THE INDIA FORUM
A JOURNAL-MAGAZINE ON CONTEMPORARY ISSUES

December 20, 2021

Lost in the Haze

Pollution norms in India's coal power plants

By: Maria Chirayil,Ashok Sreenivas,Shripad Dharmadhikary

Despite the serious pollution and health concerns about emissions from coal-based power plants, the many norms that the government has notified remain largely on paper. Will India ever operate under a stringent emission control regime?

The role of coal in the Indian power sector is being widely debated in the context of the energy transition to clean fuels. Economic and policy drivers have resulted in a growing share of renewable energy in the power generation mix. While the share of coal in power generation is projected to decline gradually but the absolute quantity of coal used is most likely to increase for a while. With the continued role of coal in power generation, the pollution and health risks associated with thermal generation will also continue. The pollution level in areas with a higher concentration of thermal generators, like Korba and Singrauli, has consistently been found to be high[1]. Emission standards are an important lever for controlling emissions from thermal power generation and addressing some of the associated concerns. This is essential for reducing the health and livelihoods impacts of thermal generation on the vast population living near thermal power plants (TPP)s.

Until 2015, the only emission standards for TPPs were on the emission of particulate matter (PM). On 7 December 2015, the Ministry of Environment, Forest, and Climate Change (MOEFCC) notified the Environment Protection (Amendment) Rules, 2015. The amended rules introduced more stringent norms for PM, and new standards for sulphur dioxide (SO_2), nitrous oxides (NOx), mercury (Hg) emissions and water consumption in thermal power plants and mandated zero waste water discharge for all TPPs installed after 1 January 2017. There is some difference of opinion on the need for SO_2 emission norms given that Indian coal is generally low-sulphur, but research suggests that SO_2 leads to formation of secondary PM that is a major contributor to PM pollution near thermal plants. Hence, it is important to curb SO_2 emissions (Guttikunda & Jawahar, 2014) (Cropper, et al., 2020). The 2015 rules required all TPPs to be in adherence to the norms within two years of the notification, by December 2017.

With six years in the rear-view mirror since its notification, the 2015 rules merit review to examine the on-ground progress of adherence.

How do the environmental norms impact the power sector?

Discussions about the emission standards for TPPs seldom include discussions on actions that need to be taken by power sector agencies to ensure compliance. To begin with, in order to adhere to the norms, TPPs would need to install or retrofit some Pollution Control Equipment (PCE). The PCE required varies based on several factors, including the size, location and vintage of the TPP, and the kind of coal it uses. The requisite technology could vary from Flue Gas Desulphurisation systems (FGD) and Dry Sorbent Injection (DSI) to control SO_2 emissions, to Electro Static Precipitators (ESP) for PM emissions or Selective Catalytic Reactors (SCR) to address NOx emissions. Often, checks of adherence to the norms and implementation of PCE have been conflated with and limited to FGD – the most expensive and complex PCE – implementation.

Installing such PCE could require significant gestation periods. FGDs, for example, may require more than two years for equipment installation and some down-time (up to three months) for connection with the unit. In the absence of careful planning and scheduling, multiple TPPs may shut down at the same time and affect power supply to the consumer.

Moreover, PCE installation also requires the incurring of significant capital expenditure and some running cost, which will, in turn, impact the cost of generation and tariffs of these TPPs. In the case of TPPs whose tariffs have been set under the cost-plus regulation[2] (Section 62 of the Electricity Act, 2003), the responsibility of addressing such changes in tariff falls on the respective (State or Central) Electricity Regulatory Commission. On the other hand, for TPPs whose tariffs have been set through competitive bidding (under Section 63 of the Electricity Act, 2003), tariff changes are dealt with in accordance with the conditions agreed to in their respective Power Purchase Agreements (PPAs). These additional costs for adherence to the environmental norms have been incurred due to a change in law, after the determination of tariffs under Sections 62 and Section 63 of the Electricity Act, 2003[3]. As per the tariff regulations and PPA conditions. the tariff increase on account of such a change in law can be passed on to the consumer. Despite the

impact on consumers and the sector at large, there has been little clarity on the treatment of the additional expenditures and tariffs.

> [T]he environmental norms have undergone several dilutions and the deadlines for compliance have been pushed back multiple times in the six years since they were notified in 2015.

Further, in order to ensure sector-wide smooth and timely adherence to the revised environmental norms, sector stakeholders and institutions should have taken timely action. For instance, The Ministry of Power (MoP), should have declared the change in law at an early stage, electricity regulators should have come up with a timely sector-wide framework, and the Central Electricity Authority (CEA) should have undertaken the requisite benchmarking studies. While some action on these fronts has been seen of late, these steps have been limited and have come after significant delays.

In fact, the MoP only recognised the revised environmental norms as change in law in 2018, a year after the first deadline for adherence had lapsed. The lack of regulatory guidelines led to several litigious complications and delays for several TPPs. There has also been inaction or counterproductive action from other sector actors. Additionally, the environmental norms have undergone several dilutions and the deadlines for compliance have been pushed back multiple times in the six years since they were notified in 2015. Table 1 lists in detail the developments in the six years since the 2015 amendment to the pollution norms.

Table 1: What Happened in the Six Years since the 2015 Amendment?		
Date	**Event**	**Features**
07 December 2015	The Environment (Protection) Amendment Rules, 2015 by MOEFCC	Norms changed to include SO_2, NOx, Hg, water consumption and zero waste water discharge; broadly consistent with international standards
13 October 2017	Memorandum on revised action plan submitted by MOP to MOEFCC	Suggested timeline change to 2022 with staggered implementation schedule prepared by CEA
07 December 2017	*1st Deadline for all TPPs*	*Vast majority does not adhere* CPCB issues notices to TPPs with new deadlines as suggested by MoP
02 February 2018	Affidavit on behalf of MOEFCC submitted at Supreme Court	Timeline changed to 2019 for NCR plants and 2022 for rest
30 May 2018	MOP directive to CERC	Recognising the 2015 Amendment as change in law and calling for a guiding framework
28 June 2018	The Environment (Protection) Amendment Rules, 2018 by MOEFCC	Norms regarding water consumption relaxed and stack heights revised
07 March 2019	CERC Tariff Regulation 2019 for plants falling under Sec. 62 of the Electricity Act of 2003	Incorporates in-principle approval, additional capital expenditure and tariff structure on account of revised emission norms
07 December 2019	*2nd Deadline for NCR plants*	*Vast majority does not adhere*
25 August 2020	CERC Tariff Regulations First Amendment 2020	Includes financial and operational parameters and recovery mechanism for Sec 62 plants
19 October 2020	The Environment (Protection) Amendment Rules, 2020 by MOEFCC	NOx norms diluted for plants with commissioned between 2004 and 2016
31 March 2021	The Environment (Protection) Amendment Rules, 2021	Extends the deadlines for compliance up to 2025 (MOEFCC, 2021)
16 April 2021	Taskforce for categorization of TPP constituted	TPPs split into categories A, B, or C according to location of TPPs as per the 2021 Amendment
13 August 2021	CERC suo-motu order	Incorporates recovery mechanism of additional cost due to environmental norms for Section 63 plants
07 December 2022	*2nd Deadline for non-NCR plants*	*Likely to be missed by most given current status and required lead time*
31 December 2022	*Deadline for compliance of Category A TPPs*	*For retiring and non-retiring units*
31 December 2023	*Deadline for compliance of Category B TPPs*	*For non-retiring units*
31 December 2024	*Deadline for compliance of Category C TPPs*	*For non-retiring units*
31 December 2025	*Deadline for compliance of Category B and C TPPs*	*For retiring units*

Source: Prayas (Energy Group) compilation based on government notifications and regulatory document

What is the status of adherence six years after notification of norms?

Prior to the 2021 amendment, TPPs were required to adhere to the environmental norms by 2019 (plants located in National Capital Region) or 2022 (plants located elsewhere in the country) to remain operational. The standards were applicable to units based on their vintage, with different norms applying to the plants installed before 2004, between 2004 and 2016, and after 2016. To track adherence to these deadlines while ensuring adequate electricity supply (even when some plants have been down for PCE installation), the CEA published a staggered implementation plan, based predominantly on unit-wise FGD implementation. The CEA also publishes a report to monitor the status of PCE implementation, tracking progress across various stages such as planning, feasibility study completion, tender

specification, award of bids, and project completion. If the roll-out had progressed as envisaged, then now in December 2021, all NCR plants and a majority of the non-NCR plants should already be in adherence or have FGDs installed.

Unfortunately, this is not the case.

The CEA tracks FGD implementation for 167 gigawatts (~437 units) of the 209 GW of thermal capacity in the country. According to its October 2021 report, around half of this monitored capacity has missed the unit-wise deadline that was prescribed in its staggered implementation plan. Forty per cent of the monitored capacity is in the bid awarded stage of the FGD implementation process, and 38% have issued notices inviting tenders. Given that a significant proportion of the monitored units is still in the preconstruction stage of the FGD installation process, and that the installation of FGDs could take up to 36 months, it is highly unlikely that FGDs for many of these units will be commissioned before the 2022 deadline – despite the five-year extension granted from 2017.

> [T]here are several plants ... which have been commissioned after 2017 and have been generating electricity without the requisite pollution control equipment, and are hence presumably in violation of the norms.

The monitored capacity also includes 118 GW, which was scheduled to have FGDs installed by December 2021. However, only 2% of this capacity has seen installation and 38% of the 118 GW has seen no change in FGD implementation status since January 2020. Moreover, the CEA's implementation schedule deals with TPPs commissioned prior to 2017; plants commissioned from 2017 were expected to have FGD/PCE installed from their date of operation. Yet, there are several plants, such as the Darlipalli TPP in Odisha, Suratgarh TPP in Rajasthan, and Bhadradri TPP in Telangana, which were commissioned after 2017 and have been generating electricity without the requisite PCE, and are hence presumably in violation of the norms.

These timelines and implementation schedules, however, have little meaning[4] now that the 2021 amendment has been notified. TPPs are now classified into Categories A, B, or C based on the pollution and population level of the TPP location, and the due date of retirement. This amendment also introduces a penalty, called the environment compensation, to be paid by the TPPs, which varies from Rs. 0.05 to Rs. 0.20 per unit electricity generated, based on the duration of non-compliance. While the Central Electricity Regulatory Commission (CERC) has clarified that this penalty cannot be passed through to consumers, there is insufficient clarity on whether it will act as a deterrent. Even if there is non-compliance, generators will continue to receive their fixed costs, which will allow them to continue to service their loans and get a return on equity. The TPPs can technically continue to operate without PCE as long as the penalty is paid. Distribution companies may also continue to procure power from such generators to ensure stability in supply. This is especially a concern in the case of mass non-compliance, since it would not be practicable to shut down all such units.

A taskforce constituted in April 2021 to categorize TPPs into the three categories repeatedly missed its deadlines. Until recently, there was no official statement on which TPPs fall into which category, giving TPPs a convenient excuse that they do not even know their compliance deadline and applicable penalties. (The CPCB published the classification of power plants as this article was being finalized.) Around 23 GW of the currently installed capacity falls into Category A, which has the most critical deadlines and the highest penalties. Category B also has around 23 GW. The remaining ~163 GW will fall in Category C, with the laxest deadlines and lowest penalties. Since the lowest penalties will be applicable on the largest proportion of TPPs that have not installed PCE, the repercussions of non-compliance are less severe for a large number of plants.

Who should be held accountable?

The action to be taken on non-compliance and the responsibility to ensure adherence to the environmental norms has been passed around the key actors like a hot potato. The rollout, or lack thereof, of the norms shows that the various stakeholders are not serious enough about their implementation.

- The MoP and CEA, for instance, have often side-stepped taking proactive action. Issues such as benchmarking of the cost and technology, addressing the concerns of units that comply with the norms early, and the shutdowns needed for synchronisation should have been, but were not addressed in a timely manner. The CEA came out with a very rough cost benchmarking for FGDs only in February 2019, and produced technology selection information limited to FGDs in February 2020. Even the MoP's directive to the CERC, allowing passing through of PCE related costs, came only in May 2018, after the initial deadline of December 2017 had lapsed. Further, the 2021 amendment and the pushback of deadlines was influenced by the CEA's paper on the January 2021 plant location specific emission norms. In June 2021, the CEA reviewed the SO_2 emission norms, and

continued to push for a 10 to 15 year timeline for adherence. The explanation was that plants located in areas with low levels of ambient SO_2 need not be subject to stringent timelines. This explanation, however, does not take into account the fact that the SO2 emissions lead to the formation of secondary particulates. Hence, looking at levels of ambient SO2 alone to assess SO2 emissions is insufficient . This stance, along with the delayed action and requests for relaxation, raises questions about the seriousness of these agencies in having TPPs adhere to norms.

> In the absence of regulatory certainty, the provisions of the 2015 amendment were open to interpretation and invited ad hoc action, litigation, and associated delays.

- Generators have consistently delayed taking action on adherence. When the initial deadline of December 2017 was in effect, generators delayed initiating proceedings for FGD installation with their respective SERCs. For example, Lalitpur Power Generation Company and Nabha Power filed petitions with their SERCs only in November 2017 and January 2018. This practice continued with the second deadline for compliance, and many TPPs, including Lalitpur and Nabha, have missed the unit-level deadlines as in the staggered implementation plan. Of the ~16 GW which was supposed to have FGDs installed by December 2019 according to the revised timelines, only 1 GW had actually done so. Generators are found to default even in newly commissioned TPPs, which are supposed to have operational PCE from the start of operations. Plants that operate without PCE though they were commissioned after 2016, include Darlipalli TPP in Odisha, Suratgarh TPP in Rajasthan, and Bhadradri TPP in Telangana.

- While other factors like supply constraints and ambiguity in costs, may be genuine bottlenecks to compliance, the uncertainty on the part of regulators has also not helped. Though the norms pertain to the environmental sector, they have a significant impact on the power sector. Challenges such as revenue loss during shut-downs, capital and operational expenditures in implementation, and the impact on consumer supply and tariffs should have been pre-empted and addressed by central and state regulators. Further, even though the 2015 amendment was recognised as a change in law event by the MoP's 2018 directive to the CERC, it was not supplemented by a regulatory framework with enabling guidelines. In the absence of regulatory certainty, the provisions of the 2015 amendment were open to interpretation and invited ad hoc action, litigation, and associated delays. In fact, clarity on even preliminary in-principle approvals only came with the 2019 CERC tariff regulations. Some attempts to provide clarity at the central level have included amendments to the 2019 CERC tariff regulations and a suo-motu order that addressed tariff impacts and compensation mechanisms for additional costs. While these are positive developments, they have been introduced five years after the 2015 amendment. These regulations still do not provide any incentives for early adherents. It is also not clear if the cost recovery of PCE is allowed only if the norms are met rather than against just the installation of PCE. At the state level, there has been no action at all to the best of our knowledge, other than dealing with individual cases. It is also not clear if the 2021 amendment would have regulatory implications. For example, though the imposed penalties will not be passed through to consumers and hence would have no tariff implications, would it affect the merit order despatch mechanism? Regulators are yet to begin any pro-active action on such questions.

> The inaction by actors..continues even with the 2021 amendment, casting a shadow on the likelihood of yet another round of deadlines being met.

- The 2015 amendment was a step in the right direction by the MOEFCC, and was based on several studies, and expert and public consultation. It also drew on comparisons with international standards. Since then several stakeholders have proposed dilution and delays, which the MOEFCC has accepted quietly. The MOEFCC, in its affidavit to the Supreme Court, had submitted MoP's staggered plan and accepted 2019 (for the NCR) and 2022 (for the rest of the country) as the new deadline. In spite of this, it notified the 2021 amendment and the new deadlines, thus deviating from its commitment to the Supreme Court, and without obtaining the Court's permission. With regard to adherence to the norms, the Pollution Control Boards (PCBs) have the responsibility of monitoring and ensuring accountability. However, they have been relatively lax in taking action on non-compliance. For example, the inaction towards plants commissioned after 1 January 2017 that were supposed to comply with the norms from the day of commissioning but are yet to install PCE[5]. The data collected from emissions monitoring by the PCB is not accessible in the public domain, impeding the transparency of process and making it impossible to identify which plants, if any, are adhering to the norms. The lack of transparency, accountability, and intent has led to

several missteps in the roll out of the norms.

The inaction by actors, along with sectoral ambiguity towards the environmental norms, continues even with the 2021 amendment, casting a shadow on the likelihood of yet another round of deadlines being met.

What challenges lie ahead?

Six years after the notification of the Environment Protection (Amendment) Rules, 2015 were notified, there has been precious little progress, both in terms of development of institutional procedures and actual implementation. The limited action under the 2015 rules, the seeming reset with the 2021 amendment, the several iterations of dilution and delay, and the continuing attempt to push the deadline further back another decade, call into question the sincerity to implement the norms and address the serious pollution-related challenges near TPPs. The skewed regulatory focus on installation of PCE, gives additional weight to this scepticism. This is because actual adherence depends on whether emissions have been controlled, which, in turn, depends on utilisation of the PCE and not just installation. Additionally, the government retracting the mandate to use washed coal, ostensibly on account of a cost burden, sets a worrying precedent.

The key question is that despite the serious pollution and health concerns around generation of power from coal, will India ever operate under a stringent emission control regime?

Footnotes:

1

The Air Quality Index in these reigons average at 300, which is severe and a health risk to resident communities.

2 Under cost-plus regulation, the generator's tariff is set such that it is allowed to recover its costs (subject to prudence checks by the regulator) along with a rate of return.

3 Some TPPs were required to install PCE at the time of their installation. The change in law does not apply to such generating stations.

4 TPPs commissioned from 2017 onwards were required to be in compliance from the start of operations, and it is unclear whether the 2021 amendment changes this adherence requirement.

5 However, in theory, lack of PCE installation does not translate to non-adherence. TPPs may be able to adhere to the norms through other alternative methods (use washed, low sulphur coal, etc). Adherence in such cases can only be confirmed based on publicly released emissions monitoring data.

References:

Cropper, M., Cui, R., Guttikunda, S., Jawahar, P., Park, Y., Yao, X., & Song, X.-P. (2020). The mortality impacts of current and planned coal-fired. *Proceedings of the National Academy of Sciences of the United States of America*.

Guttikunda, S. K., & Jawahar, P. (2014, August 19). Atmospheric emissions and pollution from the coal-fired thermal power plants in India. *Elsevier Atmospheric Environment*.

MOEFCC. (2021, March 31). *Environment (Protection) Amendment Rules, 2021*. Retrieved from MOEFCC: http://moef.gov.in/wp-content/uploads/2021/04/GSR243.pdf