Revisit the idea of 'aging out' India's coal plants

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A more nuanced analysis considering the various characteristics of individual plants would be appropriate

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As part of the Union Budget address for 2020-21, the Finance Minister, Nirmala Sitharaman, said that the shutting down of old coal power plants, which are major contributors to emissions, will aid the achievement of India's Nationally Determined Contributions, an idea which has been endorsed by the Power Minister, R.K. Singh.

Some studies cite advantages

Some research studies have also argued in favour of it, citing the economic and the environmental benefits of shutting down coal plants older than, say, 25 years. It is argued that the availability of under-utilised newer (and presumably more efficient) coal-basedcapacity means that shutting down older inefficient plants would lead to improved efficiencies, reduced coal usage, and hence, cost savings.

Further, it is argued that it would be uneconomical for old plants to install pollution control equipment required to meet the emission standards announced by the Environment Ministry, and hence it would be better to retire them. The recent order from the Central Electricity Regulatory Commission (CERC) allowing Delhi's BSES distribution company to exit its concluded 25 year old power purchase agreement with the National Thermal Power Corporation Limited's Dadri-I generating station, also lends some credence to this.

Since plants older than 25 years make up around 20% of the total installed thermal capacity in the country and play a significant role in the country's power supply, decisions regarding their retirement merit finer scrutiny to see if the claimed benefits really accrue.

The benefits

How significant are the potential benefits?

While there are some old plants tied up in expensive power purchase agreements, as in the case of the CERC order, there are also several old plants, which generate at lower costs. For instance, plants such as Rihand, Singrauli (both Uttar Pradesh), and Vidhyanchal (Madhya Pradesh), are all over 30 years old and have very low generation costs of around ₹1.7/kWh, which is lower than the national average. This may be due to locational advantage rather than efficiency, as older plants are likely to be located closer to the coal source, reducing coal transport costs. However, this just highlights the complexity of the issue, since efficiency does not naturally translate to savings.

A savings analysis

Indeed, our analysis suggests that the total savings in generation cost from shutting down plants older than 25 years would be less than ₹5,000 crore annually, which is just 2% of the total power generation cost. These savings may not be sufficient to even pay for the fixed costs (such as debt repayment) that would have to be paid anyway, even if the plants are prematurely retired. Similarly, savings in coal consumption by replacing generation from plants older than 25 years with newer coal plants are also likely to be only in the 1%-2% range.

The argument about older plants finding it uneconomical to install pollution control equipment to meet environmental norms is a stronger one, as all coal plants should indeed reduce emissions. However, even here, the argument is not black-and-white. There are some old plants that may continue to be economically viable even if they install pollution control equipment as their current fixed costs (which would increase with pollution control equipment installation) are very low. Indeed, about half the coal capacity older than 25 years has already issued tenders for pollution control equipment installation.

Risks with retirement

The question then becomes whether these limited savings are worth the risks associated with early retirement of coal plants, especially given the current trends in the country's power sector. To support the growing intermittent renewable generation in the sector, there is an increasing need for capacity that can provide flexibility, balancing, and ancillary services. Old thermal capacity, with lower fixed costs, is a prime candidate to play this role until other technologies (such as storage) can replace them at scale. Further, the capacity value of the old capacity is critical to meet instantaneous peak load, and to meet load when renewable energy is unavailable.

There is also a political economy risk, as aggressive early retirement of coal-based capacity, without detailed analyses, could result in real or perceived electricity shortage in some States, leading to calls for investments in coal-based base-load capacity by State-owned entities. About 65 gigawatts (GW) of thermal capacity is already in the pipeline, of which about 35 GW is in various stages of construction. This is likely in excess of what the country needs, and further addition to it, driven by State political economy considerations, will lead to stranded assets and locked-in resources.

This is not to say that no old plant should be retired. However, using age as the only lever to drive these decisions is too blunt an instrument, and can prove counter-productive. Instead, a more disaggregated and nuanced analysis, considering the various technical, economic and operating characteristics of individual plants and units, while also accounting for aspects such as intermittency of renewables, growing demand, and need to meet emission norms, would be appropriate to make retirement-related decisions. Hence, it may be prudent to let old capacity fade away in due course, while focusing on such detailed analysis and weeding out the needless capacity in the pipeline, to derive long-term economic and environmental benefits.

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