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Potential for nuclear to fill coal power gap

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TNB may take active role if govt pushes development

ENERGY

PETALING JAYA: Tenaga Nasional Bhd (TNB) may take an active role in asset ownership if the government pushes through its nuclear power plant development, according to UOB Kay Hian (UOBKH) Research.

The research house said nuclear power plants require substantial upfront capital, but this is offset by a long operational lifespan of 60 to 80 years and stable fuel prices, resulting in one of the lowest levelised cost of energy, second only to solar.

The upfront capital for one gigawatt (GW) capacity is about US\$4bil to US\$10bil, or approximately RM16bil to RM40bil, at current exchange rates.

"The average payback period for nuclear power plants sits at around 25 years.

"In comparison, a 1GW combined-cycle gas turbine power plant costs US\$800mil to RM850mil, with a projected operational lifespan of 25 to 30 years," the research house said in a note.

UOBKH Research believes that nuclear energy is seen as a potential replacement as Malaysia phases out baseload coal-fired power plants.

The country is also navigating the energy trilemma of ensuring energy security, affordability, and sustainability.

"With Malaysia's mandate to phase out coal-fired power plants by 2050, nuclear energy is studied intently, given its consistent electricity output to deliver affordable baseload power.

"Its high capacity factor of over 90% (versus 75% for Malaysia's coal power plants and 25% for solar) will complement intermittent renewable sources such as solar.

"This will help the country achieve its 70% generation mix by 2050."

UOBKH Research also pointed out that Malaysia is likely to consider conventional nuclear plants as opposed to small modular reactors (SMRs).

Preference is skewed towards the conventional model, given maturity and proven nuclear technology, the research house said.

Conventional nuclear plants offer a well-documented history of safety, reliability, and baseload power generation, making them better suited for a country's first nuclear deployment.

"Against this backdrop, nuclear power offers a compelling solution to the energy trilemma through its baseload reliability, predictable and affordable fuel supply, and minimal carbon footprint."

UOB Kay Hian Research

Both conventional nuclear power plants and SMRs command an operational lifespan of 60 to 80 years.

This is reinforced by a low unplanned capability loss, with the global average at 4% over 2022 to 2024.

SMRs are considered the future of nuclear energy, given their affordability, shorter construction timelines, flexible capacity, scalability, as well as their wide range of applications.

However, most SMR concepts are still within advanced development stages with potential commercialisation within the next decade.

To date, there are only two in operation worldwide, located in Russia and China.

Currently, most Asean countries are in Phase 1 of nuclear infrastructure development, focusing on regulatory reforms, feasibility studies, environmental impact analysis and engagement of international technical partners.

Despite this progress, UOBKH Research said the majority maintains a "wait-and-see" stance, monitoring first movers to gain better clarity into deployment challenges such as climate risks and supply chain constraints.

Vietnam and the Philippines are viewed as regional frontrunners, expected to set precedents that could accelerate the adoption of nuclear energy among other Asean countries.

However, land-constrained nations such as Singapore may remain on the sidelines, waiting for SMR technologies to achieve greater technical and regulatory maturity before undertaking meaningful commitments.

"The recent Middle East conflict and closure of the Strait of Hormuz have exposed Malaysia to sharp fossil fuel price swings,

exerting pressure on the country," the research house said.

"Against this backdrop, nuclear power offers a compelling solution to the energy trilemma through its baseload reliability, predictable and affordable fuel supply, and minimal carbon footprint.

"In essence, nuclear power offers a natural hedge against carbon fuel price volatility, supported by the stability of global uranium supply," UOBKH Research added.

In another note, Kenanga Research said the recent spike in fuel costs due to the Middle East crisis is expected to be neutral for most players, given the established fuel-cost pass-through mechanisms for TNB and Malakoff Corp Bhd.

"A rising coal price may actually favour these generators as the moving average price used for reporting typically stays higher than the actual application coal cost during such periods.

"This timing difference results in a net gain, or a positive fuel margin, for the generation segment," the research house said.

Beyond nuclear energy, UOBKH Research expects the country's total solar photovoltaic capacity to exceed 6.5GW from 2026 to 2029, as the government calls for Large Scale Solar 6 tenders and the Corporate Renewable Energy Supply Scheme projects take off.

Assuming a construction cost of RM2mil to RM3.5mil per megawatt, total engineering, procurement, construction, and commissioning replenishment opportunities are estimated at a staggering RM13bil to RM23bil in the next five years.

"Additionally, potential opportunities for up to 8GW of brownfield and greenfield gas-fired power plants, as part of the government's decarbonisation plan, are a boon for the sector."