

SECTOR OVERVIEW

A. Introduction

1. **Background.** India is the third-largest electricity producer in the world after the People's Republic of China (PRC) and the United States,¹ with an installed capacity of 371.1 gigawatts (GW) as of June 2020.² India's electricity generation capacity increased by 121.5 GW during fiscal year (FY)2014–FY2020 (ending 31 March). Although thermal power accounts for 62.2% of installed capacity, renewable energy has been a key driver of capacity growth. India ranks fifth in installed renewable energy capacity globally³ and added 52.0 GW of renewable power generation capacity during FY2014–FY2020. Base load and peak load deficits have decreased since FY2013; India's base load deficit (0.5%) and peak load deficit (0.7%) in FY2020 were at their lowest levels since 1992.⁴ India's average per capita energy consumption of 1,181 kilowatt-hours (kWh) in FY2019 is estimated to be one-third of the global average. Total power generation capacity as of 30 June 2020 is in Table 1.

Table 1: Installed Capacity by Resource

Resource	Capacity (MW)	Capacity (%)
Thermal (coal, gas, oil)	230,905.7	62.2
Hydro	45,699.2	12.3
Nuclear	6,780.0	1.8
Renewable energy resources	87,669.2	23.6
Total	371,054.1	100.0

MW = megawatt.

Source: Government of India. [Central Electricity Authority](#).

2. **Government of India's renewable capacity targets.** As part of its nationally determined contributions under the Paris Agreement, India intends to achieve a 40% share of installed power generation capacity from nonfossil fuel sources by 2030,⁵ equal to about 450 GW of installed renewable capacity.⁶ India has a shorter-term interim target of adding 175 GW of installed renewable capacity by FY2022, including 100 GW of solar and 60 GW of wind energy capacity.⁷

3. **Renewable capacity growth.** In FY2014–FY2020, India's wind power installed capacity increased from 21.0 GW to 37.7 GW and solar power from 2.6 GW to 34.6 GW.⁸ The renewable energy capacity additions have been driven by various government fiscal and regulatory incentives, such as generation-based incentives,⁹ a tax holiday under section 80IA,¹⁰ accelerated

¹ Enerdata. 2019. [Global Energy Statistical Yearbook 2020](#).

² Government of India, Central Electricity Authority. 2020. [All India Installed Capacity \(in MW\) of Power Stations \(as on 30.06.2020\)](#). New Delhi.

³ Government of India. 2019. *Economic Survey 2018–19*. New Delhi.

⁴ Government of India, Central Electricity Authority. 2020. [Executive Summary on Power Sector](#).

⁵ United Nations Framework Convention on Climate Change. 2016. [India's Intended Nationally Determined Contribution: Working Towards Climate Justice](#).

⁶ *Economic Times*. 2020. [India to have 450 GW Renewable Energy by 2030: President](#). 31 January.

⁷ Government of India, Press Information Bureau. 2020. [Contribution of Renewable Energy Sources is Estimated to be Around 21% of Electricity Demand in 2021-22 : R.K.Singh](#). New Delhi (6 February).

⁸ Government of India, Ministry of New and Renewable Energy. 2020. [Programme/Scheme Wise Physical Progress in 2019-20 & Cumulative up to June, 2020](#). New Delhi.

⁹ An additional incentive of ₹0.50 per unit above the feed-in tariff for wind projects, capped at ₹10 million/MW and available for a minimum of 4 years and a maximum of 10 years. The scheme ended in March 2017.

¹⁰ Allowed tax waivers on profits for 10 assessment years. The incentive ended in March 2017.

depreciation,¹¹ renewable purchase obligations,¹² “must run” status,¹³ and deemed generation for renewable projects.¹⁴

4. **Trend in tariffs.** Renewable power is procured through competitive reverse auction. Wind energy was procured under a feed-in tariff regime until competitive auctions started in February 2017. Solar and wind energy tariffs have declined significantly since 2015 because of technological advances that have increased power generation, leading to declining equipment prices. Wind tariffs reached a low of ₹2.43 per kilowatt-hour (kWh) in December 2017 but increased to ₹2.70–₹2.80/kWh, with a weighted average tariff of ₹2.80/kWh, in FY2020. Solar tariffs reached a low of ₹2.36/kWh in July 2020 (driven by the fall in price of solar modules) and averaged ₹2.90/kWh in FY2020.

B. Challenges in the Sector

5. **Impact of coronavirus disease.** The suspension of a large proportion of commercial and industrial activity because of the lockdown to contain the spread of the coronavirus disease (COVID-19) has resulted in a decline in power demand. In April 2020, demand decreased by 22.3% to 85.6 terawatt-hours compared with April 2019.¹⁵ However, reduction in demand improved to 14.9% in May 2020 and 9.7% in June 2020 as economic activity resumed.¹⁶ As per ICRA Limited, an Indian rating agency (Moody’s subsidiary), annual power demand for FY2021 is expected to decline by about 1%.¹⁷ This decline is not expected to impact solar projects owing to their “must run” status. As per feedback from power producers, solar projects have not witnessed any significant curtailment during lockdown; it is thermal capacity that has faced lower offtake. However, reduced power demand, particularly from high-paying and profitable customers, is expected to lead to deterioration of the state power distribution companies’ (DISCOMs’) already poor financial health. DISCOMs’ outstanding amounts increased from \$14.3 billion in March 2020 to \$17.6 billion in June 2020.¹⁸ DISCOMs are delaying payments under power purchase agreements (PPAs), citing lack of liquidity, which increases working capital requirements for power producers.

6. **Delays in receivables.** The financial health of many DISCOMs is a concern because of high and mounting aggregate technical and commercial (AT&C) losses and failure to recover the full cost of power sold. As a result, these DISCOMs delay payments to developers. The average payment cycle for DISCOMs as of March 2020 was 5–6 months; in Andhra Pradesh, Telangana, and Tamil Nadu, delays were 10–12 months.

7. **Land acquisition and transmission bottlenecks.** The sector faces challenges: lack of good land sites and contiguous land parcels; land acquisition issues; insufficient grid connectivity,

¹¹ Accelerated depreciation reduces tax outflow in the initial year; depreciation began at 80% in the first year of operations but the government halved the benefit to 40% for projects commissioned after March 2017.

¹² A mechanism by which state power distribution companies (DISCOMs) and consumers are obligated to purchase (i) a certain percentage of power from renewable energy sources; or (ii) renewable energy certificates traded on power exchanges.

¹³ The power generated from a renewable project will be compulsorily evacuated, with no provision of backing down.

¹⁴ The developer is paid for its plant availability (based on annual generation on a pro-rata basis) if electricity is not purchased because of grid issues (e.g., grid unavailability).

¹⁵ *Business Line*. 2020. [All-India Power Demand Declines 22% in April Amid Covid-led Lockdown](#). 3 June.

¹⁶ *Financial Express*. 2020. [Power Consumption Falls Again in June; Economic Activity Dull in Unlock-1 Phase](#). 1 July.

¹⁷ V. Kumar. 2020. [Covid-19 Impact: Indian Electricity Demand to Decline 1 Percent](#). *The Hindi Business Line*. 29 April.

¹⁸ Government of India, Ministry of Power. 2020. [Payment Ratification and Analysis in Power Procurement for Bringing Transparency in Invoicing of Generators Portal](#). New Delhi.

which causes transmission congestion; and grid infrastructure that is inadequate to evacuate renewable power.

8. **Renegotiation of power purchase agreements and grid curtailment.** Andhra Pradesh DISCOMs issued notice to developers for renegotiation of PPAs of operational renewable projects. The state government perceived PPAs entered at feed-in tariff rates to have been awarded at higher tariffs than the tariff levels discovered in later years through the auction route. Although the Andhra Pradesh High Court issued a stay order, this action adversely impacted investor confidence. Renewable power has “must run” status in the merit order dispatch and transmission companies generally adhere to it. However, projects have sometimes witnessed grid curtailment in Andhra Pradesh, Karnataka, and Telangana, among other states, that adversely impacted cash flows.

9. **Lack of access to low-cost, long-tenor project finance funds.** Local long-term financing for renewable energy continues to be scarce because domestic banks and financial institutions have largely reached their exposure limits for the energy sector. Bank financing is usually not available for more than 10–15 years, even though PPAs usually have a tenor of 25 years. Rising stresses in the renewables sector because of some DISCOMs’ irregular payments have made domestic lenders averse to increasing their exposure.

10. **Customs duty.** In July 2018, the Government of India imposed a safeguard duty on solar cell imports from the PRC and Malaysia for 2 years—25% from 30 July 2018 to 29 July 2019, 20% from 30 July 2019 to 29 January 2020, and 15% from 30 January 2020 to 29 July 2020. As a result, India’s imports of solar cells decreased from \$3.8 billion in FY2018 to \$2.2 billion in FY2019 to \$1.7 billion in FY2020.¹⁹ Given India’s insufficient capacity to manufacture solar components, the drop in solar cell imports resulted in reduced solar capacity additions. Annual solar capacity additions fell to 6.4 GW in FY2020 compared with 9.4 GW in FY2018. For projects affected by the safeguard duty, increased project costs attributable to the duty can be recovered through a tariff increase.²⁰ In July 2020, the Ministry of Finance approved continued imposition of the safeguard duty on solar cells from the PRC, Thailand, and Viet Nam for another year starting 30 July 2020. The safeguard duty of 14.9% will be imposed from 30 July 2020 to 29 January 2021 and 14.5% from 30 January 2021 to 29 July 2021. The union budget of the Government of India for FY2021, proposed a 20% basic customs duty (BCD) on imported solar cells and modules. Although this duty has not yet been promulgated, the Ministry of New and Renewable Energy (MNRE) announced on 1 July 2020 that solar imports from the PRC would be exempted from BCD if the PPAs were signed before the duty’s implementation. The decision is subject to the approval of the Ministry of Finance, and in case it does not allow such a provision, MNRE would allow developers to claim reimbursements for imports from the PRC under the change-in-law provision in the PPAs. As per industry sources, total customs duty (safeguard duty and BCD) is expected to be 25% for the first year and 40% after that.²¹

C. Policy Response and Sector Outlook

11. **Government of India’s liquidity infusion as part of the COVID-19 Response Stimulus Package.** As part of the financial package to revive the economy, the government has allocated

¹⁹ V. Petrova. 2020. [India Considering Extending Safeguard Duty on Chinese PV Imports - Report](#). *Renewables Now*. 7 January.

²⁰ S. Mohanty. 2020. [Chinese Solar Imports to Be Exempted from BCD if PPA Signed Earlier](#). *The Economic Times*. 1 July.

²¹ N. Prasad. 2020. [India Set to Extend Levy of Safeguard Duty on Solar Imports by Another Year](#). *Mercom India*. 20 July.

\$12.3 billion to assist DISCOMs under stress across India during the COVID-19 lockdown, which has restricted commercial and industrial activity and reduced associated power demand. The package for the power sector is expected to reduce the burden on DISCOMs for maintaining distribution of electricity as supplied by generation and transmission companies. The liquidity will be infused (in two equal tranches) through the Power Finance Corporation (PFC) and Rural Electrification Corporation (REC), which will extend special long-term transition loans of up to 10 years to DISCOMs. Loans will be provided to the DISCOMs against guarantees by the state governments. As of 31 July 2020, \$9.3 billion had been approved from the facility (to be disbursed in two tranches).²²

12. **Payment security mechanism.** In July 2019, the Ministry of Power directed the regional and the state load dispatch centers to dispatch power to DISCOMs only after the generation company confirmed that the DISCOMs had opened letters of credit in favor of the generation company (as required under the PPAs).²³ However, most DISCOMs have not yet provided letters of credit to the generation companies, and clarity is lacking about these letters of credit.²⁴ The central government has also entered into a tripartite agreement with the Reserve Bank of India and state governments, with central entities such as Solar Energy Corporation of India and NTPC Limited as beneficiaries. Under the agreement, the Reserve Bank of India can deduct funds from the central government's financial allocation to the states in the event of payment delays and/or default by DISCOMs to the central entities.

13. **Infrastructure development.** Solar parks with pre-developed infrastructure are being established to mitigate land acquisition and transmission risks. Grid capacity additions are planned under two main schemes—the Green Energy Corridor Project²⁵ and renewable energy zones—to be implemented by FY2022. These will add about 80 GW of transmission grid capacity to existing grid capacity of about 24 GW for renewable energy, increasing total renewable energy grid capacity to more than 100 GW.²⁶

14. **Ujwal DISCOM Assurance Yojana.** The central government launched Ujwal DISCOM Assurance Yojana (UDAY) in 2015, a financial and operational restructuring scheme, which aims to improve DISCOMs' weak financial health. The key components of the UDAY scheme are the following: (i) state governments take over financial liabilities of their DISCOMs in phases, (ii) operational efficiency is improved by reducing transmission and distribution losses and rationalizing tariffs, and (iii) states meet their renewable purchase obligations. DISCOMs' operational and financial indicators have improved since UDAY's launch: (i) AT&C losses have declined and were 18.9% as of FY2020, compared with 20.7% in FY2016; (ii) the deficit between average revenue realized and average cost of supply declined from ₹0.59/kWh in FY2016 to

²² PSU Watch. 2020. [Rs 90,000 cr Package: PFC, REC Sanction Loans to DISCOMs Worth Rs 68,000 cr in 1st Tranche](#). 11 August.

²³ Government of India, Ministry of Power. 2019. [Order No. 23/22/2019-R&R](#). New Delhi.

²⁴ S. Bajaj. 2019. [Letter of Credit Has Not Been Effective as Payment Security for Solar Developers](#). *Mercom India*. 9 December.

²⁵ The Green Energy Corridor Project aims to synchronize electricity produced from renewable sources, such as solar and wind, with conventional power stations in the grid. The project is being implemented by eight renewable energy-rich states: Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu. The project includes about 9,400 kilometers of transmission lines and substations with a capacity of about 19,000 megavolt amperes. ADB has provided financing to the Power Grid Corporation of India Limited to finance a part of the project. ADB. 2015. [Report and Recommendation of the President to the Board of Directors: Proposed Loan to Power Grid Corporation of India Limited for the Green Energy Corridor and Grid Strengthening Project in India](#). Manila.

²⁶ Crisil Research. 2019. *Power Sector Outlook*. New Delhi.

₹0.42/kWh in FY2020; and (iii) DISCOMs' combined losses are estimated at \$4.1 billion in FY2020, down from \$7.1 billion in FY2016.

15. **New financing avenues.** Issuance of capital market instruments such as green and masala bonds²⁷ has increased as they offer the opportunity to obtain funds at a lower cost and, in the case of masala bonds, protection from exchange rate fluctuations. An estimated \$9.2 billion worth of green bonds had been raised by Indian entities by June 2020. The central government is supporting the renewable energy sector by making concessional financing available through government-owned financial institutions such as PFC, REC, and the Indian Renewable Energy Development Agency Limited.

D. Role of the Private Sector

16. The private sector is expected to be increasingly important in accelerating investment in renewable energy. To achieve the renewable energy targets, \$330 billion in additional investment will be needed, of which \$80 billion will be required by FY2022 and \$250 billion for FY2023–FY2030. The investments are expected to be largely driven by the private sector.

17. The leading companies involved in renewable energy are given in Table 2.

Table 2: Installed Renewable Energy Capacity of Leading Companies

Company	Wind (MW)	Solar (MW)	Total (MW)
ReNew Power	3,254	2,245	5,499
Greenko	2,358	1,358	3,716
ACME		2,900	2,900
Tata Power	1,161	1,694	2,855
Adani Green		2,148	2,148
Mytrah	2,030		2,030
APIPL		1,718	1,718
Sembcorp Green Infra	1,365		1,365

APIPL = Azure Power India Private Limited, MW = megawatt.

Source: Crisil Research.

18. India's renewable energy sector has attracted over \$42 billion in investments since 2014. It has witnessed the entry of several global strategic and institutional investors such as JERA (a joint venture between Tokyo Electric Power Company and Chubu Electric Power Company); Engie (formerly GDF Suez, a French utility); EDF; Sembcorp; GIC (Singapore); Abu Dhabi Investment Authority; Caisse de dépôt et placement du Québec; Canada Pension Plan Investment Board; Goldman Sachs; JP Morgan; Actis; and Macquarie. Their interest seems to be driven by growth opportunities, better risk-adjusted returns, and a competitive and transparent bidding landscape.

²⁷ Masala bonds are bonds issued outside India but denominated in Indian rupees, rather than the local currency of the place of issuance or US dollars.