

Overview of Power Sector Policy for 5 ASEAN Countries: Current Status, Challenges, and Partnership Prospects

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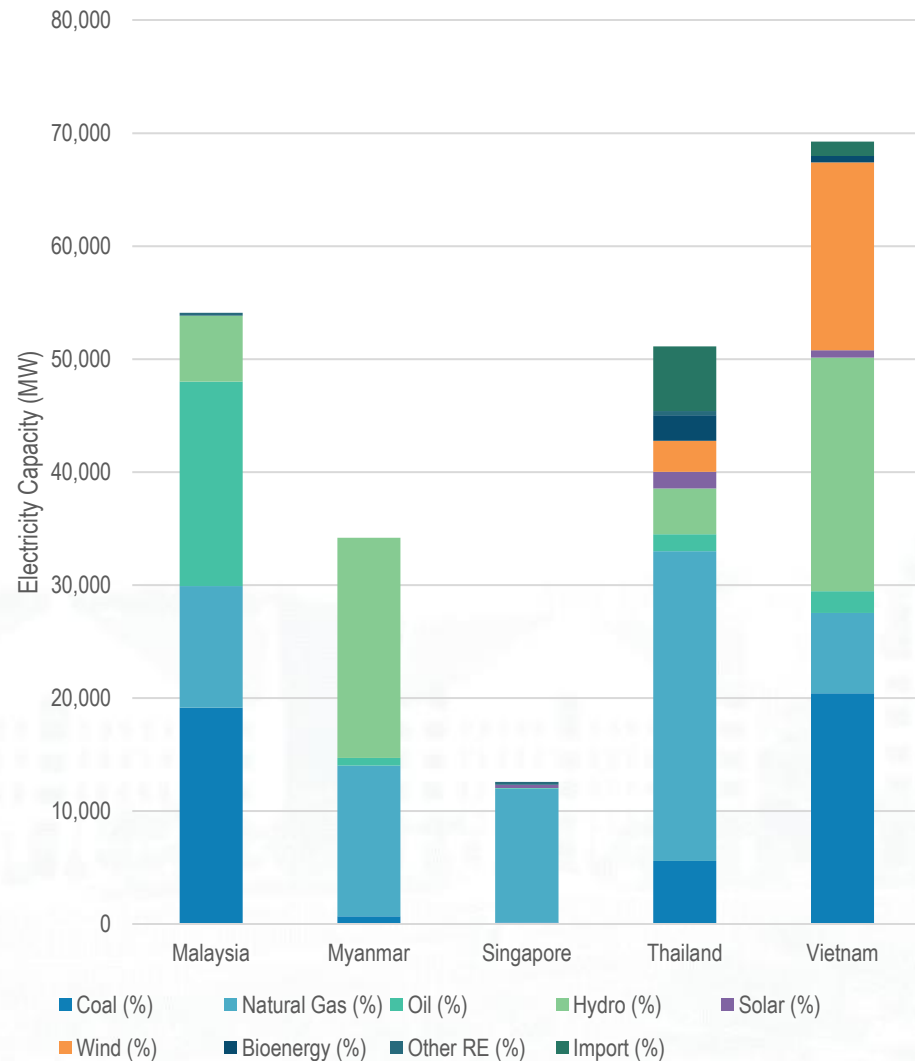
Discussion and Prospect for Cross-country partnerships

01

Overview statistics of current power sector



Overview of power sector in 5 ASEAN countries



	Malaysia (1)	Myanmar (2)	Singapore (3)	Thailand (4)	Vietnam (5)
Year	2019	2017	2020	2021	2020
Generating Capacity (MW)	54,093	34,183	12,582	51,128	69,258
Electrification (%)	100%	58%	100%	99.9%	99.4%
Coal (%)	52.9%	2%	1.2%	10.9%	29.5%
Natural Gas (%)	29.8%	39%	94.1%	53.6%	10.25%
Oil (%)	0.5%	2%	0.4	3.0%	2.79%
Hydro (%)	16.1%	57%	0%	7.9%	29.9%
Solar (%)	0.21%	0%	2.3%	5.3%	24.0%
Wind (%)	0%	0%	0%	2.9%	0.9%
Bioenergy (%)	0.51%	0%	0%	4.5%	0.8%
Other RE (%)	0%	0%	2%	0.7%	0%
Import (%)	0%	0%	0%	11.2%	1.8%

Source:

- (1) Department of Statistic Malaysia (2019)
- (2) Myanmar Country Profile by AGEP (2020)
- (3) Singapore Energy Statistics by EMA (2020)
- (4) Electricity Generating Authority of Thailand (2021), Energy Regulatory Commission (2021)
- (5) Power Development Plan – Draft 3 (2020)

02

Current national policies, targets and challenges related to power sector



Summary of national targets related to power sector

	Malaysia	Myanmar	Singapore	Thailand	Vietnam
Renewable energy mix	20% by 2020 23% by 2025 30% by 2030	62% by 2030.	at least 2GW of solar energy by 2030	25% by 2025 43% by 2037	54% by 2025 (24% hydropower, 30% non-hydro), 48% (19% hydropower, 29% non-hydro power) by 2030 (PDP VIII Draft v.3)
Electrification	Not applicable	75% by 2025 100% by 2030	Not applicable	Not applicable	100% (PDP VIII Draft v.3)
Carbon intensity reduction target 2030	45% by 2005 level	243 million tonnes	36% from 2005 level	20 - 25% by 2005 level	16.7% compared to the BAU scenario by 2030 (Updated NDC 2020)



National policies related to power sector in Myanmar

Country	Policies	Highlights
Myanmar	Myanmar Sustainable Development Plan (2018-2030)	<ul style="list-style-type: none">• Strategy 5.4: Provide affordable and reliable energy to populations and industries.
	Myanmar Energy Master Plan (2015)	<ul style="list-style-type: none">• To develop 15% - 20% share of renewable energy in 2020 in the total installed capacity.
	National Electrification Plan (2014)	<ul style="list-style-type: none">• To connect all Myanmar households to a supply of electricity by 2030.• For remote Areas: implement off-grid solar home systems and mini-grid solar / solar/hybrid projects.
	National Energy Policy (2014)	<ul style="list-style-type: none">• To ensure energy security for the sustainable economic development in the country• To provide affordable and reliable energy supply to all consumers, especially for remote areas <i>without electricity</i>.



Myanmar's challenges in power sector

Renewable Energy Development

- Low electrification rate (58%)
- Private Sector involvement for the funding sustainability
- Strong enabling framework, & long-term incentive

Industrial Energy Efficiency Improvement & Conservation Program

- Emphaise on the design, demonstration & pilot testing of off-grid, community embedded renewable energy systems
- Mainstreaming energy efficiency measures in the overall energy sector policy

Improvements on Information Dissemination & Stakeholders Consultation

- Stakeholders, entrepreneurs and ministries consultation through National Energy Management Committee (NEMC).



National policies related to power sector in Thailand

Country	Policies	Highlights
Thailand	Alternative Energy Development Plan (AEDP) - 2018	<ul style="list-style-type: none">• Increase share of RE in heat sector and power sector across all technologies• Decrease share of RE (biofuel) in transport due to expected rise of EVs
	Energy Efficiency Plan (EEP) - 2018	<ul style="list-style-type: none">• Increase energy efficiency through policy measures, equipment standards, financial incentives, R&D, capacity building, etc.
	Gas Plan (GAS) - 2018	<ul style="list-style-type: none">• Provide enough natural gas at fair price and reliable supply• Supply shift from domestic and Myanmar sources to LNG import• Thailand to become regional LNG trading hub
	Power Development Plan (PDP) - 2018 Rev.1	<ul style="list-style-type: none">• Maintain and expand the generation, transmission and distribution adequately• Smart grid development plan for disruptive technologies• Preparation for power market competition

Source: [Department of Alternative Energy Development and Efficiency \(2020\)](#), [Department of Alternative Energy Development and Efficiency \(2020\)](#), [Energy Policy and Planning Office \(2020\)](#), [Energy Policy and Planning Office \(2020\)](#)



Thailand's challenges in power sector

Techno-economic barriers for renewables

- RE projects need better access to finance and capital.
- Grid access barriers for RE
- Reduced use of dispatchable plants

Fossil industry

- Just transition

Political engagement and alignment

- Political will and ownership
- Consistency of policies and strategies
- Cross-sector misalignment and coordination



National policies related to power sector in Singapore

Country	Policies	Highlights
Singapore	Alternative-energy disadvantaged status	<ul style="list-style-type: none">• Primary source of electricity generation still comes from fossil fuels (coal/natural gas) and petroleum products• Conditions (limited land, low wind speeds, low water flow rate, no geothermal sources, etc) not viable for most RES, except solar
	Grid Capacity	<ul style="list-style-type: none">• With the uptake in adoption of electric vehicles (EVs), the power grid infrastructure needs to be upgraded in order to keep up with increased demands



Singapore's challenges in power sector

Increase Solar Energy Use

- Raise use of solar energy to 1.5 gigawatt-peak in Public Sector
- Solar panels will be installed where feasible on all public sector premises

Slash Water and Energy Consumption

- Energy and water use will be reduced by 10 per cent from the past three year's average.
- Under the Paris Agreement, Singapore aims to peak its emissions at 65 million tonnes by around 2030, halve that amount to 33 million tonnes by 2050, and achieve net-zero emissions sometime in the second half of the century
- To halve the amount of energy used to produce desalinated water, and is exploring new technologies in reverse osmosis to improve the production of NEWater.

Lower Carbon Emissions

- All Government cars will run on cleaner energy by 2035
- From 2023, all new Government cars must have zero exhaust emissions



National policies related to power sector in Malaysia

Country	Policies	Highlights
Malaysia	Green Technology Master Plan Malaysia (2017-2030)	<ul style="list-style-type: none">• Provide a conducive environment for green technology development (energy, manufacturing, transport, waste)
	National Energy Efficiency Action Plan	<ul style="list-style-type: none">• Promotion of 5-Star Rated Appliances• Minimum Energy Performance Standards (MEPS)
	National Renewable Energy Policy and Action Plan	<ul style="list-style-type: none">• To increase RE contribution in the national power generation mix• To ensure reasonable RE generation costs



Malaysia's challenges in power sector

Over-dependence on fossil fuel

- Increasing **energy** import dependency (coal)
- **High subsidy** on fossil fuel

Slow growth on renewable energy

- **Unattractive financial returns** scheme for REs expect solar
- **Liberalization of solar industry** - current NEM program has a quota of 300 MW for the commercial sector from Apr 2021 to Dec 2023, with only 0.03 MW left by June 30

Horizontal and vertical coordination

- **Multi-agencies involvement**
 - EPU, SEDA, EC
 - Cross-agencies misalignment
- **Lack of data transparency and sharing**
 - Energy planning and optimization challenges



National policies related to power sector in Vietnam

Country	Policies	Highlights
Vietnam	Resolution 55/NQ-TW On Orientations of the Viet Nam's National Energy Development Strategy to 2030 and outlook to 2045	<ul style="list-style-type: none">• Total installed capacity to reach 125 - 130 GW and power output to reach 550 - 600 TWh by 2030.• The share of renewable energy sources in the TPES reaches 15 - 20% in 2030 and 25 - 30% in 2045.• Strengthening international cooperation; actively and proactively developing strategic partnerships to realize the targets of importing energy in the long term and investing in overseas energy resources
	Power Development Plan VIII – Draft v3	<ul style="list-style-type: none">• Total capacity installed to reach 138 GW by 2030• Power demand forecasted to reach 491.3 TWh in 2030• 48% share of fossil fuel, 19% hydropower, 29% non-hydro power, 4% imported in 2030
	Nationally Determined Contribution 2020	<ul style="list-style-type: none">• With both domestic and international support, the reduction contribution of energy sector will be 16.7% compared to BAU scenarios (155.8 mil tonnes of CO₂eq)



Viet Nam's challenges in power sector

Grid Capacity

- Grid transmission overload due to the rapid development of solar power in Ninh Thuan and Binh Thuan

Regulatory framework

- Discontinuous tariffs schemes and unclear roadmap for RE auction mechanisms

Access to capital

- 13 billion USD/year (2021-2030) is required realize the power development plan VIII

03

Existing collaboration in power sector

*APAEC: ASEAN PLAN OF ACTION FOR ENERGY COOPERATION



Why partnerships among ASEAN countries is important?

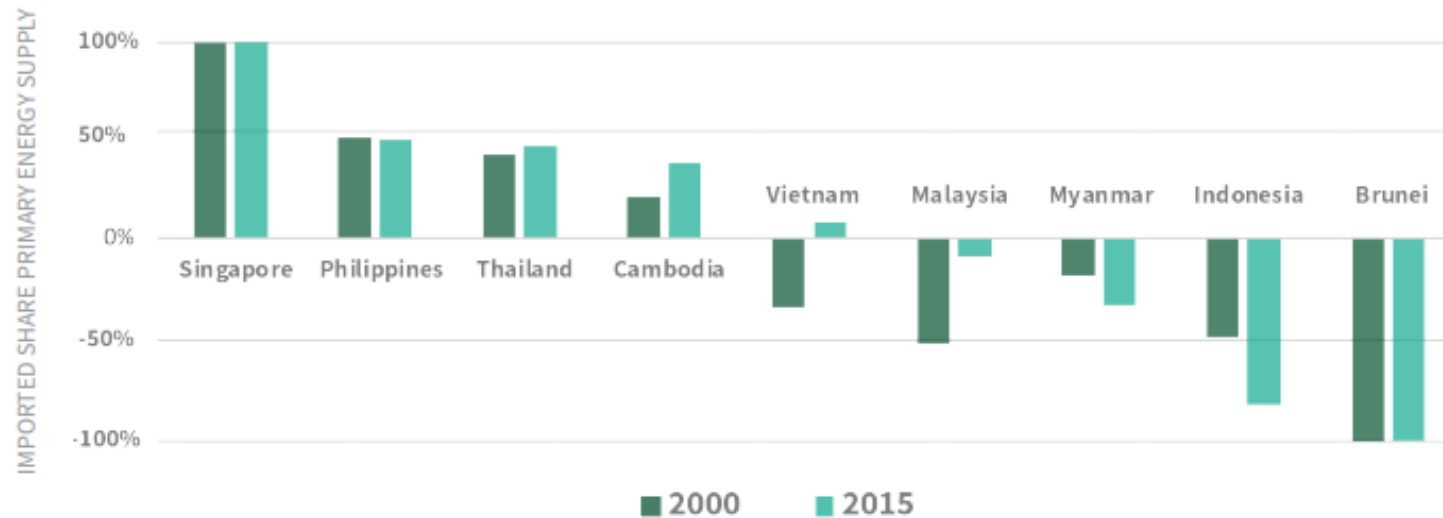


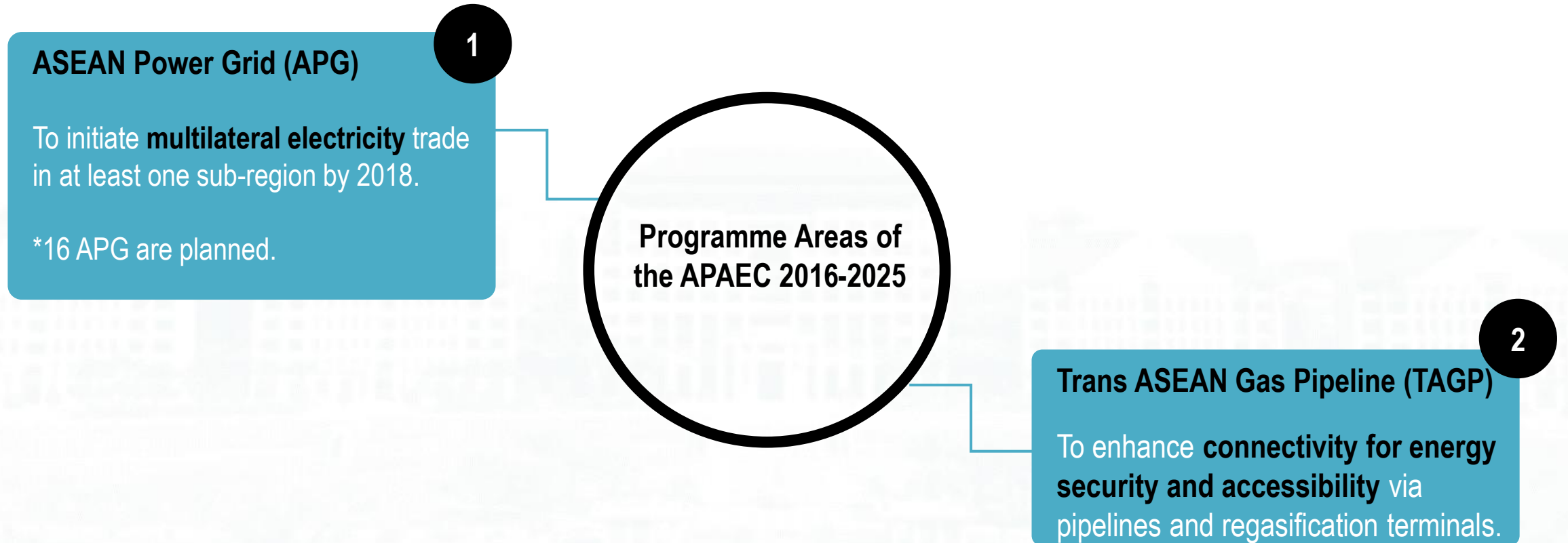
Figure 6: 2016 Net Imports of Primary Energy
Source: International Energy Agency.

- Net imports of primary energy have increased from 2000 to 2015 - more exposed to **potentially volatile global commodity markets**
- **Unequal distribution of renewable resources in the region and rising electricity demand throughout the region - committed to increasing interconnection of their grids**
- **SDG 17 (Global partnership for development) - issues of common interest to build deeper and more long-lasting collaborations**



ASEAN Power Grid & Trans ASEAN Gas Pipeline

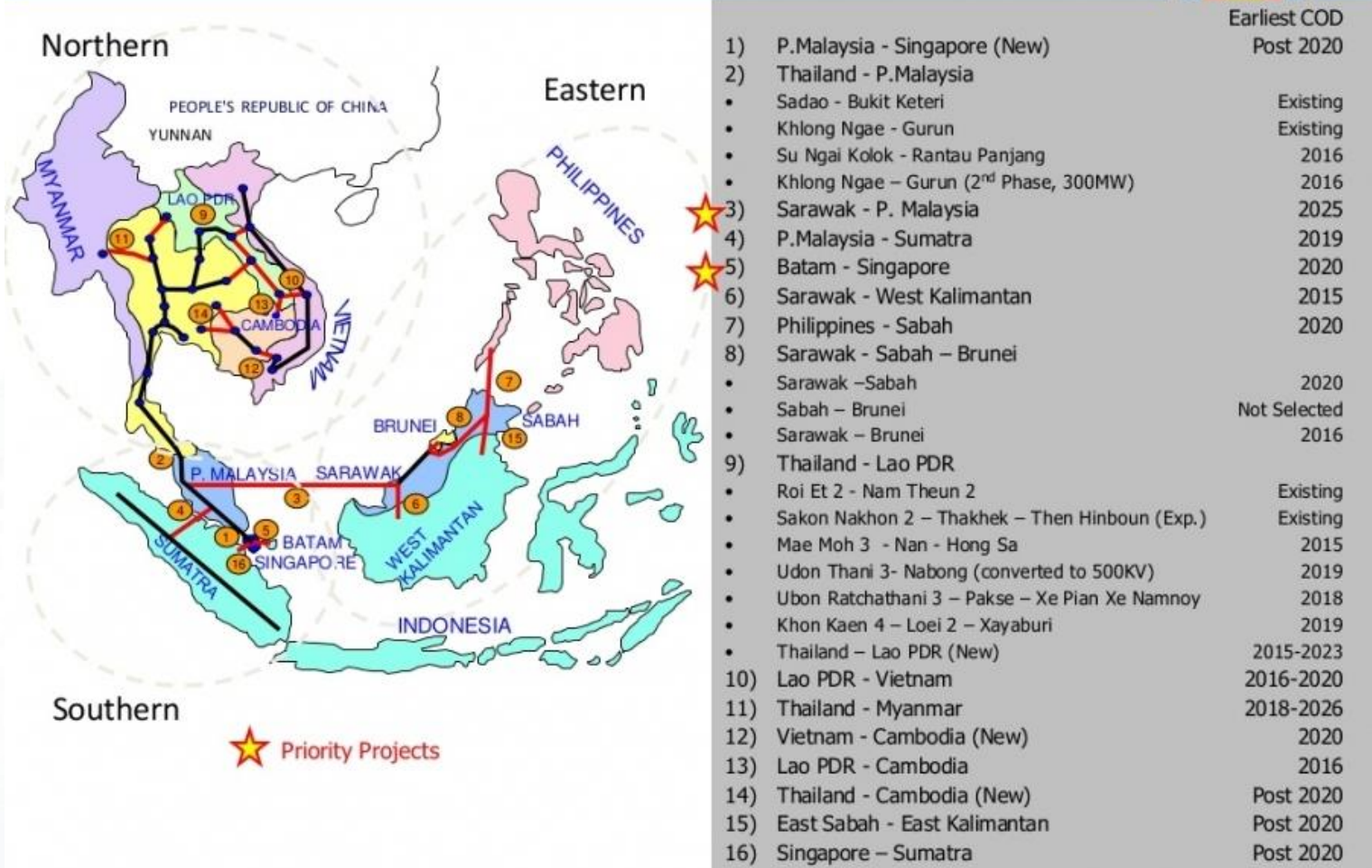
THE ASEAN PLAN OF ACTION FOR ENERGY COOPERATION (APAEC) 2016-2025





ASEAN Power Grid

ASEAN Power Grid (APG)



ASEAN Power Grid

1

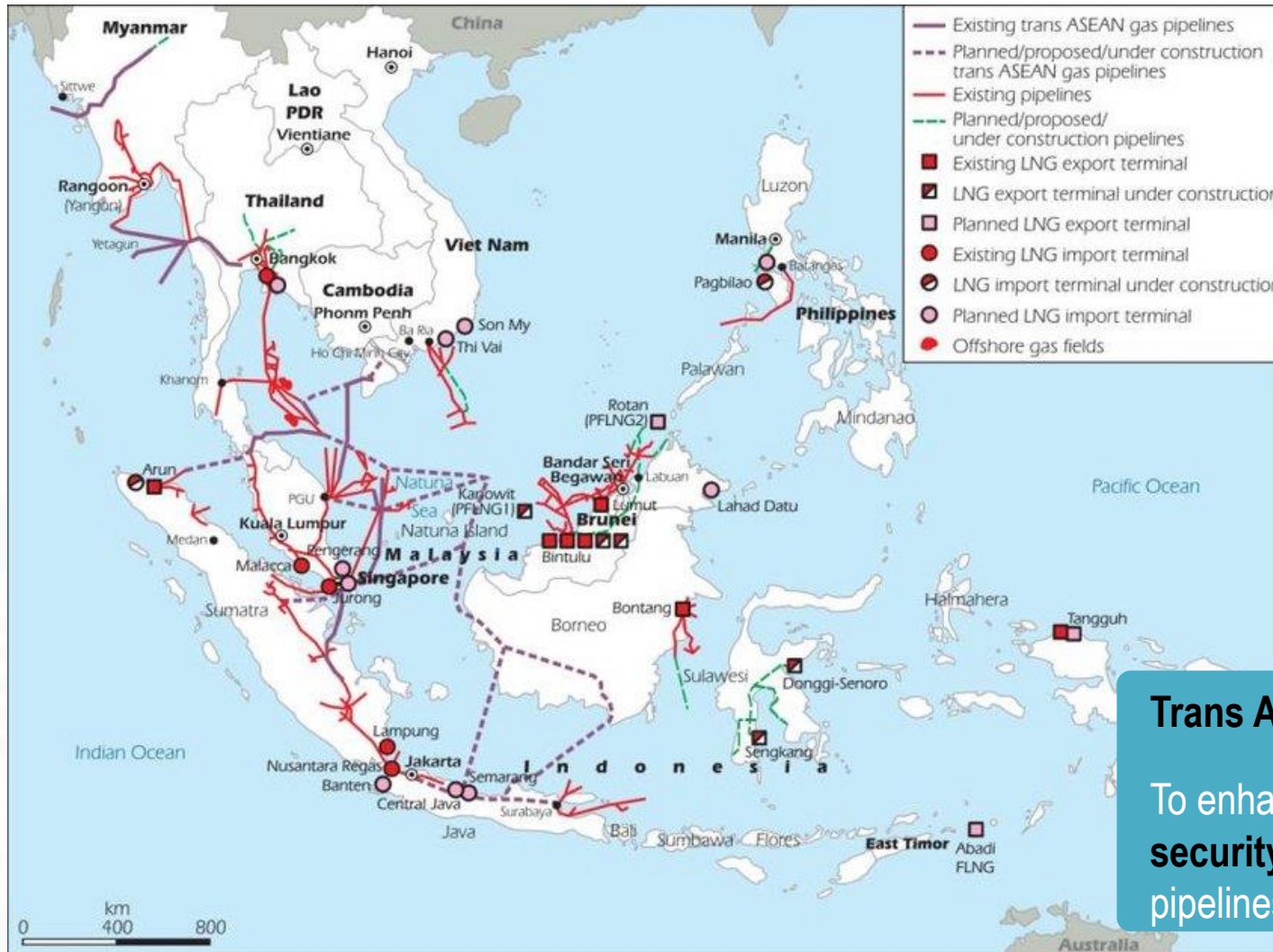
To initiate **multilateral electricity trade** in at least one sub-region by 2018.

Programme Areas of the APAEC 2016-2025 Phase 1

(Source: ASEAN Member States, 2011)



Trans ASEAN Gas Pipeline



Examples of Trans ASEAN Gas Pipeline in Malaysia

- 100-kilometre pipeline from West Natuna, Indonesia to the Duyong field of Peninsular Malaysia
- 270-kilometre pipeline from the Malaysia-Thailand Joint Development Area to Peninsular Malaysia via Songkla

Trans ASEAN Gas Pipeline 2

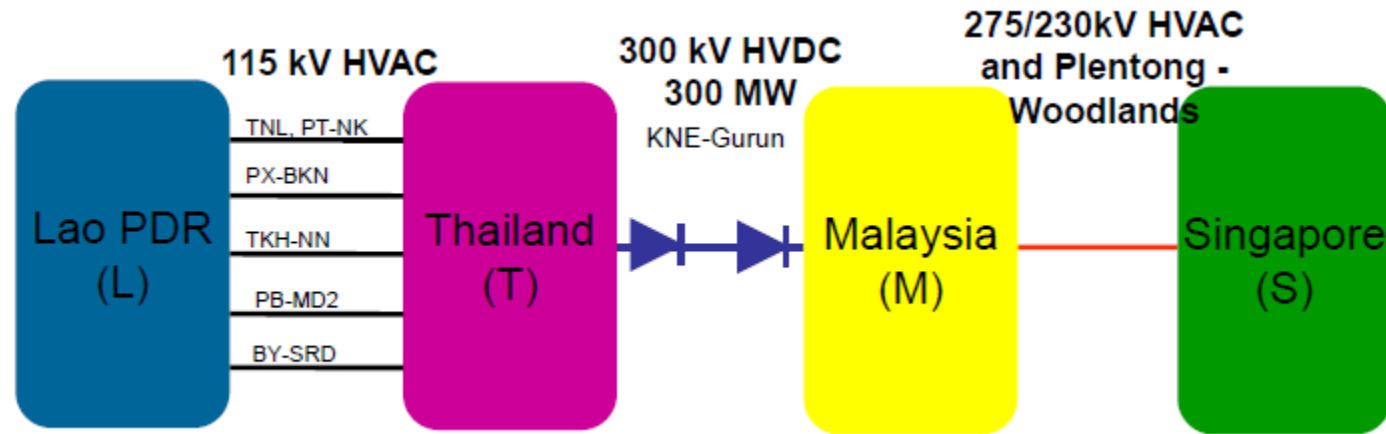
To enhance connectivity for energy security and accessibility via pipelines and regasification terminals.

Programme Areas of the APAEC 2016-2025 Phase 1

(Source: IEA, 2014)



Examples of ASEAN Power Grid



Source: Economic Planning Unit, Year

1. LTMS-PIP

- A **multilateral power trading** up to 100 MW sales capacity
- Exports power from Lao PDR and imports into Thailand, exports from Thailand and import into Malaysia, and finally exports into Malaysia and import into Singapore
- **Wheeling charge methodology** is used for charges in the power trading (IEA, 2019)



Examples of ASEAN Power Grid in Malaysia-Thailand



2. TNB-EGAT(Gurun-Khlong Ngae)

- Collaboration: **Malaysia-Thailand**
- Transmission rate: **300kV High Voltage Direct Current (HVDC)**
- Transmission capacity: **300 MW**
- Mode of operation: **Power purchase**

(Source: Economic Planning Unit, 2019)



Examples of ASEAN Power Grid in Thailand-Laos



Thailand – Laos Transmission Line Interconnections

- Collaboration: **Thailand - Laos**
- Transmission rate:
 - For export from Laos to Thailand:
 - **Three 500kV lines**
 - **Two 230kV lines**
 - For power energy interexchange:
 - **Five 115kV lines**
 - **Seven medium voltage (22kV and 35kV) lines**
- Transmission capacity: **up to 9,000 MW**
- Mode of operation: **Power Purchase Agreement (PPA) for export lines, Power exchange agreement for other**



Power trading between Vietnam – Lao PDR

Laos to supply Vietnam power from Mitsubishi-built wind farm

By Dat Nguyen June 17, 2021 | 06:15 pm GMT+7



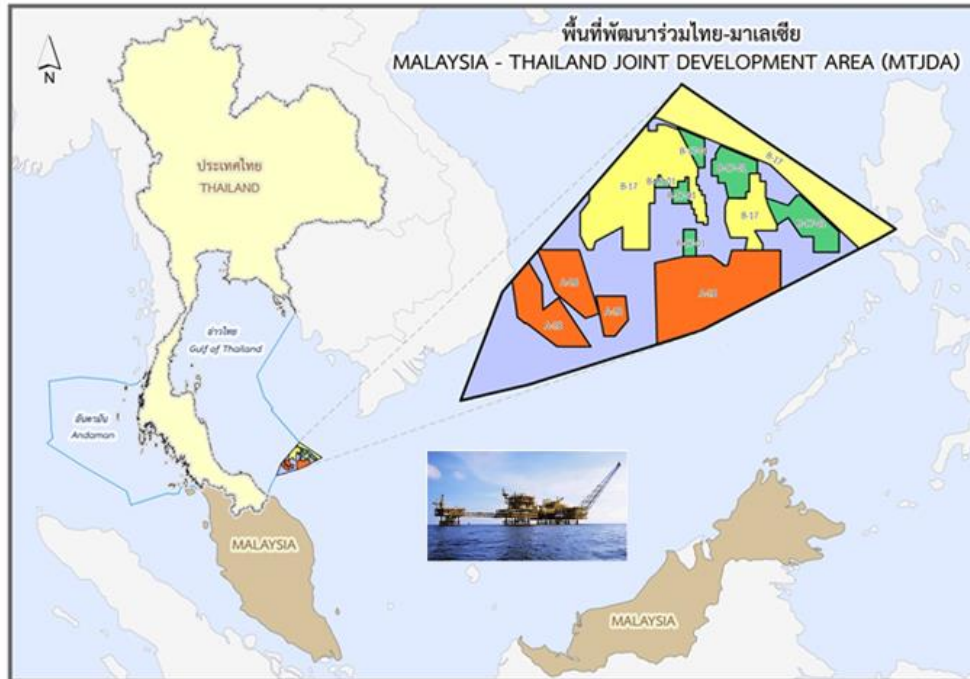
The project is expected to be the first cross-border electricity interchange from wind power generation in Southeast Asia. Source:

[VnExpress](#)

- Partnership: [Vietnam – Lao PDR](#)
- Main framework: [MOU on power interchange between Vietnam and Lao PDR governments signed on 16/9/2016](#)
- Potential of importing power from Laos to Vietnam is 17GW, including 7.4GW hydropower, 4.9GW coal power, 5GW wind and solar power. (Draft Power Development Plan VIII)



ASEAN Gas Pipeline in Thailand - Malaysia

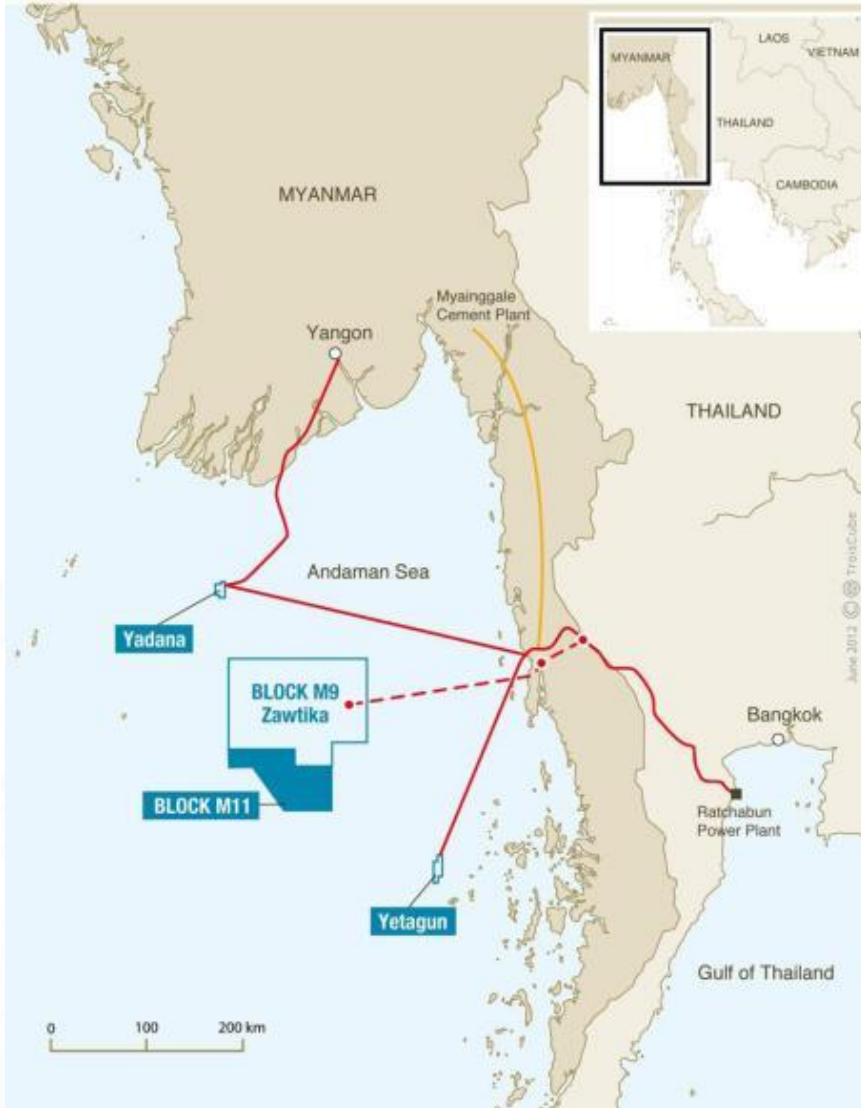


(Source: [MTJDA, 2015](#))

- Collaboration: Thailand - Malaysia
- Shareholders: Thailand's PTT (50%), Malaysia's Petronas (50%)
- Jointly developed by Thailand and Malaysia from 1979, the partners agreed to jointly explore and produce hydrocarbons in JDA area.
- The hydrocarbons are sent via pipeline to process in gas separation plant (GSP) in Songkhla, Thailand. GSP is connected via an overland pipeline to Malaysian PGU III pipeline system (gas grid).



ASEAN Gas Pipeline in Myanmar - Thailand



- Collaboration: Myanmar – Thailand
- Shareholders: Total (31.24%), Chevron (28.26%), PTTEP (25.5%) and MOGE (15%)
- Pipeline is connected to the gas grid for supplying gas to Thailand's Ratchaburi and Wang Noi electric power plants in Bangkok
- Import: between 1.2 and 1.3 billion cubic feet each day.

CONTROVERSIES

Did Vietnam Just Doom the Mekong?

A policy reversal on Mekong dams has put Hanoi's credibility – and the river's fate – on the line.

By [Tom Fawthrop](#)
November 26, 2019



The recent decision by a Vietnamese oil company, Petrovietnam, to invest in a huge dam close to the much-loved World Heritage Site in Luang Prabang, Laos, has caused confusion and dismay for many Mekong experts, civil society groups, and some government officials in Hanoi.

A cascade of dam projects on the Lower Mekong in Laos has triggered consistent expressions of critical concern from Vietnam, with its delta highly vulnerable to such dams' damaging downstream impacts. Back in 2011, the former Vietnamese prime minister publicly called for all construction to stop on the Xayaburi dam. Vietnam has also [called upon Laos to rethink](#) all subsequent dams.

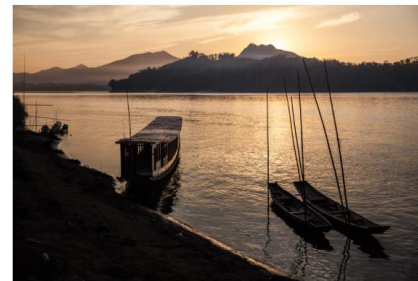
Now, however, the Vietnamese government has switched sides and slipped into bed with the dam developers through its



Thai villagers hold banners opposing the building of a dam on the Mekong river during a rally outside a construction company in Bangkok, Thailand, April 24, 2012.
Credit: AP Photo/Apichart Weerawang

Thailand NGO Calls For End to Mekong Dam Project in Laos

BY EARTH+ORG | ASIA | FEB 22ND 2021 | 3 MINS



A civic group in Thailand, called Fair Finance Thailand, is petitioning the country's financial institutions to end construction loans for the Luang Prabang dam project along the Mekong River in Laos, warning that it could negatively affect the environment, displace families along the river and disturb livelihoods.

Why Myanmar's junta is likely to ignore the opposition to Chinese dams on Salween river

International isolation following the coup may now force the government to move closer to Beijing than it would like.

Tyler Roney, Kyaw Ye Lynn, Robert Bociaga & Marc Jaffee

Jun 11, 2021 · 07:30 pm



PUBLIC STATEMENT – DON'T BUY POWER FROM LUANG PRABANG DAM: MEKONG DAMS ARE UNNECESSARY FOR THAILAND'S POWER SECTOR



Thai court takes villagers' case against power firm, Laos dam

By Amy Sawitta Lefevre

3 MIN READ



BANGKOK, June 24 (Reuters) - A Thai court accepted a lawsuit against state-owned Electricity Generating Authority of Thailand (EGAT) and four other state bodies on Tuesday for agreeing to buy electricity from a \$3.5 billion hydropower dam being built in neighbouring Laos.

04

Discussion and Prospect for Cross-country partnerships

- **Solar industry – knowledge and technical expert sharing (Vietnam FiT)**
- **G-to-G to work together for the GHG emissions reduction targets**
- **Continue to promote smart grid integration, thereby ensuring electricity security, diversifying resources, facilitating higher share of renewables**
- **Cross-country investment (e.g., Malaysia/Singapore to invest solar PV in other countries with more lands/ favourable conditions for renewables development)**





Thank you.

