

# Challenges to adopting renewable energy

Southeast Asia too invested in fossil fuels  
to undergo quick green transition

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June and July 2023 were the Earth's hottest months on record and the unprecedented extreme weather has focused the attention of all countries on the perils of climate change.

The Indian University Grants Commission issued guidelines to all universities that all students must study subjects, such as environmental education and climate change, to graduate, starting from the 2023–24 academic year.

Southeast Asia and the Indian sub-continent were identified in many climate studies as two of the most vulnerable regions. It is likely that the Asean public will look at the climate challenges seriously.

Everyone associates climate change with carbon emissions and Asean's call to limit fossil fuel use is gaining momentum. The member states have committed to zero emissions by the latest 2060s.

There is a saying in the electric power industry that "decarbonisation is electrification". Looking at the renewable energy-based electrification drive, it is important to understand the challenges for Asean.

It goes without saying that renewable is a synonym for sustainable, so focusing on renewable energy-based electrification is also good for the regional economy in the long run.

### Renewables' cost advantage

Fossil fuels are used in three major applications: power generation, transportation and home heating. Renewables, such as solar, wind and hydro, are increasingly replacing natural gas and



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coal-based power generation.

A notable achievement of modern science is that the use of renewables in power generation is more efficient and cheaper today.

The best measurement of electricity generation cost is the levelised cost of energy (LCOE). It measures the average net present cost of electricity generation for a plant over its lifetime.

The LCOE generated by renewables has declined significantly in the past decade, most notably for solar panel-based photovoltaics. One can select good sites to produce electricity using solar and wind at US\$50/MW or lower today, much cheaper than fossil fuel-based power plants.

Economics also dictates an aggressive transition to a renewable energy-driven power system. When we look at Asean member states' renewable adoption road map, solar and wind are prominent.

Electrification means replacing technologies or processes that use fossil fuels, like internal combustion engines (ICE) and gas boilers, with electrically powered equivalents, such as electric vehicles or heat pumps.

An electric vehicle (EV) is much more efficient than ICE vehicles, with the former using more than 80% of the electric energy delivered to its battery compared with the latter using only 30% of the chemical energy stored in the fuel. Similarly, using a heat pump is cheaper than boilers.

However, two main barriers could slow down renewable adoption in the region. First is the reconfiguration of the electric grid and second, how to tackle the system transition cost from stranded assets, such as coal plants.

The first challenge is electric grid reconfiguration. Solar and wind-generated power is intermittent, subject to daytime irradiance and weather. They are distributed energy resources (DER) whose capacity factor is low compared to fossil-fuel plants that can deliver power any time in response to demand fluctuations.

### Adoption barriers

To incorporate solar and wind into the grid needs supporting technologies to modify the grid, such as long-distance high-voltage direct current and alternate current transmission to send the power to faraway consumption centres or new energy storage systems (ESS) to store power for use during nighttime or period with little wind. And for EVs to



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be widely adopted, the grid must be reconfigured to install industrial-grade charging poles.

The grid reconfiguration calls for more investments in transmission and distribution, a departure from the traditional investment model of focusing investment on the generating end.

International Energy Agency (IEA) data show that grid and storage investment in renewable solar and wind installation in pioneering renewable-adopting countries can be close to the generating sides. However, the current power-pricing structure in Asean has not adapted to the shifting paradigm. The price incentive for higher smart-grid transmission investment is still missing.

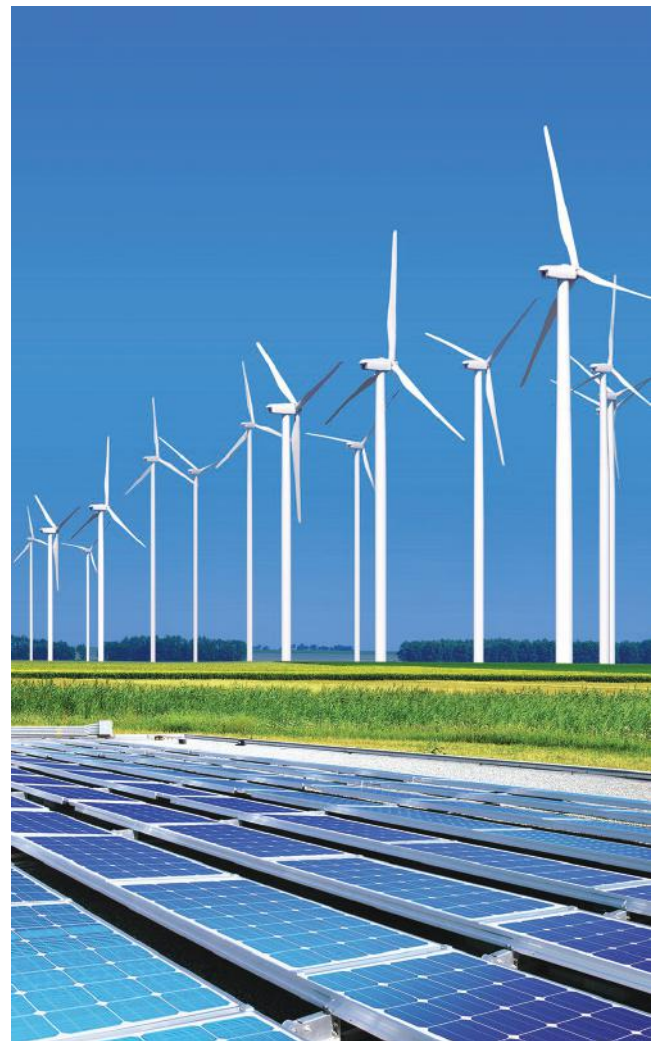
The second key barrier is stranded assets. Some member states built many coal plants in the mid-2000s to mid-2010s after the 1998 Asian financial crisis to accelerate their electrification process.

These plants have operation life as high as 40–50 years, and their premature retirement could affect the finances of many operators, particularly if there are existing “take or pay” power-purchase agreements between the government and plant operators.

The Just Energy Transition Partnership (JETP) between Indonesia and donor countries is being watched closely to decide whether such a retirement scheme for coal-fired power plant works.

Behind the speedy renewable adoption challenges is the skill capacity of staff handling the transition. The ongoing revolution in power generation from centralised power plants to distributed power sources, passive transmission and distribution systems to smart grid calls for a new knowledge set.

Strengthening member states’ coordination and skill-sharing with partner countries could help them adopt the latest technology in their energy transformation.



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