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A need to balance energy security with low-carbon transition

The Edge, Malaysia



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The demand for energy across South-east Asia, the world's fourth-largest energy consumer, is expected to rise sharply. The 8th Asean Energy Outlook projects an energy demand increase of 2.6 times by 2050, driven by industrialisation, urbanisation and the rapid growth of digital infrastructure.

As the region races to meet this demand, a mismatch is emerging between the speed at which new industrial assets are being commissioned and the much slower pace of grid reinforcement. This readiness gap threatens to create power supply chokepoints that could constrain Asean's economic trajectory.

"There is a real possibility that demand will outpace the region's current infrastructure deployment if action is not taken, leading to bottlenecks or chokepoints in consistent power supply," says Cheah Wai Seng, energy, resources and industrials leader at Deloitte Malaysia.

The challenge is compounded by what energy analysts describe as an energy trilemma, which is the struggle to balance rapid economic growth with energy security and sustainability.

"An energy trilemma is particularly acute in this region, where energy security risks stem from the struggle to balance rapid growth with sustainability," says Zayana Zaikariah, a senior researcher at think tank ISIS Malaysia.

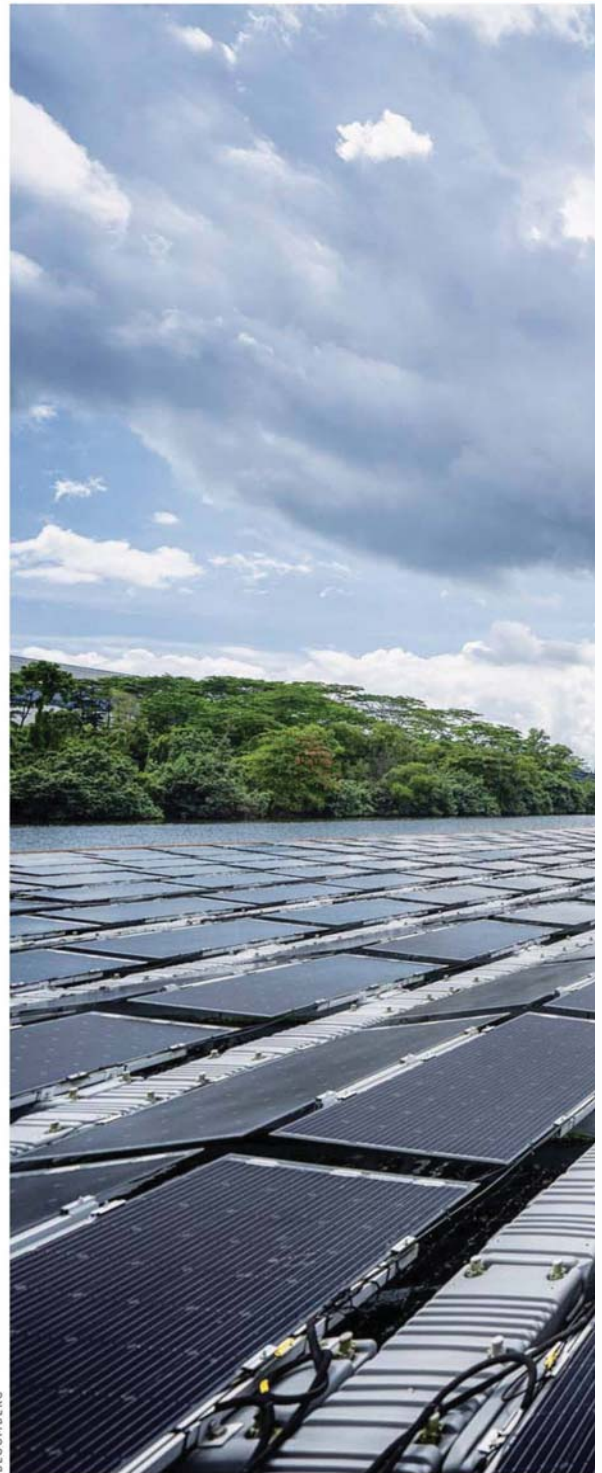
"Many states prioritise energy security through new fossil-fuel projects or fuel imports whenever shortages emerge. While this strategy averts intermittency in the short term, it heightens longer-term vulnerabilities."

Structural weaknesses further complicate the picture. "Geographical mismatches dur-



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Cheah, Deloitte Malaysia



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The Monsoon Wind Power Project in Dak Cheung, Laos



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Rao, Ernst & Young Consulting

ing peak demand cycles lead to a reliance on intermittent sources without sufficient stabilisation. This is a primary hurdle to regional energy security,” says Cheah.

VISION MEETS REALITY

A long-standing initiative to link all Asean member states into a single, integrated electricity system by 2045, the Asean Power Grid (APG) is designed to enable cross-border power flows that can smooth supply variability and enhance collective energy security.

According to the Asean Centre for Energy, strengthened cross-border interconnections

would allow member countries to tap into Asean’s renewable potential of 8,119GW of solar and 342GW of wind capacity, supporting the regional target of 23% renewable energy (RE) share in primary energy supply by 2025 and 52% by 2040.

“Development of the APG will be crucial to build interconnectivity and integrate power systems at a regional scale to enhance regional energy security and drive economic growth. The Lao PDR-Thailand-Malaysia-Singapore Power Integration Project phase two is an example of building resilience in the power grid across Asean,” says Philip Rao, EY Asean energy leader

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and partner at Ernst & Young Consulting.

Malaysia could benefit from the APG as a regional grid allows the country to tap electricity from neighbouring countries in times of need, says Cheah. "Beyond that, the APG will help smooth RE variability across a wider area while supporting Asean's collective clean energy goals."

Digital platforms are also emerging as tools to manage demand variability.

"For Asean countries such as Malaysia or Vietnam, adopting a 'Piclo-style' digital marketplace would allow grids to absorb the lumpy demand of new data centres by incentivising those centres to shift non-critical cooling loads or deploy on-site UPS batteries as grid-stabilising assets," he says.

A digital marketplace, such as those developed by UK-based firm Piclo, enables grid operators to procure flexibility services from distributed energy resources, such as batteries and electric vehicles, allowing participants to adjust electricity consumption or generation.

Progress on physical interconnections, however, has been uneven. As at end-2025, only nine of the 18 priority interconnection projects had been completed, with most existing cross-border power links remaining bilateral.

FINANCING THE TRANSITION

The scale of investment required to realise the APG is significant. The Asean Interconnection Masterplan Study estimates that US\$764 billion in investment is needed to build the transmission and power generation infrastructure necessary for high levels of variable RE adoption.

But there are opportunities for investors and funders in the region. The Asean region exhibits a strong positive correlation between GDP growth and power consumption, says Rao. "The need for reliable, cheaper electricity and enhanced energy security to drive GDP growth would naturally draw private capital interest to invest in modernising energy supply and transmission, as the upside would justify the price tag that comes with it."

Regulatory clarity is essential to mobilising this capital, as is development of a harmonised regional regulatory and legal framework among the Asean countries, he adds.

Meanwhile, Zayana believes that the traditional reliance on concessional climate finance is no longer sustainable. Given the current geo-

political landscape, the scale and speed of the capital required exceeds what can be supplied by development finance.

"Regulatory and financing frameworks that crowd in private capital for grids and system reliability must be prioritised, or the region risks hosting new industrial and digital growth by deepening carbon intensity rather than bending the emissions curve," she says.

THE RENEWABLE CHALLENGE

While RE dominates global capacity additions, translating new capacity into a reliable system supply remains constrained by grid integration challenges, storage availability and permitting timelines.

"To address this, Malaysia has taken concrete steps under the National Energy Transition Roadmap and Regulatory Period 4, prioritising supply schemes such as the Corporate Renewable Energy Supply Scheme and smart-grid modernisation. These measures are aimed at improving variable renewable injection while minimising the risk of destabilising grids originally designed around fossil-fuel baseload," says Cheah.

Solar remains the most cost-competitive and fastest-growing RE source in Asean, thanks to its shorter commissioning cycle, which allows for faster scalability compared with large hydro or geothermal, he says.

Zayana says utility-scale solar, particularly when paired with storage, is expected to continue expanding across Asean. "It faces fewer regulatory and grid bottlenecks than other technologies. Wind is not suitable in some areas, while large hydro carries longer development risks.

"For now, gas will continue to anchor system reliability as a transition fuel. However, the absence of a regionally consistent definition of 'clean' and 'transition' energy continues to blur investment signals and slow capital deployment."

The core constraint remains grid hosting capacity. While grid upgrades are accelerating storage integration, further flexibility will be required to ensure that the rapid influx of RE does not compromise system stability and that firm, dispatchable supply is available to support the region's expanding industrial and digital economy, say the interviewees. ●

By Elaine Boey



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