



Biodiversity & Environment

India's Coal Plants: SO₂ Emission Control

Tags:

- **GS Paper - 3**
- **Environmental Pollution & Degradation**

For Prelims: Centre for Research on Energy and Clean Air (CREA), Sulfur Dioxide (SO₂), Flue Gas Desulfurization (FGD), Circulating Fluidised Bed Combustion (CFBC), Greenpeace, Coal, Oil, Natural Gas

For Mains: The Environmental Consequences of Measures to Mitigate SO₂ Emissions.

Why in News?

Recently, an analysis by the Centre for Research on Energy and Clean Air (CREA) has found less than 8% of India's coal-based power plants have installed the SO₂ emission reduction technology recommended by the Union Ministry of Environment, Forest and Climate Change (MoEF&CC) to keep Sulfur Dioxide (SO₂) emissions in check.

- According to a 2019 **Greenpeace study**, India is the largest emitter of SO₂ in the world.

What are the Technologies to Reduce SO₂ Emissions?

- **Flue Gas Desulfurization (FGD):**
 - FGD is the process of removing sulphur compounds from the exhaust emissions of fossil-fueled power stations.

- This is done through the addition of absorbents, which can remove up to **95%** of the **sulphur dioxide** from the **flue gas**.
- Flue gas is the material emitted when fossil fuels such as coal, oil, natural gas, or wood are burned for heat or power.
- **Circulating Fluidized Bed Combustion (CFBC):**
 - CFBC Boiler is an **environment-friendly** power facility to reduce the discharge of pollutants such as **nitrogen oxide** and **sulphur oxide** by injecting **air** and **lime** at the same time for burning.
 - A **bed of solid particles** is said to be **fluidized** when the **pressurised fluid** (liquid or gas) is passed through the medium and causes the **solid particles** to behave like a fluid under certain conditions. **Fluidization** causes the transformation of the state of solid particles from **static to dynamic**.

What are the Key Findings of the Study?

- Only a combined capacity of **16.5 Gigawatts(GW)** of coal plants have installed **FGDs** and **Circulating Fluidised Bed Combustion (CFBC)** boilers equivalent to **5.9 GW** across India.
- The **CREA analysis** found that **92 %** of the country's coal power plants function without FGDs.
- Blanket extension of the deadline for all **coal power plants** without checking on their progress by **MoEF&CC** and **Central Pollution Control Board (CPCB)** played a major role in derailment of emission controls from coal-based electricity generation units.
 - The **MoEF&CC** introduced emission standards in **2015** for regulating **PM, SO₂, NO_x, and Hg (Mercury) emissions**.

- The deadline has been extended four times for units in Delhi and the National Capital Region (NCR) and three times for most other units across the country.
- India's energy generation installed capacity stands at **425 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**.

What is the Categorisation of Power Plants for Installing FGD?

- In 2021, the MoEF&CC divided the categories of **coal-power plants** based on geography to enforce deadlines.
 - **Category A** is demarcated to **coal-based power plants** within a 10-kilometer radius of the **National Capital Region (NCR)** and of cities with a **million-plus population**.
 - **Category B** is **within a 10 km radius** of critically polluted areas or non-attainment cities.
 - **Category C** is the remaining plants throughout the country.
 - The majority of the country's power plants belong to Category C, with the longest deadlines.

Way Forward

- **Accelerate FGD Implementation:**
 - Prioritise and expedite the installation of **FGD** technology in coal-based power plants. Encourage and incentivize the adoption of this technology to ensure

compliance with emission standards set by the MoEF&CC.

- **Expand CFBC Implementation:**
 - Provide support and incentives for power plants to adopt **CFBC technology**, aiming for a broader implementation to enhance environmental sustainability.
- **Stricter Enforcement and Monitoring:**
 - Strengthen regulatory mechanisms for monitoring and enforcing emission standards. Implement strict penalties for non-compliance with deadlines and emission regulations.
- **Research and Development (R&D):**
 - Invest in **research and development** to explore and implement advanced technologies that go beyond current standards. Foster innovation in clean energy solutions and emission control technologies to make coal-based power generation more sustainable.

UPSC Civil Services Examination
Previous Year Question (PYQ)

Prelims

Q1. Why is there a concern about copper smelting plants?

1. They may release lethal quantities of carbon monoxide into environment.
2. The copper slag can cause the leaching of some heavy metals into environment.
3. They may release sulphur dioxide as a pollutant.

Select the correct answer using the code given below.

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (b)

Q2. With reference to furnace oil, consider the following statements:

1. It is a product of oil refineries.
2. Some industries use it to generate power.
3. Its use causes sulphur emissions into the environment.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (d)

Mains

Q1. Describe the key points of the revised Global Air Quality Guidelines (AQGs) recently released by the World Health Organisation (WHO). How are these different from its last update in 2005? What changes in India's National Clean Air Programme are required to achieve revised standards? (2021)

Q2. Environmental Impact Assessment studies are increasingly undertaken before a project is cleared by the Government. Discuss the environmental impacts of coal-fired

thermal plants located at coal pitheads.
(2014)

