

Executive Summary

The BIMP (Brunei, Indonesia, Malaysia, and the Philippines) region contains significant energy resources that could be developed to stimulate the economic growth and development of the region. These resources, however, are unevenly distributed. The current supply and demand imbalances create opportunities for trade and initiate power market integration at the sub-regional level. In the long-term, Malaysia's Sarawak and Indonesia's Kalimantan could emerge as major power exporters in Borneo. Full development of the energy resources of BIMP, however, can only be realised when its power market cluster is fully integrated in the much broader ASEAN power markets.

In the first chapter, the authors evaluate the benefits of expanding grid interconnection lines in ASEAN by carrying out a simulation with the Optimal Power Generation Planning Model and the Supply Reliability Evaluation Model on the basis of the current expansion plan of grid interconnection. Through the efficient use of hydropower resources in Borneo and the expansion of regional interconnection lines, it is possible to reduce fossil fuel consumption, CO₂ emissions, and costs of power source development. By expanding the interconnection lines within BIMP alone, these effects can be expected to a certain extent. But even more remarkable effects may be expected by further interconnecting with large energy-consuming areas like Peninsular Malaysia and Luzon. However, any significant cost reduction can only be achieved from a long-term point of view or within a period up to 2050. Thus, long-term plans by the government of host country as well as international financial institutions and their steady implementation are indispensable.

The second chapter contributes a road map to resolve the regulatory, institutional, and technical barriers specific to the electricity market integration in BIMP, where it can be initiated despite the disparity of electricity industry structures and regulatory frameworks between trading countries. Among the approaches for market integration, the coordination of power system operators rather than the consolidation of the power market and power system operators is the most practical and appropriate for the BIMP power market cluster.

Given the power industry structures and regulatory environment of the BIMP countries, the coordination models that could be applied include: i) unidirectional trade, ii) bidirectional power transactions, iii) power purchase from IPP, iv) third-party access, and v) multi-buyer multi-seller market. The interconnection projects and planned power exchanges identified under APG for the BIMP market cluster could be characterised according to these coordination arrangements.

To fully realise economic benefits from developing the region's energy resources for power generation, the paper outlines a road map for power market integration in BIMP that serves as recommendation to governments in the region on how to proceed with regional power interconnections. The road map is divided into four stages of development.

- Stage 1. Incremental development of regional transmission backbone infrastructure;
- Stage 2. Incremental intra-Borneo power trade based on projects with mutual benefits;

- Stage 3. Incremental inter-Borneo trade arrangements; and
- Stage 4. Establishment of a multi-buyer, multi-seller regional power market.

Following the road map requires individual country investment commitments. Stage 1 investments would be by each of the countries in their territories. Investments in stage 2 and stage 3 would be carried out by trading parties. Stage 4 requires cooperation commitments from BIMP countries since the establishment of a multi-buyer, multi-seller market requires multilateral financing and the transfer of some of the functions of the national system operators to the cross-border market operator.

Chapter 3 aims to develop a business model for pan-ASEAN integrated electricity market. For this, it is necessary to understand the success formula of currently operating integrated electricity markets and identify key factors involved such as principles, frameworks, practicalities, and conditions. At present, the European electricity market represents the world's most extensive cross-jurisdiction reform of the electricity sector involving integration across distinct states and national electricity markets. As such, Europe is selected as study model to understand the market principles, framework, and practicalities for the integration of regional electricity market.

To design a business model for integrated electricity market for Southeast Asian region, the most significant aspects should include market coupling arrangements and algorithms, congestion management and capacity auction methods, coordination mechanism and relevant network code among transmission system operators (TSOs) for grid balancing, and auxiliary services and compensation for such services. This chapter touches upon these issues by referring to the Nordic and European experiences. Major standing problems and challenges of the European electricity market model are also briefly discussed.

Chapter 4 aims to investigate the barriers, especially institutional and political barriers, to electricity market integration in ASEAN. It also discusses practical policy options to accelerate market integration in the ASEAN power sector.

Besides emphasising political will as necessary in accelerating the development of APG and market integration, several policy recommendations are provided. The first is to strengthen and build institutional capacity. The second is to improve collaboration in national capacity building and coordination in power sector reforms among ASEAN countries. The third is to adopt a stepwise approach toward the promotion of power trade and market integration. The fourth is to build public-private partnership to give the private sector a more active role in market integration, especially with regards to investment in power infrastructure. This can also be extended to international institutions such as the World Bank and the Asian Development Bank. The fifth recommendation is to promote cleaner and abundant renewable energies. Penetration of renewable energy into the power sector calls for power grid interconnection and market integration. It should be noted, however, that higher share of renewable energy also raises challenges to the robustness of ASEAN countries' power grid.