

Should old coal plants be retired?

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For economic as well as environmental reasons, there is talk of shutting old coal plants. The decision is neither straightforward nor uniform. A nuanced view is needed to select the ones to close, and more importantly to stop too many new ones coming up.

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Thermal power plants, and their role in power generation are coming under increasing scrutiny, given their socio-economic and environmental impacts. The falling costs of renewables-based generation, among other factors, makes it easier to shift to a greener electricity sector. This has thrown up the question - should we prematurely shut down old coal power plants, which are major contributors to emissions? Another motivating factor is India's Nationally Determined Contribution to reduction of emissions under the Paris climate agreement, which would be easier to achieve if older coal plants were shut.

Some recent research studies have also argued in favour of retiring coal plants older than 20-25 years, citing economic and environmental benefits of doing so. The premise of such arguments is that newer, and likely more efficient, coal capacity is under-utilized, and shutting down older plants would lead to improved efficiencies, reduced coal usage, and hence, cost savings.

Older plants would also have to incur the costs of installing Pollution Control Equipment (PCE) to adhere to the new environment protection norms notified by the Ministry of Environment, Forests and Climate Change. These could make older coal plants uneconomical, and strengthen the case for their early retirement. Further credence is lent to this by the recent Central Electricity Regulatory Commission (CERC) order, which allowed Delhi's BSES distribution company to exit its concluded power purchase agreement (PPA) with NTPC's Dadri-I generating station after 25 years.

These reasons to do away with older coal plants, however, must be weighed against arguments for keeping them. Plants older than 25 years account for a substantial portion -- around 20 per cent -- of the total installed thermal capacity in India. Before retiring such a big contribution, a lot of careful analysis is needed.

Potential benefits

Some older plants are indeed tied up in expensive PPAs. But there are also several old plants with low generation costs, such as Rihand, Singrauli, and Vidhyanchal, which are all over 30 years old and have generation costs much lower than the national average. In some instances, this can be attributed to the location advantage of older coal plants, which are likely to be closer to the coal source, and thus have lower coal transport costs. Thus, even if the plants themselves aren't very efficient, such reduced costs highlight the complexity of the issue, as efficiency does not naturally translate to savings.

As per our analysis, shutting down coal plants older than 25 years and replacing their output with generation from newer ones would result in cost savings of lesser than Rs.5000 crores per year. This is around two per cent of the total power generation costs, and is unlikely to be sufficient to even cover the fixed cost payments which would accrue even if the plants were retired early. Similarly, savings in coal consumption if older coal plants were replaced by newer ones is also likely to only be in the range of 1-2 per cent of the country's coal consumption for power generation.

Coal savings may be greater if some or all of the generation from retiring old coal plants is replaced by electricity from renewables, rather than new coal plants. However, in this case, the benefit of helping to relieve the financial stress of under-utilised new coal capacity would not be achieved.

These trade-offs further highlight the nuances of different possibilities and their implications for cost-savings, thus underscoring the need for greater analysis. This is not an argument for continuing to run old and inefficient plants, but an argument that outright retirement may turn out to be a hasty and heavy-handed approach to achieve this objective. Instead, other measures may be more appropriate -- such as introducing an inefficiency penalty while determining the despatch schedule.

All coal-based capacity must adhere to the new environmental norms and reduce their emissions. In several cases, an older plant that makes the necessary upgrades may become economically unviable, since the cost has to be recovered in its remaining life. However, even here, the picture is not black-and-white. Some old plants continue to be economical despite PCE installation owing to the fact that they have very low fixed costs. Additionally, around half of the plants that are over 25 years old have already undertaken PCE-related expenditure, and issued tenders for installation. This means that even when accounting for costs on account of PCE, the issue is not straight forward.

Associated risks

Not only are the savings potentially limited, there are also likely risks associated with the early retirement of coal based capacity, and these are often neglected. Renewable energy generation is intermittent, and as it grows into a larger share of the power sector, there will be growing need for capacity that can provide flexibility, balancing, and ancillary services. Older coal capacity can effectively and prudently provide these services owing to their lower fixed costs at least until such time that alternate technologies, such as storage, can replace them at scale. Older plants are also crucial to meet peak load and seasonal demand, wherever intermittent renewable generation is unable to.

Accounting for such services will further eat into the limited potential benefits of early retirement. The impact of such retirement will not be uniform, and in the short run could lead to real or perceived power shortages in some states. Shortages are anathema to state energy politics, and early retirement of plants could have the perverse effect of calls for investment in thermal base load capacity, especially by state-owned entities.

Maharashtra, Telangana and Tamil Nadu have seen massive coal-based capacity addition spurts in the past driven by such concerns. About 65 GW of thermal capacity is already in the pipeline, with about 35 GW in various stages of construction. This capacity is likely to be sufficient to meet the future requirement of the country. Further additions to it, driven by state-level compulsions, will only worsen the situation, and could result in stranded assets and locked-in resources in the coming decades.

Age must not be the only lever

Thus, the benefits of early retirement of coal plants are likely to be limited and carry associated risks of unintended capacity addition. However, this does not mean that no old plant should be retired. Instead, the conclusion is that using age as the only lever to drive these decisions is too blunt an instrument, and can prove counter-productive. Retirement decisions should be driven by more dis-aggregated and nuanced analysis, considering the various technical, economic, and operating characteristics of individual plants and units, while also accounting for the intermittency of renewables, the rising demand for energy, and the need to meet emission norms.

The older capacity is anyway likely to fade away in due course. Advanced age, increasing costs due to maintenance, the availability of competitive alternate sources of generation, and other economic, operational and environmental drivers will eventually ensure this. Some old plants can be profitably retired now, and that should happen. Beyond that, however, rather than closing all old plants, it is more critical to identify and cull the planned excessive capacity in the pipeline.