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project delivery experts

# Connecting Southeast Asia's Energy Future

## Infrastructure, Resilience and Regional Connectivity in the AI Era

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June 2026

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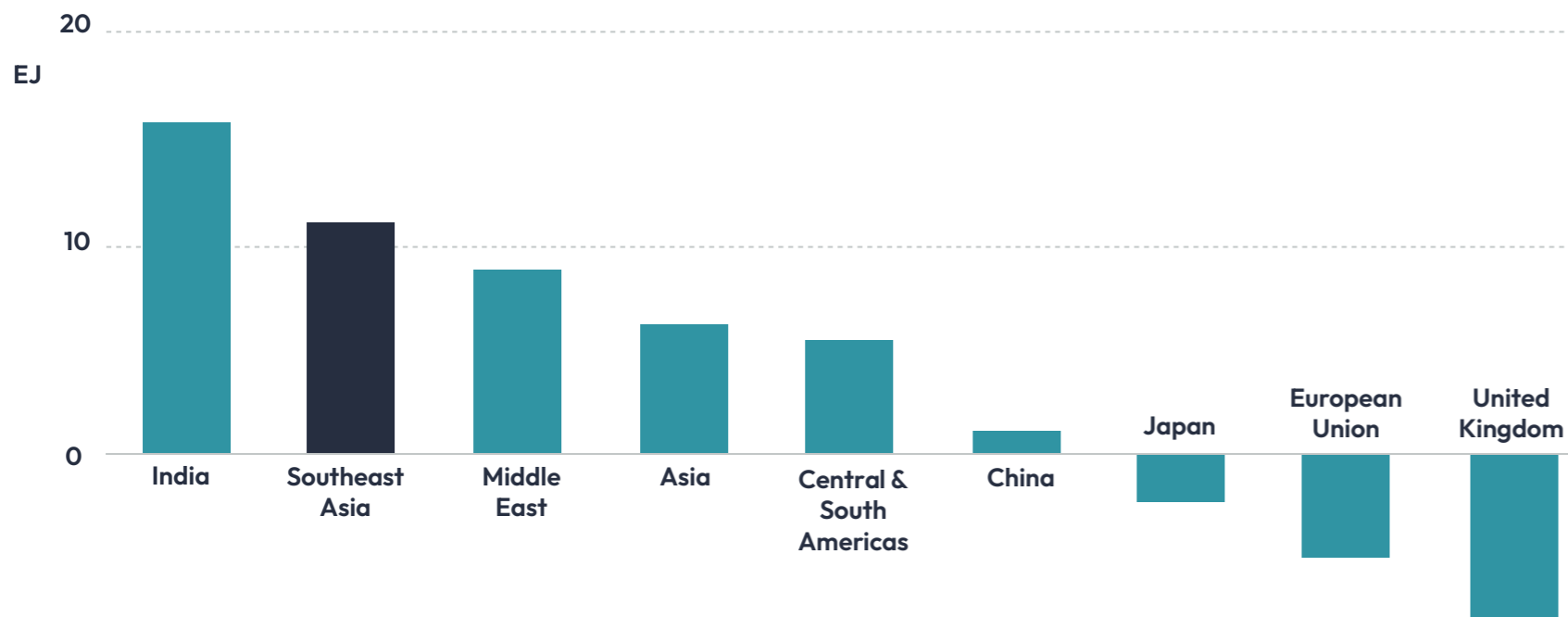
# Introduction

Southeast Asia's energy transition is evolving across a highly diverse set of national markets. Each country is progressing from a distinct starting point, with energy mixes shaped by geography, economic conditions, infrastructure maturity, demand growth and resource availability.

Industrial growth, urbanisation and digital infrastructure are accelerating electricity demand across the region. The rapid growth of AI-enabled services and hyperscale data centres is adding a new layer of demand intensity, placing greater pressure on generation, transmission and grid infrastructure. In response, governments and utilities are working to expand capacity, maintain reliability and support long-term transition ambitions within increasingly complex delivery environments.

**Southeast Asia is projected to account for one of the largest increases in global energy demand to 2035, second only to India.**

CHANGE IN ENERGY DEMAND 2023 - 2035



Adapted from: IEA, Navigating Thailand's Energy Transition: Policies, Outlook and Finance, June 2025.

As demand rises and renewable capacity expands, energy infrastructure will require greater transmission capability, stronger connectivity and improved network resilience. Energy security and reliability remain central priorities, placing greater emphasis on storage, grid capability, transmission planning and the coordination of generation, storage and transmission between markets.

Singapore is already helping to bring this shift into focus. With limited domestic renewable resources and growing demand, its energy strategy is increasingly centred on low-carbon electricity imports, regional partnerships and cross-border power trading. In doing so, Singapore is helping to advance a broader regional conversation about connectivity, infrastructure integration and the future movement of power across Southeast Asia.

The result is a regional energy landscape where long-term resilience will increasingly depend on the ability to strengthen transmission infrastructure, coordinate investment and improve connectivity between markets over time.



*Long-term resilience will increasingly depend on the ability to strengthen transmission infrastructure, coordinate investment and improve connectivity between markets.*



Southeast Asia reflects a wide range of economic conditions, infrastructure maturity and generation profiles. While the region is often discussed collectively, the realities on the ground differ significantly from country to country.

This variation is already visible across the region. Manufacturing growth and large-scale data centre investment are reshaping Malaysia's energy outlook, while Thailand is expanding renewable capacity within a generation mix that continues to support a mature industrial economy. In Indonesia, major investment is being directed toward generation, transmission and storage infrastructure across a geographically dispersed market. Vietnam's rapid industrialisation and renewable expansion are placing greater pressure on transmission capability and grid infrastructure, while the Philippines continues to prioritise energy resilience and network modernisation across an island-based geography. Singapore, with limited domestic generation options, is increasingly positioning itself as a regional hub for energy imports, financing and cross-border connectivity.

These differences are becoming strategically important. Variations in renewable potential, demand growth and infrastructure capability are strengthening the case for greater coordination between countries and more connected regional power networks. As that coordination deepens, the region will need to balance the benefits of shared infrastructure and cross-border power flows with national priorities around reliability, resilience and energy security.



# A Changing Energy Landscape

Diverse energy mixes are shaping different transition pathways across Southeast Asia.



ELECTRICITY GENERATION FROM RENEWABLES, 2020 TO 2025  
(TERAWATT-HOURS)

Source: ember-energy.org

# Regional Outlook

## MALAYSIA

### *Industrial expansion and digital infrastructure demand*

Malaysia is strengthening its position as one of Southeast Asia's key industrial and digital infrastructure markets, supported by continued manufacturing growth and major investment in hyperscale data centres, particularly in Johor and greater Kuala Lumpur.

Gas and coal continue to provide significant baseload generation alongside renewable expansion. Solar and hydro are expected to play an increasing role over time, supported by continued investment in transmission infrastructure and network capability.

Rising electricity demand from manufacturing and digital infrastructure is increasing the importance of reliability, grid resilience and long-term infrastructure planning. Malaysia's proximity to Singapore also gives it growing strategic relevance within regional energy discussions. As cross-border electricity trading and interconnection initiatives develop, Malaysia is likely to become increasingly important within broader conversations around regional power flows and infrastructure integration.



## THAILAND

### *Renewable growth within an established manufacturing economy*

Looking ahead, Thailand is pursuing renewable expansion with large-scale solar and floating solar initiatives, while maintaining a broad generation mix capable of supporting industrial demand and long-term energy reliability.

As one of Southeast Asia's more established manufacturing economies, Thailand's energy strategy reflects a strong emphasis on affordability, stability and energy security alongside renewable development. Floating solar projects have become a notable feature of the country's renewable investment pipeline, particularly where existing water infrastructure can support deployment.

The market also reflects the growing importance of balancing renewable expansion with broader grid capability and transmission planning. Thailand's role within existing and proposed regional transmission links reinforces its importance in wider discussions around cross-border electricity trading and regional coordination.



## INDONESIA

### *Scale, geography and long-term infrastructure investment*

Indonesia represents one of Southeast Asia's largest and most strategically important long-term energy markets. Rapid industrialisation, downstream processing industries, urbanisation and population growth are all contributing to rising electricity demand and significant infrastructure investment requirements.

The country is planning major expansion across generation, transmission and storage infrastructure while continuing to increase renewable capacity over time. Indonesia's geography, however, creates considerable delivery complexity. Expanding and coordinating transmission infrastructure across a dispersed island network presents substantial logistical, technical and investment challenges, including the continued development of inter-island transmission links and undersea cable infrastructure.

Storage, transmission capability and infrastructure sequencing are becoming increasingly important as the country seeks to integrate new generation capacity while maintaining reliability across geographically separated markets. Indonesia's scale and proximity to Singapore also give it growing regional importance within discussions around connectivity, cross-border infrastructure and future regional power flows.



## VIETNAM

### *Rapid industrialisation and network pressure*

Vietnam has emerged as one of Southeast Asia's fastest-growing energy markets, driven by manufacturing expansion, industrial growth and sustained foreign investment.

The country has rapidly expanded renewable generation capacity over recent years. This pace of development has increased pressure on transmission networks, grid capability and broader infrastructure planning, particularly as industrial electricity demand continues to accelerate.

Vietnam increasingly illustrates the importance of aligning renewable expansion with long-term investment in transmission, storage and network resilience. The market highlights how quickly energy demand profiles can evolve when industrial growth, manufacturing activity and generation investment accelerate simultaneously.



## PHILIPPINES



### *Energy resilience across an island-based market*

The Philippines is focused heavily on energy resilience, transmission capability and infrastructure modernisation across a geographically dispersed island network.

Offshore wind is emerging as a significant long-term opportunity, supported by growing interest in expanding renewable generation capacity and improving energy security. The country's geography, however, means that large-scale renewable development will depend heavily on transmission coordination, storage capability and network reliability.

As a result, the Philippines provides a strong example of why Southeast Asia's energy transition increasingly depends on infrastructure resilience and connectivity alongside generation investment.



## SINGAPORE



### *Connectivity, energy imports and regional power flows*

Singapore is increasingly positioning itself as a regional hub for energy imports, financing, market development and cross-border connectivity.

Limited domestic renewable resources, combined with rising demand from digital infrastructure and economic growth, are driving greater emphasis on imported low-carbon electricity and regional energy partnerships. Singapore has become one of the strongest proponents of cross-border electricity trading and regional interconnection initiatives, including discussions linked to the ASEAN Power Grid.

Its role within the region is becoming strategically important because it reinforces the broader direction of Southeast Asia's energy landscape – one where transmission capability, regional coordination and connected infrastructure are likely to play a larger role over time.



# The Growing Importance of Grid Infrastructure and Connectivity

Across Southeast Asia, renewable expansion is increasing the importance of transmission capability, storage, network resilience and broader infrastructure coordination.

Many markets are now managing a more complex energy environment in which generation growth must be supported by parallel investment in grid infrastructure, storage capability and transmission networks. Reliability, affordability and industrial competitiveness remain central priorities, particularly as electricity demand continues to rise.

Storage is becoming increasingly important in this context, not only to support renewable integration, but to balance supply and demand, manage peak load and strengthen network resilience.

This is creating greater focus on how power can move efficiently across markets, how infrastructure investment is sequenced and how regional coordination can strengthen network performance. As inverter-based generation increases, system security will also become a more important consideration. Increasingly, the challenge is not simply adding generation capacity but ensuring generation, storage, firming and transmission infrastructure can operate together effectively across evolving power networks.

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*The ability to sequence investment, align stakeholders and manage dependencies across projects, markets and jurisdictions will be critical to translating regional energy ambition into reliable and deliverable outcomes.*

# Regional Integration and the ASEAN Power Grid

The ASEAN Power Grid is one of Southeast Asia's most important long-term infrastructure concepts, reflecting growing interest in cross-border electricity trading, transmission connectivity and stronger coordination between regional power markets.

The ASEAN Plan of Action for Energy Cooperation (APAEC) 2026–2030 gives further weight to this agenda, supporting collaboration across energy policy, renewable investment and transmission infrastructure. Its targets for renewable energy and energy intensity also point to the increasing importance of coordinated infrastructure planning across ASEAN markets.

Greater connectivity may support more efficient power distribution, stronger network resilience and improved long-term energy security, particularly where countries have different renewable resources, demand profiles and domestic generation capacity. Singapore's focus on imported electricity is helping to accelerate these conversations, while Singapore and Malaysia are likely to remain early movers given their stronger infrastructure networks, institutional capability and existing role in regional energy and digital markets.

As regional interconnection deepens, power networks must also be designed around national energy security requirements. This means enabling cross-border electricity trade while retaining strategic control over critical infrastructure, limiting concentrations of dependency and preserving reliable domestic capability during periods of disruption.

Over time, coordinated transmission infrastructure, regional power flows and long-term network investment will become increasingly important to Southeast Asia's energy resilience. Regional integration will require not only physical infrastructure, but clear governance, operational resilience and institutional trust.



## Emerging regional interconnection through the ASEAN Power Grid

Source: ASEAN Centre for Energy, 2025

# Delivering Infrastructure Across Complex Markets

As Southeast Asia's energy landscape evolves, infrastructure projects are becoming larger, more interconnected and more dependent on coordination across jurisdictions, stakeholders and delivery environments.

The region's next wave of investment is likely to include:

**TRANSMISSION EXPANSION**

**GRID MODERNISATION**

**STORAGE INFRASTRUCTURE**

**CROSS-BORDER INTERCONNECTION**

**SYSTEM SECURITY AND FIRING**

**LONG-TERM NETWORK PLANNING**

These projects introduce increasing complexity around financing, stakeholder coordination, regulatory alignment and infrastructure sequencing.

As energy infrastructure becomes more interconnected, delivery risk will increasingly sit at the interfaces between projects, markets and stakeholders. Generation, transmission, storage and interconnection cannot be planned in isolation. The ability to sequence investment, align stakeholders and manage dependencies will become central to whether regional energy ambitions translate into deliverable outcomes.



# Conclusion

Southeast Asia's energy transition is moving through a wide range of national pathways, each influenced by supply chain constraints, delivery capacity, enabling infrastructure readiness, industrial growth and long-term economic priorities.

Across the region, investment in generation, transmission and grid networks is accelerating, alongside growing interest in storage, regional interconnection and cross-border electricity trading. AI and digital infrastructure are adding further momentum, increasing the need for reliable, scalable and more coordinated power networks. This is reshaping how energy is generated, stored, transmitted and dispatched.

Over time, stronger transmission capability and greater coordination between markets will become increasingly important to energy reliability, economic growth and long-term resilience.

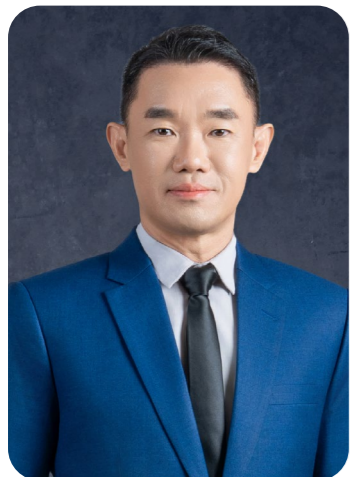
As this shift continues, delivery will become as important as direction. The ability to sequence investment, align stakeholders and manage dependencies across projects, markets and jurisdictions will be critical to translating regional energy ambition into reliable and deliverable outcomes.





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