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## 'REFORMASI' TO UNLOCK MALAYSIA'S RENEWABLE ENERGY POTENTIAL?

The Edge, Malaysia



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# 'REFORMASI' TO UNLOCK MALAYSIA'S RENEWABLE ENERGY POTENTIAL?

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**A** **S MALAYSIA WORKS** to achieve carbon neutrality by 2050, attention is often directed towards the technical solutions and investments needed to achieve this goal. However, the energy transition also critically depends on governance: the policies, market structures and regulatory frameworks that can facilitate investment in renewable energy.

During the last couple of years, we have seen encouraging incremental reforms in the sector, such as third-party access to the grid. However, especially in light of the expected increase in energy demand coming from new data centres, decarbonising Malaysia's power system may require deeper reforms.

Malaysia's electric power system is currently managed by centralised, government-owned and vertically integrated energy monopolies: Tenaga Nasional Bhd, Sarawak Energy Bhd and Sabah Electricity Sdn Bhd. These organisations largely control the production, transmission and distribution of electricity in the country. Because the energy transition involves, to a great extent, increased electrification, the structure of electricity markets is of increasing importance.

By and large, the energy monopolies have served Malaysia well, supplying reliable and affordable energy to a rapidly expanding and industrialising economy since the 1970s. In Malaysia and elsewhere, the centralised structure of the energy system has historically been driven by technology and capital requirements.

Legacy power systems operate without energy storage and with passive customers, who cannot adjust their demand. To avoid interruptions, energy demand needs to be matched with supply instantaneously and continuously,

and this requires energy systems to have excess capacity (reserve margin).

Due to the cost of maintaining excess capacity and the necessary transmission infrastructure, market-based competition is not economically viable, thus giving rise to a natural monopoly. These techno-economic circumstances have led to the creation of vertically integrated and government-owned energy companies with fixed energy prices set by regulators.

### Market mechanisms for a dynamic, decentralised energy system

However, what served Malaysia well in the 1970s and 1980s may not serve it as well in the 2020s.

With the growth of decentralised energy generation, cost-effective energy storage, smart meters and the Internet of Things, vertically integrated state-owned monopolies may no longer be needed. In fact, they may be a hindrance to embracing emerging new energy technologies.

From the perspective of renewable energy, Malaysia has been falling behind since the 2000s. Following the 1997/98 Asian financial crisis, the country embarked on a policy of encouraging private-sector investment in coal-fired electricity generation. From 2000 to 2010, the share of renewable energy generation declined from 12% to 6%. As of 2022, renewable energy generation in Malaysia has increased again, to around 18%.

However, Malaysia lags most of its regional peers, including Thailand (20%), Indonesia (20%), China (30%) and Vietnam (52%). Malaysia aims to reach Vietnam's current renewable energy share by 2050, a quarter century from now.

Renewable energy generation is also heavily concentrated in Sabah and Sarawak. In Peninsular Malaysia, only 8% of energy is generated from renewable sources.

There are three key challenges to increasing renewable energy generation: matching the intermittency of supply with varying demand, accommodating both decentralised energy production and consumption, and ensuring the affordability and reliability of the energy system. A recent study suggests that these challenges can be more effectively addressed via a market-based energy system.

The most efficient way to manage variations in supply and demand is through price signals. When energy is abundant, low prices



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can encourage households and businesses to increase consumption or store energy. Smart systems can be used to heat water, cool spaces, run appliances and charge batteries when energy is cheap and abundant.

Price flexibility can also incentivise investors to install energy storage solutions. In Peninsular Malaysia, the system marginal price of electricity can double between daytime (peak supply) and night time (peak demand), meaning that in theory, one can buy electricity at around 17 sen per kWh during the day, store it, and then sell it back to the grid at night for 34 sen, a 100% difference.

A more open system would allow third-party providers to buy, store and sell energy on the grid in Malaysia. In some cities in the US, such as New York, electric school buses are doubling as mini power stations, storing energy when parked and selling back to the grid when needed.

As renewable energy generation expands, the gap between peak demand and peak supply will increase further. While an energy system

Visitors take a selfie while visiting the Ban Siew Keng Temple in Jenjarom, Selangor, outside Kuala Lumpur, Malaysia. Hari Anggara via Reuters Connect

with fixed prices can struggle to accommodate such shifts, dynamic pricing can create opportunities for new and agile market participants.

The decentralised production of energy, together with the presence of fixed-price feed-in tariffs, can also present problems for grid operators because they are required to purchase electricity during periods of high supply. Dynamic pricing, which includes a price for grid capacity, can provide decentralised producers, such as households, with a price signal that can influence their decision to store, use or sell excess electricity to the grid. Market forces can drive decisions to invest in grid capacity or storage, leading to overall efficiency gains.

Although Malaysia's energy costs are low by international standards, they contain large hidden costs. The government has provided large subsidies for fossil fuels, accounting for up to 4% of GDP and 20% of government expenditure, dwarfing public investment in renewable energy. By comparison, Germany and Italy each spend about 1% of GDP subsidising renewable energy.



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In addition to direct subsidies, Malaysia has not yet imposed any carbon pricing on the emissions from coal and natural gas power plants. Even a low carbon price would significantly raise the cost of energy generation using these fuels. If subsidies and the hidden emission costs of fossil fuels are taken into account, then renewable energy is more cost effective compared to fossil fuels. A market-based energy system would favour a shift towards cheaper renewable energy.

### Special energy zones as a regulatory testbed

Regulating a market-based energy system is not easy. Badly designed regulations can lead to underinvestment, declining reliability and higher costs for consumers. We only need to look at historical examples in California or, more recently, Texas to understand the consequences of inadequate energy market regulation. Yet just as Malaysia learnt from the Asian financial crisis, it can learn to regulate a dynamic energy market.

To develop regulatory capacity, to encourage innovation and to allow the public and private sectors to gain experience, Malaysia could set up Special Energy Zones (SEZs) as regulatory testbeds. Islands like Langkawi or Labuan, or other more isolated regions in the country, could be designated as SEZs.

SEZs would rapidly transition towards a market-based energy system, creating a laboratory for new regulations, technologies and decentralised energy production. The goal of these SEZs would be to achieve net zero emissions within a five- to 10-year time frame and act as pioneers for the rest of Malaysia. Having several SEZs operating simultaneously can allow experimentation and a degree of competition, spurring further innovation between SEZs.

In the short term, public funding can be provided to SEZs to support their accelerated energy transition. However, in the long run, this funding could be far less than the current subsidies for fossil fuels.

### Governance key to unlocking renewable energy potential

While the move towards a market-based energy system may seem drastic, significant regulatory reforms may be necessary for Malaysia to achieve its net zero emission goals.

The National Energy Transition Roadmap, which is positioned as a key policy document

to help Malaysia achieve its emission reduction goals, envisions a 32% cut in greenhouse gas emissions from the energy sector by 2050. However, based on the country's reports submitted to the United Nations Framework Convention on Climate Change, a reduction of at least 50% appears to be needed.

Malaysia's centralised energy system may also be influencing decision-making on the speed of renewable energy investment and the choice of renewable energy technologies.

Owners of coal power plants have an incentive to extend the plant's lifespan in order to maximise their return on investment. While this position is understandable, it may also slow down investments in renewable energy.

A second concern is that incumbent energy producers may wish to preserve their market share by favouring large-scale and centralised low-carbon energy technologies that reinforce their monopoly position. This may drive a preference for nuclear energy or large-scale hydropower over decentralised technologies like solar photovoltaics.

If Malaysia is to realise its renewable energy ambitions and become an "Asean hub", it may need to make significant changes to the governance of its energy system. Allowing a more market-based approach with dynamic pricing and multi-party access to the grid could provide it with the flexibility needed to increase its renewable energy uptake while supporting innovation and mobilising private investment. ●



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