

METROLOGY INFRASTRUCTURE FOR ASEAN CROSS-BORDER POWER INTEGRATION AND SYSTEM RESILIENCE

Dr JING Tao

Principal Metrologist, Electrical Metrology

National Metrology Centre, A*STAR

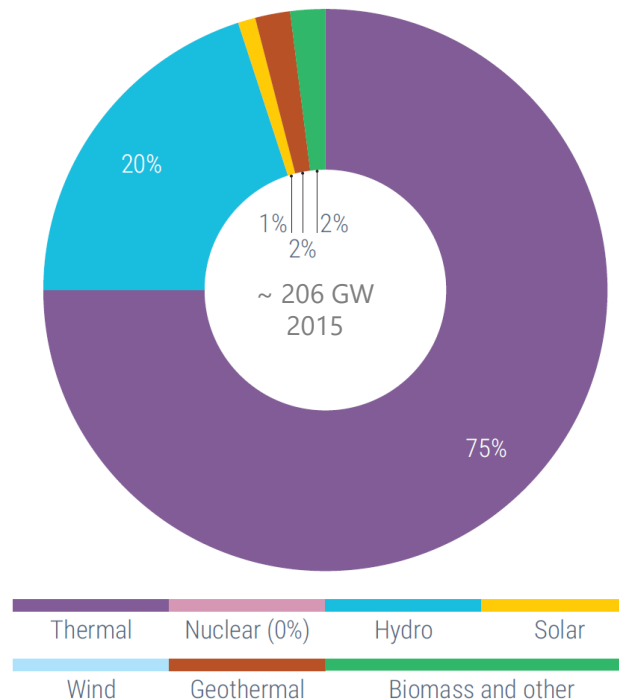
SIEW UNESCAP ROUNDTABLE ON
SUSTAINABLE CONNECTIVITY IN ASIA-PACIFIC
30 Oct 2020



ASEAN Installed Power Capacity Structure

- ❑ 75 % by fossil fuels
 - 30 % coal
 - 8 % oil
 - 37 % natural gas
- ❑ In the Paris compatible scenario, fossil fuels need to be substantially reduced to 30 % by 2040
- ❑ Rich of clean energies, but not evenly distributed
- ❑ cross-border transmission is needed to make their full potential and efficient use.

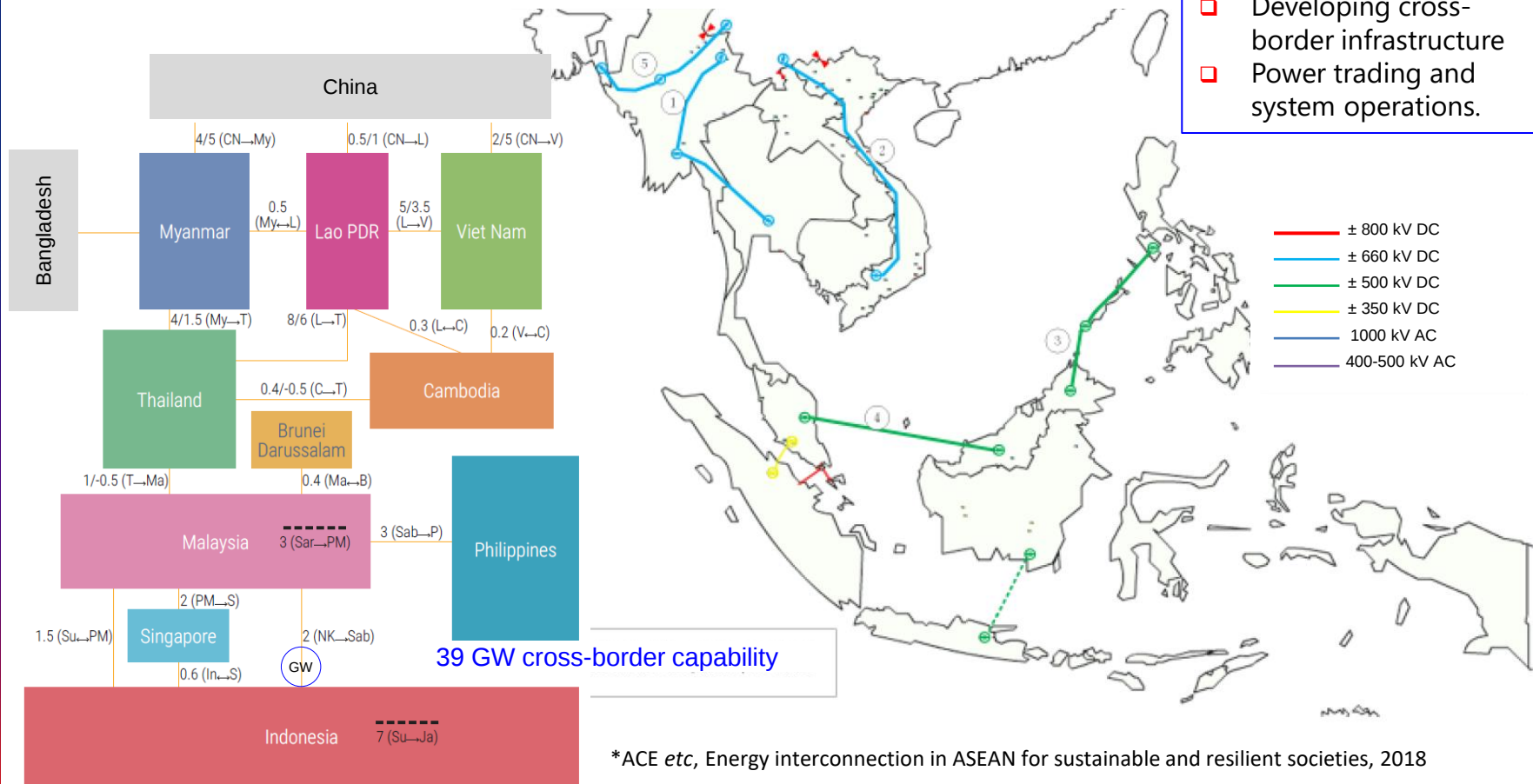
Clean Resources in ASEAN, GW	Biomass	37.7
	Geothermal	33.29
	Hydro	240.97
	Solar	3.15-5.55 (kWh/m2/day)
	Tidal	219.2
	Wind	> 87



* ACE *etc*, Energy interconnection in ASEAN for sustain. and resilient societies, 2018
H. Nishimura, SETA2020



ASEAN Grid Interconnection Prospect in 2035



*ACE etc, Energy interconnection in ASEAN for sustainable and resilient societies, 2018

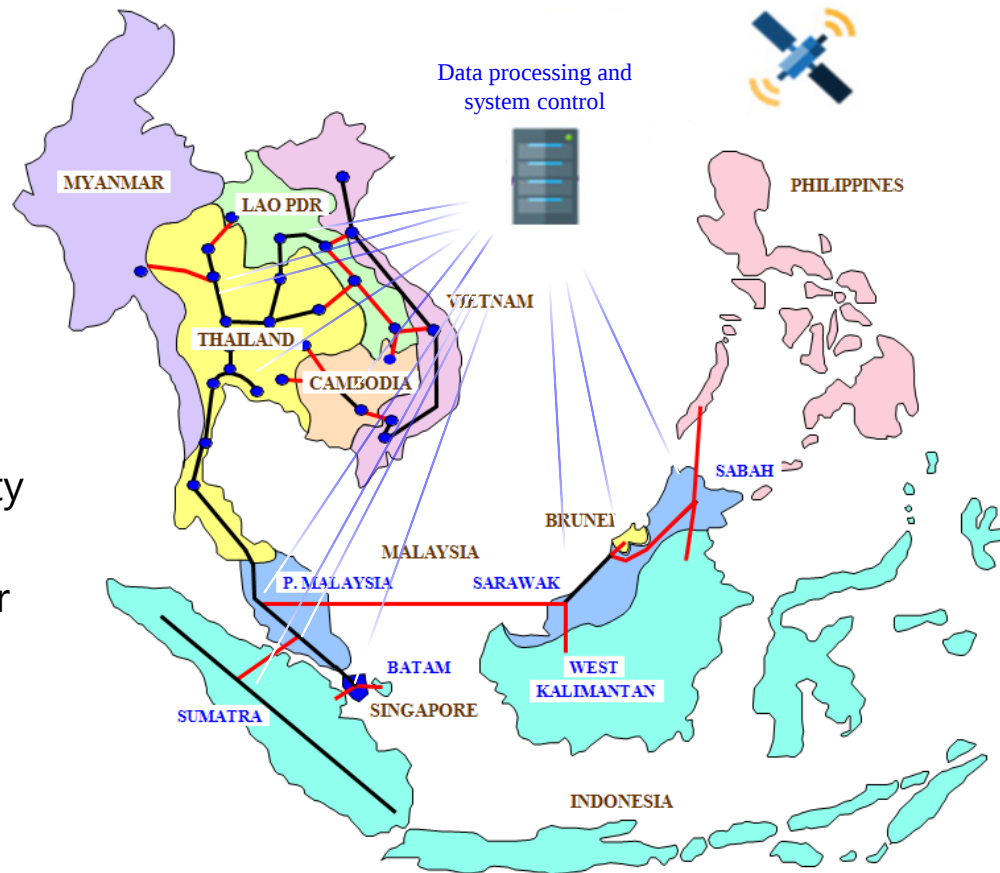


Technical Considerations for Resilient Cross-border Grids

- ❑ High-precision sensor systems, for simultaneous data acquisitions and transmission among grids
- ❑ Large grid simulation and analysis for comprehensive condition monitoring and predicting, and speedy switching to ensure grids resilience and prevent outages
- ❑ Therefore, an integrated operational platform that performs
 - real-time analysis and speedy response
 - system status monitoring and predictive maintenance estimates
 - SI-traceable metering at all necessary nodes
- ❑ Regulatory framework on use and operation of interconnected grids and energy metering.

Metrological Strategy to Ensure Grid Resilience

- ❑ A **metrological strategy**, combined with IOT, ICT, Big Data technologies for the observability and controllability of interconnected grids.
- ❑ A measurement framework for improving and using **Phasor Measurement Units (PMU)**, and for maintaining their reliability and accuracy.





Measurement Development for Data Acquisition

- ❑ Tools for **loss measurements** at various apparatus and locations under high voltage and current (HV, HC) for localizing disturbance so to ensure transmission efficiency and grid stability
- ❑ Improvements of HV and HC **measurement accuracy** for precise grid management and metering.
- ❑ Tools to determine **power quality** and its propagation, to assess and suppress its effects on grid stability.
- ❑ Methods and systems for **calibrations** and verifications
- ❑ ...



Commissioning of a Power standard system

Data Metrology for Data Quality in Processing and Decision Making

- ❑ To evaluate process and analyze data uncertainty
- ❑ To develop and validate algorithms & software for on-line performance assurance of sensors and their remote calibrations
- ❑ To establish data traceability chain & system.



Data Acquisition & Collection



Data Transmission



Data Processing



Data Analytics



Data Application



lifecycle
of
data



CREATING GROWTH, ENHANCING LIVES



THANK YOU

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