

# On heat and power stress, act but not in haste

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It is that time of the year. Summer is upon us, and several states are putting out heat advisories. In a tropical country like India, how we manage heat is an important determinant of health and wellbeing. It is getting tougher by the year. A [recent study](#) by Prayas (Energy Group) found that days are getting hotter in traditionally cooler parts of Maharashtra and nights are getting hotter across the state along with an increased number of consecutive hot days. Similar trends are observed across the country. An increasingly popular coping strategy is artificial cooling through appliances such as air conditioners, resulting in higher electricity demand.

Changes in weather patterns are characterised by high uncertainty, and this uncertainty extends to both electricity demand and generation sources such as solar, wind and hydro, all of which depend on weather. In addition, demand depends on additional factors such as economic activity, and consumer behaviours, with added uncertainties. Finally, generation and transmission resources could also become unavailable due to various reasons resulting in unplanned outages.

In this context, the findings of the report of the [short-term resource adequacy plan for 2025-26](#) by India's grid operator, Grid-India, are significant. Conducted annually under the national resource adequacy guidelines, the study simulated the Indian grid for the financial year 2025-26 under thousands of potential realisations of demand and renewable generation profiles and unplanned outages.

The study found that shortages could occur in over 500 hours in the best case, mostly in May and June, and over 1000 hours in the median case, spread over April to October. Peak shortages are expected to touch 30 GW, over 12% of the demand! All of these shortages are expected to occur during non-solar hours, indicating that even though demand peaks during the day, there is sufficient generation capacity available to meet that demand.

Publishing future such studies in July of the previous financial year, as per the guidelines, would give some time for remedial actions. For the next couple of months, though, what measures are available to avoid shortages?

## **Immediate measures**

First, it should be ensured that generation sources are available when they are needed most. In the Grid-India study, a large number of unplanned outages, over 40 GW, are assumed to occur during peak shortage months, based on past trends. Through better preventive maintenance practices and fuel supply planning in the coming month, it should be ensured that the entire thermal generation fleet is available and operating as flexibly as possible.

Over 10 million air conditioners are sold in India each year, a good chunk of them in the run up to summer. Awareness programs to buy energy efficient ACs and use them judiciously can lower the growth in demand immediately while also providing necessary space comfort. This could be in the form of advertising campaigns to promote use of higher set point temperatures for air conditioners and switching off appliances when not needed.

Utilities can appeal to consumers to shift their appliance usage to day time so that the stress on the grid is reduced during evening and night time. This was tried in Kerala and Kolkata last summer, with some beneficial results.

### **Long term measures**

As significant renewable energy capacity continues to be added due to lower generation costs, battery storage needs to be added in a calibrated manner. Given their modular nature, shorter gestation periods and fixed prices, renewables and storage allow for agile decision making.

Thermal generation will continue to play an important role in balancing the system. The fixed cost payments for thermal power plants should be weighted such that they get the maximum payment for availability during high demand months and hours. India has roughly 25 GW of gas-based generation capacity which can help in stress situations, but remains under-utilised due to erratic gas supply. Efforts should be made to streamline fuel supply for these plants, adding gas storage facilities if needed.

Several states are relooking at the time-of-day tariffs in light of the changing supply mix, to send price signals to consumers to shift demand to times when the cost of supply is lower. Over time, demand response programs can be considered as well, where large consumers are paid to shift their load at the request of the utility.

India will continue to add new buildings and appliances with growing cities and population. Several measures are suggested in the building codes published by the Bureau of Energy Efficiency to reduce energy demand while ensuring thermal comfort. These include more appropriate building materials and design elements to reduce heat build-up inside buildings and increase ventilation. Implementing these recommendations along with ratcheting up appliance efficiency standards and incentivising 5-star appliances will go a long way in reducing stress on the power system.

### **Haste makes waste**

The possibility of shortages should not be an excuse for making hasty decisions that lead to undesirable lock-ins. The instinctive response of utilities to deal with potential shortages continues to be to contract round-the-clock base load power which is costly, has long gestation periods and likely to result in stranded assets.

Considering uncertainties in future weather patterns, demand and technology costs, addition of generation, storage and transmission resources should be done in as agile, rigorous and transparent manner as possible.

Advanced open-source modelling tools, such as those used in the Grid-India study, are now mature and facilitate such studies in a transparent manner, without needing hefty license fees. These tools are thus ideal for making decisions that affect the larger public. There is a need for institutions such as utilities, system operators and regulators to build internal capability to take advantage of these tools and techniques.

Given the complexities and uncertainties involved and expertise needed, regulators and policy makers should seek inputs from a wide spectrum of stakeholders before approving resource plans from DISCOMs.

These steps will ensure that, in the long run, growing demand will be met with least cost, using a variety of supply and demand resources.

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