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28 JUN, 2026

SSML strengthens Sabah's energy security, grid resilience

Borneo Post (KK), Malaysia

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SABAH is taking a major step towards a more secure, reliable and sustainable energy future through the implementation of the Sabah Southern MADANI Link (SSML), one of the largest and most strategic electricity transmission infrastructure projects undertaken by Sabah Electricity Sdn. Bhd.

As Sabah's integrated electricity utility responsible for power generation, transmission, distribution and retail services, Sabah Electricity plays a critical role in developing the infrastructure required to support the State's economic growth, industrial development and energy transition aspirations.

The Southern MADANI Link is a key investment in strengthening Sabah's transmission network and enhancing the resilience of the state-wide electricity grid. Upon completion, the project will close the final gap in Sabah's 275kV transmission backbone, creating a stronger and more interconnected grid capable of supporting growing electricity demand and future development across the State.

The need for a more robust transmission system has become increasingly important as Sabah continues to experience growth in industrial activities, urbanisation, digitalisation and population expansion. A resilient and well-connected transmission network is essential to ensure electricity can be delivered safely, efficiently and reliably to homes, businesses and industries throughout the State.

Spanning approximately 330 kilometres, the Southern MADANI Link will establish a new 275kV high-voltage transmission corridor connecting from Sipitang to Tawau. The project will complement the existing transmission network and create an alternative pathway for power transfer between the West Coast and East Coast regions of Sabah.

The Southern MADANI Link is being implemented in phases. Phase 1A, which is currently under construction, involves the development of approximately 60 kilometres of 275kV transmission line connecting PMU Mengalong in Sipitang to PMU Upper Padas. Scheduled for completion in 2028, this phase represents an important milestone in strengthening transmission capacity between Sabah's West Coast and Interior regions.

The subsequent Phase 1B will involve the development of approximately 270 kilometres of 275kV transmission line from PMU Upper Padas to PMU Kalumpang. Upon completion, this phase will establish the final interconnection required to complete Sabah's state-wide grid network, creating a fully interconnected 275kV transmission backbone that enhances power transfer capability, operational flexibility and overall grid resilience across the State.

From a power system perspective, the completion of the Southern MADANI Link will significantly strengthen Sabah's transmission architecture. The enhanced network will allow electricity to be transferred more efficiently across longer distances, improve system stability, optimise power flows and reduce dependence on single transmission corridors.

One of the most important outcomes of the project is the improvement of grid resilience. By creating alternative transmission pathways between major load centres, the system will be better equipped to manage maintenance activities, equipment outages and unforeseen disturbances. In the event of a transmission line fault or operational disruption, electricity can be rerouted through alternative pathways, reducing the risk of widespread supply interruptions and improving overall network reliability.

Engineering scope and technical challenges

The Southern MADANI Link encompasses a comprehensive range of engineering, electrical and civil works designed to strengthen Sabah's power infrastructure.

The project involves the construction of approximately 330 kilometres of new 275kV transmission lines, transmission towers, substations, switching stations and supporting telecommunications infrastructure. Modern grid technologies, including advanced protection systems, Supervisory Control and Data Acquisition (SCADA) systems and real-time monitoring solutions, will be

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deployed to enhance operational efficiency, network visibility and system reliability.

Delivering a transmission project of this scale presents significant engineering challenges. The transmission corridor traverses mountainous terrain, remote locations and environmentally sensitive areas, requiring extensive route optimisation studies, geotechnical investigations, slope stabilisation works, foundation engineering and access road construction.

To ensure long-term asset performance and operational reliability, detailed engineering assessments are undertaken throughout the planning and construction phases. Environmental protection measures, including erosion control, drainage management, slope protection and environmental monitoring programmes, are also incorporated to minimise impacts on surrounding communities and natural ecosystems.

Supporting economic growth and energy development

A reliable transmission network is fundamental to economic development and investment attraction. The Southern MADANI Link will support the growing electricity requirements of strategic development corridors and industrial clusters across Sabah, including the Sipitang Oil and Gas Industrial Park (SOGIP) and emerging industrial areas in the Interior and East Coast regions.

The strengthened transmission network will facilitate more efficient transfer of electricity from major generation sources to demand centres, improving overall system efficiency and optimising the utilisation of available generation resources across Sabah.

The project also complements the Sabah-Sarawak Interconnection through Mengalong, Sipitang, strengthening regional power connectivity and providing greater operational flexibility for the Sabah grid.

Enabling Sabah's energy transition

Beyond improving reliability and energy security, the Southern MADANI Link will play a crucial role in supporting Sabah's long-term energy transition.

A stronger transmission backbone will provide greater flexibility for integrating future renewable energy projects, including hydroelectric, solar and other renewable energy resources identified under the Sabah Energy Roadmap and Master Plan 2040 (SEARAMP 2040). Enhanced transmission capacity will enable renewable energy generated in different parts of Sabah to be transmitted more efficiently to load centres across the State.

The project also positions Sabah to support future regional power connectivity initiatives, including broader Borneo Grid and ASEAN Power Grid aspirations, reinforcing the State's strategic role in the evolving regional energy landscape.

Building Sabah's future grid

More than a transmission infrastructure project, the Southern MADANI Link represents a long-term investment in Sabah's energy future. By strengthening grid resilience, enhancing energy security, improving transmission reliability and supporting renewable energy integration, the project will provide the foundation for a stronger, smarter and more sustainable electricity network.

As Sabah continues its development journey, the Southern MADANI Link will serve as a critical component of the State's future transmission architecture, enabling economic growth, empowering communities and ensuring a reliable supply of electricity for generations to come.

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