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Re-strategizing To Meet The Growing Demand For Power

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Highlights :

Authored by: Jogendra Behera, Head Policy Advocacy & Regulatory Affairs, Apraava Energy



Jogendra Behera, Head Policy Advocacy & Regulatory Affairs, Apraava Energy

Few sectors, if any, today pose as many challenges or hold as many opportunities as India's power sector. It has witnessed developments and disruptions in recent years, and while the long-term goal posts remain largely steady, we might have to move sideways towards them instead of headlong. India's power demand grew at an unprecedented 9% annually during the past 2-3 years, as compared to 6% during pre-Covid years. Peak demand reached an all-time high of 241 GW during September 2023. There are many reasons for this heightened demand, including rapid post-pandemic economic growth, increase in per capita income, change in weather patterns, etc. While these are positive signs and indicate healthy economic activity, the challenge lies in meeting the rapidly growing demand without sacrificing India's energy transition goals.

For many decades, India was a power-deficient country. During FY12, the energy and peak deficits were 8.5% and 10.6% respectively – a significant demand-supply gap even after two decades of first introducing power sector reforms. However, during the next five years, bolstered by a strong emphasis on capacity addition and a liberal framework under the Electricity Act 2003, the installed capacity grew at an average of 11% annually, changing the country's power situation from deficit to surplus. In FY19, the energy and peak deficits had reduced to as low as 0.6% and 0.8%.



Then Covid-19 struck and disrupted economic activities. Demand for electricity declined by nearly 0.5% during FY21 and the average IEX Day Ahead Market (DAM) price reduced to Rs 2.8/unit, with availability of sell bids being almost twice that of buy bids in the exchange platform. However, the situation changed in March 2022, after the pandemic abated. Amidst the revival of economic activity and the unfortunate occurrence of heat waves in northern states, there was a surge in electricity demand, which, combined with supply-side constraints such as inadequate availability of domestic coal and a rise in the prices of imported coal and gas

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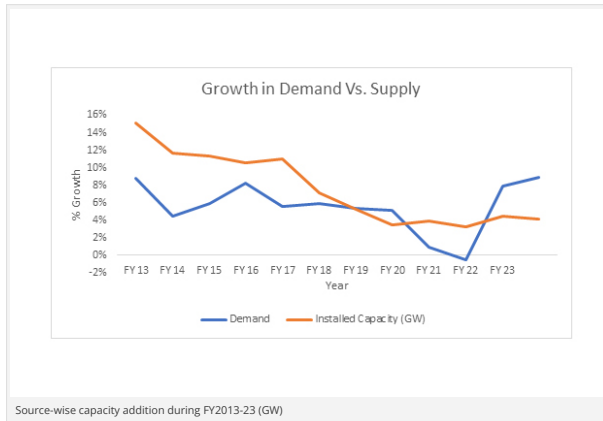
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following the Russia-Ukraine war, worsened the demand-supply situation. India faced one of its worst power shortages ever. On 25th March 2023, the daily average IEX DAM prices touched Rs 19/unit, compelling the Ministry of Power (MoP) and Central Electricity Regulatory Commission (CERC) to swing into action. The CERC imposed a price cap of Rs 12/unit across DAM from 1st April 2023, while the MoP, under Section 11 of the Electricity Act 2003, directed imported-coal-based plants to generate and supply power to Discoms. Domestic-coal-based plants were asked to blend at least 10% of imported coal for effectively managing their coal. The MoP also took several other measures to improve the domestic coal supply and ensure that thermal generating stations were available during high demand periods.



It seemed initially that the power crisis of March-April 2022 might be a one-off aberration. However, as the situation persisted, it became apparent that there was an underlying systemic issue. From FY18 to FY23, installed capacity increased by an average annual rate of 4%, slower than the increase in demand, except during the pandemic. Almost 80% of this capacity addition came from RE sources. Solar power can only be generated during daytime, while wind and hydro power only achieve their maximum capacity utilization during the monsoon season. As a result, we have witnessed power shortages during the summer months, when greater demand for cooling leads to an increase in overall energy demand. Shortages are visible especially during morning and evening hours, when solar power is out of the equation. This also gets reflected in the spot market prices. During FY2023, the average IEX DAM price was around Rs 5.94/unit whereas the average price during morning and evening hours (6-9 AM and 6-9 PM) was around Rs 7.3/unit.

	Thermal	Nuclear	Hydro	Solar	Wind	Other RES	Total Capacity
FY13	19.9	0.0	0.6	0.8	1.6	0.7	23.5
FY14	16.8	0.0	1.0	0.9	2.6	3.9	25.2
FY15	20.6	1.0	0.8	1.1	2.3	0.6	26.4
FY16	21.8	0.0	1.5	3.0	3.4	0.5	30.3
FY17	7.6	1.0	1.7	5.5	5.6	0.3	21.7
FY18	4.6	0.0	0.9	9.4	1.7	0.7	17.2
FY19	3.4	0.0	-0.1	6.5	1.6	0.5	11.9
FY20	4.3	0.0	0.4	6.5	2.1	0.9	14.1
FY21	4.1	0.0	0.5	5.5	1.6	0.4	12.0
FY22	1.4	0.0	0.5	13.9	1.1	0.4	17.4
FY23	1.2	0.0	0.2	12.7	2.3	0.2	16.6

Source: Ministry of Power Website

To avoid yet another power crisis in the coming summer, the MoP has extended its aforesaid directions, pertaining to the operations of imported coal-based plants and the blending of imported coal, till 30th June 2024. The price cap of Rs 10/unit on the exchange transactions has been continued, and two new elements - High Price DAM (HP-DAM) and PUSHp portal - have been introduced to ensure availability of unutilized capacity during high demand situations. As a long-term measure, Discoms have been mandated to ensure resource adequacy at all times by entering into power purchase contracts corresponding to their demand, including the planning reserve margins.

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Multiple pathways should be considered to meet India's growing power demand. India is already targeting to add 45-50 GW of firm and dispatchable RE capacity annually based on a hybrid arrangement or battery storage. Until grid-scale battery storage achieves the desired scale and becomes commercially viable, the Government could perhaps provide viability gap funding to battery storage and support the development of pumped storage hydro plants. There could also be emphasis on reducing the turnaround time from project conceptualization to execution by expediting the bidding and contract-signing processes and by providing support with land acquisition, transmission access, right of way, etc.

Besides adding new capacity, it is also important to maximize the utilization of existing capacity by ensuring efficient fuel allocation and undertaking other market-based measures. As much as possible, demand should be shifted to the daytime, when solar power is in play. This can be helped through faster implementation of "Time of Day" mechanism and demand response measures. There should be continued emphasis on smart grid implementation and digitalization of networks. The challenges we face today have given us opportunities to accelerate the implementation of various advanced technologies such as cost-effective grid-scale battery storage, pumped storage hydro power plant, rooftop solar, behind-the-meter solutions, smart meters, smart grids, etc. Taking a long-term view will help us take decisive strides in the ongoing energy transition.

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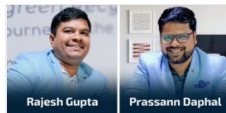
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