

# Chapter 4

## Policy Implications

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## Chapter 4

### Policy Implications

#### **1. Economic Rationality of Tightening Air Pollutant Emission Standards of Coal-fired Power Plants**

It is difficult to convert an environmental value into monetary terms. Environmental countermeasures for coal-fired power plants are sometimes considered a cost that does not generate any benefit and that plant operators may hesitate to implement. This study estimates the monetary value of good air quality, of which the benefits have rarely been quantified until now. We found that, in the countries surveyed, the potential benefit from tightening air pollutant emission standards often exceeds the cost of installing AQCS. Campaigns against new coal-fired power plants are escalating because of air pollution. In many ASEAN countries, tightening emission standards for coal-fired power plants and installing AQCS to conform to the standards are economically rational.

Installing AQCS, however, requires careful consideration of each country's circumstances. All coal-fired power plants to be constructed from now on must be equipped with appropriate facilities, but whether or not existing power plants should be so equipped must be studied. ASEAN countries utilise coal-fired power plants in different ways and the status of AQCS installation is different across countries. Each country may have its own plan for installing AQCS.

Coal-fired power generation is forecast to increase in ASEAN until 2040, and in BAU the ratio of coal-fired power generation to total generated electricity will increase to 57.2% in 2040 (38.0% in 2015). Coal-fired power generation continues to be a major energy source in each country.

ASEAN countries install AQCS in coal-fired power plants that started operation in or after 1990. The installed capacity of coal-fired power plants that started operation in or before 1989 is approximately 4.2 GW, and in or after 1990 approximately 59.6 GW. Although a power plant with large installed capacity requires a large amount of investment, existing power plants that are expected to operate long into the future should be prioritised for AQCS installation. It is

possible to consider prioritising the installation of NO<sub>x</sub> control facilities, as their adoption rate is lower than those of SO<sub>x</sub> and PM. Because isolating the pollutant source of SO<sub>x</sub> and PM is easier,<sup>7</sup> however, and many control facilities have already been installed in many countries, it may be reasonable to prioritise facilities for SO<sub>x</sub> and PM to complete the countermeasures for all power plants.

Types of coal used in coal-fired power plants are different depending on the country or power plant. Some types of coal have low sulphur content. For example, coal produced by Adaro is classified as significantly low sulphur in Indonesia. If a power plant uses low-sulphur coal, it may be better to prioritise either NO<sub>x</sub> or PM control over SO<sub>x</sub>. The type of coal used by a power plant should be considered when planning to install AQCS.

## **2. Financing Issues**

Criticism of coal-fired power plants is rapidly escalating mainly in Western Europe because of global warming. Since 2013, the World Bank Group and development banks in Europe (European Bank for Reconstruction and Development [EBRD], European Investment Bank [EIB]), amongst others, have announced policies to restrict coal-related investments and loans.<sup>8</sup> The World Bank Group excludes new construction of coal-fired power plants from the list of eligible projects for investment and loans, except in rare cases. The group considers supporting existing facility-related projects only when they improve efficiency. EBRD has removed coal-fired power generation projects, except in rare cases, from its list of eligible projects for investment and loans, and EIB has started to apply a CO<sub>2</sub> emission standard of 550 g/kWh.

As international and foreign-government financing becomes more difficult, the climate for domestic financing has worsened because of the increasing uncertainty of the prospects of coal-fired power generation. Two factors stand out: (1) the decline of the load factor of coal-fired power plants due to increased use of renewable energy, and (2) the risk that the

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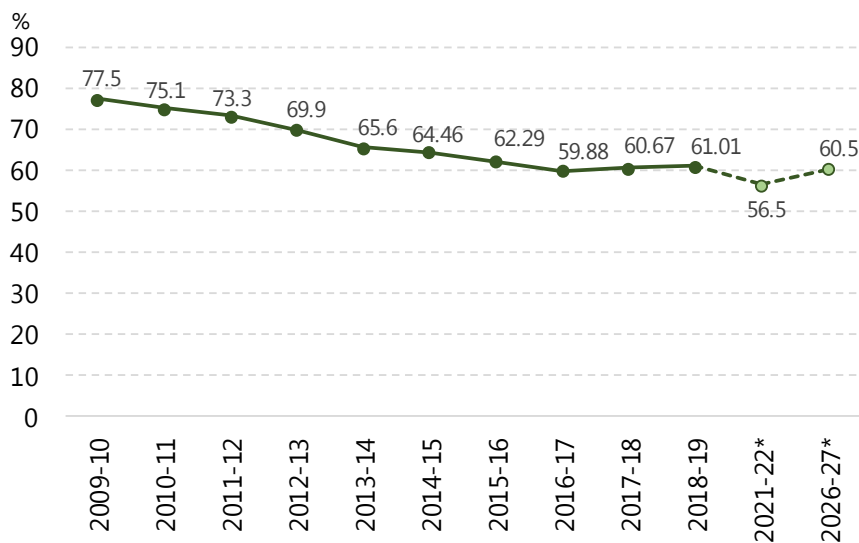
<sup>7</sup> Automobiles also emit NO<sub>x</sub>. Therefore, it is difficult to quantify the effect of countermeasures taken in power plants with reference to the total emission amount of NO<sub>x</sub>.

<sup>8</sup> Financial institutions operated mainly by non-OECD countries, including the Asian Infrastructure Investment Bank (AIIB), are not moving to restrict loans for and investments in coal-related projects. For example, the Asian Development Bank says that coal-fired power generation is necessary to fulfil energy demand and that it is prepared to support efficiency improvement (Super Critical, Ultra Super Critical, etc.). AIIB says it is prepared to consider loans for coal-related projects only when they are replacing facilities with low efficiency or are indispensable for reliability of an electric power network system.

share of coal-fired power generation will decrease in a low-carbon energy mix as a part of measures against global warming. The risk may not be too high because coal-fired power generation is expected to continue to be important in ASEAN. However, in BAU, the long-term forecast until 2040 suggests that the share of renewable energy in power generation will rapidly increase in some countries (e.g. Thailand). Thus, it is possible that political measures supporting a low-carbon energy mix may influence the prospects of coal-fired power generation.

Factor (1) is evident in India. During the COP 21 meeting, the government set a goal ‘to achieve about 40 percent of installed capacity from non-fossil fuel-based energy resources by 2030 with the help of transfer of technology and low cost international finance’ to reduce electric power sector-related greenhouse gas [GHG] emissions (Kumar, 2019). India has consistently worked to reduce GHG emissions, and the share of renewable energy in power generation (excluding hydropower), which was 0.5% in 2000, increased to 6.9% in 2016. The share of variable renewable energy such as solar and wind power generation increased from 0% in 2000 to 4% in 2016. Renewable energy power sources have generally low marginal costs and are often eligible for prioritised connection to power systems, causing a decline of the load factor of coal-fired power plants (Figure 4.1).

**Figure 4.1: Coal Power Plant Load Factor, India**



Source: Kumar (2019).

Coal-fired power plants are frequently required to operate in a standby capacity to absorb the output fluctuation of renewable energy-based power sources. A coal-fired power plant is suitable for operation at a constant output as a base load, whilst standby capacity needs the ability for frequent shutdowns or sharp ups and downs in output. The Central Electricity Authority forecasts that the installed capacity of power sources using renewable energy will reach 175 GW and is studying the performance of coal-fired power plants as a balancing power source.

Like India, ASEAN may experience a decline of load factor of coal-fired power plants, which may operate with ups and downs in output. If a coal-fired power plant needs to operate under such conditions, further efforts will be needed to improve the climate for financing for coal-fired power generation technology.

First, because overseas financing is no longer feasible, local financing should be procured. Local electric power companies' investment capacity and local financial institutions' strength are important. To create an environment where local government-affiliated and private financial institutions can adequately fund new coal-fired power plants and related technology such as AQCS, the government must declare that the plants and technology are important. By making every effort to reduce risks from possible policy changes, amongst others, the government may improve the investment climate.

Second, to enhance their investment capacity, local electric power companies must ensure that their management is sound. Subsidies must be eliminated. In November 2015, the leaders of the Asia-Pacific Economic Co-operation (APEC) economies reaffirmed their landmark 2009 commitment to 'rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption whilst recognising the importance of providing those in need with essential energy services' (IEA, 2017: 8). Several APEC members have moved ahead with energy pricing reforms (IEA, 2017). Around 60% of total fossil fuel consumption subsidies in APEC economies are in the residential sector (for gas, electricity, and LPG) and reforms have been slow (IEA, 2017). Reforms are politically sensitive but can bring multiple benefits, including freeing up resources for government investment in infrastructure, for example. Recent reforms to reduce electricity subsidies in Indonesia, Malaysia, and Viet Nam should be continued, enhanced, and implemented in all ASEAN countries (IEA, 2017).

Last, some countries are liberalising or planning to liberalise their electricity markets. Fully liberalising not only the wholesale but also the retail electricity market will generally increase the uncertainty of electric power companies' profitability, making investment in large-scale infrastructure and facilities, including AQCS, difficult for the companies.

Investment in coal-fired power generation-related technology faces multiple political challenges such as liberalisation of the electricity market and environmental countermeasures to reduce air pollution and CO<sub>2</sub> emissions. In ASEAN countries where energy demand continues to increase along with their economic growth, however, coal-fired power generation will continue to be important because locally available resources can be utilised or fuel procurement costs are low. Such countries must study how to utilise coal-fired power generation in a sustainable manner, not only for their energy security but also for the health of their people. ASEAN policymakers will be required to tighten air emission standards for coal-fired power generation at the right time and on the right scale, and to promote installation of AQCS.