ASEAN POWER MARKET INTEGRATION FOR ELECTRICITY SUPPLY SECURITY

ASEAN POWER GRID
POWERING THE REGION

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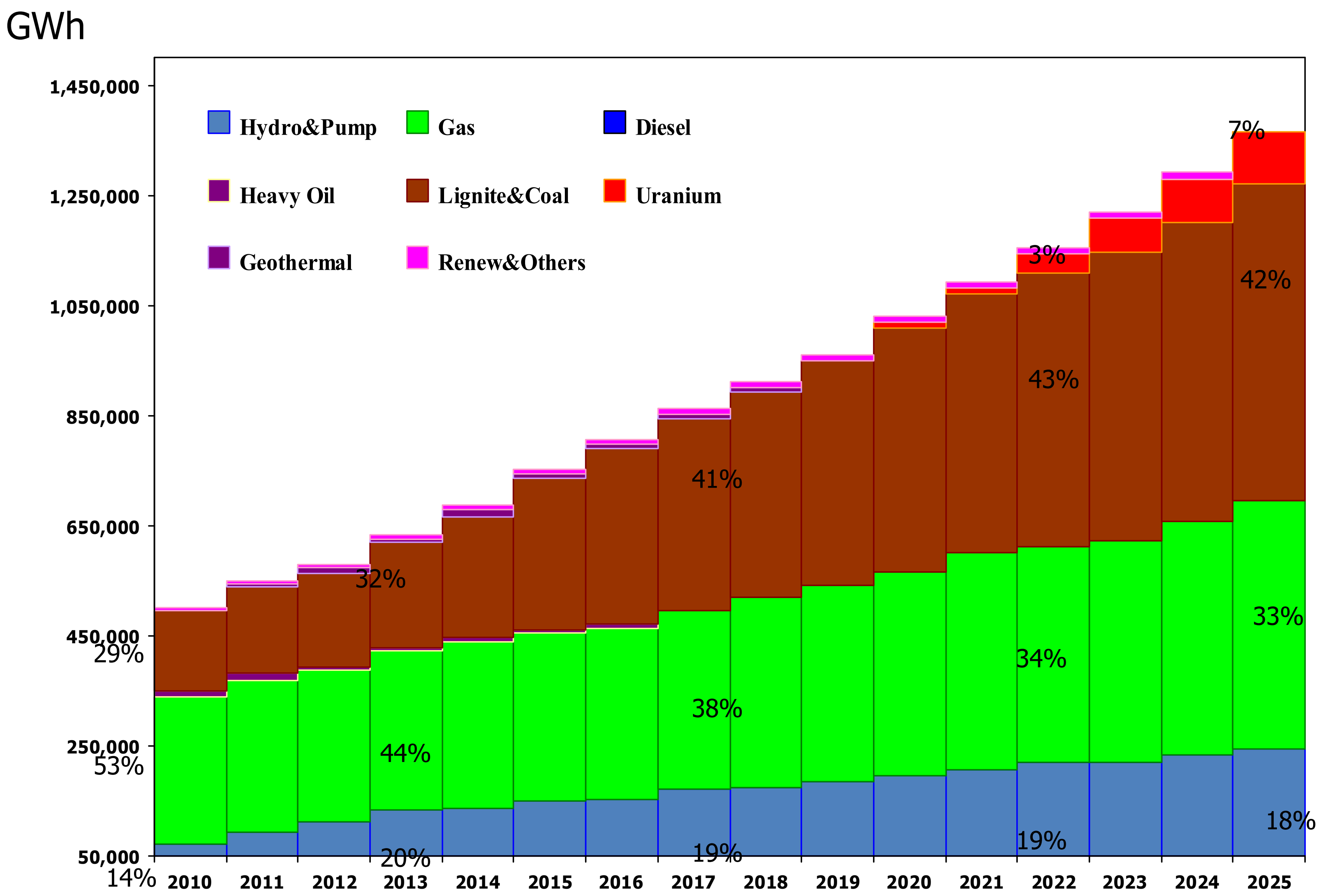
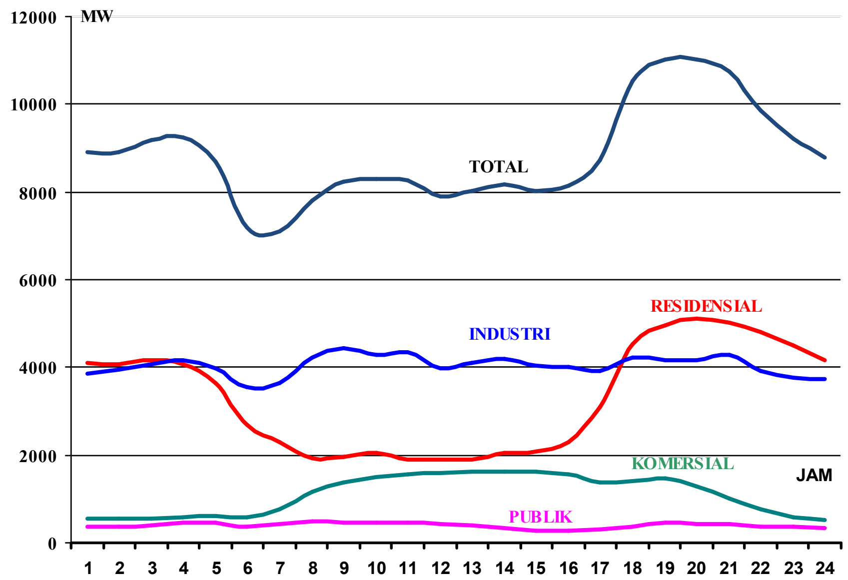
1. Energy Supply Industry Structure of HAPUA Members Country

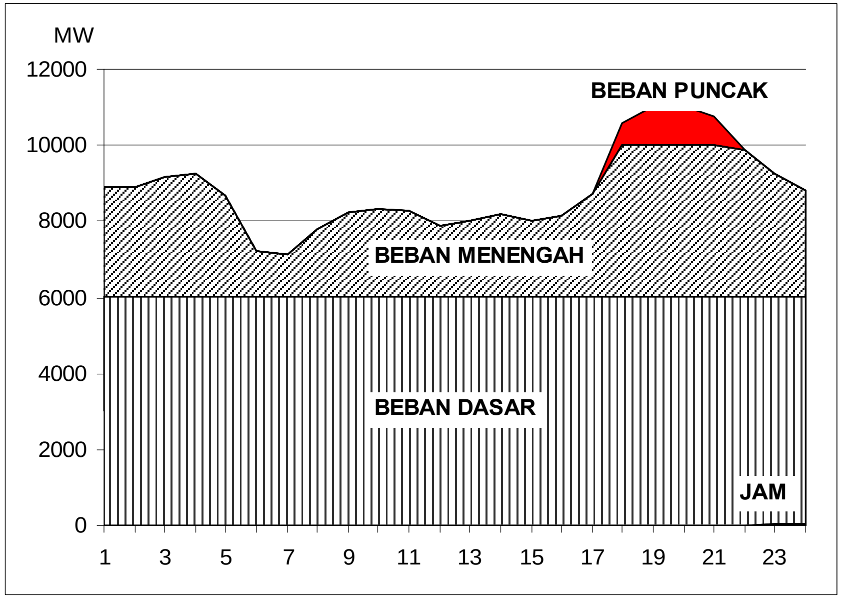
Country	Utility Serves	Note	Installed Capacity (MW)
1. Brunei Darussalam	Departement of Electrical Services (DES)	Vertical Integrated Utility (VIU)	827
2. Cambodia	Electricite Du Cambodge (EDC)	VIU	732
3. Indonesia	PT PLN (persero)	VIU	40 524
4 Lao PDR	Electricite Du Laos	VIU	2 978
5. Malaysia	Tenaga Berhad SESCO SESB	VIU Penisular Malaysia VIU Serawak State VIU Sabah	27 179
6. Myanmar	Ministry of Electric Power (MEPE) 1 MEPE (2)	Transmission and Distribution Hydro Power Generation	3 494
7. Philippines	National Power Corporation Trans Co	Power Generation Company Transmission Company	16 924
8. Singapore	SP Power Grid	Gencos, T & D	9 951
9. Thailand	EGAT MEA & PEA	Generation, SO & Transmission Distribution/Retail Supply	34 335
10. Vietnam	Electricity of Vietnam (EVN)	VIU	26 926

2. THE DEMAND GROWTH 7 % AND THE FOSSIL FUEL IS MAJOR SHARE WITH COAL REPLACE OIL AND GAS



3. ASEAN GROWING MARKET POWER SUPPLY ISSUES





Å Typical Load behavior, peak on short duration during evening

Å The role of Oil and Gas Power plant on power supply during peak period due to quick start and low cost on investment

Å Vulnerable to shortage of Oil and Gas supply and high operational cost

Å Risk to the political issues on lack of power

4. Study from IEA on ASEAN Power Market Integration

Individual Challenges

i. Fuel Security
- Vulnerability to fuel supply disturbances
  - Import of gas/oil
  - Coal stock
- Insufficient fuel diversity
  - Only 1 or 2 dominant sources

ii. Inadequate investment for generating capacity & transmission lines
- Funding
- Dependency on IPPs'participation
- Delayed projects

iii. Complex geographical system

iv. Operational inefficiencies

v. Politicized

vi. Heavy subsidies -> artificially low tariff

vii. Rural electrification
- Grid or off-grid electrification?

Compounded by interrelations

Å Oil almost imported from outside ASEAN

Å Natural Gas only produced by three countries

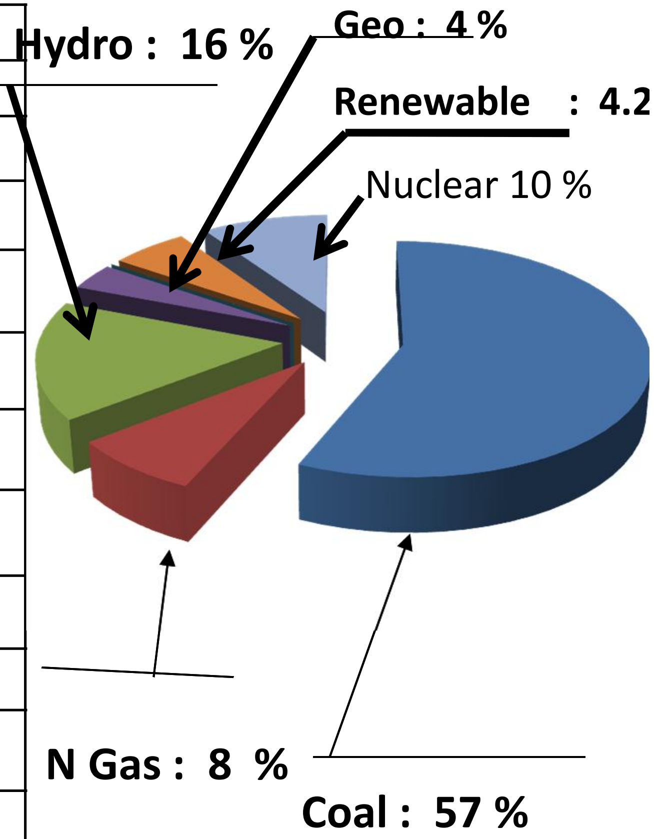
Å Coal mostly only produced by Indonesia

5. Steps on Emergency Response

1. Diversification Policy on Power Development Plant by step away from Oil Fuel Power Plant to Coal and Natural Gas Power Plant.
2. Intensive implementation of Demand Side Management (DSM) by clipping the peak and fill the valley program.
3. Accelerate the development of ASEAN Power Grids (APG) Project to support ASEAN Power Market Integration.

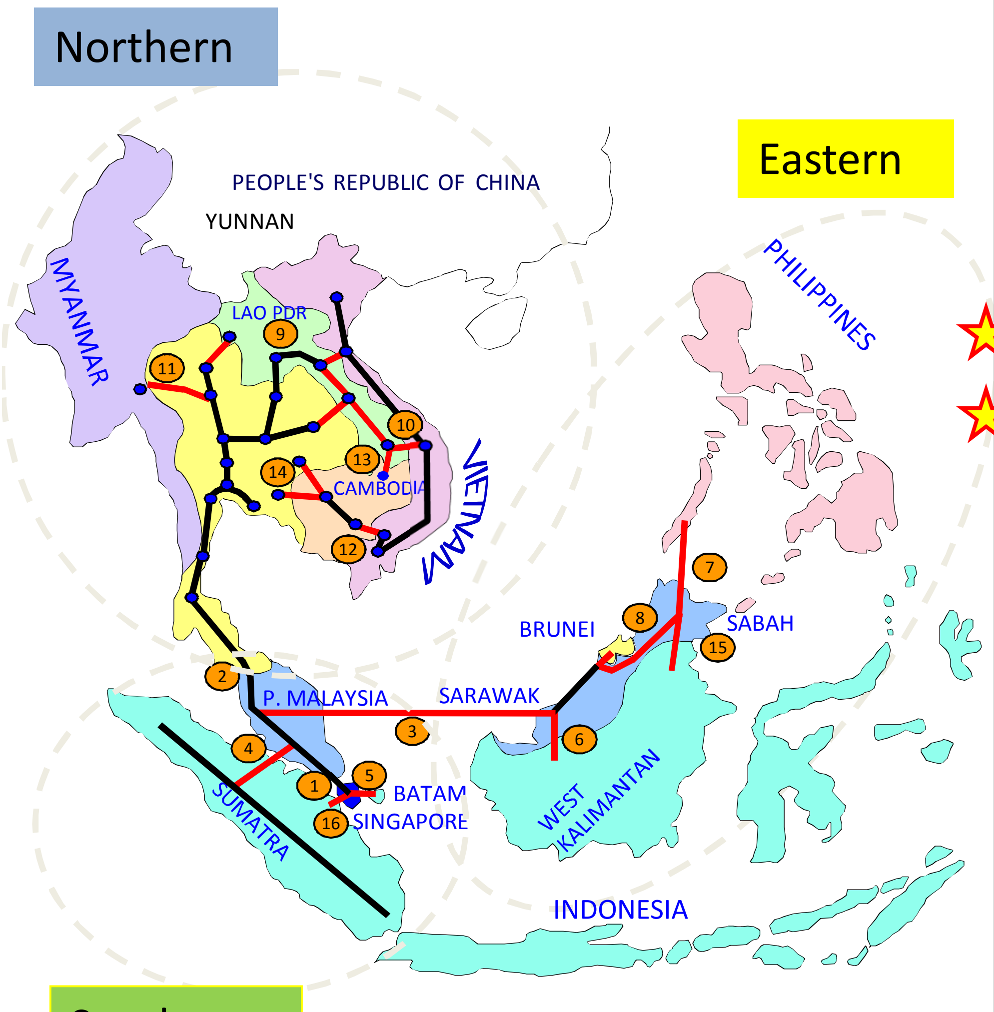
6. HAPUA Power Plant Development Project Committed in MW (2012 – 2030)

	Coal	N Gas	Hydro	Geo.Th	Oil	Renewable	Nuclear	Total
Brunei (2209 - 2013)					6			6
Cambodia (2009 - 2020)	1105		143					1248
Indonesia (2012-2021)	37700	2500	6300	6300				52800
Lao (2012 - 2022)	1800		7557					9357
Malaysia (2012 - 2030)	570	750	584					1904
Myanmar(2009 - 2018)			1205					1205
Phillipines (2012 - 2030)			5394	1495		3042		9931
Singapore (2012 - 2020)		900						900
Thailand (2012 - 2030)	4400	2545					9481	16426
Vietnam (2010 - 2030)	73924	9762	13399			9330	10700	117115
Total	119499	16457	34582	7795	6	12372	20181	210892



7. ASEAN Power Grid Projects

(Updated in May 2014)



Priority Projects

		Earliest COD
1)	P.Malaysia - Singapore (New)	Post 2020
2)	Thailand - P.Malaysia	
•	Sadao - Bukit Keteri	Existing
•	Khlong Ngae - Gurun	Existing
•	Su Ngai Kolok - Rantau Panjang	2016
•	Khlong Ngae – Gurun (2nd Phase, 300MW)	2016
3)	Sarawak - P. Malaysia	2025
4)	P.Malaysia - Sumatra	2019
5)	Batam - Singapore	2020
6)	Sarawak - West Kalimantan	2015
7)	Philippines - Sabah	2020
8)	Sarawak - Sabah – Brunei	
•	Sarawak –Sabah	2020
•	Sabah – Brunei	Not Selected
•	Sarawak – Brunei	2016
9)	Thailand - Lao PDR	
•	Roi Et 2 - Nam Theun 2	Existing
•	Sakon Nakhon 2 – Thakhek – Then Hinboun (Exp.)	Existing
•	Mae Moh 3 - Nan - Hong Sa	2015
•	Udon Thani 3- Nabong (converted to 500KV)	2019
•	Ubon Ratchathani 3 – Pakse – Xe Pian Xe Namnoy	2018
•	Khon Kaen 4 – Loei 2 – Xayaburi	2019
•	Thailand – Lao PDR (New)	2015-2023
10)	Lao PDR - Vietnam	2016-2020
11)	Thailand - Myanmar	2018-2026
12)	Vietnam - Cambodia (New)	2020
13)	Lao PDR - Cambodia	2016
14)	Thailand - Cambodia (New)	Post 2020
15)	East Sabah - East Kalimantan	Post 2020
16)	Singapore – Sumatra	Post 2020

8. THE ASEAN POWER GRIDS PROJECT

1. Response to the threat of Energy Supply Security

2. Has the strength commitment of ASEAN leader and support from the solidity of HAPUA council

SHARE THE FUTURE BENEFIT OF POWER MARKET INTEGRATION

Å Optimization the indigenous energy availability
Å Utilizing the technology excellent
Å The commercial viability
Å The multilateral trading among ASEAN Member States

9. IMMEDIATE ACTIONS FOR SUCCESS OF APG AS DISCUSSED ON APAEC 2016 - 2025

1. Alleviate the Cross Border Issues by :

   Å Set up the ASEAN Regulatory Network

   Å Set up Generation and Transmission Planning Group

2. Harmonization on Technical Standard and Operation by set up ASEAN Transmission System Operator
3. Conduct the pilot project “LTMS Multi trading” for demonstrate the benefit of Power Market Integration

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THANK YOU

TERIMA KASIH

THANKS TO : ALL HAPUA WG