

Chapter 7

Policy Recommendations for the Strategic Usage of Coal

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Chapter 7

Policy Recommendations for the Strategic Usage of Coal

7-1. Clean Coal Technology for Strategic Usage of Coal

Economic development and growth in the EAS region have been remarkable and demand for electricity is forecasted to increase substantially. In the EAS region, coal is the more secure and affordable energy resource compared to oil and gas as its reserve is abundant. Therefore, coal-fired power generation will continue to play a central role in meeting an increasing electricity demand.

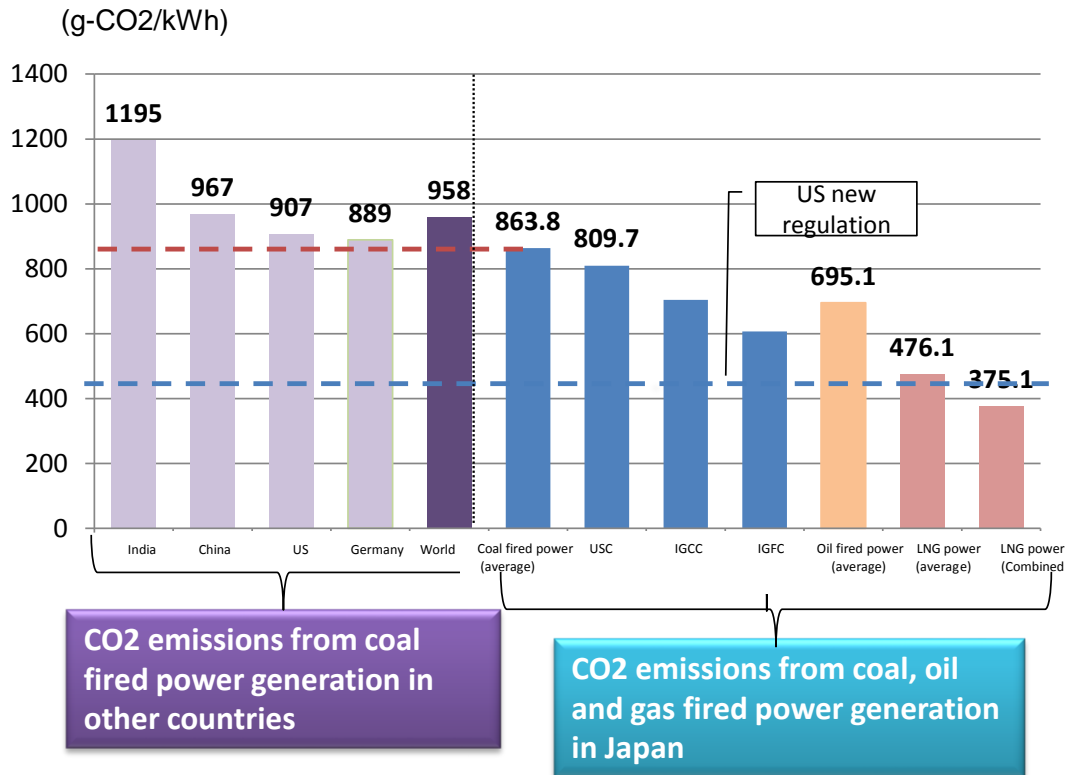
However, half of the regional coal resources are defined as low-rank coals. Low-rank coal has limited use and low utilisation efficiency because of high moisture content and low heating value. In addition, it contains higher carbon content than oil and gas because coal upon combustion generates the biggest amount of CO₂ per unit among all primary energy sources. Considering such conditions, the introduction of clean coal technology (CCT)—which is high efficiency, low emission, and available to low-rank coal—is indispensable. The advantages of introducing high-efficiency CCT are fuel cost reduction and CO₂ emission reduction more than the increment of construction cost. Furthermore, based on low emission in CCT, applicability to credit mechanism such as the joint crediting mechanism can be considered.

In June 2013, US President Barack Obama announced ‘The President’s Climate Action Plan,’ and upon receiving this plan, the US Environmental Protection Agency proposed a new regulation on CO₂ emission for power plant at 1,000 lb/kWh (453.6 g/kWh). As shown in Figure 7-1, it is impossible for fossil fuel power plants to sustain this regulation with the exception of gas-combined cycle power plant. Therefore, it will be necessary for coal-fired power plants to adopt CCS (carbon dioxide capture and storage) technology and high efficiency CCT in the future.

On the other hand, coal-fired power plants will continue to increase in the EAS region as mentioned above. According to an IEA report titled ‘21st Century Coal: Advanced Technology and Global Energy Solution’, an estimated 59 gigatons (GT) of reduced CO₂ emissions from coal power plant could have been achieved had new coal units over the past 50 years used the highest efficiency technology available when built. Therefore, high

efficiency CCT with a set of operation and maintenance (O&M) techniques should be introduced. CO₂ emissions and coal consumption will be reduced, which will enhance environmental compliance and energy supply security accordingly.

Figure 7-1. CO₂ Emissions from Fossil Fuel Power Plants



Source: Based on development targets of various research businesses, Central Research Institute of Electric Power Industry (CRIEPI), 2009; International Energy Agency (IEA), 2012, CO₂ Emissions from Fuel Combustion.

7-2. Road Map

In order to promote the adoption of suitable CCT in EAS region, a road map for strategic utilisation of coal in each country group in the EAS region has been created based on the technological potential map formulated in this study. The road map for each group is shown in Figure 7-2.

(1) Group A

The countries in group A have already promoted the use and expansion of ultra super critical (USC) and they should focus on the introduction of high-efficiency IGCC (integrated coal gasification combined cycle) from now on. They also need to implement more effective environmental measures including those for the removal of heavy metals. The CO₂ emissions standard for coal-fired power stations proposed by US stipulates an emission

level of 1,000 lb/kWh, which is a level not achievable by USC or IGCC. Therefore, there is a need to consider the application of CCS, which is currently under development, by 2025.

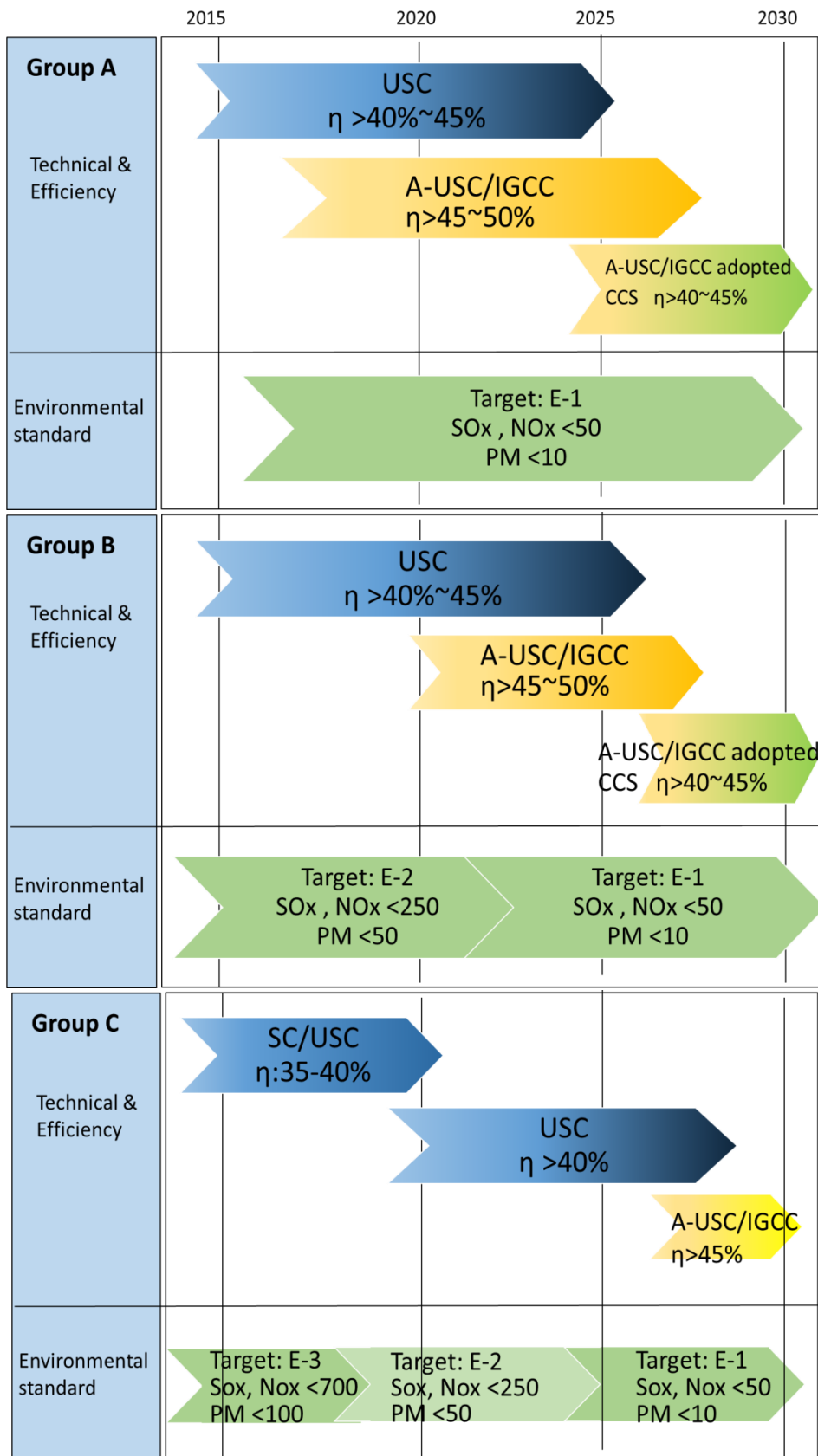
(2) Group B

Countries in Group B have coal-fired power stations that are already in operation and will soon introduce or plan to introduce USC. The promotion of USC is expected in the future. Because these countries' current environmental standards are not sufficient for future environmental protection, more stringent environmental regulations should be put into force. Utilisation of high-efficiency CCT such as IGCC should be planned for the period 2020–2025 or later. Regarding their existing power generation facilities and newly constructed power stations, appropriate operation and maintenance for maintaining power generation efficiency will contribute to the reduction in operating costs, effective utilisation of resources, and improvement of environmental protection.

(3) Group C

In these countries, only small-scale thermal power stations are operating but relatively large power stations will be needed in the future as their economies continue to develop and increase the demand for electricity. Those countries will need to introduce SC or USC and set appropriate environmental standards for power stations exceeding 600 MW in capacity. More stringent environmental standards should be established in line with the progress of CCT promotion. At the time of introducing CCT, efforts should be made for providing advance education and training on equipment operation and maintenance to foster capable engineers, and ensure stable operation and maintenance of facilities.

Figure 7-2. Road Map for Each Country Group in the East Asia Summit Region



Source: Author's proposed road map.