

INSIGHTS

AI and Electricity: Safeguarding ASEAN's Energy Security and Integration in the Digital Era

ROS Sayumphu¹, PhD in Science and Technology Studies

¹ ***Ros Sayumphu*** is a Research Fellow at AI Forum

After the COVID-19 pandemic and the onset of the Ukraine crisis, the world faced a global energy crisis driven by post-pandemic production declines and war-related disruptions, forcing European nations to scramble for alternatives to Russian gas—often at the expense of environmental goals through the use of coal and fossil fuels. This crisis rippled globally as sanctions restricted oil and gas imports, highlighting that energy is not just a commodity but a critical pillar of national security, especially as the rapid expansion of digitalization and data centers creates an insatiable demand for power that, if unmet, could lead to national instability. As speculation grows regarding ASEAN’s potential as a premier hub for digital technology, the region faces the dual challenge of increasing energy production and stockpiling to meet this rising demand while ensuring long-term security. Consequently, exploring the relationship between AI and electricity becomes vital, as AI offers the potential to protect critical electrical infrastructure, bridge existing energy gaps, and enhance the overall security, sustainability, and integration of energy systems across Southeast Asia.

The ASEAN Power Grid (APG)

The concept of having resilient electricity in ASEAN is not new. The ASEAN member states signed a Memorandum of Understanding (MoU) on the ASEAN Power Grid (APG), which was signed in 2007. This document demonstrates that ASEAN member states intend to create an integrated power grid to exchange electricity and optimize energy resources for the region. Furthermore, ASEAN aims and is mindful of renewable energy, as highlighted by the strategic document ASEAN Plan of Action for Energy Cooperation (APAEC) (2016-2025), which aims to achieve a regional target of 23% renewable energy by 2025 while also emphasizing the importance of increasing energy savings in power generation, transmission, and consumption through the implementation of smart grids and modern technology. Although these visions have been beautifully written and outlined on paper, there has yet to be a fully integrated ASEAN-wide power grid. However, progress has been made, as evidenced by projects such as the Thailand-Malaysia-Singapore Power Integration Project (TMS-PIP), Sarawak (Malaysia)-West Kalimantan (Indonesia) Transmission Project, Thailand-Lao PDR Power Transmission Projects, and Cambodia-Laos Transmission Project, to name a few.

AI application into Electricity: Prospect and Challenges

Because energy will be generated, transmitted, and consumed, a smart grid is a modern electricity grid that uses cutting-edge technology to monitor, control, and manage electricity

production, transmission, and distribution, which will be critical to improving efficiency, dependability, and sustainability. For instance, by employing sensors and automated systems, it would be possible to swiftly determine the source of power outages, modify the flow of electricity in response to demand in real time, and give customers information on how much energy they are using. All of these actions would save energy and minimize waste. This also aids in the maintenance of the energy grid because the automated system can reduce grip tension, improve grip reliability, and support sustainable development goals.

Economically, AI in electricity grip would also be necessary for smart energy conservation for consumers, as the energy saved could be used for other purposes in the economy rather than wasting it. This practice would also help to reduce the number of unnecessary blackouts, which cause economic disruption. Power outages, particularly in the economy where high-tech manufacturing is critical, could cause significant economic decline. Furthermore, AI could predict the electricity trend and assist the state in mapping of the energy plan, especially if the country aims to accommodate more investment, economic growth, and population. As a result, AI's ability to predict electricity demand is critical to managing energy distribution and aligning economic growth. Aside from being generated, transmitted, and consumed, AI could also be used to promote energy trading and transactions; it could be through blockchain that the complex bureaucracy is eliminated.

Although this is true, the cost of implementing an AI system in developing countries is a challenge, and the technological gap that exists in ASEAN certainly does not help, which is one of the reasons why the electricity grid in ASEAN has not been fully covered and integrated, in addition to the geographical location issue. At the same time, each nation remains skeptical of AI, and the lack of established regulatory frameworks that create a confident environment to foster integration is also a source of concern. Furthermore, as smart grids and other AI applications create an environment that is more vulnerable to cyberattacks, strong cybersecurity measures are required to protect critical infrastructure.

Conclusion

In conclusion, while ASEAN recognizes the importance of AI and the need for electricity integration, there is still room for improvement, and technology resilience should be considered a cornerstone for fostering this integration. Because if one country in ASEAN is weak and unable to protect and maintain its critical infrastructure, it creates vulnerability for others as

well. To move forward, collaboration on building defence capacity and resilience in general is as critical as investment in the smart power grip.

** Edited with ChatGPT for clarity; all views expressed are solely those of the author.*

** The opinions expressed are the author's own and do not reflect the views of AI Forum.*