

INTRODUCTION

Power is among the most critical components of infrastructure, crucial for the economic growth and welfare of nations. The existence and development of adequate power infrastructure is essential for sustained growth of the Indian economy. The fundamental principle of India's power industry has been to provide universal access to affordable power in a sustainable way. The Ministry of Power has made significant efforts over the past few years to turn the country from one with a power shortage to one with a surplus by establishing a single national grid, fortifying the distribution network, and achieving universal household electrification.

India's power sector is one of the most diversified in the world. Sources of power generation range from conventional sources such as coal, lignite, natural gas, oil, hydro and nuclear power, to viable non-conventional sources such as wind, solar, agricultural and domestic waste. Electricity demand in the country has increased rapidly and is expected to rise further in the years to come. In order to meet the increasing demand for electricity in the country, massive addition to the installed generating capacity is required.

India was ranked fourth in wind power capacity and solar power capacity and fourth in renewable power installed capacity, as of 2021. India is the only country among the G20 nations that is on track to achieve the targets under the Paris Agreement.

MARKET SIZE

India is the third-largest producer and consumer of electricity worldwide, with an installed power capacity of 411.64 GW as of January 31, 2023.

As of January 31, 2023, India's installed renewable energy capacity (including hydro) stood at 168.4 GW, representing 40.9% of the overall installed power capacity. Solar energy is estimated to contribute 63.3 GW, followed by 41.9 GW from wind power, 10.2 GW from biomass, 4.92 GW from small hydropower, 0.52 from waste to energy, and 46.85 GW from hydropower.

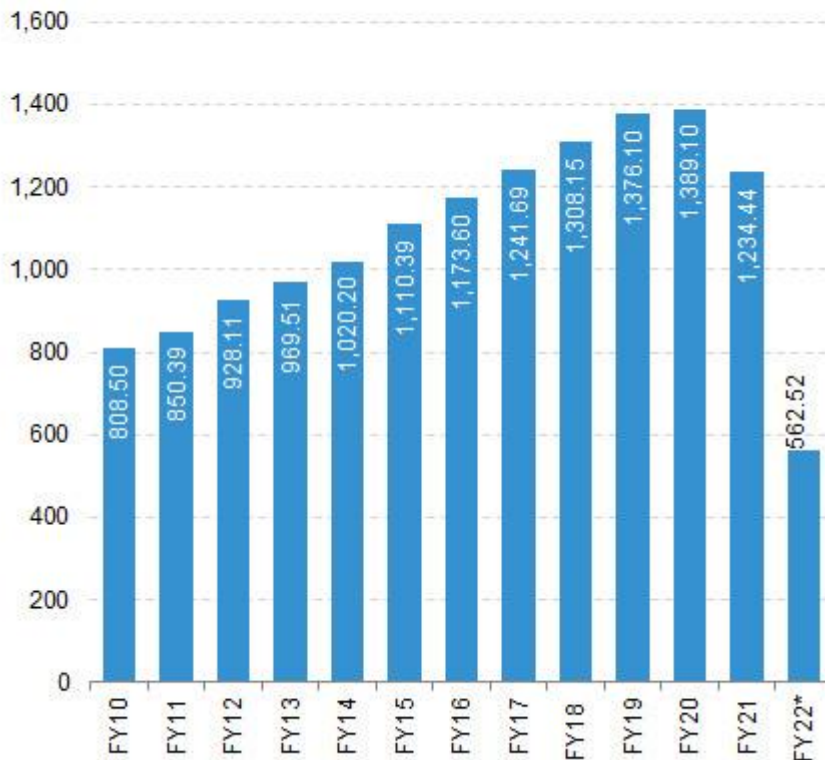
The non-hydro renewable energy capacity addition stood at 4.2 GW for the first three months of FY23 against 2.6 GW for the first three months of FY22.

With electricity generation (including renewable sources) of 1,359.21 BU in India up to January, 2023 in the current fiscal year FY23, the country witnessed a growth of 10.08% YoY. According to data from the Ministry of Power, India's power consumption increased 11% YoY in December, 2022 to 121.19 BU.

The peak power demand in the country stood at 205.03 GW in December, 2022.

The coal plants registered a PLF of 73.7% for the first nine-months period in FY23 compared to 68.5% in FY22 for the same period.

Total generation in India FY22 (including renewable sources) (BU)



DEVELOPMENTS/INVESTMENTS

Total FDI inflows in the power sector reached US\$ 16.57 billion between April 2000-December 2022.

Some major investments and developments in the Indian power sector are as follows:

- In February 2023, Tata Power inaugurated 'Divyang' a managed customer relations centre in Mumbai, which is a first among Indian power utilities.
- In January 2023, the Union Cabinet (CCEA) approved investment of US\$ 315 million (Rs. 2,614 crores) for SJVN's 382 MW Sunni Dam Hydro Project.
- In January 2023, President of India laid foundation stone of SJVN's 1000 MW Bikaner Solar Power Project in Rajasthan.

- In January 2023, the President of India dedicated transmission system built by Powergrid for 8.9 GW of solar power in Rajasthan.
- In August 2022, Tata Power Green Energy Limited (TPGEL), a wholly-owned subsidiary of Tata Power, commissioned a 225MW hybrid power project in Rajasthan.
- Mumbai headquartered Essar Group has formed the Essar Energy Transition (EET) with the objective to invest a total of US\$ 3.6 billion in developing a range of low carbon energy transition projects over the next five years.
- In November 2022, the Maharashtra State Electricity Distribution Corporation Limited (MSEDCL) granted the "Letter of Award" (LoA) to Tata Power Renewable Energy Limited (TPREL), a Tata Power subsidiary, to build a 150 MW solar project in Solapur, Maharashtra.
- In October 2022, SJVN started commissioning its 75 MW Solar Power Project in Parasan Solar Park which is located at Tehsil Kalpi, District Jalaun near Kanpur, Uttar Pradesh.
- In August 2022, NHPC Limited and the Government of Himachal Pradesh inked an implementation agreement for the 500 MW Dugar Hydroelectric Project in the Chamba District of Himachal Pradesh.
- In August 2022, Norfund, who manage the Norwegian Climate Investment Fund, and KLP, Norway's biggest pension company, signed an agreement to buy a 49% share of a 420 MW solar power plant in Rajasthan for Rs. 2.8 billion (US\$ 35.05 million).
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- In August 2022, NHPC signed a MoU with the Investment Board Nepal (IBN) to develop 750 MW West Seti and 450 MW SR-6 Hydroelectric Projects in Nepal.
- In July 2022, NTPC signed a MoU with MASEN (Moroccan Agency for Sustainable Energy) for cooperation in the renewable energy sector.
- In June 2022, SJVN announced a collaboration with the Assam government for the development of hydro and renewable energy projects in the state.
- In June 2022, SJVN signed investment agreements worth Rs. 80,000 crore (US\$ 10.24 billion) with the Uttar Pradesh government for implementing three solar power projects in the state.
- In May 2022, SJVN signed a pact with Tata Power Solar Systems to build a 1,000 MW solar project worth Rs. 5,500 crore (US\$ 704.38 million) in Bikaner, Rajasthan.
- In June 2022, NTPC declared commercial operation of second part capacity of 15 MW out of 56 MW Kawas Solar PV project in Gujarat.

- SJVN Limited is looking to develop 10,000 MW solar power projects inviting investment of Rs. 50,000 crore (US\$ 6.56 billion) in the next five years in Rajasthan.
- In June 2022, NHPC signed an engineering, procurement, and construction (EPC) contract with Adani Infra Limited to develop a 600 MW solar project under the Central Public Sector Undertaking program (Phase-II).
- Investment in India's renewable energy sector grew more than 125% YoY to touch a record US\$ 14.5 billion in FY22.
- In March 2022, NTPC announced that it was ready to start partial power generation of 10 GW from a 92 MW floating solar energy plant being set up at NTPC's unit at Kayamkulam in Kerala.
- In March 2022, NTPC announced that it will start commercial operations of 74.88 MW capacity of its 296 MW Fatehgarh solar project in Rajasthan.
- In March 2022, Adani Solar and Smart Power India (SPI), a subsidiary of Rockefeller Foundation, signed a non-financial and non-commercial MoU promote the usage of solar rooftop panels in rural India.
- In February 2022, Kolkata-based Eminent Electricity Distribution Ltd., a subsidiary of CESC Limited, bid Rs. 871 crore (US\$ 113.24 million) to take over Chandigarh's power supply department, which was approved and the transition will happen by the end of March.
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- In November 2021, NTPC announced that its 80 MW solar power-generation capacity in Jetsar (Rajasthan) has started commercial operations from October 22, 2021. The total capacity of the project is 160 MW.
- In November 2021, SJVN began the second unit work of the 1,320 MW Buxar thermal power plant in Bihar.

GOVERNMENT POLICIES & INITIATIVES

The Government of India has identified the power sector as a key sector of focus to promote sustained industrial growth. Some initiatives by the Government to boost the Indian power sector are as below:

- In the Union Budget 2022-23, the government allocated US\$ 885 million (Rs. 7,327 crore) for the solar power sector including grid, off-grid, and PM-KUSUM projects.
- Under the Union Budget 2022-23, the government announced the issuance of sovereign green bonds, as well as conferring infrastructure status to energy storage systems, including grid-scale battery systems.

- The Green Energy Corridor projects have been initiated to facilitate renewable power evacuation and reshaping the grid for future requirements. As on October 2022, 8651 ckm of intra-state transmission lines have been constructed and 19,558 MVA intra-state substations have been charged.
- To encourage rooftop solar (RTS) throughout the country, Ministry New and Renewable Energy has developed a National Portal wherein any residential consumer from any part of the country can apply for rooftop solar without waiting for Discom to finalize tender and empanel vendors. Since the launch on July 30, 2022, the total number of applications received on the national portal is for 117 MW solar capacity and the feasibility of more than 18 MW projects is granted.
- Production Linked Incentive Scheme (Tranche II) on 'National Programme on High Efficiency Solar PV Modules', with an outlay of US\$ 2.35 billion (Rs. 19,500 crore) was approved and launched.
- As of August 24, 2022, over 36.86 crore LED bulbs, 72.18 lakh LED tube lights and 23.59 lakh energy-efficient fans have been distributed across the country, saving around 48,411 million kWh per year and around Rs. 19,332 crore (US\$ 2.47 billion) in cost savings.
- As of November 2022, over 51.62 lakh smart metres have been deployed under the National Smart Grid Mission (NSGM), with a further 61.13 lakh to be deployed.
- Electrification in the country is increasing with support from schemes like Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY), Ujwal DISCOM Assurance Yojana (UDAY), and Integrated Power Development Scheme (IPDS).
- In order to meet India's 500 GW renewable energy target and tackle the annual issue of coal demand supply mismatch, the Ministry of Power has identified 81 thermal units which will replace coal with renewable energy generation by 2026.
- In February 2022, a parliamentary standing committee recommended the government to take steps to increase the loan limit for renewable energy sector under priority sector lending. The current limit stands at Rs. 30 crore (US\$ 3.93 million).
- In December 2021, West Bengal got a loan approval for US\$ 135 million from the International Bank for Reconstruction and Development (also called the World Bank) to improve the operational efficiency and reliability of electricity supply in select regions in the state.
- In November 2021, the government announced future plans to increase the funding under the PLI scheme for domestic solar cells and module manufacturing to RS. 24,000 crore (US\$ 3.17 billion) from the existing Rs. 4,500 crore (US\$ 594.68 million) to make India an exporting nation.
- In November 2021, Energy Efficiency Services Limited (EESL) stated that it will partner with private sector energy service companies to scale up its Building Energy Efficiency Programme (BEEP).

- In September 2021, the Government of the United Kingdom announced that it will invest US\$ 1.2 billion through public and private investments in green projects and renewable energy in India to support the latter's target of 450 GW of renewable energy by 2030.
- The Pradhan Mantri Sahaj Bijli Har Ghar Yojana, "Saubhagya", was launched by the Government of India with an aim of achieving universal household electrification. As of March 2021, 2.82 crore households have been electrified under this scheme.
- According to the S&P Global Platts Top 250 Global Energy Rankings 2021, Reliance Industries Ltd. and Indian Oil Corp. Ltd. ranked 3rd and 6th, respectively.

ROAD AHEAD

In the current decade (2020-2029), the Indian electricity sector is likely to witness a major transformation with respect to demand growth, energy mix and market operations. India wants to ensure that everyone has reliable access to sufficient electricity at all times, while also accelerating the clean energy transition by lowering its reliance on dirty fossil fuels and moving toward more environmentally friendly, renewable sources of energy. Future investments will benefit from strong demand fundamentals, policy support and increasing government focus on infrastructure.

The Government of India is preparing a 'rent a roof' policy for supporting its target of generating 40 GW of power through solar rooftop projects by 2022. It also plans to set up 21 new nuclear power reactors with a total installed capacity of 15,700 MW by 2031.

The Central Electricity Authority (CEA) estimates India's power requirement to grow to reach 817 GW by 2030. Also, by 2029-30, CEA estimates that the share of renewable energy generation would increase from 18% to 44%, while that of thermal energy is expected to reduce from 78% to 52%.

The government plans to establish renewable energy capacity of 500 GW by 2030.

Top Power Producing States in India

- **Gujarat**
- **Maharashtra**
- **Tamil Nadu**
- **Rajasthan**
- **Karnataka**
- **Uttar Pradesh**

Industry Contacts

- **Ministry of New and Renewable Energy (MNRE)**
- **Indian Wind Energy Association (INWEA)**
- **Indian Electrical & Electronics Manufacturer's Association (IEEMA)**
- **Central Electricity Authority**

