Company Highlights

Key developments in the past 12 months

About a decade ago, the government, envisioned renewable energy as a cleaner, sustainable alternative to thermal power, and take several steps to strengthen this sector in a bid to meet the country's energy needs. Driven by policy reforms, incentives and focused attention from the government, several domestic and international players as well as dynamic entrepreneurs ventured into this sector. These included independent power producers (IPPs), power utilities, diversified business houses, equipment manufacturers, and engineering, procurement and construction (EPC) companies. Over the years, the government's continued focus and favourable global economic indicators resulted in rich dividends for a number of these companies. A large number of start-ups also emerged, making significant progress in the early years. However, the renewable energy sector in India has been going through a rough patch of late. Project development has slowed down due to various reasons. With solar and wind power tariffs at record low levels, banks have become wary of lending to developers over concerns about project viability. In this scenario, small companies' difficulty in raising capital is keeping them away from participating in project auctions, restricting their growth and crippling their ability to refinance loans. The year 2019 saw a number of mid-sized companies and large business groups taking the exit route, and manufacturers becoming wary of investing in this market.

Renewable Watch *presents a snapshot of recent developments pertaining to key developers, manufacturers and EPC companies during 2019...*

ACME Group

- Incorporated in 2003, ACME Cleantech Solutions has expanded its portfolio significantly. It operates in the solar segment through ACME Solar Holdings Limited, which is a part of the ACME Group. Recently, the ACME Group secured third position in the global solar PV asset ownership rankings in the Wood Mackenzie's Global Solar Photovoltaic (PV) Asset Ownership Report and Database, 2019. The company has 2.3 GW of solar power installed capacity in its portfolio.
- In May 2019, ACME Solar won a 300 MW solar project under Maharashtra State Electricity Distribution Company Limited's (MSEDCL) 1,000 MW tender. The company quoted Rs 2.74 per kWh, which was the lowest price quoted by any developer under the tender.
- In March 2019, the company quoted a tariff of Rs 2.48 per unit and secured a 250 MW project under the Solar Energy Corporation of India's (SECI) 750 MW tender for developing grid-connected solar PV power projects across Rajasthan.
- During the year, the company cancelled a 600 MW solar project that it had won in August 2018 under NTPC's 2,000 MW solar tender. According to the power purchase agreement (PPA) with NTPC, the generated power was meant to be supplied to Telangana, and the tariff, trading margin and contracted capacity had to be approved by the Telangana State Electricity Regulatory Commission within two months of signing of the PPA, failing which it would stand terminated.

Adani Power

- Adani Power Limited, a part of the Adani Group, is involved in conventional and renewable power generation. It has installed the world's largest single-location solar PV manufacturing plant. Adani Green Energy Limited (AGEL), a subsidiary of the Adani Group, develops renewable energy projects while Adani Solar manufactures solar mod-

ules. AGEL, as of June 2019, had a project portfolio of 4,560 MW, comprising 2,623 MW of solar projects, 1,547 MW of wind projects and a 390 MW wind-solar hybrid plant.

- During 2019, AGEL won a bid for implementing a 390 MW interstate transmission system (ISTS)-connected wind-solar hybrid power project under SECI's Tranche I tender for hybrid plants. It quoted a tariff of Rs 2.69 per kWh. The project is expected to be commissioned by March 2021. With this, AGEL's renewable power generation capacity in India has reached 5.16 GW, with 2.02 GW of projects under operation and the balance 3.14 GW at the development stage. Besides, it signed an MoU with the Gujarat Energy Development Agency for setting up a solar-wind hybrid park in Kutch at an investment of Rs 300 billion.
- In August 2019, AGEL announced that it will acquire Essel Infra's 205 MW of solar assets for Rs 13 billion. These assets are located in Punjab, Karnataka and Uttar Pradesh, and have long-term PPAs with state discoms. In May 2019, Adani Green Energy (UP) Limited, a wholly owned subsidiary of AGEL, commissioned a 50 MW grid-connected solar PV power project in Uttar Pradesh. The power off-taker for this project is Uttar Pradesh Power Corporation Limited (UPPCL). The approved PPA tariff for the project is Rs 5.07 per kWh.
- Among other projects, the company won 250 MW of wind power capacity at a tariff of Rs 2.82 per kWh, in February 2019, under SECI's 1.2 GW wind power auction.

Aditya Birla Group

- Aditya Birla Renewables Limited (ABRL), a subsidiary of Aditya Birla Nuvo Limited, was incorporated in 2015. The company develops and operates solar power plants. Meanwhile, Aditya Birla Finance Limited (ABFL) is a non-banking finance company under Aditya Birla Capital Limited.
- In October 2019, Aditya Aluminium, which is a unit of the Aditya Birla Group, completed the setting up of a 24 MW captive solar power project at Lapanga in Sambalpur district. The company will use the generated power in the aluminium smelting process.
- In January 2019, ABRL signed a 25-year PPA with the Grid Corporation of Odisha for a 75 MW solar PV project. The project is expected to be completed by June 2020.

Amplus Energy Solutions

- Established in 2013, Amplus Energy caters to commercial and industrial customers. The company specialises in end-to-end solutions for rooftop and ground-mounted solar power projects. With a cumulative capacity of over 500 MW under operation and development, the company serves more than 150 commercial and industrial customers at over 200 locations across India, the Middle East and Southeast Asia.
- It is backed by I Squared Capital, a global private equity (PE) fund focused on developing long-term sustainable infrastructure assets. Petronas, a leading global infrastructure investor, acquired Amplus Energy in 2019 with the intent to grow in the renewable energy space and move beyond the oil and gas sector.
- In July 2019, Amplus invested nearly Rs 5 billion in its second open access solar project of 100 MW in Deoria district, Uttar Pradesh. Earlier, Amplus had invested Rs 2.5 billion to establish a 50 MW open access solar project in Mirzapur, Uttar Pradesh. The project is under construction.

Avaada Energy

- An independent power producer, Avaada Energy aims to develop a 5 GW renewable energy portfolio in Asia and Africa by 2022. In a recent solar auction conducted by SECI in October 2019, Avaada won a 300 MW project at a tariff of Rs 2.71 per unit. Prior to that, it won a 50 MW SECI project at a tariff of Rs 2.55 per unit. In February 2019, it won a 300 MW solar project at Rs 2.75 per kWh in an auction conducted by MSEDCL.
- The company is actively investing in the open access solar space as well. It is in the process of setting up 2 GW of open access solar plants in the states of Maharashtra, Tamil Nadu, Haryana, Karnataka and Odisha. According to sources, the company currently has a portfolio of over 500 MW of open access solar plants in the commercial and industrial sector.
- Avaada Energy recently raised over $145 million from the Asian Development Bank (ADB), European investors (such as Germany's Deutsche Entwicklungs- und Investitionsgesellschaft, the Dutch Development Bank and the Netherlands Development Finance Company) and Avaada's promoters. The company will use the money to finance the 2.4 GW of capacity under development.
- In November 2019, the company also received $15 million in equity investment from Proparco, a French development finance institution, for part financing its renewable energy portfolio of the targeted 5 GW capacity.

Ayana Renewable

- Ayana Renewable Power Private Limited (ARPPL) aims to build a multi-GW renewable energy portfolio in India and its neighbouring countries of Bangladesh, Nepal, Bhutan, Myanmar and Sri Lanka. ARPPL was previously fully backed by the CDC Group Plc, which is a development finance institution owned by the UK government. However, in early 2019, the CDC Group Plc divested its 51 per cent stake in ARPPL. This stake was acquired equally by the National Investment and Infrastructure Fund and Ever-Source Capital through its fund, Green Growth Equity Fund. Both the companies cumulatively invested Rs 23.386 billion in ARPPL.
- The company is developing 800 MW of solar capacity in Andhra Pradesh (500 MW to be installed in two separate solar parks) and Rajasthan (300 MW). It is the

first project to be set up in the Anantapur solar park and is expected to be commissioned any time soon. The second project will be put up in the Kadapa solar park and the scheduled commissioning is in June 2020. The third project, which is at the initial development stage, will be located in Rajasthan.

Azure Power

- One of the leading renewable energy IPPs in India, Azure Power India Private Limited has developed, constructed and operated solar projects of varying sizes, from utility scale, rooftop to mini- and microgrids, since its inception in 2008.
- In November 2019, it entered into a subscription agreement to raise $75 million through a private placement of 6,493,506 equity shares at $11.55 per share to Caisse de depot et placement du Quebec, a long-term institutional investor and a pension fund. Following the completion of the private placement, which is expected to take place in December 2019, CDPQ's equity interest in Azure Power will increase from 41.4 per cent to 49.4 per cent.
- Prior to this, the company announced its plan to issue a green bond offering of $350 million. The bond will mature in 2024 with an expected US dollar coupon of 5.65 per cent.
- During the year, the company commissioned and secured a number of solar power projects in the rooftop, utility-scale and open access segments. These include a 150 MW project tendered by the Maharashtra government, a 300 MW project under SECI Tranche III, a 300 MW project under SECI Tranche IV, and a 100 MW project tendered by SECI to be set up in Rajasthan.
- Among the completed projects is a 100 MW ultra mega solar power project at Pavagada, Tumkur district, Karnataka. Bids for the project were invited by Karnataka Renewable Energy Development Limited in February 2018. Azure Power also commissioned 165 MW of the 260 MW solar power project in Gujarat. Bids for this project were invited by Gujarat Urja Vikas Limited in June 2017. Besides, the company has commissioned two solar power projects of capacity 40 MW and 50 MW in Uttar Pradesh and Andhra Pradesh, respectively, and over 60 MW of solar rooftop projects.
- In November 2018, NTPC Limited issued a letter of award to Azure Power for setting up 300 MW of solar capacity under 2,000 MW of ISTS-connected solar projects. Bids for the tender were invited in March 2018. The solar PV capacity will be set up across India on a build-own-operate (BOO) basis. The proposed projects are expected to be commissioned by early 2021.

Bharat Heavy Electricals Limited

- Set up in 1964, Bharat Heavy Electricals Limited (BHEL) has over three decades of experience in solar PV manufacturing. It is also involved in the EPC of solar projects.
- In June 2019, it won two orders worth Rs 8 billion for setting up 200 MW of solar energy capacity. Its solar PV portfolio touched the 1,000 MW mark with these orders. BHEL secured the orders from NTPC and Gujarat State Electricity Corporation Limited (GSECL). The NTPC order envisages setting up India's largest floating solar PV plant of 100 MW capacity at NTPC's Ramagundam plant in Telangana, while the GSECL order involves setting up a 100 MW ground-mounted solar PV plant at the Raghanesda Ultra Mega Solar Park in Banaskantha district of Gujarat.
- This was followed by BHEL securing a Rs 1 billion order to install a 25 MW floating solar project in Andhra Pradesh. With this, the company's EPC portfolio for floating solar plants reached 130 MW.

Canadian Solar

- Canadian Solar India Private Limited is the Indian arm of Ontario-based Canadian Solar, a manufacturer of solar PV modules set up in 2001. It has been working towards creating a foothold in the Indian solar market through acquisitions as well as module supply agreements.
- Towards the end of 2018, Canadian Solar acquired the remaining 51 per cent stake in each of the two solar power ventures with the Suzlon Group for a total of Rs 281.1 million. Suzlon and Canadian Solar had entered into a joint venture (JV) in 2016 for the two solar power projects – Amun Solarfarms Limited and Avighna Solarfarms Limited. Canadian Solar had earlier picked up a 49 per cent stake each in Amun and Avighna for a total of Rs 264.2 million. The two solar projects have a capacity of 15 MW each and are located in Telangana.

Central Electronics Limited

- State-run Central Electronics Limited (CEL) was established in 1974 to commercially exploit indigenous technologies developed by national laboratories, and research and development institutions in the country. CEL works independently as well as in collaboration with premier national and international laboratories, including defence laboratories.
- It sources cells from various manufacturers in order to produce solar modules. In October 2019, it invited bids for the supply of 500,000 multicrystalline (non-PERC) solar cells. As per the tender documents, the cells must provide an efficiency of minimum 18.8 per cent and must be delivered as per CEL's requirements up to March 31, 2020.
- Of late, it has been actively participating in the government's solar programmes. In October 2019, CEL invited bids for supply of balance of system (BoS), installation, commissioning and testing of 10 kWp off-grid solar power plants (hybrid) along with all the necessary accessories. The solar plants will be set up across 34 sites in the states of Uttar Pradesh, Rajasthan, Assam and Bihar. The project will be completed in 90 days.
- The company plans to participate in the tender floated by Ajmer Vidyut Vitran Nigam Limited for the solarisation of grid-connected agricultural consumers

in Rajasthan under Component C of the Kisan Urja Suraksha Evam Utthan Mahaabhiyan (KUSUM) rural solar scheme. The plants will be set up on a pilot basis for Ajmer Vidyut Vitran Nigam Limited, Jaipur Vidyut Vitran Nigam Limited and Jodhpur Vidyut Vitran Nigam Limited. In order to bid for these projects, CEL plans to tie up with another entity, which will execute the solar project using CEL-supplied solar panels. Bids are therefore invited from parties willing to act as subcontractors of CEL for project execution.

CleanMax Solar

- CleanMax Enviro Energy Solutions Private Limited, also known as CleanMax Solar, is a leading firm in the commercial and industrial rooftop market. Companies such as Adobe India, Mindtree, Volvo Group India, the Tata Group, SKF, ACC, United Breweries Limited and Bangalore Airport procure solar power from its network of private solar farms in Karnataka and Tamil Nadu to meet their renewable energy targets. CleanMax Solar also sets up stand-alone projects for commercial and industrial power consumers. For instance, it has recently set up a 1 MW rooftop project for Hindustan Shipyard Limited in Andhra Pradesh.
- In June 2019, CleanMax Solar decided to set up a 150 MW solar farm project in Haryana. The solar farm will be developed in Sirsa district on 600 acres of land at an investment of about Rs 6 billion. The project will be implemented under the group captive scheme and will be funded through a combination of debt and equity. The equity component of Rs 2 billion will be contributed by captive users, while the remaining Rs 4 billion will be funded through debt.
- The company raised Rs 2.75 billion in equity funding from UK Climate Investments LLP. This is the third institutional investor to support CleanMax Solar's growth plans. The company secured equity financing of up to Rs 7 billion from an affiliate of Warburg Pincus and the International Finance Corporation (IFC) in 2017.
- In April 2019, CleanMax IPP, a subsidiary of CleanMax Solar, received Rs 1.58 billion in loan from PTC India Financial Services to refinance loans from KKR India Financial Services, a non-banking financial arm of the private equity (PE) firm KKR. CleanMax IPP had received this loan from KKR in January 2018. CleanMax is expected to use the funds to meet the capital expenditure for the development of its Bellary project, which consists of a 32 MW solar project owned by CleanMax IPP.

Cleantech Solar

- In December 2018, Royal Dutch Shell Plc picked up a 49 per cent stake in Cleantech Solar, a Southeast Asia and India-focused solar energy systems developer, for $100 million. It is the British energy giant's first investment in the alternative energy space in Asia. Headquartered in Singapore, Cleantech Solar owns and operates more than 120 solar power plants across Southeast Asia, representing over 200 MW in capacity, with India accounting for almost three-fourths of its generation capacity. Cleantech's clients include the likes of Coca-Cola, Apollo Tyres, MJ Logistics, Sangam (India) and Kerry Ingredients.
- In a unique arrangement, the lead-acid battery manufacturer, Exide Industries, entered into three separate share subscription and shareholders agreements with Cleantech in April 2019 to form three special purpose vehicle (SPV) companies. The three SPVs are tasked with the development of captive solar projects at the company's factories in Maharashtra, Tamil Nadu and Haryana.

CLP India

- CLP Holdings Limited, a company listed on the Hong Kong Stock Exchange, entered the Indian power sector in 2002 as CLP India Private Limited. It later diversified into renewables to mitigate the fuel supply issues plaguing the conventional power sector.
- CLP India has 12 wind farms aggregating over 900 MW in capacity across Gujarat, Maharashtra, Tamil Nadu, Karnataka, Rajasthan and Madhya Pradesh. These wind farms are Khandke (50.4 MW), Andhra Lake (106.4 MW) and Jath (60 MW) in Maharashtra; Mahidad (50.4 MW) and Samana (100.8 MW) in Gujarat; Saundatti (72 MW) and Harapanahalli (39.6 MW) in Karnataka; Sipla (50.4 MW), Tejuva (100.8 MW) and Bhakrani (102.4 MW) in Rajasthan; Theni (99 MW) in Tamil Nadu; and Chandgarh (92 MW) in Madhya Pradesh.
- In the solar space, the company owns three assets – the 100 MW Veltoor project in Telangana, and the 50 MW Gale project and the 20 MW Tornado project in Dhule, Maharashtra.
- CLP India plans to expand its renewable energy portfolio in line with the group's focus on low-carbon businesses. The firm will leverage both greenfield and brownfield opportunities in the renewable energy space, that is, it will participate in the central government auctions as well as acquire existing wind and solar projects.

EDF Renewables

- EDF Renewables is a leading international renewable energy player, with gross installed capacity of 13 GW worldwide. The company mainly focuses on wind and solar PV. It operates mostly in Europe and North America but is continuing to grow by moving into emerging markets of Brazil, China, India, South Africa and the Middle East.
- In India, it operates through EDEN Renewables India, its solar PV JV with Total Eren. EDEN Renewables India has been developing, building and operating solar projects in the country since 2016. It currently operates four solar plants, totalling 207 MWp in installed capacity, across the states of Rajasthan, Uttarakhand and Madhya Pradesh.
- In July 2019, EDEN Renewables India signed four 25-year long-term PPAs for

four solar power projects totalling 716 MWp in installed capacity in northern India. These are a PPA with SECI for a 450 MW solar project in Rajasthan; and three PPAs with UPPCL (for two solar projects of 98 MW each and one of 70 MW).

ENGIE

- In July 2019, French energy conglomerate ENGIE's total renewable capacity in India crossed 1.5 GW after Gujarat Urja Vikas Nigam Limited awarded it a 280 MW solar project. The project is part of the state's Raghanesda Solar Park, which is currently under development.
- In November 2018, the company acquired a 90 per cent stake in Simpa Energy from its parent company Simpa Networks. The parent company is a distributed energy solutions provider to households and businesses, with the pay-as-you-go pricing model.

First Solar

- US-based First Solar is a vertically integrated company that manufactures solar modules and constructs solar projects. It also provides operations and maintenance services for solar projects. In India, it is one of the biggest suppliers of thin-film solar modules.
- The company currently manufactures its thin-film products at four factories – its original factory in Perrysburg, Ohio, the massive Kulim plant in Malaysia, and the twin factories in Vietnam. The company's new 1.2 GW factory in Lake Township, Ohio, is expected to become operational in 2020. First Solar is expecting to ship 5.4-5.6 GW of solar modules over the course of 2019.
- The company essentially has its order book full for the next two years, making it one of the only US-based module makers that have been able to hold out against the juggernaut of Chinese solar manufacturing.

Fortum

- Fortum India, a unit of the Finland-based Fortum Oyj, plans to set up 300 MW of solar power capacity each year in India for the next five years. This will take its total installed capacity to over 2,100 MW from the current capacity of around 700 MW.
- During the year, Fortum entered into a 50:50 joint venture with Numaligarh Refinery Limited to set up a Rs 15 billion bio-ethanol plant in the Northeast. It will use bamboo as raw material for the plant. The bio-ethanol from the project, which is likely to be completed by 2021, will be sold to Numaligarh Refinery Limited.
- Fortum also plans to set up over 100 electric vehicle (EV) charging stations across Hyderabad, New Delhi, Bangalore and Mumbai in the next six months. It has already set up around 50 EV charging stations.

Fourth Partner

- Fourth Partner Energy, a distributed solar energy developer for commercial, industrial and government institutions, was founded in October 2010. Its offerings include capex-, RESCO- and open access-based plants. The company has executed over 1,800 installations across 23 states in India. It is backed by TPG's The Rise Fund, which invested $70 million in the firm in June 2018.
- In September 2019, it executed a 10 MW solar power plant for Bharathi Cement at its manufacturing facility at Kadapa in Andhra Pradesh. Some of the company's other clients in the state include Walmart, Andhra Bank, D-Mart and Visakhapatnam Smart City.
- In April 2019, Fourth Partner Energy announced the commissioning of eight solar projects with a capacity of 3,116 kWp in Telangana under SECI's rooftop scheme.

Greenko Group

- The Greenko Group's renewable energy portfolio comprises wind, biomass and run-of-the-river hydro projects as well as conventional energy projects, including those based on natural gas. The company has around 4.5 GW of total renewable energy operational capacity and 8 GW under construction. It has enough funds to expand its multi-gigawatt portfolio over the next few years.
- In one of the largest rounds of fundraising by an Indian clean energy producer in 2019, sovereign wealth funds GIC Holdings Pte. Ltd and the Abu Dhabi Investment Authority (ADIA) pumped in $824 million in Greenko Energy Holdings in two tranches. The new capital

will be used to fund its business plan, which includes the capex for integrated renewable energy projects and other opportunistic and valuable acquisitions. With this funding, the total investment by the two funds has reached $2.2 billion in Greenko. While GIC and ADIA hold 61 per cent and 15 per cent, respectively, in Greenko, founders Mahesh Kolli and Anil Kumar Chalamalasetty own the remaining 24 per cent.

- Around July 2019, it also signed a deal with Siemens Financial Services, the financing arm of Siemens AG, for an equity investment in its Poovani wind power project in Tamil Nadu. Greenko is developing the 200 MW project, which was auctioned by SECI.

Hero Future Energies

- The Hero Group entered the Indian renewable energy market with Hero Future Energies Private Limited (HFE) in 2013. Its total installed capacity stands at 1,200 MW, with another 800 MW in the pipeline.
- In November 2019, Masdar, also known as the Abu Dhabi Future Energy Company, acquired around 20 per cent in Hero Future Energies Private Limited (HFE) for $150 million, valuing the Indian renewable energy firm at $750 million. The funds will help HFE execute its plans to build a 5 GW portfolio by 2022 and expand its operations in Africa and India, as well as be present across the solar energy value chain. HFE also plans to put up a large grid-connected solar plant of up to 100 MW capacity in Southeast Asia. The company is also foraying into battery storage and floating solar.
- Prior to this round of funding, in April 2019, IFC provided debt financing of over $43 million for the development of HFE' 250 MW solar power park at Bhadla in Rajasthan. Eventually, $25 million was provided by HDFC Bank and $65 million by AIIB towards debt funding. The equity financing of $54 million has been undertaken by HFE itself. The project is being developed by Clean Solar Power (Jodhpur) Private Limited, a subsidiary of HFE. A 25-year PPA has been signed with SECI.

Hinduja Renewables Energy

- Hinduja Renewables Energy Private Limited (HREPL), a subsidiary of the Mumbai-based Hinduja Group, is a solar power IPP. It started its operations in the solar IPP space in 2016. The company is looking at both acquisitions and greenfield project development as part of its growth strategy. It currently operates a 125 MW portfolio, including 110 MW of utility-scale ground-mounted solar plants and 10 MW of rooftop solar projects. The majority of HREPL's projects have been implemented in open access and group captive modes.
- The company aims to increase its operational project capacity to 300 MW by March 2020. Around 75 MW of its solar power capacity is at the construction stage in Tamil Nadu while another 5 MW is being developed in Gujarat.

Inox Wind

- The company primarily operates in the wind turbine manufacturing space. It is part of the $3 billion Inox Group, which is a diversified conglomerate operating in the industrial gas, chloromethane, refrigerant, fluoropolymer, multiplex, wind turbine manufacturing and cryogenic engineering segments.
- In November 2019, it won a contract from ReNew Power to equip a 38 MW wind farm in the state of Gujarat. To this end, ReNew Power has ordered 19 units of Inox Wind's 2 MW DF 113/92 turbine, which will be installed at the project site in Anjar. The project was awarded under the SECI Tranche II auction.
- In January 2019, Inox Wind received a letter of intent (LoI) from AGEL for the development of wind power projects with a combined capacity of 501.6 MW in Kutch district, Gujarat. As part of the contract, Inox Wind will supply, erect and commission its 3.3 MW wind turbine generators with a rotor diameter of 145 metres and a hub height of 100-120 metres. The wind turbines will be set up across projects that were won by AGEL under SECI auctions. The combined capacity is scheduled to be completed over the next 15 months.
- Of this, Inox Wind has already commissioned wind projects with a cumulative capacity of 166 MW. In October 2019, it closed a deal for the sale of a 50 MW wind power project at Dayapar, Kutch, Gujarat. Adani Green Energy will be a strategic investor in the project, which is part of the capacity won under SECI bids for ISTS-connected wind power projects.
- Going forward, Inox Wind plans to add a 3.3 MW turbine to its existing 2 MW platform. The manufacturer, which sources turbine technology from US-based AMSC, has stated that the new machine will have a 146 metre rotor diameter.

Jakson Group

- Established in 1947, the Jakson Group entered the solar segment in 2011. The Noida-based company is an EPC contractor, an IPP and a manufacturer of solar products such as PV modules and inverters. It has a capacity to manufacture 70 MW of monocrystalline and polycrystalline modules (in Noida) and 500 MW of module mounting structures. Jakson plans to expand its solar energy portfolio to 1 GW, including 150 MW of captive installations. The company also aims to increase its solar manufacturing capacity to 1.5 GW by 2020.
- In May 2019, Jakson launched a compact hybrid energy storage system (HESS) for residential and commercial users. It plans to sell it to customers through a channel partner network.

Larsen & Toubro

- Larsen & Toubro (L&T) operates in the solar segment through its solar EPC company L&T Construction. The company has an indigenous capability to design solar PV systems, BoS and power evacuation systems. It operates in the grid-connected PV, concentrating solar power, microgrid and mega

rooftop segments.

- During the past one year, L&T Construction Limited has received a number of projects. In March 2019, it secured a 15 MW floating solar farm project to be set up at the Meghadri Gedda reservoir in Visakhapatnam district, Andhra Pradesh. The bid was invited by Greater Visakhapatnam Smart City Corporation Limited in December 2018. During the same month, the company won a Rs 3.52 billion contract for building a 100 MW solar plant for the Bengaluru-based Raasi Green Earth Energy. The plant is coming up in Ramanathapuram district of Tamil Nadu.

Leap Green Energy

- Leap Green Energy (LGE), headquartered in Coimbatore, Tamil Nadu, started in 2009 with a portfolio of only 3.3 MW of wind power assets. Over time, it has increased its operational capacity to 751 MW wind power assets with an additional 400 MW under construction. These assets are spread over four renewable resource-rich states – Tamil Nadu (with a capacity of 403.75 MW), Maharashtra (with 26 MW of wind assets), Rajasthan (270.5 MW) and Madhya Pradesh (50.9 MW).
- In January 2019, LGE signed an MoU with the Tamil Nadu government with a target to add 250 MW of wind energy assets in the state. The company, one of the largest players in the direct C&I power sale segment, is in the process of increasing the size of its commercial and industrial portfolio by an additional capacity of 150 MW of wind energy and 80 MW of solar energy in Tamil Nadu and Karnataka.
- The company also provides forecasting services to other wind project operators and currently provides forecasts for over 8,000 MW of assets to the Tamil Nadu grid for renewable energy integration.
- LGE has set a target to expand its portfolio to over 5,000 MW by 2023. Besides wind power, it might look to venture into wind–solar hybrids, repowering of wind power projects, energy storage, and even offshore wind power generation.

LONGi Solar

- Established in 2000, LONGi Solar, which is headquartered in Xi'an, Shaanxi province, China, is a leading solar wafer, cell, module and ingot manufacturer globally. The company forayed into solar component manufacturing with ingots and wafers. It entered the solar cell and module market after acquiring China-based Lerri Solar Technology in November 2014. In 2012, the company got listed as LONGi Green Energy Technology on the Shanghai Stock Exchange.
- Although a relatively new player in India, it has managed to establish a significant footprint. As part of its plans to capture a bigger share of the Indian solar market, LONGi launched its new high performance Hi-MO 4 high-power bifacial module at a recent event. The company has already installed these modules at various developer sites on a trial basis and is expecting significant uptake in the coming years.
- While currently it is focused on the utility-scale segment, going forward, LONGi plans to foray into the rooftop market. It is one of the few foreign manufacturers that are actively looking to set up a manufacturing base in the country under SECI's solar panel manufacturing scheme.

Mahindra Susten

- Mahindra Susten Private Limited, the solar energy arm of the Mahindra Group, is a solar EPC company that offers extensive expertise in energy solutions and engineering. The company started operations in 2011 by offering turnkey EPC solutions for solar projects. So far, it has commissioned over 1,500 MW of solar projects while another 2 GW of projects are under execution.
- Mahindra Susten's business model is to build and sell assets. In August 2019, the company was reported to be in the process of selling 160 MW of solar assets. The sale process could fetch over Rs 10 billion and Mahindra is likely to use the sales proceeds to develop its pipeline of around 1 GW.
- In June 2019, Mahindra Susten partnered with Japan-based Mitsui & Co to jointly develop and operate solar power projects in India. The Mahindra Group holds a 51 per cent stake in the JV, Marvel Solren Private Limited, with Mitsui owning the remaining stake. Marvel currently operates four distributed solar projects in India with a combined capacity of 16 MW and aims to expand it to 150 MW by 2023.

Mytrah Energy Limited

- Mytrah Energy Limited (MEL) operates as an IPP in both the solar and wind energy segments. It executes and maintains projects across 10 states. The company

currently has a portfolio of about 2,000 MW of wind and solar projects in the country (including those in the pipeline). While it is planning to significantly expand its portfolio, market conditions have thrown a spanner in the works.

- In the past one year, the company has been in discussions with investors to raise equity, and it is even considering selling part of its completed portfolio. The focus of the company is on divesting stake, raising funds, paring debt and redeploying the funds in some of the new projects.

NHPC Limited

- NHPC Limited was incorporated in 1975 for the development of hydroelectric power. Later, NHPC expanded its scope to include the development of power through conventional and non-conventional sources in India and abroad.
- In July 2019, the Cabinet Committee on Economic Affairs (CCEA) approved NHPC's 2,880 MW Dibang multi-purpose project in Arunachal Pradesh. The CCEA approved the Rs 16 billion expenditure on pre-investment activities and gave various clearances for the project. The estimated cost of the project is Rs 280.8 billion, which includes interest during construction and financing charges of Rs 39.75 billion, at the June 2018 price level. Once completed, this will be the largest hydroelectric plant in the country. In August 2019, NHPC signed a memorandum of association with the Assam government for the Lower Subansiri project. The National Green Tribunal gave the go-ahead for the project in July 2019 and NHPC is expected to begin the construction of the project soon.

NLC

- NLC India Limited (NLCIL), a prominent thermal power producer, has in recent years developed significant renewables capacity. The company has set ambitious renewable energy target to cross 21 GW by 2025 and about 11.3 GW in the next three years.
- In September 2019, the company commissioned 95 MW capacity of the 109 MW solar power project in Ramanathapuram district, Tamil Nadu. With this, the company's total renewable energy capacity has exceeded 1 GW. The 109 MW project is part of 709 MW solar power projects awarded by TANGEDCO.
- NLCIL is also executing a 20 MW solar power project at an estimated cost of Rs 1.31 billion in the Andaman Islands.

NTPC Limited

- NTPC Limited is one of India's largest power producers. It has set a target to diversify its fuel mix, in line with the country's clean energy generation targets. By 2032, non-fossil fuel-based generation capacity will make up nearly 30 per cent of NTPC's portfolio.
- The company had a very successful year in terms of tendering and winning wind and solar power projects. In June 2019, it won 40 MW of capacity under the Uttar Pradesh New and Renewable Energy Development Agency's (UPNEDA) 500 MW solar tender at a tariff of Rs 3.02 per unit. The lowest tariff quoted in this auction is the same as the tariff quoted in UPNEDA's auction for 550 MW of projects by NTPC. Under the previous auction, which was concluded in December 2018, NTPC won 85 MW of capacity. Besides, in May 2019, NTPC secured 100 MW of solar capacity under SECI's 250 MW grid-connected solar projects tender for the Dondaicha solar park, Maharashtra.
- NTPC has been tendering a number of solar and floating PV projects as part of its mandate to promote solar power. In November 2018, NTPC Limited issued an LoA to Azure Power India Private Limited for the installation of 300 MW of solar capacity under the tender for 2,000 MW of ISTS-connected solar projects. The proposed projects are expected to be commissioned by early 2021. It also tendered a 25 MW floating solar PV project in Simhadri, Andhra Pradesh, and a 100 MW floating solar project at the Ramagundam power station located in Peddapalli district of Telangana.
- NTPC Limited has been active in the EV charging infrastructure space too. In March 2019, it invited bids for setting up charging stations for EVs, including buses and four-wheelers, on a turnkey basis. In January 2019, the Goa government signed an agreement with NTPC for assistance in procuring 100 electric buses and setting up charging stations. In November 2018, NTPC signed MoUs with vehicle aggregators Ola, Lithium, Shuttl, Bikxie, Bounce, Electrie and Zoom Car for the development and utilisation of public charging infrastructure in the cities of Jabalpur, Navi Mumbai and Bhopal.

Orient Green Power Limited

- As of June 2019, Orient Green Power Limited (OGPL) wind power capacity stood at 425 MW and registered near to no growth during the previous year. Of this, 308.3 MW is located in Tamil Nadu, 75.4 MW in Andhra Pradesh, 29.2 MW in Gujarat and 1.25 MW in Karnataka. Another 10.5 MW is located in Europe.
- OGPL plans to take several strategic steps to strengthen its position in the segment in 2019-20. To improve its cash flow and liquidity, it is in discussions with financiers to offer lower interest rates for its upcoming projects and to extend loan maturities. It is looking to refinance debt of around Rs 10 billion, which is currently at 13 per cent interest, to lower levels.

Punjab Renewable Energy Systems Private Limited

- Punjab Renewable Energy Systems Private Limited (PRESPL) was set up in 2011 with the aim to build a viable ecosystem of biomass supply chain management. The company started operations with a 12 MW paddy straw-based power plant in Patiala, owned and operated by Punjab Biomass Power Limited, and over the years has increased its presence across 11 states.

- To fund its expansion plans, the company has received PE investments from various investors. responsAbility Investments AG invested $2 million in PRESPL's Series-A funding carried out in September 2013. PRESPL then received a Series-B investment of $5 million from the NEEV Fund in April 2019. In September 2019, the company closed its Series-B round of funding by raising $3 million from Shell. The funds will be used for business expansion and for setting up more briquetting plants and boilers.

Rays Power Infra Private Limited

- Rays Power Infra is an integrated solar power company. It has a presence in key solar states in the country, and has set up over 620 MW of solar capacity, as of June 2018.

ReNew Power

- Established in 2011, ReNew Power Ventures owns and operates utility-scale solar and wind projects as well as distributed solar projects across the country. In October 2019, ReNew Power joined the global club of top renewable power generation companies by becoming the eleventh firm to reach 5,000 MW of installed capacity. Of this, 3,100 MW is wind and 1,900 MW is solar. The company aims to install 8,000 MW of capacity in eight months, with an additional 3,000 MW coming largely from NTPC and SECI tenders.
- The company currently has utility-scale assets in eight states, including Rajasthan, Gujarat, Madhya Pradesh and Tamil Nadu. It has distributed solar capacity across 20 states.
- In October 2019, it commissioned a 250 MW solar plant in Bikaner, Rajasthan. The plant, equipped with robotic cleaning technology, is the company's second largest solar farm; the first being in Maharashtra. Power from the Bikaner plant will be procured at Rs 2.72 per kWh by the Maharashtra state discom.
- The company, which is backed by investors such as Goldman Sachs, the Canada Pension Plan Investment Board and ADIA, is looking to sell around 300 MW of projects to raise funds. Towards the end of 2018, the company bought 1,100 MW of wind and solar power assets of Ostro Energy, making it one of the biggest acquisitions in the Indian renewable energy space.

SB Energy

- Incorporated in June 2015, SB Energy is a three-way JV between Bharti Enterprises Limited, the Foxconn Technology Group and the SoftBank Corporation.
- Among the various projects it won during 2019 are the 330 MW capacity auctioned by SECI under its 1.2 GW tender (Tranche V). Prior to this, in February, SB Energy quoted a tariff of Rs 2.83 per kWh for a 600 MW capacity tendered. However, it was awarded only 324.4 MW due to the bucket filling method being applied to the awarded capacities in reverse auctions.
- Earlier this year, SB Energy lost 250 MW of capacity when the Gujarat government refused to allocate projects after completion of the financial bidding round.

Sembcorp Green Infra

- Sembcorp Energy India Limited (SEIL), formerly known as Thermal Powertech Corporation of India Limited, is a leading IPP with about 4.38 GW of thermal and renewable power capacity in operation and under development. In 2018, SEIL underwent reorganisation wherein the Sembcorp Group's Indian energy businesses were consolidated. The Sembcorp Group has stakes in Sembcorp Gayatri Power Limited, which focuses on thermal power, and Sembcorp Green Infra Limited, which focuses on renewable energy.
- As of mid-2019, it had an installed renewable energy capacity of 1,192 MW spread across wind and solar energy projects in several states. The company has over 30 wind energy projects aggregating 1,152 MW in capacity in Tamil Nadu, Karnataka, Gujarat, Madhya Pradesh, Maharashtra, Rajasthan and Andhra Pradesh. In the solar segment, the company operates three projects totalling 35 MW in Gujarat and Rajasthan. Notably, the company has long-term PPAs for 96 per cent of its renewable energy capacity.

Siemens Gamesa Renewable Energy

- Siemens Gamesa Renewable Energy (SGRE) is involved in the engineering, designing and production of wind turbines. The company is also engaged in the development and construction of wind projects.
- In October 2019, SGRE confirmed the purchase of Senvion's European service fleet for Euro 200 million ($222 million). Senvion is a German wind turbine manufacturing company, which was earlier a subsidiary of Suzlon Energy. The acquisition, expected to be completed by March 2020, will add nearly 9 GW worth of Senvion's service contracts and over Euro 200 million in associated annual services revenue to SGRE's balance sheet.
- In January 2019, SGRE won an EPC contract from ReNew Power Limited for the supply of 270 wind turbines for two wind power projects with a total capacity of 567 MW in Gujarat and Karnataka. Both the projects are expected to be commissioned by June 2020. Earlier, SGRE secured an EPC contract for the supply of turbines for a 126 MW wind power project in Osmanabad, Maharashtra.
- In the solar space, SGRE commissioned a 10 MW solar power project near Coimbatore in Tamil Nadu. The company was appointed as the EPC contractor for the captive project by Lakshmi Machine Works.

Soham Renewable Energy India

- Soham Renewable Energy India, a company headquartered in Bengaluru, was established as a small-hydro power

(SHP) development firm. More than 15 years later, the company has installed four SHPs with a total capacity of 54 MW. However, declining plant costs and shorter gestation periods of solar power in comparison to small hydro, have made Soham move to a mix of small-hydro and solar power.

- The company is implementing three solar power projects of 95 MW capacity in Karnataka. Expected to be commissioned by the first quarter of 2020, these projects will start selling power to C&I consumers under the open access mechanism.

Sprng Energy

- Incorporated in December 2016, Sprng Energy Private Limited (SEPL) is a 100 per cent owned entity of Mauritius-based Solenergi Power Private Limited (SPPL). SPPL is, in turn, 100 per cent owned by Actis Solenergy Limited, which is also based out of Mauritius. SEPL is a renewable energy platform created to invest $450 million, raised by Actis through its Actis 4 Funds, to install around 1,750 MW of renewable energy capacity in India. It has been one of the most active participants in both solar and wind power tenders issued by SECI and NTPC.
- In addition to the 194 MW operational solar power capacity already acquired from the Shapoorji Pallonji Group, the company has commissioned 250 MW of solar power and 150 MW of wind power capacities, and the remaining 1,147.5 MW (500 MW solar and 647.5 MW wind) is expected to be commissioned over the next two years.

Sterling & Wilson

- The solar engineering and construction arm of the Shapoorji Pallonji Group, Sterling & Wilson Solar Limited (SWSL) is one of the leading solar EPC firms in India as well as globally. It started operations in 2011, and in 2013, the company completed its first turnkey project, a 36 MWp solar power plant located in India. In 2014, it entered the international market and in 2016, it ventured into the rooftop solar space.
- The year 2017 was eventful for the company. Apart from demerging from its parent company, it commenced work on the world's largest single-location solar PV plant (in Abu Dhabi), which was commissioned in July 2019. Over a span of seven years, the company has expanded its operations to 26 countries and now has a portfolio of 205 solar power projects with an aggregate capacity of 6,870.12 MWp.
- The company was one of the few renewable energy firms to launch an initial public offering (IPO) this year. The company received bids for nearly 19 million shares for its IPO of 22.17 million shares, excluding the anchor portion. The issue was subscribed only 0.85 times. The stock finally made its debut on the bourses on August 20, 2019, listing at a price of Rs 706 per share on the National Stock Exchange and Rs 700 per share on the Bombay Stock Exchange. The listing of the stock at a rate lower than the issue price had more to do with weak market conditions rather than any shortfall in SWSL's performance.

SunSource Energy

- SunSource Energy was established in 2010, and has since grown to become one of the key players in the Indian solar power segment. In a short span of time, SunSource Energy has grown from a two-man army into a 200-employee company. It has expanded its operations to several countries including the US, Singapore, Thailand and the Philippines, and has a geographical presence in over 25 states in India. SunSource has a portfolio of over 300 MW, of which 60-70 MW is set up outside India. Its clientele includes Yakult, Jubilant FoodWorks, Jamia Millia Islamia, Indian Oil Corporation and Thomson Press. The company also operates in the EPC space.
- Recently, the company ventured into the open access solar space by winning a 70 MW project in Uttar Pradesh. The project is expected to be one of the largest open access-based solar projects in the state and was granted approval under the UPERC Captive and Renewable Energy Generating Projects Regulations, 2014.

Suzlon Energy Limited

- Suzlon is a vertically integrated organisation with an international presence across 18 countries in Asia, Europe, Africa and the Americas, as well as Australia. The company has a cumulative installed wind capacity of over 17.5 GW. The shift to auction-based capacity addition in India (which is its prime market) and the resultant disruption in the market caught all stakeholders, including Suzlon, off guard.
- The heavily indebted company has been under intense market scrutiny since it defaulted on $172 million of bond repayments in July 2019. Reports suggest that the pressure ramped up further when separate debt restructuring packages involving investment by Canada's Brookfield and Danish original equipment manufacturer Vestas came to no results.
- As was intimated by the company to the stock exchanges vide its letter dated July 17, 2019, the company's lenders have already signed inter-creditor agreements and in terms of the circular of the Reserve Bank of India dated June 7, 2019, the lenders have time till January 2020 to work on a sustainable resolution plan before taking any extreme steps.

Tata Power Renewable Energy Limited

- Tata Power Renewable Energy Limited (TPREL) is a leading renewable energy developer with an ambitious target for the growth of renewables. Its renewable energy operating capacity is 2,628 MW, comprising 931 MW wind and 1,696 MW solar. TPREL is a wholly owned subsidiary of Tata Power, and is the parent company's primary investment vehicle for clean and renewable energy-based power generation capacity. The

company is also in the process of implementing 650 MW of greenfield renewable power projects. As an EPC contractor, it has commissioned more than 3.6 GW of projects and 315 MW of varied rooftop projects of numerous sizes across India. In September 2019, Tata Power Solar commissioned a 150 MW solar project at Chhayan village in Pokhran, which sells power through an interstate transmission system to MSEDCL. In the same month, it won the bid for setting up a 105 MWp floating solar energy project in Kerala. The project will be set up on NTPC's reservoir at Kayamkulam in Alappuzha district, and will be commissioned within 21 months.

- The company has forayed into the PPA space as well as the group captive solar business. It also launched a residential rooftop solar programme and has already carried out awareness drives in 36 cities across the country, with plans to cover at least 100 cities. The company has entered the microgrid space, and is installing these systems to not only provide power for basic electricity needs but also to create entrepreneurs at the village level itself. On the manufacturing side, Tata Power Solar has an annual production capacity of 300 MW of cells and 400 MW of modules.

UJVN Limited

- State-run Uttarakhand Jal Vidyut Nigam Limited (UJVNL) has been playing a key role in helping Uttarakhand meet its power requirements. It was set up in 2001 for the development of new hydropower projects and the renovation, modernisation and upgradation of the existing hydropower plants in the state.
- UJVNL currently operates 16 hydropower stations of different sizes with a combined capacity of 1,292 MW. This also includes some old hydropower plants up to 100 years old. By 2023-24, UJVNL is targeting to add another 220 MW of capacity. It plans to expand its renewable energy portfolio by adding solar- and bagasse-based cogeneration projects. The overall projected capex across all sources is expected to be about Rs 25 billion.

- UJVNL has undertaken the construction of five projects with a combined capacity of 148.5 MW. Of these, one large hydroelectric project on the Vyasi river (120 MW) and three SHPs – Kaliganga I (4 MW), Kaliganga II (4.5 MW) and Suringad II (5 MW) – are scheduled to be commissioned during 2019-20. The fifth project, the Madhmaheshwar (15 MW) SHP, is scheduled to be commissioned in 2020-21.
- Apart from projects under construction, UJVNL has 16 hydro projects at various stages of development. One of them is the 300 MW Lakhwar project. The project, with a proposed installation of three units of 100 MW each, is expected to generate 612.93 MUs annually in a 90 per cent dependable year.

Vestas Wind Systems

- Vestas Wind Systems is a Danish company set up in 1898, with headquarters in Aarhus, Denmark. It is involved in the design, manufacture and installation of wind turbines. The company has been quite active in the Indian wind power space in 2019.
- During the year, the company won a number of EPC contracts. It secured an EPC contract from Vivid Solaire Energy Private Limited (Engie) for the supply of turbines for the 252 MW Thattaparai wind power project in Tuticorin district of Tamil Nadu. The project was awarded to Vivid Solaire by SECI. The delivery of turbines is expected to commence in June 2019 and be completed by March 2020.
- It also won an EPC contract from Trinethra Wind and Hydro Power Limited for the supply of turbines for a 101 MW wind power project in Rajkot, Gujarat. The delivery of turbines was expected to commence in June 2019 and work on the same was expected to be completed by September 2019.

Vikram Solar

- The Kolkata-based company was founded 13 years ago. Its parent organisation Vikram India Limited, established in 1974, has over 45 years' experience in manufacturing tea processing machinery, sponge iron and textiles. Taking forward the legacy, Vikram Solar has expanded its solar portfolio and now has a presence in six continents.
- The company has been growing at a steady pace in both the manufacturing and EPC spaces. In February 2019, the company secured an order from Hindustan Zinc for setting up a 1 MW floating solar power project at Ghosunda dam near Chittorgarh, Rajasthan. It also commissioned an 18.5 kW rooftop solar plant for Century Ply (India) Limited. The rooftop project is located at the latter's headquarters in Kolkata. For this project, Vikram Solar used its smart Solivo modules, which are developed in collaboration with Tigo, a Silicon Valley-based solar PV solutions company.
- In January 2019, the company secured a contract from NTPC Limited to install a 140 MW solar plant in Bilhaur, Uttar Pradesh. The solar plant will be spread across 700 acres and is expected to be completed in late 2020. ■