POWERup

Update on India's electricity capacity, generation and investment

Institute for Energy Economics and Financial Analysis

4Q 2025

1. Installed capacity

Fourth quarter (4Q) 2025 update:

Non-fossil fuel-based power capacity accounted for 83.3% of all new capacity installed in 4Q 2025, with solar continuing to dominate capacity additions.

India added a gross power-generating capacity of **12,850 megawatts (MW)** and net power generation capacity of 12,840MW (after accounting for retirements) **in the fourth quarter of 2025 (September–December)**, with **non-fossil fuel-based capacity** accounting for **83.3%** of the additions **(Table 1).**

These additions raised India's total power capacity to **513.7GW** by the end of 2025, with non-fossil fuels accounting for over half the mix at **266.8GW (51.9%)**. To meet the 2030 target of 500GW of non-fossil capacity, India must now add 46.6GW of clean energy capacity annually.

Solar continued to dominate capacity additions with a **66%** share, followed by coal (16.7%), wind (10.8%), and large hydro (6.3%) in 4Q 2025. The following were the **notable additions** from energy sources other than solar and wind:

- **Coal power** capacity additions included the commissioning of PVUNL's Patratu Super Thermal Unit 1 (800MW) in Jharkhand, SJVN Thermal Limited's Buxar Unit 1 (660MW) in Bihar, and NUPPL's Ghatampur Unit 2 (660MW) in Uttar Pradesh.
- **Large hydro power** capacity additions included the commissioning of Greenko's Hydro Unit 5 (240MW) at its Pinnapuram integrated renewable energy project in Andhra Pradesh, THDC's Tehri Pumped Storage Plant Unit 3 (250MW) in Uttarakhand, and NHPC's Subansiri Lower Unit 2 (250MW) on the border of Arunachal Pradesh and Assam.

Table 1: Installed power generation capacity (MW), by source, 4Q 2025

Energy source	As of 30 September 2025	As of 31 December 2025	New capacity added	% of new capacity added#
Wind power	53,124	54,511	1,387	10.8
Solar power*	127,332	135,810	8,478	66.0
Small hydro	5,134	5,159	25	0.2
Biomass	10,757	10,757	-	0.0
Waste to energy*	854	857	2	0.0
Large hydro	50,108	50,915	807	6.3
Nuclear	8,780	8,780	-	0.0
Coal (+ lignite)	224,078	226,230	2,152	16.7
Gas	20,132	20,122	-10	NA
Diesel	589	589	-	0.0
Total	**500,889**	**513,730**	**12,840**	**-**

*Includes grid and off-grid capacities
#of the gross capacity added: **12,850MW**

Source: Central Electricity Authority, GoI; IEEFA

Full year - January-December 2025 update:

Capacity additions reached record levels in 2025, with gross additions up 75% and net additions up 53.5% over 2024.

India added a record **59,349MW** of total new power generation capacity in 2025 (January–December), a **75%** increase from annual additions achieved in 2024 (33,922MW). Even net power capacity additions (after accounting for capacity retirements) increased by 53.5% to 51,728MW in 2025 (**Table 2**). A significant total of 7,336MW in capacity was retired in 2025, mostly in 2Q 2025, comprising non-operating coal and gas plants and a 100MW nuclear plant unit.

Non-fossil fuel-based power capacity accounted for **82.8%** of the new power capacity added in 2025 as compared with 86.5% in 2024. Solar, wind, and large hydro continued to drive significant capacity additions in the non-fossil fuel category, keeping the share above 80%. Growth in renewables was led by accelerated installations of solar and wind power capacity, supported by increased tender activity and improved policy visibility.

India's policy notification to progressively reduce the waiver on inter-state transmission system (ISTS) charges from 1 July 2025 has expedited the commissioning of renewable energy projects, as developers moved to lock in a 25-year waiver or discount on transmission charges. Full ISTS charges will apply to all renewable energy projects (including hybrid projects) commissioned after 1 July 2028.

Table 2: Power capacity additions by source (MW), 12 months (January-December), 2024 vs 2025

Energy source	Net capacity addition, 2024 (MW)	% of new capacity added, 2024~	Net capacity addition, 2025 (MW)	% of new capacity added, 2025#
Wind power	3,427	10.1	6,348	10.7
Solar power*	24,546	72.4	37,945	63.9
Small hydro	114	0.3	58	0.1
Biomass	466	1.4	29	0.0
Waste to energy*	37	0.1	237	0.4
Large hydro	58	0.2	3,946	6.6
Nuclear	700	2.1	600	1.0
Coal (+ lignite)	4,574	13.5	7,260	12.2
Gas	-220	-	-4,696	-
Diesel	-	-	-	0.0
Total	**33,702**	**-**	**51,728**	**-**

*Includes grid and off-grid capacities
~As a % of gross capacity added: **33,922MW**
#As a % of gross capacity added: **59,349MW**

Source: Central Electricity Authority, GoI; IEEFA

Net annual capacity additions trend:

Annual capacity additions crossed the 50GW mark for the first time.

Net power capacity additions represent the increase in operational capacity after accounting for retirements. To meet the rising demand for electricity, India must continue to expand its operational power capacity. India recorded the highest-ever net capacity additions of **51,728MW** in **2025**, with significant contributions from solar (37,945MW), coal (7,260MW), and wind (6,348MW) **(Table 3)**. Solar is the primary driver, with capacity installations increasing from a range of 10,000–14,000MW in 2021–23 to close to 38,000MW in 2025, a record year. Wind capacity additions also increased over the years, from about 1,500MW in 2021 to more than 6,000MW in 2025, accelerating with the rise in hybrid projects combining wind and solar, and in some cases, storage.

Large hydro power capacity annual additions have also increased over the last five years to nearly 4,000MW, driven by the rising demand for firm renewable power and for balancing solar and wind power. Coal capacity additions also doubled from 2021 levels to above 7,000MW.

2025 was a record-breaking year for both gross and net capacity additions, underscoring the accelerating momentum of India's energy transition. Sustaining this pace is critical to achieving the country's 2030 target of 500GW of non-fossil fuel power capacity. The long-term fundamentals remain strong, driven by the increasing viability of round-the-clock renewable supply as storage costs decline, the proven scalability of rooftop solar, and the rapid expansion of domestic solar module and wind turbine manufacturing. Yet, a few challenges persist, including rising transmission grid congestion during peak solar hours and delays in state distribution utilities' power purchase agreements, which threaten to slow progress.

Table 3: Net power capacity additions by source (MW), last five years

Energy Source	2021	2022	2023	2024	2025
Wind power	1,459	1,847	2,806	3,427	6,348
Solar power*	11,882	13,956	10,016	24,546	37,945
Small hydro	89	96	51	114	58
Biomass	30	34	52	466	29
Waste to energy*	265	88	60	37	237
Large hydro	714	338	60	58	3,946
Nuclear	-	-	700	700	600
Coal (+ lignite)	3,685	586	4,001	4,574	7,260
Gas	(57)	(75)	214	(220)	(4,696)
Diesel	0	79	0	-	-
Total	**18,067**	**16,950**	**17,961**	**33,702**	**51,728**

*Includes grid and off-grid capacities

Source: Central Electricity Authority, IEEFA

Capacity additions among large states:

Maharashtra retained the lead it took in the previous quarter, adding the highest renewable energy capacity in 4Q 2025.

Among large states (with installed renewable power generation capacity of 10GW or more), **Maharashtra** led in renewable energy capacity installations (2,661MW) in 4Q 2025 (**Table 4**), driven by an increase in rooftop and utility-scale projects. Maharashtra surpassed Tamil Nadu in cumulative installed renewable power capacity in 2Q 2025 and, by the end of 2025, had an installed capacity base of 30.6GW, making it the third largest after Rajasthan and Gujarat.

Rajasthan and Gujarat continued their high-growth trajectory, adding capacity of over 2,000MW in the quarter, supported by favourable policies and large renewable energy park developments.

Table 4: Renewable energy capacity installations (MW), large states*

	4Q 2024	1Q 2025	2Q 2025	3Q 2025	4Q 2025
Rajasthan	2,266	1,973	3,735	2,613	2,161
Gujarat	1,958	1,910	4,148	2,571	2,630
Madhya Pradesh	823	516	452	365	249
Maharashtra	1,491	1,780	1,911	3,362	2,661
Andhra Pradesh	82	940	1,358	504	859
Karnataka	224	1,316	613	970	484
Tamil Nadu	615	967	507	840	524

*States with an installed renewables capacity of close to 10GW or more.

Source: Central Electricity Authority, MNRE, IEEFA

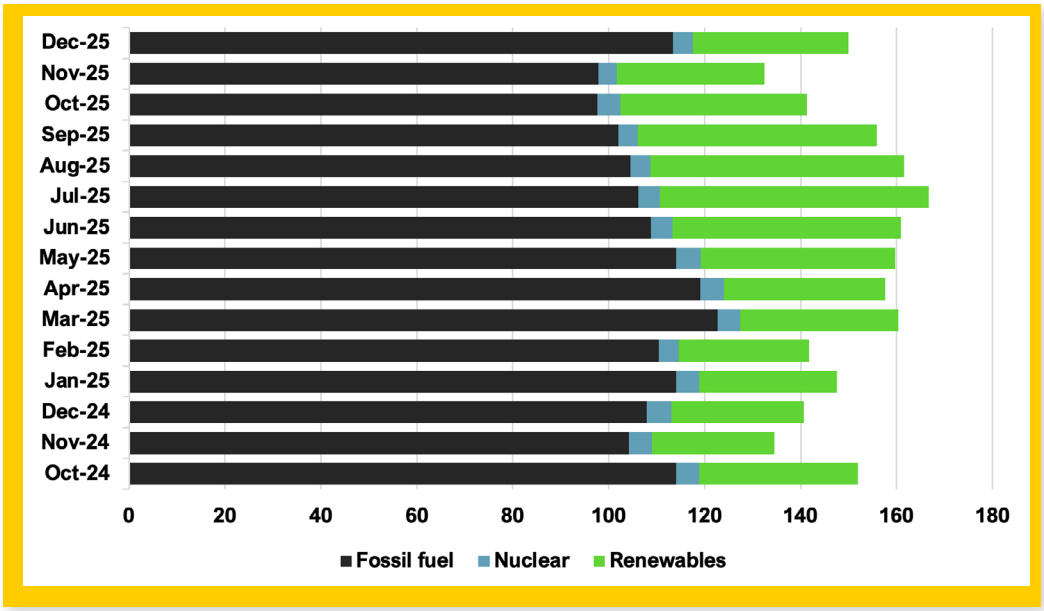
2. Generation

The share of fossil fuel–based power generation fell to 71.4% in 2025, while renewable power generation surged 18.5% in 4Q 2025.

India's total **power generation decreased marginally by 0.8%** from 427.05 billion units (BUs) in 4Q 2024 to **423.83BUs** in **4Q 2025 (Figure 1)**. The decrease was largely due to unseasonal rains in October 2025, which lowered temperatures in certain areas of the country, leading to a nearly 7% year-over-year (YoY) drop in demand in 4Q 2025.

Among energy sources, fossil fuel–based power generation decreased by 5.3%, nuclear power generation decreased by 12.1%, and **renewable power generation** increased by **18.5%** YoY in 4Q 2025. This trend aligns with the previous quarters since 2Q 2025. For the full year, the share of **fossil fuel–based generation** decreased from 75.3% in 2024 to **71.4%** in **2025**.

Figure 1: Power generation by source (BU), monthly, 2024-25



Source: Central Electricity Authority, MNRE, JMK Research, IEEFA

Renewable power generation increased in 2025, driven by a strong monsoon that boosted hydropower output. In addition, significant capacity additions in solar and wind energy reinforced this surge. Cheaper renewable electricity is increasingly displacing more expensive fossil fuel and nuclear power across the country.

3. Investments

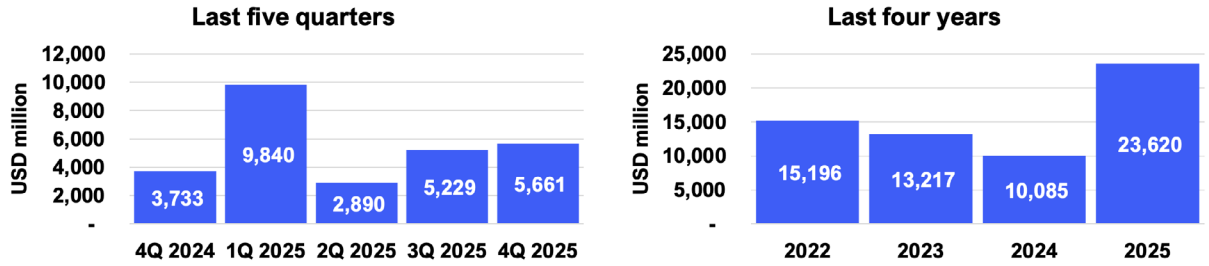
Full-year renewable energy sector investments rose sharply to USD23.6 billion in 2025, the highest in recent years. The sector is witnessing renewed interest from both domestic and international investors, driven by clear signs of market maturity.

According to industry estimates, **investments in the renewable energy** sector **increased by 51.6%** YoY from about USD3,733 million in 4Q 2024 to approximately **USD5,661 million in 4Q 2025 (Figure 2)**. This was the highest investment in 4Q 2025 in the last four years. Full-year investments at around USD23,620 million were also the highest in the last four years and were **134.2%** higher than the USD10,085 million recorded in 2024.

Investments in the Indian renewable energy sector are rising primarily due to the following reasons:

- Increased tendering (targeting 50GW per year) and procurement through government-appointed Renewable Energy Implementing Agencies (REIAs), such as SECI, NTPC, NHPC, and SJVN. Procurement through multiple agencies has increased volumes and created a more visible pipeline of projects.
- Increasing demand for green/renewable power from commercial and industrial consumers through the open access route as their climate commitments strengthen.
- Heightened interest from global private equity and sovereign funds as India's renewable energy sector has shown signs of maturity by achieving 50% non-fossil fuel capacity target five years ahead of schedule.
- A stable policy environment driving the energy transition across multiple sectors — including power (clean energy capacity targets, etc.), industry (emissions reduction targets, green hydrogen mission, carbon markets, etc), agriculture (solarisation of electricity demand), and transportation (electrification targets and efficiency norms) — is leading to increased demand for renewable energy.

Figure 2: Investments in India's renewable energy sector (USD million)



Sources: JMK Research, news reports

Some significant investments and deals that were announced during the quarter include:

RP–Sanjiv Goenka Group	The RP–Sanjiv Goenka Group announced an INR158 billion (USD1.7 billion) capital expenditure plan for investments across energy, education, and healthcare in West Bengal. Of this, INR120 billion (USD1.3 billion) will be invested in a 5,000MWh grid-scale battery energy storage system, along with renewable energy capacity, to supply firmer renewable energy to Kolkata.
Tata Power	Tata Power will invest INR110 billion (USD1.2 billion) in a 1,800MW pumped hydro storage project at Shirawta, Pune, with construction commencing in July 2026. The project is part of a 2,800MW pumped storage programme with the Maharashtra government to support grid-scale renewable integration.
Rural Electrification Corporation (REC)	Rural Electrification Corporation (REC) has sanctioned a loan of INR75 billion (USD826 million) for a Brookfield-backed hybrid renewable energy project in Kurnool, Andhra Pradesh, comprising 400MW of solar and 640MW of wind capacity. The INR99 billion (USD1 billion) project is being developed by Evren, Brookfield and Axis Energy's clean energy platform, and represents REC's largest-ever funding for a private-sector project.
Vayona Energy	TPG and a Mavco-led consortium have completed the acquisition of Siemens Gamesa's onshore wind business in India and Sri Lanka and renamed it Vayona Energy. The consortium acquired a 90% stake for a reported INR50 billion (USD 550 million) to focus on the manufacturing, installation, and servicing of onshore wind turbines.
ACME Solar Holdings	ACME Solar Holdings has secured INR47 billion (USD518 million) from Indian financial institutions, including Power Finance Corporation Ltd (PFC) and National Bank for Financing Infrastructure Development (NaBFID), to fund new renewable energy projects and refinance existing debt.
Asian Development Bank (ADB)	Asian Development Bank (ADB) has approved an INR41.6 billion (USD460 million) results-based loan to the government of Maharashtra to support agricultural solarisation in the state, alongside an additional INR3.6 billion (USD40 million) concessional loan from the Clean Technology Fund.
ReNew Vyoman Power	ADB has signed an INR30 billion (USD331 million) financing package with ReNew Vyoman Power to develop an 837MW wind-solar hybrid project with a 415MWh battery energy storage system in Andhra Pradesh. The project will supply 300MW of round-the-clock (RTC) power and is ADB's first financing of an RTC renewable energy project.
Aditya Birla Renewables Limited (ABREN)	Aditya Birla Renewables Limited (ABREN) has secured up to INR30 billion (USD330 million) in equity investment from Global Infrastructure Partners (BlackRock). The investment values ABREN at around INR146 billion (USD1.6 billion) and will support the expansion of its 4.3GW pan-India renewable portfolio spanning solar, hybrid, floating solar, and RTC renewable power projects.
Hero Future Energies	Hero Future Energies has secured INR19.08 billion (USD210 million) in loan financing from State Bank of India and Canara Bank to develop a 120MW renewable hybrid project (wind, solar, and storage) in Kurnool, Andhra Pradesh. The funding supports project construction and long-term commercial operations and is under a long-term Power Purchase Agreement (PPA) with SJVN.
Oyster Renewable Energy	Oyster Renewable Energy has secured debt financing of INR18.44 billion (USD203 million) from Union Bank of India for a 342MW wind-solar hybrid project in Madhya Pradesh. The project will be connected to the ISTS grid and operate under a 25-year captive PPA.
Inox Clean Energy	Inox Clean Energy has acquired renewable energy producer Vibrant Energy for about INR18 billion (~USD200 million). Vibrant's 1.3GW portfolio, including 800MW of operational capacity, will help Inox Clean Energy move closer to its 3GW target by FY2026.

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