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India Smart Grid Forum

India SMART UTILITY Week 2024

Session – 8 Super Grids for Energy Transition & Energy Security – CBET in South Asia and Interconnection of Regional Grids in Asia

25th years of ASEAN Power Grid

Presented By

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Supporting Ministries



समन्वय नगरी
MINISTRY OF POWER
GOVERNMENT OF INDIA



समन्वय नगरी
MINISTRY OF NEW AND
RENEWABLE ENERGY
GOVERNMENT OF INDIA



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National Institution for Transforming India



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GOVERNMENT OF INDIA



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DEPARTMENT OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION,
GOVERNMENT OF INDIA



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Introduction to the ASEAN Centre for Energy (ACE)



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Established in January 1999, ASEAN Centre for Energy (ACE) is an **intergovernmental organization within ASEAN** structure that represents the 10 ASEAN Member States' interests in the energy sector.

What We Do



Catalyst

Unify and strengthen ASEAN energy cooperation by providing a platform for sharing, policy advisory, best practices, and capacity building.



Knowledge Hub

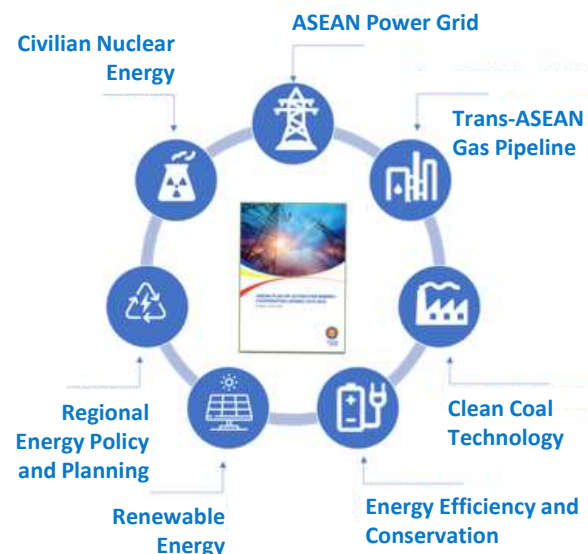
Provide a knowledge repository for ASEAN Member States (AMS) and services through data management, publication, and dissemination.



Think Tank

Assist AMS on research and identifying practical and specific solution on policies, legal, and regulatory frameworks, technologies, and innovative solutions.

ASEAN Plan of Action for Energy Cooperation (APAEC)



What is APAEC?

A series of guiding policy documents serving as the platform for deeper cooperation both within ASEAN as well as with DPs and IOs.

What does APAEC do?

Promoting **multilateral cooperation and integration** in the energy sector.

What is APAEC trying to achieve?

To attain the goals of **ASEAN Economic Community (AEC)** by enhancing security, accessibility, affordability, and sustainability in the energy sector.



The APAEC Phase II: 2021 – 2025



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A regional blueprint for energy cooperation in the ASEAN that builds on the success of APAEC Phase I: 2016-2020, sets out ambitious targets and initiatives to enhance energy security and sustainability and supports the UN SDG 7.

ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 Phase 2: 2021-2025

- **Theme:** “Enhancing Energy Connectivity and Market Integration in ASEAN to Achieve **Energy Security, Accessibility, Affordability and Sustainability** for All”.
- **Sub-theme:** “Accelerating Energy Transition and Strengthening Energy Resilience through Greater Innovation and Cooperation.”

APAEC Program Area No.1: ASEAN Power Grid



Key Strategies:

To expand regional multilateral electricity trading, strengthen grid resilience and modernisation, and promote clean and renewable energy integration.



Outcome Based Strategies:



OBS 1

Accelerate the completion of APG Project and initiate the expansion of multilateral electricity trading



OBS 2

Work on Institutional framework and regulatory capacity as minimum requirement to advance multilateral electricity trading



OBS3

Work on harmonizing the minimum technical requirements to advance multilateral electricity trading



OBS 4

Explore integrating renewable energy and other digital developments into APG Grid



Historical Brief of ASEAN Power Grid Based on APAEC



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APAEC 1999-2004

- Identification & Planning
- Policy Framework
- Monitoring the potential line
- 14 Potential lines

APAEC 2005-2009

- Develop the APG through Interconnections
- Invite the private generations as identified supply, & develop the AIMS I
- 2 Lines are completed

APAEC 2010-2015

- Accelerate development of the 11 identified lines
- AIMS II is conducted
- Optimizing PDP with Interconnections scheme

1. Peninsular – Singapore

2. Thailand – Peninsular

3. Serawak – Peninsular

4. Sumatera – Peninsular

5. Batam – Bintan – Spore – Johor

6. Serawak – West Kalimantan

7. Philippines – Sabah

8. Serawak – Sabah – Brunei

9. Thailand – Lao PDR

10. Lao PDR – Vietnam

11. Thailand – Myanmar

12. Vietnam – Cambodia

13. Lao PDR – Cambodia

14. Thailand – Cambodia

15. East Sabah – East Kalimantan

16. Singapore – Sumatera

17. Lao PDR – Myanmar

18. Sumatera – Java - Kalimantan



APAEC 2016-2020 Phase I

- Pursue 3 Priority Projects (4, 8, 13)
- Established electricity trading at least in one sub-region

APAEC 2021-2025 Phase II

- AIMS III Phase I&II update
- AIMS III Phase III
- RE Optimizing





9 out of 18 interconnection projects of AIMS III are operational. Commencement of the **LTMS-PIP** on 23 June 2022 with around 270 GWh electricity has been traded.

Key Accomplishments

- ✓ Completion of the AIMS III Phase 1 and 2, identified **62 VRE** sites potentially to be integrated into APG projects.
- ✓ Initiated **Feasibility Studies** on proposed interconnection projects under AIMS III.
- ✓ Initiated the work towards **Brunei Darussalam–Indonesia–Malaysia–Philippines Power** Integration Project (BIMP-PIP).
- ✓ Continue to work on fulfilling the minimum requirements of MPT

Future Directions from MTR and 41st AMEM

- To pursue an aspirational regional target for interconnection of AMS towards **2045**.
- to enhance and **expand the region's power systems**, the implementation of APG interconnection projects, and the work to advance multilateral power trading (MPT).
- To periodically **align AIMS with evolving national and regional power landscapes**, establish a long-term RE target under the next APAEC, initiate more detailed analysis, and formulate plans for higher capacity additions for the future prioritized interconnections.
- Establish **financial frameworks** to realize pending projects
- Extend the **MoU of APG** and continue progressive coordination among APG-related bodies.

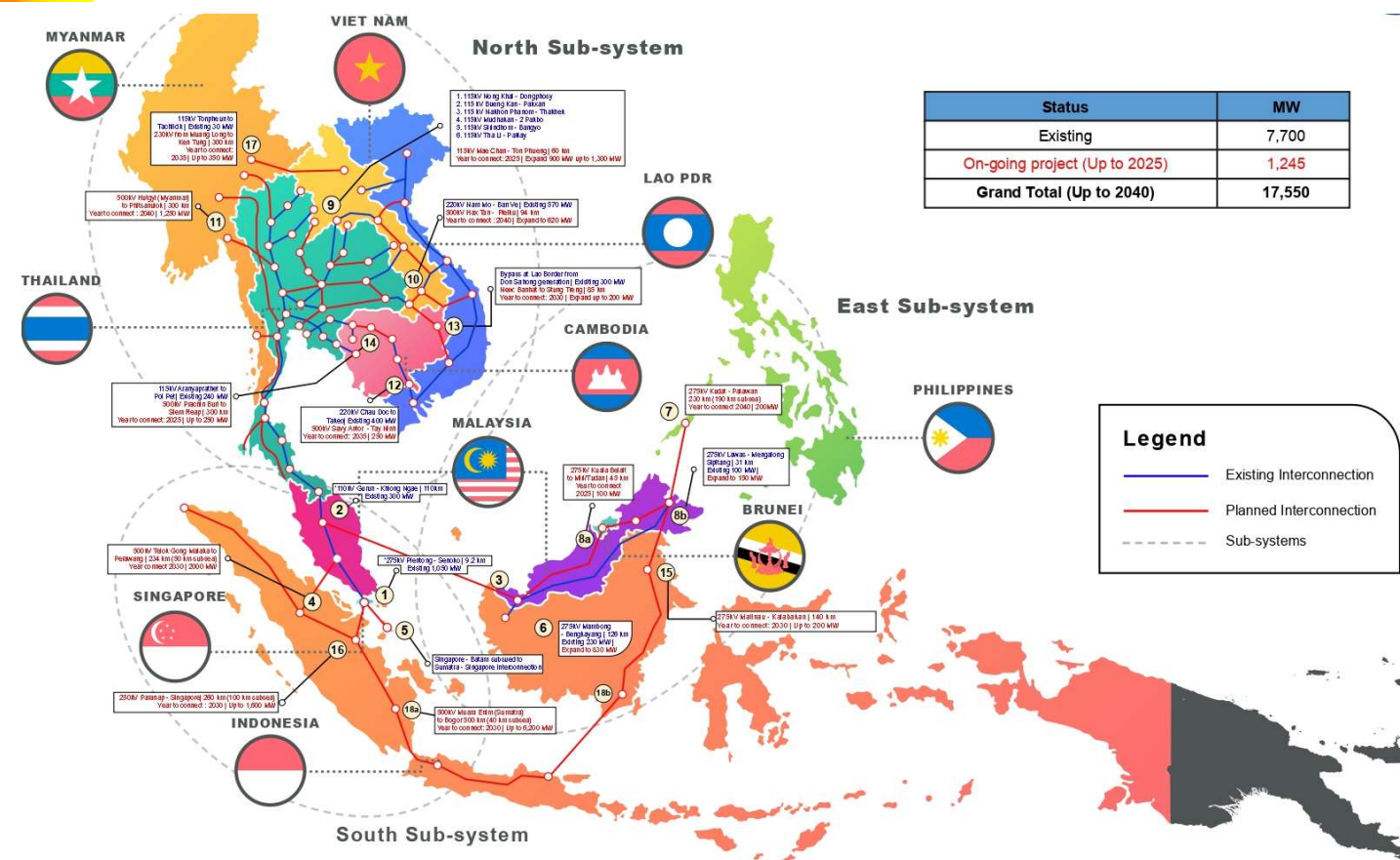


ASEAN Power Grid – Work Priorities and Regional Collaboration



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Infrastructure Development

- 18 priority interconnection has been identified
- 9 out of 18 has been operated
- Several are currently on-going FS: Sumatra – P. Malaysia (new) & Kalimantan – Sabah (new), Thailand – Malaysia (upgrade existing)

ASEAN Interconnection Master Plan Study (AIMS) III

Phase 1:
Capacity Expansion
Planning
(2020, updated in 2022)

Phase 2:
Grid Performance
Analysis
(2020, updated in 2022)

Market Development

- Lao PDR – Thailand – Malaysia PIP (2019)
- Lao PDR – Thailand – Malaysia – Singapore PIP (2022)
- Expansion to another subregion

Phase 3:
Multilateral Market
Analysis
(2024)

Source based: Updated Power Development Plan (PDP) scenario under AIMS III, 2022

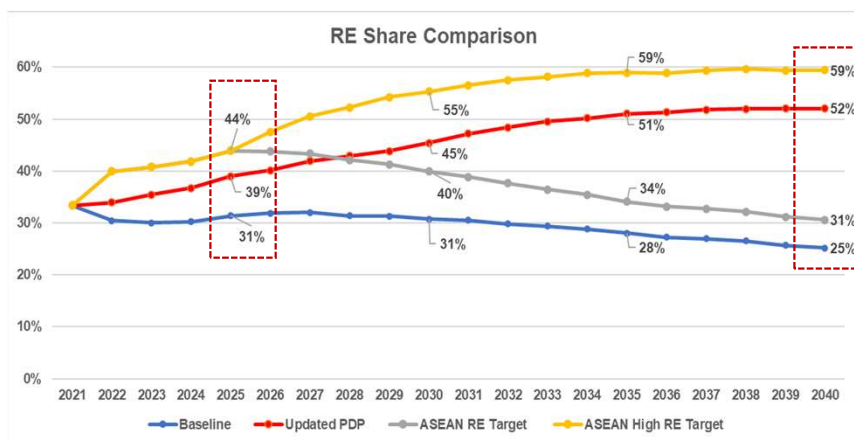


Benefits of Regional Interconnectivity under ASEAN Power Grid



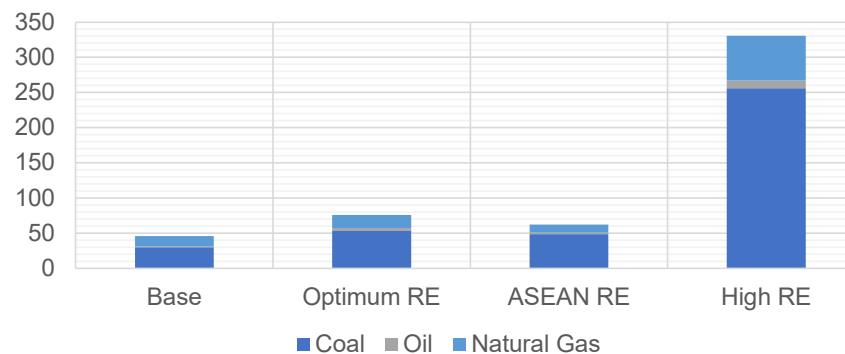
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- The Updated PDP scenario results show that the current efforts by the 10 AMS will bring the region to reach 39% RE share by 2025, only 5% less than the target in the ASEAN RE Target scenario.
- Under this Updated Scenario, ASEAN foresee **44.5 GW of solar and 14.3 GW of wind capacity** by 2025 and even higher growth towards 2040.
- The findings conclude that the current commitment of AMS:
 - brings the region on track towards achieving its target by 2025 and even aiming for a higher target towards the 2040 time frame, and
 - fosters a greater collaboration to progress the establishment of the ASEAN Power Grid

Potential of Avoided Emissions in ASEAN by 2040
(in Million Tons)



- By having APG, under the ASEAN RE Target Scenario, ASEAN **would avoid the use of 48.8 million tons of coal, 2.1 million tons of oil, and 13,607 million m3 of natural gas** cumulatively in 2040.
- The potential avoided fuel consumption is an important finding since it will **affect the overall cost for the AMS generation** and interconnection expansion capacity in meeting the regional demand growth.
- The APAEC target articulated in the ASEAN RE Target scenario and the High RE Target scenario could help the AMS reach the target for greenhouse gas emissions avoided each year.
- The study estimates the ASEAN RE scenario could potentially avoid around **90,852 million tons of CO2 and 57 thousand tons of NOx emissions** under the ASEAN RE Target scenario by 2040.

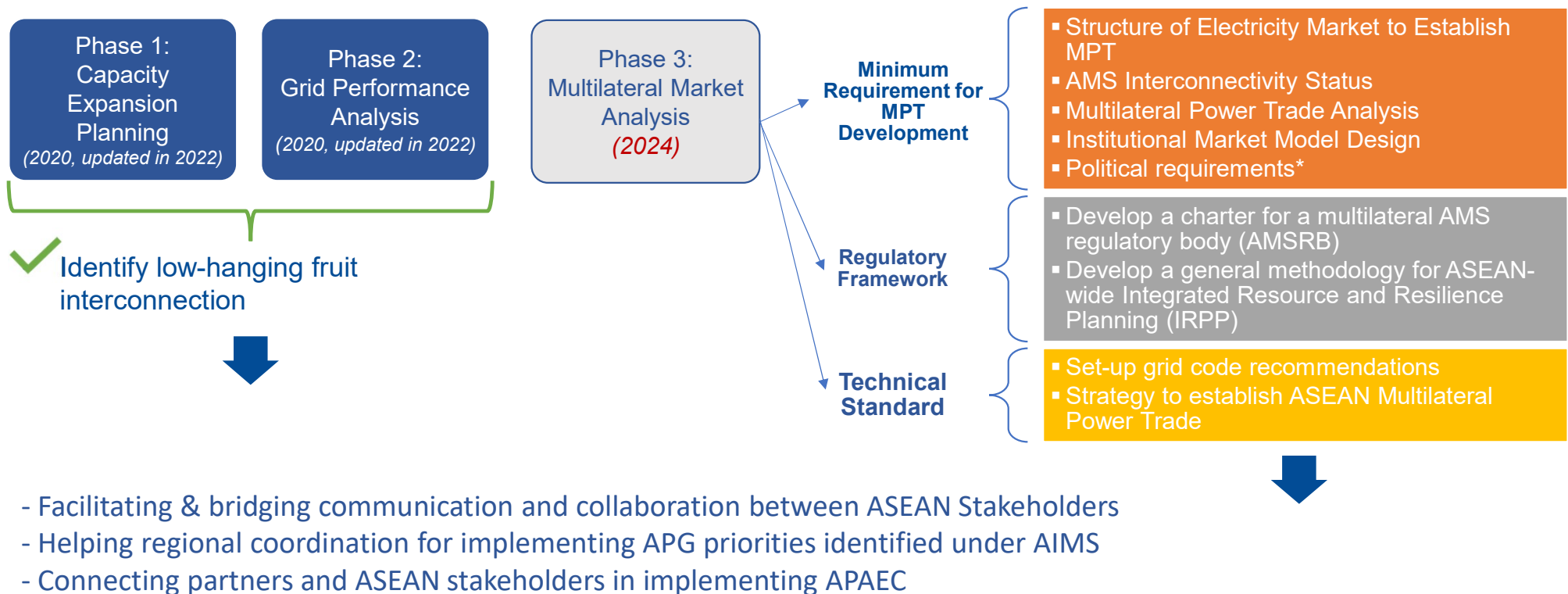


ACE Role in Facilitating Regional Collaboration for APG



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CASE
for Southeast Asia

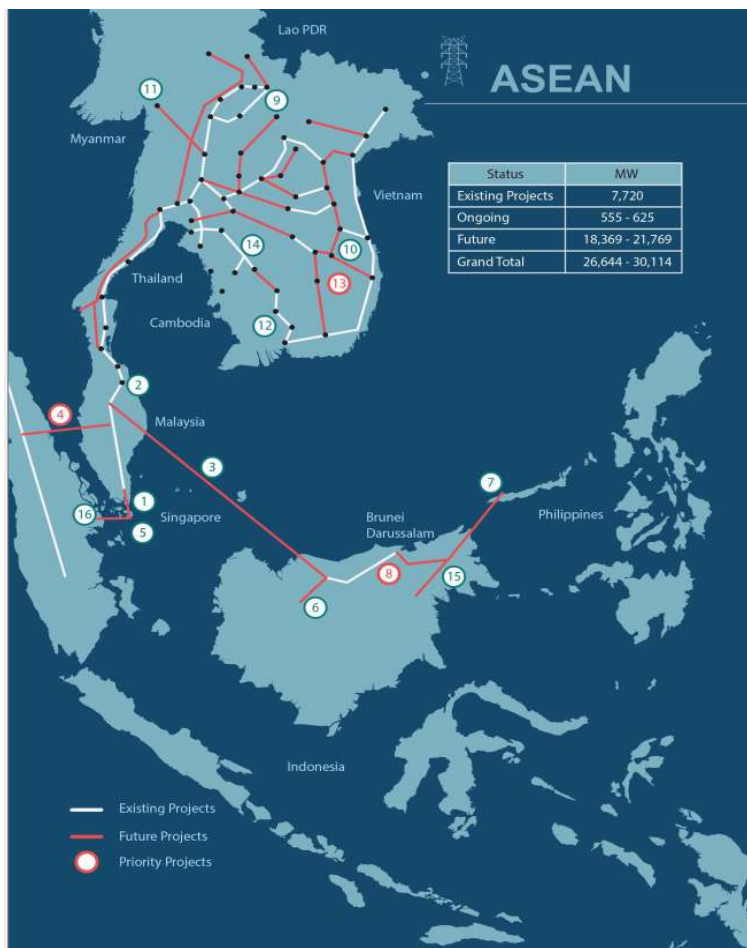


Today's Quote



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The Region requires a balance in energy trilemma:

- security,
- affordability,
- and environmental sustainability.

APG initiative to fuelling the increasing regional energy demand and Energy Trilemma.

Today's Quote

“There will be no energy transition without transmission”



THANK YOU

*For discussions/suggestions/queries email: **isuw@isuw.in***

visit: www.isuw.in

Links/References (If any)