Crisil
Intelligence

CleanMax Enviro Energy Solutions Ltd

Assessment of the Indian corporate renewable power market

Final report

August 2025

by S&P Global

Crisil Intelligence

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1 Overview of Indian macroeconomic landscape

1.1 Real GDP growth

India's real gross domestic product (GDP) at constant prices (fiscal 2012) was estimated at Rs 188.0 trillion (provisional) last fiscal vis-à-vis Rs 176.5 trillion (first revised estimates) in fiscal 2024, as per data released by the National Statistical Office (NSO) in May 2025. This represents a nominal on-year growth of 6.5%.

This fiscal, too, Crisil Intelligence[1] expects GDP growth at 6.5%, which is close to the pre-pandemic average of 6.6% between fiscals 2011 and 2020 (as per NSO data). This will allow India to retain its tag of the fastest growing large economy.

Even the International Monetary Fund (IMF), in April 2025, projected India's real GDP to grow 6.2% on-year in fiscal 2026, the highest among the top 10 economies. In sync, the World Bank has projected India's GDP growth at 6.3%.

The pace of growth is projected to catapult India to become the fourth largest economy in the world this fiscal and the third largest by fiscal 2028, according to the IMF, surpassing Japan and Germany.

Notably, in fiscal 2024, India's GDP growth surged to 9.2%, which was the highest in 12 years, thanks to an abnormal surge in government spending and a rebound in private consumption.

Figure 1: India vs other major nations

	United States	China	Germany	Japan	India*	United Kingdom	France	Italy	Canada	Brazil
Nominal GDP (Tn USD) CY24	29.18	18.75	4.66	4.03	3.91	3.64	3.16	2.37	2.24	2.17
Per capita electricity consumption 2023 (MWh)	12.5	6.6	6.1	8.2	1.4	4.3	7.9	5.3	16.4	3.3
Real GDP Growth CY24 (in %)	2.8	5.0	-0.2	0.1	6.5	1.1	1.1	0.7	1.5	3.4

** India GDP data as per NSO for fiscal 2025*

Source: World Economic Outlook Database (April 2025) by IMF, International Energy Agency (IEA), Central Electricity Authority (CEA), Crisil Intelligence

In the past decade (fiscals 2014-2024), India's GDP at constant prices (fiscal 2012) increased at a CAGR of ~5.3%, driven by government policies, focus on the manufacturing sector, exports, increased digitalisation, implementation of the Goods and Services Tax (GST), and strong consumption and investment.

[1] Based on Crisil Centre for Economic Research (CCER) projections
Projections of key economic indicators for India in this chapter are as per CCER

Given the current inflation trajectory, Crisil Intelligence expects inflation to average 4.3% this fiscal vs 4.6% last fiscal. Lower inflation keeps the window open for one more repo rate cut by the Reserve Bank of India (RBI) apart from the 100 basis points (bps) cut announced so far.

The surplus in services trade and a robust flow of remittances provide a cushion and should keep the current account in the safe zone. Crisil Intelligence expects the current account deficit (CAD) at 1.3% of GDP in fiscal 2026 compared with the estimated 1.0% last fiscal.

While the CAD is expected to remain manageable, there could be some risks, especially to capital flow because of disruptions in global economic growth and geopolitical uncertainties. However, India's healthy macroeconomic parameters do provide some cushion to the rupee against these shocks, although it is not entirely immune. Crisil Intelligence expects the rupee to remain volatile in the near term, settling at ~87.5/$ by March 2026.

Table 1: Key economic indicators and our projections

Parameters	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26P
GDP growth (%)	6.5%	3.9%	-5.8%	9.7%	7.0%	9.2%	6.5%	6.5%
Per capita GDP growth	5.3%	2.8%	-6.7%	8.8%	6.9%	8.3%	5.5%	5.3%
CPI (%, average)	3.4%	4.8%	6.2%	5.5%	6.7%	5.4%	4.6%	4.3%
CAD/GDP (%)	-2.1%	-0.9%	0.9%	-1.2%	-2.0%	-0.7%	-1.0%	-1.3%
FAD/GDP (%)	3.4%	4.6%	9.2%	6.7%	6.4%	5.6%	4.9%	4.4%*
Exchange rate (Rs/$, March-end)	69.5	74.4	72.8	76.2	82.3	83.0	86.6	87.5
10-year G-sec yield (%, March-end)	7.5%	6.2%	6.2%	6.8%	7.4%	7.1%	6.7%	6.4%

*P - projected, CPI - Consumer Price Index, G-sec - government security, FAD - fiscal account deficit. *Budget estimates*

Source: CSO, RBI, Crisil Intelligence

1.2 Effect of macroeconomic factors on growth

In the current age, emerging segments such as data centres, artificial intelligence (AI), financial technology (fintech), education technology (edtech), renewable energy (RE), global capability centres are the new triggers of macroeconomic growth. Additionally, while the role of regulations and policies cannot be underplayed, the focus is on innovation. Advances in technologies such as cloud computing, AI and IoT drive the demand for digital services.

Easy access to capital at low interest rates fuels investment and growth. High energy costs impact operating costs, especially for energy-intensive facilities. These factors interact and influence each other, shaping industrial growth.

Crisil Intelligence has detailed below how policies, infrastructure development, digitalisation and the need for sustainability are driving overall growth.

Union Budget 2025-26: The budget allocated Rs 0.6 trillion to the Ministry of New and Renewable Energy (MNRE) and Rs 1.07 trillion to the Ministry of Power (MoP). The allocation to key schemes under MNRE increased 25.0% from the budget for fiscal 2025 owing to 12.0% and 80.0%, higher allocation to the Indian Renewable Energy Development Agency (IREDA) and Pradhan Mantri Surya Ghar Muft Bijli Yojana, respectively. The budget proposes to develop atleast 100 GW of nuclear energy by 2047 to support country's energy transition efforts. Further, it highlighted to incentivise states to reform electricity distribution and augment intra-state transmission capacity.

Monetary policy: In its monetary policy statement dated June 6, 2025, the Monetary Policy Committee (MPC) of the RBI reduced the policy repo rate by 50 bps to 5.50%. Consequently, the standing deposit facility (SDF) rate under the liquidity adjustment facility (LAF) was adjusted to 5.25% and the marginal standing facility (MSF) rate and the bank rate to 5.75% each. This decision is in consonance with the objective of achieving the medium-term target for CPI inflation of 4.0% within a band of +/- 2.0%, while supporting growth.

Boost infrastructure: Capital expenditure (capex) and effective capex, which are budgeted at Rs 11.2 trillion and Rs 15.5 trillion will account for 3.1% and 4.3% of GDP, respectively. Budget 2025 also enumerated measures to be undertaken by the Government of India (GoI) to support the states and the private sector in boosting investments in infrastructure. This is expected to boost power demand.

Thrust on manufacturing: The government has made some progress in improving labour market efficiency through various programmes such as Skill India, Make in India and Production Linked Incentive (PLI) scheme. Further, the Budget 2025-26 announced to setup National Manufacturing Mission with an aim to improve domestic value addition and build an ecosystem for solar PV cells, EV batteries, electrolysers, wind turbines, high voltage transmission equipment and grid scale batteries.

Digitalisation: The Indian government's Digital India programme aims to boost financial inclusion and deliver services electronically through increased internet connectivity. Key initiatives include digital public infrastructure for agriculture, national digital library for children and adolescents, fintech services, Skill India digital platform, data embassy, fiscal support for digital public infrastructure and Unified Payments Interface (UPI) for real-time payments. These initiatives will drive efficiency-led growth and digitalisation.

Sustainability: Focusing on sustainability and reducing carbon footprint of businesses can positively influence operations and costs. While initial investments in sustainable practices are costly, long-term benefits include reduced energy consumption and lower operating costs, leading to increased profitability.

1.3 Carbon reduction emission measures

The 2021 United Nations Climate Change Conference (COP26) was a landmark event, as it laid down the commitment to phase down coal power, accelerate the transition to clean energy, reduce methane emissions by 30% by 2030 and provide $100 billion per year in climate finance to developing countries.

India has submitted its Nationally Determined Contributions (NDCs) after COP26, which include reduction in emissions intensity of its GDP by 45% by 2030 from 2005 level, achieve ~50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF), and create an additional carbon sink of 2.5-3 billion tCO_2e through additional forest and tree cover by 2030. Initially, India had set a target of 450 GW renewable energy (RE) installed capacity by 2030, which was revised to 500 GW non-fossil fuel-based capacity by 2030. This underscores India's recognition of the urgent need to accelerate the transition towards RE to mitigate the impacts of climate change and achieve sustainable development.

The Supreme Court judgment in March 2024, in Writ Petition (Civil) No. 838 of 2019), has established the duty of the states to maintain ecological balance and hygienic environment. Even though the right to a clean environment has been acknowledged, the right against climate change will force the states to give preference to environmental protection and sustainable development.

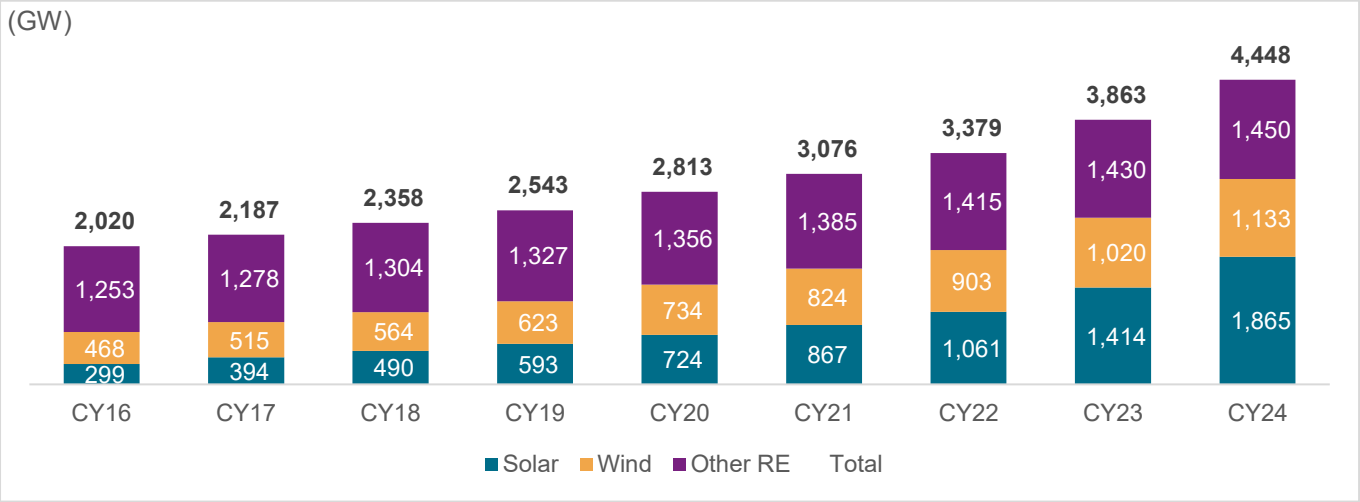
The Indian government has introduced amendments to the Energy Conservation Act 2001, aiming to accelerate the country's transition to a low-carbon economy. The designated industries have been assigned mandates to reduce their carbon footprint by 2030, with the Bureau of Energy Efficiency (BEE) tasked with monitoring their progress.

2 Overview of global solar and wind segments

2.1 Robust growth in RE installations

As per International Renewable Energy Agency (IRENA), global RE capacity was 4,448 GW in 2024, accounting for 46% of total installed power capacity. Global installed solar capacity expanded to 1,865 GW in 2024 from 299 GW in 2016, clocking a CAGR of 25.7%. Wind capacity increased to 1,133 GW in 2024 from 468 GW in 2016, at a CAGR of 11.7%. Solar accounts for 41.9% and wind accounts for 25.5% of the total RE capacity installed globally. Robust growth has been led by fall in costs, favourable government policies and strong thrust on avoiding carbon emissions.

Figure 2: Source-wise installed RE capacity globally

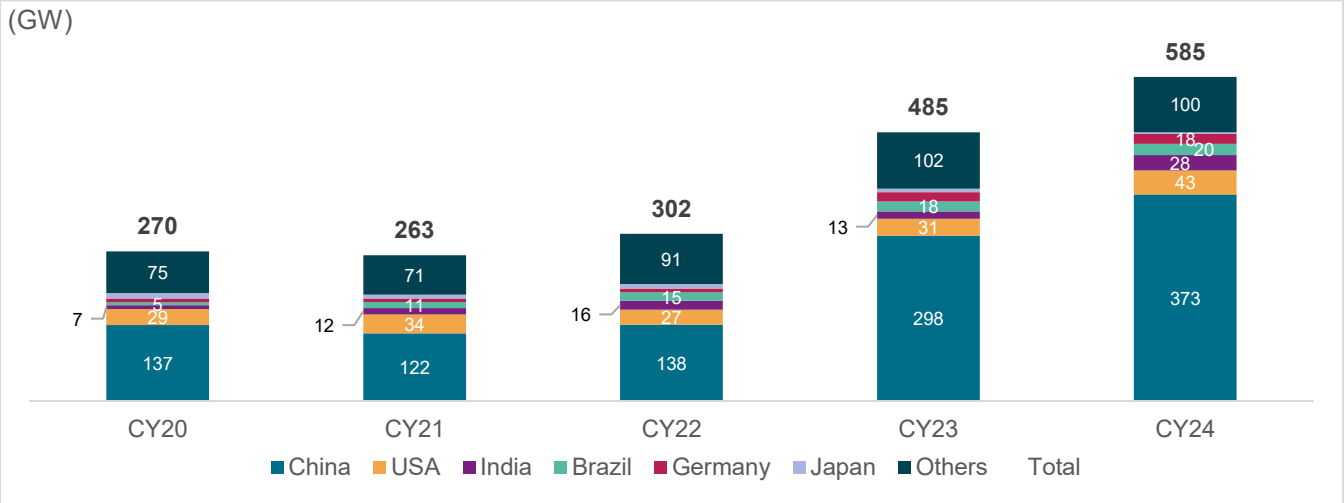


Notes: Others include hydro power, marine energy, bio energy and geothermal energy
Solar includes solar photovoltaic (PV) as well as concentrated solar. Wind includes offshore and onshore
Source: IRENA: Renewable capacity statistics 2025, Crisil Intelligence

Continuing the trend reported in recent years, 2024 saw the largest increase in RE capacity to date – with 585 GW addition – expanding the stock of renewable power by 15.1%. Renewables accounted for a record 92.5% of global power additions, largely due to significant growth in solar and wind power.

Solar power alone accounted for over three-fourths of RE additions, with a record 451 GW added during the year, while 113 GW of wind energy was added. China and the United States (US) collectively account for 416 GW (or 71.1%) of RE capacity installed in 2024, while India ranks third in annual RE installation with 28 GW (4.8%) added in 2024.

Figure 3: RE capacity additions in key countries



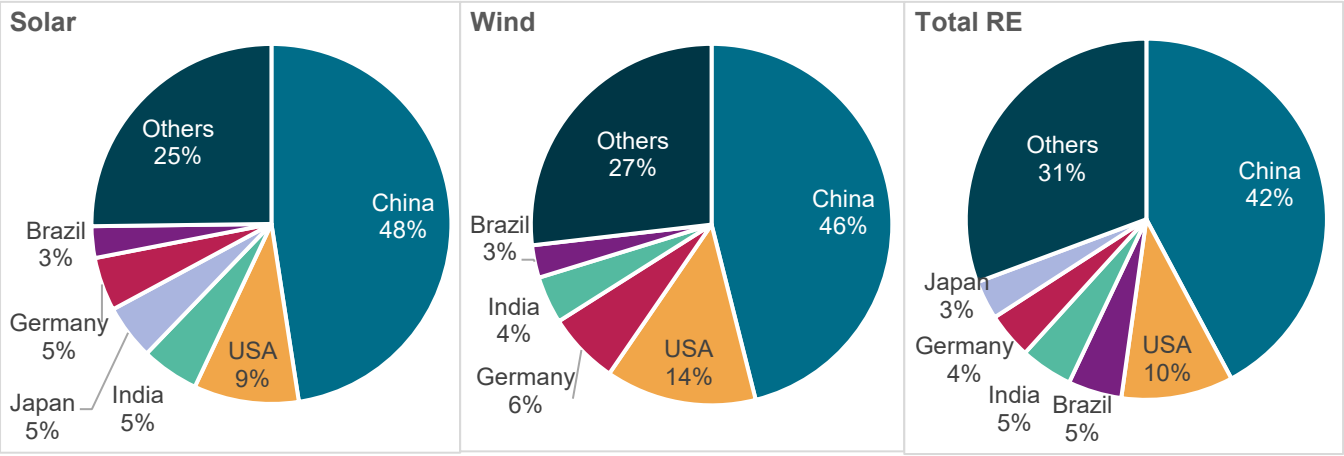
Source: IRENA, Crisil Intelligence

2.1.1 India third-largest consumer of electricity

India has emerged as a key player in the global electricity and RE market. It is the third-largest electricity consumer and the fourth largest in terms of installed RE capacity globally as per IRENA. India has significantly increased its non-fossil fuel-based generation capacity, with its share rising from 30.2% in 2015 to 47.1% in 2024. As of 2024, the combined solar and wind capacities comprise 31.6% of the country's total installed capacity. Solar energy recorded a meteoric rise from just 2.6 GW in fiscal 2014 to 82 GW in fiscal 2024 and 106 GW in fiscal 2025, driven by ambitious policy targets, declining technology costs, falling solar tariffs, improved grid infrastructure, rising domestic manufacturing base for solar modules and large-scale solar parks. Wind capacity increased to 50 GW in fiscal 2025 from 21 GW in fiscal 2014.

The domestic RE market has expanded faster than most leading global economies, positioning India just behind China and the US in annual additions. As per CEA, the total RE installed capacity in India was 209 GW in 2024, positioning it fourth in global RE installed capacity, fourth in wind power and third in solar power capacity.

Figure 4: India's share in global RE market in 2024



Source: IRENA, Crisil Intelligence

India’s energy security is a critical issue, necessitating a balance between energy availability, affordability and sustainability. Furthermore, the current geopolitical landscape and economic fragmentation have heightened the importance of energy security, with increasing risks associated with energy supply disruptions.

India’s energy transition policies, such as the National Green Hydrogen Mission, Ethanol Blending Program (EBP), PM-KUSUM Scheme, PLI Scheme for Batteries, Solar PV module manufacturing and Ultra Mega Renewable Energy Parks aim to create a diversified and resilient energy landscape. These policies and schemes are expected to not only enhance energy security but also contribute to sustainable development, economic growth and environmental protection. As India continues towards a cleaner and more secure energy future, the successful implementation of these policies will be crucial in addressing the challenges of energy availability, affordability and sustainability.

According to IEA, total investment in clean technologies crossed $2 trillion in 2024. In India, clean energy investment in India reached $68 billion. The total FDI inflow into the Indian RE segment jumped 10 times from $414 million in fiscal 2014 to $4,012 million in fiscal 2025.

India's green ambitions are also supported by international partnerships, including the International Solar Alliance and its One Sun One World One Grid (OSOWOG) initiative launched by the Indian prime minister in 2018. This globally interconnected power grid project aims to share RE resources among countries for mutual benefits and global sustainability. The OSOWOG initiative, supported by MNRE and the World Bank, will reduce carbon footprint, energy costs and storage needs, while enhancing the viability of solar projects. It will also open new avenues for international cooperation, helping to meet Paris Agreement targets and create a global ecosystem of shared renewable energy resources.

2.1.2 Levelised cost of solar and wind energy continues to spiral downwards

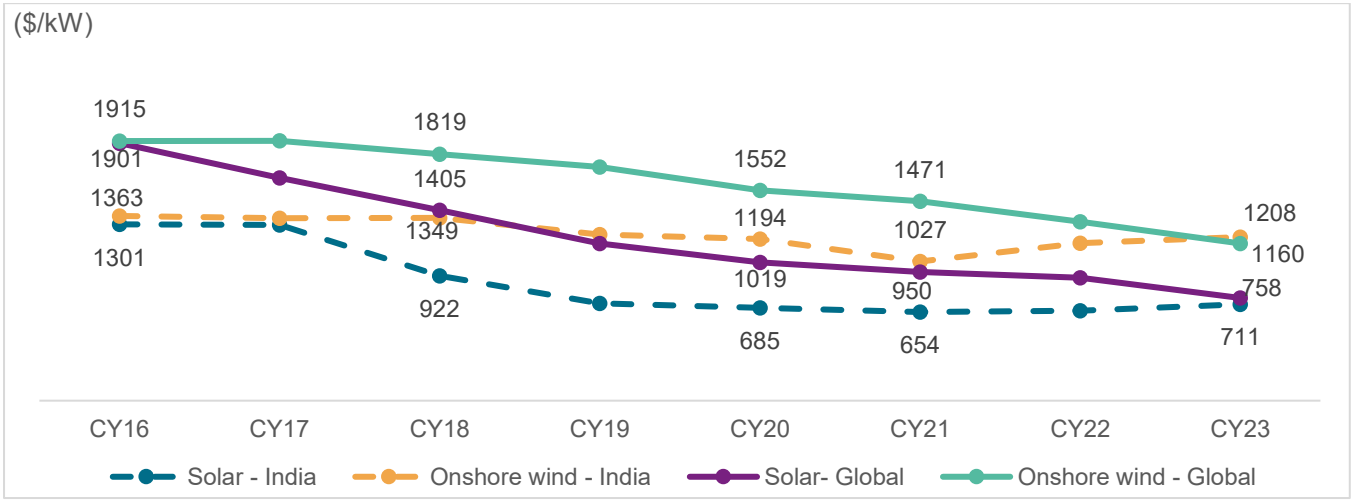
The cost of RE has plummeted over the past decade, driven by declining equipment costs, large-scale deployment and supportive government policies. The global weighted average levelised cost of energy (LCOE) for solar and wind power has seen a significant reduction, making them increasingly competitive with fossil fuels.

For utility-scale solar PV, the global weighted average LCOE of projects commissioned in 2023 fell 12.0% y-o-y to $0.044/kWh. This was led by a 16.5% decline in the global weighted average total installation cost to $758/kW (from $ 908/kW in 2022) as solar module prices as well as balance of system costs fell. This was higher than the 4.4% decline experienced in 2022, as rising PV module and commodity prices at the end of 2021 and into 2022 had an impact on installation costs.

Onshore wind power projects commissioned in 2023 witnessed 2.9% lower y-o-y global weighted average LCOE at $ 0.033/kWh. The drop in LCOE was led by large scale deployment in China, where costs witnessed a drop led by higher hub heights and turbines size.

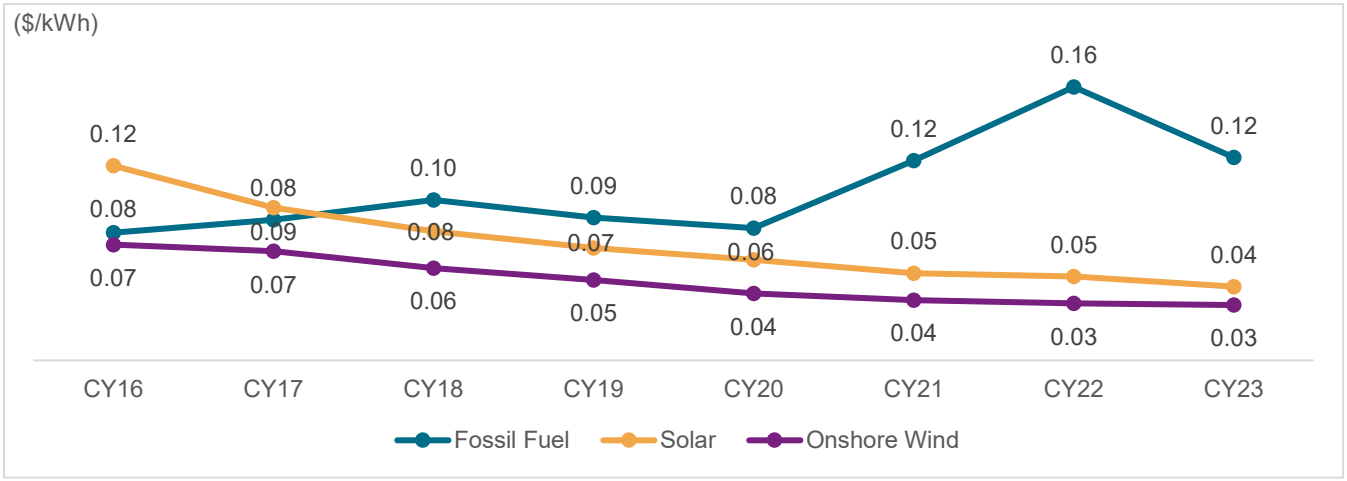
India witnessed a substantial decline in solar PV installation cost between fiscals 2016 and 2023, with overall cost falling 45.3%. Wind installations experienced a relatively modest reduction of 11.4% over the same period. Cost reductions have been witnessed in LCOE as well. Solar LCOE decreased 42.8% ($0.084/kWh in 2016 to $0.048/kWh in 2023), while onshore wind LCOE declined 36.0% ($0.072/kWh in 2016 to $0.046/kWh in 2023), driven by technology advancements and improved project economics.

Figure 5: Solar and wind energy installation costs



Source: IRENA, Crisil Intelligence

Figure 6: Global weighted average LCOE of wind, solar and fossil fuel energy



Source: IRENA, Crisil Intelligence

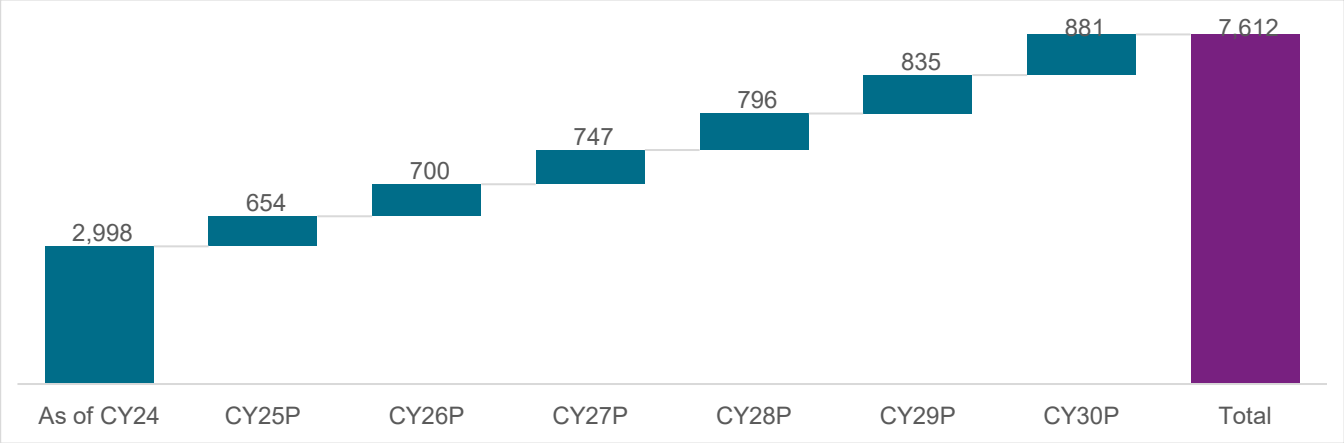
With the continuous drop in installation costs and improving efficiencies, the competitiveness of solar and onshore wind energy against fossil fuels improved further. In 2023, the global weighted average LCOE of utility-scale solar PV and wind power become 63.7% and 72.7% lower, respectively, than the average cost of fossil fuel. This coupled with other benefits, including significantly shorter commissioning timeline as well as potential for carbon footprint reduction, makes a compelling case for further build-out of RE capacity. The capital cost for setting up a solar project is expected to range $580-630/kW, while the cost for wind project is expected to be $1,000-1,100/kW in 2030. Moreover, it is estimated that the LCOE for utility scale PV could reach $0.02-0.03/kWh in 2030, whereas onshore wind LCOE is expected to range$0.03-0.04/kWh in 2030.

2.1.3 About 4,600 GW solar and wind energy capacity additions expected globally over 2025 to 2030; India's share to increase further

As per the IEA, the total RE capacity is expected to cross 9,700 GW by 2030 from 4,448 GW in 2024. This would result in net capacity addition of over 5,200 GW between 2025-2030. Solar PV and wind power are expected to dominate this growth, accounting for over 85% of all new renewable capacity additions by 2030. This would be driven by their competitive pricing compared with fossil and non-fossil alternatives, as well as supportive government

policies. China and the US would dominate capacity additions globally by contributing 65-68% of the total capacity addition over the next five years. Other countries such as Brazil, Germany and Japan would collectively add about 300-310 GW over the same period. As shown in the figure below, global annual wind and solar energy capacity additions are projected to continue their upward trend.

Figure 7: Global projections for annual wind and solar capacity addition (GW)



P: Projected
Source: IEA, Crisil Intelligence

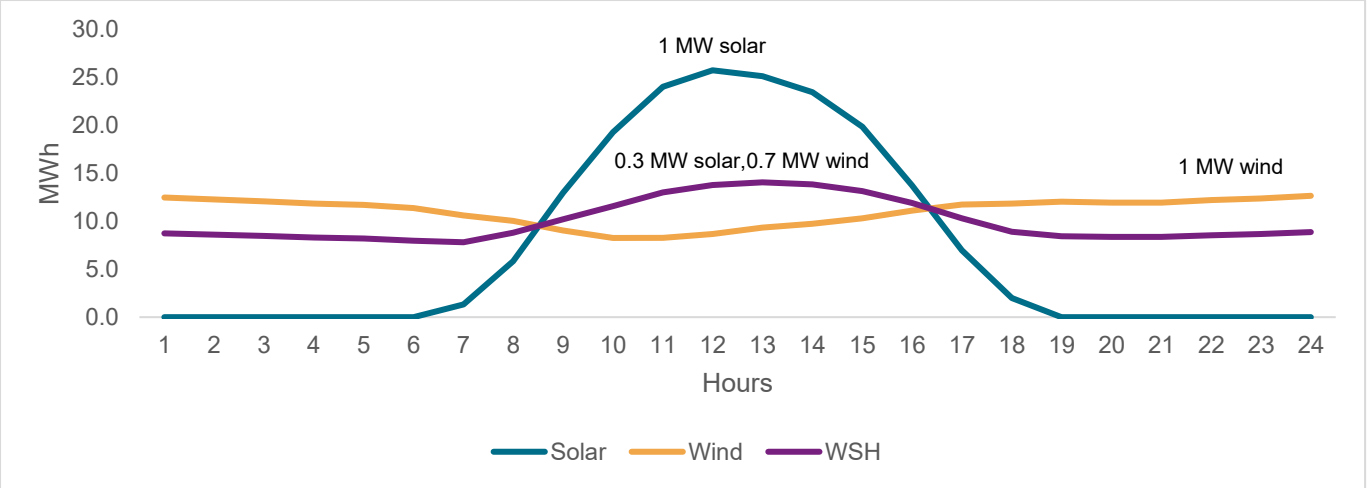
According to the IEA, India is expected to log rapid growth, with its annual solar and wind capacity additions increasing from 28 GW in 2024 to 56 GW in 2030, translating into a total RE capacity addition of ~350 GW between 2025 and 2030. Over 80% of the RE capacity (~285 GW) is expected to come from solar and wind projects. This would be driven by large-scale government procurement programmes, attractive tariffs and a strong commitment to addressing the effects of climate change. As a result, India's share of global solar and wind energy additions is expected to go up from 4.7% in 2024 to 6-7% by 2030. Moreover, RE auctions, corporate power purchase agreements (PPAs) and incentives stimulating installation of distributed solar PV will continue to spur overall RE capacity growth.

While global RE capacity is expected to triple by 2030, India is projected to add over 47-48 GW on average annually by then, making it the third largest market. Challenges such as grid bottlenecks, discoms' financial health and land acquisition remain, but the country's trajectory points toward becoming a global RE powerhouse with a diversified and rapidly growing clean energy ecosystem.

2.2 Wind-solar hybrid power, an emerging solution; favourable generation profile leads to higher offset of grid power and greater savings

The intermittent nature of solar and wind energy can pose challenges in meeting constant power demand. Solar energy, for instance, is only generated during the daylight hours, with peak production typically occurring between 10 AM and 2 PM. Wind energy, on the other hand, is more variable and can be generated throughout the day, with peaks often occurring at night and in the early morning hours, depending on local wind patterns. However, by combining solar and wind power in the wind-solar hybrid (WSH) projects, the complementary nature of these two energy sources can provide a more stable and predictable energy supply throughout the day.

Figure 8: Indicative hourly power output profile of solar, wind and WSH power projects



Source: Crisil Intelligence

There are two primary types of hybrid projects: co-located and non-co-located. Co-located hybrid projects integrate wind and solar generation at a single site, sharing infrastructure such as land, transmission lines and grid interconnection facilities, which help to reduce capital and operational costs. In contrast, non-co-located hybrid projects involve wind and solar components situated at different locations but operated in a coordinated manner to meet combined energy delivery commitments or grid requirements, often through centralised control systems.

Benefits of WSH projects outweigh challenges

- ➕ Higher capacity utilisation factor (CUF) of up to about 50% (vs 26% for standalone solar and 35% for standalone wind)
- ➕ Increased power availability for consumers over extended periods — nearly round-the-clock supply
- ➕ Ideal for consumers aiming to reduce their total energy costs or carbon emissions
- ➕ Lower transmission cost per unit of electricity due to more efficient use of transmission infrastructure
- ➖ Limited number of sites with true hybrid potential, but other project variations can be developed
- ➖ Complex and costly land acquisition process - specific land parcels are required for each wind turbine depending on the overall project design

Source: Crisil Intelligence

The typical energy requirement met by standalone solar, wind and WSH systems depends on resource availability, type of industrial load and use of energy banking. Standalone solar and wind projects can offset only up to 40-60% of the energy requirement with banking provisions. WSH power projects are particularly advantageous for corporate PPAs as they align better with a company's round-the-clock power needs and can replace up to 80-90% of the energy requirement with RE when a banking facility is opted for. This not only translates into greater cost savings over the PPA tenure but also maximises the share of clean energy in the corporate energy mix – leading to substantial

reductions in carbon emissions and helping companies meet their sustainability and Net Zero[2] commitments more effectively.

2.3 Global corporate RE procurement

2.3.1 Global Renewable Energy Power procurement models

The way corporations procure power has undergone a significant shift in recent years, driven by a combination of environmental, regulatory and economic factors. As companies increasingly prioritise sustainability and commit to carbon neutrality and net zero emissions targets, the demand for clean energy has surged. This trend is further fuelled by the growing pressure from investors, customers and regulators to improve sustainability. Environmental, social and governance (ESG) compliance has become a key metric for business evaluation, with companies demonstrating sustainability leadership gaining a competitive edge in the market. In fact, over 400 companies worldwide have joined the RE100 initiative, pledging to power 100% of their operations with renewable electricity, with many aiming to achieve this goal by 2030. The declining cost of solar PV and onshore wind has also made renewables a more economically attractive option compared with fossil fuels.

As governments promote greater adoption of RE companies are leveraging innovative procurement models to secure long-term cost savings and improve energy security.

One of the most convenient models is on-site RE generation, where a project developer installs a RE project on their premises. On-site electricity production not only reduces dependence on grid electricity but also helps reduce energy costs in the long run. However, high upfront investment costs and space constraints can pose challenges. Another model is off-site RE projects which allow large consumers to procure RE from large-scale, grid-connected utility RE projects.

2.3.2 Global corporate PPA market witnessed ~65 GW deals in 2024; to continue to surge, led by attractive economics and emission reduction targets

Global corporate RE procurement deals have clocked a robust growth of 27-28% CAGR between 2020 and 2024, rising to 65-68 GW of annual addition in 2024. The Asia Pacific region, followed by Europe, has led growth in the global corporate PPA market, particularly post 2021, driven by favourable policies and economics. In fact, the Asia Pacific region and Europe together accounted for 70% of the global corporate RE procurement deals in 2024.

Demand for RE by corporates has been led by the data centre industry globally. In 2024, data centres are estimated to have accounted for about one-fourth of the total corporate RE deals. Most of these deals have been led by Amazon, Google, Microsoft, Meta and Apple across geographies. With rapid adoption of artificial intelligence, cloud computing and Internet of Things (IoT), the demand for clean energy from data centres is expected to witness a surge. Similarly, RE deals in the manufacturing sector are also expected to grow at a healthy pace (as demand rises in line with GDP growth) amid rising electrification of industrial processes.

Solar PV has been the preferred option by corporations looking at procuring RE. However, as corporates reap economic and sustainability-linked benefits of RE, they are increasingly adopting WSH projects. In fact, as Battery Energy Storage System (BESS) costs fall, corporates are evaluating the integration of such systems, too. In the US,

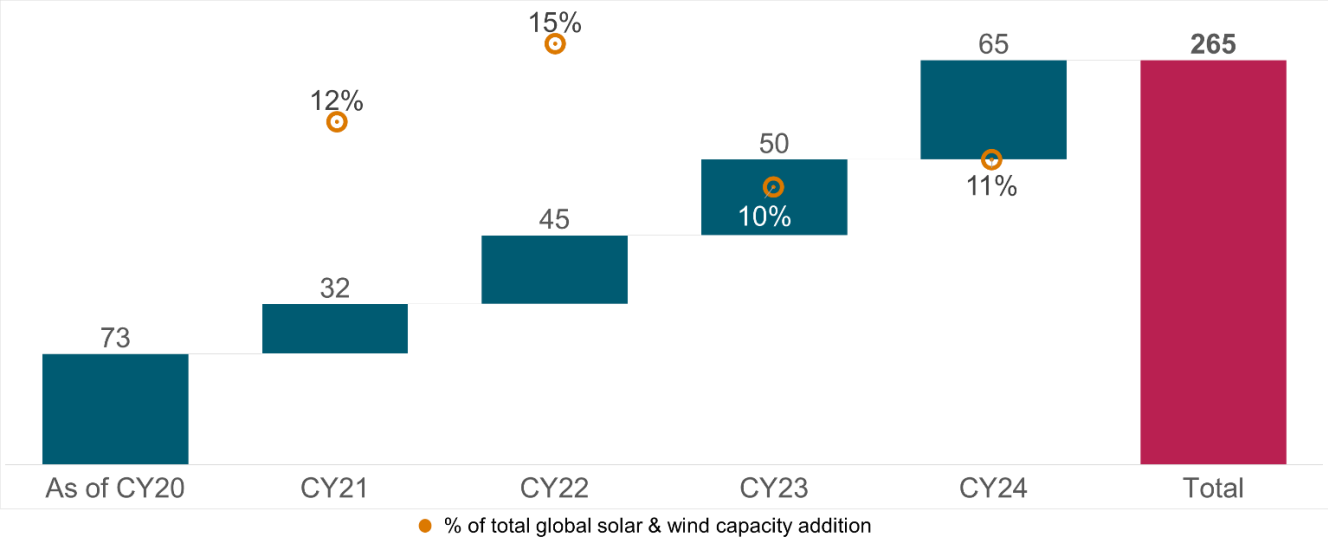
[2] Net zero refers to the balance between the amount of GHG emissions produced and the amount removed from the atmosphere. Achieving net zero means that any emissions released are offset by equivalent amounts of emissions being removed, typically through natural processes or technological solutions. This concept is central to efforts aimed at mitigating climate change, as it involves reducing emissions to as close to zero as possible and compensating for any remaining emissions through carbon offsetting or sequestration.

in particular, corporations have also executed deals to source nuclear energy, especially given its reliable and steady generation profile.

Further, the structure of electricity markets varies across regions, influencing the types of PPAs that prevail. It is observed that direct PPAs are dominant in regulated electricity markets, whereas liberalised markets tend to favour virtual and retail PPAs, which offer greater flexibility and provide accessibility to a wider range of buyers. E.g., it has been noticed that in the Asia Pacific region, onsite renewable contracts have been the preferred choice for many corporates. This is complemented by direct PPAs, which together form the majority of corporate PPAs in the region.

As the energy landscape continues to evolve, it is likely that the mix of PPA structures and RE sources will remain dynamic, with regional differences and technological advancements shaping the market.

Figure 9: Estimated global RE-based corporate PPA annual capacity addition (GW)



Source: Industry, Crisil Intelligence

Leading corporations in clean power procurement are now setting their sights on a more ambitious goal — achieving hourly and locational matching of clean electricity supply and demand through a 24/7 carbon-free energy procurement. This shift is expected to further accelerate the growth of RE capacity, driving the transition towards a low-carbon economy. It is estimated that if all the 400+ RE100 members meet their clean electricity shortfall entirely through RE PPAs, it will catalyse an additional 105-110 GW capacity between 2026 and 2030.

About 16-18% of the total global annual RE capacity additions is estimated to be added for corporates. The global corporate PPA market is projected to log a rapid CAGR of 25-28% between 2024 and 2030. This would result in a total RE capacity addition of 960–970 GW for corporates globally by 2030.

2.3.3 Indian corporate PPA market to flourish; share in the global landscape to rise to 11-12% by 2030

India's corporate PPA market is growing rapidly due to government support, waiver in interstate transmission charges, exemption in cross subsidy surcharge (CSS) and additional surcharge (AS) for captive and group captive consumers. The Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022, have created a user-friendly framework, driving momentum in India’s RE open access sector. As a result, about 14 GW of open access capacity (including rooftop solar) was installed in the last two years, with about 8 GW added in 2024 alone.

India's share in global corporate PPA was estimated at 4-5% in 2020, which increased to 8-9% in 2024. The growth was driven by the high tariffs of coal-based electricity in the country and increasing accessibility and affordability of RE sources, particularly solar energy.

The cumulative corporate open access renewable capacity, including solar rooftop installation was ~42 GW as of December 2024, with solar holding ~72% share (including rooftop solar). Crisil Intelligence expects an installed capacity of 120-122 GW of corporate-driven RE capacity by fiscal 2030 under the base case scenario, with 75-77 GW expected to be added between fiscals 2026 and 2030.

2.4 VPPA and cross-border sourcing of I-RECs

Globally, virtual power purchase agreements (VPPAs) including energy attribute purchase agreement (EAPA) are increasingly recognised as a mature and widely adopted tool for corporate RE procurement. In a virtual PPA, the seller and the buyer enter into a contract for difference or other financial derivative contract where they agree a strike price (fixed price) for the RE provided by the buyer. The seller and the buyer settle the difference between the strike price and the variable market price (spot price) at which the seller sells the power it produces to the utility supplier. The seller transfers the associated energy attribute certificate (EAC), commonly known as International Renewable Energy Certificates (I-RECs) or RECs in the Indian market.

The global landscape of corporate RE procurement is led by North America, which has emerged as the most prominent region for corporate renewables procurement, with over 45 GW of deals secured through VPPAs as of 2023, which represents 80-85% of the total corporate PPAs. Major corporations such as Walmart, General Motors, and Meta have all engaged in VPPA deals to secure clean energy and reduce emissions.

In Europe, Spain has been at the forefront of VPPA adoption, with a significant number of deals being executed in the country. Over the past five years, 5-6 GW of VPPAs have been executed in Europe which represents over 10% of the total corporate PPAs executed over the same period. Several cross-border agreements have been executed through VPPA in Europe by multinational corporations (MNCs) who have operations in different regions/countries. Over the next five years, it is expected that VPPA in Europe would account for 40-45% of the total corporate deals.

Other countries such as Japan, Singapore, Malaysia and South Korea are some of the major emerging markets for VPPA. While their existing VPPA capacities are less than 1 GW, over the next five years, 10-20% of corporate PPAs could be through VPPA mode.

Moreover, I-REC, which is a globally accepted RE certificate, certified by the International Tracking Standard Foundation (the founder of I-REC), is designed for businesses to meet their energy targets and support RE generation. The cross-border sourcing of I-REC has emerged as a key enabler for global corporations to meet their decarbonisation[3] and sustainability targets. This trend has been seen in data centres, top-tier technology firms and large industrial multinationals that have aggressive Scope 2[4] emission reduction goals but limited access to RE in certain operational geographies.

India is emerging as a preferred destination for VPPAs and I-REC sourcing owing to its high grid emission intensity (offering meaningful carbon abatement), competitive renewable tariffs, abundant renewable potential, and faster execution timelines. This trend is leading to the set-up of new RE projects owing to the global corporate push for 'additionality', where buyers seek assurance that their RE procurement is contributing to the creation of new capacity,

[3] Decarbonisation is the process of reducing or removing GHG emissions from the atmosphere

[4] Scope 1: Direct emissions that occur from sources that are controlled or owned by a company; Scope 2: indirect emissions from generation of purchased energy and Scope 3: all indirect emissions that occur in the value chain of a company

rather than simply reallocating existing green electrons. International buyers, particularly from the tech and manufacturing sectors, increasingly favour I-REC-linked contracts from new-build or under-construction projects in India. Moreover, such arrangements provide a long-term revenue visibility to developers, thereby catalysing investment in new solar and wind assets.

I-REC redemptions from Indian projects have increased from 1.21 million in 2020 to 8.57 million in 2024. As of December 2024, about 36 million I-RECs had been issued by Indian projects and about 23 million I-RECs had been redeemed, representing ~4% of the global redemptions.

MNCs are not only purchasing I-RECs to meet global sustainability targets but are also exploring bilateral procurement structures, such as VPPAs to enhance traceability, price certainty and impact. These structured deals allow for a more strategic engagement with renewable projects, offering both commercial and reputational benefits while accelerating the energy transition in high growth markets like India.

Going forward, as global corporations approach their carbon neutrality/ net zero goals, stakeholder pressure for real sustainability impact rises, and the need to match the 24/7 clean energy goals, cross-border sourcing of green attributes is expected to accelerate. While many Indian companies have set targets for carbon neutrality beyond 2030, all five major tech companies from the US - Apple, Meta, Google, Amazon and Microsoft - have committed to achieving carbon neutrality by 2030 across their entire value chain, including data centre operations, supply chain, vendors, product and service usage and employee-related emissions.

In India, with the Central Electricity Regulatory Commission (CERC)'s draft guidelines on VPPAs, developers as well as consumers are likely to be more forthcoming and such contracts are expected to proliferate in the market. Also, VPPAs provide developers an opportunity to diversify away from their exposure to utilities.

Based on the regional assessment of the corporate RE PPA market and the existing visibility of VPPA transactions, it can be estimated that by 2030, the VPPA market, including EAPA, will log a significant growth and will account for a substantial share of the global corporate PPA market, potentially reaching up to 45-50%, with India's VPPA penetration of 10-12% expected by 2030 through evolving regulations around the VPPA market. As a result, the global energy attributes market from corporates is expected to be 430-480 GW by 2030 and 10-15 GW in India during the same period, primarily driven by demand from large technology companies, data centres and MNCs.

However, challenges remain – mainly around the lack of standardisation in VPPAs across borders, currency fluctuation risks, and policy and regulatory flip-flops in India. Nevertheless, as the global demand for high-quality, impact-driven carbon-free energy scales up, India is well positioned to become a major hub for I-REC-linked RE projects, provided supportive policy and financing mechanisms continue to evolve.

2.5 Overview and outlook on global carbon market

Carbon markets play a crucial role in reducing GHG emissions by providing a mechanism for companies to offset their carbon footprint. By purchasing carbon credits, corporates can invest in projects that reduce or remove GHG emissions, such as renewable energy projects or reforestation initiatives.

The carbon credits denote a quantifiable unit equivalent to one metric tonne of carbon dioxide or other greenhouse gases, which have been either sequestered from the atmosphere or prevented from being emitted. On this basis, emission reduction projects are broadly categorised into avoidance projects and removal projects.

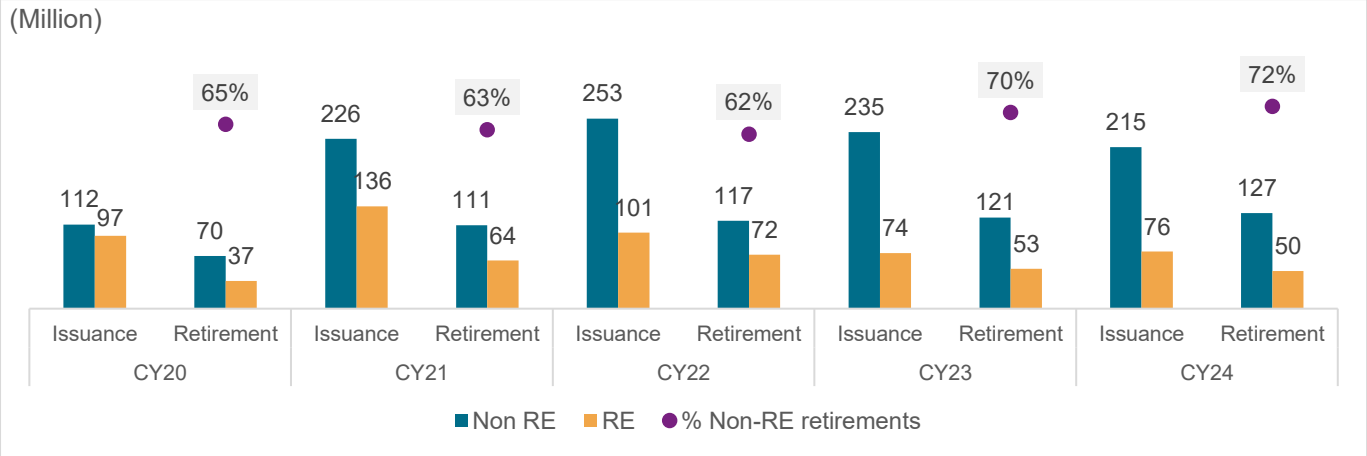
The global carbon markets is divided into two primary categories as given below. Both markets involve buying and selling of carbon credit, but the key difference lies in the regulatory requirements and obligations.

- *Compliance Carbon Markets (CCM)*: Companies are required to meet specific emission reduction targets set by regulatory authorities. These targets are often legally binding, and companies must purchase carbon credits to offset their emissions and comply with regulations

- *Voluntary Carbon Markets (VCM)*: It is driven by organisations and individuals who voluntarily choose to offset their emissions by purchasing carbon credits. These credits are not mandated by regulations but used to demonstrate environmental responsibility and sustainability

Supply of carbon credits is represented by issuances from carbon crediting mechanisms. The demand for carbon credit, as indicated by retirement rates, has remained relatively stable between 2022 and 2024. A breakdown of these credits reveals that ~35% originates from renewable energy projects, primarily large-scale grid-connected electricity projects, while 60-70% come from non-RE based carbon removal projects, such as nature-based activities, encompassing emissions reductions from agriculture, forestry and land-use projects. This shift in focus is expected to play a significant role in shaping the future of carbon credit markets.

Figure 10: Annual issuance and retirement volume of carbon credits in the voluntary carbon market



Source: Industry, Crisil Intelligence

The carbon credit prices vary based on several factors such as project type, standard issuing credits, credit vintage, and associated co-benefits. Over the past two years, the weighted average price for non-RE based solutions has remained in the range of $4-5/tonne. However, nature-based removal projects have consistently demonstrated higher prices over the past 3-4 years and have been trading at a price premium of $13-15/tonne.

The VCM recorded a CAGR of 23% between calendar years 2019 and 2024. Since 2021, its growth has stagnated, with the market value declining from a peak of $2.1 billion in 2021 to over $535 million in 2024, owing to price volatility and low-quality credits. Despite this, the total VCM value is estimated at $10-12 billion as of 2024.

The global carbon markets present a large and rapidly evolving opportunity. There is a rising demand for non-RE credits, particularly nature-based removal solutions. The issuance of such credits grew from 22 million in the calendar year 2020 to about 42 million in 2024, registering a CAGR of 17%. It is estimated that by the calendar year 2030, the carbon removal solutions are projected to account for 35-40% of the global VCM credit supply, up from existing 12-15%, as more companies are increasingly using carbon credits, particularly removals, to offset residual emissions. Moreover, majority of technology customers plan to utilise high-quality carbon removal credits to offset the remaining emissions, in addition to procuring environmental attributes. As a result, the global carbon removal credit market is projected to reach $7-10 billion by the calendar year 2030.

The global carbon markets present a large and rapidly evolving opportunity. The overall VCM is expected to reach $20-25 billion by 2030 at a CAGR of 14-15%, driven by an increase in global demand for carbon offset solutions as organisations seek to meet their decarbonisation goals.

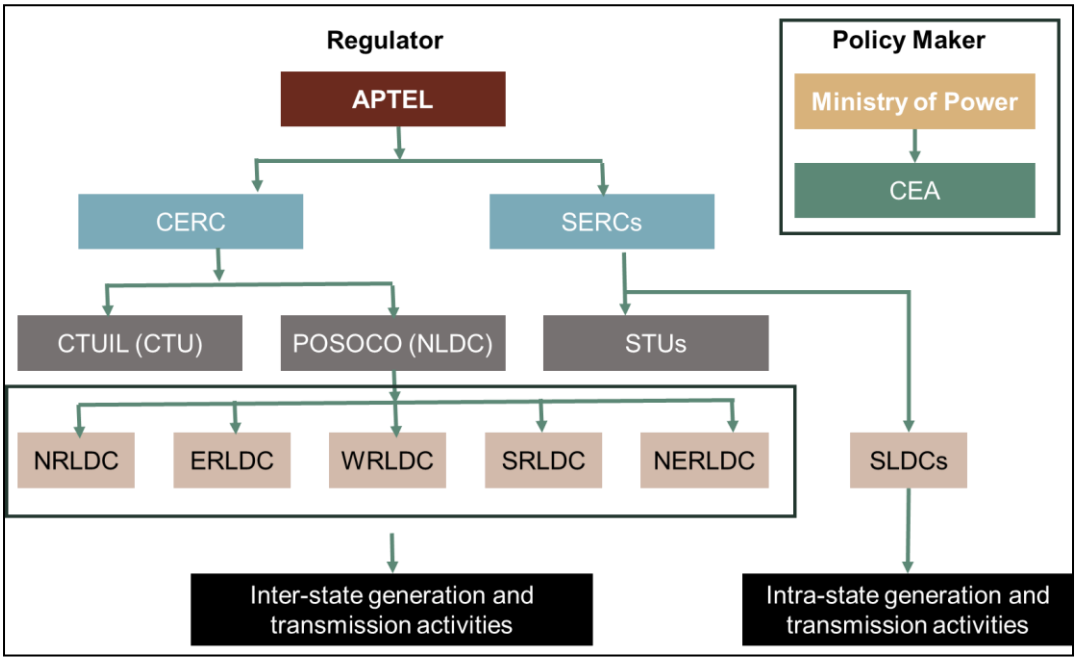
3 Indian RE sector deep dive

3.1 Overview of the Indian power sector

3.1.1 Operating and regulatory structure

The sector is regulated in a structured manner with various functions being distributed between multiple implementing agencies. There are three chief architects of the sector — the Central Electricity Regulatory Commission (CERC), the CEA, and the State Electricity Regulatory Commissions (SERCs).

Figure 11: Institutional and structural framework



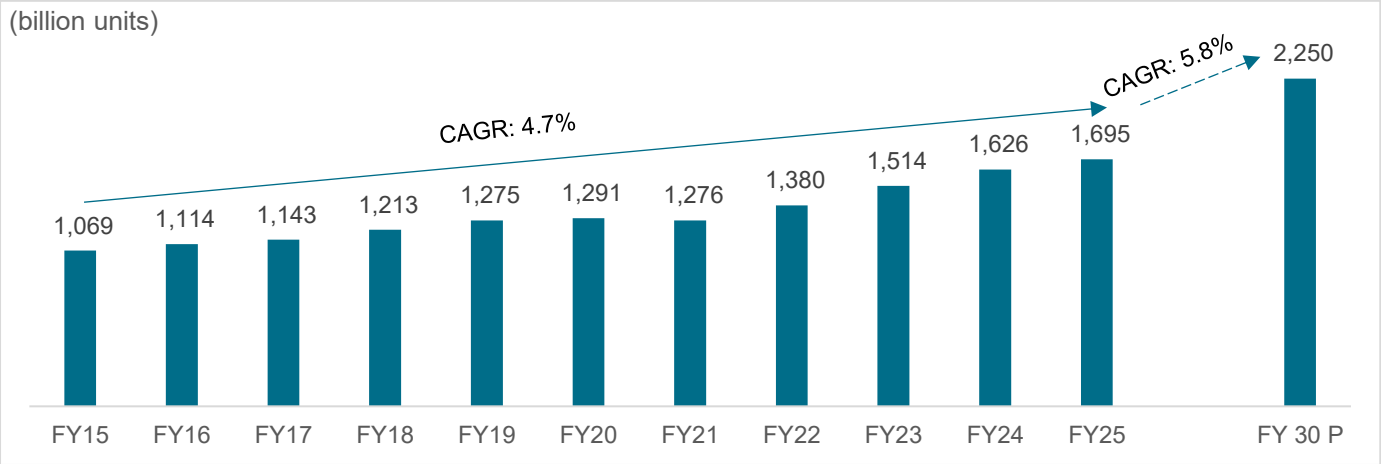
Note: APTEL: The Appellate Tribunal for Electricity; WRLDC: Western Regional Load Despatch Centre; ERLDC: Eastern Regional Load Despatch Centre; SRLDC: Southern Regional Load Despatch Centre; NLDC: National Load Despatch Centre (Now called as GRID-INDIA); NRLDC: Northern Regional Load Despatch Centre; NERLDC: North-Eastern Regional Load Despatch Centre; SLDC: State Load Despatch Centre; CTU: Central Transmission Utility; STU: State Transmission Utility.
Source: Crisil Intelligence

3.1.2 Energy requirement grew at a CAGR of 4.7% over the past decade

Over the past decade (fiscals 2015-2025), India's electricity requirements have experienced a steady growth rate at a CAGR of 4.7%, driven by rising GDP growth, increased power availability, improved electricity access and rapid urbanisation. In addition, government initiatives, such as the Make in India programme, PLI schemes and railway electrification have contributed to this growth.

Although the Covid-19 pandemic led to a temporary slowdown in energy requirement growth due to economic contraction and financial strain on power distribution companies, the sector has since rebounded. In fiscal 2023 and 2024, energy requirements surged 9.7% and 7.4% on-year, respectively, driven by a resurgence in economic activity, a pickup in manufacturing and agricultural production and increased infrastructure spending by the government. Further, erratic weather patterns resulting from climate change have also played a role in driving up energy demand.

Figure 12: Energy requirement in India



P: Projected; Source: CEA, Crisil Intelligence

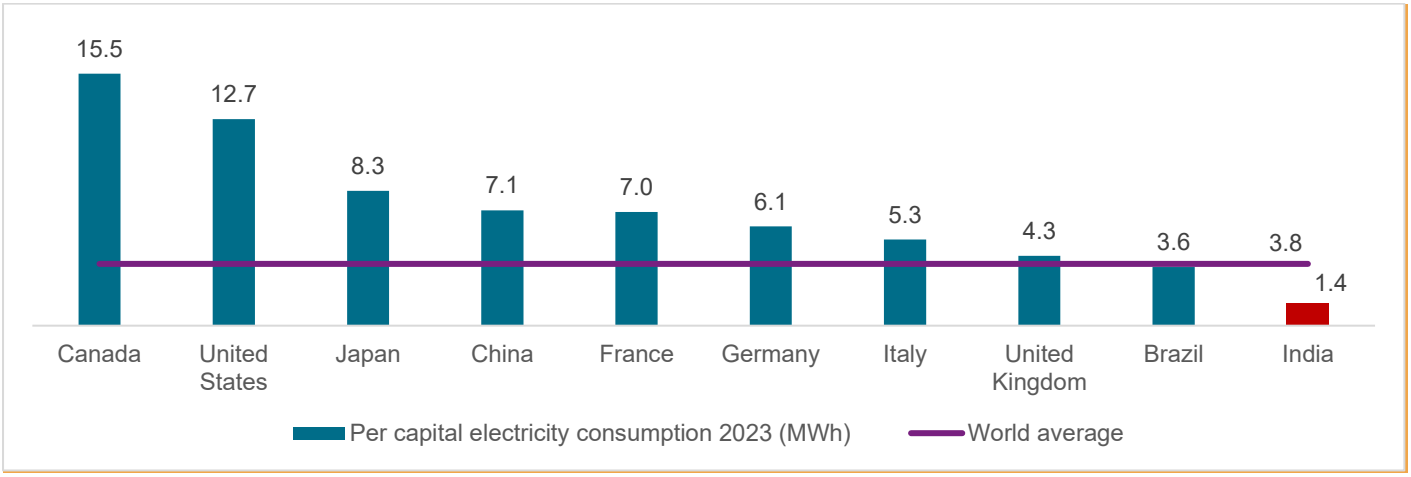
Crisil Intelligence estimates that power demand will clock a CAGR of 5.8% to reach ~2,250 billion units by fiscal 2030. Demand growth is expected to be driven by a rise in per capita income, build-up in industrial manufacturing capacity and large-scale infrastructure investments. Rising penetration of consumer electronics, railway electrification, metro and dedicated freight corridor buildout, data centre capacity expansion and EV adoption are also expected to drive the demand upwards. On the other hand, demand growth is expected to be restricted by lower Transmission and Distribution (T&D) losses, improving energy efficiency in industries and large-scale rooftop solar adoption.

Energy demand from C&I consumers in India is expected to clock a CAGR of 5-6% to 1,125-1,170 billion units, representing ~50-52% of the total energy demand in India in fiscal 2030.

3.1.3 India's per-capita electricity consumption remains significantly lower than the world average, implying strong growth potential

India's per capita electricity consumption in 2023 stood at just 1.4 MWh — less than half the global average of 3.8 MWh and significantly lower than that of developed economies, such as Canada (15.5 MWh) and the US (12.7 MWh). This reflects not only India's lower per capita income but also the early stage of its energy consumption curve.

Figure 13: Per capita electricity consumption 2023, MWh



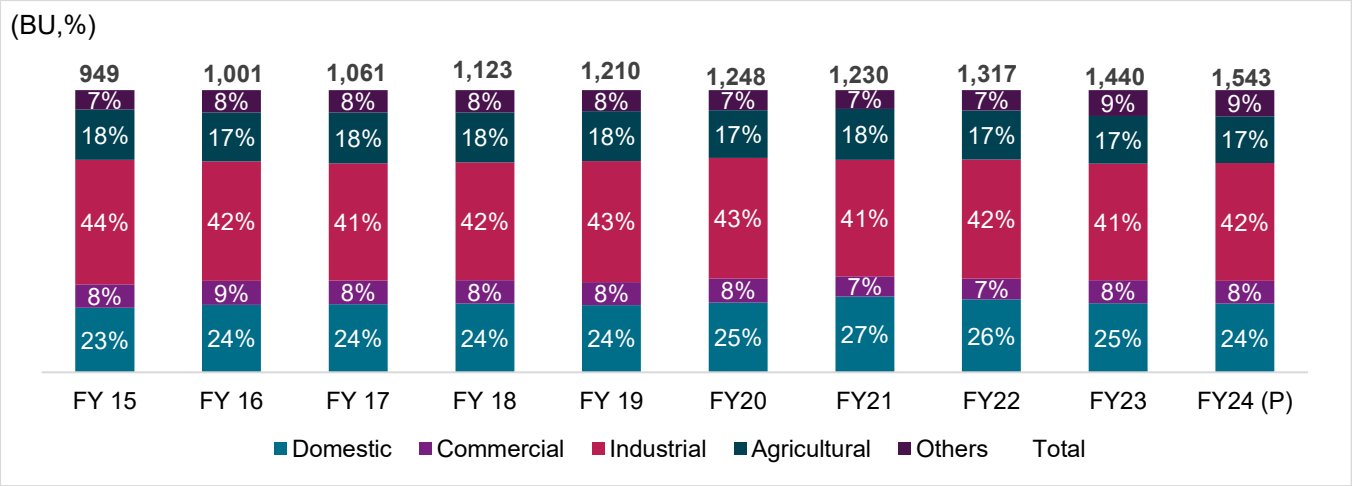
India's data is as of fiscal 2024; Source: World Bank, EIA, Crisil Intelligence

As industrialisation deepens, household electrification expands and digital and cooling loads rise, India presents substantial headroom for electricity demand growth. With a young population, rising urbanisation and growing aspirations, electricity consumption is expected to increase steadily, supported by policy focus on 24x7 reliable power and clean energy transitions. This structural under-penetration positions India as one of the most important long-term growth markets for electricity and related infrastructure globally.

3.1.4 C&I consumers account for more than 50% of total power consumption; growth in the segment to be led by strong thrust on manufacturing and infrastructure

The commercial and industrial (C&I) consumer categories account for more than 50% of total power consumption across the country. Power consumption in the C&I segment rose at a healthy pace of 5.0% CAGR over fiscals 2015-24. In fact, the pace of growth in the C&I segment post Covid-19 has been much faster at a CAGR of 8.9% from fiscal 2021 to 2024. C&I consumers are expected to contribute to the rising projected demand and shall continue to be the largest power consuming category. This growth will be led by rising urbanisation, large-scale infrastructure build-out (for example, the National Infrastructure Pipeline) and increasing industrialisation (the Make in India programme coupled with the PLI scheme and favourable corporate taxes). More importantly, among C&I consumers, a significant surge in demand for green energy is expected, particularly from technology companies and export-oriented industries as they strive to expand capacities in a sustainable manner.

Figure 14: Consumer segment-wise share of electricity sales in India



Note: The 'Others' category includes railways, public lighting, public water works, sewage pumping and other miscellaneous consumers.
P: Provisional; Source: CEA, Crisil Intelligence

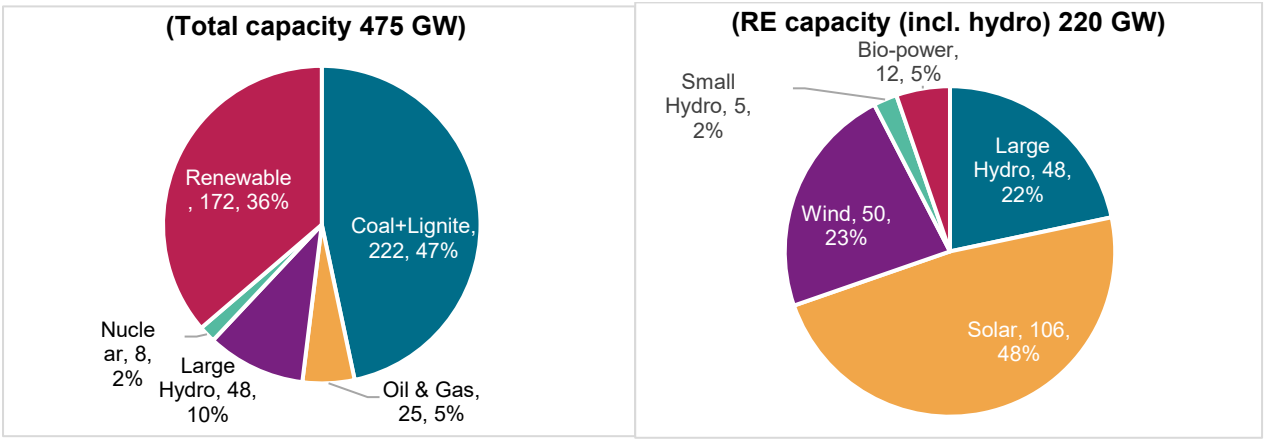
3.2 Overview of the Indian RE sector

3.2.1 Thermal power dominates generation capacity mix; shift to RE to continue over next five years

As of March 2025, renewable energy (including large hydro) forms a significant and growing share of India's energy mix, accounting for 46.3% of the total installed capacity at 220 GW out of 475 GW. Within renewable energy, solar power leads with 106 GW, comprising 48% of the RE portfolio, followed by wind at 50 GW (23%). This strong push toward renewables reflects India's strategic shift toward cleaner sources of energy to enhance energy security, meet

its climate goals, and decarbonise its growing economy. Solar and wind, in particular, are expected to drive the next wave of capacity additions, supported by falling costs, favourable policies and strong investor interest.

Figure 15: Installed capacity as of March 2025 (GW, %)

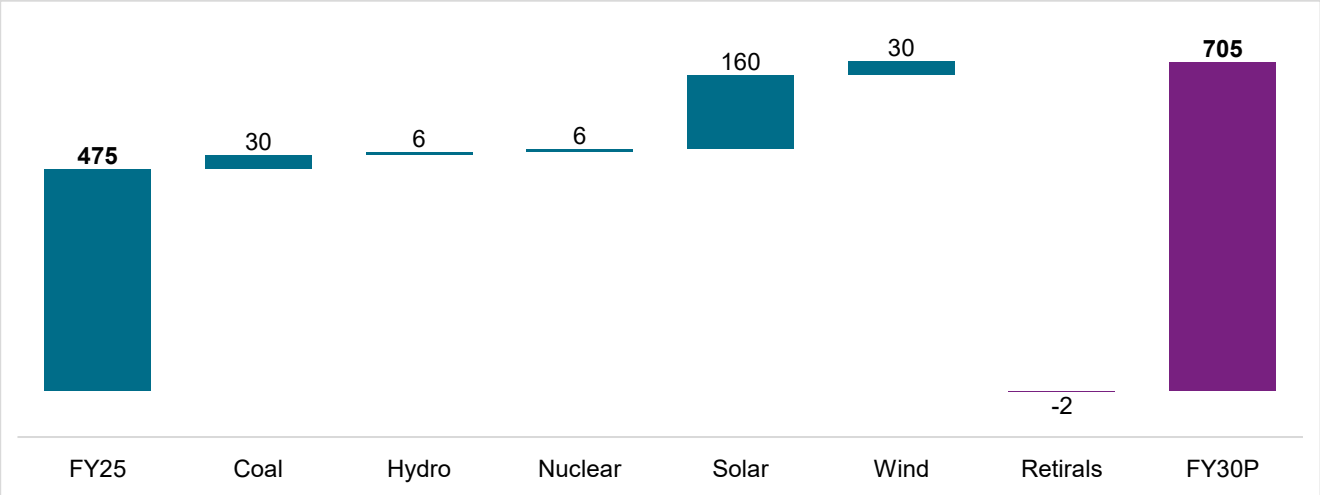


Source: CEA, Crisil Intelligence

India's installed electricity generation capacity has grown steadily from 355 GW in fiscal 2019 to 475 GW in fiscal 2025, driven by continued expansion across conventional and renewable energy sources. While coal and lignite still form the largest share at 222 GW (46.7%), the most significant trend has been the acceleration of renewable energy, now accounting for 36.3% of total capacity. Within this, solar capacity has grown nearly fourfold, from 28 GW in fiscal 2019 to 106 GW in fiscal 2025, while wind capacity has increased from 36 GW to 50 GW over the same period. Solar and wind have contributed nearly one-third of capacity additions since fiscal 2019, underpinned by falling costs, investor confidence and robust policy support.

India's generation mix is projected to continue its clean energy pivot. By fiscal 2030, total installed capacity is expected to reach 705 GW, with the share of coal and lignite declining to 35%, while solar and wind are projected to rise to ~38% and ~11%, respectively. The growth in renewables will be complemented by capacity additions in storage projects (PSP 5-7 GW and BESS 28.5 GW is expected to be added by fiscal 2030) to ensure system reliability and flexibility. This transition aligns with India's target of achieving 500 GW of non-fossil fuel capacity by 2030 and reflects a strategic shift toward a low carbon, diversified and resilient power sector.

Figure 16: Growth in India's electricity installed capacity, GW

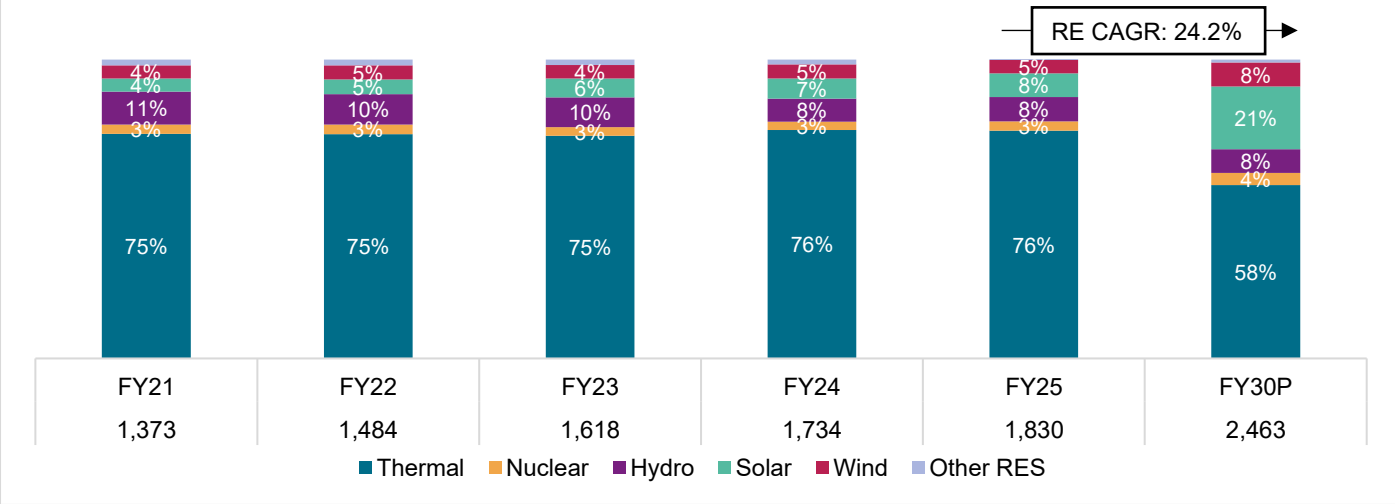


P: Projected; Source: CEA, Crisil Intelligence

While RE (excluding large hydro) accounted for 36.3% of total installed capacity in fiscal 2025, its contribution to the energy supply mix was 14.0% due to dependency on natural resources leading to intermittent power generation and thereby lower Plant Load Factor (PLF). However, in terms of absolute numbers, RE generation increased from just 191 BU in fiscal 2015 to 255 billion units in fiscal 2025. As a percentage of total generation, the share of wind and solar energy has increased to 12.5% in fiscal 2025 from 8.3% in fiscal 2020.

While thermal power is expected to garner a substantial share in power supply mix, that of renewable power is expected to increase significantly. The share of thermal power in the country's generation mix is expected to come down to 58% by fiscal 2030. Renewable energy (solar, wind and other RES) share is expected to more than double to 30% in fiscal 2030.

Figure 17: Power generation mix projections, billion units



The numbers mentioned below the bar are total units generated from all sources;
P: Projected; Source: Crisil Intelligence

3.2.2 Options for power sale

India's power procurement landscape is multifaceted, with IPPs having access to various channels to supply electricity to consumers. The market can be broadly categorised into two primary segments, providing a range of options for power distribution.

1) **Utility segment:** This part of the market involves central government-appointed agencies or state-owned distribution companies (discoms) that buy power directly from producers through a competitive bidding process and, in turn, supply power to a wide range of customers, including businesses, industries, farmers and households.
    - **Central government-appointed nodal agencies**: IPPs participate in a bidding process, where they offer their best price for supplying electricity. This bidding is conducted by central government-appointed nodal agencies such as Solar Energy Corporation of India (SECI), NVVN, NHPC and SJVN. After securing the contract, the IPP signs a PPA with the respective nodal agency, outlining the terms of the deal. The nodal agency, in turn, signs a power sale agreement (PSA) with various discoms, essentially acting as a strong creditworthy intermediary between the IPP and discoms, thereby providing payment security to investors.
    - **State discoms:** IPPs directly participate in bidding processes initiated by individual state-owned discoms.
2) **C&I segment:** C&I consumers may directly procure electricity from IPPs, outside the regulated utility framework. This is enabled under the Open Access and Group Captive mechanisms provided by the Electricity Act, 2003. The IPP and C&I consumer negotiate and sign a bilateral PPA, outlining the terms of electricity supply. The electricity generated by the IPP is transmitted to the consumer through the state's T&D network. The consumer pays open access charges such as wheeling, transmission and scheduling, as well as applicable losses, to the discom to utilise its network. The various options to supply power to the C&I segment are listed below:
    - **C&I onsite**: Onsite power generation, where the IPP sets up a power plant within the consumer's premises
    - **STU-connected C&I group captive**: The consumer and IPP form a group captive arrangement, where the IPP generates power and supplies it to the consumer through the STU network
    - **STU-connected C&I third-party open access**: The consumer purchases power from a third-party IPP and uses the STU network to transmit the power to its premises.

CTU-connected energy attribute contracts: The consumer purchases energy attribute certificates (such as renewable energy certificates) from the IPP, which are connected to the central transmission

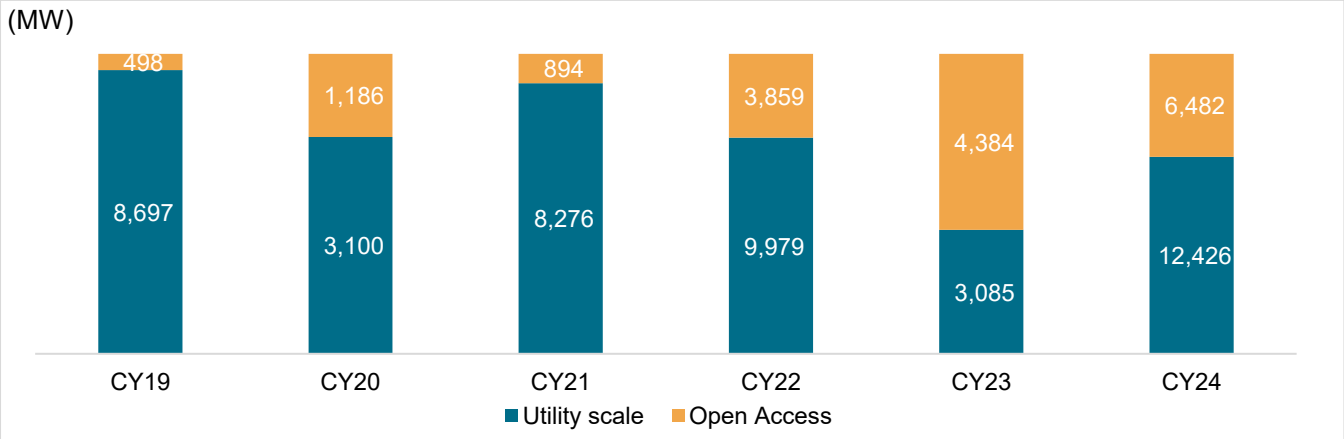
Table 2: Power sale framework for the utility and corporate renewable markets

Parameter	Utility market	Corporate market
Project development	Set up large renewable power parks for supply of power to discoms and corporate consumers	
Tendering agency	PSUs such as SECI, NTPC and NHPC	Corporate consumer, in case a formal bid process is followed
Power trading intermediary	Typically, same as tendering agency	None
Commission paid to power trading intermediary	Rs 0.02-0.07/kWh (based on applicable regulations)	None
Demand identification	Tendering agencies may or may not identify potential offtakers before issuing tenders	Through business development and direct engagement

Parameter	Utility market	Corporate market
Tender issuance	Strictly based on competitive bidding guidelines issued by the MoP and MNRE	Typically, circulated to select a few project developers of high technical and financial reputation
Eligibility criteria for tender participation	Strictly based on competitive bidding guidelines issued by the MoP and MNRE	No specific criteria defined; typically, negotiable with the consumer
Cost of tender participation	Earnest money deposit of about Rs 1 million/MW	Typically, not required or negotiable with the consumer
Shortlisting process	E-reverse auction	Typically, bilaterally negotiated; some consumers may conduct a bidding process
PPA signing and other associated regulatory processes	• Tariff adoption petitions filed at the CERC and SERCs of respective offtaker discoms, which can take several months • Transmission connectivity • Other statutory approvals	• Transmission connectivity and wheeling and banking approvals are required from the respective state authorities • Other statutory approvals
Commissioning timeline	Multi-year timelines, (from award of contract to commissioning) with projects often delayed beyond prescribed timelines	6-10 months for solar and 12-15 months for wind (between PPA signing and project commissioning)

Within solar and wind technologies—Open Access (OA) mode, which enables C&I consumers to procure electricity directly from an Independent Power Producer (IPP) rather than the state utility – is emerging as an attractive option for both consumers given the potential cost savings (refer Section 3.3 for more details). As a result, the share of OA in solar and wind capacity addition has increased to 34% in the calendar year 2024 from just 5% in the calendar year 2019.

Figure 18: Solar and wind capacity addition split by utility scale and OA routes



Source: Crisil Intelligence

3.2.3 Advantages for project developers selling power in the corporate market

Wider customer base and tariff premium

India has vast base of medium-to-large C&I consumers with demand of more than 1 MW, creating a huge addressable market. Unlike utility-scale projects[5] that are tied to discoms of large power-consuming states, developers can spread offtake risk across multiple clients, thereby hedging cash flow risk and enabling portfolio-based scaling.

C&I renewable PPAs are typically in the range of Rs 3.20-4.50/ kWh, compared with Rs 2.50-3.00/kWh in utility-scale auctions. This tariff premium (after adjusting for relatively short PPA tenures versus utility-scale projects) allows developers to secure higher Internal Rate of Returns (IRRs), while still offering considerable savings to C&I consumers over grid tariffs.

Innovative contract structures

Project developers in the corporate renewable market have greater flexibility and the opportunity to offer customised solutions to consumers — business model, tariff structures, tenure, PPA terms, etc. Also, a typical power supply deal in the corporate market can eventually expand to include additional technologies (battery storage, renewable heat, etc.) or business offerings (energy efficiency, sale of environmental attributes, etc.). The highly regulated and rigid nature of tenders and contracts in the utility market does not allow such customisation or upselling of products and services.

Higher probability of securing additional contracts

In the utility-scale market, each tender is a new and isolated opportunity that does not offer existing power suppliers any competitive advantage. In the corporate market, however, it is much easier for an existing supplier to upsell or cross-sell its services and products as and when such a need from the consumer arises. For example, a rooftop solar project developer may eventually enter a PPA for a land-based open access project, conduct emissions or energy audit services, and sell carbon offsets or renewable energy attributes not only to existing consumer but also to its upstream suppliers.

Shorter approval process and quality-based selection process

Tariff adoption for PPAs signed bilaterally between project developers and corporate consumers does not require any regulatory approval. Tariff adoption in the utility market can take several months. There have been many instances of awarded projects scrapped due to delay in adoption of tariff petitions by SERCs.

Unlike PSU tendering agencies and discoms, corporate consumers consider multiple factors, apart from tariff, to choose a project developer. Power procurement is not a core business for most corporate consumers, and value-added services offered by project developers hold significant value to such consumers. Support in liaising with government agencies to meet requirements under open access regulations, reconciliation of monthly bills and energy accounting are some of the key activities that consumers are required to conduct. Consumers view favourably project developers that can and are willing to offer these soft services in addition to physical power supply.

Better receivable profile

State discoms have average payment delay of 6-9 months, or even higher in some cases. In contrast, C&I clients, especially those rated A and above, are usually able to maintain receivable cycles of <60-day.

[5] Utility-scale RE projects are large-scale projects that supply electricity to state Discoms or government nodal agencies (such as such as SECI, NTPC, SJVN, NHPC, etc), typically through long-term PPAs awarded via competitive bidding

Deeper consumer insights enable tailored solutions

The corporate market is driven by direct and bilateral negotiations between project developers and consumers, enabling developers to gain a nuanced understanding of the consumer's specific requirements. This collaborative approach allows developers to tailor their offerings, often providing sustainable technology and business structuring solutions that precisely meet the consumer's objectives, thereby delivering enhanced value.

3.2.4 OA power procurement is also attractive for consumers

With the evolution of the corporate renewable power market, consumers now have multiple technologies, market instruments and business models to choose from based on commercial, financial and strategic considerations. Below are a few benefits that accrue to consumers opting for OA power purchase.

Significant financial savings over grid power cost

C&I consumers subsidise other consumer categories and are faced with artificially inflated grid tariffs. Average variable grid tariffs across key industrial states vary from Rs 6.92/kWh to Rs 16.15/kWh. In comparison, solar and wind power tariffs under long-term PPAs are in the range of Rs 3.20-4.50/kWh, offering significant financial savings to consumers. Under the group captive model, C&I consumers across industrialised states stand to save Rs 1.20-5.80/kWh (i.e., 21-62%) over grid tariffs, with average savings of ~35% (refer to Section 4.1 for state-wise analysis). For technology customers, their power demand load is typically round-the-clock, allowing them to benefit from 80-90% renewable penetration with a wind-solar-hybrid combination.

Attractive customer payback periods

The group captive structure is the prevalent business model in the corporate renewable power market, requiring minimum investment equivalent to 26% of project equity, translating to about 7.8% of project cost. At current estimated rates, consumers incur about Rs 25 million/MWp for solar power projects and Rs 80 million/MW for wind power projects. Payback periods vary from 1 to 3 years for solar power projects and 4 to 5 years for wind power projects based on the consumer's variable grid tariff. Payback periods will be marginally longer in the case of 100%-owned power projects.

Flexibility in technology, business model and market instrument

Corporate consumers have multiple options to increase RE procurement and can choose from different technologies based on their requirement, power consumption, investment appetite and electricity meter ownership.

Technology	Relevant consumer categories
Onsite/rooftop solar	Consumers with access to and availability of rooftop space
Ground-mounted solar	Most suited for consumers with high day-time power consumption
Wind	Most suited for consumers with high power consumption during early morning and night
Wind-solar hybrid	Most suited for consumers with stable power consumption across the day
Storage – battery or pumped hydro	Consumers with round-the-clock power consumption
Business model	**Typical consumer characteristics**
Third-party sale	Consumers unwilling to make long-term capital commitment and operate with very high variable grid tariffs
Group captive	Consumers willing to make some capital investment and looking to reduce power costs

100% captive	Consumers with high cash reserves and, at least, some experience in project execution
Market instrument	**Suitability**
Long-term PPA, up to 25 years	Consumers willing to commit to long-term procurement
Short-term PPA, up to 11 months, including power exchange	Consumers looking to meet short-term gaps in renewable power procurement target
Virtual PPA	Consumers ineligible for open access or rooftop solar projects
Renewable energy certificates	Consumers ineligible for open access or rooftop solar projects Consumers looking to meet any shortfall in renewable power procurement targets

Meeting renewable power procurement targets

An increasing number of Indian firms and international companies with operations in India are setting voluntary RE procurement targets. The table below shows the voluntary targets set by select companies across multiple sectors.

Table 3: Voluntary targets set by leading C&I consumers with operations in India

Company	Sector	RE/ decarbonisation target	Target year
NTT Data	Data centre	100% renewable energy across all data centres	2030
Google	Technology	24x7 carbon-free energy on every grid	2030
Meta	Technology and social media	Net zero emissions across the value chain	2030
Amazon	Technology and retail	100% RE matched globally (achieved in 2023); Net Zero	2023; 2040
Apple	Technology	Carbon neutral across the entire value chain (Scope 1, 2, 3)	2030
Microsoft	Technology	100% RE; Carbon Negative	2025; 2030
Shell	Energy	Scope 1 and 2 reduction of 50%; Net Zero	2030; 2050
Goldman Sachs	Financial services	Net Zero (operations); Value chain decarbonisation	2030; 2050
Unilever	FMCG	100% RE; Net Zero across the value chain	2030; 2039
Bayer	Pharmaceuticals and chemicals	100% RE globally; India operations already transitioned	2030
H&M	Retail and fashion	100% RE across operations; Net Zero	2030; 2040
Diageo	Beverages	Net Zero across operations; 100% RE electricity already achieved in several markets	2030
Accenture	Consulting and services	100% RE achieved in 2021; Net zero by 2025	Achieved; 2025
ITC	Conglomerate (FMCG, hotels)	100% RE	2030
Cargill	Food and agriculture	30% reduction in supply chain GHG per tonne of product sold	2030
Berry Global	Packaging	>90% reduction in Scope 1-3 emissions	2050

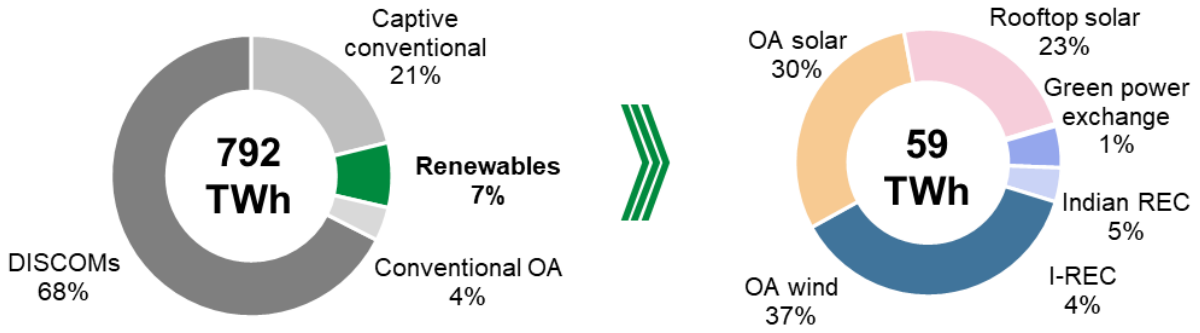
Source: Sustainability reports, Crisil Intelligence

3.3 Procurement routes in the C&I renewable market

C&I consumers account for over half of the country's total power consumption, with the bulk of this demand met by discoms. Industries with substantial captive power needs, such as metals, oil and gas, and cement, have been slower to adopt renewable OA, largely due to the availability of low-cost thermal power and heavy legacy investments in captive thermal plants. Nevertheless, the share of captive conventional power in total corporate consumption dropped from 30% in fiscal 2019 to 21% in fiscal 2023. Meanwhile, direct RE procurement by C&I consumers (i.e., renewable energy penetration for C&I) rose sharply from just 4% in fiscal 2019 to about 7.4% in fiscal 2023. The RE consumption in India

grew at a CAGR of 12.6% between fiscal 2019 – 2023, whereas RE consumption by C&I saw a significantly higher growth rate of about 24.3% during the same period.

Figure 19: C&I power consumption and split of RE procurement at the national level, fiscal 2023

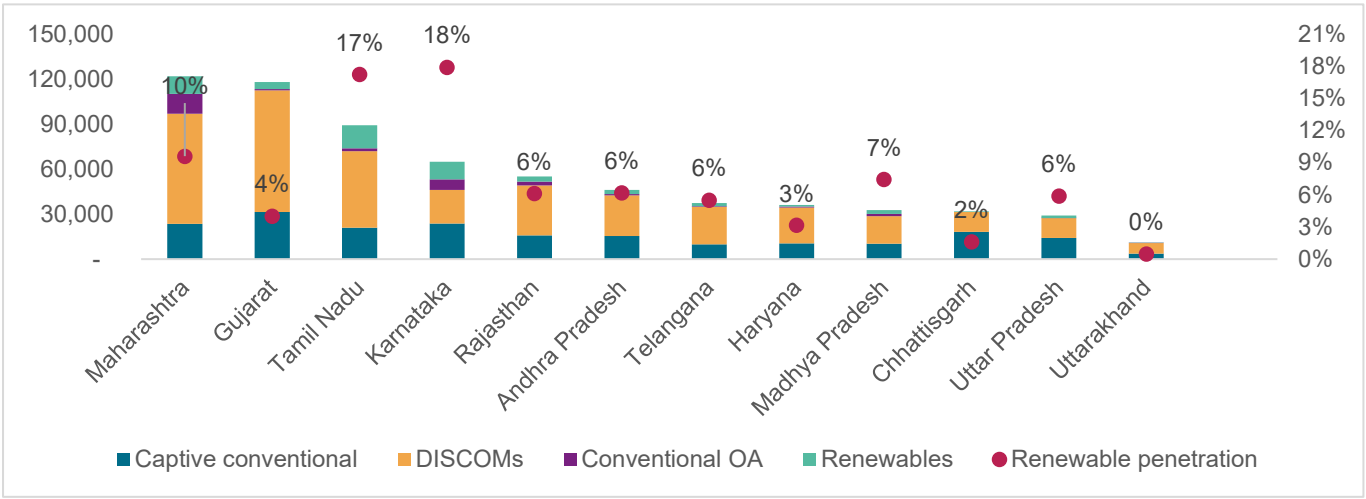


Source: State tariff orders, CEA, Crisil Intelligence

The pace of C&I renewable adoption varies widely across states, reflecting different levels of market maturity. Karnataka and Tamil Nadu, with their well-established OA policies, continue to lead. However, the introduction of Green Open Access Rules (GOAR), coupled with falling renewable costs and improving policy frameworks, is now spurring strong momentum in states such as Maharashtra, Gujarat, Haryana, Rajasthan and Chhattisgarh.

BESS are emerging as a pivotal component in C&I renewable energy strategies. Supported by declining storage costs, favourable regulations, and initiatives such as Rajasthan's 5% BESS mandate, adoption is rising as businesses seek greater power reliability, operational flexibility and the ability to optimise consumption patterns. Alongside, energy efficiency solutions are an emerging space and is expected to be a key market for C&I customers.

Figure 20: Corporate power consumption by source across leading states (GWh), fiscal 2023

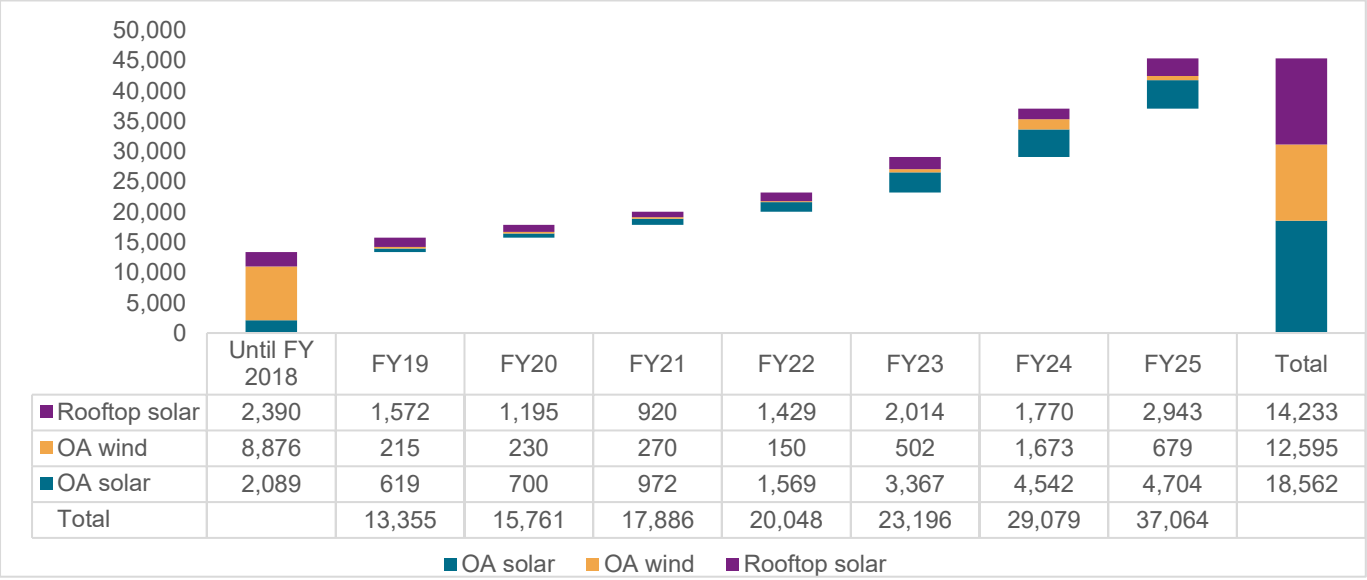


Source: CEA, Crisil Intelligence

OA capacity additions were historically supported by incentives on OA charges. However, the withdrawal of such incentives slowed down growth between fiscals 2019 and 2022 due to volatility in solar module prices as well as policy/ regulatory flip-flops (ALMM, state OA stance, etc.). However, since fiscal 2023, momentum on OA capacity additions has significantly improved, led by strong interest from corporate consumers. OA capacity additions averaged 5.9 GW in the last two fiscals. Total OA renewable capacity as of March 2025 was estimated at 31.2 GW, with robust growth expected in the next five years.

In the rooftop solar market, growth also picked up in the last 1-2 years, with 2.9 GW added in fiscal 2025 alone. As of March 2025, total C&I rooftop solar capacity was estimated at 14.2 GW with the OPEX segment accounting for 19% of total capacity.

Figure 21**: C&I renewable capacity addition trend (MW)**



	Until FY 2018	FY19	FY20	FY21	FY22	FY23	FY24	FY25	Total
Rooftop solar	2,390	1,572	1,195	920	1,429	2,014	1,770	2,943	14,233
OA wind	8,876	215	230	270	150	502	1,673	679	12,595
OA solar	2,089	619	700	972	1,569	3,367	4,542	4,704	18,562
Total		13,355	15,761	17,886	20,048	23,196	29,079	37,064	

Source: State tariff orders, CEA, Crisil Intelligence

Rooftop solar is typically the first RE procurement route considered by corporates due to its low cost, scale and asset control. It is generally followed by the OA route to reduce power procurement cost and/or achieve sustainability goals.

3.3.1 Rooftop or onsite solar

Rooftop and onsite ground-mounted solar installations are a preferred RE option for C&I consumers with adequate space, offering 10-15% RE offset without the need for external land or transmission infrastructure. Adoption is supported by simple regulatory processes and proven implementation models across states, with metering structures such as net metering, gross metering or behind-the-meter systems.

C&I consumers typically choose between two models:

- Capex model (dominant): Consumers invest upfront and benefit from lower tariffs due to GST credits and accelerated depreciation, but bear performance and maintenance risk
- Opex/RESCO model: Popular with large consumers — zero capex, risk transferred to the developer and assured savings, but limited by the need for creditworthy, large-scale offtakers

3.3.2 Open access

OA allows consumers to procure power directly from any power generator across the country. The route is suitable for consumers looking to procure a higher quantum of renewable power as there are no space constraints. Consumers may install renewable power projects themselves on a 100% captive basis, but procurement from IPPs under long-term ‘group captive’ PPAs is the most popular option.

Table 4: Key features of different OA business models

Particulars	100% capex	'Group' captive	Third-party sale
Key features	• Customer owns 100%, developer builds and operates • Consumer makes the entire upfront capital investment	• Customer owns minimum 26%, developer owning 74% or lower builds and operates • A third-party IPP may own the remaining equity and takes all responsibility for developing and operating the power plant; consumer buys power from IPP as per a mutually agreed PPA	• Owned, built and operated 100% by developer • Consumers buy power from IPPs under a mutually agreed PPA
Benefits	• Streamlined project approval process • Competitive PPA price offered under the group captive model • Exemption from CSS and AS accounting for about Rs 1.30-2.50/kWh under the group captive model • Tax incentives available under 100% captive model		• No upfront capital needed • No annual compliance requirements
Disadvantages	• Upfront capital investment required • Consumer(s) forego profits or dividends, which are adjusted in tariff • Annual compliance requirements to prove captive status		• Higher PPA price • Higher landed cost due to applicability of OA charges

Source: Crisil Intelligence

The MoP issued final green open rules in FY23, which are desirable for consumers, and most of the major states have already adopted these. The new rules allow small consumers with sanctioned load over 100 kW to be eligible for OA with banking provisions subject to an annual cap of 30% of power consumed from the local discom. The rules propose that OA applications be approved within 15 days and that a uniform methodology for calculating OA charges be followed across all states. This is expected to propel capacity additions under this route over the medium to long term.

3.3.3 Inter-state transmission system (ISTS)-connected projects

CTU- or ISTS-connected projects can supply power throughout India by using the national grid network. These projects enable developers to support pan-India operations for corporate customers in multiple ways. Customers with multiple facilities across states can aggregate demand to purchase electricity under a combined PPA; customers with facilities in states where STU-connected projects are not viable or feasible can access power through CTU-connected projects; and customers that wish to contract for energy attributes through EAPAs without purchasing physical electricity. EAPAs are contracts that require developers to unbundle energy attributes and sell them to C&I consumers, often registered as I-RECs/RECs. The electricity generated from these projects is sold either on power exchanges in India or to other brown power PPA consumers.

There are two key categories of C&I customers that benefit from ISTS power:

1. Large manufacturing facilities in states without adequate renewable potential or high intrastate OA costs or policy landscape (e.g., Jharkhand, Odisha, UP, WB and Northeast)

2. Data centre and technology companies are purchasing environmental attributes generated from green power in India to meet RE commitments for their operations in India and the broader Asia-Pacific region

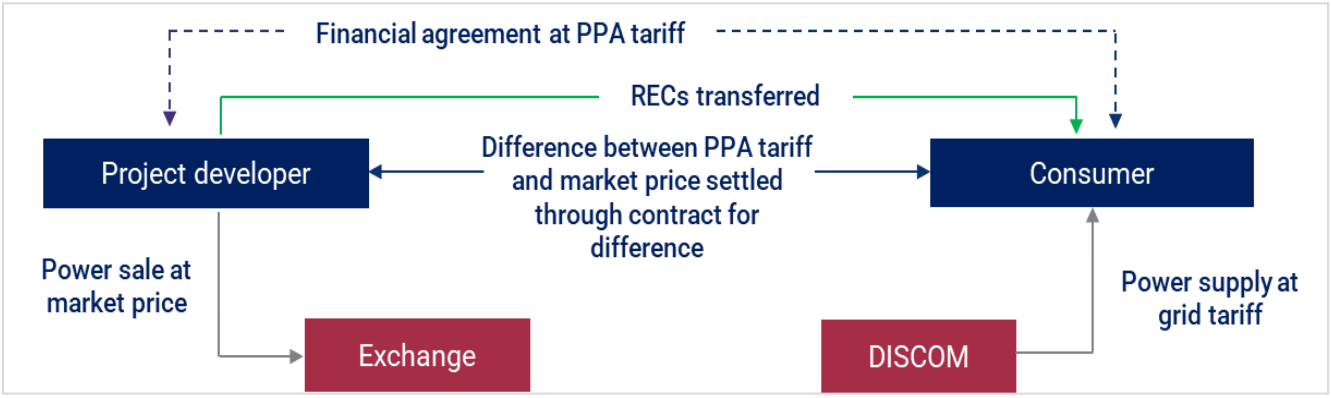
The OA market has historically been limited to intra-state projects, where both the renewable project and the consumer are located within the same state. However, the market is exploring inter-state projects given ISTS waiver (25% reduction starting July 1, 2025, and a full phase-out by fiscal 2028) for OA projects, which is typically Rs 0.50-0.80/kWh for a 25-year period for projects commissioned by June 2025.

ISTS-based OA power continues to offer a cost advantage for large C&I consumers, even after factoring in ISTS charges and losses of Rs 0.20-0.25/kWh (assuming a 75% waiver on ISTS charges). Despite this adjustment, the landed cost of ISTS power is still Rs 0.10-0.20/kWh lower than comparable intra-state OA. Customers already operating under intra-state OA arrangements – particularly in states with favourable banking or OA policies – are likely to continue with existing set-ups due to operational familiarity and policy stability. However, ISTS remains an attractive alternative for new buyers, those looking to diversify procurement across geographies, or entities in states where intra-state OA is constrained by regulatory barriers or higher charges.

3.3.4 Virtual power purchase agreements

In a VPPA, a buyer contracts to purchase Renewable Energy Power at a predetermined price, without physically receiving energy. In a VPPA framework, an agreement is reached for the sale of RECs to the consumer at a mutually agreed price, and brown power is sold on the exchange with a contract for difference. Essentially, through a VPPA including EAPA, corporates support set-up of RE projects and, in turn, retain the green attributes (RECs). It also allows consumers to purchase green attributes such as RECs while continuing to buy power from discoms or other sources. This framework also provides consumers and developers with a hedge against power price volatility to the extent of the strike price or cap/floor. The industry is exploring this option, experimenting with some variants of VPPAs.

Figure 22: VPPA transaction structure



Source: Crisil intelligence

CERC has recently released draft guidelines for VPPAs in India. As per the guidelines, Indian RECs are allowed to be transferred without any cost and without a power trader. CERC has also recognised that both parties may directly settle the difference between market and strike price according to a mutually agreed contract. As per the above framework, parties do not require any derivative contracts to complete a VPPA. Hence, full jurisdiction of such contracts remains with CERC under REC Regulations, Power Market Regulations, and Grant of Trading License Regulations, ending years of uncertainty for the sector.

VPPAs are emerging as a commercially attractive option for C&I consumers, particularly when linked to ISTS-connected RE projects. Unlike green tariffs, which involve a fixed premium over grid power and offer limited pricing

transparency, VPPAs allow for greater cost control and potential savings, especially under favourable market conditions.

C&I consumers are also increasingly adopting EAPAs and other green attribute contracting structures to meet their sustainability goals. By combining VPPAs with RECs, corporates can make credible progress towards their 100% RE and Scope 2 reduction goals without relying on physical OA or state-level grid connectivity. While VPPAs are fundamentally structured as cost-plus instruments for acquiring green attributes, they can become cost-neutral or even cost-saving depending on the strike price versus real-time market prices. Since green tariffs often carry premiums of Rs 0.50-1.00/kWh over grid tariff and are subject to regulatory variability, VPPAs offer not just greater flexibility and long-term visibility, but also a more commercially viable route for companies seeking to decarbonise at scale, particularly across multiple states. This makes VPPAs especially attractive for large, creditworthy consumers that may not have access to physical OA but still want to demonstrate credible, reportable RE procurement.

3.3.5 Power exchanges

The power exchange market in India, specifically the Green Term-Ahead Market (G-TAM) and Green Day-Ahead Market (G-DAM), provides consumers with opportunities to buy and sell renewable power on a short-term basis. G-TAM allows bilateral purchase of power for delivery duration up to one week, with options for same-day, next-day, next-week, or next 2-10 days contracts. In contrast, G-DAM enables trading of power through a closed online auction process for delivery on the next day. Green attributes are embedded with traded power to avoid double counting, ensuring the integrity of the market.

The total cleared volume in calendar year 2024 was up 58% on-year due to a sharp increase in demand (up 55% on-quarter) on the back of prolonged warm weather in most parts of the country. Average clearing price on the green exchange in CY2024 was estimated at Rs 4.96/kWh compared with Rs 4.57/kWh on the conventional DAM market, implying a premium of Rs 0.29/kWh for green attributes. Corporate participation in the market remains low at 10-20%, with only large consumers such as ArcelorMittal Nippon Steel and Indian Railways participating.

3.3.6 Green tariffs

A green tariff is a special power tariff determined by state regulators for consumers that want to purchase renewable power. It is a simple procurement route that does not require any changes in physical procurement, metering or infrastructure, making it attractive to consumers that are averse to relatively complex procurement options such as OA. All consumers are eligible to procure power from the local discom at green tariffs, but it entails an extra cost (over and above the respective consumer category grid tariff), which is a deterrent for many. The green tariff premium calculation methodology is arbitrary and lacks visibility, and the green attributes are not transferred to the consumer but rather retained by the discom [for non-obligated entities and over renewable purchase obligation (RPO) targets of obligated entities] that uses them to meet its RPO targets.

Despite their operational simplicity, the uptake of green tariffs has been poor due to the high cost, which is set at a premium of 5-10% over grid tariffs. Some states, such as Karnataka, transfer green attributes to obligated entities only, but this is not a standard practice. Overall, the green tariff has remained a non-starter due to its high cost and lack of clarity over green attributes.

3.4 Key growth themes driving RE demand among C&I consumers

3.4.1 Growth in manufacturing under Make in India and PLI prompting RE adoption

The Indian government has launched several initiatives to boost domestic manufacturing and reduce dependence on imports. The "Make in India" initiative, launched in 2014, aims to transform India into a global manufacturing hub

and attract foreign investment. The government has also introduced policies such as "Atmanirbhar Bharat" and PLI for products such as electronics, pharmaceuticals and medical devices to encourage domestic production and exports. As per industry estimates, electricity cost accounts for 15-20% of total manufacturing across sectors in India. Thus, to ensure financial viability and competitiveness, manufacturers look for cheaper and cleaner sources of electricity, such as solar and wind power.

3.4.2 Offsetting global and regional emissions through OA projects in India

International companies with operations in India are seeking renewable power and related market instruments not only to meet their electricity requirements within India but also for their international operations. Companies find India an attractive market to invest in due to its comparatively low levelised cost of energy, which enables them to undertake large-scale projects and use I-RECs to offset Scope 2 emissions of their global power operations. Companies such as Amazon and Microsoft have announced such deals. International companies also bring knowledge of new market instruments and frameworks that help power generators develop new products and expand their offerings.

Case study 1: Global consumer tech company offsetting product-use emissions through RE in India

A global consumer electronics major, with one of the largest device user bases worldwide, has been actively working to reduce emissions across its value chain. A key challenge has been addressing Scope 3, Category 11 emissions, i.e., electricity consumed during the lifetime use of its products by customers. These account for more than 20% of the company's total carbon footprint.

Structure and mechanism

To tackle this, the company has launched a programme to match product usage electricity with RE in key markets where its products are sold and used. It has already enabled over 13 GW of clean energy globally, spanning both supplier operations and customer product use.

In countries such as India, where a significant share of its user base resides and the grid is still carbon-intensive, the company is supporting the development of new renewable capacity. These projects are typically executed through long-term procurement arrangements, local partnerships with developers and retirement of I-RECs to ensure credible accounting.

Estimated impact

While project-level disclosures are limited, estimates suggest the company's efforts in India could help offset hundreds of GWh of electricity consumption annually, directly attributable to product usage in the country.

Strategic relevance

This approach represents a shift in how corporates view climate responsibility — not just decarbonising operations but also the use phase of their products. For Indian developers, it unlocks a new demand stream from global corporates seeking to meet voluntary RE targets and Science-Based Targets via high-impact geographies such as India.

Case study 2: VPPA-based RE procurement by a global tech major

Effective 2022, a leading global technology services company has signed up for VPPAs for an estimated 1.2 GW of RE projects in India. The contracted capacity includes multiple solar and wind projects across multiple states, including Rajasthan, Madhya Pradesh and Karnataka.

Structure and mechanism

The VPPAs are structured to provide RECs — specifically I-RECs — without requiring physical delivery of power to the buyer. The developer sells electricity to the grid, while the corporate buyer retains the environmental attributes, enabling them to meet global sustainability targets under Scope 2 emissions accounting.

- As of 2024, the global tech major is estimated to have a total demand of ~2 GW, based on public disclosures. This demand is expected to increase severalfold in the coming years
- India operations, including data centres and corporate offices, are conservatively estimated to contribute a fraction of the signed-up capacity

Strategic relevance

- India offers among the lowest OA tariffs globally (Rs 2.80-4.00/kWh), making it a cost-effective location for sourcing I-RECs
- The VPPA model decouples power procurement from physical consumption, allowing companies to invest in markets with the best economics while meeting targets across jurisdictions
- This structure is particularly suited for global firms with fragmented or complex power loads, especially in regions where green power is expensive or not easily accessible

3.4.3 Implementation of Carbon Border Adjustment Mechanism

The European Union (EU) is set to implement the Carbon Border Adjustment Mechanism (CBAM) starting October 2026. As part of the CBAM, the EU plans to impose tax on goods imported from countries that do not have a carbon pricing mechanism. Some of the leading industrial sectors expected to face such taxes include cement, iron and steel, aluminium, fertilisers, chemicals and refined petroleum products. Many companies in these sectors are looking to transition to renewable power to reduce their GHG emissions. In fact, several of these companies have also set targets to achieve net-zero GHG emissions or increase the share of RE sources in total power supply to 100%.

These sectors are expected to form a major share of renewable power demand over the near to medium term as companies pursue more ambitious sustainability goals, face growing supply-chain pressures, and adapt to evolving regulations such as CBAM alongside domestic growth in industrial production, infrastructure and electrification.

3.4.4 Infrastructure growth and electrification in sectors such as airports and metro systems

Infrastructure-led electrification is emerging as a significant demand driver for RE in India. Rapid expansion in sectors such as airports, metro rail networks, industrial parks and smart cities is leading to higher power requirements, with a growing emphasis on sourcing this demand sustainably. These sectors often operate under state or central government mandates that increasingly prioritise clean energy adoption, either through direct procurement or via innovative models such as green OA and hybrid PPAs. Given their large and often 24x7 energy needs, such infrastructure projects are actively exploring customised RE solutions, including round-the-clock supply, energy storage integration and location-specific renewable sourcing. As infrastructure modernisation gathers pace, this segment is expected to play a critical role in deepening corporate RE adoption across the country.

3.4.5 Impending launch of a national carbon market

The Government of India has notified the Carbon Credit Trading Scheme (CCTS), 2023, and in June 2025, it issued a draft of the GHG Emission Intensity Targets, 2025, under its compliance mechanism. The draft specifies baseline GHG emission intensities for fiscal 2024 and binding reduction targets for fiscals 2026 and 2027 for each obligated entity. These entities include large industrial facilities in aluminium production, iron and steel manufacturing, and other high-emission sub-sectors listed in the official schedule. For example, aluminium smelters such as Hindalco's facilities are required to progressively lower their emission intensity by around 2-6% from baseline levels over the two compliance years. In the iron and steel sector, major producers such as SAIL, Tata Steel and JSW Steel have

similarly been assigned measurable step-down targets — typically in the range of 2-7% from the baseline — varying by plant and production process.

Non-compliance without surrendering equivalent Carbon Credit Certificates (CCCs) will result in environmental compensation equal to twice the average annual market price of CCCs, payable to the Central Pollution Board. By setting facility-specific targets and linking compliance to a tradable carbon credit framework, the scheme is designed to both incentivise emission reductions and create a transparent market for trading carbon performance across India's most energy- and emission-intensive industries.

3.4.6 Growing demand for green hydrogen

Many states have issued dedicated policies to promote and incentivise construction of green hydrogen production facilities, including associated renewable projects. Many companies in Japan, Korea and Singapore have expressed interest in importing green hydrogen from India. For example, in 2022, Singapore's Keppel Infrastructure inked a deal with Greenko Energy Holdings to set up a green ammonia facility with 250,000 Tonnes Per Annum (TPA) capacity in India. The facility would require an estimated 1.3 GW of solar and wind power capacity. Progressing towards its sustainability goals, India has set a target to produce 5 million tonne of green hydrogen by 2030.

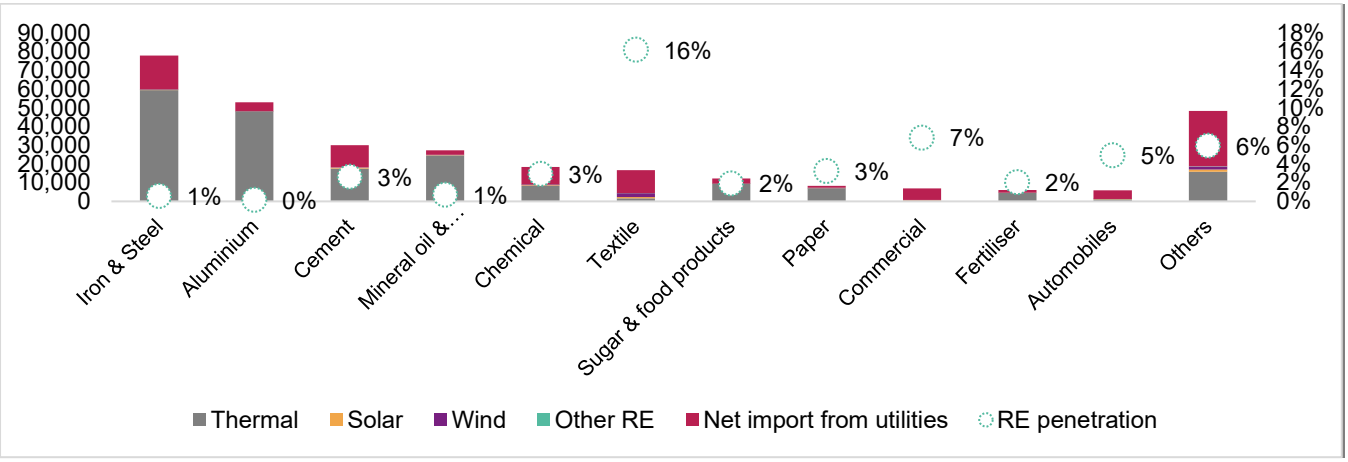
3.5 Traditional and emerging industries boost procurement of renewable power

The two types of consumer categories that are driving renewable power procurement comprise the traditional (manufacturing and infrastructure) and emerging (AI, global capability centres or GCCs and cloud computing) industries.

3.5.1 Traditional industries

In fiscal 2023, captive consumers exceeding 0.5 MW contracted demand utilised 311 TWh of power (66% from captive projects and 34% from discoms), accounting for ~40% of total C&I power demand. Thermal power constituted 96%, with renewable power (majorly wind and solar), accounting for only 4%. The iron and steel, aluminium, refineries and cement industries are expected to be the leading adopters of RE owing to their high conventional power consumption and decarbonisation initiatives. Another set of consumers within the traditional sectors include Indian infrastructure companies and GCCs. These companies are steadily increasing their procurement of renewable energy, driven by sustainability targets, reputation pressure, and long-term cost advantages. These large airports, metro networks, and IT campuses are increasingly building new capacities.

Figure 23: Power procurement by captive consumers exceeding 0.5 MW contracted demand (GWh) for fiscal 2023



Note: Other industries include jute, mining and quarrying, engineering, collieries, plastic, rubber and miscellaneous
Source: CEA, Crisil Intelligence

3.5.2 Emerging sectors including AI, cloud computing and data centres – new growth theme in the sector

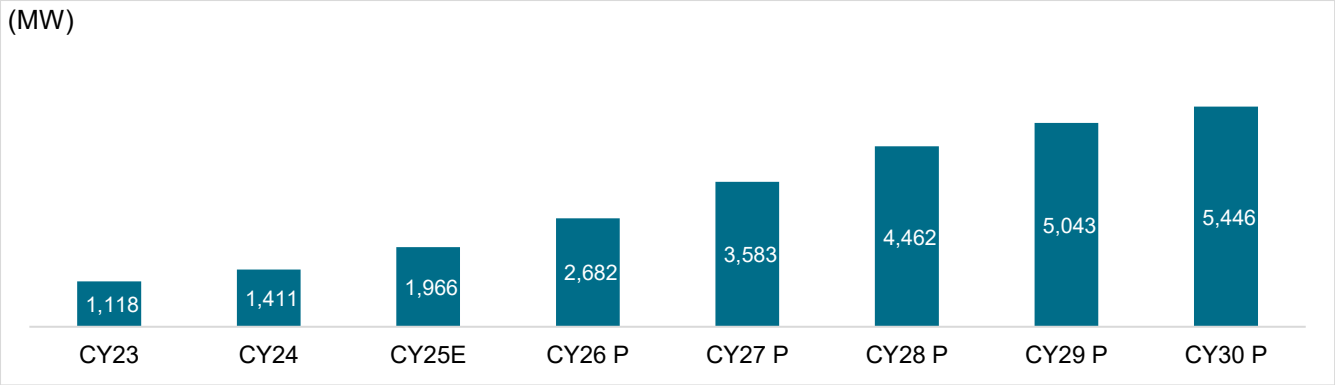
Companies in the emerging industries are steadily increasing their procurement of RE, driven by sustainability targets, reputation pressure and long-term cost advantages. Large airports, metro networks and IT campuses are increasingly building new capacities.

India's data centre industry is witnessing rapid growth, driven by increasing demand for cloud computing, data storage, digital services and GCC. Increasing growth in the AI market has directly translated into higher power demand. To meet this growing demand, data centre operators are likely to opt for renewable power sources, given the potential to save costs as well as reduce carbon footprint. Electricity costs account for 30-40% of a data centre's operating expenses. As the capacity of data centres expands, it is expected to result in significant RE capacity addition.

Over the past few years, AI has emerged as mainstream from being under experimentation. With the development of new AI models, including GPT-4, Gemini 1.5 and DeepSeek, comes a significantly higher appetite for data centre capacity and electricity. The trend is not only technological but has a material infrastructural and more importantly, environmental implication. These infrastructure hubs, which house thousands of high-performance graphic processing units and central processing units, are evolving from back-end utilities to frontline investment priorities.

India is fast emerging as a critical node on the global data centre map. With rising internet penetration, digital payment infrastructure and the localisation of cloud and AI services, the demand for domestic data processing is surging. From an installed capacity of just 1.1 GW in calendar year 2023, the capacity is expected to increase to 5.4 GW by calendar year 2030. Mumbai, Hyderabad, Chennai and NCR are evolving into hyperscale clusters, driven by submarine cable landings, favourable state policies and access to skilled labour. Strategic land banks, strong fibre connectivity and incentives under various state policies are further catalysing this growth.

Figure 24**: India's data centre installed capacity**



P: Projected
Source: Crisil Intelligence

3.6 Key consumer expectations and typical contractual clauses under corporate PPAs

C&I consumers are looking for more than just low tariffs. They value predictability, flexibility and reliability in energy procurement. Key expectations include contracted RE tariffs being lower than grid throughout the PPA tenure, ensuring savings on grid tariffs over time. They prefer developers with a strong financial and execution track record, especially those with local experience as this assures timely delivery and continuity. Minimal operational risk is also essential. Consumers want guaranteed compliance with central and state policies, reliable plant performance and minimal disruption.

Further, buyers now look for developers offering a wide mix of technologies (solar, wind and hybrid) and solutions (on-site, group captive, third party and VPPA), which helps in meeting their decarbonisation goals holistically. Corporates also value flexibility in contracting, whether it is tenure, exit clauses or adjustments due to mergers and acquisitions (M&A) or regulatory changes. Early commencement of power supply (within six to nine months for OA) is preferred, especially from developers with shovel-ready projects and clearances in place.

Building on these expectations, C&I PPAs are evolving to include specific contractual terms that reflect both developers' and consumers' priorities. The table below captures key differences in the tariff structure, commissioning timelines and lock-in periods under typical offsite and onsite contracts.

Table 5: **Key contractual clauses**

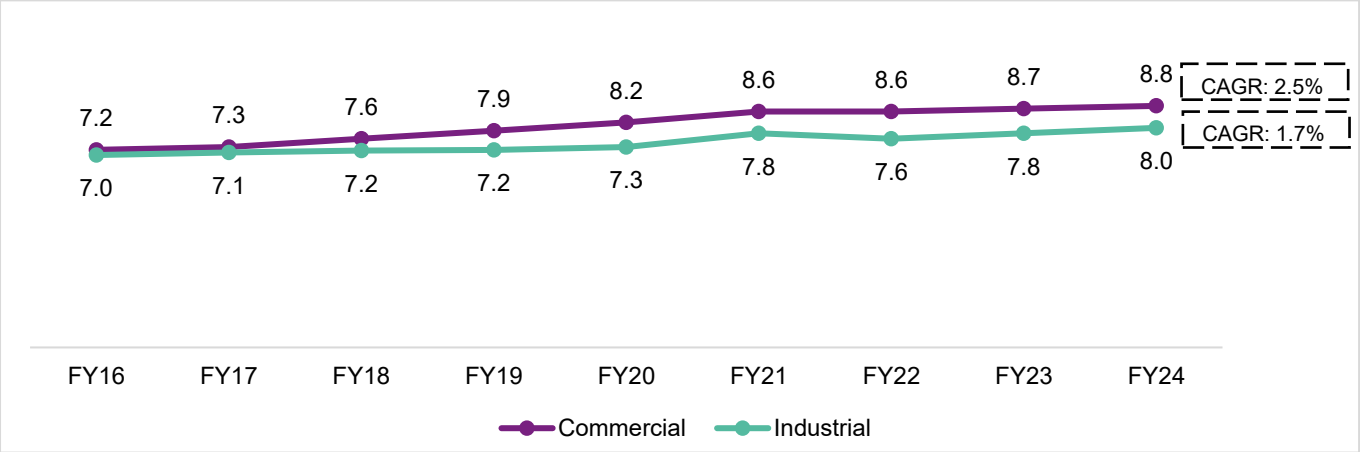
	Offsite contracts	Onsite contracts
Tariff	• Typically, a fixed tariff is payable over the entire PPA term. In some cases, tariffs may escalate to 0.50-1.0% per annum • Some developers also have grid linked tariffs	Fixed tariffs, no escalation
Commissioning timeline	Commercial date of operation (COD) is typically within six to 10 months for solar and 12-15 months for wind following the PPA signing. For group captive projects, COD may depend on equity infusion by the offtaker. Delays attract liquidated damages based on grid tariff differential and generation shortfall	COD within six months of PPA signing date

	Offsite contracts	Onsite contracts
Term and lock-in period	PPAs are typically of a fixed term of 25 years with a lock-in period of ~10 years. Within the lock-in period, PPAs may be terminated in case of default by the project developer or any consumer event or force majeure	Fixed locked-in term of 20-25 years
Payment of OA charges	All payment responsibilities and risks associated with OA charges such as CSS, AS, transmission and wheeling charges/ losses are usually borne by the offtaker subject to minimum savings guarantee	No charges are applicable
Minimum generation and offtake guarantee	Offtakers and project developers are obligated to consume and produce majority of contracted energy. In case of a shortfall, developers are liable to pay the difference between grid tariff and landed cost. Similarly, offtakers are liable to pay the shortfall at PPA tariff	
Minimum assured savings	Minimum savings of Rs 0.50-1.00/ kWh or up to 20% over consumers' variable grid energy charges. If savings are lower than the specified amount, the PPA tariff is renegotiated downwards subject to floor price. In absence of a consensus between the parties, the PPA may be terminated without penalty by the offtaker	5-10% of variable grid tariffs
Termination payment	• In the event of default by the offtaker: Offtaker is supposed to pay PPA tariff for minimum guaranteed supply for the remaining PPA term or 100% of project capex in the first year, reducing to 10% of capex by the end of the PPA term or normative revenue for 12 months • Project developer event of default: Project developer must provide compensation equivalent to 1 year of savings for guaranteed energy output	In the event of default by the offtaker before system commissioning: Payment of 5-30% of project cost, if delivery of equipment has not started or 12-75% of project cost, if delivery has started • Offtaker default after system commissioning: Entire project capex in the first year, reduced to 10% of capex by the end of 20-25 years • Default by project developer: Loss on savings for one to two years

3.7 C&I grid tariffs and landed cost of OA power

C&I grid tariffs logged a CAGR of 2.5% and 1.7%, respectively, between fiscals 2016 and 2024, led by the need to cross-subsidise agricultural and residential user tariffs. In fiscal 2024, the average cross-subsidisation level for C&I consumers was ~116%.

Figure 25: C&I average billing rate at the national level (Rs/ kWh)



Source: NITI Aayog, Crisil Intelligence

Variable grid tariffs for HT industrial consumers showed an upward trend across target states[6] between fiscals 2022 and 2025. Between fiscal 2022 and fiscal 2026, states like Tamil Nadu, Uttarakhand and Telangana have seen increases of INR 1.21-1.45/ kWh, with some like Maharashtra rising even more steeply from INR 9.01 to INR 10.36/kWh. Karnataka and is a rare outlier, with tariffs moderating slightly in this period due to surplus conditions and regulatory constraints. Although subject to slightly different tariff structures, HT commercial consumers followed a broadly similar trend. Despite some regional policy variations, this historic movement reflects increasing power procurement costs and persisting cross-subsidies.

Grid tariffs are projected to rise further across most industrial categories, driven by higher cost recovery targets, phasing out of subsidies and elevating capex requirements for discoms. For instance, Tamil Nadu tariffs are expected to touch Rs 9.40/kWh by fiscal 2030. Notably, Karnataka and Maharashtra released Multi-Year Tariff (MYT) orders that signal a decline in tariffs in the near term. However, such reductions may be challenged by discoms over time, if financial stress escalates. On balance, grid tariff inflation remains a persistent and structural feature, making renewable power procurement highly lucrative for large C&I consumers.

Table 6: **HT C&I variable grid tariff projections (Rs/ kWh)**

State	Category	FY22	FY23	FY24	FY25	FY26	FY27P	FY28P	FY29P	FY30P
Andhra Pradesh	Industrial	7.20	7.30	7.30	7.30	7.33	7.37	7.40	7.44	7.47
	Commercial	8.30	8.40	8.40	8.40	8.43	8.47	8.50	8.54	8.57
Chhattisgarh	Industrial	7.49	7.81	7.81	8.13	8.51	8.75	8.99	9.24	9.50
	Commercial	7.44	8.01	8.01	8.13	8.42	8.68	8.94	9.21	9.48
Gujarat	Industrial	7.53	7.46	8.10	7.68	7.68	7.73	7.78	7.83	7.89
	Commercial	7.86	7.79	8.45	8.02	8.02	8.07	8.12	8.18	8.23
Haryana	C&I	6.90	6.96	6.96	6.96	7.26	7.28	7.30	7.32	7.34
Karnataka	Industrial	8.39	8.39	8.23	8.02	7.70	7.70	7.58	7.56	7.56
	Commercial	10.14	10.14	10.25	9.22	6.99	6.71	6.38	6.37	6.37
Maharashtra	Industrial	9.01	9.09	9.76	10.17	10.36	10.18	9.96	9.19	9.10
	Commercial	16.13	15.92	16.67	17.58	16.15	15.89	15.44	14.54	14.27
Rajasthan	Industrial	6.89	7.17	7.11	6.91	6.92	6.92	6.93	6.94	6.94
	Commercial	8.83	9.11	9.05	8.85	8.86	8.86	8.87	8.88	8.88

[6] Target states include Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Karnataka, Maharashtra, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh and Uttarakhand.

State	Category	FY22	FY23	FY24	FY25	FY26	FY27P	FY28P	FY29P	FY30P
Tamil Nadu	Industrial	6.67	7.09	7.25	7.61	7.88	8.23	8.60	8.99	9.40
	Commercial	9.14	8.93	9.14	9.56	9.87	10.02	10.17	10.32	10.48
Telangana	Industrial	6.84	7.90	7.90	7.90	8.29	8.69	9.12	9.57	10.04
	Commercial	7.74	8.80	8.80	8.80	9.18	9.58	10.00	10.44	10.90
Uttar Pradesh	Industrial	7.57	7.48	7.48	7.48	7.45	7.42	7.39	7.36	7.34
	Commercial	8.47	8.47	8.25	8.25	8.18	8.11	8.04	7.97	7.90
Uttarakhand	Industrial	5.35	5.70	6.54	7.08	7.22	7.35	7.50	7.64	7.79
	Commercial	7.30	8.30	8.44	8.48	8.61	8.73	8.86	8.99	9.13

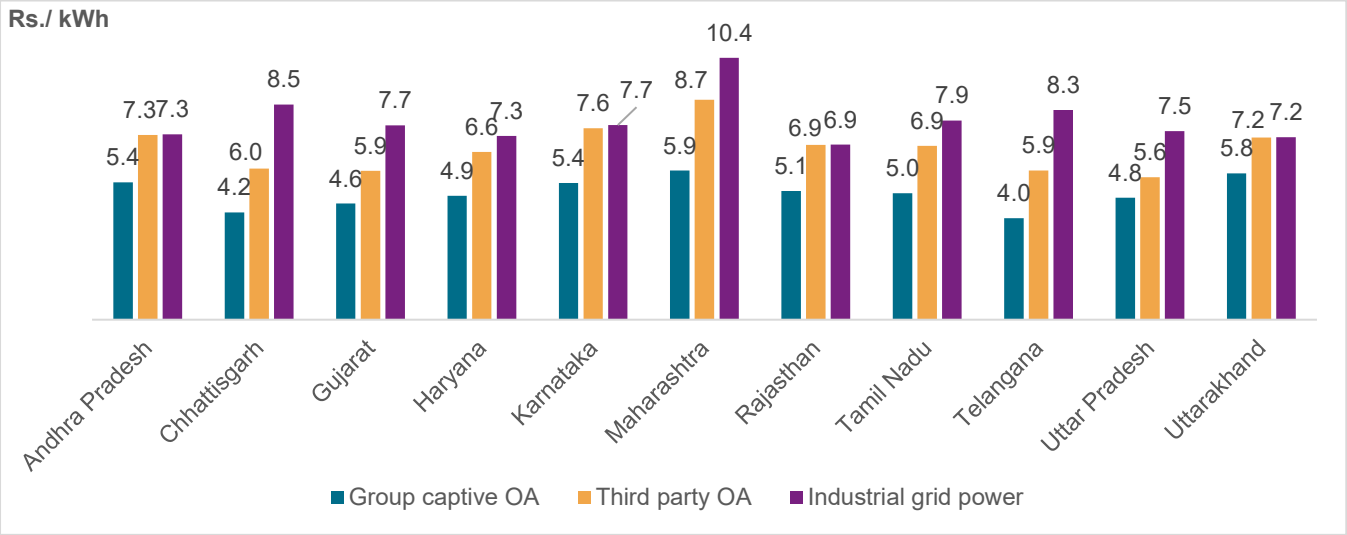
Note: HT consumers are those who are supplied electricity at high voltage levels, typically 33 kV and above. Grid variable tariff is a sum of energy charge, fuel adjustment cost and electricity duty (ED) based on the respective state regulations.
Source: State tariff orders, Crisil Intelligence

C&I tariffs have been rising over the years and they are likely to be on the rise over the medium term due to several factors:

- India is heavily dependent on thermal power for base load and cost of fuel for thermal plants have been increasing.
- Increasing RE penetration requires additional infrastructure and management costs.
- India's power demand is growing rapidly, leading to peak demand management issues. To manage peak demand, utilities may increase tariffs during peak hours to discourage consumption and prevent grid overload.
- With increasing inflationary pressures, power costs are likely to increase with higher T&D and grid balancing costs.
- Due to legacy issues, cross subsidisation will continue at least for some years, leading to higher tariffs for C&I consumers.
- India's power grid requires modernisation and upgradation to accommodate growing demand and increasing share of RE.

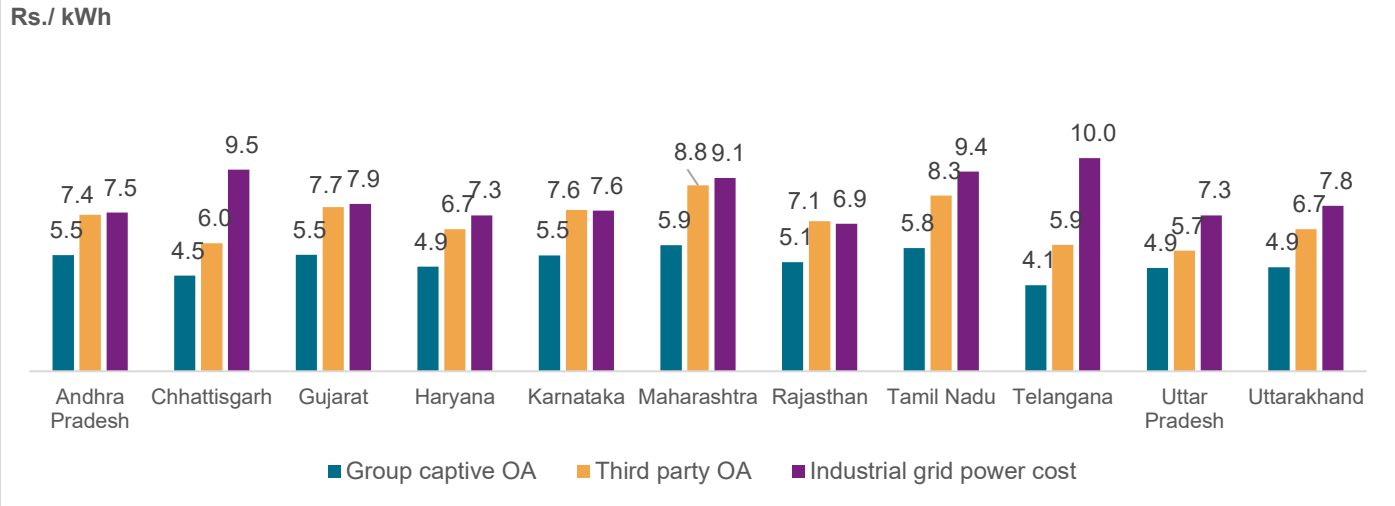
Given the rising trajectory of C&I grid tariffs, coupled with competitive RE tariffs, group captive open access power is attractive for corporate consumers compared with grid power even after accounting for applicable grid charges in states. The financial attractiveness also applies to vanilla wind and wind-solar hybrid OA power under which the applicable grid charges will remain at similar levels. However, in most states, third-party OA is not feasible due to the levy of CSS and AS.

Figure 26: Landed cost of solar power comparison for OA and grid power in FY26



Even going forward, financial attractiveness of OA renewable power is expected to maintain due to tariff inflation.

Figure 27: Landed cost of solar power comparison for OA and grid power in FY30



Note: Base OA tariff has been assumed at Rs. 3.30/ kWh for a vanilla solar project across all states. Actual tariffs in different states may vary due to multiple factors like irradiation, associated developer risks and consumer creditworthiness. Grid power landed cost included applicable Fuel Adjustment Cost (FAC) and Electricity Duty.

Source: State tariff orders, Crisil Intelligence

3.8 Policies and regulations drive growth in the open access market

3.8.1 Captive/ group captive policies

According to the Electricity Rules, 2005 a power plant can qualify as a captive generating plant (CGP), if the captive user holds at least 26% ownership. A group captive mode is where a power plant is developed for collective usage of multiple consumers. A power project is considered captive if the entities consume at least 51% of the power generated and own at least 26% of the equity.

The rules mandate that each user of a CGP must consume electricity annually in proportion to its shareholding in the CGP entity subject to a variation of +/-10%. The Electricity (Third Amendment) Rules, 2023 amended the provisions and allowed power consumption by a subsidiary company or the holding company of a captive user to be considered as captive consumption. The amended rules also appointed the CEA to verify the captive status of CGPs where the projects and their users are located in more than one state. Group captive is the most preferred route by corporate consumers owing to minimal investment requirement and exemption from OA charges such as CSS and AS.

The Supreme Court judgement dated October 2023 reaffirmed that captive users must together hold a minimum 26% of ownership of the CGP and consume at least 51% of the aggregate electricity generated by CGP. It also mentioned that the minimum ownership requirement of 26% must be met and satisfied throughout the year and not at the end of the fiscal. It also clarified the proportionality principle where the owner of every 1% shareholding in CGP should have a minimum consumption of 1.96% with a variation of +/- 10%. The 51% consumption requirement will be tested annually.

As far as benefits for captive users are concerned, as per section 42(2) of the Electricity Act, 2003, captive power plants, set up by end-users for their consumption, are exempted from payment of cross-subsidy and additional surcharges otherwise applicable for open access consumers. Thus, the Centre's policy support has played a role in promoting the captive/group captive model, especially for C&I consumers.

3.8.2 Introduction of Green Energy Open Access (GEOA) rules

The Electricity (Promoting Renewable Energy through Green Energy Open Access) Rules, 2022, give consumers the option to draw green energy through OA if their contract demand is 100 kW or above, with no limit on supply of power for captive consumers. Multiple consumers with a collective contract load of 100 kW are also eligible for OA, making access easier for smaller consumers. As OA allows bulk procurement at low cost, it has become one of the most popular routes among corporates to procure green energy.

Exemptions and provisions for third-party OA consumers

Consumers opting for open access to procure power from third-party suppliers must pay transmission and distribution utilities various charges to use their networks. These include the cross-subsidy surcharge, transmission and wheeling charges, losses, connectivity charges and load dispatch centre charges. The cross-subsidy surcharge, determined by state regulatory commissions, compensates distribution companies for revenue loss from high-paying commercial and industrial consumers shifting away from discom supply.

The National Tariff Policy (2016) ensures that this surcharge remains manageable to encourage competition. It caps the cross-subsidy surcharge at 20% of the average cost of supply (ACoS) for industrial consumers and exempts captive and group captive sales. Further relief comes under the Electricity (Promoting Renewable Energy through Green Energy Open Access) Rules, 2022, which limit any increase in the cross-subsidy surcharge to 50% for 12 years from the commissioning of the project and waive additional surcharges if fixed charges are paid. Since cross-subsidy and additional surcharges together account for roughly 50% of total grid charges, these measures significantly improve the viability of OA for consumers.

Exemptions and provisions for captive and group captive consumers

Captive and group captive routes remain the most attractive option as projects set up by end users for their own consumption are exempt from paying cross-subsidy and additional surcharges otherwise applicable to third-party consumers. Thus, the central government's policy support has played a role in promoting the captive/group captive model, especially for C&I consumers.

Banking and procedural clarity

Banking is allowed on a monthly basis on payment of banking charges. The unutilised surplus banked energy lapses at the end of each banking cycle and the RE generating station get RECs to the extent of the lapsed banked energy. Consumers can also purchase green energy by placing a requisition with their discom.

The rules provide stakeholders long-term certainty on open access charges, which will help determine their returns from the project. Further, if an open access application is not approved within 15 days, it will be deemed approved to ensure timely execution of projects by minimising the risk of cost escalation. The demand for green energy open access from C&I consumers is likely to increase after implementation of these rules. However, discom cooperation, regulatory proactiveness in timely tariff orders and green energy tariffs are monitorable.

3.8.3 Adoption of green open access rules by key states

Most of the large industrial and RE-rich states have notified green energy OA regulations, largely in line with the central rules. However, there are a few deviations, which are listed below.

Table 7: Comparison of MoP's green open access rules with state-notified RE open access regulations

	Eligibility	Banking	CSS and AS waiver	Standby charges	Unused banked power
MoP rules	100 kW or above	Monthly; banked quantum at 30% of monthly consumption for discom; banking charges at 8% of banked energy	100% AS waiver and CSS shall not increase by more than 50% in 12 years Not applicable if fixed charge are being paid	Should not exceed 25% of energy charges	Entitled to get REC for the lapsed banked energy
Andhra Pradesh	✓	✓	No cap on CSS and no AS exemption	✓ (20%)	Paid at 75% of the last discovered SECI tender for given RE source
Chhattisgarh	✓	Monthly; additional withdrawal charges of 30% on power redeemed during peak hours	100% AS waiver and no increase in CSS for 12 years	✓	✓
Gujarat	✓	Banking charges of Rs 1.5/kWh	✓	✓ (10%)	✓
Haryana	✓	Banking allowed only for group captive SPVs with single offtaker	✓	✓	✓
Karnataka	✓	2% additional banking charges for drawing off-peak banked energy during peak hours	No cap on CSS but AS exempted	✓	✓
Maharashtra	✓	No cap on banked quantum	No cap on CSS but AS exempted	-	✓

	Eligibility	Banking	CSS and AS waiver	Standby charges	Unused banked power
Rajasthan	Minimum 1 MW contracted load	Banking on annual basis; allowed only for captive projects; banked energy ay maximum of 25% of RE injected or 30% of total monthly consumption form discom, whichever is higher; Banking not applicable after FY30	No cap on CSS and no AS exemption	-	✓
Tamil Nadu	Minimum 1 MW contracted load	Solar: Monthly Wind: Annual; 12% charges	NA	-	Surplus power compensated at 75% of generic/ lowest tariff bid
Telangana	✓	✓	✓	-	✓
Uttar Pradesh	✓	Daily banking	No cap on CSS, AS exempted	-	No compensation
Uttarakhand	✓	✓	✓	-	✓

Source: MoP, SERCs, Crisil Intelligence

States are slowly moving away from the benefits/waivers given to RE projects since the industry is now mature. However, due to the inherent exemptions given as a right to Green Energy OA consumers (CSS and AS), the proposition remains competitive to conventional sources of electricity supply for new projects as well.

Renewable energy is a compelling proposition for C&I customers, typically offering cost savings of 30-45% over grid tariffs, further driven by rising sustainability goals, increasing pressure from global stakeholders (such as investors and customers) and a supportive regulatory environment.

General Network Access regulations

In October 2022, the MoP launched the General Network Access (GNA) initiative, providing non-discriminatory access to the interstate transmission network nationwide for designated customers. The CTU grants GNA for a specified period and maximum megawatt capacity, allowing for more flexible transmission planning and implementation. A key benefit of GNA is that it enables generators and drawees to plan their power requirements without needing to identify a specific source of purchase or sale, thereby streamlining the process for IPPs to access the transmission network without having to specify target beneficiaries.

ISTS charge waiver for CTU-connected projects

The MoP waived the ISTS charges and losses on all solar and wind projects commissioned before June 30, 2023. In 2021, the waiver was extended for projects commissioned up to June 30, 2025, but with only the ISTS charges waived and losses remaining applicable. After June 2025, an annual increase of 25% in the ISTS charges is applicable for solar, wind, hydro PSP and BESS sources, resulting in the applicability of 100% of ISTS charges from July 2028. In February 2023, it was clarified that green hydrogen and green ammonia projects would get a waiver of ISTS charges for 25 years if the projects were commissioned before June 30, 2025.

Significant relief has been given to renewable projects with two six-month SCOD extension beyond June 30, 2025, due to force majeure and unavailability of power evacuation infrastructure. These projects will be eligible for 100% ISTS charges waiver. The MoP further decided to extend the waiver of ISTS charges on BESS projects co-located with renewable power projects at the same substation before June 30, 2028, for 12 years.

4 Outlook on the Indian C&I renewables sector

4.1 Overall market outlook is highly positive with total capacity expected to increase ~3x by fiscal 2030

The C&I segment is poised to play a pivotal role in driving the country's RE growth story over the next few years. With rising electricity demand, increasing emphasis on sustainability and cost efficiency, and a favourably evolving policy and regulatory environment, there has been a fundamental shift in the C&I sector's power sourcing strategy. The growth of the OA market in India is being driven by two key factors: the substitution of conventional power with renewable energy and the rising power demand from the industrial sector.

Firstly, corporates are increasingly replacing conventional grid-supplied power with bilaterally procured renewable energy because of significant cost savings, sustainability goals, pressure from global stakeholders and supportive regulatory frameworks. In fiscal 2023, C&I renewable consumption in the country stood at 59 TWh, just 7.4% of total C&I demand. However, adoption is expected to accelerate, led by rising cost savings up to 40% of the unit cost of electricity and improved bankability of OA structures.

Secondly, power demand is rising steadily in India's industrial sector, especially in high energy consumption segments, such as manufacturing, automotive, cement, and data centres. This is fuelled by increased production activity, economic expansion and digital infrastructure growth. Corporates are not only looking to meet their rising energy needs but are also under increasing pressure from investors, customers and regulators to reduce their carbon footprint. Corporate PPAs offer a reliable and cost-effective way to secure long-term green power while meeting sustainability targets. The dual push of replacing conventional power with renewables and the need to meet growing industrial energy demand has positioned corporate PPAs as a strategic tool for India's energy transition. Industrialised states are witnessing robust growth in power consumption, with C&I demand expected to clock a CAGR of 5.0-6.4% between fiscals 2023 and 2030 depending on the respective state's dynamics. This equates to an increase from 792 TWh to 1,013 TWh by fiscal 2030. As energy strategies of C&I consumers increasingly prioritise cost certainty and decarbonisation, a large share of this incremental demand is expected to be met via renewable energy rather than conventional grid supply or captive thermal power.

In the base case projections, C&I RE consumption is estimated to grow nearly 4x, from 59 TWh in fiscal 2023 to 246 TWh by fiscal 2030. This reflects both organic demand growth and increasing RE share within the overall C&I mix, enabled by policy clarity, better financing options and stronger developer interest in the C&I segment. Evacuation approvals and land acquisition are critical for pipeline development in India, ensuring infrastructure and land access for effective project execution. From that perspective, an accelerated scenario has also been developed to account for potential upsides. In this case, power demand could grow faster than expected with more rapid progress in transmission infrastructure, proactive favourable policy shifts (especially around banking, forecasting and scheduling) and a reduction in regulatory bottlenecks. RE consumption in the accelerated case is expected to increase to 281 TWh. To better assess state-wise opportunities, a structured attractiveness index was developed to evaluate states on five parameters. Each parameter was assigned a weight and a benchmark was created to assess its attractiveness.

1. Total C&I power consumption quantum: This metric captures the demand for power from the C&I segment in fiscal 2023. States with higher power consumption, such as Maharashtra (122 BU), Gujarat (118 BU) and Tamil Nadu (90 BU), offer greater potential for RE adoption simply due to their scale, making them inherently attractive. In contrast, Uttarakhand (11 BU) and Telangana (27 BU) represent smaller opportunity sizes. The 11 high-potential states which are Karnataka, Gujarat, Maharashtra, Tamil Nadu, Haryana, Chhattisgarh, Rajasthan, Telangana, Andhra Pradesh, Uttarakhand, and Haryana together account for approximately 80% of India's C&I energy consumption and are characterized by high solar irradiation and wind speeds.

2. Financial savings over grid tariffs[7]: This refers to the potential cost savings for C&I consumers when switching to RE compared with prevailing grid tariffs. States like Maharashtra (39-61%), Telangana (37-44%) and Uttar Pradesh (36-46%) stand out due to their high differential, making them lucrative markets for open access and behind-the-meter solutions. Andhra Pradesh and Chhattisgarh show relatively lower savings (16-27% and 23–33%, respectively), limiting short-term commercial viability
3. C&I renewable policy and overall ecosystem: Policy stability and ecosystem readiness significantly impact execution certainty. Karnataka and Tamil Nadu have matured, stable policies, while Gujarat is considered supportive barring some constraints, such as banking restrictions. States such as Telangana, Rajasthan and Haryana have shown improvements in recent years, signalling growing intent
4. Physical resource viability: This assesses the quality of solar and wind resources along with land availability. States like Karnataka, Gujarat and Rajasthan benefit from high irradiation and wind potential. However, Maharashtra, despite having excellent solar and wind potential, is rated "moderate" due to high land costs. Andhra Pradesh and Telangana are also rated "high", making them technically sound markets
5. RE penetration: This is a proxy for headroom available for future growth – lower current penetration indicates higher potential. Gujarat (4%), Rajasthan (6%) and Chhattisgarh (2%) are attractive on this front, with significant room to expand. On the flip side, Karnataka (18%) and Tamil Nadu (17%) already have relatively higher RE shares, slightly limiting their incremental opportunity

Gujarat, Karnataka and Maharashtra are expected to be the top three states for C&I renewable market growth. Gujarat, especially, is estimated to leap from 4% RE penetration in fiscal 2023 to 23% by fiscal 2030, driven by strong demand, favourable policies (excluding banking) and robust resource availability. Pan-India, RE penetration for C&I stood 7.4% on average in fiscal 2023 and is projected to grow to ~20% by fiscal 2030. In the accelerated case, RE penetration is expected to be relatively higher at 23% by fiscal 2030.

Figure 28: State attractiveness index

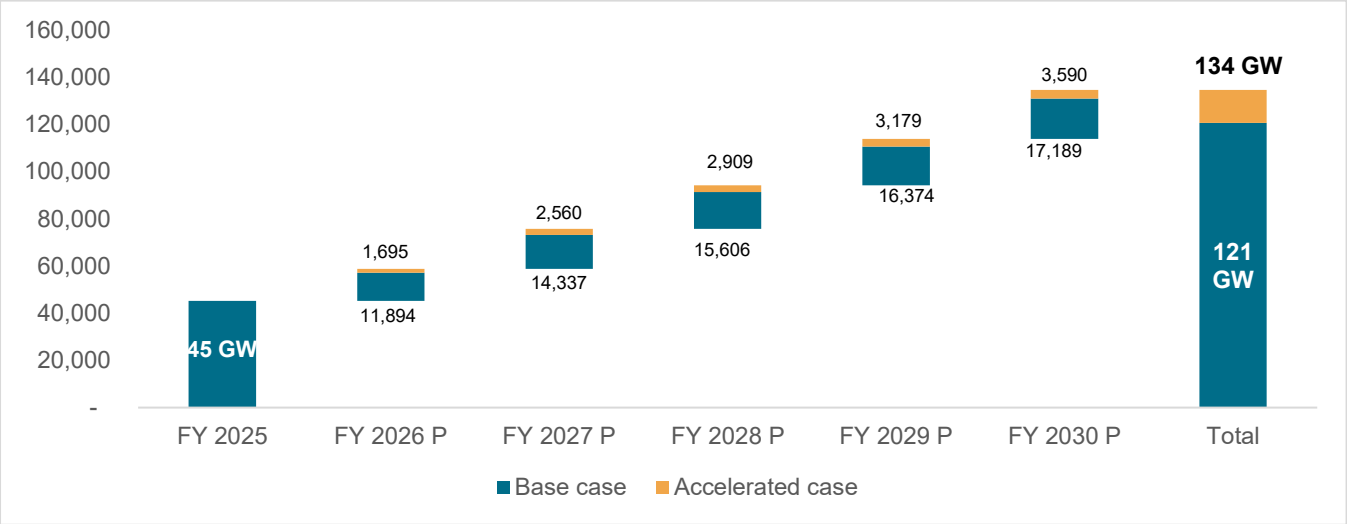
State	Overall attractiveness	Total C&I power consumption, FY 2023, BU	Financial savings over grid power, %	C&I renewable policy and overall ecosystem	Physical resource viability	RE penetration, %	
						FY 2023	FY 2030
Gujarat	High	118	27-40%	Largely stable and supportive barring banking policy	High	4%	23-25%
Karnataka	High	64	34-42%	Mature and stable policy environment	High	18%	30-32%
Maharashtra	High	122	39-61%	Largely positive with timebound approvals	Moderate	10%	25-27%
Rajasthan	High/ Moderate	55	32-40%	Improved stance in recent years	High	6%	20-23%
Tamil Nadu	High/ Moderate	90	22-38%	Mature and stable policy environment	Moderate	17%	25-27%
Haryana	Moderate	36	24-32%	Improved stance in recent years	Moderate	3%	16-19%
Telangana	Moderate	27	37-44%	Improved stance in recent years	High	6%	15-17%
Chhattisgarh	Moderate	32	23-33%	Supportive policy stance with additional incentives	Moderate	2%	13-15%
Andhra Pradesh	Moderate	39	16-27%	Improved stance in recent years	High	7%	16-18%
Uttar Pradesh	Moderate/ Low	29	36-46%	Supportive policy stance; teething issues on regulatory approvals	Moderate	6%	12-13%
Uttarakhand	Moderate/ Low	11	25-40%	Supportive policy stance	Moderate/ Low	0%	10-12%

Source: Crisil Intelligence

[7] Financial savings range is specified for a solar power project under the group captive model.

Based on the above attractiveness framework, Crisil Intelligence expects robust capacity additions from the C&I sector over the next five years. Total corporate renewable installed capacity is expected to grow at a CAGR of 22-24% from an estimated 45 GW as of March 2025 to 121 GW and 134 GW by fiscal 2030 under the base and accelerated cases respectively, requiring 15-18 GW of annual capacity addition by 2030. This demand is expected to be primarily STU-connected due to power banking availability, especially in solar-wind rich states.

Figure 29: Projected C&I renewable capacity, MW



Note: All numbers are shown on an MW AC basis. To convert to DC capacity, a multiplier of 1.4x may be assumed.
P: Projected; Source: Crisil Intelligence

Capacity additions to be supported by replacement of conventional power sources and rising power demand

C&I RE growth is underpinned by a twin-engine model: rising demand from a growing economy and new high-consumption sectors, alongside substitution driven by cost advantages, sustainability commitments, and enabling policy frameworks such as GEOA rules. This dual foundation ensures a robust and diversified capacity addition pipeline well into the next decade. Historically, around 25–26% of C&I RE capacity catered to new demand, while the majority replaced grid power. By fiscal 2030, the share of capacity serving new demand is expected to rise to 34%, indicating a maturing market where both drivers contribute meaningfully.

India's industrial and technology sectors are experiencing sustained electricity demand growth, fuelled by:

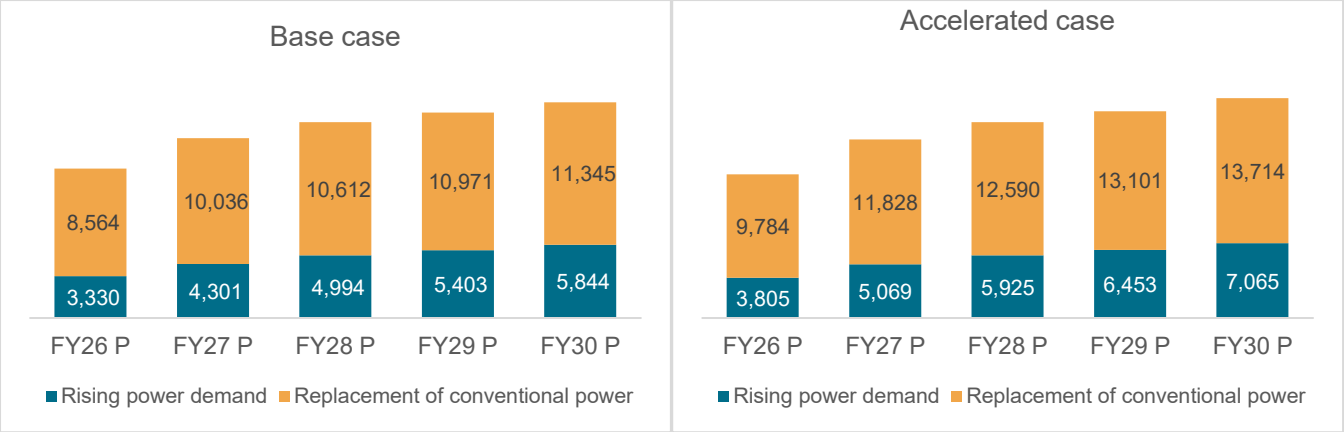
- Economic expansion and manufacturing growth – Industrial capacity utilisation has increased from 74.7% in Q1 FY2024 to 76.3% in Q1 FY2025, signalling higher operational intensity and scope for greenfield expansion. Policy pushes like *Make in India* and PLI schemes are catalysing growth in sectors such as electronics, logistics, and infrastructure.
- New high-consumption sectors – Data centres, driven by hyperscalers, co-location players, and AI-led workloads, are committing to 100% RE for upcoming facilities, adding large, stable baseload demand.

The shift from grid-supplied electricity to renewable energy is accelerating due to:

- Tariff advantage – C&I RE is typically cheaper compared to conventional grid tariffs, providing a strong economic incentive for industries to switch.
- Sustainability goals – Corporates are committing to net-zero targets, making RE procurement a strategic choice beyond cost optimisation.
- Favourable open access regulations – The GEOA rules, 2022 have standardised and simplified OA processes, reduced approval timelines, and allowed consumers with a contracted demand of 100 kW or more to procure RE. Many states are now aligning their regulations with GEOA, leading to greater policy

clarity on charges, banking provisions, and exemption of additional surcharges for RE procurement. This consistency across states is lowering entry barriers and enabling faster, large-scale adoption of C&I renewables.

Figure 30: Projected capacity addition split by power demand and replacement of conventional sources, MW

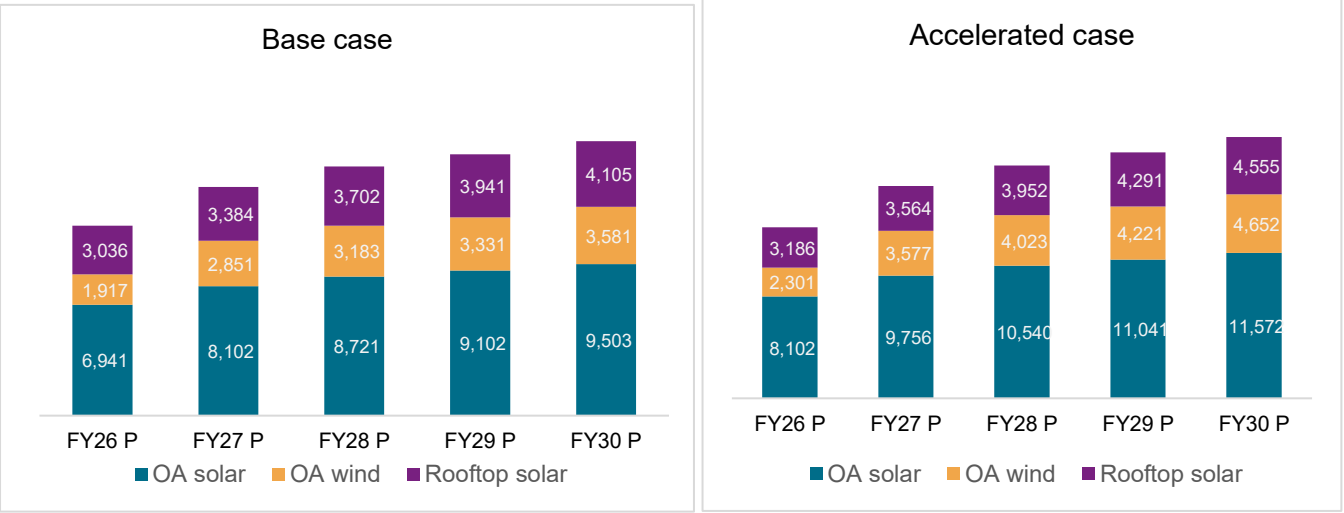


P: Projected; Source: Crisil Intelligence

OA solar to lead capacity additions; wind power projects to gather pace

Over the next five years, installations are expected to carry out via the OA model, which is estimated to account for nearly 76% of the additions, or 57 GW. The balance is expected to come from the rooftop solar segment, which is likely to witness additions of ~18 GW, growing steadily with annual additions of 3-4 GW. Within OA, solar power is expected to be the dominant technology going forward. However, wind power is increasingly becoming crucial in balancing the intermittent solar power output. Annual OA wind power capacity addition, which has averaged at 973 MW in the last five years, is expected to significantly pick up going forward, rising to about 4 GW by fiscal 2030. Overall, the share of wind power is expected to be 20-30% in total OA capacity addition.

Figure 31: Annual capacity projections (by technology, MW)



Note: All numbers in the chart are shown on MW AC basis, unless stated otherwise. For conversion of solar capacity to DC capacity, an approximate DC:AC factor of 1.4:1.0 may be assumed.

P: Projected; Source: Crisil Intelligence

STU connected projects to dominate; potential cost savings to drive CTU-based projects

In terms of the type of connectivity, Crisil Intelligence believes STU-connected farms are likely to dominate capacity addition, where customers can settle their energy requirements on a monthly net basis, compared with plants connected to the ISTS or CTU networks, which require energy settlement every 15 minutes (or 2,880 settlements in a 30-day month). STU projects are expected to dominate due to ease of power injection, attractive banking policy and higher savings than ISTS projects. Hence, STU-connected projects are well-suited for customers who benefit from monthly banking provisions and lower transmission charges under applicable state policies, especially in solar-wind rich states.

However, CTU-connected projects for consumers located in states with insufficient physical resources and/or unattractive OA policies and I-REC coupled VPPA for large global companies will grow this market in parallel. Growth is expected regardless of reducing waivers as these select set of customers will make savings over other alternative power procurement options. Overall, CTU-connected projects of 18 GW are expected to be added by fiscal 2030.

The base and accelerated capacity addition scenarios point to a substantial opportunity for developers and corporates to scale up renewable energy adoption through the OA route. The adoption of green power is nascent today (only 7.4% of corporate demand is met through bilaterally procured green energy), but is slated to rise to 20-23% on account of its strong value proposition of saving, on an average, 40% of the unit cost of electricity, while also benefiting corporates on their sustainability positioning and making them a better fit into the global value chain.

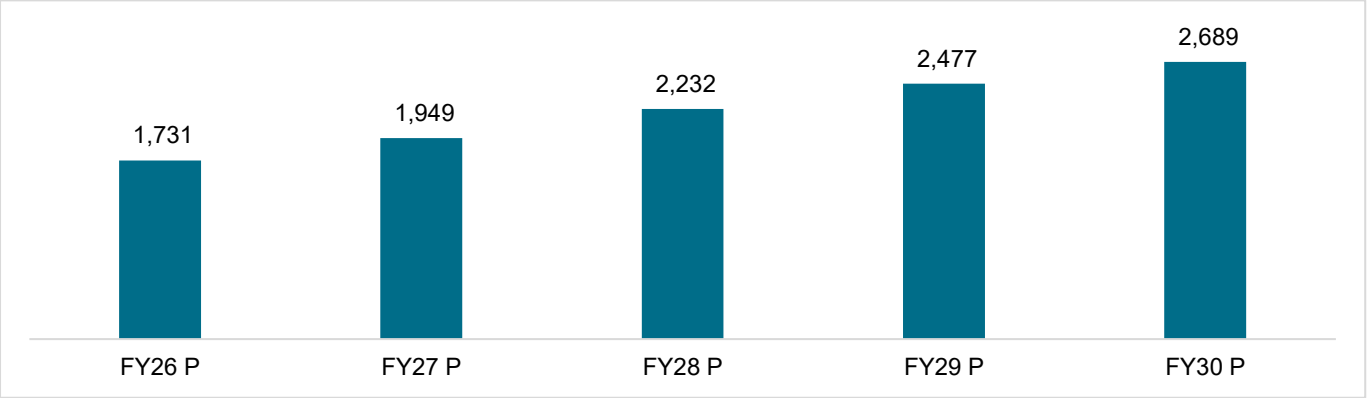
Beyond STU-connected demand, global corporates operating in India are increasingly exploring VPPAs including EAPAs and other green attribute-based contracting mechanisms to meet their Scope 2 and broader net zero emission targets.

4.2 I-REC/EAPA-based OA capacity addition expected to evolve as a key decarbonisation tool for global corporates

The I-REC and broader energy attribute market in India has steadily evolved into a powerful tool for corporates, both domestic and global, to credibly account for RE usage, particularly in regions where physical energy procurement through OA remains a challenge. With over 8.3 million certificates issued and 6.1 million redeemed by Indian beneficiaries in fiscal 2025, the I-REC market is now entering a phase of meaningful scale.

As of December 2024, an estimated 6 GW OA RE capacity in India was registered under the I-REC mechanism. Over the past three fiscal years, annual capacity additions stood at 400–800 MW, reflecting a nascent but steadily growing market. Historically, the projects have been small in terms of scale, but a marked shift is underway. Rising interest in VPPAs, including EAPAs coupled with greater regulatory clarity and stronger RE sourcing mandates from global value chains, is expected to accelerate I-REC-linked capacity additions – to over 2.7 GW annually by fiscal 2030 from 900 MW in fiscal 2025. At this pace, India's energy attribute market could expand to 12-17 GW by 2030, driven largely by demand from technology companies, hyperscale data centres and multinational corporations.

Figure 32**: Projected I-REC/EAPA annual capacity addition (MW)**



Source: Crisil Intelligence

These projects are expected to serve two broad categories of demand. First, large Indian corporates, particularly those operating in states with restrictive OA regimes, are using I-RECs as a transitional tool to increase RE share without waiting for regulatory pathways to open. Second, global corporations with operations in India are leveraging I-RECs to align local sourcing with global sustainability targets, especially in sectors such as information technology (IT), retail and manufacturing. As the voluntary RE market matures, I-RECs are expected to complement physical open access and rooftop installations. Key enablers for this market include stronger registry infrastructure, streamlined accreditation and integration of digital monitoring and blockchain-based issuance. In summary, the I-REC market in India is at the cusp of breakout growth. While still relatively small within the total C&I RE capacity, it is poised to become a vital pillar in India's decarbonisation toolkit, helping corporates meet RE goals flexibly, credibly and at scale.

4.3 Key risks and challenges

The realisation of the I-REC market opportunity is contingent upon addressing a few structural and policy-level challenges. While the policy landscape has improved considerably over the past few years, regulatory bottlenecks in some states still persist. Transmission infrastructure bottlenecks are another key constraint. Timely availability of STU and CTU connectivity, especially for large, multi-site VPPA and I-REC projects, is also a major hurdle. Going forward, bridging these policy and infrastructure gaps is critical to unlocking the full potential of OA-based RE procurement. A stable, investor-friendly OA regime, backed by proactive state-level support, transparent connectivity planning and clear regulatory mechanisms, can drive significant capacity addition in the coming years. Without these enablers, the market may not realise its full potential, particularly with regard to serving global corporates with aggressive RE targets and tight decarbonisation timelines.

Regulatory challenges

- **Variable open access charges:** The open access charges are variable in nature. Most of the state discoms are gradually increasing their OA charges, making it less attractive for the C&I consumers. Increase in OA charges can drive up the cost of Renewable Energy Power for a buyer. However, these charges are regulated and cannot be increased on an ad hoc basis. The transmission and wheeling charges have remained consistent, albeit a few exceptions in most of the states. CSS is capped at 20% of the ACoS rate to industries and waived for group captive customers, full waiver of additional surcharge if fixed charges are paid by the consumer and additional surcharge is not applicable in case of group captive customers. However, for projects offering a fixed discount over discom tariffs, any increase in CSS is advantageous. For a 20 paise per unit increase in CSS, an increase of Rs 1.00 per unit in discom tariff would be required, which results in a clear advantage of 80% savings for the customer

- **Addition of new OA charges:** There are various new charges, other than the OA charges, many states have introduced for OA consumers. For example, in Gujarat, the hybrid policy of 2018 applied multiple wheeling charges of Re 0.05 per kWh on hybrid projects. In Madhya Pradesh, the Harit Urja Tax was introduced in a new renewable energy policy at the rate of Re 0.10 per kWh. Some states have introduced grid support/parallel operation charges applicable only to captive power plants
- **Captive project status:** Captive projects are more attractive than third-party OA ones. Most C&I consumers are opting for captive OA and as a result, discoms are incurring revenue losses. Group captive customers need to abide by group captive guidelines, in accordance with the Electricity Rules, 2005, and compliance is tested at the end of the year. The Supreme Court, in a judgement on October 9, 2023, clarified multiple aspects of the Electricity Rules, 2005, relating to captive/group captive plants and captive users

Contractual challenges

- **PPA and loan tenure** mismatch: Typically, the duration of a long-term PPA in the C&I segment is 15-25 years, while the duration of the loan taken for the project might be longer. Lenders may be hesitant to offer favourable loan terms if there is a significant tenor mismatch, potentially leading to higher interest rates. However, PPA tariff for the supply of green power is generally at a discount to grid tariff (black power). Therefore, demand for green power is always expected to be there.
- **Contract standardisation**: Government tenders usually have a standardised PPA, which is a part of the RfP document. However, in OA projects, PPAs are often customised based on mutually agreed terms between parties after negotiation. This can lead to inconsistencies in contractual terms and, in the event of a dispute, the lack of standardisation can complicate the resolution process
- **Contract enforcement:** It arises from challenges associated with ensuring that all parties adhere to the terms of the PPA. However, inconsistent contractual terms, misinterpretation of any regulatory provision or ambiguity in policies and regulation can impact the enforcement of PPAs

Operational challenges

- **Performance**: Fluctuations in wind speed and solar irradiance due to extreme weather can lead to variations in power output, which can affect the revenue projections. Any unexpected breakdowns or faults can also lead to longer downtimes and reduced power generation
- **Grid curtailment:** Integrating an RE project into the grid in a RE rich state can lead to congestion, forcing the grid operator to curtail power to avoid overloading the network. Moreover, intermittent supply of RE can affect grid stability. Standalone solar is more prone to grid curtailment compared with wind or WSH, since all solar projects peak at the same time, which is not the case with wind

5 Threats and challenges

Threats

- Any adverse shifts in government policy, including a reduction in incentives or changes to electricity regulations, can significantly impact a renewable player's revenue and profitability. However, considering India's COP 26 commitments, climate change ambitions and government push for RE, major alterations in the regulatory regime are less likely. Further, compared with RE capacity addition of ~70 GW, conventional capacity addition stood at just ~20 GW over the last five fiscal years
- Only a few states are fully complying with the RPO obligations, and enforcement on obligated entities - discoms and OA and captive power users - to meet RPO targets has been limited. The proposed amendment to the Electricity Act, 2003, stipulates a penalty on RPO non-compliance and uniform imposition of penalties. Further, strict enforcement would be critical for significant improvement and fair distribution of RPO compliance across states
- The RE industry is facing cost pressures due to volatility in module prices, exchange rates, freight and commodity prices on account of geopolitical uncertainties. This may impact on the EPC margin of renewable players as they may not be able to pass on the cost increases to the project developing SPVs
- The RE sector is highly competitive, with numerous players vying for market share. Further, climate change and extreme weather events can affect the performance and reliability of renewable energy systems, potentially causing disruptions or damage to infrastructure. Further, economic downturns and financial instability can reduce the capital available and increase costs for renewable energy investments, affecting the company's expansion plans
- The Indian RE sector is experiencing increased consolidation, primarily through M&As. This trend is driven by the sector's growth potential, strong investor interest and the desire to create diversified and substantial asset bases. Large players are expanding their portfolios, both organically and inorganically, leading to the transfer of ownership of significant renewable energy assets.

Challenges

- Availability of contiguous land and issues related to acquisition of land parcels are some of the key challenges developers are facing. The acquisition of large tracts of land in a single resourceful location involves multiple stakeholders, which slows down the pace of project execution. The 40-GW solar park scheme, which provides land to successful bidders to set up the projects, is facilitative in this aspect
- Availability of timely transmission connectivity is another challenge. To optimise costs, utilisation levels and losses associated with the transmission system, robust transmission planning is crucial. Various stakeholders at appropriate levels have raised concerns about the connectivity for renewable projects. In response, nodal agencies (PGCIL and SECI) have planned various schemes to reduce grid congestion and enhance connectivity.

6 Competitive assessment

Competitive mapping of RE players entails an in-depth analysis of key companies, including the total number of years they have been in the business, technology-wise installed capacity, geographical presence, products and services within a given market to understand competitive intensity.

Clean Max Enviro Energy Solutions Ltd, incorporated in 2010, has established itself as a leading RE player in India's C&I segment. The company operates in a competitive landscape, with some of the listed IPPs such as Adani Green Energy Ltd, ReNew Energy Global Plc, ACME Solar Holdings Ltd, NTPC Green Energy Ltd and other large unlisted IPPs such as Tata Power Renewable Energy Ltd and JSW Neo Energy Ltd. Some of these companies serve C&I customers as part of their broader business operations.

Further, CleanMax faces direct competition from peers such as Continuum Green Energy Ltd, Amplus Solar Power Pvt Ltd, Fourth Partner Energy Pvt Ltd, and AMPIN Energy Transition Pvt Ltd. These firms have a sizable quantum of operational RE capacities with over 70% of the capacity tied up with C&I customers.

- CleanMax is India’s largest C&I renewable energy provider with:
    - 2.18 GW of operational, owned and managed capacity, and 2.77 GW of contracted, yet to be executed capacity, as of March 31, 2025
    - 2.54 GW of operational, owned and managed capacity, and 2.53 GW of contracted, yet to be executed capacity, as of July 31, 2025
- With nearly 15 years of experience since inception in 2010, CleanMax specialises in delivering net zero and decarbonisation solutions, including supplying renewable power and offering energy services and carbon credit solutions to customers across data centres, AI and technology industries, and large enterprises across sectors including infrastructure, cement, steel, industrial manufacturing, FMCG, pharmaceuticals, real estate and GCCs.
- CleanMax holds a leading position with the largest customer base amongst C&I renewable energy players in India with 531 customers across 1,127 signed PPAs, as of March 31, 2025.
- CleanMax is one of the early movers in the C&I RE sector in India, having played a key role in the evolution of the industry and its operating models. It has also been an early adopter of leading global technologies to lower the levelised cost of electricity and enhance efficiency and reliability.
- CleanMax’s business model is distinct from utility-scale RE developers, as the company does not participate in competitive tenders with state-owned distribution companies or central government utilities (SECI, for instance), which award projects based solely on the lowest tariff bids, allowing limited tariff flexibility. As a result, CleanMax prices its offerings at a premium compared with large utility scale peers, primarily due to distinct project economics and risk profile. CleanMax’s weighted average tariff for capacity commissioned in fiscal 2025 was Rs 3.76 per kWh, whereas the industry weighted average for listed utility scale renewable energy players for the same period was Rs 2.44 – 2.46 per kWh.
- CleanMax enjoys significantly greater flexibility in designing contract structures tailored to specific needs of individual consumers. Unlike IPPs operating in the utility-scale segment, where projects are typically awarded through competitive bidding and governed by stringent regulatory frameworks, CleanMax can negotiate innovative bilateral agreements that offer adaptable pricing, tenure and risk-sharing mechanisms

- CleanMax had a market share[8] of about 12% of the annual OA RE capacity additions[9] during fiscal 2024, 3% during fiscal 2023 and 6% during fiscal 2022.
- CleanMax had a higher market share in Gujarat and Karnataka during fiscal 2024. CleanMax's market share in annual OA RE energy capacity addition in Gujarat was about 20% in fiscal 2024, 8% in fiscal 2023 and 7% in fiscal 2022. In Karnataka, its market share in annual OA RE capacity addition was about 25% in fiscal 2024, 16% in fiscal 2023 and 11% in fiscal 2022
- CleanMax's key customers consist of:
    - High growth industries of data centres, AI and technology, including Equinix, Amazon, Google, Apple, etc
    - Conventional C&I players across industries including infrastructure, manufacturing and allied services, airports, cement, steel, real estate and GCCs
- CleanMax plans to deepen its engagement with customers operating in industries that benefit from key India growth themes such as "Make in India", AI, GCC, data centre growth and India infrastructure growth
- CleanMax projects are being developed strategically located in states such as Gujarat, Karnataka, Tamil Nadu, Maharashtra, Rajasthan, Haryana, Chhattisgarh, Uttar Pradesh with high solar irradiance or high wind speeds, optimising for greater plant load factors
- As of March 31, 2025, CleanMax had one of the widest geographical coverages offering onsite solar in 21 states in India and international locations i.e., UAE, Thailand and Bahrain. Further CleanMax offers STU and CTU connected farms across ten states in India with a mix of wind and solar for C&I customers.
- To further penetrate the technology customers segment, CleanMax plans to build its pipeline for future CTU-connected contracting, including developing evacuation and land across Rajasthan, Gujarat and Karnataka, which are high-resource generation states with robust power evacuation infrastructure. This is in addition to existing STU-connected farms, which are strategically located in Maharashtra, Tamil Nadu and Karnataka to ensure seamless supply to data centres clusters in Mumbai, Chennai, and Bengaluru, which are key areas for technology customers. All these states are characterised by high solar irradiation and high wind speeds.
- CleanMax is ranked[10] first and second by Global Real Estate Sustainability Benchmark (GRESB) for adopting the best ESG practices throughout its value chain. This positions the company as a preferred partner for clients, including technology companies that seek vendors dedicated to sustainability principles
- CleanMax has a deep understanding of the sustainability needs of C&I customers, leveraging its expertise in developing, operating and maintaining long-term infrastructure assets, backed by credentials and balance sheet
- CleanMax is expecting to explore partnerships in the wind turbine O&M market, which is synergistic with its portfolio and a growing market opportunity
- CleanMax's portfolio reflects key growth themes in corporate RE procurement including: (i) the expansion of India's data centre capacity, driven by demand for cloud computing, data storage, digital services and AI, (ii) increased use of India-origin I-RECs by international technology companies to meet sustainability targets, (iii) growth in manufacturing under the "Make in India" initiative and PLI schemes, prompting renewable

[8] Market share refers to the approximate percentage of total OA RE capacity installed by the company during a specific period/year, out of the total OA RE capacity installed by all the players in the market during the same period based on the data available in public domain.
[9] Renewable energy capacity addition is the new capacity that is added/commissioned during a particular period/year.
[10] 1st out of 685 participants globally and 2nd out of 53 participants (RE developers), as given in CleanMax's annual report for fiscal 2024

energy adoption] and (iv) infrastructure growth and electrification in sectors such as airports and metro systems, creating demand for customised RE solutions

Table 8: Analysis of operational parameters of large utility-scale RE IPPs

Parameters	CleanMax Enviro Energy Solutions	Adani Green Energy	ReNew Energy Group PLC	Tata Power Renewable Energy	ACME Solar Holdings	JSW Neo Energy	NTPC Green Energy
Ownership/group/key investors	Brookfield Renewables, Augment Infrastructure, Danish Investment Fund	Adani Family, Totalenergies, Other institutional investors	Canada Pension Plan Investment Board, Abu Dhabi Investment Authority, ReNew	TATA Power	ACME Group	JSW Group	NTPC
Year of incorporation	2010	2015	2011	2007	2015	2021	2022
C&I operational capacity (MW) as on March 31, 2025							
Solar	1,388	NA	1,100	NA	NA	518	NA
Wind	280	NA	401	NA	NA	573	NA
Hybrid	510	NA	NA	NA	NA	NA	NA
C&I subtotal	**2,178**	**0.0**	**1,501**	**478**	**0.0**	**1,091**	**0.0**
C&I as a % of total operational capacity	**100.0%**	**NA**	**14.0%**	**8.6%**	**NA**	**21.1%**	**NA**
Capacity tied up, other than C&I	0	14,243	9,198	5,062	2,540	4,078	5,902
Total operating capacity	**2,178**	**14,243**	**10,700**	**5,540**	**2,540**	**5,169**	**5,902**
C&I installed capacity in the last 3 years							
As of FY23	1,040	NA	687	140	NA	235	NA
As of FY24	1,755	NA	1,266	204	NA	253	NA
As of FY25	2,178	NA	1,442	478	NA	1,091	NA
3-year CAGR	44.7%	NA	47.8%	84.8%	NA	115.5%	NA
Total units generated (including open access and utility scale) during the last 3 years (billion units)							
FY25	2.62	27.97	21.74	9.89	4.01	5.75	6.83
FY24	1.93	21.81	19.04	8.07	2.59	4.42	5.71
FY23	1.05	14.88	17.11	7.19	NA	0.45	3.86
C&I projects under execution/pipeline (MW) as of March 31, 2025							
Solar	2,677	NA	415	NA	NA	228	NA
Wind	1,233	NA	614	NA	NA	398	NA

Parameters	CleanMax Enviro Energy Solutions	Adani Green Energy	ReNew Energy Group PLC	Tata Power Renewable Energy	ACME Solar Holdings	JSW Neo Energy	NTPC Green Energy
Hybrid	Included in above capacities	61	NA	NA	NA	1,624	NA
Subtotal	**3,910**	**61**	**1,029**	**1,100**	**0**	**2,738#**	**0**
Total C&I customers (onsite and offsite)	531	NA	73+	NA	NA	NA	NA
Solutions and offerings to C&I customers as on March 31, 2025							
Onsite	✓	✗	✗	✓	✗	✗	✗
Offsite (including RE farms)	✓	✓	✓	✓	✗	✓	✗
Virtual PPAs	✓	✗	✓	✗	✗	✓	✗
Carbon removal project development	✓	✗	✓	✗	✗	✗	✗
Carbon credits, RECs/I-RECs	✓	✗	✓	✓	✗	✓	✗
Other offerings	Carbon consultancy	Utility projects, merchant power projects, storage	Utility projects, merchant power projects, storage, solar PV manufacturing, green hydrogen, energy management solutions	Utility projects, storage, solar PV manufacturing, EV charging, third-party EPC, microgrids	Utility projects, storage	Utility projects, merchant Renewable Energy Power, storage, hydro projects, green hydrogen	Utility projects, green hydrogen, small hydro, energy storage
STU and CTU connected projects as on March 31, 2025							
Solar	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wind	Yes	Yes	Yes	Yes	No	Yes	Yes
Hybrid	Yes	Yes	Yes	Yes	NA	NA	Yes
CTU projects	Under-construction	Yes	Yes	Yes	Yes	Yes	NA
Key offtakers	Only C&I clients	TANGEDCO, Karnataka ESCOMs, UPPCL, NTPC, SECI, MSEDCL, PSPCL, NPCL, GUVNL,	SECI, NTPC, REC-DVC, SJVN, PTC, corporates, MSEDCL, APSPDCL, GUVNL, MPPMCL,	SECI, NTPC, SJVN, AP discoms, RJ Discoms, KA discoms, NHPC, C&I	SECI, NTPC, GUVNL, CSPDCL, MSEDCL, UPPCL, MPPMCL, PSPCL, Telangana discoms, Bihar	SECI, GUVNL, Karnataka discoms, PSPCL, MSEDCL, AP discoms, Telangana discoms, C&I Clients	SECI, GUVNL, CESC, NTPC, SJVN, MPPMCL, REMCL, NVVN, NHPC, UPPCL, DVC

Parameters	CleanMax Enviro Energy Solutions	Adani Green Energy	ReNew Energy Group PLC	Tata Power Renewable Energy	ACME Solar Holdings	JSW Neo Energy	NTPC Green Energy
		TSSPDCL, merchant	TSNPDCL, C&I, merchant		discoms, APSPDCL		
In-house EPC and O&M capabilities	Yes	Yes	Yes	Yes	Yes	Yes	BoP EPC activities are outsourced
Key presence (C&I)	India: 21 states International: Dubai, Thailand, Bahrain	No	NA	Pan-India	No	NA	NA
Key presence in states (offsite C&I including under-development)	**Solar:** Chhattisgarh, Haryana, Karnataka, Maharashtra, Gujarat, Rajasthan, Tamil Nadu, Uttarakhand, Andhra Pradesh and Uttar Pradesh **Wind/WSH:** Gujarat, Karnataka, Maharashtra, Rajasthan, Tamil Nadu, Andhra Pradesh	Gujarat	NA	NA	NA	**Solar:** Maharashtra, Karnataka, Telangana **Wind:** Karnataka, Maharashtra	NA
Capacity utilisation factor (CUF)/plant load factor (PLF) based on MW_{AC}							
FY23							
Solar	23.85%	24.70%	25%	21.80%	22.08%	22%	22.74%
Wind	30.95%	25.20%	27%	19.10%	NA	30%	23.58%
Hybrid	34.29%	35.50%	NA	NA	NA	NA	NA
FY24							
Solar	23.06%	24.50%	25%	22.70%	23.60%	22%	23.97%
Wind	34.52%	29.40%	28%	20.20%	NA	24%	19.78%
Hybrid	39.18%	40.70%	NA	NA	NA	NA	NA
FY25							
Solar	24.65%	24.80%	25%	22.90%	25.60%	22%	24.17%
Wind	31.60%	27.20%	26%	19.40%	NA	21%	21.01%

Parameters	CleanMax Enviro Energy Solutions	Adani Green Energy	ReNew Energy Group PLC	Tata Power Renewable Energy	ACME Solar Holdings	JSW Neo Energy	NTPC Green Energy
Hybrid	45.90%	39.50%	NA	NA	NA	NA	NA
Average tariff for projects commissioned during the year (Rs/kWh)							
FY23	4.09	2.76	2.76	NA	2.74	NA	2.82
FY24	4.12	2.48	2.23	NA	2.48	NA	2.64
FY25	3.76	2.46	NA	NA	2.44	NA	2.45
Average plant availability							
FY23	98.20%	98.83%	NA	99.53%	99.23%	NA	NA
FY24	98.19%	99.12%	NA	99.54%	99.41%	NA	NA
FY25	98.17%	99.01%	NA	99.63%	99.50%	NA	NA
Average grid availability							
FY23	98.95%	98.47%	NA	NA	99.37%	NA	NA
FY24	99.26%	99.53%	NA	NA	99.40%	NA	NA
FY25	99.10%	99.80%	NA	NA	99.80%	NA	NA

**Note:*

1. *JSW Neo capacity includes O2 Power's capacity. The acquisition was announced in Dec 2024, CCI approval received in Mar 2025 and transaction completed in Apr 2025. JSW Neo offerings also include O2 Power's offerings; # JSW Neo's total C&I under-construction capacity includes O2 Power's under-construction capacity*
2. *ReNew's reported capacities are as of May 2025 as per the investor presentation for Q4FY25*
3. *Tata Power C&I capacity includes only group captive capacities as reported in their annual reports/press release*
4. *NTPC Green Energy's energy generation for FY23 is as per carved out numbers from NTPC group given in the RHP document*

Source: Websites of companies, annual reports, investor presentations, Crisil Intelligence

Table 9: Operational parameter analysis of key C&I players

Parameters	CleanMax Enviro Energy Solutions	Continuum Green Energy	Amplus Solar Power	Fourth Partner Energy	AMPIN Energy Transition
Ownership/group/ investors	Brookfield Renewables, Augment Infrastructure, Danish Investment Fund	Continuum Green Energy Holding Ltd and JC Infinity(B) Ltd	Petronas	Norfund, TPG, RISE and British International Investment	Asian Infrastructure Investment Bank, LGT Group, Intermediate Capital Group, Sumitomo Mitsui Banking Corporation, Siemens
Year of incorporation	2010	2007	2013	2010	2016
C&I operational capacity (MW) as on March 31, 2025					
Solar (including onsite)	1,388	NA	1,589	971	924
Wind	280	144	NA	173	NA
Hybrid	510	1,651	NA	70	112
C&I subtotal	**2,178**	**1,795**	**1,589**	**1,214**	**1,036**
C&I as a % of total operational capacity	**100%**	**77.1%**	**88.3%**	**100%**	**70.1%**
Capacity tied up, other than C&I	0	535	212	0	443
Total operational capacity (MW)	**2,178**	**2,330**	**1,800**	**1,214**	**1,479**
C&I installed capacity in the last 3 years					
As of FY23	1,040	593	NA	850	NA
As of FY24	1,755	1,017	NA	1,019	NA
As of FY25	2,178	1,795	NA	1,214	1,479
3-year CAGR	44.7%	73.9%	NA	19.5%	NA
Total units generated from open access/C&I projects during the last 3 years (billion units)					
FY25	2.62	NA	NA	NA	NA
FY24	1.93	1.45	NA	1.13	NA
FY23	1.05	1.02	NA	0.72	NA
C&I projects under execution/pipeline (MW) as on March 31, 2025, based on publicly available data					
Solar	2,676	NA	NA	828	541
Wind	1,233	36	NA	503	NA
Hybrid	included in above capacities	1,199	NA	652	320
Total	**3,910**	**1,235**	**400**	**1,982**	**861**
Total no. of C&I customers (including onsite and offsite)	531	170+ (As of Jun 2024)	400+	400+	100+
Solutions and offerings to C&I customers as on March 31, 2025					
Onsite	✓	✗	✓	✓	✓
Offsite (including RE farms)	✓	✓	✓	✓	✓

Parameters	CleanMax Enviro Energy Solutions	Continuum Green Energy	Amplus Solar Power	Fourth Partner Energy	AMPIN Energy Transition
Virtual PPAs	✓	✗	✗	✓	✓
Carbon removal project development	✓	✗	✗	✗	✗
Carbon credits, RECs/I-RECs	✓	✓	✓	✓	✓
Other offerings	Carbon consultancy	NA	Energy storage	Energy storage	Energy storage, trading, green hydrogen, solar PV manufacturing
STU & CTU connected projects as on March 31, 2025					
Solar	Yes	NA	Yes	Yes	Yes
Wind	Yes	Yes	No	Yes	No
Hybrid	Yes	Yes	No	Yes	Yes
CTU connected projects	Under-construction	Yes	Yes	Yes	Yes
Key offtakers	Only C&I clients	C&I, SECI, MPPMCL, MSEDCL, GUVNL	C&I, NVVN, NTPC, HPPC	Only C&I clients	SECI, GUVNL, RUMSL, CESC, NTPC, SJVN and C&I Clients
In-house EPC and O&M capabilities	Yes	Turnkey/BoS EPC for wind projects are outsourced	Yes	Yes	Yes
Key presence (onsite and offsite)	India: 21 states International: Dubai, Thailand, Bahrain	NA	25 states	24 states International: Indonesia, Bangladesh, Vietnam and Sri Lanka	23 states
Key presence in states (off-site C&I including under-development)	**Solar:** Chhattisgarh, Haryana, Karnataka, Maharashtra, Gujarat, Rajasthan, Tamil Nadu, Uttarakhand, Andhra Pradesh, Uttar Pradesh **Wind/WSH:** Gujarat, Karnataka, Maharashtra, Rajasthan, Tamil Nadu, Andhra Pradesh	**Wind:** Gujarat, Maharashtra, MP **WSH:** Gujarat, Tamil Nadu, Rajasthan, MP, Karnataka	**Solar:** Rajasthan, UP, Chhattisgarh, Karnataka, Haryana, Maharashtra **SW+BESS:** Gujarat	**Solar:** UP, Karnataka, Maharashtra, Haryana, Tamil Nadu **Wind/WSH:** Gujarat, Karnataka, Tamil Nadu	**Solar:** Rajasthan, Maharashtra, Tamil Nadu, Karnataka, UP, AP, Jharkhand, Odisha, Haryana **WSH:** Karnataka, Gujarat
Capacity utilisation factor/plant load factor					
FY23					
Solar (offsite)	23.85% (AC)	18.45% (DC)	NA	16.40% (DC)	NA

Parameters	CleanMax Enviro Energy Solutions	Continuum Green Energy	Amplus Solar Power	Fourth Partner Energy	AMPIN Energy Transition
Wind	30.95%	24.01%			
Hybrid	34.29%	NA			
FY24					
Solar (offsite)	23.06% (AC)	14.73% (DC)	NA	17.50% (DC)	NA
Wind	34.52%	24.96%			
Hybrid	39.18%	NA			
FY25					
Solar (offsite)	24.65% (AC)	NA	NA	NA	NA
Wind	31.60%				
Hybrid	45.90%				
Average plant availability					
FY23	98.20%	97.83%	NA	NA	NA
FY24	98.19%	97.97%			
FY25	98.17%	NA			
Average grid availability					
FY23	98.95%	99.71%	NA	NA	NA
FY24	99.26%	99.66%			
FY25	99.10%	NA			

NA — not available or not applicable

Note:

1. *The capacity of Amplus is as of Dec 2024*
2. *Continuum's grid availability refers to the external grid availability as disclosed in the DRHP document*

Source: All the figures included above for respective peers have been extracted from public sources such as websites of respective peers, their Annual Reports and other publicly available filings and CRISIL Intelligence.

The respective peers' KPIs may not be comparable on account of, inter alia, the size and scale of each of the businesses of the peers', possibility of the peers defining such metrics differently for any reason

Definitions:

Capacity utilisation factor (CUF) or plant load factor (PLF) is the quantum of energy the plant is able to generate compared with its maximum rated capacity.

Grid availability: It is calculated as weighted average of Grid availability by operational projects capacity (solar, wind and hybrid) in the portfolio during the period/year

Installed capacity: Represents total operational capacity as on the given date.

Offsite: the projects that are located away from the premises of the end consumer and supply electricity through the grid under open access regulatory mechanisms. These projects are connected to the distribution network, allowing energy to be wheeled to customers located at different geographic locations

Onsite solar: It refers to solar power plants that are located within customer's premises

Operating capacity: It refers to the capacity which is commissioned and operational as of the reporting date

Plant availability: It is calculated as weighted average of plant availability by operational projects capacity (solar, wind and hybrid) in the portfolio during the period/year calculated based on the installed capacity of each technology.

Under-construction/pipeline capacity: For CleanMax, under-construction capacity is the contracted capacity for which PPAs/ LoIs have been signed with customers and pipeline capacity includes projects which have either received or applied for evacuation approval. For peers, it is the total capacity including under-construction and projects which are at various stages of development as disclosed by them on their websites/press releases/investor presentations.

- CleanMax's revenue from sale of power grew at a CAGR of 52.71% from fiscal 2023 to fiscal 2025, and EBITDA grew at a CAGR of 58.14% during the same period, which was higher than the latest available median Revenue and EBITDA growth rate of all peers of 20.08% and 18.05%, respectively.
- CleanMax delivered a cash ROIC (based on Opening funds invested) of 13.03% in fiscal 2025, higher than the 11.33% average for all peers for the latest available period
- CleanMax maintained a Debt (net off liquid assets) to adjusted EBITDA ratio of 4.80 times in fiscal 2025, which was lower than the peers' average of 6.40 times during the latest available period
- The trade receivable days (power sales) were 26 days for CleanMax in fiscal 2025. The receivable days for the peers ranged between 35 to 129 days during the latest available period
- CleanMax delivered a cash ROE (based on Opening equity) of 17.73% in fiscal 2025. The cash ROE (based on Opening equity) may not be directly comparable with that of industry peers due to varying levels of retained earnings among companies, which could have been affected by losses and may not provide a consistent basis for evaluation
- When compared with listed/to be listed (i.e. DRHP filed) renewable energy players, viz. Continuum Green Energy Limited, Adani Green Energy Limited, NTPC Green Energy Limited, ACME Solar Holdings Limited and ReNew Energy Group PLC:
    - CleanMax's Debt (net off liquid assets)/Adjusted EBITDA was 4.80 times against listed/to be listed peer median ratio of 5.67 times
    - CleanMax's 3-year average gross block/Adjusted EBITDA was 5.82 times against listed/to be listed peer median of 7.20 times

Table 10: Financial parameters of C&I and other RE IPP players

Particulars	Units	Clean Max Enviro Energy Solutions Limited			Adani Green Energy Limited			ReNew Energy Group PLC			Acme Solar Holdings Limited		
		FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23
Revenue from operations													
-Renewable Energy Power Sales	Rs million	11,072.48	8,663.33	4,748.15	94,950.00	77,350.00	58,090.00	84,199.00	77,204.00	71,575.00	14,051.31	13,192.50	12,949.04
-Renewable Energy Services	Rs million	3,766.53	5,180.04	4,547.67	17,170.00	14,850.00	19,670.00	13,314.00	4,744.00	7,753.00	0.00	0.00	0.00
Total income	Rs million	16,103.42	14,253.09	9,609.79	1,24,220.00	1,05,210.00	86,170.00	1,09,070.00	96,531.00	89,309.00	15,752.41	14,662.67	13,613.73
Gross Margin %													
-Renewable Energy Power Sales	%	92.56%	93.36%	93.48%	95.81%	95.63%	95.47%	NA	92.31%	92.28%	NA	95.30%	95.62%
-Renewable Energy Services	%	16.17%	25.11%	12.88%	16.13%	20.07%	11.13%	NA	18.97%	10.28%	NA	NA	NA

Particulars	Units	Clean Max Enviro Energy Solutions Limited			Adani Green Energy Limited			ReNew Energy Group PLC			Acme Solar Holdings Limited		
		FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23
EBITDA	Rs million	10,150.72	7,415.73	4,059.19	1,00,870.00	86,190.00	57,720.00	83,078.00	73,386.00	64,304.00	14,055.40	12,361.65	12,390.62
Adjusted EBITDA	Rs million	10,093.31	7,722.36	4,245.97	99,400.00	85,150.00	63,550.00	80,672.00	71,323.00	64,768.00	14,313.47	12,476.17	12,395.52
-Renewable Energy Power Sales	Rs million	9,552.70	6,670.92	3,764.17	94,241.84	79,938.96	59,452.05	NA	66,899.10	59,513.78	14,313.47	12,476.17	12,395.52
-Renewable Energy Services	Rs million	540.61	1,051.44	481.80	5,158.16	5,211.04	4,097.95	NA	4,423.90	5,254.22	0.00	0.00	0.00
Adjusted EBITDA Margin %													
-Renewable Energy Power Sales	%	81.94%	74.17%	75.32%	91.60%	92.39%	92.66%	NA	80.85%	79.47%	NA	85.12%	91.07%
-Renewable Energy Services	%	14.35%	20.30%	10.59%	26.18%	30.28%	18.92%	NA	52.71%	42.62%	NA	0.00%	0.00%
PAT attributable to owners	Rs million	278.43	(309.88)	(652.69)	14,440.00	11,000.00	9,740.00	NA	3,404.00	(4,817.00)	2,521.08	6,977.98	(31.41)
Cash PAT	Rs million	3,250.04	2,375.03	1,610.45	42,290.00	38,610.00	34,840.00	NA	24,903.00	17,569.00	6,003.79	4,413.17	4,969.39
Debt (net off liquid assets)/ Adjusted EBITDA	Times	4.80	4.10	2.71	5.10	5.55	7.60	7.04	6.36	4.77	4.82	5.87	5.49
Debt (net off liquid assets)/ Total equity	Times	1.97	2.17	2.16	3.07	2.90	6.43	NA	4.67	3.83	1.66	2.66	3.79
3Y/2Y average Cash ROIC (Based on Opening funds invested in business)	%	13.75%			12.69%			11.22%			12.65%		
3Y/2Y average Gross Block to Adjusted EBITDA (EBITDA efficiency)	Times	5.82			5.94			9.18			6.51		
3Y average cash ROE (Based on Opening Equity)	%	16.81%			NA			NA			NA		
DSO (days) or Trade receivable turnover	Days	54	55	53	48	71	81	71	89	151	89	123	199
-Renewable Energy Power Sales	Days	26	27	27	NA	NA	NA	NA	NA	NA	89	123	199
-Renewable Energy Services	Days	136	103	80	NA	NA	NA	NA	NA	NA	NA	NA	NA

Particulars	Units	Clean Max Enviro Energy Solutions Limited			Adani Green Energy Limited			ReNew Energy Group PLC			Acme Solar Holdings Limited		
		FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23
Cash SG&A/Adjusted EBITDA	%	13.38%	25.87%	24.20%	4.83%	3.91%	3.40%	NA	14.06%	15.38%	NA	12.52%	5.23%
EBITDA CAGR		58.14%			32.20%			13.66%			6.51%		
Reported ROIC (based on Opening funds invested)	%	13.10%	13.96%	13.58%	12.53%	14.32%	10.53%	10.80%	11.31%	12.50%	13.00%	11.68%	12.94%
Reported ROIC (based on Average funds invested)	%	10.73%	11.36%	9.78%	11.14%	12.25%	10.04%	10.24%	10.35%	11.05%	10.92%	11.55%	12.29%
Cash ROIC (based on Average funds invested)	%	10.67%	11.83%	10.23%	10.97%	12.10%	11.05%	9.94%	10.06%	11.13%	11.12%	11.66%	12.30%
Cash ROIC (based on Opening funds invested)	%	13.03%	14.54%	14.21%	12.35%	14.15%	11.60%	10.49%	10.99%	12.59%	13.24%	11.78%	12.95%
Cash ROE (based on Average equity)	%	14.78%	15.60%	13.03%	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cash ROE (based on Opening equity)	%	17.73%	19.62%	12.77%	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reported ROE (based on Average equity)	%	1.27%	-2.04%	-5.28%	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reported ROE (based on Opening equity)	%	1.52%	-2.56%	-5.18%	NA	NA	NA	NA	NA	NA	NA	NA	NA

Particulars	Units	Tata Renewable Energy Private Limited			NTPC Green Energy Limited [1]			Continuum Green Energy Limited			JSW Neo Energy Limited		
		FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23
Revenue from operations													
-Renewable Energy Power Sales	Rs million	98,762.70	101,751.90	81,969.30	22,096.40	19,625.98	14,497.09	NA	14,133.10	9,951.05	NA	13,892.70	2,712.20
-Renewable Energy Services	Rs million	0.00	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00	NA	0.00	0.00
Total income	Rs million	100,460.20	104,001.80	84,833.30	24,657.00	20,376.57	14,575.27	NA	14,855.05	11,345.05	NA	13,988.50	2,764.70
Gross Margin %													

Particulars	Units	Tata Renewable Energy Private Limited			NTPC Green Energy Limited [1]			Continuum Green Energy Limited			JSW Neo Energy Limited		
		FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23
- Renewable Energy Power Sales	%	NA	45.50%	48.87%	NA	93.61%	93.41%	NA	84.93%	82.79%	NA	3.47%	4.91%
- Renewable Energy Services	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EBITDA	Rs million	43,174.50	34,216.00	32,027.50	21,727.90	18,215.31	13,174.34	NA	11,073.89	8,533.69	NA	(482.00)	(1,271.30)
Adjusted EBITDA	Rs million	43,762.30	35,123.10	32,896.40	21,731.20	18,307.17	13,174.49	NA	11,107.44	8,501.97	NA	447.60	(59.70)
-Renewable Energy Power Sales	Rs million	43,762.30	35,123.10	32,896.40	21,731.20	18,307.17	13,174.49	NA	11,107.44	8,501.97	NA	447.60	(59.70)
-Renewable Energy Services	Rs million	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	NA	0.00	0.00
Adjusted EBITDA Margin %													
- Renewable Energy Power Sales	%	NA	33.91%	39.09%	NA	89.84%	90.39%	NA	75.15%	75.38%	NA	3.20%	-2.16%
- Renewable Energy Services	%	NA	0.00%	0.00%	NA	0.00%	0.00%	NA	0.00%	0.00%	NA	0.00%	0.00%
PAT attributable to owners	Rs million	6,675.40	7,497.50	7,277.60	4,754.80	3,447.10	4,564.79	NA	(5,748.70)	(4,243.81)	NA	(903.70)	(1,452.10)
Cash PAT	Rs million	29,401.60	20,307.70	19,152.20	14,138.00	11,401.26	8,539.93	NA	(617.09)	(470.12)	NA	27.40	(238.10)
Debt (net off liquid assets)/ Adjusted EBITDA	Times	4.21	3.47	4.56	5.67	2.92	6.54	NA	7.31	6.79	NA	-2.15	-113.58
Debt (net off liquid assets)/ Total equity	Times	NA	1.43	0.99	0.78	1.98	1.09	NC	-57.75	29.32	NA	-0.01	-0.01
3Y/2Y average Cash ROIC (based on Opening funds invested in business)	%	13.58%			13.33%			10.58%			0.38%		
3Y/2Y average Gross Block to Adjusted EBITDA (EBITDA efficiency)	Times	7.33			7.79			9.71			0.03		
3Y average cash ROE (based on Opening Equity)	%	NA			NA			NA			NA		
DSO (days) or Trade receivable turnover	Days	119	125	143	85	68	38	NA	48	123	NA	66	105

Particulars	Units	Tata Renewable Energy Private Limited			NTPC Green Energy Limited [1]			Continuum Green Energy Limited			JSW Neo Energy Limited		
		FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23	FY25	FY24	FY23
- Renewable Energy Power Sales	Days	NA	NA	NA	85	68	38	NA	NA	NA	NA	NA	NA
- Renewable Energy Services	Days	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cash SG&A/ Adjusted EBITDA	%	NA	37.04%	28.44%	NA	4.45%	3.39%	NA	13.89%	12.52%	NA	27.70%	-406.03%
EBITDA CAGR		16.11%			28.42%			19.98%			NM		
Reported ROIC (based on Opening funds invested)	%	13.31%	12.02%	14.97%	11.42%	17.68%	12.46%	NA	9.88%	11.63%	NA	-0.55%	-8.11%
Reported ROIC (based on Average funds invested)	%	11.43%	11.24%	12.85%	7.83%	12.42%	12.62%	NA	9.28%	9.20%	NA	-0.50%	-2.48%
Cash ROIC (based on Average funds invested)	%	11.59%	11.53%	13.20%	7.83%	12.48%	12.62%	NA	9.31%	9.17%	NA	0.47%	-0.12%
Cash ROIC (based on Opening funds invested)	%	13.49%	12.34%	15.37%	11.42%	17.76%	12.46%	NA	9.91%	11.59%	NA	0.51%	-0.38%
Cash ROE (based on Average equity)	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cash ROE (based on Opening equity)	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reported ROE (based on Average equity)	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reported ROE (based on Opening equity)	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Particulars	Units	Amplus Solar Power Private Ltd [2]			Fourth Partner Energy Private Limited			Ampin Energy Transition Private Limited		
		CY24	CY23	CY22	FY25	FY24	FY23	FY25	FY24	FY23
Revenue from operations										
- Renewable Energy Power Sales	Rs million	NA	481.48	486.67	NA	5,693.66	3,452.80	NA	2,161.80	1,349.20
- Renewable Energy Services	Rs million	NA	0.00	0.00	NA	0.00	0.00	NA	1,214.52	29.23

Particulars	Units	Amplus Solar Power Private Ltd [2]			Fourth Partner Energy Private Limited			Ampin Energy Transition Private Limited		
		CY24	CY23	CY22	FY25	FY24	FY23	FY25	FY24	FY23
Total income	Rs million	NA	547.79	537.64	NA	6,255.61	3,796.03	NA	3,883.64	1,534.80
Gross Margin %										
- Renewable Energy Power Sales	%	NA	91.46%	92.97%	NA	81.91%	83.04%	NA	91.32%	89.14%
- Renewable Energy Services	%	NA	NA	NA	NA	NA	NA	NA	3.71%	76.60%
EBITDA	Rs million	NA	429.18	455.92	NA	2,661.17	948.41	NA	1,732.77	823.60
Adjusted EBITDA	Rs million	NA	471.05	465.94	NA	2,902.10	1,561.50	NA	1,790.52	916.82
- Renewable Energy Power Sales	Rs million	NA	471.05	465.94	NA	2,902.10	1,561.50	NA	1,761.86	902.78
- Renewable Energy Services	Rs million	NA	0.00	0.00	NA	0.00	0.00	NA	28.65	14.03
Adjusted EBITDA Margin %										
- Renewable Energy Power Sales	%	NA	86.37%	87.48%	NA	48.18%	43.04%	NA	66.02%	60.25%
- Renewable Energy Services	%	NA	0.00%	0.00%	NA	0.00%	0.00%	NA	2.29%	20.73%
PAT attributable to owners	Rs million	NA	(114.72)	(95.67)	NA	(3,466.22)	(1,990.15)	NA	(1,203.99)	(1,086.87)
Cash PAT	Rs million	NA	117.60	144.46	NA	(1,125.77)	(996.71)	NA	(455.52)	(500.05)
Debt (net off liquid assets)/ Adjusted EBITDA	Times	NA	6.05	6.54	NA	9.71	8.80	NA	8.42	7.29
Debt (net off liquid assets)/ Total equity	Times	NA	9.28	6.90	NA	7.67	3.42	NA	2.21	2.33
3Y/2Y average Cash ROIC (Based on Opening funds invested in business)	%	11.14%			7.13%			6.09%		
3Y/2Y average Gross Block to Adjusted EBITDA (EBITDA efficiency)	Times	8.58			22.53			20.79		

Particulars	Units	Amplus Solar Power Private Ltd [2]			Fourth Partner Energy Private Limited			Ampin Energy Transition Private Limited		
		CY24	CY23	CY22	FY25	FY24	FY23	FY25	FY24	FY23
3Y average cash ROE (Based on Opening Equity)	%	NA			NA			NA		
DSO (days) or Trade receivable turnover	Days	NA	89	67	NA	64	86	NA	102	50
- Renewable Energy Power Sales	Days	NA	NA	NA	NA	NA	NA	NA	NA	NA
- Renewable Energy Services	Days	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cash SG&A/Adjusted EBITDA	%	NA	7.56%	8.04%	NA	80.05%	105.61%	NA	41.08%	49.89%
EBITDA CAGR		0.88%			NM			261.04%		
Reported ROIC (based on Opening funds invested)	%	NA	10.5%	10.6%	NA	6.52%	4.34%	NA	5.83%	5.61%
Reported ROIC (based on Average funds invested)	%	NA	10.2%	10.8%	NA	5.82%	3.03%	NA	3.90%	3.71%
Cash ROIC (based on Average funds invested)	%	NA	11.2%	11.1%	NA	6.35%	4.99%	NA	4.03%	4.13%
Cash ROIC (based on Opening funds invested)	%	NA	11.5%	10.8%	NA	7.11%	7.15%	NA	6.02%	6.24%
Cash ROE (based on Average equity)	%	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cash ROE (based on Opening equity)	%	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reported ROE (based on Average equity)	%	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reported ROE (based on Opening equity)	%	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- *All the figures included above for respective peers have been extracted from public sources such as websites of respective peers, their Annual Reports and other publicly available filings and CRISIL Intelligence*

- *The respective peers' KPIs may not be comparable on account of, inter alia, the size and scale of each of the businesses of the peers', possibility of the peers defining such metrics differently for any reason*
- *In the companies above where FY25 numbers are not available, 2Y average has been computed for Gross Block to Adjusted EBITDA, and average cash ROIC* (Based on Opening funds invested) *ratio*
- *For the peers listed above, where a separate segment is disclosed in the financial statements, Revenue from Operations, Gross Margin, Adjusted EBITDA, Adjusted EBITDA Margin, and DSO have been split between* Renewable Energy *Power Sales and* Renewable Energy *Services. For companies reporting a single segment, these metrics have been calculated solely for* Renewable Energy *Power Sales*
- *Adjusted EBITDA, Adjusted EBITDA Margin, Cash PAT, Cash ROIC (Based on Opening funds invested), Cash ROIC (Based on Average funds invested). Cash ROE (Based on Opening equity), Cash ROE (Based on Average equity) and Cash SG&A are derived by adjusting reported figures to exclude non-cash items and one-off transactions, as identified in respective the financial statements*
- *NC: Not computed*
- *NM: Not meaningful*
- *EBITDA: Earnings before interest, tax, depreciation and amortisation*
- *PAT: Profit after tax*
- *ROIC: Return on invested capital*
- *ROE: Return on equity*
- *SG&A expenses: Selling, general and administrative expenses*
- *3Y/2Y: 3-year/2-year*

1. Ratios for fiscal 2024 have been calculated from the restated consolidated financial statements in the prospectus of the company dated November 23, 2024. Ratios for fiscals 2023 and 2022 have been computed based on the special-purpose carved-out combined financial statements in the prospectus of the company dated November 23, 2024
2. The financial year for Amplus Solar Power Pvt Ltd is January to December, accordingly, the ratios have been computed for calendar year instead of financial year

Formulae used:

- Revenue from operations (power sales): Revenue from operations for the given year from power sales business
- Revenue from operations (Renewable Energy services): Revenue from operations for the given year from Renewable Energy services business
- Revenue from operations: Revenue from operations (power sales) + Revenue from operations (Renewable Energy services)
- Power sales revenue growth: Revenue from operations (power sales) for the current year / Revenue from operations (power sales) for the previous year – 1
- Total income: Revenue from operations + Other income
- Cost of goods sold (power sales): Operations and maintenance cost + Sub-contracting costs
- Cost of goods sold (Renewable Energy services): Cost of materials consumed + Purchase of goods + Changes in inventory
- Gross margin (power sales): Revenue from operations (power sales) - Cost of goods sold (power sales)
- Gross margin (Renewable Energy services): Revenue from operations (Renewable Energy services) - Cost of goods sold (Renewable Energy services)
- EBITDA: Revenue from operations – cost of materials consumed – cost of services – purchase of traded goods – employee benefits – other expenses
- Adjusted EBITDA (power sales): Gross margin (power sales) - Cash SG&A expenses (power sales)
- Adjusted EBITDA (Renewable Energy services): Gross margin (Renewable Energy services) - Cash SG&A expenses (Renewable Energy services)
- Adjusted EBITDA: Adjusted EBITDA (power sales) + Adjusted EBITDA (Renewable Energy services)

- Adjusted EBITDA margin (power sales): Adjusted EBITDA (power sales) / Revenue from operations (power sales)
- Adjusted EBITDA margin (Renewable Energy services): Adjusted EBITDA (Renewable Energy services) / Revenue from operations (Renewable Energy services)
- EBITDA CAGR: (EBITDA for the latest available year / EBITDA for the 2 years prior) ^ (1/2)
- Cash PAT: Restated profit/loss attributable to owners + Depreciation/ Amortisation/Impairment + non cash finance costs + non cash expenses – deferred tax credit - non cash incomes
- Cash PAT margin: Cash PAT / Total income
- Total Borrowings: Long-term borrowing + Short-term borrowing
- Funds invested in business: Total Borrowings + Total equity
- Cash ROIC (based on Opening funds invested): Adjusted EBITDA / Funds invested in business at the beginning of the year
- Cash ROIC (based on Average funds invested): Adjusted EBITDA / Average funds invested in business
- Reported ROIC (based on Average funds invested): EBITDA/ Average funds invested in business
- Reported ROIC (based on Opening funds invested): EBITDA/ Funds invested in business at the beginning of the year
- Cash ROE (based on Opening equity): Cash PAT / Opening equity
- Cash ROE (based on Average equity): Cash PAT / Average equity
- Reported ROE (based on Average equity) : Restated profit/ loss for the year attributable to owners of company/ Average equity
- Reported ROE (based on Opening equity): Restated profit/ loss for the year attributable to owners of company/ Opening equity
- Cash SG&A / Adjusted EBITDA: Cash SG&A expenses / Adjusted EBITDA
- Debt (net off liquid assets): Total debt -Cash and cash equivalents - Bank balance other than cash and cash equivalents - Long-term margin money – Current investments
- Debt (net off liquid assets): / Adjusted EBITDA: Opening Debt (net off liquid assets) / Adjusted EBITDA
- Debt (net off liquid assets): / Total equity: Closing Debt (net off liquid assets) / Closing total equity
- Gross block / Adjusted EBITDA: Opening gross block of property, plant and equipment (excluding rights of use) and intangible assets / Adjusted EBITDA
- Trade receivable days: Average trade receivables of current year and previous year / Revenue from operations * 365
- Trade receivable days (power sales): Average trade receivables (power sales) of current year and previous year / Revenue from operations (power sales) * 365
- Trade receivable days (Renewable Energy services): Average trade receivables (RE services) of current year and previous year / Revenue from operations (Renewable Energy services) * 365
- Opening funds invested in business: Funds invested in business at the end of previous fiscal.
- Average funds invested in business: Average of Funds invested in business at the end of the fiscal and Funds invested in business at the end of previous fiscal.
- Average equity: Average of Total equity attributable to the owners of the Company as at the end the fiscal and Total equity attributable to the owners of the Company at the end of the previous fiscal
- Opening equity: Total equity attributable to owners of the company as at the end of the previous fiscal

About Crisil Intelligence (formerly Market Intelligence & Analytics)

Crisil Intelligence is a leading provider of research, consulting, risk solutions and advanced data analytics, serving clients across government, private and public enterprises. We leverage our expertise in data-driven insights and strong benchmarking capabilities to help clients navigate complex external ecosystems, identify opportunities and mitigate risks. By combining cutting-edge analytics, machine learning and AI capabilities with deep industry knowledge, we empower our clients to make informed decisions, drive business growth and build resilient capacities.

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