24	6,283	7,920	14,203
2024-25	3,652	5,178	8,830
2025-26	6,009	6,130	12,139
Total	15,944	19,228	35,172

B. Transformation Capacity (Commissioned - 220 kV and above) in MVA:

Year	Inter State Transmission System (ISTS)	Intra State Transmission System (InSTS)	Total (ISTS + InSTS)
2023-24	31,820	38,908	70,728
2024-25	39,335	47,098	86,433
2025-26	72,905	40,108	1,13,013
Total	1,44,060	1,26,114	2,70,174

Table-II

State-wise details of the installed Battery Energy Storage System (BESS) capacity:

Sl. No.	Details of BESS Deployment	State	Capacity	
			MW	MWh
1.	10MW/10MWh BESS project with Lithium-ion Battery-NMC at Tata Power-DDL's sub-station in Rohini	Delhi	10	10
2.	20MW solar power project integrated with an 16MW/8MWh BESS at Dollygunj and AttamPahad in South Andaman	Andaman & Nicobar	16	8
3.	Modhera Sun Temple Solar with BESS (6 MW SPV with 6MW/19.2 MWh BESS installed at Village Sujanpura& 50 kW SPV with 150 kWh BESS installed at the Sun Temple	Gujarat	6	19.2
4.	1.7 MW Solar PV Power Plant (300 kW at Agatii & 1400 kW at Kavaratti) with 0.5 MW/ 1.4 MWh BESS (at Kavaratti) at Lakshadweep	Lakshadweep	0.5	1.4
5.	BESS project at Rajnandgaon, Chhattisgarh - 100 MW(AC) Solar PV Project with 40 MW/120 MWh Battery Energy Storage System	Chhattisgarh	40	120
6.	GSECL Gujarat Solar plus Storage Hybrid - 35MW Solar PV with 57 MWh BESS Location: Kutch Lignite Thermal Power Station (KLTPS)	Gujarat	12	57

7.	SECI Peak Power 1200 MW with 75 MW/150 MWh BESS	Karnataka	75	150
8.	SECI RTC 400 MW with 25MW/100MWh BESS	Rajasthan	23	92
9.	20 MW/ 40 MWh BESS in Delhi under Tariff-Based Competitive Bidding	Delhi	20	40
10.	VRFB (Vanadium Redox Flow Battery) Storage System of 0.6 MW/3 MWh at NETRA, NTPC Greater Noida	Uttar Pradesh	0.6	3
11.	185 MW (AC) Solar PV with 45.4 MW for 4 Hour (Min. 254 MWh) BESS at Kajra, Lakhisarai	Bihar	70.5	282
12.	250kW/1,200 kWh BESS supporting solar power projects at the Khavda Renewable Energy Park in the Rann of Kutch,	Gujarat	0.25	1.2
13.	Kolkata Metro Rail Corporation 4 MW four-quadrant inverters using LFP or LTO batteries as energy storage element.	West Bengal	4	6.4
14.	180 MW/360 MWh Standalone BESS in Gujarat at 400 KV Charal Substation sanand 2, GIDC, Charal	Gujarat	180	360
15.	Juniper Merchant Sale BESS	Rajasthan	250	500
16.	ACME Merchant Sale BESS	Rajasthan	800	3,200
17.	Adani Merchant Sale BESS	Gujarat	1,200	3,370
18.	Pilot Projects of 300 MW/600 MWh Standalone BESS by Pace Digitek under TCGCB for MSEDCL	Maharashtra	220	440
	Total		2,927.85	8,660.20

Legend:

SECI-Solar Energy Corporation of India Limited

TBCB- Tariff-Based Competitive Bidding

MSEDCL-Maharashtra State Electricity Distribution Company Limited

GIDC-Gujarat Industrial Development Corporation

RTC- Round The Clock

This information was given by The Minister of State in the Ministry of Power, Shri Shripad Naik, in a written reply in the Lok Sabha today.

NR/MD

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