Awareness Workshop (Webinar) Japanese technologies to monitor emissions from thermal power plants and other energy-intensive industries in India

Discussion points of today's webinar

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7.5.2 POWER SECTOR EMISSIONS

MoEF&CC notified 'Environment (Protection) Amendment Rules, 2015" for Thermal Power Plants (TPPs) on 07.12.2015 regarding standards for particulate matter (PM), SO, NO, mercury emissions, and water consumption. As per the notification, all the existing stations were required to comply with the new standards within two years, that is, by December, 2017, and the new stations, including all stations presently under construction were required to meet the new norms w.e.f. 01.01.2017. Subsequently, reviewing the representation from Ministry of Power and Central Electricity Authority highlighting practical difficulties with respect to compliance of the prescribed TPP emission norms by December 2017 an earliest practical feasible plan extending up-to December 2022 was prepared for installation of FGDs and other pollution control equipment at the identified coal-based TPP units in consultation with Regional Power Committees and the utilities and notified by the Ministry in December 2017.

Extending again to 2024??

Source: National Clean Air Programme, MoEFCC



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New environmental norms for thermal power stations in India

				[unit: mg/Nm	13] * ‡
Emission parameter		Thermal p	China		
	Bef	ore Dec 31, 2003	Before Dec 31, 2016	From Jan 1, 2017	2016-
PM		100	50	30	
SO2	6 2(500 (for < 50 00 (for => 50	0MW unit) 0MW unit)	100	35
NOx		600	300	100	50
Mercury (Hg)	NIL 0.03	. (< 500MW) 5 (=> 500MW)	0.03	0.03	

Environment Protection Tax

Source: MoEFCC 2015



Source of the data: http://hchb.gov.cn/a/biaozhun/guojia/896.html Source: "The impact of environmental protection tax on sectoral and spatial distribution of air pollution emissions in China", Xiurong Hu et al 2019 Environ. Res. Lett. 14 054013

By the end of **2017**, the country collected **pollutant discharge fees** of more than **22 billion yuan (USD3.38 billion)** from nearly **330,000 enterprises**.

Local governments will have more autonomy to set a range for the taxes – from 1.2 yuan to 12 yuan (USD0.2-1.8) for each unit of air and water pollution emitted – to reflect the different regional environmental conditions.

Beijing will levy 12 yuan on one unit of air pollution emitted, which is the highest limit of the tax range.

Emission Control for Soot and Smoke

Regulated substances: Sulfur oxides (SOx), Soot and dust, Hazardous substance (Nitrogen oxide (NOx), Cadmium, etc.)



Regulated area

Whole country

Source: Development of Air Pollution Control Framework in Japan and Cooperation with Asian Countries, 5th International Forum on Sustainable Future in Asia, January 23, 2020, Teruyoshi Hayamizu, Center for Health and Environmental Risk Research, NIES, Japan

Control by the total amount of emissions; Emission limits depend on the location

Table 5.1. Obligation of pollutants emission measurement

		Emission gas volume	Minimum frequency	Note	
Soot and Smoke etc. < 4	SO _x	>= 10Nm ³ / hour	Every two months	24 hours monitoring required for those subject to total emission regulations	
	NO _x	$>= 40,000 \text{ m}^3 \text{ / hour}$	Every two months	24 hours monitoring required for those	
		< 40,000 m ³ / hour	Every six months	subject to total emission regulations	
	Others (e.g., Soot and Dust, other pollutants such as Cadmium, etc.)		2 Every two months	24 hours monitoring Total mass emission	
	< 40,000 m ³ / hour	< 40,000 m ³ / hour	Every six months	control standard	

Fuel Use Formula: Q = a x W^b

- Q : Emission limit (Nm3/hr)
- W: Amount of fuel consumed (kL/hr, converted into heavy oil)
- a: Constant determined by prefectural governor
- b: Constant determined by prefectural governor (0.80-1.0)

Formula of SOx emission standard: q = K x 10⁻³ x He²

q: Emission limit (mass of SOx, Nm3/hr)
K: Constant value (depending on the region: 3.0-17.5)
He: Effective stack height

Source: POLICIES, REGULATORY FRAMEWORK AND ENFORCEMENT FOR AIR QUALITY MANAGEMENT: THE CASE OF JAPAN – ENVIRONMENT WORKING PAPER No. 156, OECD

While the MoE has released guidelines for the organisation and design of inspections, **the ultimate responsibility lies with** <u>local governments</u>

Table 5.2. Number of facilities / factories checked by local governments in 2016

	Total number (by facility)	Total number (by factory)	Inspections (by factory)	Administrative Guidance (by facility)	Administrative Orders (by facility)	Litigation (by facility)
Soot and Smoke	217,673	87,727	14,427	4,422	1	0
VOCs	3,445	1,091	604	76	2	0
Asbestos	12,474	n.a.	23,703	4,971	4	0

Source: POLICIES, REGULATORY FRAMEWORK AND ENFORCEMENT FOR AIR QUALITY MANAGEMENT: THE CASE OF JAPAN – ENVIRONMENT WORKING PAPER No. 156, OECD

In both cases, strict monitoring is essential for regulating the emissions.

Status of flue gas desulphurisation (FGD) installation of thermal power plants

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66 GW Total ESP Ipgradation	NCR 3.3 GW	Award Pending 0.9 GW ESP Awarded 2.4 GW
Implementa tion Planned	Rest of India 62.7 GW	ESP Implementaion Plan Available 61 GW

Status of electric-static precipitator (ESP) installation of thermal power plants

Only 2.4GW equivalent yet (3.6% of total) as of Sep 2019

How is the current status? Will it be all installed by Dec 2022?

7.5.3 INDUSTRIAL EMISSION

Industrial pollution is another area of concern that contributes majorly to the air pollution in India.

Action Points

- Introduction of gaseous fuels and enforcement of new and stringent SO2/NOx/PM2.5 standards for industries using solid fuels.
- Stricter enforcement of standards in large industries through continuous monitoring.
- 8. Utilize the Gujarat case study for a compelling case for other states to adopt third-party audits for polluting industries for enhancing implementation (States)

In one of the experiments conducted in **Gujarat** through randomized evaluation it was observed that **random assignment of auditors to industrial plants**, payment from a common pool, their monitoring for accuracy and providing them with financial incentives for better reports for compliance auditing, **led to 80% less likeliness of submission of false pollution readings**.

Source: National Clean Air Programme, MoEFCC

Suggestions from "Breathe India"

#4. Reform Regulatory Framework for Industrial Air Pollution

Revise standards and practices:

A revised regulatory framework for **installation of devices** like vortex separators, electrostatic precipitators, settling chambers etc. needs to be developed.

Improve audit process:

Development of a right incentive structure for the environmental auditors will lead to an improved auditing process. The current practice of self-audit with the industry managing and paying the auditors should be changed.

Incentivise law enforcement:

To improve **law enforcement at the state level**, stricter law enforcement against polluting industries is critical.

#5. Implement a National Emissions Trading System

Introducing a market-based instruments within a regulatory framework based on the concept of 'polluters pay' should be implemented. It would entail capping the individual pollution levels of all industries to certain **emission allowance**. The currency of trade would be **tonnage of pollutants** produce such as '**CO2, SOx and NOx units**', which are inter-convertible.

#13. Develop Consistent and Quantified National, Sub-National and Sectoral Plans

Define city-level plans with clear timelines and emission targets across various sources of pollution : A comprehensive Action Plan at the national-level should be complemented with well-designed and well-researched State-level and city-level plans, with strong implementation and monitoring mechanisms.

China's model

Discussion points:

How is the compliance status of SOx and NOx emissions regulation?

How has it been monitored? How will it be?

Is there any certification system for emissions monitoring equipment?

How will the regulation be enforced?

Marketing potential?

Japan-India Technology Matchmaking Platform (JITMAP)

JITMAP promotes low-carbon technology transfer and diffusion in India through matching Japanese service providers with Indian counterparts. JITMAP activities are supported by the Ministry of the Environment and Hyogo Prefectural Government, Japan. IGES and TERI serve as a secretariat for coordinating relevant stakeholders in both countries.

Seminar and workshop

Feasibility study

Training of trainers

Regulatory discussion

JITMAP Partners & Locations of the Activities

Japan's Blue Sky Initiatives

- In order to promote cooperation in controlling India's air pollution by making full use of Japanese knowledge and technology, the Embassy of Japan launched "Blue Sky Initiatives" in 2018.
- This initiative covers a range of modern technologies, products and projects produced by Japanese companies that can help India move towards an environment-friendly future.
- It will also help in collaborating with "Swachh Bharat Mission" to enhance health and sanitary sector.

References:

China's policies:

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Japan's policies:

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