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One Community for Sustainable Energy

2024 Recap – Electricity Insights

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To provide an update on the electricity trends in 2024 and forecasts for 2025. This article highlights the green transformation of the power sector to maintain energy security and sustainability in ASEAN.

Amidst a rapid growth of energy landscape, ASEAN's power sector remains at the forefront of a transformative shift to enhance energy security and sustainability. Throughout 2023, the region focused on addressing a rapidly evolving energy demand through the expansion of electricity interconnections and promoted more clean energy utilisation, as highlighted in the 2023 Recap – Electricity Insights. Building on this significant progress, 2024 marks an ongoing effort to prioritise renewable energy integration, regional power trading, and emerging energy technologies to align with global decarbonisation pathways and ensure long-term energy resilience.

The ASEAN region continues to prioritise its energy transition through policy reforms, renewable energy projects, and cross-border collaborations. In the first quarter, two ASEAN Member States (AMS), Cambodia and Laos, strengthened their cross-boundary power transactions to advance energy cooperation while meeting rising domestic demand. In the second quarter, a new scheme of cross-border green electricity sales was introduced in Malaysia which aligned with the commitment to support ASEAN Power Grid (APG) initiatives. Singapore and Indonesia secured new licenses and approvals on green electricity imports to foster regional decarbonisation goals as highlighted in mid-2024. In the last few months of 2024, ASEAN governments agreed that the region should prioritise regional grid interconnection towards the goal of an enhanced energy security and increased clean energy integration.

"Advancing energy horizons: Policies, Innovations, and Cross-Border Collaborations in ASEAN's Power Sector. The ASEAN electricity landscape highlights a dynamic interplay of regional collaborations, policy advancements, and technological innovations which draw a collective effort to enhance regional energy security and sustainability. ASEAN Member States are navigating challenges such as power outages, price volatility, diverse regulatory frameworks, and infrastructure barriers through energy projects prioritising renewable energy integration and grid modernisation. Innovations such as hydrogen power plant and sub-sea transmission cable have been introduced to help the region ease the pressing need for resilient energy systems."

Navigating Electricity Pricing, Shortages, and Security Challenges

Rising energy production costs, resource limitations, and demand present significant electricity pricing challenges across ASEAN. In Vietnam, electricity prices are highly unlikely to decrease due to depleting natural resources and financial challenges faced by Vietnam Electricity (EVN). The droughts in 2023 significantly reduced hydropower output, forcing a greater reliance on

coal-fired power, which further escalates production costs. Vietnam's EVN raised retail electricity prices by 4.8% in October 2024 to address the rising costs of electricity production and transmission. Similarly, in the Philippines, electricity rates increased for the third consecutive month, with a slight upward adjustment of USD 0.000412/kWh due to higher transmission charges despite lower generation costs.

In order to shield consumers from rising fuel costs, several countries have implemented various measures to stabilise the electricity price volatility. Malaysia allocated USD 428 million in electricity subsidies for Peninsular Malaysia to mitigate the impact of rising fuel prices on consumers. Similarly, Thailand has reduced electricity rates to USD 0.11 per unit for January to April 2024. However, the rates remain influenced by future fuel costs and outstanding financial obligations to the Provincial Electricity Authority (PEA). Meanwhile, stagnant to the 2023 price, the Electricity Authority of Cambodia announced in early 2024 that no tariff change would be imposed, keeping the electricity tariff for residential consumers at 0.095 – 0.18 USD/kWh (EAC, 2024). Although several approaches have been undertaken to mitigate electricity price surges in the future, the region needs diverse and more innovative strategies to balance affordability and sustainability in electricity pricing.

Furthermore, aside the challenges in stabilising electricity costs, power shortages and supply disruptions continued to pose as another technical constraint threatening the regional energy security. In Myanmar, unreliable hydropower generation during dry conditions has caused persistent electricity blackouts since the 2021 coup which is severely disrupting business, particularly micro and small enterprises. Likewise, Vietnam anticipates electricity shortages due to limited offshore power capacity. The government emphasised that the country would require 19 GW of capacity addition between 2023 and 2025 to maintain domestic energy supply in order to meet growing energy demand. Cambodia also dealt with frequent power outages, hindering domestic business operation and economic stability.

Comparing to Malaysian firms seeing 0.4 outages and Indonesian 0.2 outages per month, Cambodian businesses witnessed approximately 0.9 outages in 2023. According to The Enterprise Surveys, the outages impacted on the increase of costs associated with electricity by up to 1.1%, ranked the highest among other AMS. Therefore, the Cambodian government plans to improve electricity distribution and consumption, prioritising consistent power supply at stable rates. On the other hand, Singapore proposed a legislative bill allowing the Energy Market Authority (EMA) to impose power rationing during emergencies, reinforcing the country's preparedness for supply disruptions. Power rationing may be implemented as a last resort during severe and unexpected fuel or electricity shortages, where system buffers, fuel reserves, and other emergency measures are deemed insufficient.

Fostering Energy Connectivity through Cross-Border Initiatives

In 2024, several ASEAN Member States made progress in large-scale and cross-border collaborations between nations to increase the RE share in their power development plan. By 2030, Vietnam plans to increase power capacity by focusing on the renewable energy sources including wind, biomass, waste-to-energy, and solar totalling 32,750 MW, coupled with a 5,000 MW import from Lao PDR. To achieve this total capacity, Vietnam is expected to expand its offshore wind power capacity to 6,000 MW and solar capacity to 4,100 MW along with grid modernisation as outlined in the country power development plan: National Electricity Development Plan 2021-2030. Simultaneously, Vietnam is increasing its electricity exports to 400 MW to support Cambodian's economic growth and rising energy demand. On the other hand, with its unique geographical location, the Philippines is also working towards unstable power supply issues across islands by enhancing interconnection projects, such as the ongoing Visayas-Mindanao grid interconnection that offers opportunity to enhance power supply performance on Negros Island.

Singapore announced the continuation of the LTMS-PIP, doubling its power import to 200 MW—100 MW from Lao PDR and 100 MW from Malaysia—to further secure electricity supply. Additionally, the establishment of a workgroup between Singapore, Lao PDR, and Cambodia marked the significance of regional energy cooperation in overcoming challenges in the implementation of APG. The countries joined forces to address common barriers in the APG initiatives by developing a framework to streamline regulatory processes, facilitate commercial agreements, and improve the infrastructure needed for seamless electricity trade.

Malaysia is strengthening its regional power cooperation through key initiatives aimed at expanding cross-border electricity trade and interconnection projects. A significant step forward is the introduction of the Energy Exchange Malaysia (ENEGEM) platform, which enables renewable energy developers in Malaysia to sell clean electricity to neighbouring countries in order to reinforce its role as a regional energy hub. Additionally, Malaysia is working towards the implementation of the Sarawak-Singapore electricity interconnection project, which is expected to be operational commercially by 2031. Similarly, bilateral collaboration on cross-border interconnections between Indonesia and Malaysia also continues to present significant progress in 2024. Following the signing of trilateral Memoranda of Understanding (MoU) involving Perusahaan Listrik Negara (PLN), Tenaga Nasional Berhad (TNB), Sabah Electricity Sdn Bhd (SESB), and ACE during the 41st ASEAN Ministers on Energy Meeting (AMEM) in 2023, PLN has secured a grant of USD 2 million from the U.S. Trade and Development Agency (USTDA) to support the development of feasibility studies for two interconnections between Sumatra, Indonesia and Peninsular Malaysia, and between North Kalimantan, Indonesia and Sabah. These cross-border interconnections would unlock the potential of enhancing energy resilience through the utilisation of variable renewable energy (vRE) sources of up to a total of 2.4 GW.

The 42nd AMEM acknowledged the achievements of multilateral efforts in promoting energy cooperation through grid interconnectivity and power trade across ASEAN. The Joint Ministerial Statement of the 42nd AMEM also highlighted the ongoing progress of the Brunei-Indonesia-Malaysia-Philippines Power Integration Project (BIMP-PIP). In 2023, the multilateral initiative of Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA) established the BIMP-PIP Task Force focusing on the initiation and monitoring of potential projects including those related to power interconnectivity and cross-border electricity trading through feasibility and viability studies. The draft of the Terms of Reference of BIMP-PIP Task Force has been acknowledged in the Joint Statement of the 27th BIMP-EAGA Ministerial Meeting in October 2024. Upon its initiation in 2023, the Task Force is expected to present the feasibility of cross-border power trade between BIMP countries by 2025.

Harnessing Innovation to Advance Power Infrastructure and Grid Modernisation

ASEAN continues to witness transformative advancements in the power sector, including the incorporation of hydrogen fuel and subsea transmission cable. In line with the clean initiative, the Malaysian government has planned to launch its first solid-state hydrogen reactor scheduled for early 2025. This innovative 5-kilowatt reactor is expected to maximise the electricity coverage in rural areas. Through a green hydrogen production plant in Sarawak, the expansion is to export one gigawatt of renewable electricity to Singapore by 2032 via a 700 km undersea cable, with a future potential plan to achieve broader markets such as South Korea and Japan. Meanwhile, to suppress additional import, Singapore has started the construction of its own 600 MW of the hydrogen-ready combined cycle gas turbine expected to be completed by the end of 2027 and aimed to help the country tackle the rising energy demand by about 3-5% annually over the next 10 years. The country believes that using 50% hydrogen mix in the power plant will cut down on the carbon emissions by 33%. On the other hand,

the Philippines showed its power transmission technological development through the energisation of a 184-circuit-kilometer High-Voltage Direct Current submarine cable with a transfer capacity of 450 MW connecting the three of the major islands in the country, Luzon, Visayas, and Mindanao.

Furthermore, ASEAN's pursuit of energy security is also depicted by breakthroughs in modernising grid infrastructure to minimise transmission challenges and enhance renewable energy integration. Indonesia overcomes intra-island and inter-island interconnections by advancing a super grid project. The grid modernisation initiative is designed to link electricity from renewable energy sources across archipelago by utilising high-capacity transmission lines. Since the supergrid project plans to build a 1680 km transmission line with a total investment of up to USD 4.8 billion, Indonesia's regulator encourages exploring alternative financing mechanisms, including private-sector partnerships. Therefore, this project is targeted to support the country's ambitious target of achieving 23% renewable energy by 2025. Meanwhile, Vietnam is collaborating with South Korea to improve grid stability using superconducting cable which can increase transmission efficiency and capacity by more than five times in case of power expansion due to overload. First commercialised domestically in 2019, the technology is proven to remove electromagnetic waves and reduce environmental impact associated with land use for substations and transmission towers.

Paving the Way for Decarbonisation Across Electricity Sector

ASEAN countries are continuing their push towards decarbonisation through various renewable energy initiatives. Energy Market Authority (EMA) Singapore has granted conditional licenses and approvals for the country to import low-carbon electricity, including 2 GW of projects, in collaboration with Indonesia, estimated to begin operations by 2028. This initiative supports Singapore's decarbonisation commitment by achieving 6 GW of low-carbon imports by 2035.

In Malaysia, the Green Electricity Tariff Programme (GET) will continue into 2024, providing renewable energy from solar and hydropower sources, with plans to improve subscription options and pricing. Malaysia also released another initiative, named the Corporate Renewable Energy Supply Scheme (CRESS) which incentivises the use of renewable energy in the industrial sector, allowing the RE generation companies to utilise the national transmission grid to transmit clean electricity to customers. To further accelerate the transition, the government has extended the Solar for Rakyat Incentive Scheme (SolaRIS), offering rebates of up to USD 902 for solar system installations until April 30, 2025. Meanwhile, the Net Energy Metering (NEM) program has been enhanced, enabling existing users to increase their solar capacity while expanding eligibility to agricultural electricity users. The NEM Rakyat category quota has been increased by 150 MW, reaching a total of 600 MW, while the NEM NOVA category for commercial and industrial users has been expanded by 300 MW, bringing the total to 1,700 MW. These initiatives collectively support Malaysia's ambitious goal of achieving a 70% renewable energy share in the national electricity supply by 2050.

To reduce carbon emissions and enhance sustainability across power sector, Vietnam and Cambodia are accelerating their renewable energy transitions through wind and hydropower. Vietnam, in its National Power Development Plan, has committed to a significant increase in renewable energy, targeting 6,000 MW of offshore wind power and 29,346 MW from hydropower by 2030 to support its carbon reduction goals. Cambodia is making strides in its energy transition, with the integration of wind power into the national grid by 2026, which will contribute to decarbonising its energy sector by reducing reliance on fossil fuels.

Meanwhile, Thailand is reconsidering its renewable energy target, aiming to surpass 50% in the Power Development Plan to meet carbon neutrality by 2050. The country is exploring biomass and nuclear power projects to reduce carbon emissions, with ongoing support for large-scale floating solar farms to enhance renewable energy generation.

As ASEAN navigates its evolving energy landscape, the region remains committed to balancing energy security, affordability, and sustainability. The expansion of cross-border power interconnections, advancements in renewable energy, and innovative grid modernisation efforts reflect a collective drive towards long-term energy resilience.

Despite persistent challenges such as price volatility and supply disruptions, AMS are actively implementing policies and infrastructure projects to accelerate the clean energy transition. Notably, successful energy policies and strategies adopted by certain AMS, such as Malaysia's electricity subsidy schemes or Singapore's low-carbon electricity import initiatives, could serve as models for other nations to address similar challenges. Moving forward, continued collaboration, investment, and technological innovation will be crucial in shaping a more sustainable and interconnected ASEAN power sector.

Energy insight is an inside analysis based on collected news for certain period of time, through the ASEAN Energy News Clipping of the ASEAN Energy Database System (AEDS). This edition covers the year of 2024.

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