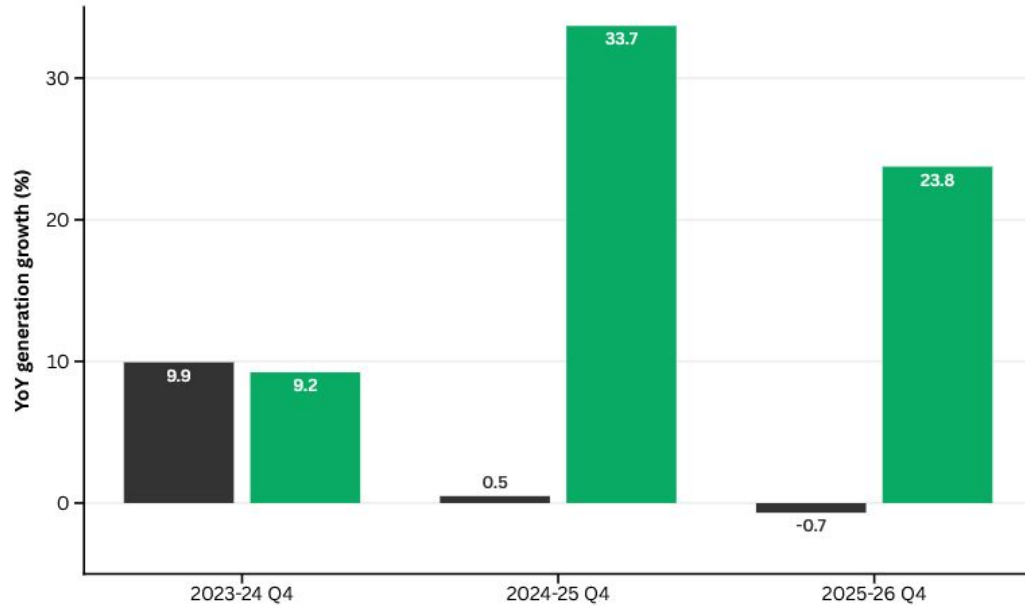


India's year-on-year growth in electricity generation: Coal vs. Solar

■ Coal + Lignite ■ Solar



Source: GRID-INDIA



CREA

Centre for Research on Energy and Clean Air

Quarterly energy snapshot for India

Q4 2025-26

Key findings

Demand trends

- Peak electricity demand in Q4 2025-26 reached 245 GW on 9 Jan. Overall demand grew by about 3% YoY, with the 245 GW peak marking the new high for the Q4 2025-26 peak.
- A notable operational trend is the increasing alignment of peak demand with solar generation hours: 88 out of 90 days recorded peak demand during solar hours.
- On the peak demand day (9 January), during the peak demand time (10:00 AM), total generation stood at 246 GW, with thermal power contributing the highest share at 67% (165 GW). This was followed by solar at 20% (48 GW), hydro at 6% (14 GW), wind at 3% (8 GW), and nuclear at 2% (6 GW). Gas and other sources together contributed the remaining 2% (6 GW).
- Across Q4 2025-26, Maharashtra in Western India continued to lead with a peak of 32 GW, followed by Gujarat (25 GW) and Uttar Pradesh (23 GW).

Generation

- India saw a 3% YoY increase in power generation in Q4 2025-26. Electricity generation from coal & lignite saw a marginal decline of 1%, while generation from solar, wind, nuclear, and large hydro increased by 24%, 11%, 10%, and 7%, respectively.
- Compared to Q4 2024-25, India's solar electricity generation has shown an increase of 24% (39.5 billion units or BU to 48.9 BU). Solar output peaked in March, with the highest daily generation recorded on 27 March at 658 million units (MU).

Renewable energy curtailment and emergency TRAS

- Despite facing curtailment, solar generation still grew by 24% year-on-year in Q4 2025-26, rising from 39.5 BU to 48.9 BU
- During Q4 2025-26, approximately 27 GW (72 MU) of solar and 4 GW (6 MU) of wind generation were curtailed. An additional 83 GW (103 MU) of solar and 11 GW (17.5 MU) of wind were curtailed under the Indian grid's Tertiary Reserve Ancillary Service (TRAS).
- Curtailment was largely concentrated in high-renewable states, with Gujarat in Western India accounting for the highest share. The state recorded 20 GW (57 MU) of solar and 3 GW (4.6 MU) of wind curtailment. Additionally, the highest TRAS-down events for both solar and wind were observed in Gujarat, Khavda station at approximately 18 GW (23 MU) for solar and 5 GW (10 MU) for wind highlighting persistent challenges related to grid integration and system flexibility.

Plant load factor

- For Q4 2025-26, India's Plant Load Factor (PLF) for coal stands at 69%, lignite at 58%, gas at 12%, nuclear at 79%, large Hydro at 23%, solar at 22%, wind at 15%, and small hydro at 19%.
- Compared to Q4 2024-25, India's PLF of coal decreased by 3% (72% to 69%), gas increased by 2% (10% to 12%), nuclear increased by 1% (78% to 79%) and lignite remained the same (58%). While the Capacity Utilisation Factor (CUF) of solar (23% to 22%) and small hydro (20% to 19%) both decreased by 1%, wind (15%) and large hydro (23%) remained the same.

Installed capacity

- As of March 2026, India's total installed capacity stood at 533 GW. Coal remained the largest contributor at 222 GW, followed by solar (150 GW), wind (56 GW), and large hydro (51 GW).
- Non-fossil fuel sources (solar, wind, large hydro, other renewable energy, and nuclear) now account for approximately 53% of total installed capacity, compared to 47% from fossil fuel sources.

Capacity additions and retirements

- Capacity additions in the Q4 2025-26 period were led by renewables, with 16.2 GW of renewable energy added, compared to 2.3 GW of thermal and 0.5 GW of large hydro.
- There were no thermal power capacity retirements in Q4 2025-26.

Energy storage

- India's energy storage pipeline continues to expand rapidly. As of [March](#) 2026, tenders for approximately 247 GWh of storage capacity have been issued, including 138 GWh of pumped storage projects (PSP) and 111 GWh of battery energy storage systems (BESS).
- While only 1.2 GWh of India's BESS is currently operational, around 6 GWh is expected to be commissioned by December 2026, indicating gradual but critical progress in enabling renewable integration.

Key developments in power sector

Generation Adequacy Study and System Planning (2026–2036)

- Released by India's Central Electricity Authority on 19 March, 2026.
- Projects peak demand of 459 GW and energy requirement of 3,365 BU by 2035–36.
- Total installed capacity projected at 1,121 GW, with 70% non-fossil share contributing 48% of generation.
- Plans 174 GW / 888 GWh of energy storage, including 80 GW BESS and 94 GW Pumped Storage Plants (PSP).
- Transmission expansion planned to integrate over 900 GW, including 1,37,500 circuit kilometre (ckm) of lines and 8,27,600 MegaVolt-Ampere (MVA) of substation capacity.
- Overall, the roadmap emphasises that grid flexibility, storage, and transmission expansion are central to system reliability.
- However it should be noted that Existing 222 GW and under construction 39.4 GW coal capacity are enough to meet India's 2035-36 demand.

Revised National Electricity Policy (Draft), 2026

- Released by India's Ministry of Power on 21 January, 2026, the draft National Electricity Policy (NEP) is set to replace the 2005 policy.
- Emphasises resource adequacy planning to ensure reliable power supply.
- Targets 80% non-fossil share in installed capacity by 2047.
- Proposes stronger enforcement of Renewable Consumption Obligations (RCOs) through green procurement and mechanisms such as Virtual Power Purchase Agreements (VPPA).

Thermal Flexibility and Minimum Technical Load (MTL)

- Released by Central Electricity Authority on 18 February, 2026.
- Central Electricity Regulatory Commission highlights need to reduce MTL from 55% to 40% and explore two-shift operations.
- Finds no significant damage attributable to low-load operation, countering concerns from NTPC, India's largest integrated power utility.
- Identifies start-stop cycles, ageing, and Operations and Maintenance practices as primary drivers of wear and tear.
- Calls for pilot studies and NTPC's participation to build operational evidence and design compensation frameworks.
- This shift is critical to reducing renewable curtailment and improving grid integration in high renewable energy states.

Source-wise installed electricity generation capacity in India

- India's installed power capacity reached 532.7 GW at the end of March 2026, up 12% from March 2025, 21% from March 2024, and 28% from March 2023.
- Coal and lignite remained the largest installed sources at 228.6 GW (43%), though their share has steadily declined from 56% in 2019 and 47% in 2025.
- Renewable energy (excluding large hydro) saw the fastest growth, rising to 223.3 GW (42%) in March 2026 from 172.4 GW (36%) in March 2025, 143.6 GW (33%) in March 2024, and just 77.6 GW (22%) in March 2019. Solar drove much of this expansion, reaching 150.3 GW (28%) of total installed capacity.
- Large hydro capacity stood at 51.4 GW (10%), while gas declined to 20.1 GW (4%). Nuclear remained relatively stable at 8.8 GW (2%).

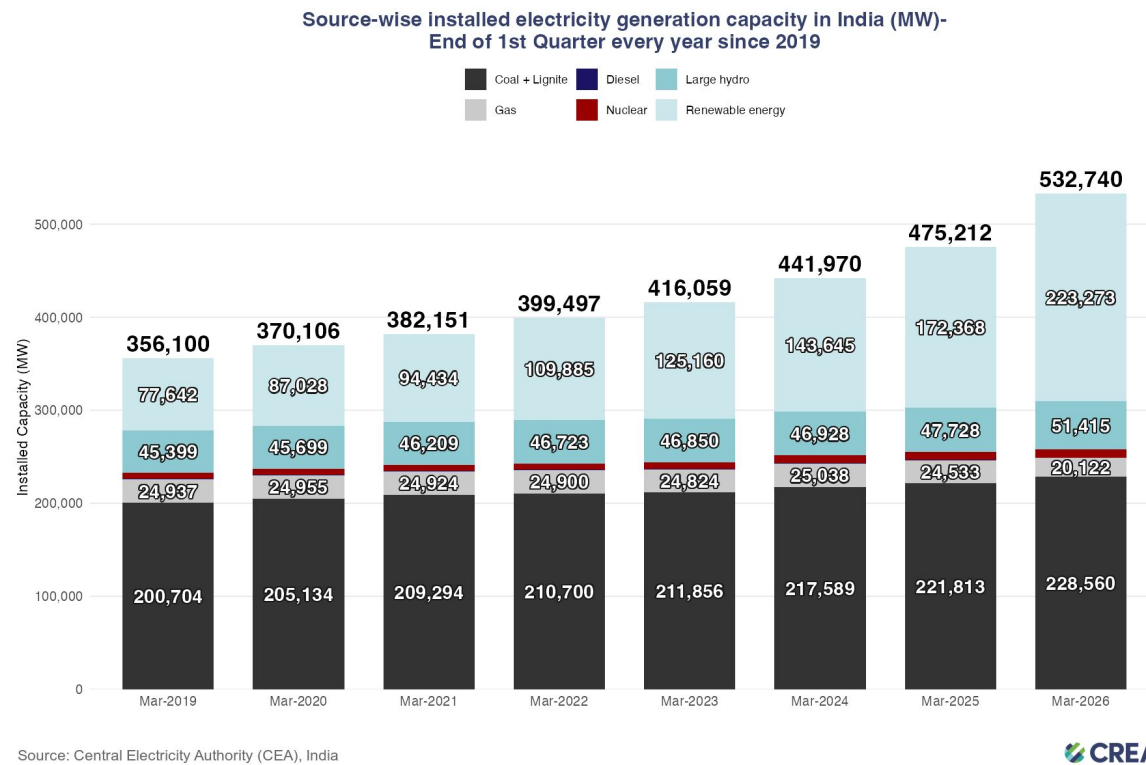


Figure 1 — Source wise installed capacity in India

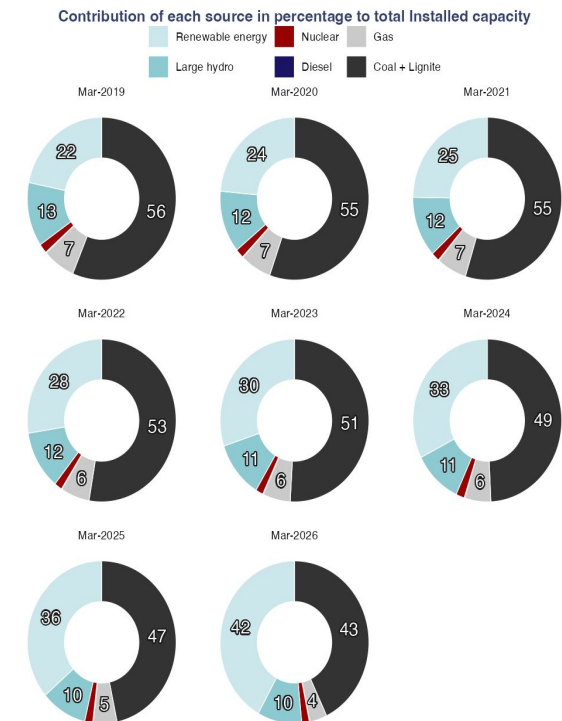
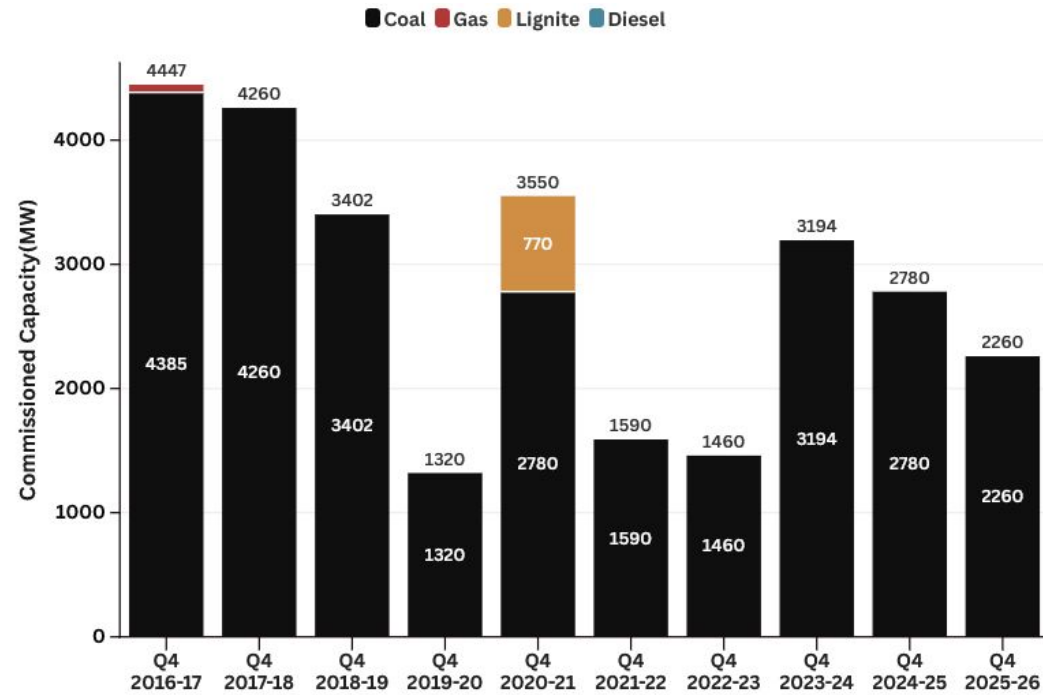


Figure 2 — Contribution of each source to total installed capacity

Commissioned, retired, and under construction thermal electricity generation capacity in India

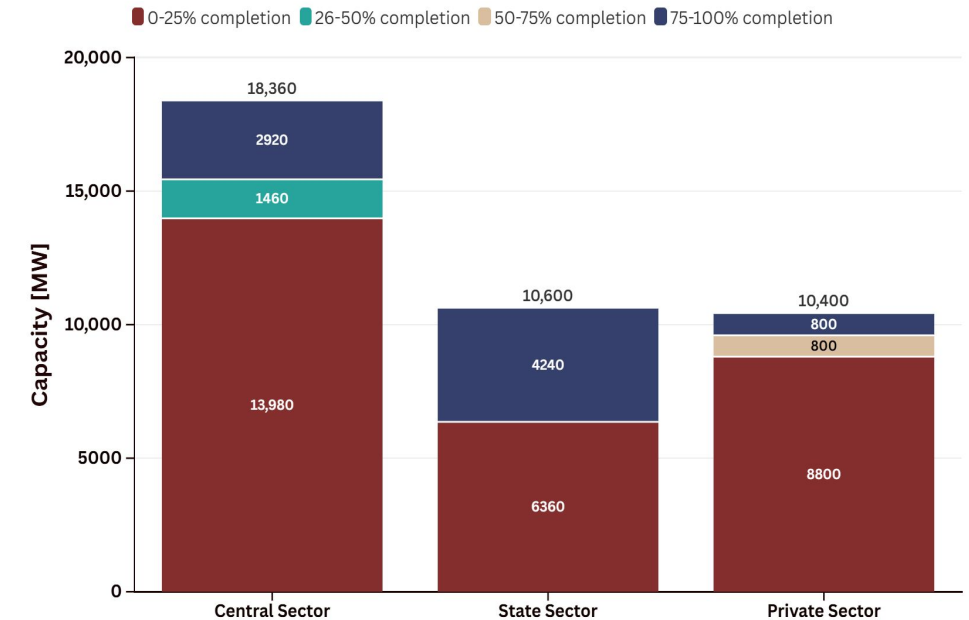
- India commissioned 2.3 GW of new thermal power capacity in Q4 2025-26, entirely coal-based. This represents a 18% decline from Q4 2024-25 (2.8 GW).
- No thermal capacity was retired in Q4 2025-26.
- As of March 2026, 39.4 GW of coal-based capacity is under construction. The central sector accounts for the largest share at 18.4 GW (47%), followed by the state sector at 10.6 GW (27%), and the private sector at 10.4 GW (26%).
- Much of the pipeline remains at an early stage of development, with nearly 30.6 GW (78%) of under-construction coal capacity below 50% completion.



Source: Central Electricity Authority (CEA), India



Figure 3 — Thermal capacity commissioned in Q4



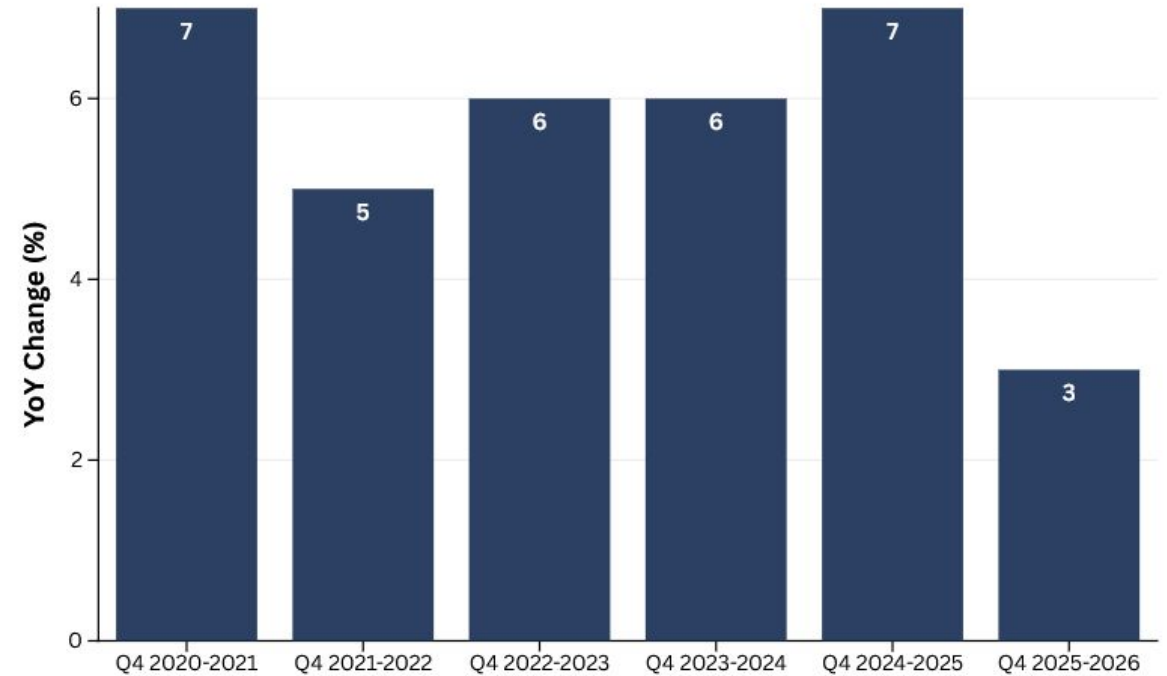
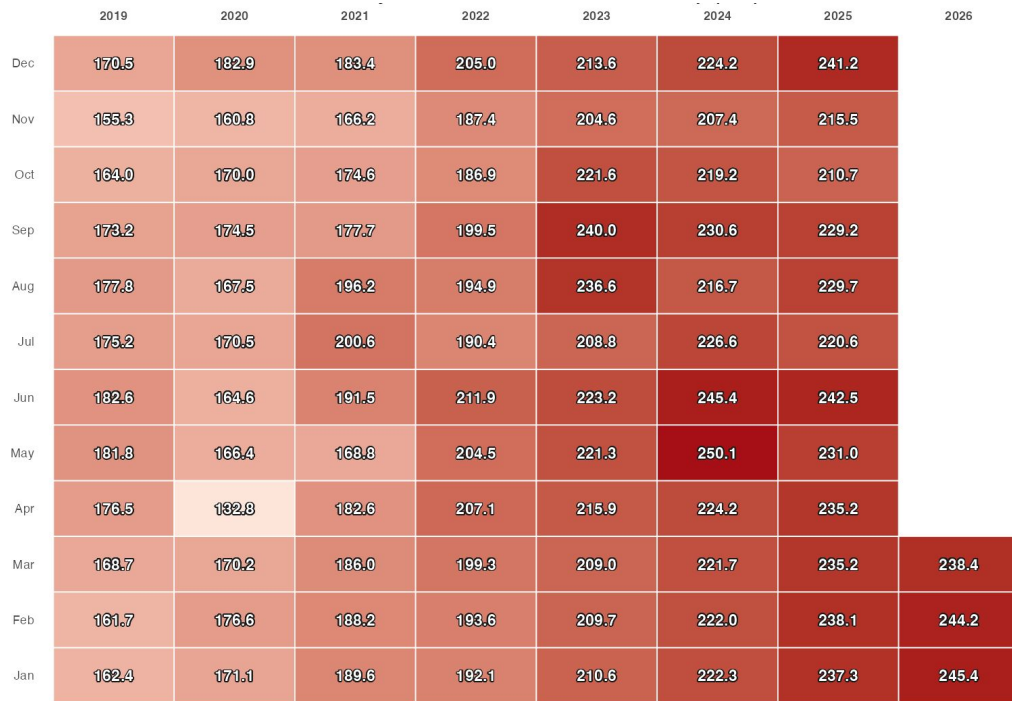
Source: Central Electricity Authority (CEA), India



Figure 4 — Sector-wise coal based electricity generation capacity under construction in India as of March 2026

Monthly maximum peak demand

- Year-on-year growth in national peak power demand has moderated, declining from 7% in Q4 2020–21 to 5% in Q4 2021–22, rising slightly to 6% in Q4 2022–23 and Q4 2023–24, and peaking again at 7% in Q4 2024–25, before slowing to 3% in Q4 2025–26.
- At the state level, Maharashtra recorded the highest peak demand in Q4 2025–26 at 32 GW, followed by Gujarat (25 GW), Uttar Pradesh (23 GW), Tamil Nadu (20 GW), and Madhya Pradesh (20 GW).



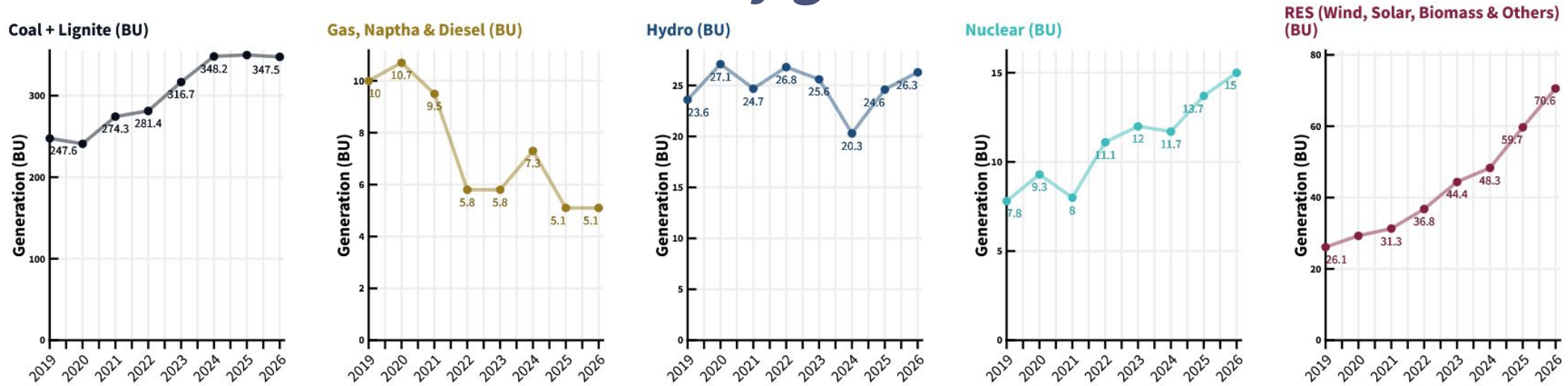
Source: GRID-INDIA



Figure 5 – Monthly maximum peak demand at national level

Figure 6 – Peak demand year-on-year change

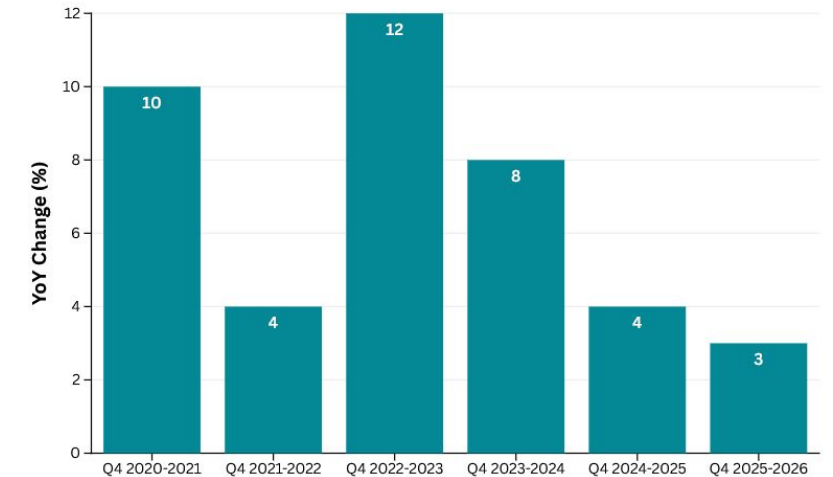
Electricity generation



Source: GRID-INDIA

Figure 7 – Source wise electricity generated in Q4

- Year-on-year growth in Q4 electricity generation increased from 10% in Q4 2020–21 to 12% in Q4 2022–23, followed by a steady moderation to 8% in Q4 2023–24 and 4% in Q4 2024–25. The trend of slowing growth persisted in Q4 2025–26, with generation rising by just 3%, marking the lowest Q4 growth rate in six years.
- Coal continued to dominate the generation mix in Q4 2025-26, contributing 339 BU (73%).
- Renewable energy sources accounted for a growing share in Q4 2025-26, led by solar at 49 BU (11%), followed by large hydro (26 BU, 6%) and wind (16 BU, 3%).
- Nuclear contributed 15 BU (3%), while lignite (8 BU, 2%) and gas, naphtha and diesel (5 BU, 1%) made up smaller shares. Other renewables contributed 6 BU (1%).



Source: GRID-INDIA

Figure 8 – Electricity generation year-on-year change

Renewable energy curtailment

- Renewable energy losses were substantial in Q4 FY2025–26. Around 26.6 GW of solar and 3.6 GW of wind generation were directly curtailed during the quarter, indicating that available renewable generation could not be fully absorbed by the grid.
- Emergency curtailment under TRAS was significantly higher than direct curtailment. Solar recorded 83.1 GW of TRAS-related curtailment, more than three times higher than direct solar curtailment, while wind saw 10.9 GW curtailed under TRAS compared to 3.6 GW of direct curtailment. This suggests operational constraints are becoming a bigger issue than outright curtailment.
- March recorded the highest renewable losses across both curtailment and TRAS events. Solar curtailment rose to 12.1 GW in March, up from 10.6 GW in January and 3.9 GW in February, while solar TRAS curtailment surged to nearly 40 GW, the highest monthly level in the quarter. Wind TRAS curtailment also peaked in March at 7 GW.
- Solar accounted for the overwhelming share of renewable losses. It contributed nearly 88% of total direct curtailment and over 88% of TRAS curtailment.
- These trends highlight growing grid flexibility constraints, particularly during high renewable generation hours. Without investments in battery storage, transmission upgrades, flexible thermal operations, and demand-side management, a rising share of clean electricity risks being wasted even as renewable capacity continues to expand.

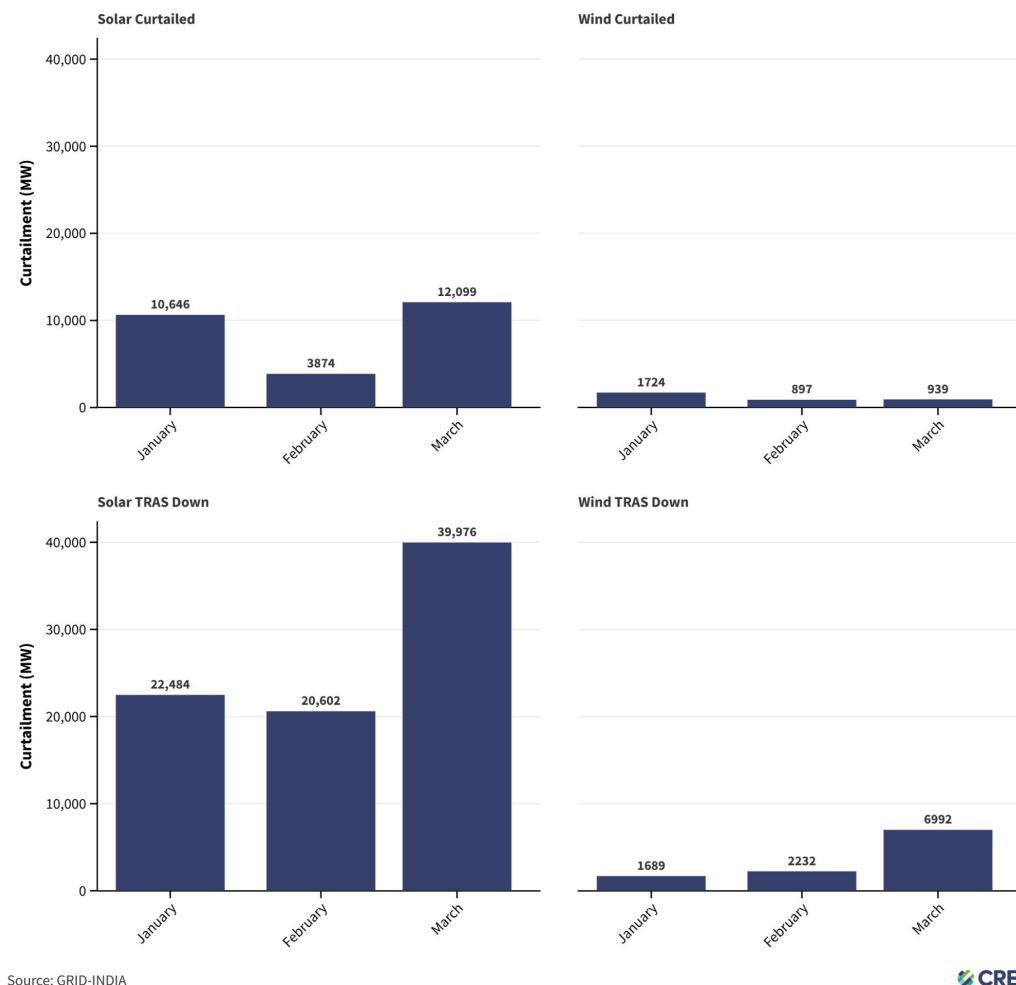
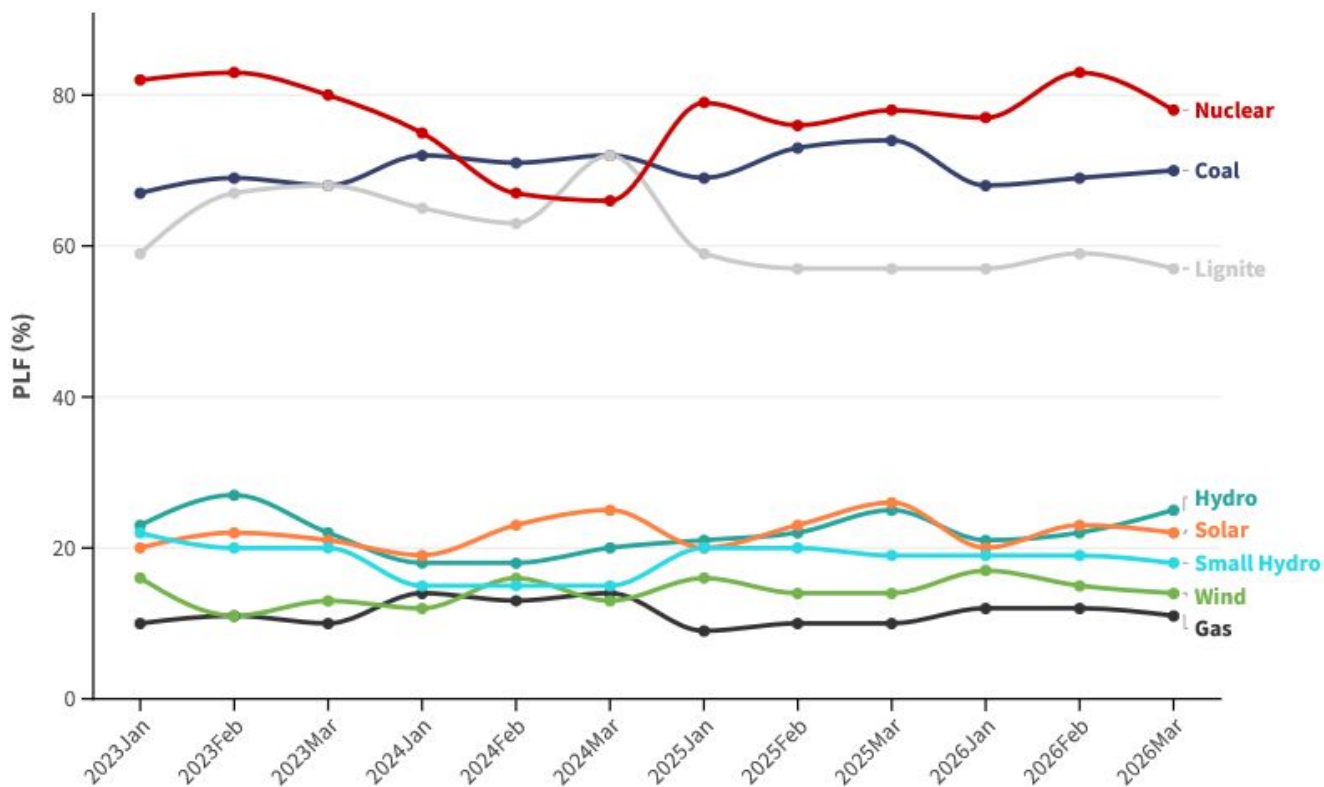


Figure 9 – Renewable energy curtailment in Q4 2025-26

Plant load factor

- Coal PLF moderated to 69% in Q4 2025-26, down from the two-year high of 72% in Q4 2024-25 and Q4 2023-24, though slightly above 68% in Q4 2022-23. This indicates relatively lower coal fleet utilisation despite rising electricity demand.
- Renewable CUFs were mixed. Solar CUF averaged 22%, lower than 23% in Q4 2024-25 after a particularly weak March (22% vs 26% in March 2025).
- Wind CUF remained stable at 15%, broadly unchanged from Q4 2024-25, while small hydro CUF declined to 19% from 20% last year.
- Hydro PLF improved to 23%, matching Q4 2024-25 levels and remaining higher than Q4 2023-24 (19%), supported by stronger March generation.
- Gas PLF rose to 12%, up from 10% in Q4 2024-25, indicating slightly higher utilisation for balancing and peak support.
- Nuclear PLF increased to 79%, marginally higher than 78% in Q4 2024-25 and significantly above 69% in Q4 2023-24, while lignite PLF remained subdued at 58%, largely unchanged from last year.



Source: [National Power Portal](#)



Figure 10 – Source wise plant load factor in Q4