

Interconnections in Southeast Asia: Opportunities and Challenges

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I. The emergence of ASEAN connectivity

The Association of Southeast Asian Nations, or ASEAN, was established on 8 August 1967 with 5 founding members, and now include the 10 member states

ASEAN has been working to enhance energy connectivity and regional market integration to meet the region's energy needs, achieve energy security, accessibility, affordability and sustainability for all ASEAN member states

ASEAN Economic Community AEC (2015) envisions ASEAN as a single market and production base characterized by free flow of goods, services, and investments, and skilled labour.

I. The emergence of ASEAN connectivity: The Looming Energy Gap

Energy demand in Southeast Asia is expected to grow rapidly in the coming decades, almost tripling from 2013 to 2040 (IEA, Energy Outlook 2015).

Fossil fuels:	82%	77%
Coal	32%	50%
Gas	44%	26%
Oil	6%	1%
Nuclear	0%	1%
Renewables	17%	22%
Hydro	14% ..	12%
Geothermal	2% ...	3%
Bioenergy	1%	3%
Other	0%	4%

II. Implications of greater ASEAN connectivity: Potential Benefits

Realize a more efficient use of energy resources. Achieve a more efficient utilization of energy sources across the region, connecting countries with surplus power generation capacity to countries facing a deficit;

Deliver economic benefits. Realize financial benefits across the region, from potential infrastructure savings as well as lower energy costs. It would also help utilities balance their excess supply and demand, improve access to energy services, and reduce costs of developing energy infrastructure;

II. Implications of greater ASEAN connectivity: Potential Benefits

Optimize regional investment. Reduce the costs of developing national energy infrastructure, notably by reducing investments in power reserves to meet peak demand, therefore lowering operational costs while achieving a more reliable supply and reducing system losses;

Attract additional investment in APG interconnection, by providing a price signal as a catalyst for their financial returns;

Facilitate investment decisions, within a regional regulatory framework to govern the orderly entry of electricity imports

II. Implications of greater ASEAN connectivity: Potential Benefits

Improve access to electricity. Help expand power networks and client base, in a region where millions of people still lack access to electricity and clean cooking energy sources. In several cases, access to electricity will prove more economically viable through connections to the APG rather than extensions of the national grid, when additional investments are required.

Enhance energy security, by diversifying energy mix (fuel type), by enhancing sustainability of electricity supply across various sources, and by building maintaining reliability of power systems

II. Implications of greater ASEAN connectivity: Environment

Expand renewable energy. Tap into renewable sources (e.g., hydro, geothermal, solar) unavailable or unfeasible at national level. Notably the abundant hydropower resources in Myanmar, Lao PDR and VietNam, and Cambodia.

Provide a greater level of penetration of renewable energy sources without putting excessive strain on the stability of the national power system, by helping substitute hydropower to present coal and gas

Help address the technical challenges to manage the intermittency of renewable generation sources

III. The ASEAN Power Grid: Objectives

The ASEAN Power Grid (APG) is a flagship project set up in 1997 by the ASEAN Heads of States, as part of the ASEAN Vision 2020. The emphasis was on the need to construct multilateral energy networks across ASEAN

The MOU was signed by Energy Ministers in July 2007, with a vision to strengthen and promote power interconnection and trade within ASEAN

The APG was created as the flagship of the 202 vision, with the purpose of delivering three main objectives:

- * achieve long-term security, availability and reliability of energy supply;
- * optimize the region's energy resources; and
- * allow access to affordable energy to populations across the region.

III. The ASEAN Power Grid: Objectives

APG core operational objectives:

- (1) Create a platform to facilitate regional electricity trade
- (2) Achieve a more effective development and utilization of energy resources
- (3) Facilitate power transfer from diverse energy sources to demand centers
- (4) Reduce capital expenditure by lowering need for new generation capacity
- (5) Capitalize on different regional demand peak timings

III. The ASEAN Power Grid: Accomplishments

Since its inception in 1997, the APG has accomplished gradual progress, particularly through the deployment of several inter-connections, many of which are fully operating on a bilateral basis

The ASEAN Economic Community (AEC) Blueprint 2025 includes, as a strategic measure, the development of multilateral electricity trade through the APG.

The vision is to enhance energy security, expand access to electricity, improve deployment of renewable energy, and optimize the use of clean energy sources throughout the AEC.

IV. The ASEAN Power Grid: Challenges

The APG is yet to operate on a multinational basis, so as to deliver its intended benefits throughout ASEAN.

The main constraint to progress in building the regional power market is the contrasting ways in which different countries manage their energy sectors, with gaps or mismatches in policy, structure and regulation

Lack of harmony in different legal and regulatory frameworks relating to power interconnection and trade, as well as technical standards and codes relating to planning, design, system operation and maintenance.

Lack of institutional and contractual arrangements for cross-border trade including matters such as taxation, transmission tariffs, and third-party access.

IV. The ASEAN Power Grid: LTM(S)

The Lao PDR-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP) was first conceptualised by Lao PDR and Singapore during bilateral discussions on energy cooperation, thereafter included Thailand, Malaysia in the discussions

LTMS project was to be the first multilateral power trade in ASEAN, the pathfinder towards realising multinational trade through the APG

IV. The ASEAN Power Grid: LTM(S)

A Working Group (WG) set up between the 4 countries to study the viability of cross-border power trade of up to 100 MW from Lao PDR to Singapore, to:

Explore the technical feasibility and viability of cross-border power trade using existing interconnections to:

- (1) Exchange information on existing and planned electricity generation sources, electricity demand
- (2) Identify the legal and regulatory issues
- (3) Explore possible commercial arrangements and possible business models

V. Creating an ASEAN multinational electricity trading platform?

As part of their efforts to establish regional power connectivity through the APG, ASEAN Energy Ministers have also envisaged (2016) the creation of an ASEAN framework for multilateral electricity trade

More recently, during their 34th meeting (September 2016), ASEAN Energy Ministers approved the creation of an APG Special Task Force to advise ministers on a framework for the APG to operate on a multilateral basis

The approach would be market-based, and adapted from various regional electricity markets from around the world, notably in the European Union (EU), Nordic countries (Nord Pool), the United States (US), the Southern African countries (SAPP), and the Central America (SEIPAC).

V. Creating an ASEAN multinational electricity trading platform?

ASEAN Energy Ministers approved a Feasibility Study to investigate requirements for the creation of an ASEAN multinational electricity trading platform, and for establishing needed regulatory and legal frameworks

The core purpose of the study is to allow ASEAN policy-makers:

- (1) to determine whether the creation of such a platform would enable the APG to operate on a multilateral basis for trading electricity and securing ancillary services;
- (2) to agree on the design of such platform, based on what works best in multilateral trading models around the world, adapted to ASEAN specificity;
- (3) to consider and agree the high-level plan for the two subsequent phases for the creation of such platform - namely the design and implementation.

V. Creating an ASEAN multinational electricity trading platform?

The Feasibility Study will assess requirements for the creation of a trading platform to allow for multilateral power trading between interconnected nations within ASEAN.

The analysis and conclusions will be based on current ASEAN conditions at the national levels, ASEAN needs and aspirations, and anticipated situation with the APG in full operation

The study will draw on findings from international experience in regional power markets, so as to identify the best approaches to addressing potential regulatory and/or legal barriers to the functioning of such a platform.

It will include the assessment of ongoing discussion on the future ASEAN regulatory framework, and the sharing of international experience on obstacles encountered and the way they have been addressed.

V. Creating an ASEAN multinational electricity trading platform?

The feasibility study would be a first phase for considering the creation of an ASEAN multinational electricity trading platform.

The process will be developed through three phases, each providing a clear decision point at ministerial level before proceeding to the next phase:

- (1) Feasibility Phase (6 months), to deliver an AEE Feasibility Study;
- (2) Design Phase, to develop its components and deliver the preparatory identified tasks needed to create the multilateral market;
- (3) Implementation Phase, to deliver a platform fully ready to operate.