ASEAN Centre for Energy
One Community for Sustainable Energy

Accelerating BESS for VRE Integration

Flex and Trade: Stories from Southeast Asia,
5 October 2026 – Bangkok Climate Action Week

Presentation by:
Monika Merdekawati, Senior Research Analyst
Sustainable & Renewable Energy Department
ASEAN Centre for Energy

The efforts on energy transition among ASEAN member states are **non-binding**. The **endorsed renewable and energy intensity reduction targets** are used to design the cooperative activities and coordination to strengthen the ASEAN community's vision of attracting FDI and promoting green transformation.

Vision Alignment

ASEAN Community Vision 2045

ASEAN RE Long-Term Roadmap 2045

ASEAN Plan for Action for Energy Cooperation 2026 - 2030

The Roadmap is used as the basis of a framework to outline the necessary direction, speed and magnitude for the actions of green energy transition under the APAEC 2026-2030.

ASEAN Economic vision 2045

Green Transformation and promote investment

Regional Efforts

- **30%** — ***Share of RE in TPES***
- **45%** — ***Share of RE in installed capacity***
- **40%** — ***Energy intensity reduction***

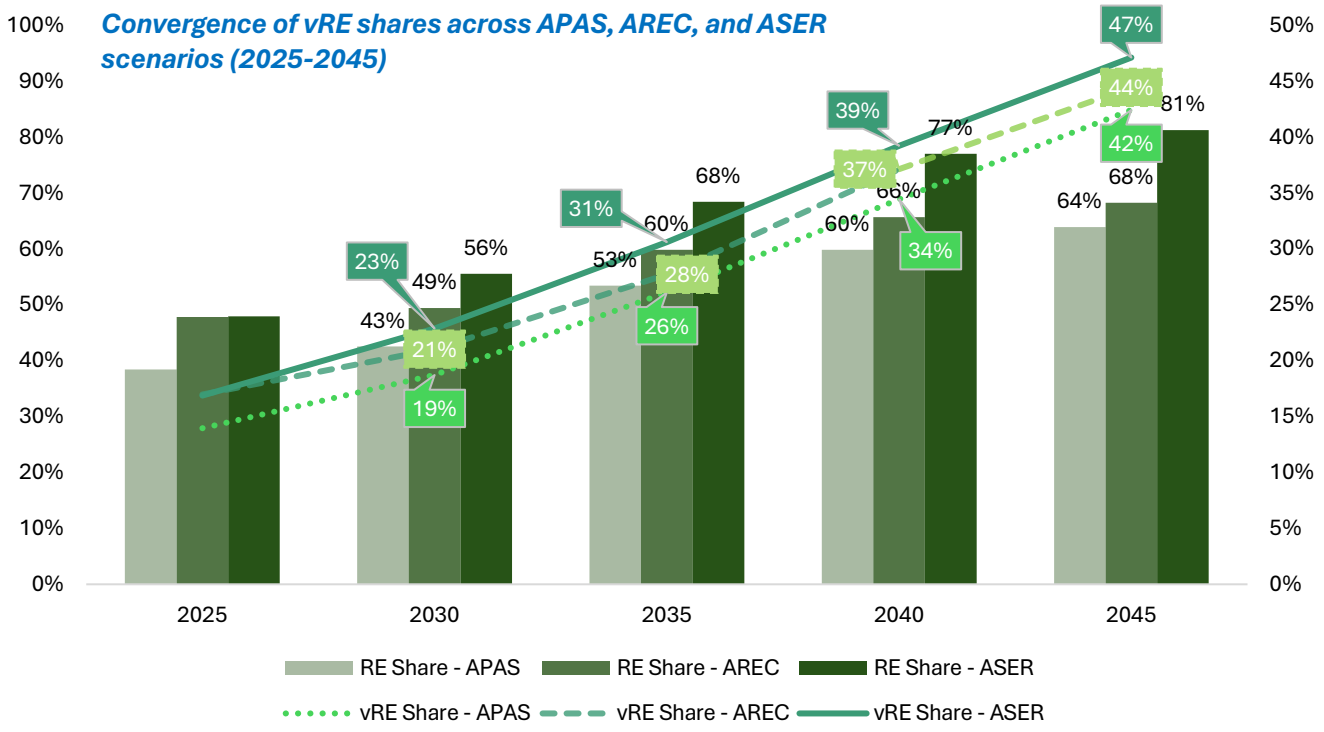
3 targets
11 joint-efforts

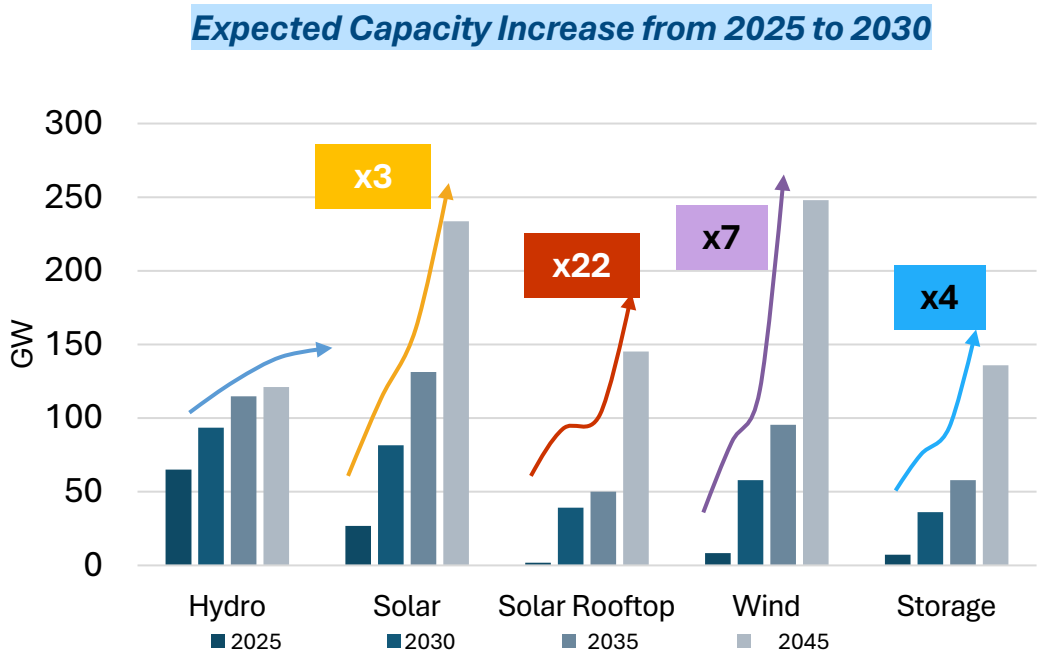
Leverage energy transition efforts

National Energy Policy Direction

- Power Development Plan
- National Energy Plan
- RE procurement
- Energy investment plan
- Cross-border power trade
- Others.

Managing **a 47% VRE generation share by 2045** and significant **capacity expansions** (utility and distributed system) requires **power system flexibility** to effectively match electricity supply and demand.



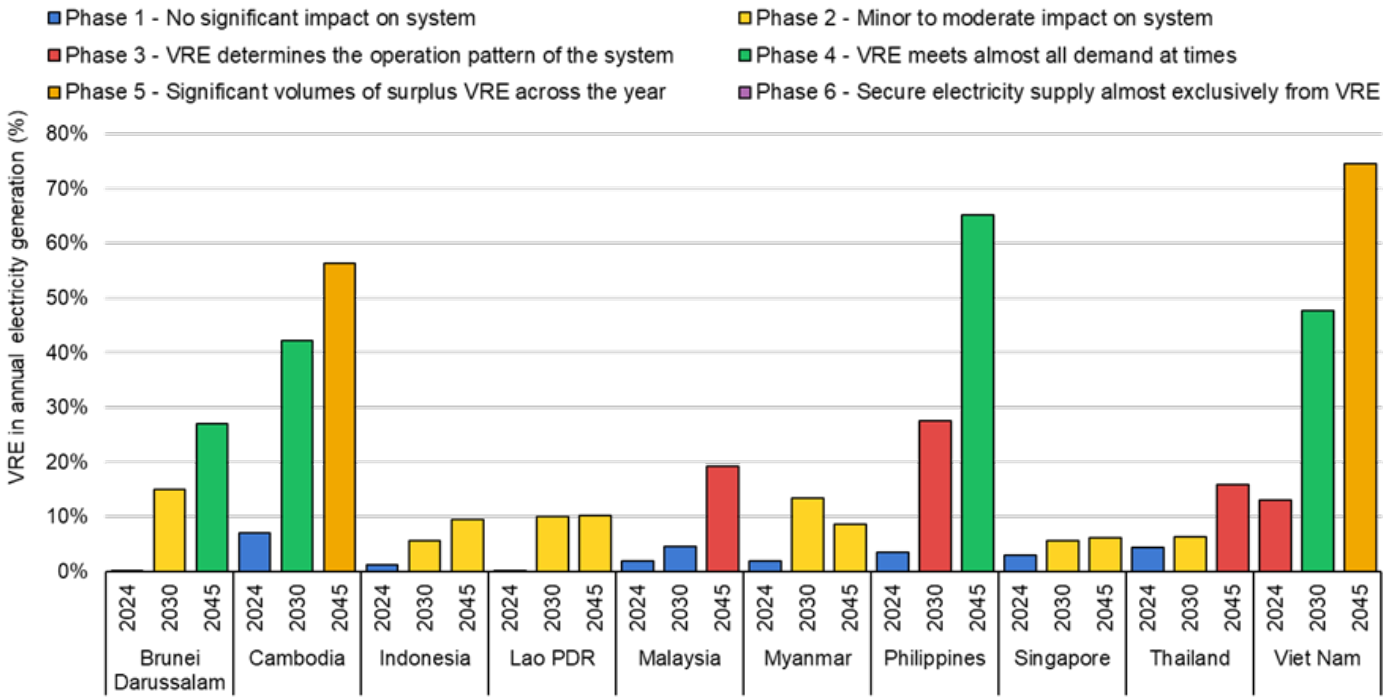


As VRE shares more than double to reach **42–47%** of the generation mix by 2045 across all scenarios

Paradigm shift in regional power systems planning and operation is necessary to handle significant supply intermittency.

Rapid increase of 2030 capacity requires **upgrading transmission** to absorb utility-scale solar (x5) and wind (x7), and **modernising distribution grids** to manage influxes of rooftop solar (x22) with storage (x4) as one option for flexibility

Escalating **VRE integration phases** demand real-time system balancing, making **BESS the most ready, modular, and cost-effective** flexibility solution



- ✓ By 2030, most of AMS are expected to remain in Phase 1 and 2
- ✓ Viet Nam already in Phase 3 and will be in Phase 4 in 2030
- ✓ By 2045, Brunei, Cambodia, Philippines, and Vietnam could enter Phase 4 and 5

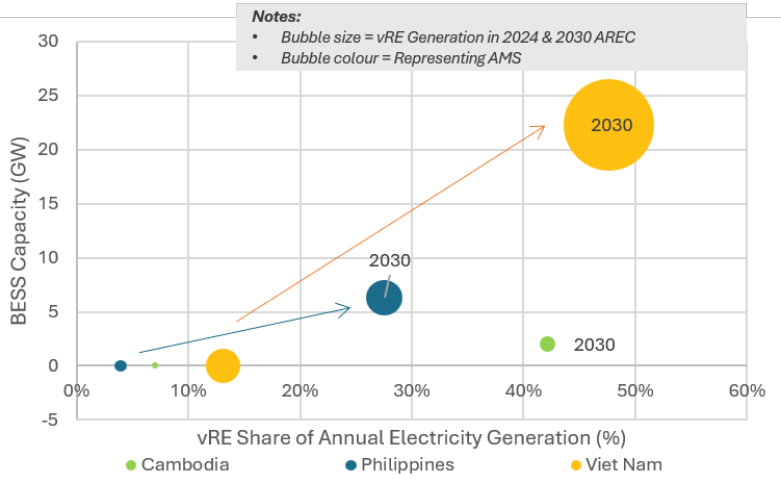
Why BESS?

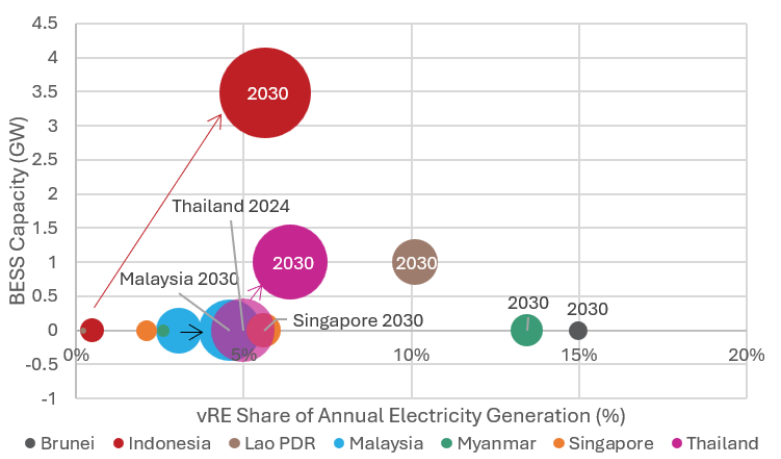
Resource Category	Flexible Resource	Sustained provision of inertia	Real-time (second to minutes)	Hourly to daily	Weeks to seasons
Dispatchable generation	Coal-fired plant				
	Gas-fired plant				
	Hydro plant				
	Nuclear plant				
Energy storage	Pumped hydro				
Cost	**Battery storage**	(with grid-forming inverters)			
Modular	Green hydrogen				
Demand side resources	Industrial load				
	AC and heating load				
	EV charging				

Early stage of readiness → High readiness

Source: ACE, IEA (2026). Accelerating Battery Energy Storage Systems for VRE Integration.

ASEAN Member States have **varying VRE ambition**; hence, different BESS needs but the current **market design requires specific consideration** to enable BESS access





Viet Nam, Philippines, and Cambodia PDPs demonstrate the highest leap in VRE & BESS
But Philippines exhibits **the institutional readiness for BESS market access**

Country	Required Leap (VRE Share%| BESS GW)	Asset Classification	Ownership	Market Participation	Grid Codes	Permitting	Procurement/ Renumeration
Viet Nam	13→49% | 22.5	●	◑	◑	●	○	●
Philippines	4→28% | 6	●	◑	●	●	●	●
Cambodia	10→42% | 2	○	○	○	○	○	○

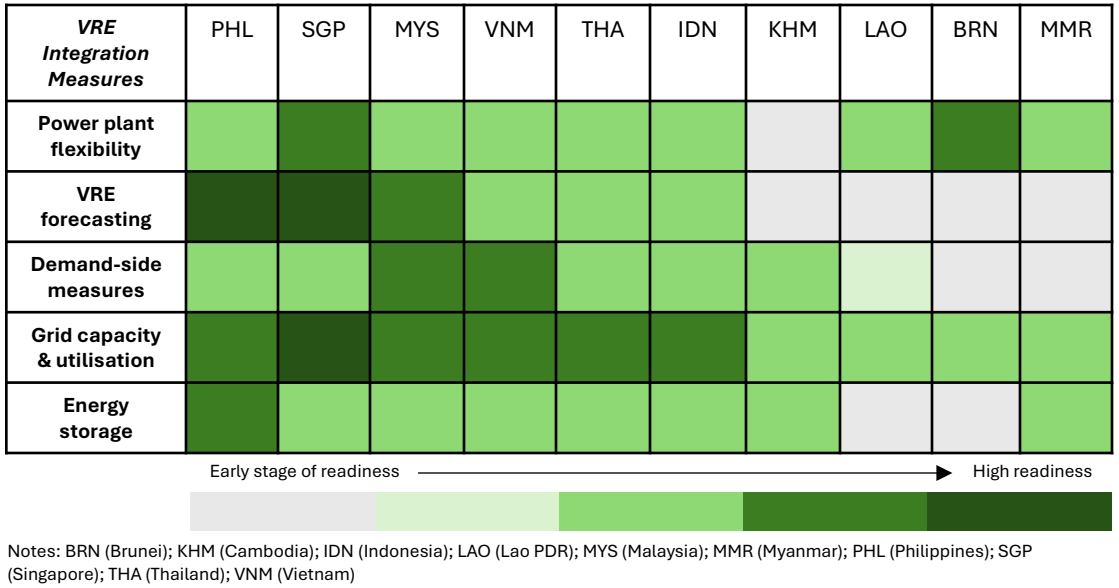
This group reflect **more conservative leap** (<10% of VRE share & <3.5 GW of BESS)
But institutional readiness need to be improved to reach maturity like Singapore

Indonesia	1→6% | 3.5	●	◑	○	◑	○	●
Thailand	4→7% | 1	◑	◑	◑	◑	○	◑
Lao PDR	1→10% | 1	○	○	○	○	○	○
Malaysia	3→5% | 0,1	◑	◑	○	◑	◑	◑
Singapore	2→4.5% | 0	●	◑	●	●	●	●

Notes: ● Established; ◑ Emerging/ Transitional; ○ Not Defined

Source: ASEAN RE Long-term Roadmap (Figure); Authors' Compilation (Table)[21]

Aligning strategic interventions with national readiness clusters is critical to successfully de-risking and deploying BESS



Notes: BRN (Brunei); KHM (Cambodia); IDN (Indonesia); LAO (Lao PDR); MYS (Malaysia); MMR (Myanmar); PHL (Philippines); SGP (Singapore); THA (Thailand); VNM (Vietnam)

Advanced: Philippines & Singapore
(**high** regulatory maturity & **high** technical readiness)

Transitional: Viet Nam, Malaysia, Thailand, Indonesia
(**emerging** regulatory maturity & **moderate** technical readiness)

Early-stage: Cambodia, Lao PDR, Brunei, Myanmar
(**undefined** regulatory maturity & low technical readiness)

Tailored Priority Actions to Scale-up BESS Adoption

	Revenue stacking	De-risking BESS	Improve Readiness
Transformational Cluster **Philippines & Singapore**	1. Develop flexibility roadmaps 2. Coordinate energy & ancillary services 3. Strengthen price through more-granular market 4. Expand market products & revenue stream		
Enabling Cluster **Cambodia, Indonesia, Malaysia, Thailand, Viet Nam**		1. Enable BESS for energy & system service 2. Establish long-term contractual arrangements 3. Develop revenue & procurement mechanisms 4. Review taxation and network tariffs *Unique case of Cambodia, considering VRE target*	
Foundational Cluster **Brunei, Lao PDR, Myanmar, Timor-Leste**			1. Integrate storage into national power system planning exercise 2. Support early deployment through targeted measures 3. Update grid connection and technical requirements to accommodate BESS integration

Source: ACE, IEA (2026). Accelerating Battery Energy Storage Systems for VRE Integration.

Thank you.

sre@aseanenergy.org