Technical Visit to TNB Prai Power Plant

By

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The Electronic Engineering Technical Division (eETD) of IEM organised a highly insightful technical visit to the TNB Prai Power Plant in Penang. The visit was attended by 30 participants comprising engineering professionals, young engineers, and consultants. It provided a rare opportunity to observe and understand the real-world application of advanced power-generation technologies employed by Tenaga Nasional Berhad (TNB).

TNB Prai Power Plant is a critical facility in Malaysia's national power infrastructure. Strategically located near major industrial hubs in Penang, the plant plays a key role in supplying reliable electricity to both industrial and residential users. It utilises state-of-the-art combined-cycle gas turbine (CCGT) technology, enabling high thermal efficiency and low emissions—aligned with TNB's vision for sustainable energy generation and operational excellence.

The history of the Prai power station dates back to the 1970s, when Prai Stages 1, 2, and 3 were commissioned with a total capacity of 450 MW to meet growing energy demand in northern Malaysia. Over the years, the facility underwent several upgrades, culminating in the commissioning of a modern CCGT plant in 2014 with a total capacity of 1,071 MW. The upgrade significantly boosted energy output and reduced environmental impact. Today, the plant is recognised as one of the most advanced and efficient gas-fired facilities in the region.

On-site briefing on safety and security protocols.

Upon arrival, participants were greeted by TNB's security officers, who provided a comprehensive safety and security briefing to ensure a smooth and secure visit. The session commenced with a warm welcome from TNB Prai's Managing Director, Mr. Rosli Ashaari, who expressed appreciation for IEM's continued engagement with the energy sector. This was followed by an in-depth technical presentation by Ts. Mohd Najib, Head of Operations, who provided an overview of the plant's operational structure. He explained the end-to-end fuel-to-electricity conversion process and how the facility integrates with Malaysia's national grid.

Key aspects included the interconnection facilities, the 275 kV grid system, the PETRONAS gas-supply pipeline, and the PBA raw-water pipeline essential for plant operations. A particularly engaging part of the session was Ts. Najib's explanation of the various gas-supply sources across Peninsular Malaysia and how TNB ensures grid reliability through stable generation. He also highlighted TNB's long-term growth roadmap (2025–2035), including technological upgrades and sustainability initiatives.

The second part of the presentation was delivered by Mr. Isman Kamaruddin, who focused on the plant's electrical protection systems. He provided a detailed overview of key equipment, including the Generator Circuit Breaker (GCB), Isolated Phase Busduct (IPB), Gas-Insulated Switchgear (GIS), and other critical components. His presentation offered valuable insights into the systems and operational requirements necessary to maintain electrical safety and ensure continuous, reliable operation in high-voltage environments.

Welcoming remarks by the Managing Director, TNB Prai Power Plant.


Technical presentation by TNB Prai Power Plant.

For the site tour, participants were divided into two groups to ensure better engagement and safety. One group toured the main plant area, observing critical infrastructure and appreciating the mechanical and thermal engineering aspects of modern gas-turbine power generation. The second group visited the central control room (CCR), where engineers demonstrated real-time monitoring systems. Participants viewed live data feeds and learned how electrical loads and gas-turbine performance are continuously managed using automated control platforms. The groups then rotated to ensure that all participants experienced both sections of the plant.

Participants during the power-plant tour.

The visit concluded with the presentation of a token of appreciation, in the form of a commemorative plaque, to TNB, followed by a group photograph with all participants and TNB representatives. The programme offered not only technical knowledge but also the opportunity to engage directly with industry professionals.

Token of appreciation from IEM to the TNB Prai Power Plant representative.

The visit to TNB Prai Power Plant was highly beneficial, offering an in-depth understanding of modern CCGT operations, national-grid integration, and digital utility management. The exposure gained will no doubt contribute to the professional development of all attendees and foster greater appreciation of sustainable energy practices in Malaysia.

Group photograph of the participants.