

Home & Sustainability & A Modernised and Flexible Grid for a Greener Future

As Malaysia is committed to reducing its greenhouse gas emissions and achieving net zero emissions by 2050, the National Energy Transition Roadmap (NETR) has set the stage for comprehensive grid initiatives and Tenaga Nasional Berhad (TNB) has emerged as a pivotal player in driving the country's transition towards sustainability.

Responsible for the generation, transmission, and distribution of electricity throughout the country, TNB has been actively working towards modernising Malaysia's energy infrastructure to support the country's journey towards Net Zero, realising its energy transition plan while keeping in line with the NETR.

Understanding Malaysia's Power Grid

Malaysia's current energy infrastructure is predominantly centralised, with natural gas, coal, and a growing contribution from renewable energy thanks to early and decisive action from its national utility. However, despite having one of the most reliable and secure energy systems in the region, the country's existing grid infrastructure faces several challenges in meeting its net-zero targets.

In its endeavour to transition to cleaner energy sources, the Malaysian government introduced Third Party Access (TPA) in 2017, fostering competition among industry players, including Independent Power Producers (IPPs). This move towards market-based pricing for power and non-power sectors ensures a reliable supply of natural gas at competitive prices, vital for the country's energy transition. Additionally, the government aims to further reform the power sector by establishing a TPA framework for fuel sources and grid infrastructure, guaranteeing cost-reflective pricing and enabling higher penetration of renewable energy (RE). TNB actively supports these measures, recognising their importance in enhancing Malaysia's competitive advantage.

The first comes from the introduction of renewable energy sources to replace emissions-heavy fossil fuels. Renewables such as wind and solar power are largely intermittent in nature, providing variable outputs according to the weather. These fluctuations can cause instability in the grid if not managed properly. The growing number of distributed energy resources such as rooftop solar panels and energy storage systems also add a significant challenge to the existing infrastructure. The rise of renewable energy prosumers - a critical component to achieving the country's goal of 31% renewable energy by 2025 - means the grid must also be prepared for an increasingly bidirectional flow of energy.

The Malaysian government is also aiming to establish a strong electric vehicle (EV) economy, targeting 1.5 mil EVs to be on the road by 2040. This is a significant increase from the 10,000 currently registered in the

country, but with the global transportation sector generating the largest share of greenhouse gas emissions, it's a shift that has to be made sooner rather than later and will require a grid capable of handling the fluctuations in demand. While the country's energy grid is relatively reliable and stable, it was not designed for the level of flexibility required in the years to come.

Modernising the Malaysian Grid and Distribution Network

Malaysia's drive towards sustainable energy is reinforced by its global commitments, notably the Paris Agreement, and the need to fortify economic diversification and energy security. Recognising the world growth potential in the clean energy industry, with an estimated USD 1.7 trillion in investments by 2023, Malaysia is focusing on the development of RE, energy efficiency (EE), and grid strengthening. Transforming Malaysia's energy grid for future demand involves more than advancement for higher energy production and distribution. The rapid growth of energy needs in Southeast Asia in recent years highlights the need for a grid that is capable of handling fluctuating generation and consumption while maintaining a balance between security, reliability and sustainability.

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The smart grid technologies allow utilities to harness advanced innovation and solutions, leveraging the power of real-time grid monitoring, data analytics, and automation, to foresee and promptly adapt to shifts in energy demand and supply. These cutting-edge grid management capabilities offer unparalleled flexibility, enabling seamless integration of intermittent renewable energy sources, electric vehicles, and other distributed energy resources, all while upholding grid reliability and security.

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