Chapter 3

Summary of Management System in Selected OECD Countries

August 2017

This chapter should be cited as

ERIA (2017), 'Summary of Management System in Selected OECD Countries', in Motokura, M., J. Lee, I. Kutani, H. Phoumin (eds.), *Improving Emission Regulation for Coal-fired Power Plants in ASEAN*. ERIA Research Project Report 2016-02, Jakarta: ERIA, pp.25-34.

Chapter 3

Summary of Management Systems in Selected OECD Countries

1. Survey of management systems in OECD countries

Based on the same survey items as in the ASEAN countries, a survey was conducted on the management systems for emission gases from coal-fired power plants in the selected OECD countries. See Section 1 chapter 1 for survey of management systems in ASEAN countries for the survey items. The surveyed selected OECD countries include Australia, Germany, Japan, the Republic of Korea, and the United States. The survey was conducted by referring to the websites, among others, of the related agencies in each country. In the case of Japan, hearings were held with coal-fired power plant operators.

2. Summary of selected OECD countries

Australia, Germany, Japan, and the United States are summarized for each survey item. The Republic of Korea was also surveyed, but its management system was omitted in this study because it is similar to the one in Japan. Because the survey is mainly focused on the regulations of the central government, the situation of local governments are1 surveyed in a limited manner.

First, general items including the legal systems are described, followed by the management systems. See Annexes 3, 4, and 5 for the emission standards in each country.

2.1. General

(A) Legislation (National)

Australia	- National Environment Protection (National Pollutant Inventory) Measure 1998 - National Environment Protection (Ambient Air Quality) Measure
Germany	- Air quality regulation is aligned with the European Union (EU) air quality legislation

	- Industrial emission is regulated under the Directive 2010/75/EU or Industrial Emission Directive (IED) - Federal Emission Control Act (in German, BImSchG)
Japan	Air Pollution Control Act (Ministry of the Environment) (A CPP which is authorized by the Electricity Business Act is exempted from the Air Pollution Control Act.)
United States	Clean Air Act (CAA) - Section 108: Air quality criteria and control techniques - Section 111: Standards of performance for new stationary sources - Section 112: Hazardous air pollutants

(B) Legislation (Local)

Australia	Each state establishes environmental legislation. Procedures vary from state to state.
Germany	Provisions on air quality control at federal state level
Japan	Local governments can establish necessary regulations relating to air pollutant emissions (in general more stringent than that of the central government).
United States	Not available

(C) Regulated pollutants

Australia	SO_2, NO_2, $PM_{10,}$ and $PM_{2.5}$
Germany	SO_2, NOx, PM, carbon, metals, volatile, asbestos, cyanides, chlorine, asbestos, etc.
Japan	SOx, NOx, PM (example Yokohama: Ordinance relating to living environment (cadmium, chlorine, lead, etc.)
United States	CO, lead, NO_2, O_3, PM, SO_2, mercury, etc. 189 pollutants (Sections 108, 111, 112)

(D) The way to recognize the facilities of emitting pollutants

Australia	Each occupier of a facility is to be required to provide information. (example, NSW state: through licensing)
Germany	- Permit of authorities must take into account the whole environmental performance of the plant. - Operators shall submit to the authority a baseline report before starting operation of an installation.
Japan	CPPs shall notify items (facility structure, pollutant control way etc.) to the prefectural governor.
United States	Not available

(E) Authority to suspend operation

Australia	(ex) NSW state: Protection of the Environment Operations Act 1997 Clean-up, Prevention and prohibition notices are provided for under the legislation. Only the minister can issue a prohibition notice on the recommendation of the Environment Protection Authority (EPA).
Germany	The authority may decide to suspend activities of a plant in whole or in part.
Japan	Local governor has power to order emitters to suspend operation when they violate the regulations. When it continuously emits more than limit, local governor can order for improvement until it is completed.
United States	Title V of CAA requires major sources of air pollutants to obtain and operate in compliance with an operating permit. Sources with 'Title V permits' are required by the CAA to certify their permits at least annually.

(F) Measurement of emission by operator

Australia	Australian Standards
Germany	According to the Technical Instruction on Air Quality Control, SO_2, NO_2, PM shall be measured continuously.
Japan	Operator shall measure the quantity or concentration of air pollutant more than every 2 months, keep records.

	(In actual) Data are being monitoring continuously, and automatically transmitted to local governor through telemeter.
United States	Follows EPA Regulation 40 CFR Part 60 Subpart Da under CAA Section 111.

(G) Assistance (National, Local)

Australia	Not available
Germany	State shall encourage the development and application of emerging techniques.
Japan	The (national) government shall endeavour to provide financial assistance, technical advice, other assistance. Local governments also convene explanatory meetings to CPP operator when the law is amended.
United States	New Source Review (NSR) and Prevention of Significant Deterioration (PSD) require large industrial facilities to install state-of-the-art air pollution controls when they build new facilities or make modifications.

(H) Relation to local community

Australia	(ex) NSW state: The law does not require periodical meetings with local community.
Germany	Relations take place at the measuring and monitoring stage, which gathers from local Länder and federal agency.
Japan	Air Pollution Control Act does not require periodical meeting with local community. Another law requires CPP developers to hold meetings with residents before new construction of CPP.
United States	The regulation does not require periodical meetings with local community.

(I) Ability of local government

Australia	(ex) NSW state: The EPA offers a 2-day course which has been designed to equip authorized officers to fulfil their responsibilities as outlined in the Protection of the Environment Operations Act 1997.
Germany	The mid-level administrative bodies have permitting authority.
Japan	Generally high, there are experts of measuring method in local government.
United States	Not available

2.2. Management system

(A) Monitoring

Australia	Areas with populations greater than 25,000 are required to install monitoring stations. (ex) NSW state: The Office of Environment and Heritage (OEH) operates air quality monitoring network. Data from network is presented online as an index (air quality index, AQI) based on hourly data and stored in a searchable database.
Germany	- Monitoring networks are operated by (i) German Federal Environment Agency, which measures stations far away from cities and (ii) German's Lander monitoring networks, which monitor the quality of the populated areas. - The data from the two monitoring networks provide the foundation of the country's air quality.
Japan	- Prefectural governors shall continuously monitor the status of air pollution. - Local governments have observing stations.
United States	(ex) PM: Operator of a facility shall install, calibrate, maintain, and operate opacity monitoring systems (COMS), and record the output of the system for measuring the opacity of emissions discharged to the atmosphere.

(B) Reporting to authority

Australia	(ex) NSW state. The law does not require licensees to report emission data to EPA periodically. Instead, licensees are required to publish pollution monitoring data.

	[Archive Requirement]: Not available
Germany	Operator shall supply the monitoring results to the authority regularly and at least annually. [Archive Requirement] Publications shall be lodged in the archives of the German Patents Office for safe custody and reference.
Japan	National and local governors may require operator to report the status of air pollutant emissions. (In actual) According to an agreement, operator submits the report to local governments every month generally, although CPP automatically send data through telemeter continuously. [Archive Requirement] 3 years. (In actual) most operator keeps important data permanently.
United States	Performance test data from the continuous monitors must be reported to the administrator. The owner or operator of the facility shall submit a signed statement. [Archive Requirement] Record-keeping requirements

(C) Inspection

Australia	(ex) NSW state: Protection of the Environment Operations Act 1997 Operators must notify pollution incidents. Mandatory audits may be required as a condition of licence if the EPA reasonably suspects. [Independent inspector] The law does not require it.
Germany	The law requires mandatory environmental inspections to be done at least every 1 to 3 years. Each inspection plan shall include a general assessment of relevant significant environmental issues. [Independent inspector] The law does not require it.

Japan	National and local governor may conduct official inspection. On-site inspection by national governor: On an irregular base, every 5 or 6 years. On-site inspection by local governor: it depends on an agreement between CPP operator and local government, one inspection per year generally, in Environment Month typically. [Independent inspector] The law does not require it.
United States	EPA's policy: Incentives for self-policing (discovery, disclosure, correction, and prevention) On-site visit by EPA, civil investigations, record reviews, information requests [Independent inspector] The law does not require

(D) Public Announcements

Australia	(ex) NSW state: Requirements for publishing pollution monitoring data - The law requires licensees to publish pollution monitoring data instead of reporting. - There are offences for failure to publish monitoring data and for publishing false or misleading data. It is necessary monthly meaningful summary of monitoring data on website, or required frequency where monitoring occurs less than monthly.
Germany	All data on air quality are published on the internet shortly after they are gathered, providing information on current pollution level. The EU Pollutant Release and the Transfer Register (E-PRTR) is a public register intended to provide environmental information and include data on emissions as reported by the state.
Japan	Local governments collect environmental data from various facilities and publish the status of air pollution at screen monitors in their city hall. Everyone can see the situation in anytime. Local governments also publish environmental report periodically.

United States	Everyone can access the air monitoring results on website. (https://www.epa.gov/outdoor-air-quality-data)

(E) Penalty

Australia	(ex) NSW state Environmental Offences and Penalties [Compensation for Damage and Losses] Strict liability
Germany	Severe cases of non-compliance can result in criminal liability. Criminal sanctions include imprisonment and fines (up to €50,000). [Compensation for Damage and Losses] Strict liability
Japan	Violation of Air Pollution Control Act including disclosure of name of subjected operator. Punishment includes imprisonment and fine. [Compensation for Damage and Losses] Strict Liability
United States	- If a civil defendant is found liable or agrees to a settlement: monetary penalty, injunctive relief, additional actions to improve the environment. - If a criminal defendant is convicted or pleads guilty: monetary fine, restitution, incarceration. [Compensation for Damage and Losses] Strict liability.

3. Summary

- The OECD countries have effective and comprehensive regulation and management systems.
  - Consistency of legislation from national to local government, wide scope of regulating air pollutants, precise and transparent monitoring, reporting and public announce system.
  - Local emission standards are likely more stringent than the national standard.

- In general, local governors are stricter than central governors in regulating air pollutant emissions. It may reflect the importance of the actual management system nearby residents and the local governor's abilities of controllership.
- In general, periodical meetings with local communities are not required, except before the new construction of a CPP, which is stipulated by another law.

- The penalties for violating air pollution control acts are strict. Penalties include suspending power generation facilities, imprisonment, and/or fines.
- Overall, except for the regulation standards for air pollutants, the OECD countries have stricter regulation standards and systems to monitor the air pollution status and publish it for the residents.
- Table 2compares the national emission standards from the CPPs in the selected OECD countries. Where the standards differ depending on the operation start year of the plant, the case of a newly constructed CPP was adopted. Where they differ depending on the plant scale, the large-scale case was adopted. Where they differ depending on the period, the daily basis (or 24 hours) was adopted. SOx and NOx have different units from one country to another. In the countries where ppm is used, accordingly, it is converted into mg/m^3, regarding them as SO_2 and NO_2, respectively.

Table 2: Emission standards for CPP in selected OECD countries

Country	SOx	NOx	PM
Australia	SO_3: 200 mg/m^3	NO_2: 800 mg/m^3	80 mg/m^3
Germany	SOx: 150 mg/m^3	NOx: 150 mg/m^3	10 mg/m^3
Japan	SOx: 50 ppm [*1] (SO_2: 133 mg/m^3)	NOx: 200 ppm (NO_2: 383 mg/m^3)	100 mg/m^3
Republic of Korea	SOx: 50 ppm (SO_2: 133 mg/m^3)	NOx: 50 ppm (NO_2: 96 mg/m^3)	10 mg/m^3
United States [*2]	SO_2: 130 ng/J	NOx: 88 ng/J	11 ng/J

CPP = coal-fired power plant, mg/m^3 = milligrams per cubic metre, ng/J = nanogram per joule,

NO_2 = nitrogen oxide, NOx = nitrogen oxides, OECD= Organisation for Economic Co-operation and Development, PM = particulate matter, ppm – parts per million, SO_2 = sulphur dioxide, SOx = sulphur oxides.

Notes: *1 Based on the CPP's location, sulphur content of fuel, stack height, etc. emission standards vary by CPP. The value is an example of a specific CPP based on an agreement between the CPP and local government.

*2 gross output.

Japan and Republic of Korea: More stringent standards in agreements between the CPP and local government than the national standard.

Source: Authors.