



# ASEAN Operational Insight Report

EICAssetMap Report

October • 2022

## Executive summary

The Association of South-East Asian Nations (ASEAN) is a regional organisation promoting greater cooperation between countries in South-East Asia across several policy areas. Since its creation in August 1967, ASEAN has expanded its membership and overseen the strategic integration of its member states. Today it consists of ten countries, including: Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. Collectively, these countries are on track to become the fourth largest economy by 2030, with a rapidly growing population of around 650 million people and one of the largest middle classes in the world. To support its economic



growth, the region's demand for power has increased considerably over the past 20 years and will continue to rise. ASEAN countries have primarily turned to hydroelectric and conventional power plants to meet this demand, both of which now dominate the region's energy mix. However, the market forces that have been driving the energy transition in Western countries have now spread to South-East Asia, kick-starting a shift away from fossil fuels to renewable sources of energy. Considerable progress has been made in the development of renewable energy projects, with all ASEAN countries pledging to increase their installed capacities of renewable energy and reduce their greenhouse gas (GHG) emissions. However, the growth of non-hydroelectric renewable energy is still highly uneven amongst ASEAN countries, with the ASEAN five majors



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(ASEAN 5), including Vietnam, Thailand, the Philippines, Malaysia and Indonesia, accounting for most of the non-hydroelectric renewable capacity installed in South-East Asia to date.

With the price of fossil fuels forecasted to remain high and the costs associated with developing renewables projects declining, ASEAN countries have an opportunity increase their installed capacity of renewable energy and reduce their dependence on conventional power. In 2015, the ASEAN Economic Community (AEC) was established to create a competitive and singular market in South-East Asia, including the necessary opportunities to meet the growing demand for energy in the region. The ASEAN Plan of Action for Energy Cooperation (APAEC) Phase II: 2021-2025, which re-enforced APAEC Phase I: 2016-2020, includes new initiatives designed to progress South-East Asia's energy transition, build energy resilience amongst ASEAN countries, and enhance energy security. As part of APAEC Phase II, ASEAN governments set a target to make renewable energy 23% of its total primary energy supply and 35% of its installed power capacity by 2025. At the 39th ASEAN Ministers on Energy Meeting (AMEM) on 15th September 2021, ASEAN member states agreed to recognise the scale of the investment, cooperation, and support required to collectively deploy renewable energy and new technologies across South-East Asia

This report provides an overview of the ASEAN region's energy mix, including its installed

capacity of renewable energy, as well as the extent to which its renewables sector is expected to grow in coming years. Next, we will look at the deployment of new technologies in South-East Asia across energy storage, hydrogen, and carbon capture, including the role these sectors will play in ASEAN's energy transition. This will be followed by an update on ASEAN's installed capacity of conventional power, as coal and gas-fired power plants continue to be a leading source of energy in the region. We will finish with an overview of South-East Asia's upstream sector amid the growing demand for oil, gas, coal, and LNG inside and outside ASEAN countries, driven by the ongoing discrepancy between the supply and demand of fossil fuels. Please note that the data compiled in this report has been taken from EICDataStream and EICAssetMap, the EIC's leading project tracking databases. For further information on the production capacity thresholds of the projects we monitor, please view the help section in EICDataStream by clicking [here](#).

To achieve carbon neutrality and reduce their dependence on fossil-fuels, ASEAN member states have set their own renewable energy targets. In February 2021, the Vietnamese Government released its National Power Development Plan 2021-2030 (PDP8), stating that the country plans to source 30% of its energy from renewable sources by 2036 and have 50GW of renewable energy installed by 2030. Indonesia's Government has announced that it is aiming to increase its total share of renewable



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energy in the country's energy mix from 9% in 2020 to 23% by 2025 and 31% by 2050. As part of Thailand's 10-year Alternative Development Plan (AEDP), the country aims to generate 33% of its total power production through renewable sources by 2037. Malaysia plans to increase its renewable energy infrastructure as a share of its total energy mix from 2% in 2019 to 20% by 2025. The Philippines has set a target of more than 34GW of installed renewable energy by 2040, as well as an increase in the share of the country's renewables from 29% in 2019 to at least 35% by 2030 and more than 50% by 2040, as part of its National Renewable Energy Plan 2020-2040. Myanmar's government has announced it will develop its renewable energy infrastructure with a plan to source 12% of its electricity from renewable installations by 2025. Brunei has committed to having renewable energy account for 10% of the country's power generation mix by 2035. Cambodia has set a target of sourcing 10% of the country's power from renewable sources (excluding hydropower) by 2030. Laos plans to make renewable energy 30% of its total energy consumptions by 2025 (excluding large hydropower projects). Finally, Singapore is aiming for at least 2GW of solar power by 2030, as well as an energy storage deployment target of over 200MW by 2025.

Conventional power plants fuelled by coal, gas, and oil, are a leading source of energy in all South-East Asian countries. In total, South-East Asia sources around 80% of its energy from

conventional power, with 173GW installed across 371 operational assets. Of this 173GW, just over 50% is fuelled by coal and 46% is fuelled by natural gas. Over the past decade, cheap and abundant fossil fuels have resulted in a steady stream of power plants coming online to meet the region's growing demand for energy. Approximately 180 power plants have been connected to the grid over the past ten years with a combined capacity of 65.3GW, 91 of which have been coal-fired with a combined capacity of 41GW. While coal accounted for approximately 56% of ASEAN's installed capacity of conventional power in January 2018, it now only accounts for just over 50%. This decline in the growth of coal-fired plants has coincided in an increase in gas-fired power and renewable energy. However, most of the South-East Asia's installed capacity of renewable energy is made-up of hydroelectric power, spread across Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, and Vietnam. While climate change is still a key concern for the region, COVID-19 and the turbulence in oil and gas markets caused by Russia's invasion of Ukraine have jeopardised South-East Asia's energy security and economic growth. More investment is needed in ASEAN's other renewables sectors, such as wind and solar, to reduce its dependence on fossil fuels.

The development of large-scale hydropower projects has been a key focus for South-East Asian countries for decades, with the aim of meeting the growing demand for clean and affordable power. Hydropower currently accounts for more than 66% of ASEAN's installed renewable capacity, with every country in South-East Asia, other than Singapore, sourcing power from hydroelectric



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plants. However, hydropower will not be enough for the region to achieve carbon neutrality. As a result, ASEAN countries have invested huge sums in the developing wind and solar projects and begun working closely with region's that have established successful wind and solar markets, such as Europe and North America, as well as neighbouring countries like China, Japan, South Korea, and Taiwan. To date, onshore wind and solar power collectively make up almost a third of the region's renewable energy mix, with solar power accounting for more than 20% of ASEAN's installed renewable capacity and onshore wind accounting for just over 10%. While offshore wind still only makes up a very small percentage of the installed renewable capacity in South-East Asia, this is likely to change, as countries such as Vietnam and the Philippines seek to utilise their vast offshore wind potential. Biomass and Energy from Waste (EfW) have not experienced the same level of growth in ASEAN countries in recent years, primarily because the COVID-19 pandemic and unpredictable weather patterns have caused disruptions to local supply-chains. However, an abundance of bioenergy in Indonesia, Malaysia, Laos, and Cambodia, could lead to a rise in coal to biomass conversion projects in the region, as we have seen in other parts of the world.

Vietnam, Thailand, the Philippines, Malaysia, and Indonesia currently account for approximately 86% of South-East Asia's total installed renewable

energy. Up until the 2015 Paris Climate Accords, Southeast Asia's renewable energy industry focused mainly on hydropower. Laos still sources almost all its energy from hydroelectric plants, and exports around half of the power it produces to rest of South-East Asia. Vietnam, Indonesia, and Malaysia have an installed hydroelectric capacity of approximately 7GW, 5GW, and 6.6GW respectively. Whilst hydroelectric power still dominates the regions renewable energy mix, the rapidly declining costs of wind turbines and solar modules in the ASEAN region, due to advances in technology, energy efficiencies and supply chain integration, have contributed to the recent growth in onshore wind, offshore wind, and solar power capacity. What is clear is that Vietnam has emerged as a leader amongst ASEAN countries in the growth of renewable energy capacity, particularly onshore wind, offshore wind, and solar power. This is due to a range of measures, including ambitious renewables targets, generous feed-in tariffs, public support for clean energy, and a clear government framework, all of which have made Vietnam a supportive investment environment for companies in the renewables sector. As you can see from Figure 3, Brunei, Cambodia, Indonesia, Lao PDR, Myanmar, and Singapore are yet to see significant increases in their installed capacities of non-hydroelectric renewable energy. However, this is likely to change since all ASEAN countries have set targets to integrate non-hydroelectric renewable energy into their energy mix by 2030.



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