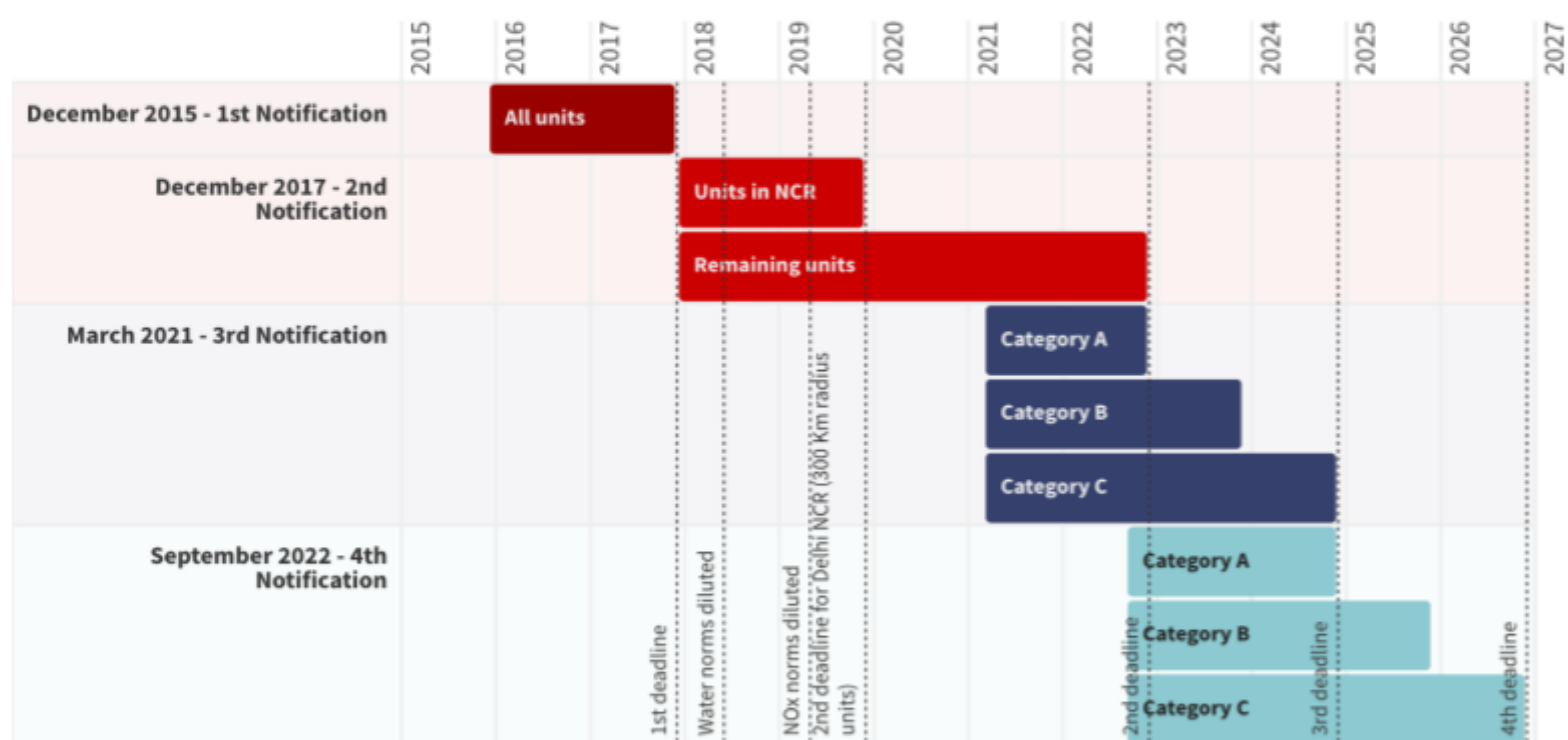


Emission Watch: Tracking the implementation of emission standard notification for coal-based power plants in India

Manoj Kumar N, and Sunil Dahiya,
12/2023



Emission Watch:

Tracking the implementation of emission standard notification for coal-based power plants in India

12/2023

Authors

Manoj Kumar N, and Sunil Dahiya

Editors

Hannah Ekberg, and Nandikesh Sivalingam

About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. CREA uses scientific data, research, and evidence to support the efforts of governments, companies, and campaigning organisations worldwide in their efforts to move towards clean energy and clean air, believing that effective research and communication are the keys to successful policies, investment decisions, and advocacy efforts. CREA was founded in Helsinki and has staff in several Asian and European countries.

Disclaimer

CREA is politically independent. The designations employed and the presentation of the material on maps contained in this report do not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect the official policy or position, or represent the views or opinions, of the Centre for Research on Energy and Clean Air (CREA), or its members and/or funders. CREA assumes no responsibility or liability for any errors or omissions in the content of this publication.

Emission Watch:

Tracking the implementation of emission standard notification for coal-based power plants in India

Key findings

- **National**
 - Eight years after the notification of emission standards for coal-based electricity generation units in India only 77 units with a combined capacity of 16.5 GW have installed FGD (24 units, 10.6 GW) or CFBC (53 units, 5.9 GW), which is less than 8% of the total coal-based electricity generation capacity;
 - only 3.2 GW capacity across 6 units have installed SO₂ control technologies over the last year (since December 2022), taking the total capacity with SO₂ control to 16.5 GW;
 - only 3.5 GW new capacity (10 units) have entered the bid awarded stage since December 2022, taking the total capacity in the bid award stage to 103 GW;
 - only 6 GW new capacity (20 units) have opened the bids since December 2022, taking the total capacity in bid opened stage to 52.4 GW;
 - In December 2020 a capacity of 26.8 GW across 92 units was in the feasibility study started/completed stage which in October 2023 still remains as high as 22.5 GW across 77 units;
 - Based on progress during past years and the fact that it takes 18-36 months to synchronize FGD after the bid award date, most of the capacity (>88 GW) in the pre-bid award stage (bid opened, tender specification made, feasibility study started/completed/not started stage) is at the risk of missing the third time extended deadlines in all categories (category A, B & C).

- **Power plant units in the 300 Km radius of Delhi-NCR:**

- The 300 km radius around Delhi-NCR hosts 12 coal-based electricity generation plants (36 units) with a cumulative capacity of 13.4 GW, out of which as of October 2023:
- FGD/DSI installation has been completed for 7 units with 2.6 GW installed capacity;
- bids have only been awarded for 6 units, with 3.4 GW capacity;
- notice inviting tenders (NIT) has been issued for 13 units, with a capacity of 3.8 GW;
- bids for 2 units, with a capacity of 0.5 GW, have been opened;
- tender specifications have been made for 3 units, totalling 2 GW; and
- four units with a cumulative capacity of 0.9 GW were at feasibility studies completed, while the feasibility study has been initiated for 1 unit (0.1 GW).

- **National Thermal Power Corporation (NTPC):**

- Out of NTPC's total 56.3 GW coal capacity monitored by Central Electricity Authority (CEA) for FGD installation, only 3.6 GW across nine units has installed FGD as of October 2023, leaving 50.7 GW capacity across 114 units at bid award stage, six units (1.1 GW) are at NIT issued stage and haven't shown any progress since December 2020.
- 0.7 GW capacity across eight units has been retired at Muzaffarpur and Talcher (Old) power plants, and two units of 105 MW each are planned to be decommissioned.
- Only three units have installed FGD since December 2022, taking the total number of NTPC coal-based power plant units with FGD to nine.
- No new bids have been awarded since December 2022
- Out of 40 units (22.5 GW) that awarded bids in 2018, only eight units with 3.2 GW capacity have successfully installed FGD; the rest 32 units (19.4 GW) still haven't completed the FGD installation process despite taking around 60 months (5 years) since the bid award date.
- None of the 42 other units (15.7 GW) that awarded bids in 2019 have finished FGD installations despite taking >48 months since the bid award date.
- None of the 35 units (12.5 GW) that awarded bids in 2020 have finished FGD installations despite taking >36 months since the bid award date.

Contents

Installed electricity generation capacity in India	6
Coal consumption in India	6
Emission standard notification for coal-based electricity generation units in India	8
FGD implementation status	10
Delhi-NCR FGD Status	13
NTPC snapshot	16
Conclusion and the Way Ahead	17
References	20

Installed electricity generation capacity in India

India's energy generation showcases a diverse mix of power sources within its total installed capacity of 425 gigawatts (GW). The thermal sector holds a predominant position within the overall installed capacity, encompassing coal (48.6%), gas (5.9%), lignite (1.6%), and a minimal share (<0.2%) from diesel. The renewable energy sector collectively plays a substantial role, with hydro (11.01%), wind (10.42%), and solar (16.92%) making significant contributions. Other sources such as small hydro, biomass power/cogen, and waste-to-energy collectively contribute approximately 5.71% (CEA, 2023a)

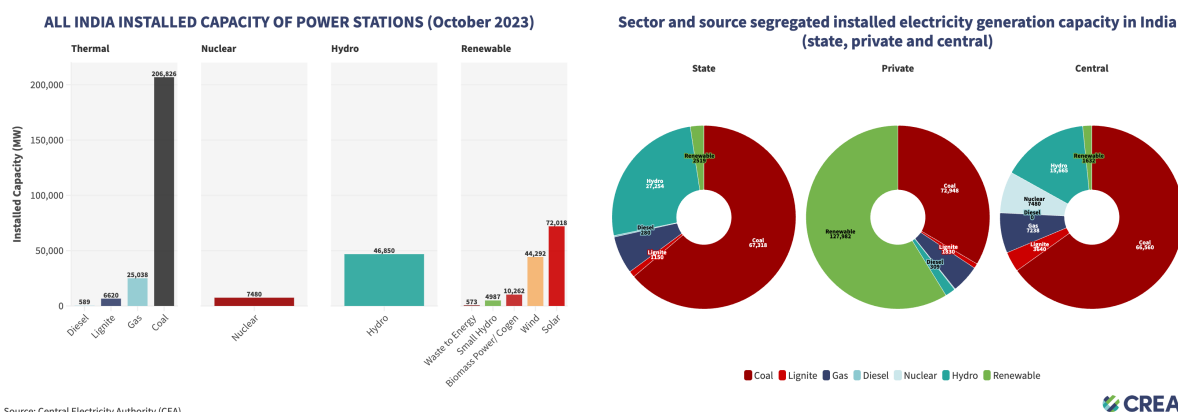


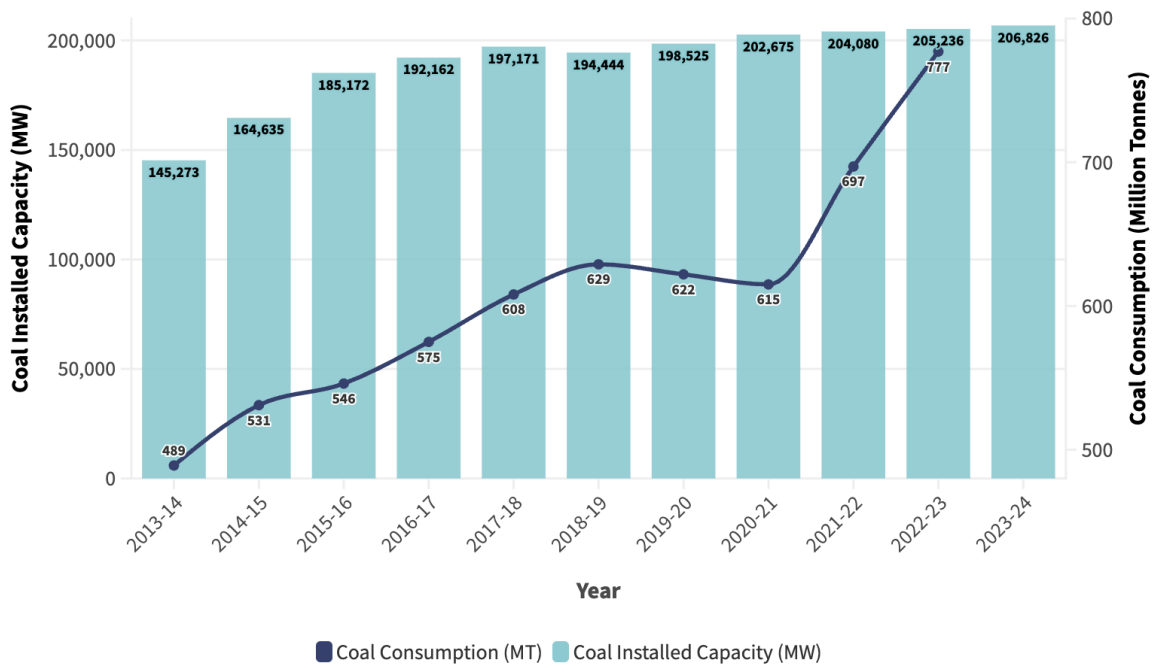
Figure 1: Source and sector-wise installed electricity generation capacity in India (October 2023)

Coal consumption in India

While the installed coal-based electricity generation capacity grew from 145 GW to 205 between FY14 and FY23, the coal consumption for electricity generation followed the trend and grew from 489 million tons (MT) to 777 MT during the same period (CEA, 2023b). This trend indicates a sustained and substantial increase in coal consumption and capacity over the past decade, underscoring the escalating global energy demands and the continued reliance on coal as a significant energy source (CEA, 2023c). The increasing coal consumption, along with raising concerns at the global level due to its contribution to GHG

emissions, also poses a rising health crisis to the local population with increasing emission load of air pollutants, necessitating the introduction of efficient pollution control technologies, i.e., FGD (flue gas desulphurization), SCR (selective catalytic reduction), SNCR (selective non-catalytic reduction) etc. at the power generation units.

Coal-based installed electricity generation capacity and coal consumption in India (FY14-FY24)



Source: Central Electricity Authority



Figure 2: Coal-based installed electricity generation capacity and coal consumption in India (FY14-FY24)

Emission standard notification for coal-based electricity generation units in India

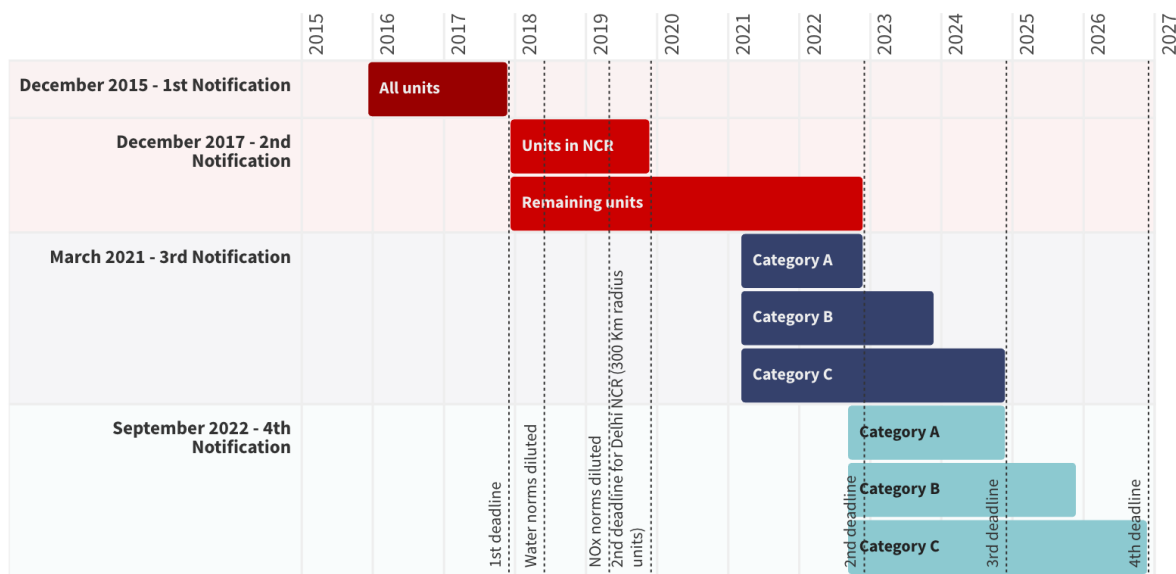
Realizing the contribution of SO₂ emissions from coal-based power generation to the overall pollution through primary and secondary particulate formation routes, the Ministry of Environment, Forests and Climate Change in India introduced the country's first-ever emission norms for controlling SO₂, NO_x, and mercury from coal-fired power generation units in December 2015. The notification initially gave a 2-year window for all power generation units to retrofit and install SO₂ control technologies, but after almost the entire capacity failed to install the FGD/DSI (flue gas desulphurization/direct sorbent injection), etc., the deadline for retrofits has been extended multiple times (MOEF&CC 2015), as depicted in Figure 3. While the emission norms have been diluted for water consumption and NO_x emissions for specific categories of the power generation units based on the age and size, the deadline for meeting the stipulated SO₂ norms has been extended four times for Delhi-NCR units and three times for most of the other units across the category. In April 2021, the MoEF&CC also categorized power plants under three different categories, giving them respective timelines to retrofit for SO₂ control for the installation of pollution-control technologies by December 2024 (MOEF&CC 2021), which later in September 2022 were extended to December 2026 (MOEF&CC 2022).

As of December 2023, the new deadline

- for power plant units within a 10 km radius of Delhi-NCR and million-plus cities is December 31, 2024, extended from the earlier date of December 2022;
- for power plant units within a 10 km radius of critically polluted cities, the deadline has been extended to December 31, 2025, from the earlier date of December 31, 2023;

- for all other power plant units across the country, earlier set for December 31, 2024, has been extended to December 31, 2026.

Timeline of emission standard notification, 2015 and its subsequent dilutions and deadline extensions for coal-based power generation units in India



Source: Ministry of Environment, Forest and Climate Change

Category A: Within 10 km radius of National Capital Region (NCR) or cities having million plus population (as per 2011 census of India) Category B: Within 10 km radius of Critically Polluted Areas or Non-attainment cities (as defined by CPCB) Category C: Other than those included in category A and B



Figure 3: Timeline of emission standard notification, 2015 and its subsequent dilutions and deadline extensions for coal-based power generation units in India

The notification also grants an extension until 2027 for retiring units (power plant units that are over 25 years old or older). The two dilutions granted to thermal power plant units for water and NOx norms were:

- Dilution of water consumption norms: In June 2018, water norms for units installed post-January 2017 were diluted from 2.5 cubic meters per megawatt-hour to three cubic meters per megawatt-hour (MOEF&CC 2018).

- Dilution of NO_x norms: In May 2019, NO_x norms for units installed between 2004 and 2016 were diluted from 300 milligrams per cubic meter to 450 milligrams per cubic meter (MOEF&CC 2019).

Implementing flue gas desulfurization (FGD) technology holds immense importance in India due to the country's persistent struggle with air pollution (CREA, 2023). With a rapidly growing population and increasing energy demands, the reliance on coal as the source of electricity has escalated, contributing significantly to elevated levels of sulfur dioxide emissions, which form a significant part of air pollution in the country through secondary particulate formulation (CREA, 2022; CREA, 2021). FGD systems play a pivotal role in mitigating the environmental impact of these emissions by effectively capturing and removing sulfur dioxide from the flue gasses before they are released into the atmosphere (CEA, 2023). This aligns with India's commitment to improving air quality and addresses the urgent need to safeguard public health from the detrimental effects of air pollution, particularly respiratory issues (Dahiya et al., 2022; PIB, 2023).

FGD implementation status

According to CEA's monthly report 'Unit wise FGD implementation status and summary sheet October 2023' out of a total of 600 units with installed capacity of 211.5 GW¹ installed coal/lignite based electricity generation capacity:

- only 77 units with a combined capacity of 16.5 GW have installed FGD (24 units, 10.6 GW) or CFBC (53 units, 5.9 GW), which is less than 8% of the total coal-based electricity generation capacity;
- 227 units with a combined capacity of 102.9 GW are at the bid award stage, which is approximately 49% of the total installed coal capacity;

¹ 31 units with a total installed capacity of 4.8 GW didn't have FGD implementation status as 10 units totalling to 1.4 GW have been retired, 16 units with a capacity of 2.1 GW are identified to be retired, and the remaining 5 units with 1.4 GW capacity are highlighted as stressed.

- 160 units with a combined capacity of 52.4 GW (~25% of total installed coal capacity) are in the bid opened stage, which comprises bid opened, NIT issued and retendering categorisation by CEA;
- 27 units with a combined installed capacity of 9.5 GW (~4% of total installed coal capacity) have completed tender specifications but haven't opened the bids yet;
- 70 units totalling 22.5 GW (~11% of total installed coal capacity) capacity are in the feasibility study phase, including both initiation and completion of the feasibility study. However, 2 units with a combined capacity of 1.4 GW (<1% of total installed coal capacity) are yet to commence the feasibility study;
- six units with a combined capacity of 1.4 GW (~1% of total installed coal capacity) are claimed to be compliant.

Eight years after the emission standard notification was notified for coal-based power generation units, less than 8% of the coal capacity has installed the FGD or has CFBC to regulate SO₂ emissions.

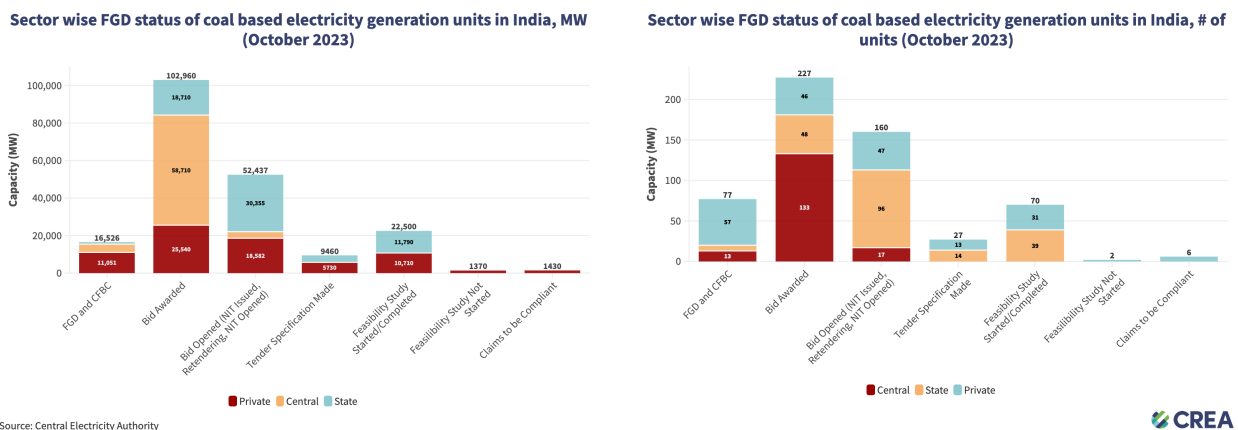


Figure 4: Sector-wise FGD installation status at coal-based electricity generation units in India (October 2023)

The NTPC (National Thermal Power Corporation), CEA, and CPCB (Central Pollution Control Board) have stipulated a timeline of 18-36 months for installation and synchronization of FGD from the bid-award date. 33.8 GW capacity awarded the bids for

FGD installations as soon as December 2019, but only 16.5 GW² capacity has installed SO₂ control technology. By December 2020, 66.5 GW capacity had already awarded the bids, but most of this capacity had not commissioned the FGD even though the stipulated time frame required was only 18 - 36 months from the bid award date.

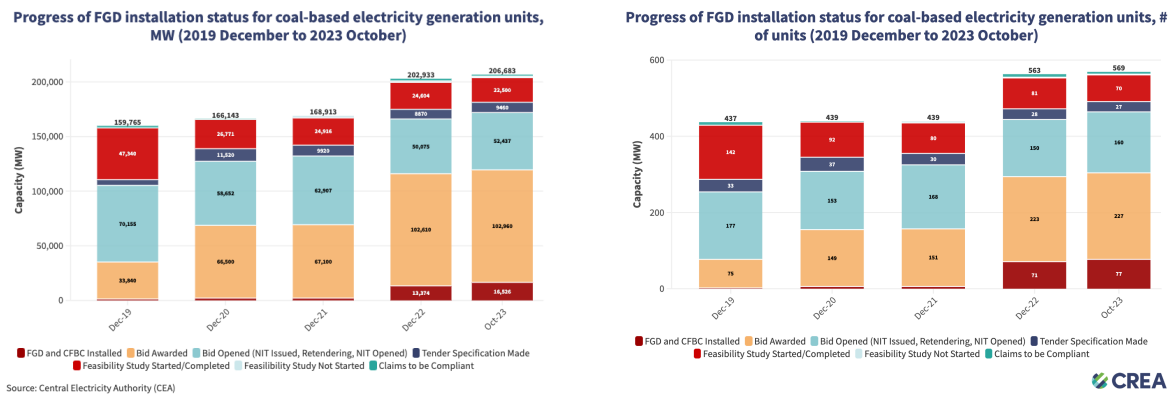


Figure 5: Progress of FGD installation status for coal-based electricity generation units, (2019 December to 2023 October)

- only 3.2 GW capacity across 6 units have installed SO₂ control technologies over the last year (since December 2022), taking the total capacity with SO₂ control to 16.5 GW;
- only 3.5 GW new capacity (10 units) have entered the bid awarded stage since December 2022, taking the total capacity in bid award stage to 103 GW;
- only 6 GW new capacity (20 units) have opened the bids since December 2022, taking the total capacity in bid opened stage to 52.4 GW;
- In December 2020 a capacity of 26.8 GW across 92 units was in feasibility study started/completed stage which in October 2023 still remains as high as 22.5 GW across 77 units;
- Based on progress during past years and the fact that it takes 18-36 months to synchronize FGD after the bid award date, most of the capacity (>88 GW) in the pre-bid award stage (bid opened, tender specification made, feasibility study

² This also includes TPP units where FGD was already installed or had CFBC.

started/completed/not started stage) is at the risk of missing the third time extended deadlines in all categories (category A, B & C).

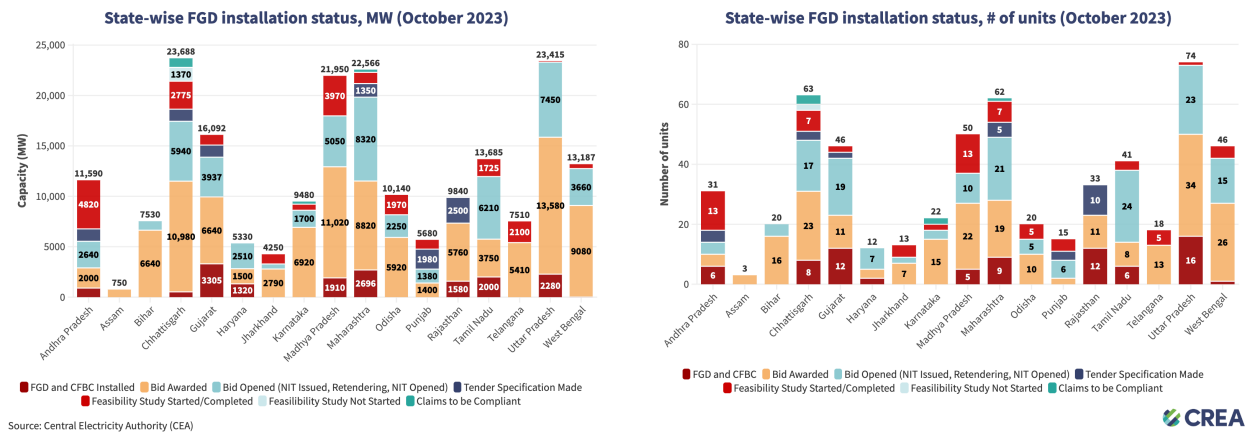


Figure 6: State-wise FGD installation status (October 2023)

Delhi-NCR FGD Status

The 300 km radius around Delhi-NCR hosts 12 coal-based electricity generation plants (36 units) with a cumulative capacity of 13.4 GW, out of which as of October 2023:

- FGD/DSI installation has been completed for 7 units with 2.6 GW installed capacity;
- bids have only been awarded for 6 units, with 3.4 GW capacity;
- notice inviting tenders (NIT) has been issued for 13 units, with a capacity of 3.8 GW;
- bids for 2 units, with a capacity of 0.5 GW, have been opened;
- tender specifications have been made for 3 units, totalling 2 GW; and
- four units with a cumulative capacity of 0.9 GW were at feasibility studies completed, while the feasibility study has been initiated for 1 unit (0.1 GW).

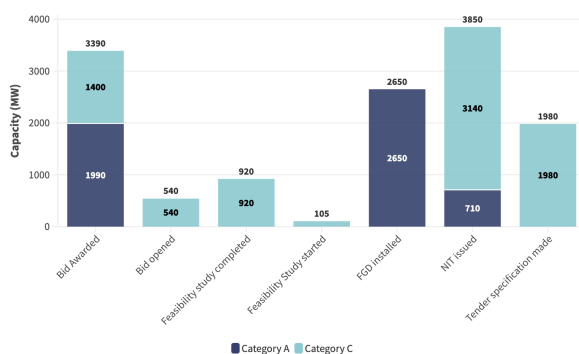
A total of 14 units (5.4 GW) in NCR fall under Category A as per the categorization of power plant units in 2021, while the remaining 22 units (8.1 GW) are categorized under Category C. It is observed that

- only 7 units within Category A have installed FGD, with a total capacity of 2.6 GW;
- the remaining 7 units under Category A are either in the bid-awarded stage (4 units with a total capacity of 2 GW) or in the NIT-issued stage (3 units with a total capacity of 0.7 GW).

None of the plants under Category C have installed FGD. The status of category C units as of October 2023 indicates that all of these units except two are at the risk of missing the fourth extended deadline (December 2027) provided to these units by MoEF&CC. It takes 18-36 months to install the FGD units after bid awards, and 20 (6.9 GW) out of 22 (8.1 GW) category C units have not even been awarded the bids; the detailed status is as follows:

- ten units with a total capacity of 3.1 GW are currently in the NIT stage;
- four units having 0.9 GW have only completed feasibility studies;
- three with two GW capacity have just made the tender specifications;
- two units with 1.4 GW installed capacity have awarded bids;
- two units with 0.5 GW capacity have opened bids; and
- one unit of around 0.1 GW has just commenced a feasibility study.

Category-wise FGD status at coal-based electricity generation units in 300 Km radius of Delhi-NCR (MW)



Source: Central Electricity Authority (CEA)

Category Wise FGD status at coal-based electricity generation units in 300 Km radius of Delhi-NCR (# of units)

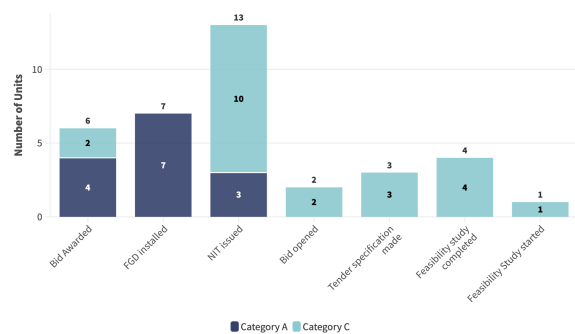
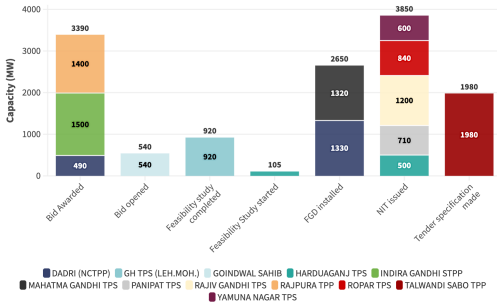
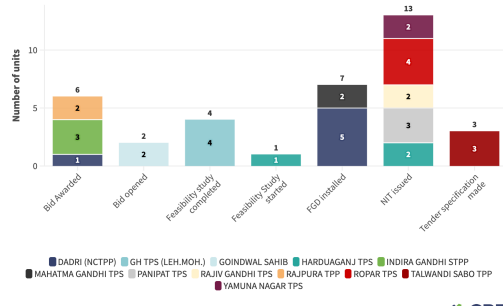


Figure 7: Category-wise FGD status at coal-based electricity generation units in the 300 Km radius of Delhi-NCR

FGD implementation status of coal-based electricity generation plants in 300 Km radius of Delhi-NCR, MW (October 2023)



FGD implementation status of coal-based electricity generation plants in 300 Km radius of Delhi-NCR, # of units (October 2023)



Source: Central Electricity Authority (CEA)



Figure 8: Power plant-wise FGD implementation status of coal-based electricity generation plants in Delhi-NCR

Power plant units in the 300 Km radius of Delhi-NCR have consistently missed the multiple deadlines for FGD installation as depicted in figure 9.

Timeline of Emission Standard notification, its dilutions, and extensions for coal-based power stations over the past seven years

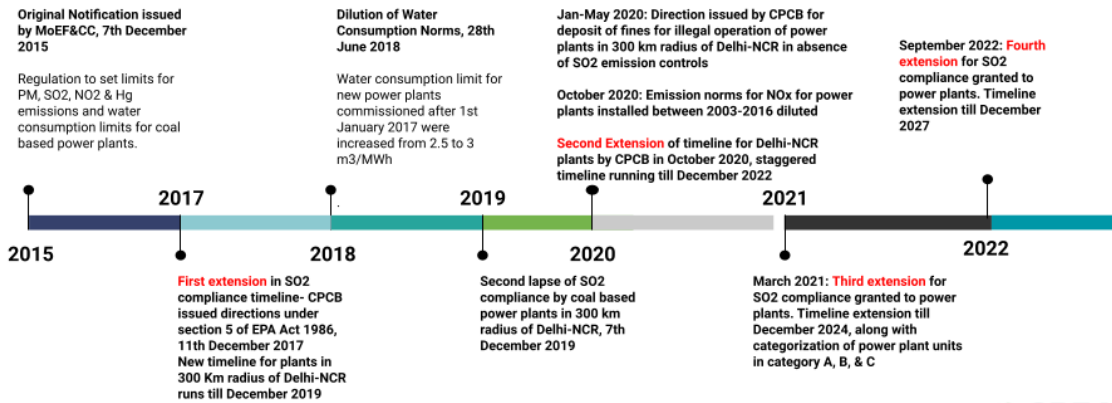


Figure 9: Timeline of emission standard notification, its dilutions, and extensions for coal-based power plants over the past seven years

NTPC snapshot

- Out of NTPC’s total 56.3 GW coal capacity monitored by CEA for FGD installation, only 3.6 GW across nine units has installed FGD as of October 2023, leaving 50.7 GW capacity across 114 units at bid award stage, six units (1.1 GW) are at NIT issued stage and haven’t shown any progress since December 2020.
- 0.7 GW capacity across eight units has been retired at Muzaffarpur and Talcher (Old) power plants, and two units of 105 MW each are planned to be decommissioned.

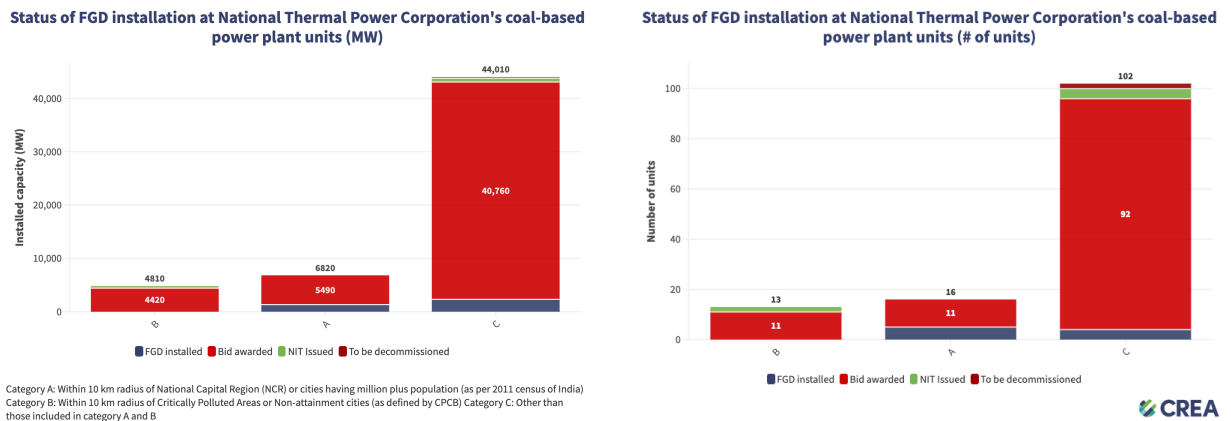


Figure 10: Status of FGD installation at NTPC's coal-based power plant units

- Only three units have installed FGD since December 2022, taking the total number of NTPC coal-based power plant units with FGD to nine.
- No new bids have been awarded since December 2022
- Out of 40 units (22.5 GW) that awarded bids in 2018, only eight units with 3.2 GW capacity have successfully installed FGD, rest 32 units (19.4 GW) still haven’t completed the FGD installation process despite taking around 60 months (5 years) since the bid award date.
- None of the 42 other units (15.7 GW) that awarded bids in 2019 have finished FGD installations despite taking >48 months since bid award date.

- None of the 35 units (12.5 GW) that awarded bids in 2020 have finished FGD installations despite taking >36 months since the bid award date.

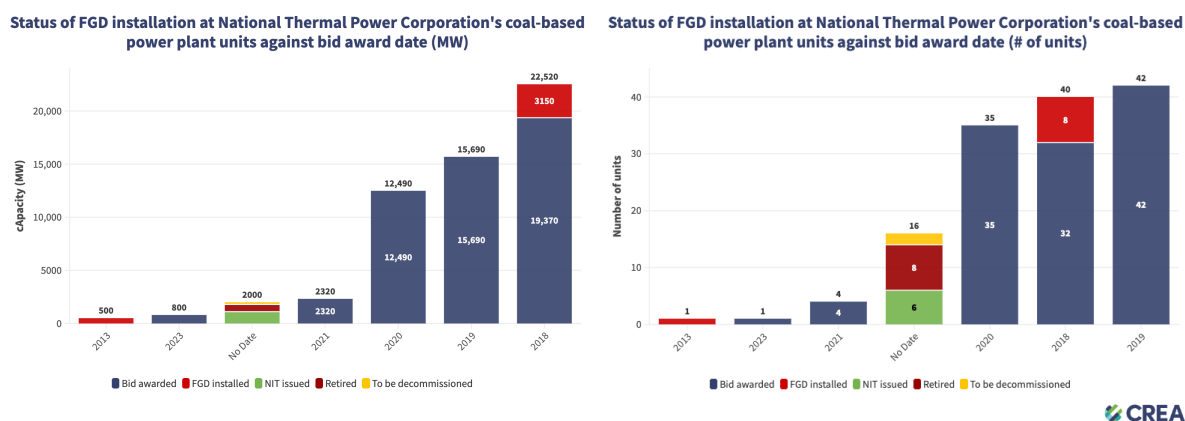


Figure 11: Status of FGD installation at NTPC's coal-based power plant units against bid award date

Conclusion and the Way Ahead

While India progresses towards meeting the growing electricity demand through renewable energy sources, coal still plays an integral role in meeting the present demand. The emissions of toxic particles and gasses during the combustion process have also contributed significantly to the country's worsening air quality and human health, which necessitated the introduction of new emission standards for coal-based power plant units in 2015. The toxic pollutant emissions can be controlled at source by installing state-of-the-art pollution control technologies such as FGD for SO₂ and Selective catalytic reduction (SCR) / Selective non-catalytic reduction (SNCR) for NO_x and operating them efficiently to ensure emissions are captured at the source. While these technologies are being installed, it is also essential to strengthen the data monitoring, data transparency, and law enforcement protocols to utilize the installed pollution control technology efficiently. Based on the information analyzed for this report, power plant operators, MoEF&CC, and CPCB need to take aggressive actions to reduce the pollution footprint of

the coal-based power plants and move forward towards helping achieve breathable air across polluted geographies.

The analysis indicates that the absence of a punitive mechanism for non-compliance with prescribed timelines allows power generators to consistently postpone the implementation of Flue Gas Desulfurization (FGD) systems. Despite initially expeditiously awarding bids to meet earlier deadlines many power generators exhibit a decline in momentum after successive deadline extensions. Consequently, they failed to install FGD within the stipulated time frame of 18 to 36 months after the bid award date.³ This trend sets an unfavorable precedent and contributes to a delay in FGD implementation, resulting in increased costs. The cost escalation is attributed to interest on capital investment for FGD installations and inflation in the cost of components. This unnecessarily raises the cost of power for consumers and financially burdens generating companies.

The way forward:

Establish a Regulatory Framework: Implement a robust penal mechanism to address non-compliance with the established timelines for power plant units. This mechanism should serve as a deterrent and ensure strict adherence to deadlines.

Introduce Interim Milestones: Define interim milestones to monitor the progress of Flue Gas Desulfurization (FGD) installation for each power plant unit. Conduct regular reviews to assess the progress and institute penal actions if satisfactory advancements are not observed at these interim checkpoints.

Enhance Transparency through Public Reporting: Promote transparency by requiring power plants to make detailed progress reports on civil and financial progress of FGD installation publicly available. Mandate the publication of these reports on the individual power plants' websites and submit them to the Central Pollution Control Board

³ Established by the power generators themselves, the Central Electricity Authority (CEA), and the Central Pollution Control Board (CPCB).

(CPCB), Central Electricity Authority (CEA), and the Ministry of Environment, Forest and Climate Change (MoEF&CC).

Public Dissemination of Emission Data: Ensure accountability by facilitating the public disclosure of pollutant emission data. Mandate power plants to publish this information on the pollution control board's website and their own company websites. This practice will contribute to increased transparency and awareness regarding environmental performance.

References

- CEA. 2018. “Amendment to standard technical specification for retrofit of wet limestone based flue gas desulphurisation (FGD) system.” Central Electricity Authority.
https://cea.nic.in/wp-content/uploads/2020/04/amendment_fgd_specs.pdf.
- CEA. 2023b. “Central Electricity Authority-General Review Report (Containing Data for the Year 2021-22).” <https://cea.nic.in/general-review-report/?lang=en>.
- CEA. 2023a. “Installed Capacity Report, Central Electricity Authority.”
<https://cea.nic.in/installed-capacity-report/?lang=en>.
- CEA. 2023c. “National Power Portal - Coal Consumption.” NPDMS: Monthly Coal Reports.
<https://npp.gov.in/monthlyCoalReports>.
- CEA. 2023. “Report on Optimal Generation Capacity mix for 2029-30.”
https://cea.nic.in/wp-content/uploads/irp/2023/05/Optimal_mix_report__2029_30_Version_2.0__For_Uploading.pdf.
- CREA. 2021. “Emission Watch - Status assessment of SO₂ emissions and FGD Installation for coal-based power plants in Tamil Nadu.” Centre for Research on Energy and Clean Air.
<https://energyandcleanair.org/publication/emission-watch-status-assessment-of-so2-emissions-and-fgd-installation-for-coal-based-power-plants-in-tamil-nadu/>.

CREA. 2022. “Emission Watch – Status assessment of SO₂ emissions and FGD installation for coal-based power plants in West Bengal.” Centre for Research on Energy and Clean Air.

<https://energyandcleanair.org/publication/emission-watch-status-assessment-of-so2-emissions-and-fgd-installation-for-coal-based-power-plants-in-west-bengal/>.

CREA. 2023. “Tracing the Hazy Air 2023 Progress Report on National Clean Air Programme (NCAP).” Centre for Research on Energy and Clean Air.

https://energyandcleanair.org/wp/wp-content/uploads/2023/01/Tracing-the-Hazy-Air-2023_Progress-Report-on-National-Clean-Air-Programme-NCAP_10th-January-2023.pdf.

Dahiya, Sunil, Lauri Myllyvirta, and Lorenzo Costantino. 2022. “Health impacts of Chandrapur Super Thermal Power Station, Maharashtra.” Centre for Research on Energy and Clean Air.

<https://energyandcleanair.org/publication/health-impacts-of-chandrapur-super-thermal-power-station-maharashtra/>.

MOEF&CC. 2015. “Ministry of Environment, Forest and Climate Change Notification December 2015 on Thermal Power Plant Emission Norms.”

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

MOEF&CC. 2018. “Ministry of Environment, Forest and Climate Change Notification June 2018.”

<https://moef.gov.in/wp-content/uploads/2018/07/Final-Amd-TPPs-Notifi.pdf>.

MOEF&CC. 2019. “Ministry of Environment, Forest and Climate Change Notification May 2019.”

MOEF&CC. 2021. “Ministry of Environment, Forest and Climate Change Notification March 2017 on Thermal Power Plant Emission Norms.” MOEFCC.

<https://moef.gov.in/wp-content/uploads/2021/04/GSR243.pdf>.

MOEF&CC. 2022. “Ministry of Environment, Forest and Climate Change Amendment Notification 2022 on Thermal Power Plant Emission Norms.”

<https://moef.gov.in/wp-content/uploads/2022/09/Amendment-Notification-06092022-2-5.pdf>.

PIB. 2023. “National Clean Air Programme (NCAP) to improve air quality in 131 cities by engaging all stakeholders.” PIB.

<https://pib.gov.in/PressReleaselframePage.aspx?PRID=1909910>.

Annex: State-wise FGD installation status, MW (October 2023)

Status	Chhattisgarh	Gujarat	Maharashtra	Madhya Pradesh	Uttar Pradesh	West Bengal	Bihar	Rajasthan	Karnataka	Telangana	Jharkhand	Assam	Andhra Pradesh	Odisha	Punjab	Haryana	Tamil Nadu	Total Capacity
Bid awarded	10980	6640	8820	11020	13580	9080	6640	5760	6920	5410	2790	750	2000	5920	1400	1500	3750	102960
Bid opened	3500	1362	7180	0	0	3660	0	0	1700	0	500	0	2640	2250	540	0	1890	25222
CFBC	523	1325	246	90	450	12	0	1580	0	0	0	0	900	0	0	0	800	5926
Claims to be SO2 compliant	900	0	270	0	0	0	0	0	260	0	0	0	0	0	0	0	0	1430
Feasibility study completed	2280	210	840	1440	0	135	0	0	600	2100	960	0	4820	420	920	0	1200	15925
Feasibility study not started	1370	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1370
Feasibility study started	495	800	270	2530	105	300	0	0	0	0	0	0	0	1550	0	0	525	6575
FGD installed	0	1980	2450	1820	1830	0	0	0	0	0	0	0	0	0	0	1320	1200	10600
NIT issued	2440	2575	1140	3730	5470	0	890	0	0	0	0	0	0	0	840	2510	4320	23915
Retendering	0	0	0	1320	1980	0	0	0	0	0	0	0	0	0	0	0	0	3300
Retired	0	0	210	0	314	690	220	0	0	0	0	0	0	0	0	0	0	1434
Stressed asset	0	0	1350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1350
Tender specification made	1200	1200	1350	0	0	0	0	2500	0	0	0	0	1230	0	1980	0	0	9460
Other tender stages	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
To be decommissioned	0	0	840	0	0	300	210	640	0	62.5	0	0	0	0	0	0	0	2053
Total Capacity	23688	16092	24756	21950	23415	13487	7740	10480	9480	7572.5	4250	750	11590	10140	5680	5330	13685	210086

Annex: State-wise FGD installation status, # of units (October 2023)

Status	Chhattisgarh	Gujarat	Maharashtra	Madhya Pradesh	Uttar Pradesh	West Bengal	Bihar	Rajasthan	Karnataka	Telangana	Jharkhand	Assam	Andhra Pradesh	Odisha	Punjab	Haryana	Tamil Nadu	Total Capacity
Bid awarded	23	11	19	22	34	26	16	11	15	13	7	3	4	10	2	3	8	227
Bid opened	8	6	15	0	0	15	0	0	3	0	2	0	4	5	2	0	9	69
CFBC	8	9	1	2	10	1	0	12	0	0	0	0	6	0	0	0	4	53
Claims to be SO2 compliant	3	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	6
Feasibility study completed	5	1	4	5	0	2	0	0	2	5	4	0	13	2	4	0	2	49
Feasibility study not started	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Feasibility study started	2	1	3	8	1	2	0	0	0	0	0	0	0	3	0	0	1	21
FGD installed	0	3	8	3	6	0	0	0	0	0	0	0	0	0	0	2	2	24
NIT issued	9	13	6	8	20	0	4	0	0	0	0	0	0	0	4	7	15	86
Retendering	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	5
Retired	0	0	1	0	3	4	2	0	0	0	0	0	0	0	0	0	0	10
Stressed asset	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Tender specification made	3	2	5	0	0	0	0	10	0	0	0	0	4	0	3	0	0	27
Other tender stages	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
To be decommissioned	0	0	4	0	0	5	2	4	0	1	0	0	0	0	0	0	0	16
Total Capacity	63	46	71	50	74	51	22	37	22	19	13	3	31	20	15	12	41	590