FACTSHEET

ENVIRONMENTAL NORMS FOR COAL-FIRED POWER STATIONS

A STATUS UPDATE

AUGUST 2020

This factsheet offers a status update on the state of compliance with the December 2015 norms, with respect to particulate matter, sulphur dioxide, and oxides of nitrogen. Compliance with water and mercury norms has not been included in this assessment.

In May 2020, Centre for Science and Environment had published its report *'Coal-based power norms: Where do we stand today?'* The report had analysed all available data on the subject till October 2019 (*to download the report: https://www.cseindia.org/coal-based-power-norms-coal-based-10125*). This factsheet has tried to assess the progress between October 2019 and August 2020.

PARTICULATE MATTER

In 2017-18, the Central Pollution Control Board (CPCB) had sent directions to plants which were not complying with particulate matter (PM) emission norms and set deadlines for them. However, no further information about these plants is available till date in the public domain.

A CSE survey and assessment, conducted in the key coal-based thermal power generating states of Madhya Pradesh, Maharashtra and Uttar Pradesh, has assumed that all the other plants and units that were not served the notice for compliance, are already meeting the standard or are compliant.

The survey and assessment have accessed data from different sources, including:

- Submissions on compliance given by the National Thermal Power Corporation (NTPC), the Damodar Valley Corporation (DVC) and some private thermal power plants to the Ministry of Power (MoP)
- CEA reports and documents
- Emissions data for plants located in other states, obtained from the CPCB
- Environment statements and compliance reports submitted by plants

Status at a glance

Particulate matter (PM)

- **56 per cent of the total capacity (206,014 MW) is in compliance in August 2020; in our earlier assessment, 53 per cent had been in the compliance.**
- **Total compliance and non-compliance could not be ascertained as no information was available on 34 per cent of the capacity.**
- **10 per cent of the capacity is in the process of upgradation.**

Sulphur dioxide (SO_2)

- **35 per cent of the total capacity is either complying or has awarded tenders to meet the norms (71 GW)**
- **The rest are in preliminary stages of compliance. It is highly unlikely for units still at preliminary stages or with no plan to meet the 2022 deadline even if they awarded the tenders now.**
- **There has been a 10 per cent increase in capacity that has awarded tenders since October 2019. An additional 20,974 MW has awarded tenders between October 2019 and August 2020. In October 2019, only 32,600 MW had awarded tenders.**
- **The Central Electricity Authority (CEA) reports a total of 58,000 MW having awarded FGD (flue gas desulphurisation) tenders — this number includes stations which already have an FGD and are further awarding tenders for upgradation.**
- **Centre-owned plants appear to be leading in implementation of SO_2 norms, followed by privately-owned ones.**
- **State-owned units have made no progress on implementation — only three have awarded tenders so far.**
- **Among the key companies that have awarded FGD tenders are NTPC (more than 90 per cent of its capacity has awarded tenders), Reliance Sassan, Abhijeet Mihan, Essar Mahan, TAQA Neyveli, Talwandi Saboo, Essar Salora, Rosa TPP, Rajpura TPP, Maithon Right Bank, Baradarha DB TPP, Simhapuri Energy, UPRVUNL Anpara and CSPCGL Korba West.**

Oxides of nitrogen (NO_x)

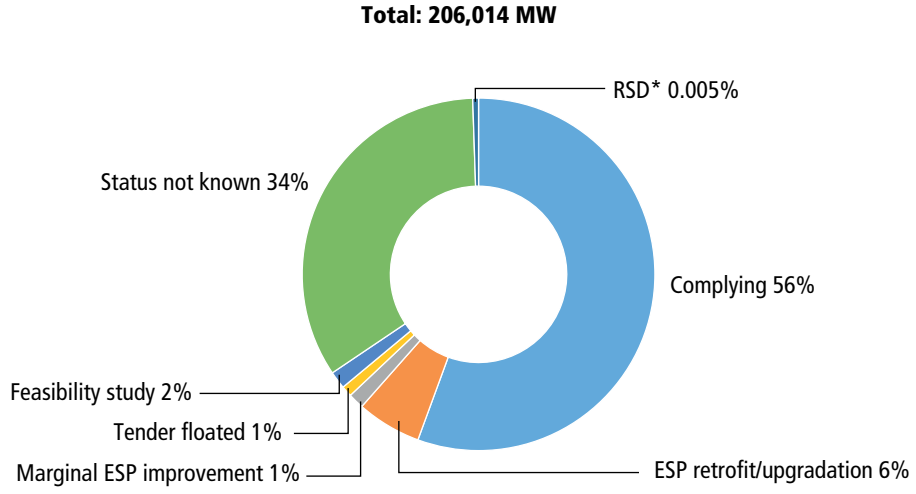
- **Current implementation progress data for a majority of the capacity is unavailable. Even in the previous assessment, there was little information available for NO_x standard implementation.**

This data has been included in CSE's final assessment as well, to prepare a full picture of the status, what is current and what needs to be done.

What is the status on PM?

CSE estimates that 56 per cent of the capacity is complying with the emission standards. About 10 per cent will need modifications, and for about 34 per cent of the capacity, the status with compliance is not known (*see Graph 1: Compliance with PM norms*).

Graph 1: Compliance with PM norms
More than half the capacity is complying



*Reserve shut down or RSD is the temporary closure of power plants until demand for electricity rises
Source: Centre for Science and Environment, 2020

SULPHUR DIOXIDE

For SO_2 control and compliance, a large proportion of the non-compliant units are considering partial or full flue gas desulphurisation (FGD), while a few of the smaller capacity and older units are opting for dry sorbent injection (DSI) technology. The CEA is monitoring the status of implementation of FGD in plants. It provides quarterly data on the progress made by plants to meet the standard – this is probably the most updated and authoritative information available. The CEA reports till August 2020 have been used in this assessment.

Compliance and non-compliance

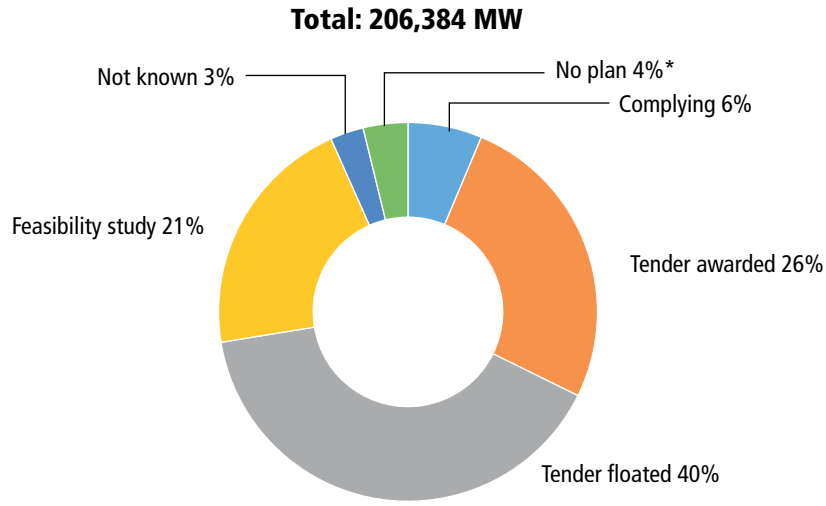
Units complying and likely to comply by 2022: 13,065 MW are already complying with the norms. This capacity includes a few stations which already have FGD – such as JSW Ratnagiri, Tata Trombay, Adani Dahanu, Adani Udupi, few units at Adani Mundra, one unit of Vindhyachal stage V, IL&FS Cuddalore, and CLP Jhajjhar. The rest which have declared to be in compliance are small-size boiler stations like TANGEDCO Mettur units 1-2, APGENCO Rayalseema units 1-5, etc. However, their claims have not been verified by the pollution control boards on the ground.

In addition, a few units that fire lignite in circulating fluidised bed boilers (CFBC), such as Barsingsar TPS, have mentioned they are in compliance with the norms (*see Graph 2: SO_2 compliance and non-compliance*). NTPC Dadri units 1-2 is a recent addition to the 'complying' list.

Tenders have been awarded by another 58 GW capacity – as per the current status, these units are likely to meet the deadline by 2022. Together, these constitute about 71 GW capacity.

Graph 2: SO_2 compliance and non-compliance

Over one-fourth of the capacity, which is at the stage of feasibility study or with no plan and status, is likely to miss the deadline for the norms



*No plan: Includes power generating units whose status is not mentioned in CEA monitoring reports and/or units that have not submitted a petition to the Supreme Court seeking relaxation of norms.
Source: Centre for Science and Environment, 2020

Units still at preliminary stages or with no plan for installation: A major capacity of 126 GW is still at preliminary stages of feasibility study (43 GW) and tender floated (83 GW); another 8 GW has no plans yet for installation, while for 6 GW the status of compliance is not known (*see Table 1: Units that have no plans for implementation*). Together, this constitutes 140 GW of capacity. **It is highly unlikely that these units would meet the deadline by 2022, even if they awarded tenders now.**

Most plants which reported having no plans to comply with the new norms, continue to present the same picture even after 10 months – the exceptions are Bajaj Lalitpur TPP in Uttar Pradesh, West Bengal Power Corporation Ltd-Bakreshwar, and few units of Dr Narala Tata Rao in Andhra Pradesh. These stations have reported that they have issued tenders in this gap, or are doing feasibility studies to install FGD technology to meet the December 2015 norms (*see Table 1*).

Table 1: Units that have no plans for implementation

CSE has identified the following 38 units from eight plants with "No plan" for implementation, of which more than half of the capacity is state-owned. About 90 per cent (32 units) are smaller capacity units of less than or equal to 250 MW. Also, more than half of the units are old, aged over 25 years

Unit-wise	State	Sector	Capacity (MW)	Year of commissioning
Bandel units 1-5	West Bengal	State	1,050	1982
Dr N Tata Rao unit 6	Andhra Pradesh	State	210	1994
RRVUNL Kota units 1-4	Rajasthan	State	640	2001-2004
Kothagudem TPS (TSGENCO) units 1-2, 4-5, 7-10	Telangana	State	1,040	1966-1997
Neyveli TPS 1 units 1-9	Tamil Nadu	Centre	600	1962-1970
North Chennai TPS (TANGEDCO) units 4-5	Tamil Nadu	State	1,200	2014
Panipat units 5-8	Haryana	State	920	2001
Raikheda TPP (GMR Energy) units 1-2	Chhattisgarh	Private	1,370	2015-2016
MPPGCL Satpura	Madhya Pradesh	State	420	1983-1984

Note: Status as of June 2020
Source: Centre for Science and Environment, 2020

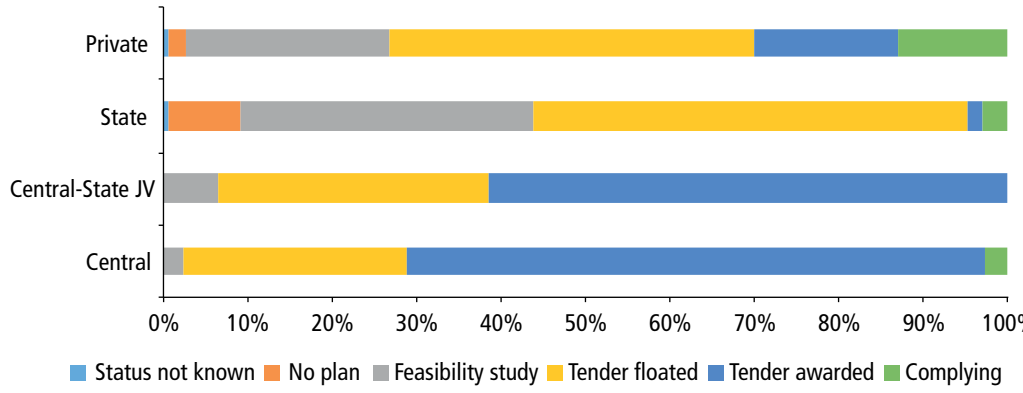
Ownership-wise comparison

Of the 206 GW capacity for which SO_2 implementation progress data has been compiled in this factsheet, it has been observed that Central plants are doing much better in terms of implementation (*see Graph 3: Ownership-wise implementation progress for SO_2 compliance – a comparison*). More than two-thirds (about 68 per cent) of Central-owned capacity (35,430 MW) has awarded tenders, and another 26 per cent capacity (13,590 MW) has floated tenders (as of June 2020).

In October 2019, out of private and state-owned plants, only one state-owned plant (comprising two units) had awarded contracts. By August 2020, a number of private stations – including Abhijeet Mihan, Essar Mahan, TAQA Neyveli, Talwandi Saboo, Sassan Power, Essar Salora, Rosa TPP, Rajpura TPP, Maithon Right Bank, Baradarha DB TPP and Simhapuri Energy – had awarded bids. The UPRVUNL Anpara's two units and CSPGCL Korba West have also awarded FGD tenders in the last 10 months.

Graph 3: Ownership-wise implementation progress for SO_2 compliance – a comparison

Very few private and state-owned units have awarded tenders



Source: Centre for Science and Environment, 2020

Table 2: NTPC – is it meeting the SO_2 norms?

The NTPC is doing better in terms of implementation – 92 per cent of its capacity has already awarded contracts and another 4 per cent has floated tenders; the rest are conducting feasibility studies

	Capacity (MW)
Complying	920
Tender awarded	59,610
Tender floated	2,890
Feasibility study	1,434
Total	64,854

Source: Centre for Science and Environment, 2020

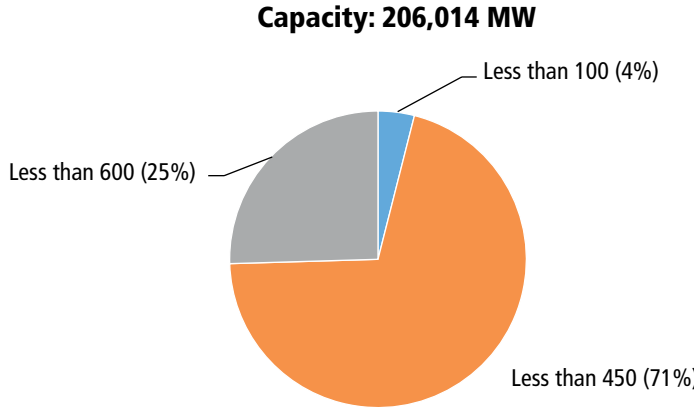
OXIDES OF NITROGEN

There is little information available on NO_x standard implementation. As per the December 2015 standards, more than three-fourth of the operating coal-fired power stations are supposed to meet a 300 mg/Nm^3 limit (*see Graph 4: NO_x emission limits*). However, on July 8, 2020, the Supreme Court accepted an upward revision of this limit to 450 mg/Nm^3. CPCB has not yet issued the notification revising the limit.

For the purposes of this assessment, CSE has used data provided by NTPC/DVC to the Supreme Court and the surveys conducted by it in key states. Analysis of the survey results indicate that emissions from 73 per cent of the capacity normally fall within the 200-400 mg/Nm^3 limit – these plants have installed either low NO_x burners or over fire air (OFA) systems, or both. Therefore, with the revision of norms from 300 to 450 mg/Nm^3, these plants are considered to be in compliance in the study (*see Graph 5: NO_x emissions intensity in the surveyed states*).

Graph 4: NO_x emission limits (mg/Nm³)

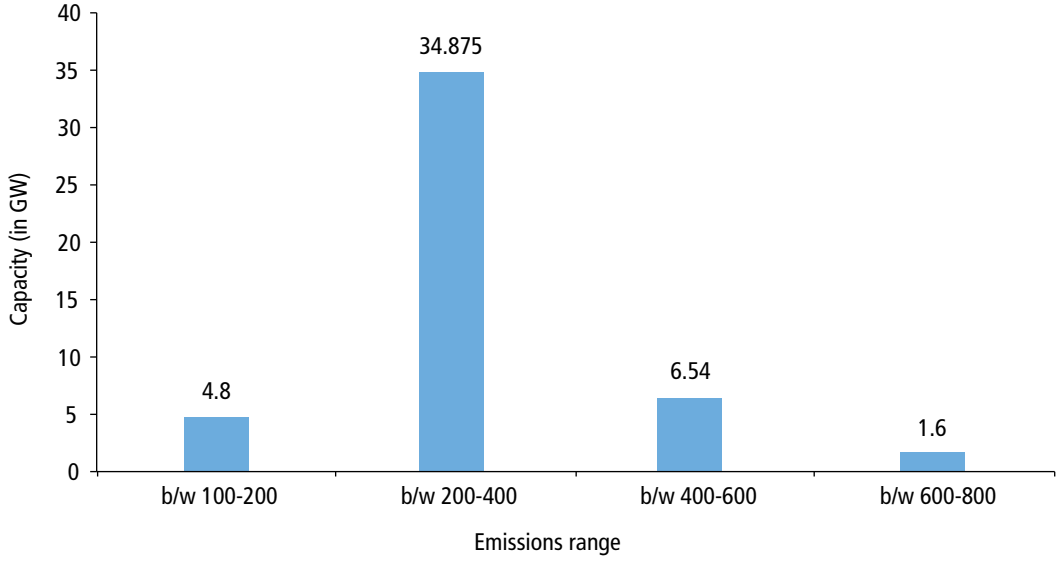
Stations commissioned prior to 2003 have to meet 600 mg/Nm³; those commissioned between 2003 and 2015 have to meet 450 mg/Nm³; and new plants commissioned post-2016 have to meet 100 mg/Nm³



Source: Centre for Science and Environment, 2020

Graph 5: NO_x emissions intensity in the surveyed states

About 73 per cent capacity had emissions between 200-400 mg/Nm³



Source: Centre for Science and Environment, 2019

According to experts, many power stations have emissions over 450 mg/Nm³ while operating in fluctuating load conditions – these will need upgradation. Among these stations are names like Tata Power-Maithon, Mundra, Jojobera, various Vedanta plants (such as Lanjigarh and Jharsuguda), Jindal Power-Tamnar, JSW Ratnagiri, Essar Mahan, most of the RRVUNL, various captive units of Hindalco, etc.

Plants commissioned after January 1, 2017 have to meet a stringent norm of 100 mg/Nm³ – but none are meeting the norms as on date. New capacity totalling 23,112 MW was added between January 2017 and October 2019, and has to meet the norm of 100 mg/Nm³. Centre-run companies account for 41 per cent of this new capacity. This norm of 100 mg/Nm³ cannot be achieved by a mere installation of OFAs and LNBs. What is needed are effective technologies like SCR/SNCR. However, the power industry is unsure about the effectiveness of SCR for high dust loading (over 90 g/Nm³), which is typical to India.

Table 3: Mapping the progress

Parametres	October 2019	August 2020
Particulate matter	Complying: 53% ESP planned/underway: 8% To retire/RSD: 1% Status unknown: 38%	Complying: 56% ESP upgradation underway: 6% Marginal ESP improvement or to retire/RSD: 1% Tender floated: 1% Feasibility study in progress: 2% Status unknown: 34%
Sulphur dioxide	Complying: 16,029 MW (8%) Tender awarded: 32,600 MW (17%) Tender floated: 59,930 MW (31%) Feasibility study in progress: 64,963 MW (34%) Status unknown: 6,995 MW (4%) No plan: 9,160 MW (5%) Retired: 1,260 MW (1%)	Complying: 13,065 (6%)* Tender awarded: 53,574 MW (26%) Tender floated: 82,844 (40%) Feasibility study in progress: 43,166 MW (21%) Status unknown: 5,875 MW (3%) No plan: 7,860 MW (4%)
Oxides of nitrogen	Most might comply – no information	Most might comply – no information

Notes: *Few power stations which had earlier indicated that they are complying with the SO_2 norms like Rattan India, and few smaller power stations, have now declared they are not complying with the SO_2 norms and are working to retrofit suitable technology.
Source: Centre for Science and Environment, 2020

For more details on the subject and for power station-wise information, please visit https://coalpowerwatch.cseindia.org/"