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India's power crisis

India is facing its worst power crisis in six years. The country of 1.4 billion people is used to power shortages in warmer seasons, but during April 2022 Indian nationals have been facing consistently 4 to 8 hours of daily power shortages, a situation that is worse than usual. This has added to the woes of many Indians whose lives are already impacted by other infrastructural problems such as traffic congestion and pollution. While in previous years the shortages were limited to rural India, the shortage has spilled over this year to urban India.



India has a long history of power shortages. The country's power supply has been lower than power demand for most of the late 90s and the 2000s. Maharashtra, India's second largest state where Mumbai is located with a population of around 125 million witnessed close to zero power shortages in the early nineties. However, as the state experienced exponential growth of demand for power in the subsequent years, 6 to 12 hours of daily power shortages became common by the year 2010. At some point in July 2012, India faced one of its worst power crises in recorded history when a large portion of the country did not receive any power for almost an entire day.

India has made commendable progress in its power situation over the last decade. The country's total installed capacity stood at around 199GW in 2012. By 2021, installed

capacity had doubled to around 399GW. As a result, power shortages have considerably reduced over the past six years.

While long blackouts still happen, they are not as persistent as they used to be. The country's record peak demand in 2021 was 203GW, so on a purely installed capacity basis India is at a power surplus. However, on a power generated basis, India is still at a deficit. There are several reasons for the discrepancy between power generation and power capacity. First, India's PLF (Plant Load Factor) for power generation companies, which are typically known as GENCOs, is around 50%. This is normal: US power plants usually operate at a PLF of around 50% as well. It is not possible for a power plant to generate its maximum power capacity all year long.

A 50% PLF is not considered unusual, and it explains why India is still running an electricity deficit:

Fiscal Year	Energy Usage (GWh)			Peak Capacity (GW)		
	Total Demand	Total Supply	Surplus/Deficit	Peak Demand	Peak Supply	Surplus/Deficit
2009-10	830,594	746,644	(10.1%)	119	104	(12.6%)
2010-11	861,591	788,355	(8.5%)	122	110	(9.8%)
2011-12	937,199	857,886	(8.5%)	130	116	(10.8%)
2012-13	995,557	908,652	(8.7%)	135	123	(8.9%)
2013-14	1,002,257	959,829	(4.2%)	136	130	(4.4%)
2014-15	1,068,923	1,030,785	(3.6%)	148	141	(4.7%)
2015-16	1,114,408	1,090,850	(2.1%)	153	148	(3.3%)
2016-17	1,142,929	1,135,334	(0.7%)	159	157	(1.3%)
2017-18	1,213,326	1,204,697	(0.7%)	164	161	(1.8%)
2018-19	1,274,595	1,267,526	(0.6%)	177	176	(0.6%)
2019-20	1,291,010	1,284,444	(0.5%)	184	183	(0.5%)
2020-21	1,275,534	1,270,663	(0.4%)	190	189	(0.5%)

Source: Ministry of Power, years in fiscal year (March ended)

But where things get more complicated in India is the underdeveloped and complicated distribution structure of power. Power generated by GENCOs are usually purchased by distribution companies, known as DISCOMs, which distribute power to end consumers. These DISCOMs are divided between central government owned DISCOMs and state government owned DISCOMs.

Contracts between GENCOs and DISCOMs are very traditional, with the two parties typically agreeing to enter into a PPA (Purchasing Power Agreement) that lasts anywhere from 10 to 25 years. For PPAs, the tariffs (i.e. the price charged by the GENCOs for each kWh of energy sold to DISCOMs) are fixed for the entire term. In a world of falling energy

prices, these PPAs can become very tricky for DISCOMs especially for the state owned DISCOMs which typically suffer from large accumulated losses. This situation has known to create tensions between GENCOs and DISCOMs, the latter being typically controlled by State governments run by politicians who prevent DISCOMs from raising tariffs, and often force them to sell electricity at a loss, especially during election campaigns.

One example is the State of Andhra Pradesh where the local DISCOM has simply refused to honour the terms of the agreed PPA signed with ReNew Power, India's second largest renewable energy company by contracted capacity. Although in early 2022 the Andhra Pradesh high court ordered the Andhra Pradesh DISCOM to repay ReNew all the unpaid tariffs, we expect to see this kind of situation repeating itself, creating more disruptions in the power ecosystem.

This brings us to the ongoing power shortages. India's power deficit is skewed towards the peak power season, which is usually from April to July as average temperatures soar across the country. An April heatwave has intensified power usage in the country. Peak demand in April reached at some point 200GW, just below the record demand seen in July 2021. Given that summer has not even started, we can reasonably anticipate that India will likely beat the 2021 record this year.



Source: POSOCO/Reuters – May 2022

Another critical factor is the ongoing coal shortage. 70% of India's power is generated from coal-fired power plants, and around 12% of the thermal coal is imported, largely

from Indonesia and Australia. The Russia-Ukraine war has disrupted import supply chains and imported coal price is expected to rise by 35% YoY in 2022.

The government has been taking some measures to alleviate the situation. Coal India, a government owned coal mining and refining corporation, has been scrambling to supply more coal to GENCOs and has increased coal generation per day to 1.64 million tonnes from an average of 1.40 million tonnes in 2021. Hundreds of passenger train services have been cancelled to make way for coal carrying railway transportation to meet urgent GENCO needs.



The government also capped prices of electricity on energy exchanges in India at 12 INR per kWh of electricity, at a time when prices are often soaring to INR 20 per kWh levels. The penetration of energy exchanges in India of the country's total power generation is only at 7%, compared to greater than 20% for developed nations, as most transactions take place under the long term PPAs described earlier. Energy exchanges offer buyers and sellers of power a way to trade short term power from the multiple buyers and sellers listed on the exchange, at a price that is dynamically standardised by demand and supply. It typically bridges short-term gaps between supply and demand. The government hoped to alleviate some pressure on the DISCOMs by imposing the 12 INR per kWh price cap. It did not help as it only pushed GENCOs to sell energy out of exchanges directly to industrial customers at a high price to circumvent the government-imposed price cap.

Moving forward, we will be closely monitoring the power situation in India. If temperatures continue to stay abnormally elevated, we can only expect shortages to get worse as we head into the peak power month of July.

Sources: Business Standard, BBC, The Economic Times, The Times of India, Ministry of Power (Government of India), Hindustan Times, Indian Energy Exchange (company filings), ReNew Power (company filings)

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