

Chapter 9

Conclusions

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Chapter 9

Conclusions

The study analysed the benefits of the Transmission Highway in the ACMECS region and identified the cross-border interconnections that will benefit all countries within the ACMECS. In the concept of the Transmission Highway, the Lao PDR could play a role in exporting additional power energy to Cambodia, Myanmar, Thailand, and Viet Nam. The benefits include the use of hydro resources in the Lao PDR to reduce thermal power generation in Cambodia, Myanmar, Thailand, and Viet Nam and improve GDP through electricity access in Cambodia and Myanmar.

Figure 5-1 shows the candidate cross-border interconnections for the Transmission Highway. Selected for the Transmission Highway are six routes of cross-border interconnections and three routes of domestic transmission lines in Thailand. Also set are the voltage level and capacities of the candidate transmission lines based on the SIL and the amount of expected power trade. The total construction cost of the Transmission Highway is about US\$1,500 million.

The electric power trade to be transmitted from the Lao PDR through the candidate interconnections is expected from the increase in energy export volume of the domestic power grid and new export-dedicated IPPs in the Lao PDR. In addition, the rise in power energy import from Thailand into the domestic power grid of the Lao PDR during the dry season is also expected. According to IRENA (2019), in China, the unit cost for installing the hydropower plant is US\$1,264/kW and US\$1,223/kW for the onshore wind power. Based on these prices, the total installation cost of new IPPs is about US\$4,016 million.

Figure 6-2 shows the expected power trade through the Transmission Highway. Basically, the Lao PDR could export additional electric power energy to a neighbouring country.

Based on the expected power trade, this study carried out a benefit analysis. The power trade through cross-border interconnections can result in many benefits. One is reduced fuel cost in thermal power plants, an economic benefit. Fuel cost reductions for 25 years amount to US\$1,569 million in Thailand; US\$2,614 million in Viet Nam; US\$1,667 million in Myanmar; and US\$448 million in Cambodia. The total fuel reduction is expected to cost US\$6,298 million.

The second benefit is reduced new investment in thermal power plants. A new investment of US\$2,093 million with 1,504 MW of total thermal generation capacity can be decreased by power trade through the Transmission Highway.

The third benefit is the decreased CO₂ emissions through the reduction of thermal power generation. This result is calculated as the social benefit. CO₂ emission reduction for 25 years total 3 Mt-C in Thailand, 31 Mt-C in Viet Nam, 21 Mt-C in Myanmar, and 5 Mt-C in Cambodia. The total CO₂ emission reduction is expected to be 60 Mt-C. In addition, decreased thermal power generation yields the benefit of carbon pricing. No carbon pricing incentive currently exists in ACMECS countries. If carbon pricing incentive will be introduced, its benefits for 25 years are US\$46.2 million in Thailand, US\$1,984.1 million in Viet Nam, US\$1,294.1 million in Myanmar, and US\$365.7 million in Cambodia. The total benefits of carbon pricing are expected to be US\$3,690.2 million. Thus, carbon pricing is feasible.

The fourth benefit, improved GDP through the electricity access, is both a social and economic benefit. The electricity access ratios in Myanmar and Cambodia are still low. Thus, this study assumed that imported electricity is used for thermal power generation reduction and electricity access in Myanmar and Cambodia. Using electricity imports from Thailand for electricity access will improve Myanmar's GDP by 0.7% in 2030 and 0.5% in 2035, and Cambodia by 0.6% in 2030 and 0.3% in 2035 (ERIA, 2019).

The fifth benefit is income from the wheeling charge. This study roughly conducted a benefit analysis of wheeling charge, assuming a unit price of 1.0 cent/kWh for all candidate cross-border interconnections. The income from the wheeling charge for 25 years in each candidate cross-border interconnection ranged from US\$446 million to US\$1,500 million. The total income from the wheeling charge is expected to be US\$5,545 million.

Based on these benefits, this study analysed the FIRR, EIRR, and NPV of the Transmission Highway. The FIRR was 15.9%. For a discount rate of 8%, the estimated NPV for the Transmission Highway is US\$859 million, and the payback period is 8.9 years. For a discount rate of 10%, the NPV is US\$557 million, and the payback period is 10.1 years. The FIRR is higher than Myanmar's long-term interest rate (9.5%). Furthermore, the EIRR was 13.9%. For a discount rate of 8%, the estimated NPV for the Transmission Highway is US\$2,170 million, with a payback period of 11.1 years. For a discount rate of 10%, the NPV is US\$1,249 million and the payback period is 11.9 years. The EIRR is also higher than 9% of the standard adopted by ADB. From these results, the Transmission Highway is financially and economically feasible.

Based on the results of the quantitative analysis on the potential economic benefits and costs of cross-border interconnections in ACMECS, the Transmission Highway's routes will be constructed and their benefits reaped. While the results of the analysis in this study may lead to further discussions and decisions, it has to be acknowledged that this study insufficiently addresses several issues. For instance, the route selection for transmission lines and cost calculations must be examined. In addition, detailed physical analyses such as power flow calculation, power system stability, short circuit current should be considered. Addressing these issues, which were analysed insufficiently, will improve the reliability of this research.

Finally, the Transmission Highway will greatly benefit ACMECS countries. To maximise the benefits of the Transmission Highway, multilateral power trade should be realised in the ASEAN region. The APG aims to expand power trade gradually and realise a total integrated Southeast Asia power grid system. As noted in Chapter 8, ACMECS countries have been discussing multilateral power trade within the framework of the GMS for many years, and they have accumulated knowledge. Therefore, ACMECS will hopefully be a pioneer in developing multilateral power trade subregionally, then throughout ASEAN. That is the direction of this study.

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