

Country Perspectives on Policy, Strategy Option, Regulatory Mechanisms, and Good Practices to Tackle PM 2,5 Problem

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PM2.5 Pollutants

PM2.5 refers to atmospheric Particulate Matter (PM);

- are fine particles, such as dust, dirt, soot, or smoke
- a mixture of solid and liquid particles suspended in the air
- have a diameter of less than 2.5 micrometers, which is about 3% the diameter of a human hair.
- This particles are very small that can only be seen with a microscope.

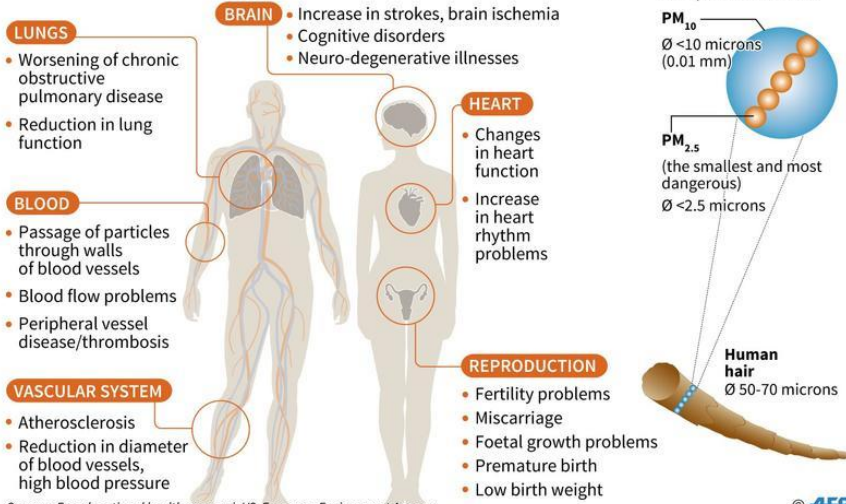
Sources of PM2.5: can be made up of hundreds of different chemicals from:

- Construction sites, unpaved roads, fields, smokestacks or fires.
- A result of complex reactions of chemicals such as sulfur dioxide and nitrogen oxides, which are pollutants emitted from power plants, industries and automobiles.
- Municipal waste burning
- Process industries (lime industries, used battery recycling industries)



Deadly impact of air pollution [PM_{2.5}]

How fine particles affect the body



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https://www.eea.europa.eu/media/newsreleases/industrial-air-pollution-has-high

PRESS RELEASE

Industrial air pollution has high economic cost

Air pollution from Europe's largest industrial facilities cost society at least €59 billion, and possibly as much as €189 billion in 2012, according to an assessment published today by the European Environment Agency (EEA). Half of these damage costs were caused by just 1 % of the industrial plants.

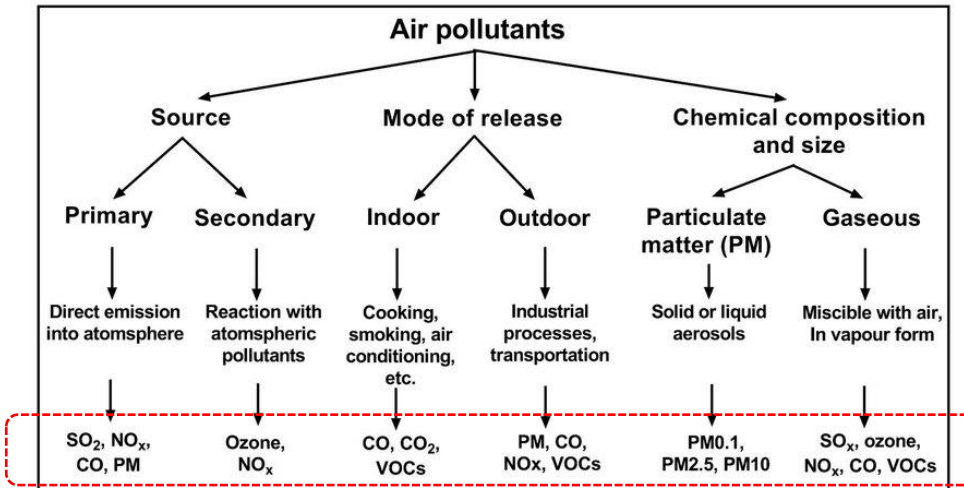
Published 21 Nov 2014 — Last modified 23 Dec 2016 — 3 min read — Photo: © Billy Wilson [Change language](#)

“ While we all benefit from industry and power generation, this analysis shows that the technologies used by these plants impose hidden costs on our health and the environment.

Hans Bruyninckx, EEA Executive Director

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Type of Air Pollutants



"...Most of the pollutant emissions into the atmosphere are related to the burning of fuels..."

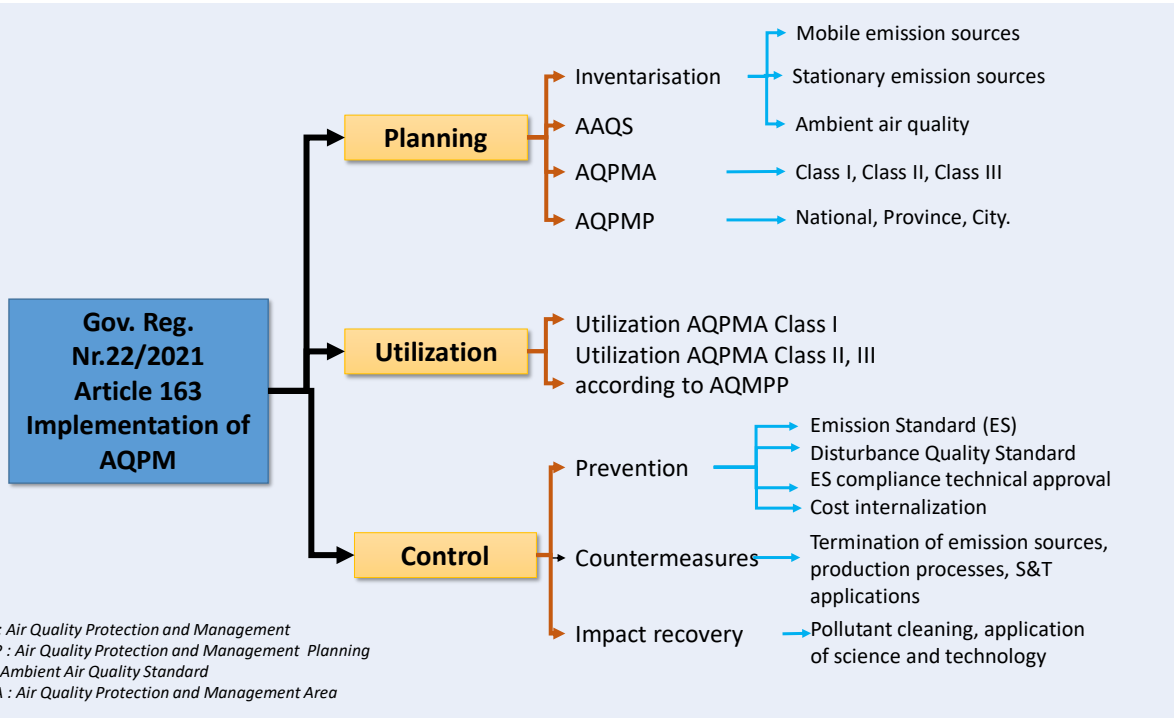
".. All regulations related to environmental permits including air quality standards are based on human/public health considerations..."

Air Pollution → Human Health → Must be regulated

Control and Monitoring Technology

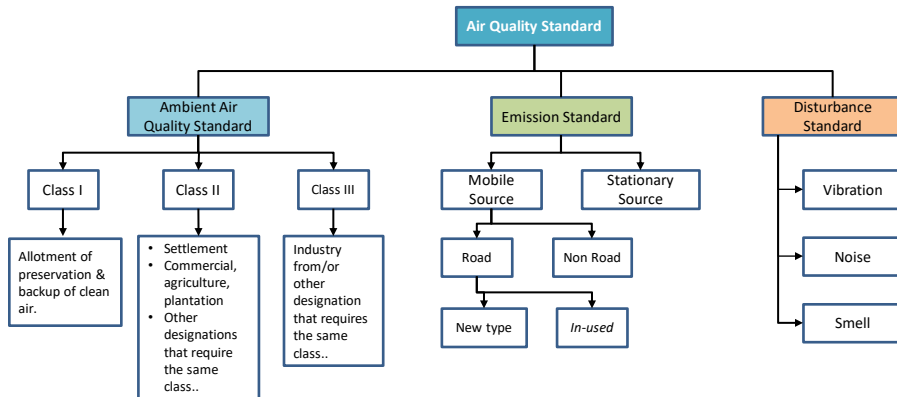
Law/Regulation (Government, Ministry etc.)

Air Quality Protection and Management (AQPM)
 (Government Regulation Nr. 22 year 2021, article 163)



Air Quality Protection and Management Area (AQPMA)

- AQPMA class I:** Allotment of preservation and backup clean air (including pristine).
- AQPMA class II:** Residential, commercial, agricultural, plantation and other areas with the same class requirements.
- AQPMA class III:** For industry or others whose class requirements are the same.



- The Minister determines the highest ambient concentration value in each class of AQPMA (Air Quality Protection & Management Area).
- Everyone is obliged to ensure that their activities do not cause the ambient air quality standard to be exceeded.
- To ensure that ambient air quality standards are maintained, the Minister establishes emission quality standards.

Article 184 paragraph (5): in the event that the AQPMA has not been established, the status of ambient air quality is determined by comparing monitoring results with ambient air quality standards.

Source: Socialization of GR 22/2021, By Ir. Ary Sudijanto, M.Sc, Directorate of Environmental Impact Prevention for Businesses and Activities, Directorate General of Forestry Planning and Environmental Management, Ministry of Environment and Forestry, 2021

Policy, Strategy Option and Regulatory Mechanism to Tackle PM 2.5

Various Indonesia's Policies, Regulation and Strategies to Tackle PM 2.5 Emission

i. Transportation Sector

1. MoEF Regulation No. P.20/MENLHK/SETJEN/KUM.1/3/2017 concerning Emission Quality Standards for New Types of Motorized Vehicles Category M, N, and O (also known as the Euro 4 standard)
 - comes into force 4 years after set.
2. Decree of the Director General of Oil and Gas of the MoMR No. 146.K/10/DJM/2020 concerning Standards and Quality (Specifications) of Diesel Fuel Oil for the Domestic Market.
 - including the stages of reducing the sulfur content in diesel fuel; sulphur content of 50 ppm for diesel fuel with a cetane number (CN) 51, enforced from April 2022..
3. DKI Jakarta Governor Regulation No 66/2020, concerning Motor Vehicle Emission Test Policy
4. DKI Jakarta Governor Regulation No 88/ 2019 concerning Amendments to Regulation No 155/ 2018 concerning Traffic Restrictions with an Odd-Even System.





Policy, Strategy Option and Regulatory Mechanism to Tackle PM 2.5

Various Indonesia's Policies, Regulation and Strategies to Tackle PM 2.5 Emission

i. Transportation Sector

5. Minister of Energy and Mineral Resources Regulation No 3 of 2023 concerning General Guidelines for Government Assistance in the Conversion Program of Fueled Motorcycles into Battery-Based Electric Motorcycles
 - o with a value of Rp. 7,000,000,-
 - o Implemented for 50,000 units of electric motorcycles in 2023 and 150,000 units of electric motorcycles in the 2024 fiscal year
6. Presidential Regulation number 55 of 2019, concerning the VAT incentives borne by the Government, given to electric cars and electric buses with certain Domestic Component Level (TKDN) value criteria
7. Finance Minister Regulation No 38 of 2023 concerning VAT Borne by the Government on Delivery of Certain Four-Wheel Battery-Based Electric Motorized Vehicles and Certain Bus Battery-Based Electric Motorized Vehicles Borne for Fiscal Year 2023 (PMK PPN DTP Electric Vehicles)
 - o to increase the utilization of electric vehicles, both two-wheeled, two-wheeled four or buses which are valid for the April 2023 tax period until the December 2023 tax period for the 2023 Fiscal Year



Various Strategies to Overcome PM_{2.5} (1)

Fuel Quality :

- ✓ Improving the quality of motor vehicle fuels with high octane values and motor vehicle technology itself refers to EURO 4
- ✓ Expanding the use of battery-based electric vehicles (private and public vehicles)
- ✓ Tightening vehicle emission testing and linking it to the amount of motorized vehicle taxes and parking fee incentives.

Tranportation Management :

- ✓ Expanding the application area for odd-even vehicle numbers
- ✓ Increase the number and types of mass transportation
- ✓ Restrictions on the age of vehicles that may operate
- ✓ Integration between modes of public transportation so as to facilitate the movement of people

Policy, Strategy Option and Regulatory Mechanism to Tackle PM 2.5

ii. Industry Sector and Power Generation

1. MoEF emission standard for fixed sources various exhaust gas emission standards
2. MoEF Minister Regulation No. 13 Year 2021 concerning Continuous Emission Monitoring System (CEMS) in industries
 - o Every industries should install CEMS and integrate it to the MoEF Monitoring System.
3. Regulation of the MoEF No 5/ 2021 concerning procedures for issuing technical approvals and certificates of operational worthiness in the field of environmental pollution control.
4. Government Regulation No. 33/2023 concerning energy conservation
 - o To regulate energy conservation in various sectors
5. Presidential Regulation No. 112/ 2022 concerning acceleration of new and renewable energy utilization for providing electricity
6. MoEMR Regulation No. 26/2021 concerning rooftop solar energy connected to the grid for public purposes

Various Strategies to Overcome PM_{2.5} (2)

Urban Air Quality Mitigation :

- ✓ Massively use solar panel for electricity in government buildings
- ✓ Carry out massive tree planting in urban areas

Industrial Emission Mitigation:

- ✓ Supervise and tighten environmental permits for Power Plant, industry and fuel stockpile
- ✓ Reducing the use of coal in the process industry
- ✓ Expanding the obligation to implement CEMS in industry
- ✓ Enforce laws against industries that violate emission limits
- ✓ Require periodic energy audits for industry
- ✓ Tax incentives for purchasing air pollution control equipment

Good Practices to Tackle PM 2.5 Problem



- Indonesia already has a number of regulations and policies to prevent PM2.5 emissions and currently have begun to be implemented
- Strategy and monitoring as well as law enforcement are needed to accelerate and maintain its implementation.
- To overcome the problem of PM2.5 emissions that occur in Jakarta and other cities, a strategy is needed to overcome them.

Good Practices to Tackle PM 2.5 Problem

➤ Good Practices to tackle PM 2.5 for Short-term in Transportation Sector

- Accelerate, increase and tighten the implementation of emission tests for all vehicles
 - Add emissions test facilities
 - Providing incentives
 - Imposition of fines for vehicles that have not carried out the emission test and not allowed to pass through certain roads
- Implement strategies to reduce traffic jams
- Strict enforcement of vehicle emission standards;
- Encouraging as many people as possible to use mass transportation (by providing incentives)



Good Practices to Tackle PM 2.5 Problem

- **Good Practices to tackle PM 2.5 for Short-term in Industry and Power Generation Sector**
 - Obligation of industries to maintain their exhaust gas emissions to meet the quality standards
 - Maintaining that the air pollution control unit/ scrubber and CEMS are in good performance
 - Repairing air pollution control devices and CEMS that are not functioning properly
 - All industries are required to install air pollution control units
 - Conduct field emission monitoring in the industry simultaneously
 - Conduct process production and energy audits to efficient the use of energy in industries
 - Imposition of fines



Good Practices to Tackle PM 2.5 Problem

- **Good Practices to tackle PM 2.5 for Medium/Long-term in Transportation Sector**
 - Implementation of continuous vehicle emission tests;
 - Including the provision of incentives and the imposition of fines for those who have not conducted emission tests
 - Imposition of a production year limit for motorized vehicles that are allowed to operate on the road;
 - Because the old vehicles, emit much higher emissions than new ones.
 - Encourage the car industry to produces all kinds of vehicles that comply with Euro 4 standards and are gradually moving towards Euro 5 standards, with much better emissions
 - Improved fuel quality to meet with Euro 4 standard and increased to Euro 5
 - Accelerate and increase the use of electric car and motorcycle
 - By providing incentives according to regulation
 - Increase and improve mass transportation infrastructure facilities at affordable prices to attract more public interest
 - Increase the use and installation of ITS (Intelligent Transport System) to reduce the traffic jam
 - Tighten of vehicle emission monitoring
 - Tighten emission standards for motor vehicles
 - Application of Carbon Market



Good Practices to Tackle PM 2.5 Problem

Good Practices to tackle PM 2.5 for Medium/Long-term in Industrial and Power Generation Sector

- Obligation of industries to ensure that the air pollution control unit/scrubbers and CEMS are in good performance and the emission always meets the quality standards.
- Obligation of all industries to use appropriate air pollution control unit to clean/filter the pollutants in their exhaust gases, before being discharged to environment
 - Including the installation of CEMS and integrate it to the monitoring system in Ministry of Environment and Forestry
- Industries are obliged to increase the process production and energy efficiency, in order to emit less air emissions
- Use of more efficient and cleaner equipment in industries
- Use of renewable energy
- Carried out process production and energy audit regularly to maintain its efficiency.
- Monitor industrial emissions strictly and periodically
- Providing support to small industries to be able to control their emissions (such as, used battery recycling industry, the lime burning industry, the tofu industry, etc).
- Imposition of fines
- Application of carbon market



Technology option of control pollutant

Technology option of control pollutant	Cyclone	Electrostatic Precipitators	Wet ESP	Fabric filter	Semi-dry FGD	Lime stone-gypsum FGD	Dual Loop Limestone-gypsum	Seawater FGD	Spray Tower Scrubber	SCR-Catalyst	SNCR
Particulate Matter	X	X	X	X	X	(X)	(X)	(X)	X		
HCl				X ¹	X	X	X	X	X		
HF				X ¹	X	X	X	X	X		
SO ₂				X ¹	X	X	X	X	X		
SO ₃			X	X ¹	X	(X)	(X)	(X)	X		
Droplets, aerosols			X								
Mercury/Hg				X ²	X ²	(X)	(X)	(X)	X ²		
Other heavy metals		(X)	(X)	X	X	(X)	(X)	(X)	X		
NOx										X	X
Dioxin/Furans & AHs				X ²	X ²				X ²	X	

(X) = There is a moderate reduction efficiency as a side effect
 X¹ = Absorbent alkaline dose
 X² = Carbon based absorbent dosage

TYPES OF AIR POLLUTION CONTROL EQUIPMENT

Air Pollution Control Devices (APCDs)

Particulate Control Equipment

- a. Settling chamber
- b. Cyclon
- c. Bag house
- d. Electrostatic Precipitator
- e. Wet collector (Scrubber)

Gas Control Equipment

- a. DeSO_x
- b. DeNO_x
- c. Absorber
- d. Adsorber

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