
THERMAL POWER PLANT EMISSION NORMS IN INDIA

Permitting Pollution Due to a Regulatory Black hole



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Context

Until 2015, coal-fired thermal power plants in India were regulated only for particulate matter emissions and there were no emission norms prescribed for NO_x, SO₂ and Mercury.

On 7th December 2015, the Ministry of Environment, Forest and Climate Change (MOEFCC) made amendments to the regulatory measures given in Environment (Protection) Rules, 1986¹ and established a new set of emission norms for the thermal power plants through the powers stipulated under the Environmental Protection Act, 1986.

Thermal Power Plant Emission Norms, 2015

Date of Installation	Particulate Matter (PM)	Sulphur Dioxide (SO₂)	Oxides of Nitrogen (NO_x)	Mercury (Hg)
Before December 2003	100mg/Nm ³	600mg/Nm ³ for < 500MW 200mg/Nm ³ for ≥ 500MW	600 mg/Nm ³	0.03 mg/Nm ³ for ≥500MW
January 2004 to December 2016	50mg/Nm ³	600mg/Nm ³ for < 500MW 200mg/Nm ³ for ≥ 500MW	300 mg/Nm ³	0.03 mg/Nm ³
January 2017 onwards	30mg/Nm ³	100 mg/Nm ³	100 mg/Nm ³	0.03 mg/Nm ³

¹ http://moef.gov.in/wp-content/uploads/2017/08/Thermal_plant_gazette_scan.pdf

CASE STUDY: Status of Implementation of New Emission Norms (2015) In One Thermal Power Plant Cluster in the Ennore, Tamilnadu :

Initially, in 2015 all Thermal Power Plants (TPPs) across India were required to meet the new emission norms within two years (by 2017). Later, through an addendum the deadline for all the TPPs was pushed by five years to December 2022 except for TPPs in the National Capital Region (December 2019). Once again, in April 2021, the Ministry of Environment, Forest and Climate Change has further extended the deadline for meeting the emission norms by an additional 3 years (until 2024). TPPs in the National Capital Region was given an extension by 1 year until 2022.

In Tamilnadu, the state Pollution Control Board (TNPCB) has installed continuous source emission monitors in each stack of TPPs (among other industries) that are connected to the CARE AIR Centre (Centre for Accessing Real Time Air (Quality) Information Report). The TNPCB's CARE AIR uses MOEFCC's 2015 emission norms as threshold values to monitor emission levels and record violations. Although the automated monitoring and collection of data has been established, no effort to monitor recorded violations and take action on violating units have been put in place.

Even as the obligation for the TPPs to comply with the 2015 norms are being extended repeatedly, Thermal Power Plants continue to exceed emission norms in its operations with impunity. This exposes a lack of a monitoring, controlling and regulating mechanism of the TNPCB. Zero action to control emissions and meet regulatory norms coupled with repeated extensions in deadlines do not instil the confidence that the State Pollution Control Board and the MoEFCC is treating air pollution as something that can have serious economic and public health repercussions.

We use the example of the Ennore Thermal Cluster, comprising of the North Chennai Thermal Power Station (NCTPS) and NTPC Tamil Nadu Energy Corporation Limited (NTECL), Vallur to demonstrate the violations in stack emissions during the period 2019-2020 when the recent deadline extension was being finalised. The total capacity of

these two installed plants is 3,330MW. The major pollutants emitted from TPPs are PM, NO_x, SO₂, CO and Mercury. (Fig. 1).



Air Pollution and COVID vulnerability

A recent study estimated that fossil fuel-related emissions contributed to as high as 22% of COVID-19 mortality in South Asia². Chennai is one of the COVID-19 hotspots in south India, with more than 3,00,000 COVID Cases recorded till May 2021. Ennore thermal cluster has thermal power plants with a total installed capacity of 3,300 MW, fly ash ponds and coal handling yards and two coal handling ports located in the vicinity of Chennai and they contribute significantly to the poor air quality in the region. In addition to the existing TPPs, three more TPPs namely NCTPS Stage 3 with a capacity of 800MW and Ennore SEZ thermal power plant with a capacity of 1320MW and Ennore Thermal Power Station Expansion of 660MW are under construction.

² <https://academic.oup.com/cardiovascres/article/116/14/2247/5940460>

Emission Data and analysis:

Continuous stack emission data is recorded by the Tamil Nadu Pollution Control Board's (TNPCB) CARE Air Centre. The one hour average of stack emission data of the two operational TPPs for two years (1st Jan 2019 to 15th Dec 2019 and 1st Jan 2020 to 31st Dec 2020) were sought through RTI application to ascertain non-compliance*. The threshold values for exceedance data calculation prescribed by TNPCB to these plants are provided below (Table 2)

Table 2: Threshold values prescribed by TNPCB

Thermal Power Plant	Particulate Matter (PM)	Sulphur Dioxide (SO₂)	Oxides of Nitrogen (NOx)
NCTPS Stage I	100mg/m ³	229ppm*	319ppm*
NCTPS Stage II	50mg/m ³	76ppm*	159ppm*
NTECL	50mg/m ³	200mg/Nm ³	300mg/Nm ³

In this report, the term **non-compliance** refers to a) the aggregate of the number of hours for which data is not available (0 reading or blank field), and b) the number of hours during which emissions exceeded the emission and monitoring norms prescribed by TNPCB for each of the parameters.

* PPM threshold values correspond with mg/Nm³ units prescribed by the MoEFCC

North Chennai Thermal Power Station

NCTPS Stage I:

NCTPS is owned by Tamil Nadu Energy Generation and Distribution Corporation (TANGEDCO). NCTPS stage I³ has 3 units commissioned between October 1994 and February 1996. It has a total installed capacity of 630 MW comprising 3 units of 210 MW each. Coal from Mahanadi coalfields Limited, Odisha, and Eastern coalfields Limited, West Bengal is used for power generation. Analysis of the stack emission data recorded by the TNPCB for 2019-2020 shows that -

- All 3 units of NCTPS Stage-I were monitoring and reporting PM, SO₂ and NOx levels to TNPCB's Care Air Centre (Fig.1).
- NCTPS Stage-I failed to monitor NOx emissions for 41% of the time and 6% of the time, the emissions exceeded the emission norms.
- PM emissions were left unmonitored for 31% of the time and 26% of the time, the PM emissions exceeded the emission norms.
- Similarly, the plant failed to monitor SO₂ for 41% of the time and SO₂ emissions exceeded the emission norms for 12% of the time in 2019 & 2020.
- **In total, the North Chennai Thermal Power Station Stage I was non compliant for 53% of the two year period.**

Stack Emission Violations of North Chennai Thermal Power Station (Stage I) during 2019 & 2020

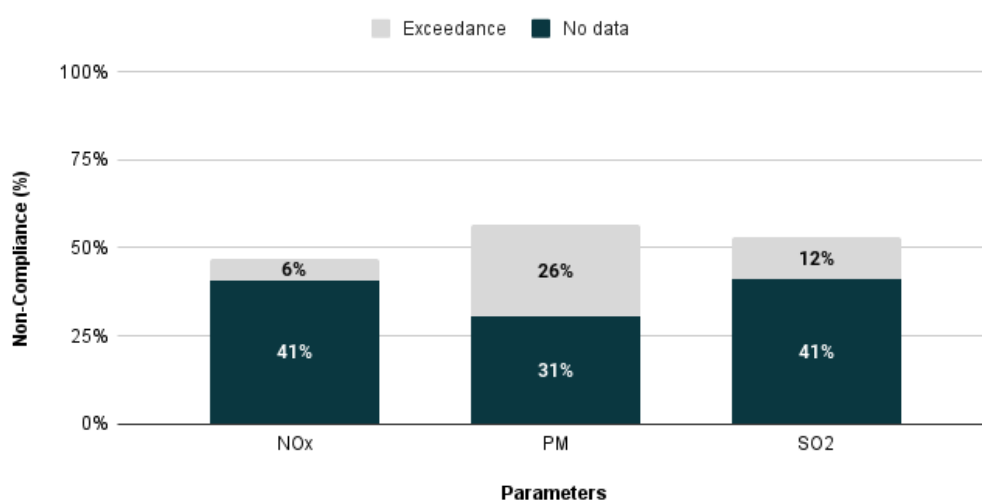


Fig. 1: Stack emission violations of NCTPS (Stage I)

³ <https://www.tangedco.gov.in/linkpdf/tnctps.pdf>

NCTPS Stage II:

NCTPS Stage II⁴ has a total installed capacity of 1200MW with 2 units of 600MW each. Similar to NCTPS Stage I, the coal fuel for energy generation is transported from Mahanadi coalfields Limited, Odisha, and Eastern coalfields Limited, West Bengal. Unit 1 and unit 2 were commissioned in March 2014 and May 2014 respectively. Analysis of the stack emission data recorded by the TNPCB for 2019-2020 shows that

- NCTPS Stage II was monitoring and reporting PM, SO₂, NO_x and CO levels to TNPCB's Care Air Centre (Fig.2).
- NCTPS Stage-II failed to monitor NO_x emissions for 5% of the time and 38% of the time, the emissions exceeded the emission norms.
- PM emissions were left unmonitored for 51% of the time and 19% of the time, the PM emissions exceeded the emission norms.
- SO₂ emissions were left unmonitored for 16% of the time and SO₂ emissions exceeded the emission norms for 15% of the time in 2019 & 2020.
- Similarly, CO was left unmonitored for 46% of the time. Although CO was being reported to the CARE AIR CENTRE by the TNPCB, the board has no threshold to monitor violations. Data is simply recorded.
- In total, the North Chennai Thermal Power Station Stage II was non compliant for 51% of the two year period.

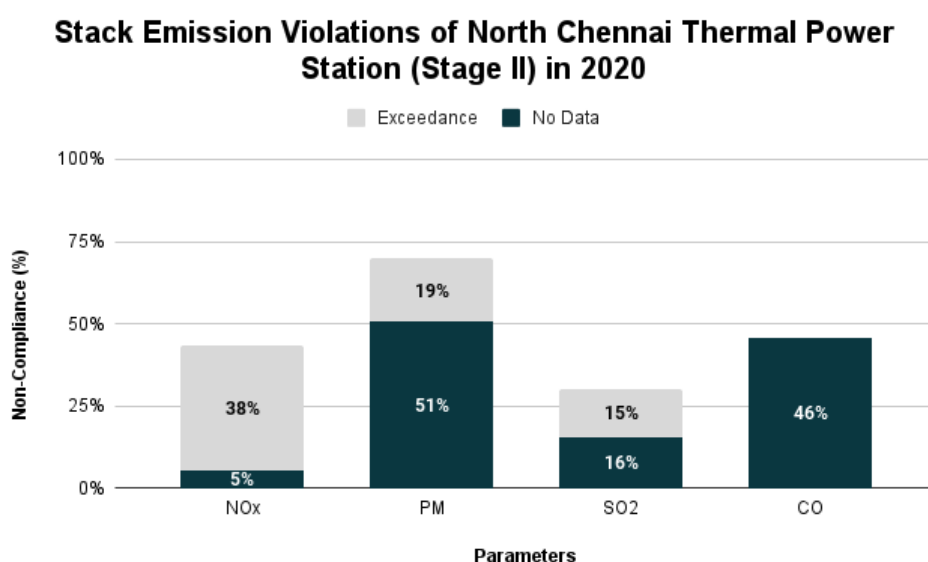


Fig. 2: Stack emission violations of NCTPS (Stage II)

⁴ <https://www.tangedco.gov.in/linkpdf/tnctps2.pdf>

NTPC Tamil Nadu Energy Corporation Limited, Vallur

NTECL⁵ is a joint venture formed by NTPC and TANGEDCO. NTECL has a total installed capacity of 1500MW (3 Units of 500MW). All three units of this power plant were commissioned in November 2012 and February 2015. The coal is transported from the Mahanadi Coalfields, Central Coalfields, Eastern Coalfields, etc.

- NTECL, Vallur monitors and reports PM, SO₂ and NO_x levels to TNPCB (Fig.3).
- NTECL, Vallur has failed to monitor the emissions of SO₂ for 12% of the year and SO₂ emissions exceeded the emission norms for 59% of the time during 2019 and 2020.
- Similarly, the plant failed to monitor PM emissions for 22% and NO_x for 1% of the time during 2019 and 2020.
- PM and NO_x emissions exceeded the emission norms for 1% and 34% of the time in 2019 and 2020 respectively.
- **In total, the NTPC Tamilnadu Energy Corporation Limited TPP was non compliant for 43% of the two year period.**

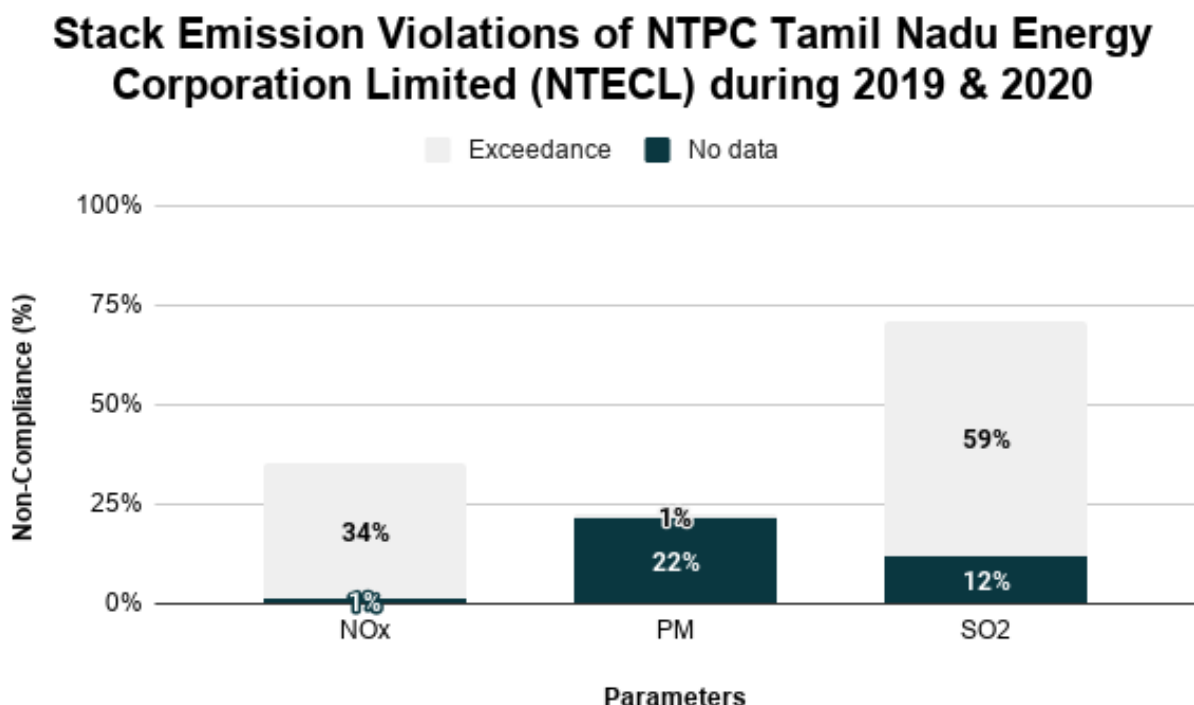


Fig. 3: Stack emission violations of NTECL

⁵ <http://ntpcntecljv.co.in/>

Discussion:

The coal-fired TPPs are one of the most polluting industries in the country accounting for over 60% of PM emissions; 45% of SO₂; 30% of NO_x and over 80% of mercury emissions. Particulate Matter based on the size of the particles, affect the cardiovascular system and cause premature death in people with heart or lung disease; cardiac arrest, irregular heartbeat, aggravates asthma, decreases lung function, increases respiratory symptoms. SO₂ is a known respiratory irritant and reduces lung function ability. NO_x is also a respiratory irritant and is found to cause cardiovascular diseases, lower birth weight in newborns and increased risk of premature death.

The emission and monitoring norms established are confined only to the pollutants emitted out of stacks/chimneys of TPPs. However, stacks are not the only source of pollution in a power plant. Fugitive sources like the coal yard, coal ash pond and transportation contribute significantly to poor air quality around TPPs. The MOEF norms don't have any guidelines for control of emissions from the fugitive sources like the ash ponds, coal handling facilities or coal transportation. Thus, failing to account for significant other sources from coal-fired power plants in contributing to ambient air pollution.

Given these limitations, in order to protect public health and ensure reduction of fossil fuel emissions in line with global carbon commitments, policy efforts should focus on ensuring 100% compliance in the shortest period possible.

It should also be noted that the data available with the TNPCB and analysed above clearly indicate that these units are in violation of their legally mandatory compliance procedures. Such violations warrants an immediate legal action on the units by the regulatory agencies.

⁶ <https://www.cseindia.org/emission-norms-for-the-coal-based-thermal-power-sector-10679>

Conclusion:

Although it's been 7 years since the new norms have been established and under use to record violations of source emissions from industries including TPPs, there is little action being taken to continuously monitor violations recorded and take action to control and regulate emissions. The Pollution Control Boards in each state has been given this mandate. Yet, there is an evident lethargy in implementing the norms. The findings of this case study on Ennore thermal power cluster shows that the two thermal power plants, by NCTPS and NTECL were in violation of prescribed emission norms between 43% to 53% of the time in a two yearly period in 2019 and 2020. Perusal of data recorded by the Tamilnadu Pollution Control Board reveals that despite the technology in place, the instances of "no data availability" indicated a laid back approach in discharging duty and a lack of political will to monitor, contrary to the spirit of the law. Non-Availability of data is not only a statutory violation, it is also a regulatory roadblock in holding polluting industries accountable.. Gross number of violations in the periods that had records for stack emissions show that the TPPs were offenders who repeatedly violated prescribed norms, with no consequence from regulatory authority. This violates the spirit of the law and results in unchecked air pollution from fossil fuel emissions that greatly impacts the environment, has big climate consequences and degrades public health.

The COVID-19 Pandemic exposed the importance of good health in contributing to society. Air Pollution is a pandemic, just as COVID-19 is, harming the health of people all over the world. Unlike COVID-19, we know so much about Air Pollution, how harmful it is to human health, and have charted out detailed mechanisms to control pollution levels.

Even as governments take all possible steps to end the COVID-19 Pandemic as soon as possible, the same urgency to end air pollution is not seen. Instead of extending deadlines and allowing polluters to go scot-free as they go un-regulated, immediate action to implement emission norms, monitor emissions and chart out detailed local level plans to keep air clean is emphasised.

