Clean Power Procurement in Southeast Asia

How to increase affordable clean power procurement options

Oct. 22, 2026



BloombergNEF

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Section 1. Executive summary

4.3 gigawatts

Cumulative volume of offsite corporate clean power purchase agreements in Southeast Asia as of October 2026

25.1 terawatt-hours

Electricity consumed by RE100 members in Southeast Asia in 2025

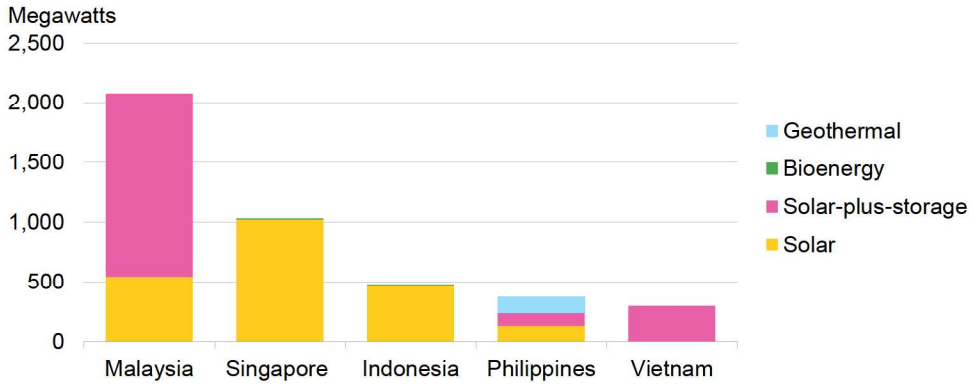
44%

Clean power's share of emissions abatement from 2026 to 2050 in Southeast Asia under BNEF's Net Zero Scenario, versus a "no transition" pathway

Electricity generation remains the largest source of emissions across Southeast Asia. The region has ample renewable resource potential, and in recent years renewable deployment has been accelerating in markets such as Malaysia, the Philippines and Vietnam. Increased corporate demand for clean power can support further renewable capacity addition, but regulatory barriers continue to constrain procurement. This report evaluates the current state of clean power procurement in Southeast Asia and outlines policy options to expand access to affordable clean power.

- Southeast Asia's power sector emissions grew by 64% in the decade leading to 2023, accounting for nearly a third of the region's total greenhouse gas production that year. Governments need to accelerate the shift from fossil fuels to renewable power if Southeast Asia is to reach net-zero emissions by 2050.
- Under BNEF's Paris Agreement-aligned Net Zero Scenario, Southeast Asia needs to invest $3.4 trillion in renewables, battery storage and power grids from 2026 to 2050 to fully decarbonize its power sector by mid-century. Allowing companies to sign clean power purchase agreements could unlock private capital to fund the transition. The shift could also reduce countries' reliance on imported fossil fuels and improve energy security.

Figure 1: Southeast Asia cumulative offsite corporate clean power purchase agreement capacity, by technology and market



Source: BloombergNEF. Note: Chart shows only offsite corporate power purchase agreements (PPAs) that are publicly disclosed or submitted directly to BNEF by market participants and meet a set of minimum requirements. Only PPAs with contract durations of more than one year are included. For PPAs with more than one offtaker or supplier, capacity is assumed to be equally split unless disclosed otherwise. Solar deal capacity is based on module capacity. Data as of Oct. 14, 2026. Data includes 475 megawatts of deals signed in Indonesia with the state utility PLN and 250 megawatts of projects in Vietnam that have started construction based on signed term sheets but have not yet finalized PPAs, according to public disclosures.

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- The world is going through its third major energy crisis in six years as the Iran war follows the disruption caused by the Covid-19 pandemic and Russia's invasion of Ukraine. The higher energy prices and supply disruption that followed have had negative impacts across Southeast Asia, where each country is heavily dependent on imports of at least one fossil fuel. This dependence on fossil fuel imports declines under BNEF's Net Zero Scenario as countries rely more on domestic renewable generation and electrify more of their energy use. Enabling corporate clean power procurement can support both parts of this transition by increasing investment in renewable supply and accelerating electrification of final energy use.
- The volume of corporate offsite clean power purchase agreements in Southeast Asia signed in 2026 reached 2.3 gigawatts, 5.6 times the 2025 volume. Recent regulatory reforms, particularly in Malaysia and Vietnam, have accelerated the growth of clean power procurement in the region. Data center growth is also creating a new source of demand. Southeast Asia had 3.2 gigawatts of live data center IT capacity as of June 2026, with 10 times that amount in the project pipeline. BNEF expects annual electricity consumption from data centers across Southeast Asia to reach 100 terawatt-hours by 2035, almost eight times the 2025 level.
- Corporate access to clean power varies widely across Southeast Asia. Businesses in Singapore, the Philippines and Malaysia enjoy a wide range of options, while those in Indonesia and Thailand are largely limited to using rooftop solar and buying renewable energy certificates.
- Regulators across Southeast Asia can consider five policy options to expand affordable clean power procurement options for corporations: 1. Open electricity markets and networks for different clean power procurement options. 2. Strengthen transparency and credibility of electricity sources and environmental attributes. 3. Incorporate "additionality" into the design of utility green tariffs and renewable energy certificate issuance. 4. Modernize grid regulations to reward efficient performance and support a greater share of renewable supply. 5. Develop interoperable cross-border electricity trade accounting and certification frameworks.
- This report has been commissioned by the Asia Clean Energy Coalition, with support from Tara Climate Foundation. All findings reflect BloombergNEF's independent analysis and views.

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Section 2. Introduction

Corporate clean power procurement can play a role in accelerating renewables deployment in Southeast Asia as markets pursue an orderly transition to net-zero emissions by mid-century, in line with the goals of the Paris Agreement. This report assesses corporate clean power procurement frameworks and current decarbonization plans in six markets: Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. It also analyzes power-sector decarbonization pathways for the five markets other than Singapore and identifies measures that could enable and expand corporate clean power procurement across the region.

2.1. Southeast Asia's energy and emissions landscape

Global greenhouse gas emissions have continued to rise, driven by increased unabated fossil fuel combustion for energy. Emissions across the six Southeast Asian markets covered in this report reached 2.9 billion metric tons of carbon dioxide equivalent in 2023, excluding emissions from the land use, land-use change and forestry sector (Figure 2). Indonesia remained Southeast Asia's largest emitter in 2023 with 39% of the regional total, down from 48% in 1990 (Figure 3). Meanwhile, Vietnam's share doubled to 17% over the same period.

Figure 2: Southeast Asia's greenhouse gas emissions, by source

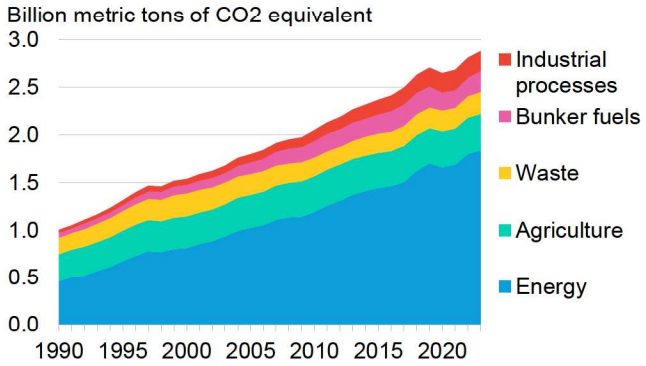
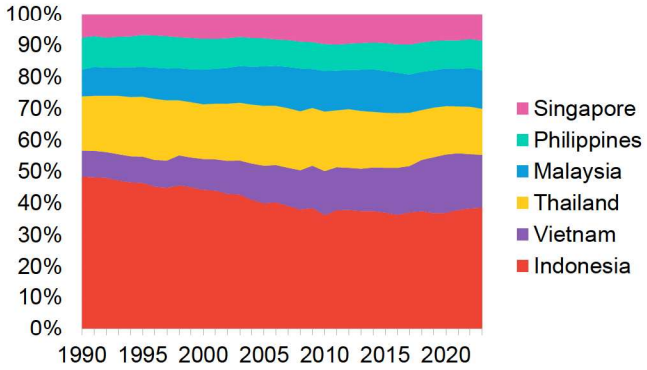


Figure 3: Share of greenhouse gas emissions in Southeast Asia, by country



Source: Climate Watch, BloombergNEF. Note: Charts include data for Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. Excludes land use, land-use change and forestry emissions.

Globally and in Southeast Asia, power and heat generation is the single largest source of emissions

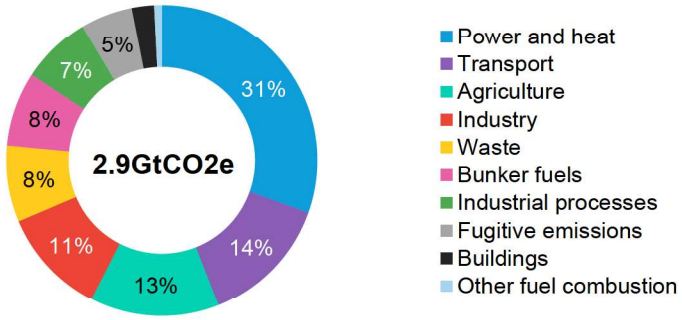
Globally and in Southeast Asia, power and heat generation is the single largest source of emissions (Figure 4). In this sector, Southeast Asia's share of global emissions has more than tripled to 5.2% in 2023 from 1.6% in 1990, reflecting the region's population growth, economic expansion and industrialization.

BloombergNEF's *New Energy Outlook* (NEO) shows renewables will be the most important lever for reducing emissions from fossil fuel combustion in a pathway aligned with the Paris Agreement goal of keeping the average rise in global surface temperature well below 2C by 2100 from pre-industrial levels. NEO's Paris Agreement-aligned Net Zero Scenario (NZS) shows that renewables directly account for 44% of emissions avoided from 2026 to 2050, compared with a no-transition scenario, in which there is no further action on decarbonization (Figure 5).

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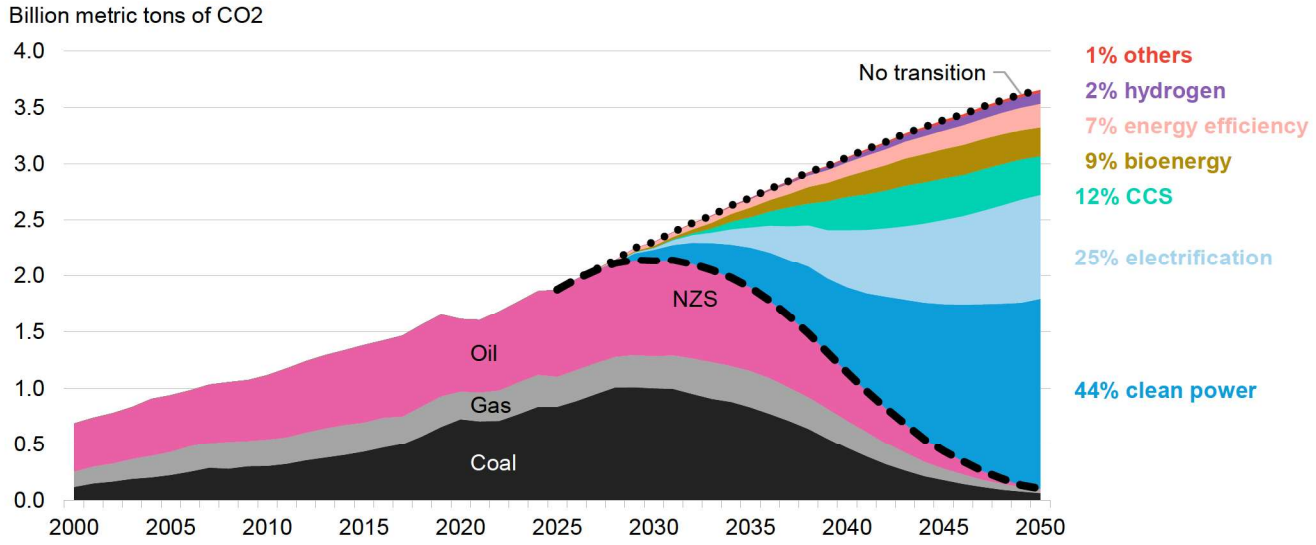
Figure 4: Greenhouse gas emissions in Southeast Asia, by source, 2023



Source: Climate Watch, BloombergNEF. Note: Chart includes data for Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. Excludes land use, land-use change and forestry emissions. GtCO2e is billion metric tons of carbon dioxide equivalent.

Electrification of end-use sectors, including road transport, buildings and industry, accounts for another 25% (Figure 5). Greater energy efficiency and clean hydrogen account for an additional 9% of emissions abatement. Renewables, both directly and indirectly, would enable nearly 80% of emissions abatement needed by 2050. For more information on the NEO modeling methodology, see Appendix A.

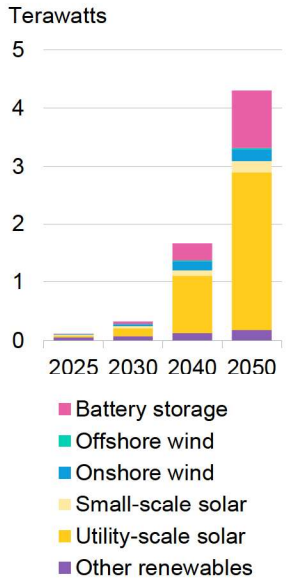
Figure 5: Carbon dioxide emissions reductions from fuel combustion in Southeast Asia – historical and Net Zero Scenario (NZS) versus "no transition" scenario



Source: BloombergNEF New Energy Outlook 2026. Note: Chart includes data for Indonesia, Malaysia, the Philippines, Thailand and Vietnam. The "no transition" scenario is a hypothetical counterfactual that assumes no further progress in decarbonization and energy efficiency. Clean technology build for power is capped at historical limits, with costs fixed at 2026 levels; the fuel mix in buildings and transport remains unchanged from 2026; and the uptake of recycling and alternative primary production processes in industry is limited. "Clean power" includes renewables and nuclear, but excludes carbon capture and storage (CCS), hydrogen and bioenergy, which are accounted for separately. "Energy efficiency" covers demand-side efficiency improvements and reductions in demand. "Others" include recycling, demand reduction and fuel switching.

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Figure 6: Installed renewables capacity in Southeast Asia – Net Zero Scenario

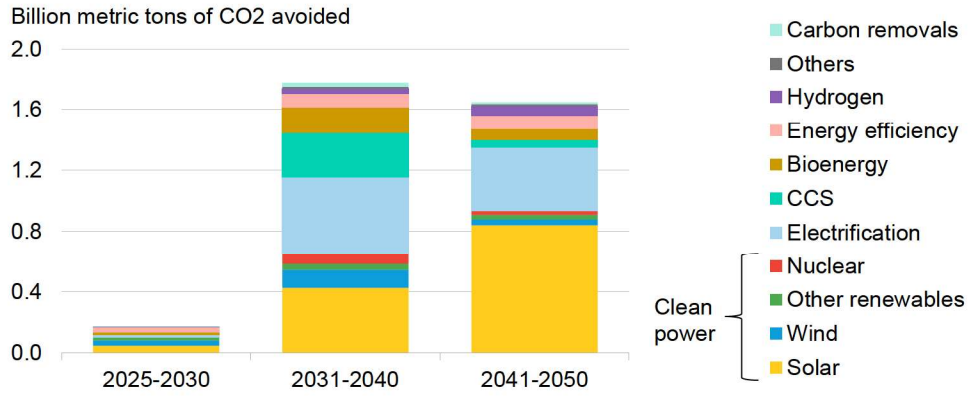


Source: BloombergNEF New Energy Outlook 2026. Note: Chart includes data for Indonesia, Malaysia, the Philippines, Thailand and Vietnam. "Other renewables" include bioenergy, hydro and geothermal.

Southeast Asia needs to pave the way for aggressive decarbonization in the 2030s

Under the NZS, Southeast Asia's emissions growth stops before the end of this decade. Thereafter, the region must significantly accelerate emissions abatement to reach net zero by 2050 (Figure 7). Southeast Asian governments need to put in place the regulations and market mechanisms required to enable accelerated investment in energy transition technologies.

Figure 7: Southeast Asia's net carbon dioxide emissions reductions by period and measure/technology – Net Zero Scenario versus "no transition" scenario



Source: BloombergNEF New Energy Outlook 2026. Note: Chart includes data for Indonesia, Malaysia, the Philippines, Thailand and Vietnam. The "no transition" scenario is a hypothetical counterfactual that assumes no further improvement in decarbonization and energy efficiency. Clean technology build for power is capped at historical limits, with costs fixed at 2026 levels; the fuel mix in buildings and transport remains unchanged from 2026; and the uptake of recycling and alternative primary production processes in industry is limited. Chart shows the net, not cumulative, contribution of each technology to abatement by time period. Time period lengths differ. CCS is carbon capture and storage. "Other renewables" include hydro and geothermal. "Energy efficiency" covers demand-side efficiency improvements and reductions in demand. "Others" include recycling, demand reduction and fuel switching.

2.2. The role of renewables in climate change mitigation

Under the NZS, Southeast Asia's cumulative solar, wind and battery storage capacity triples from 2025 to 2030 and then grows fivefold from 2030 to 2040 (Figure 6). Meanwhile, unabated fossil fuel generation peaks in 2031 and falls 39% from 2025 levels by 2040. By 2050, unabated fossil fuel generation is almost entirely phased out. The power system shifts from relying on unabated baseload fossil-fueled thermal power plants to one dominated by renewables under the NZS (Figure 8).

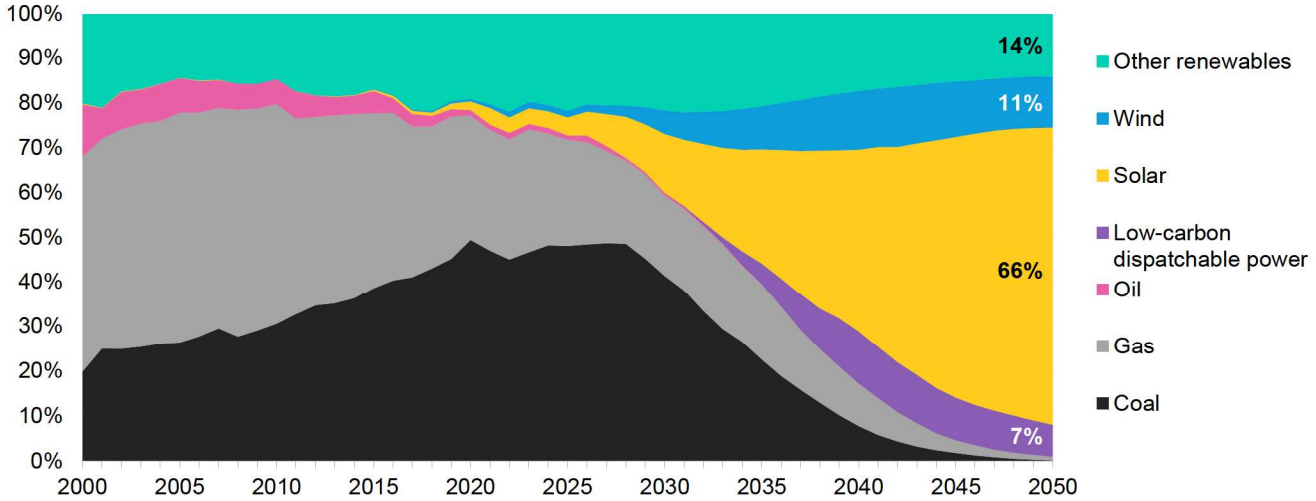
Under the Net Zero Scenario, solar and wind provide more than three-quarters of Southeast Asia's electricity supply in 2050

Solar and wind alone provide more than three-quarters of Southeast Asia's electricity supply in 2050. Their dominance is driven by economic competitiveness and scalability. Since 2017, the global levelized cost of electricity generation benchmarks for new solar and onshore wind power plants have been lower than those for new thermal power plants. Battery-based energy storage systems have also become economically viable as lithium-ion battery costs have fallen. Under the NZS, renewables, including solar, wind, hydro, biomass and geothermal, supply 92% of Southeast Asia's electricity in 2050 (Figure 8).

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Figure 8: Share of annual electricity generation in Southeast Asia, by technology/fuel – Net Zero Scenario

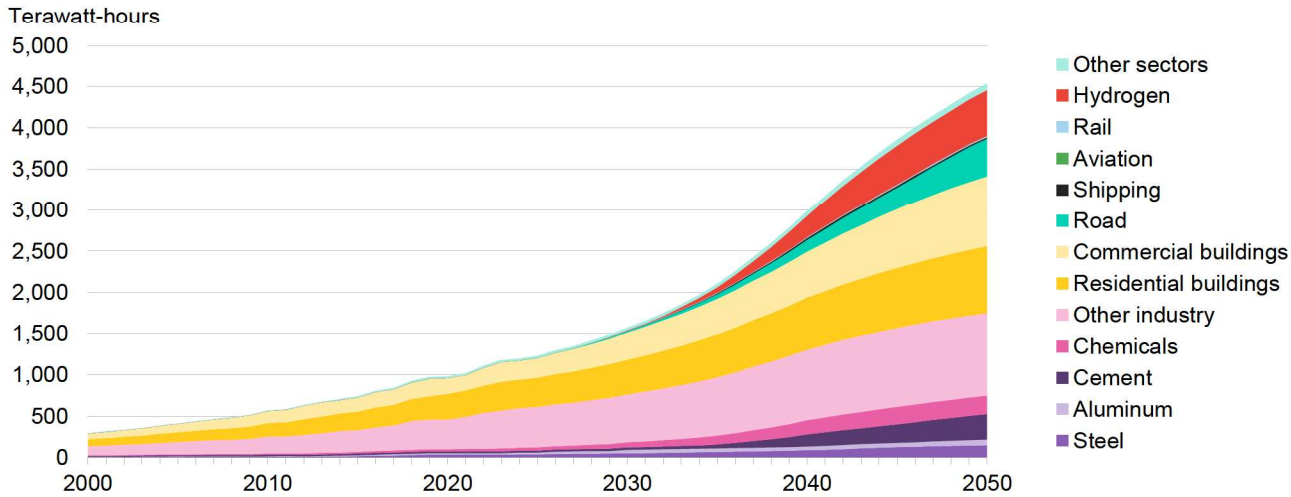


Source: BloombergNEF New Energy Outlook 2026. Note: Chart includes data for Indonesia, Malaysia, the Philippines, Thailand and Vietnam. "Other renewables" include bioenergy, hydro and geothermal. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives.

Under Paris Agreement-aligned Net Zero Scenario, companies drive electricity demand growth

Power demand in the NZS grows to 4,530 terawatt-hours (TWh) in 2050 from 1,230TWh in 2025 (Figure 9). Industry and buildings are the two largest consumers of electricity in 2050, accounting for 39% and 37% of total demand, respectively. Most industrial demand growth comes from sectors with low heat needs, such as food processing, machinery, and pulp and paper, but the cement, chemicals and steel industries also see an increase as their electrification accelerates.

Figure 9: Southeast Asia's annual electricity consumption, by sector – Net Zero Scenario



Source: BloombergNEF New Energy Outlook 2026. Note: Chart includes data for Indonesia, Malaysia, the Philippines, Thailand and Vietnam. Data excludes energy industry own use but includes electricity used for green hydrogen production.

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The largest source of new demand for electricity is commercial buildings, including data centers (see Section 3.3 for a more detailed discussion on data center power demand). It is followed by electrolyzers used to produce clean hydrogen. Even though hydrogen contributes just 2% toward emissions abatement over 2025-2050, its production accounts for about 550TWh, or 12%, of electricity demand in 2050.

Commercial and industrial activity will be a major driver of future electricity demand growth

The majority of electricity demand growth under the NZS will come from commercial and industrial activities. Enabling corporate clean power procurement will therefore be critical to funding the power capacity and grid expansion needed in the NZS.

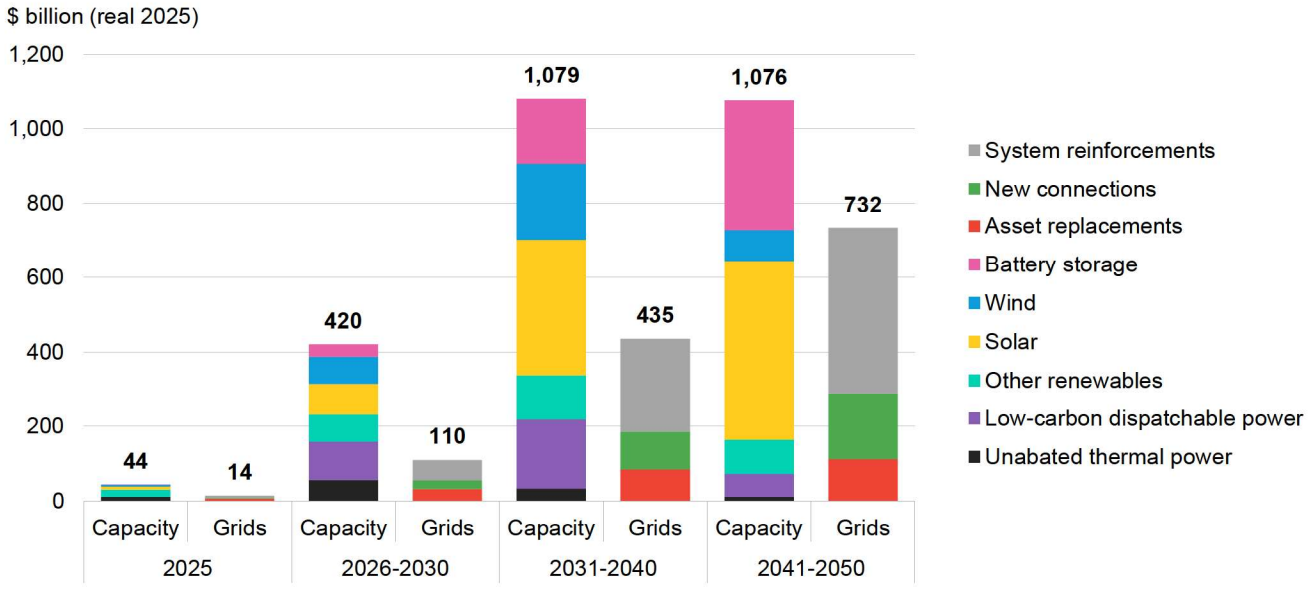
Annual power capacity investment needs to double through 2030 for net zero

Under BNEF's NZS, Southeast Asia's annual investment in electricity generation needs to increase from $44 billion in 2025 to an average of $84 billion each year from 2026 to 2030 (Figure 10). Renewables – which include biomass, hydro, geothermal, solar and wind technologies – account for the largest share of power sector investment over this period, at $230 billion, with solar and wind collectively making up 68% of this total. Under the NZS, Southeast Asia needs $1.6 trillion of investment in renewables and $560 billion in battery storage from 2026 to 2050.

Power network investment needs to rise sharply through 2030

Achieving net-zero emissions by 2050 calls for $1.3 trillion in power grid investment to support the build-out of renewables and energy storage in Southeast Asia. Corporate clean energy procurement will be a critical source of funding to meet the increased power capacity and grids investment required under the NZS.

Figure 10: Southeast Asia's investment in power capacity and grids, by period – Net Zero Scenario



Source: BloombergNEF New Energy Outlook 2026. Note: Chart includes data for Indonesia, Malaysia, the Philippines, Thailand and Vietnam. Data shows cumulative investment for the given time periods. "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives.

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2.3. Transitioning to renewables strengthens energy security

The world is going through its third major energy crisis in six years as the Iran war follows the disruption caused by the Covid-19 pandemic and Russia's invasion of Ukraine. The higher energy prices and supply disruption that followed have heightened concerns about energy security and risks related to commodity super-cycles. These concerns are particularly salient in Southeast Asia, where each of the six markets covered in this report depends heavily on imports of at least one fossil fuel.

Corporate clean power procurement can strengthen Southeast Asia's energy security by accelerating the deployment of renewable electricity projects

Corporate clean power procurement can strengthen Southeast Asian countries' energy security by accelerating the deployment of renewable electricity projects and thus reducing the need for fossil fuel imports. This is particularly relevant for the Philippines, Thailand and Vietnam, which rely heavily on imports of thermal coal and gas for power generation. Malaysia and Indonesia may also become net gas importers in the coming decades, unless domestic consumption growth slows or production decline is reversed.

BNEF assesses the implications of its scenarios for energy import dependence by starting with historical trade flows of energy commodities, measured in dollar terms. Imports are scaled forward based on modeled in-country demand for energy-related products and services under each scenario, while exports are scaled based on changes in global demand.

This approach is static and assumes that current trade balances and relative competitive positions remain unchanged. While this limits the ability to capture structural shifts in trade, it still provides a directional view of how countries' energy dependence could evolve under different transition pathways.

The Philippines, Thailand and Vietnam have the most to gain from a transition to clean energy in terms of trade balances and energy security

Southeast Asian countries' dependence on oil, coal, gas and energy product imports declines over the long term under BNEF's Net Zero Scenario. This reflects the structural nature of today's system, where reliance on fossil fuel imports is widespread. Economies with limited fossil fuel exports and high import liabilities, namely the Philippines (Figure 11 and Figure 12), Thailand (Figure 13 and Figure 14) and Vietnam (Figure 15 and Figure 16), have the most to gain from a transition to clean energy in terms of both trade balances and energy security.

The Philippines is among the Southeast Asian countries most affected by fossil fuel shortages resulting from the Iran war. The country imported a total of $20.1 billion of fossil fuels in 2024. BNEF's NZS shows a significant decline in Philippine imports of coal, oil and natural gas over the next 25 years, reflecting a structural shift in the technologies powering the economy, particularly in power generation and road transport. Under this scenario, faster uptake of clean fuels and electrified technologies reduces the cost of fossil-fuel imports by 18% by 2035 and 71% by 2050 compared with the 2024 baseline.

Offshore gas discoveries in the Gulf of Thailand during the 1970s led to the country's electricity supply becoming heavily dependent on gas power generation from the mid-1980s. Thailand's gas consumption exceeded its domestic production by 1998, leading to the country becoming a net importer, initially through pipelines from neighboring Myanmar, and later through liquefied natural gas (LNG) imports from 2011. BNEF's NZS shows Thailand can significantly reduce its reliance on fossil fuel imports across both the power sector and the wider energy economy.

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Figure 11: The Philippines' energy commodity trade balance, Net Zero Scenario

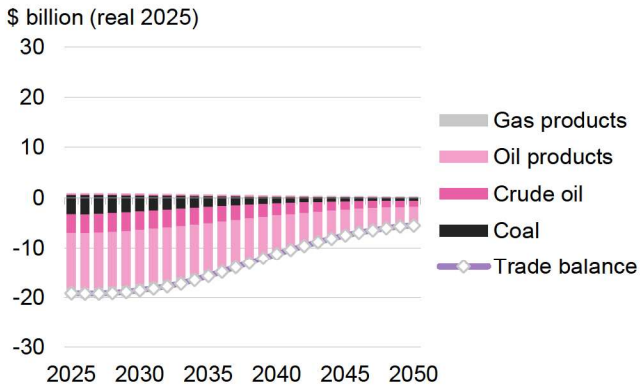
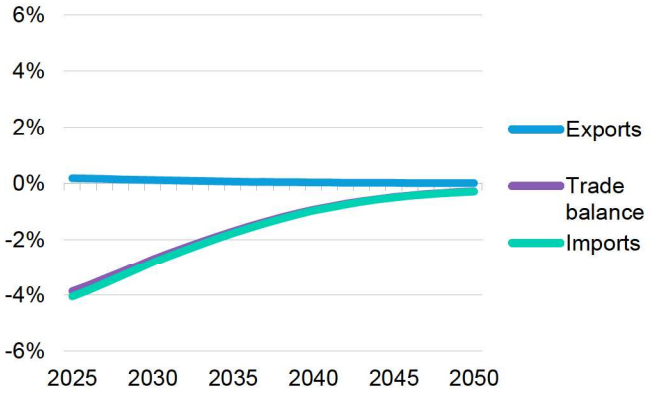


Figure 12: The Philippines' energy commodity trade as a share of gross domestic product, Net Zero Scenario



Source: BloombergNEF, Sinoimex, Global Change Analysis Model. Note: Positive and negative values indicate exports and imports, respectively. Coal includes thermal and coking coal. Imports are modeled based on in-country demand for energy commodities under the New Energy Outlook 2026 scenarios. Exports are modeled based on global demand for energy commodities, assuming a static exporter share in global trade. Imports and exports are based on observed 2024 trade data, the last year for which full data exist.

Figure 13: Thailand's energy commodity trade balance, Net Zero Scenario

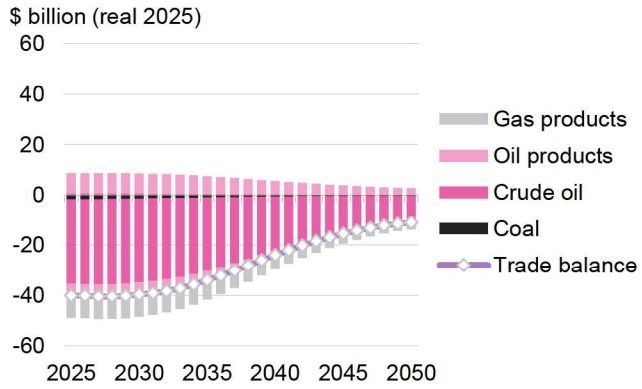
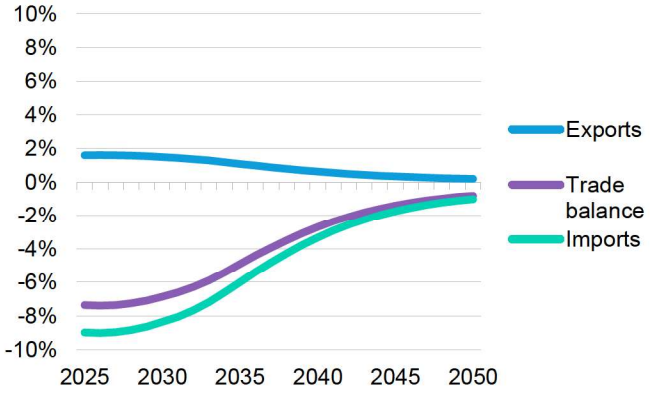


Figure 14: Thailand's energy commodity trade as a share of gross domestic product, Net Zero Scenario



Source: BloombergNEF, Sinoimex, Global Change Analysis Model. Note: Positive and negative values indicate exports and imports, respectively. Coal includes thermal and coking coal. Imports are modeled based on in-country demand for energy commodities under the New Energy Outlook 2026 scenarios. Exports are modeled based on global demand for energy commodities, assuming a static exporter share in global trade. Imports and exports are based on observed 2024 trade data, the last year for which full data exist.

Vietnam's fossil fuel imports accounted for 6% of the country's gross domestic product (GDP) in 2024. Under BNEF's NZS, spending on imported fossil fuels will increase in the near term as the economy and industrial demand continue to expand. However, full decarbonization of the energy economy will help Vietnam dramatically reduce its reliance on fossil fuel imports. By 2050, the cost of imported fossil fuel more than halves from the 2024 level.

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Figure 15: Vietnam's energy commodity trade balance, Net Zero Scenario

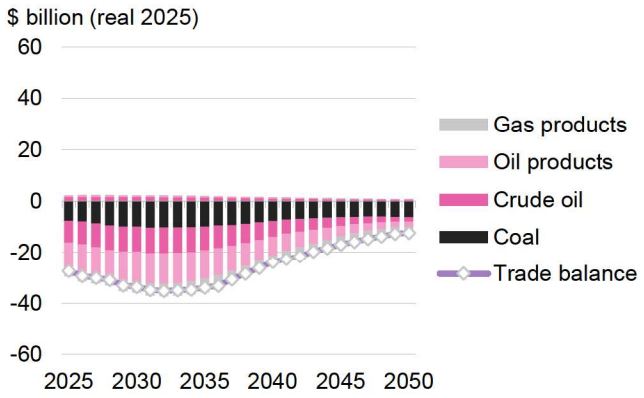
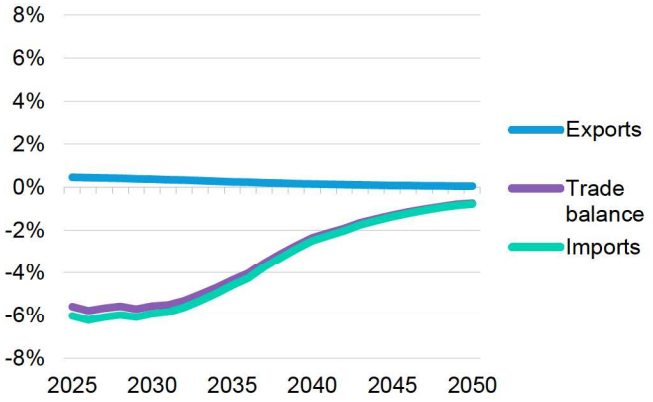


Figure 16: Vietnam's energy commodity trade as a share of gross domestic product, Net Zero Scenario



Source: BloombergNEF, Sinoimex, Global Change Analysis Model. Note: Positive and negative values indicate exports and imports, respectively. Coal includes thermal and coking coal. Imports are modeled based on in-country demand for energy commodities under the New Energy Outlook 2026 scenarios. Exports are modeled based on global demand for energy commodities, assuming a static exporter share in global trade. Imports and exports are based on observed 2024 trade data, the last year for which full data exist.

The energy transition has more nuanced impacts on large fossil fuel exporters Indonesia and Malaysia. Under the NZS, Indonesia's energy commodity trade balance worsens through the mid-2030s as global demand for Indonesian coal declines (Figure 17 and Figure 18). Thereafter, the country's shift from oil-fueled to electric vehicles accelerates and reduces its oil imports, pushing its net trade balance closer to neutrality. Corporate clean power procurement has a limited impact on Indonesia's energy commodity trade as its fossil fuel imports are mainly used for transport and industry rather than power generation.

Figure 17: Indonesia's energy commodity trade balance, Net Zero Scenario

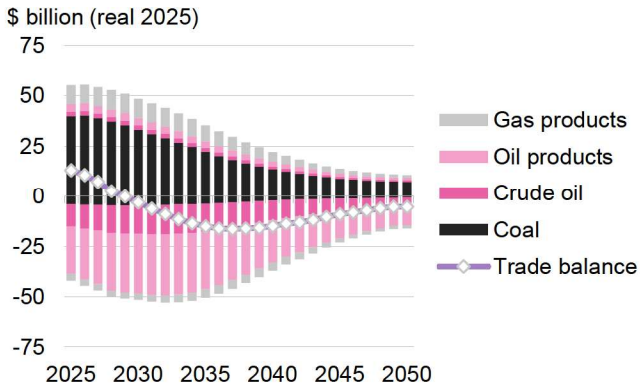
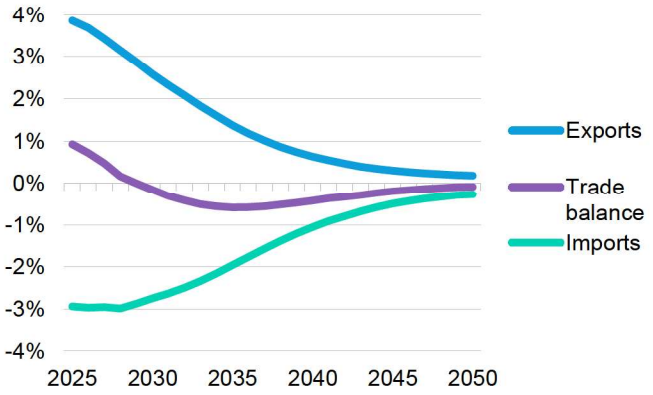


Figure 18: Indonesia's energy commodity trade as a share of gross domestic product, Net Zero Scenario



Source: BloombergNEF, Sinoimex, Global Change Analysis Model. Note: Positive and negative values indicate exports and imports, respectively. Coal includes thermal and coking coal. Imports are modeled based on in-country demand for energy commodities under the New Energy Outlook 2026 scenarios. Exports are modeled based on global demand for energy commodities, assuming a static exporter share in global trade. Imports and exports are based on observed 2024 trade data, the last year for which full data exist.

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Corporate clean power procurement could improve Malaysia's energy security by reducing its need for LNG imports

Malaysia maintains roughly equal levels of energy commodity imports and exports through 2050 under the NZS (Figure 19 and Figure 20). This balance depends on Malaysia remaining a net gas exporter and maintaining its share of the global gas market. However, this assumption is unlikely to hold given the country's rapid power demand growth driven by data centers and its ongoing shift from coal- to gas-fired power generation. Corporate clean power procurement could therefore improve Malaysia's future energy security by reducing its need for LNG imports.

Figure 19: Malaysia's energy commodity trade balance, Net Zero Scenario

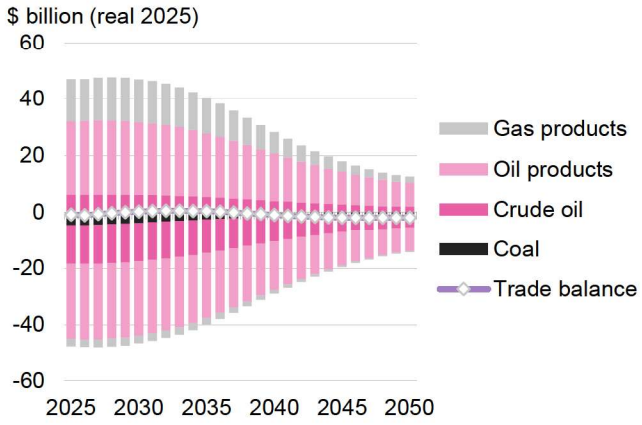
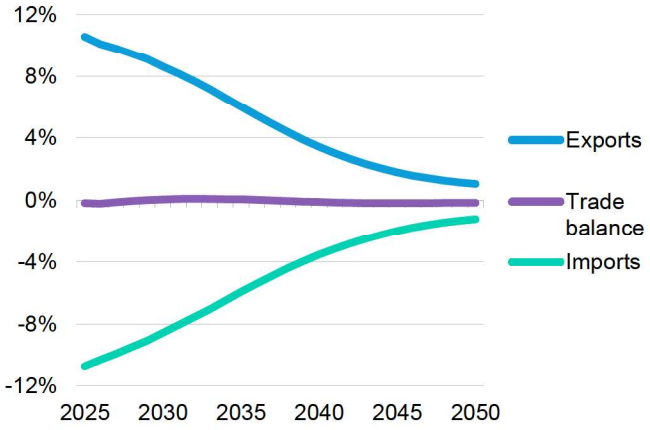


Figure 20: Malaysia's energy commodity trade as a share of gross domestic product, Net Zero Scenario



Source: BloombergNEF, Sinoimex, Global Change Analysis Model. Note: Positive and negative values indicate exports and imports, respectively. Coal includes thermal and coking coal. Imports are modeled based on in-country demand for energy commodities under the New Energy Outlook 2026 scenarios. Exports are modeled based on global demand for energy commodities, assuming a static exporter share in global trade. Imports and exports are based on observed 2024 trade data, the last year for which full data exist.

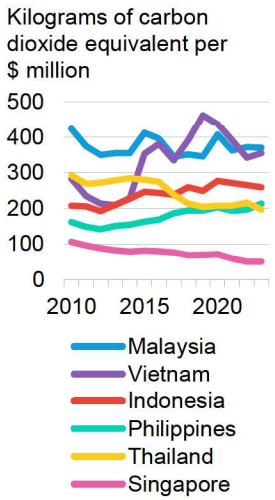
Reducing reliance on imported fossil fuels not only improves domestic energy security but also reduces exposure to global fuel price volatility. As the Iran war and resulting supply disruptions have demonstrated, power sectors across Southeast Asia are vulnerable to gas and coal price shocks. A faster shift to renewable energy can reduce the impact of such price swings on power tariffs, and corporate clean power procurement can help accelerate this transition.

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Section 3. Current state of Southeast Asian markets

3.1. State of power sector decarbonization

Figure 21: Southeast Asia's power sector greenhouse gas emissions intensity of GDP, by country



Source: BloombergNEF, Climate Watch, World Bank.

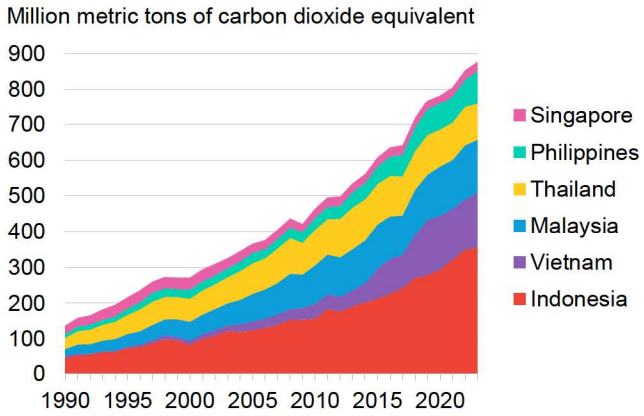
Southeast Asia's emissions from power sector on the rise

Power sector emissions from the six countries covered in this report nearly doubled to 877 million metric tons of carbon dioxide equivalent (MtCO2e) in 2023 from 464MtCO2e in 2010 (Figure 22). Vietnam experienced the highest emission growth over this period, at 269%. By contrast, annual emissions from Thailand and Singapore were roughly unchanged, even as the countries cut the emissions intensity of their GDP by 33% and 52%, respectively (Figure 21 and Figure 23).

Among these markets, only Singapore and Thailand have set 2035 emissions reduction targets that would result in an absolute reduction from current levels. Vietnam has not yet submitted its 2035 target as of Oct. 19. The remaining markets have submitted Nationally Determined Contributions to the United Nations Framework Convention on Climate Change that leave room for emissions to continue rising, putting the Paris Agreement goal at risk. Four markets – Malaysia, Singapore, Thailand and Vietnam – have set targets to reach net-zero emissions by 2050. Indonesia is targeting net zero by 2060, while the Philippines has not yet set a long-term decarbonization target but stated that it would accelerate efforts toward a net-zero emissions energy system in its 2026 NDC.

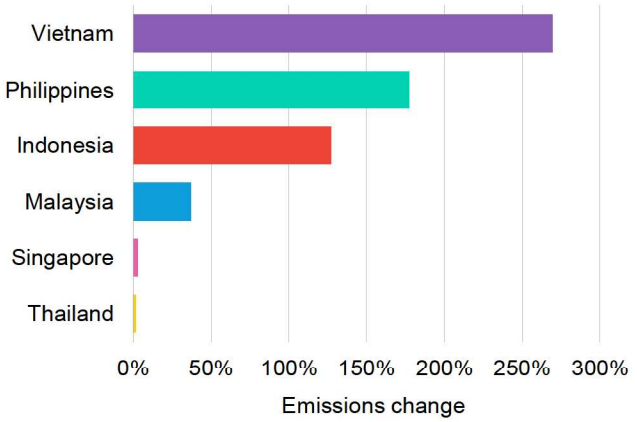
In 2023, three of these markets – Malaysia, Singapore and Thailand – signed the COP28 Global Renewables and Energy Efficiency Pledge, which calls for tripling global renewables capacity by 2030 to at least 11,000 gigawatts (GW), and doubling the global average annual rate of energy efficiency improvements from around 2% to over 4% every year until 2030.

Figure 22: Southeast Asia's power sector greenhouse gas emissions, by country



Source: Climate Watch, BloombergNEF.

Figure 23: Change in annual power sector greenhouse gas emissions in Southeast Asian countries, 2010 to 2023



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The combined renewable capacity of these six markets doubled between 2018 and 2025 (Figure 24), driven largely by a wave of solar installations in Vietnam spurred by initially generous feed-in tariffs (Figure 25). Over this period, solar and wind capacity grew by 715% and 330%, respectively, far faster than bioenergy (46%), geothermal (23%) and hydropower (14%). The relatively slow progress of the latter three technologies reflects their higher capital expenditure, limited cost reductions over time, and more complex development and operations.

Figure 24: Installed renewables capacity in Southeast Asia, by country

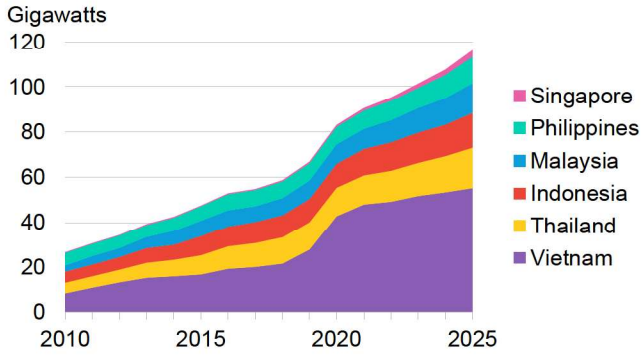
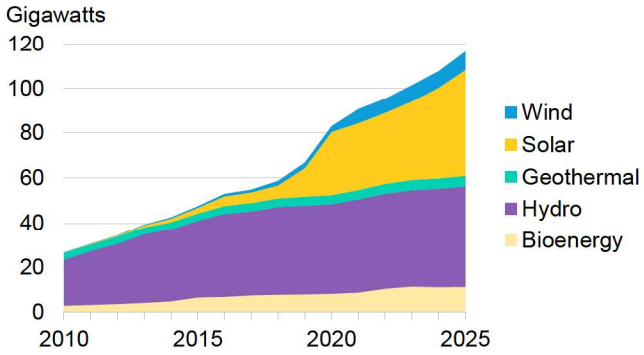
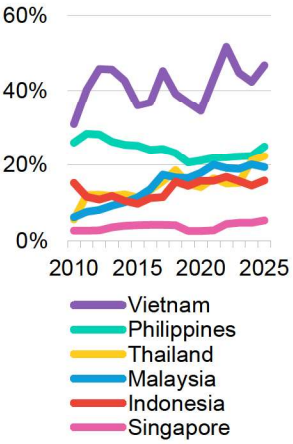


Figure 25: Installed renewables capacity in Southeast Asia, by technology



Source: BloombergNEF analysis of government sources. Note: Charts include data for Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. Renewables include solar, wind, bioenergy, hydro and geothermal.

Figure 26: Share of renewables in annual power generation in Southeast Asian countries



Source: BloombergNEF. Note: Renewables include solar, wind, bioenergy, hydro and geothermal. Only includes generation from domestic projects.

These markets will have to maintain the 2024-2025 pace of solar additions while accelerating deployment of wind, bioenergy, geothermal and hydro to deliver their share of the global goal of tripling renewable capacity. Expanding corporate clean power procurement options will be critical to supporting renewable capacity growth in the region and increasing the share of renewables in countries' generation mixes. Most Southeast Asian countries sourced between 15% and 25% of their electricity from renewables in 2025 (Figure 26), with the notable exceptions of Vietnam (47%) and Singapore (5%).

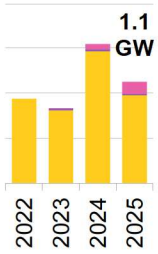
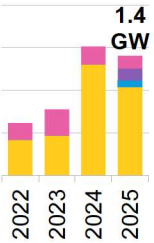
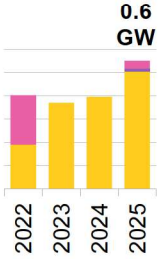
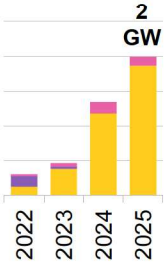
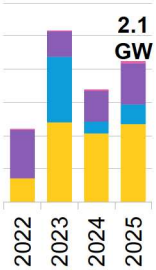
Southeast Asia's clean power deployment was enabled by economics and supportive policies, with corporate PPAs being a new catalyst

The six Southeast Asian countries added 26.2GW of renewable energy and battery storage between 2022 and 2025, averaging 6.5GW annually (Table 1). Vietnam commissioned the most renewable capacity during this period with 7.5GW, followed by Malaysia with 4.4GW. Strong renewable buildout in Southeast Asia has been supported by net-zero and aggressive renewable energy targets set by countries and the falling cost of clean power. Solar dominated clean power additions as it became the cheapest source of bulk electricity across the region, with costs as low as $43 per megawatt-hour (MWh) in Vietnam (Figure 27).

Renewable deployment in the region is set to accelerate due to increased corporate demand for clean power. Over the past few years, most markets across Southeast Asia, with the notable exception of Indonesia, have enacted regulatory reforms that allow corporate electricity buyers to sign power purchase agreements (PPAs) with renewable power producers.

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Table 1: Southeast Asia renewable energy and power market indicators as of October 2026

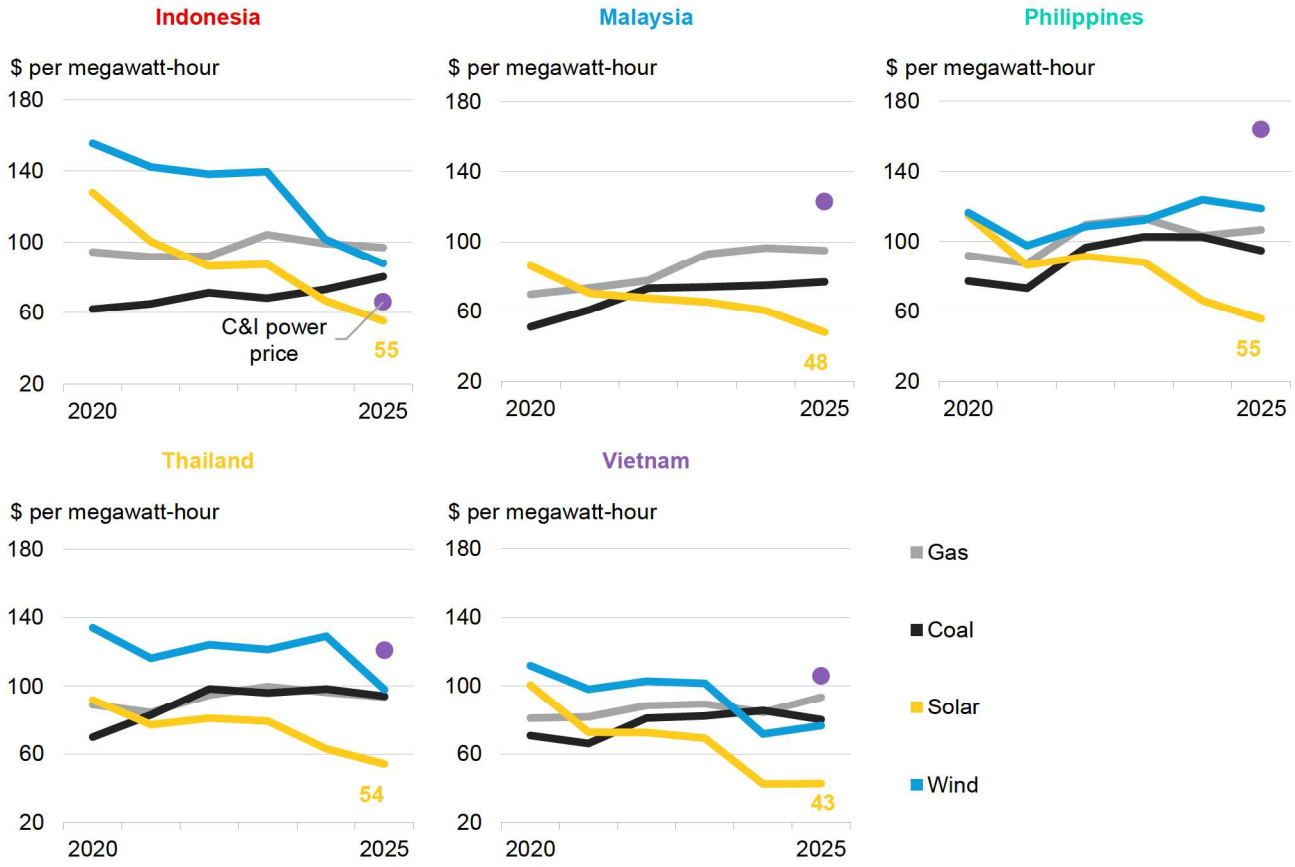
Indicator	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Renewables and storage additions Battery storage Others Wind Solar						
Policy						
Net-zero target year	2060	2050	No net-zero target	2050	2050	2050
Renewables and storage target	28% renewables share in generation mix by 2035	41% renewables share in installed capacity by 2035	35% renewable share in generation mix by 2030	3GWp solar capacity by 2030, 6GW low-carbon electricity imports by 2035	27GW of new solar and wind, 15GW of battery capacity additions by 2037	72GW capacity additions for 2025-2030
Renewables obligations	No	No	Yes	No	No	No
Offsite corporate PPA	No*	Yes	Yes	Yes	Under discussion	Yes
Grid and market structure						
Unbundled grid from generation and retail	No	No	Yes	Yes	Partially	Planned
Wholesale market availability	No	Yes	Yes	Yes	No	Yes
Priority dispatch for renewables	Yes	Yes	Yes	Not applicable	Implicit priority under PPAs	Yes

*Source: BloombergNEF. Note: The "Others" category in the first-row charts includes geothermal, hydro and bioenergy. GWp is gigawatt-peak. PPA is power purchase agreement. C&I is commercial and industrial. Renewables include solar, wind, hydro, bioenergy and geothermal. *Indonesia allows businesses to sign offsite PPAs with the state utility PLN or other utilities outside PLN's operational areas, but not with independent power producers.*

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Figure 27: Levelized cost of electricity for new power projects and average commercial and industrial retail power prices, by market



Source: BloombergNEF. Note: C&I is commercial and industrial. Assumes $1 = 17,645 Indonesian rupiah, 4.03 Malaysian ringgit, 61.27 Philippine pesos, 33.88 Thai baht and 26,268 Vietnamese dong.

3.2. State of corporate clean power procurement

Historically, corporations with large power needs have sought greater cost certainty and reliability by investing in options such as captive power plants and offsite PPAs with independent power producers (IPPs). As companies became more aware of the need to reduce emissions associated with their electricity consumption (Scope 2 emissions), they began pursuing clean power procurement opportunities. The Climate Group's launch of the RE100 initiative in 2014 increased corporate awareness and demand for clean power. In 2025, RE100 members operating in Southeast Asia consumed a total of 25.1TWh of electricity (Figure 28).

RE100 members operating in Southeast Asia consumed 25.1 terawatt-hours of electricity in 2025

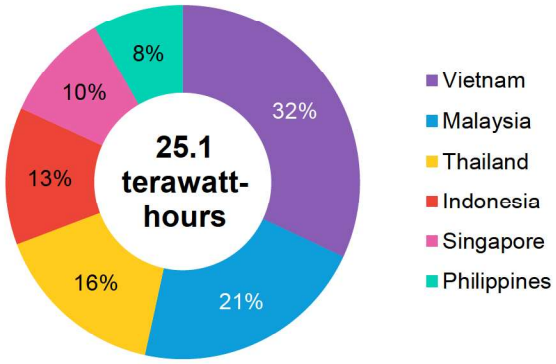
In Southeast Asia, clean power demand is driven by both domestic companies and multinationals whose suppliers operate in the region. Rising demand has led to power market reforms that expand the procurement options available to corporations beyond onsite installations and renewable energy certificates (RECs). Such reforms enabled offsite clean PPAs first in parts of North America and Europe, and more recently in Asia Pacific.

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Corporate PPAs have already supported new renewable capacity that would not otherwise have been built in Southeast Asia

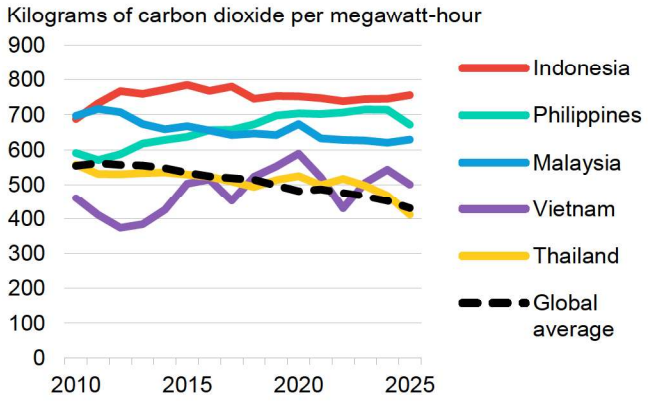
Corporate PPAs are a critical driver of continued investment in renewable capacity in Southeast Asia. They have already supported new renewable capacity that would not otherwise have been built, reflecting companies' focus on "additionality." Additionality refers to prioritizing clean power procurement options that lead to new renewable capacity instead of relying on existing projects. The emissions intensity of electricity generation in most Southeast Asian countries is still relatively high compared with global peers (Figure 29), meaning that replacing grid electricity with power from new renewable capacity can avoid significant emissions.

Figure 28: Electricity consumption reported by RE100 members in Southeast Asia in 2025, by country



Source: Climate Group, BloombergNEF.

Figure 29: Carbon dioxide emissions intensity of electricity generation



Source: BloombergNEF

Ease of procuring clean power for corporations varies widely across Southeast Asian markets (Table 2). While businesses in Singapore, the Philippines and Malaysia enjoy a wide range of options, those in Indonesia and Thailand are largely limited to using rooftop solar and buying RECs.

Table 2: Corporate clean power procurement options for Southeast Asian countries covered in this report

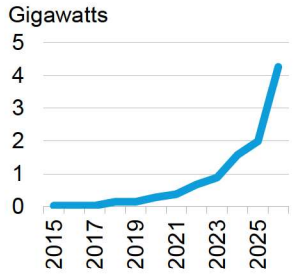
Country	Onsite PPA	International RECs	Net metering	Green tariff	Offsite PPA	Retail choice	Compliance RECs
Philippines	Yes	Yes	Yes	Yes	Yes*	Yes	Yes
Singapore	Yes	Yes	Yes	Yes	Yes*	Yes	No
Malaysia	Yes	Yes	Yes	Yes	Yes	No	No
Vietnam	Yes	Yes	Yes	No	Yes	No	Under discussion
Thailand	Yes	Yes	Yes	Yes	Under discussion	No	No
Indonesia	Yes	Yes	No	Yes	No**	No	No

*Source: BloombergNEF. Note: RECs stand for renewable energy certificates. Onsite power purchase agreements (PPAs) include rooftop solar leasing. Net metering includes cases where exported power is compensated below the retail power tariff. *Corporations buy clean power from offsite projects by signing PPAs with retailers. **Indonesia allows businesses to sign offsite PPAs with the state utility PLN or other utilities outside PLN's service areas, but not with independent power producers.*

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Figure 30: Southeast Asia's cumulative offsite corporate PPA capacity



Source: BloombergNEF. Note: Chart shows only offsite corporate power purchase agreements (PPAs) that are publicly disclosed or submitted directly to BNEF by market participants and meet a set of minimum requirements. Only PPAs with contract durations of more than one year are included. Data as of Oct. 14, 2026.

Existing policies and market regulations across Indonesia, Thailand, Vietnam and Malaysia continue to pose challenges which restrict access to affordable clean energy and constrain expansion of renewable energy supply. The electricity retail market in these countries is still not fully open to competition, thus limiting corporate procurement options.

Offsite corporate PPA deals are emerging, but challenges remain

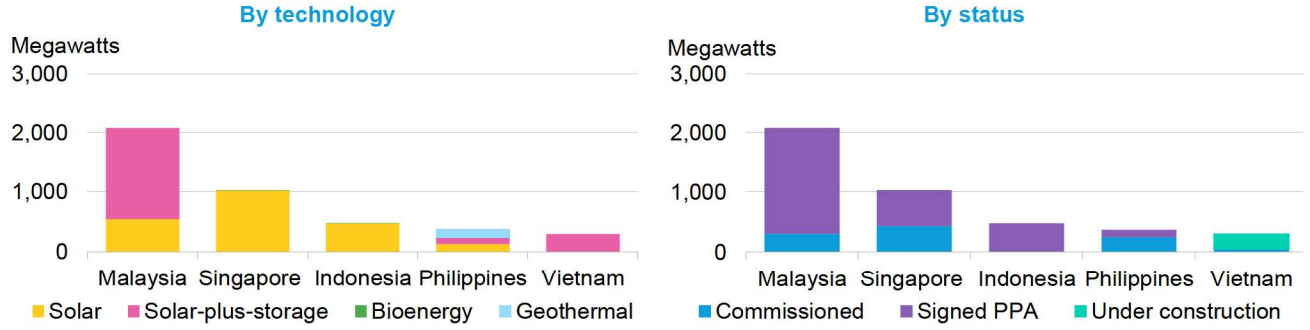
The volume of offsite corporate clean PPAs in Southeast Asia signed in 2026 reached 2.3GW, 5.6 times that of 2025.[1] Cumulative volume in the region has reached 4.3GW as of October 2026 (Figure 30). Southeast Asia's offsite PPA market grew at a compound annual rate of 61% from 2019 to 2026, reflecting rising corporate demand for clean power.

Malaysia and Singapore are the largest offsite clean PPA markets in Southeast Asia by cumulative capacity (Figure 31), while activity in Vietnam is accelerating. As of Oct. 14, Malaysia accounted for the bulk of the region's new deals in 2026, with 1.6GW, followed by Vietnam with 0.3GW, and Indonesia and the Philippines at 0.2GW each.

Singapore and the Philippines, however, have the most developed offsite clean PPA markets among the six Southeast Asian countries analyzed in this report due to their liberalized power market structures, although Singapore's limited land and renewable resource availability constrains the size of its market. Malaysia and Vietnam, which both launched offsite corporate PPA frameworks in 2024, are seeing growing activity following recent policy reforms that widened access to offsite clean power procurement.

Southeast Asia's offsite corporate PPA market remains very small relative to its population and overall power consumption. This reflects the early stage of market development in Malaysia and Vietnam, and the absence or limited availability of offsite corporate PPAs in Thailand and Indonesia. Rising demand for clean power is set to accelerate corporate PPA adoption across Southeast Asia in the coming years.

Figure 31: Southeast Asia's cumulative offsite corporate clean PPA capacity, by technology and status



Source: BloombergNEF. Note: Charts show only offsite corporate power purchase agreements (PPAs) that are publicly disclosed or submitted directly to BNEF by market participants and meet a set of minimum requirements. Only PPAs with contract durations of more than one year are included. For PPAs with more than one offtaker or supplier, capacity is assumed to be equally split unless disclosed otherwise. Solar deal capacity is based on module capacity. Data as of Oct. 14, 2026. Data includes 475 megawatts of deals signed in Indonesia with the state utility PLN and 250 megawatts of projects in Vietnam that have started construction based on signed term sheets but have not yet finalized PPAs, according to public disclosures.

[1] PPA volumes include 475MW of deals signed in Indonesia with the state utility PLN and 250MW of projects in Vietnam that have started construction and signed term sheets but have not yet finalized PPAs, according to public disclosures.

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Indonesia

Businesses cannot directly contract IPPs to build renewable energy projects in Indonesia

Businesses cannot directly contract IPPs to build renewable energy projects because offsite corporate power procurement is not allowed. Operators can buy unbundled RECs from the state-owned vertically integrated utility Perusahaan Listrik Negara (PLN) to offset their emissions, but these purchases have **no additionality** as the underlying capacity already exists.

PLN also has a Dedicated Source program, which it describes as a mechanism that allows participating power consumers to co-develop clean power plants with PLN and then purchase electricity bundled with RECs from those projects' future output. **Microsoft** signed a 10-year agreement with PLN for 200 megawatts (MW) of solar power supply under this program. In November 2022, PLN concluded a similar deal with Amazon Web Services for solar power from four projects with a total capacity of 275 megawatts-peak (MWp).

The Dedicated Source program has a potentially stronger additionality claim than a simple REC purchase, but it remains contentious. Eligible projects are limited to those already listed in PLN's power development plan, suggesting that the utility intends to build or procure them regardless of a power consumer's participation. Furthermore, PLN currently offers Dedicated Source RECs from the already-operational Ijen geothermal power plant, further complicating the program's additionality claims. On the other hand, PLN has historically fallen short of its renewable installation targets, suggesting Dedicated Source participants could help bring planned clean power capacity online.

Corporations need procurement routes that create a clearer link between electricity purchases and new clean power capacity

For corporations to play a larger role in renewable energy deployment, they would need procurement routes that create a clearer link between electricity purchases and new clean power capacity. Direct contracting with new renewable projects through offsite corporate PPAs is one possible mechanism. Other approaches could achieve the same objective if corporate demand is material to whether new clean-power projects are built.

Peninsular Malaysia

Large power consumers in Peninsular Malaysia can procure renewable energy from third-party generators through the Corporate Green Power Programme (CGPP) and Corporate Renewable Energy Supply Scheme (CRESS). The former is a virtual PPA program with an 800MW quota while the latter provides a direct PPA mechanism with no capacity quota. As of September 2026, 11 renewable project developers and eight potential offtakers have registered to participate in CRESS, presenting 3.15GW of project capacity.

BNEF estimates the landed cost of solar power sourced through CRESS at about $116/MWh and $146/MWh for systems with and without battery storage, respectively (Figure 32). The former is **lower than the retail energy charge paid by large data centers and is likely to decline further** as the costs of battery systems continue to fall rapidly.

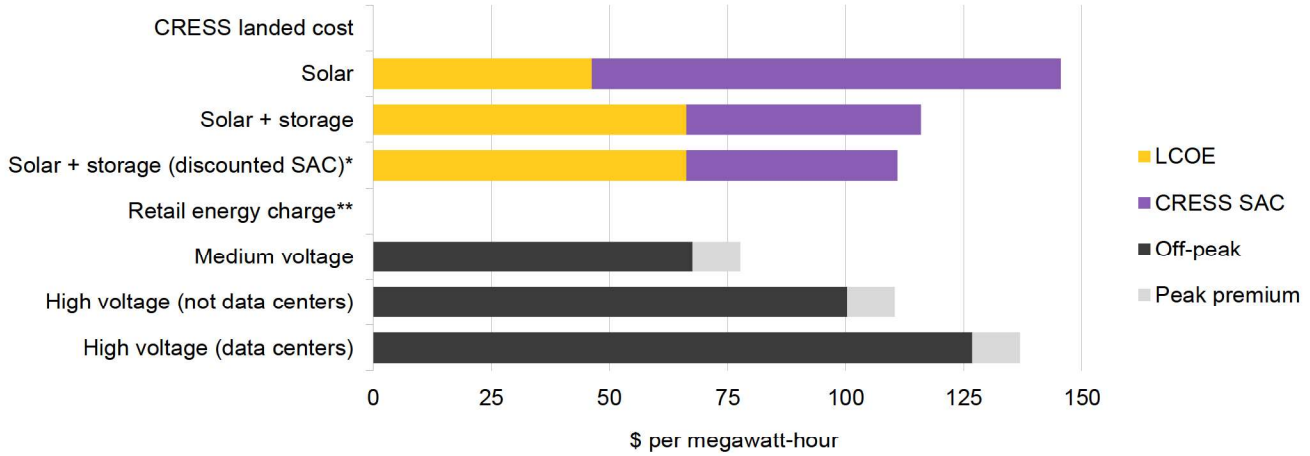
Industry stakeholders think CRESS wheeling charges are too uncertain

BNEF's conversations with industry stakeholders identified the program's system access charges (SACs) – and the uncertainty associated with them – as the main obstacle to participation. These charges – paid to TNB for the use of its grid system – are set at 400 ringgit ($99) per MWh for intermittent power and 200 ringgit/MWh for firmed power, such as solar with battery storage.

SACs are generally seen as too high and too uncertain as Malaysia's Energy Commission may increase or decrease them by up to 15% every three years. Developers and buyers continue to face difficulty anticipating future SAC changes because the detailed methodology used to determine SACs has not been publicly disclosed. **This unpredictability erodes one of the main benefits of corporate PPAs – long-term price certainty** – and prolongs contract negotiations as renewable energy generators and power offtakers try to shift the risk to one another.

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Figure 32: Estimated costs of solar power sourced through the Corporate Renewable Energy Supply Scheme (CRESS), compared with the energy charge component of non-domestic retail power tariffs in Peninsular Malaysia



*Source: BloombergNEF, Energy Commission, Tenaga Nasional Berhad. Note: LCOE refers to levelized cost of electricity and SAC refers to system access charge. LCOEs are shown for projects financed in 2026. *Discounted SAC applies to solar-with-storage projects commissioned by Dec. 31, 2028. **For the retail energy charge, medium voltage refers to grid connections of 1-50 kilovolts and high voltage to those above 50 kilovolts. The peak premium applies from 2 p.m. to 10 p.m. Monday to Friday. The comparison excludes capacity, network and retail charges, which are payable by both CRESS users and grid power consumers. Assumes $1 = 4.03 Malaysian ringgit.*

Malaysia's 2026 CRESS reforms lower grid access charges for qualifying projects and promise greater transparency on charge calculations

Malaysia's government on Sept. 18 announced an upcoming revision to CRESS aimed at simplifying contractual arrangements, streamlining procedures and documentation, establishing a 10-year minimum contract period, improving access to information on available grid connection capacity, and **increasing transparency around SAC determination from 2028**.

The government also introduced a so-called Acceleration Package that initially reduced the SAC for qualifying firm power supply projects from 200 ringgit/MWh to 140 ringgit/MWh, subject to a minimum 10-year contract period and commissioning by the end of 2028. **This was subsequently revised to 180 ringgit/MWh** at an Oct. 13 meeting with industry stakeholders, where the Energy Commission provided a high-level breakdown of the SAC for the first time. Of the 180 ringgit/MWh, 140 ringgit/MWh will be fixed for 10 years from the project commissioning date, while 40 ringgit/MWh will be subject to revision every three years. It is not yet clear whether the smaller component's periodic revision will also be capped at 15%, or how the SAC will be treated after the initial 10-year period.

The Acceleration Package therefore lowers the SAC by 20 ringgit/MWh relative to the standard SAC for firm power, at least until the next revision in 2028. Based on the current combined charge, BNEF estimates the landed cost of power at $111/MWh (Figure 32).

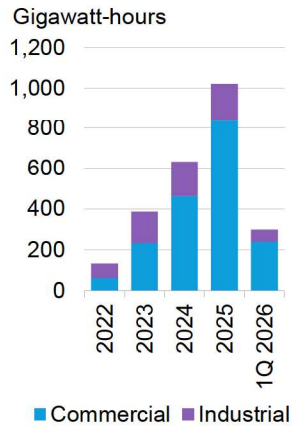
Industry participants continue to identify drawbacks with CRESS that could weaken project bankability

While the lower SAC improves CRESS project economics, industry participants continue to identify other drawbacks that could weaken bankability. These include the non-reduction of network and capacity charges payable to TNB, longer-term SAC visibility, uncertainties in grid dispatch rules, treatment and monetization of excess energy, and ownership of RECs tied to excess generation.

East Malaysia's Sarawak and Sabah states do not allow offsite corporate power procurement with third-party generators.

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Figure 33: Power consumption under Philippine Green Energy Option Program (GEOP), by customer type



Source: Philippine Electricity Market Corporation, BloombergNEF.

Philippines

Companies in the Philippines can procure clean power through electricity retailers under the **Retail Competition and Open Access (RCOA)** program and **Green Energy Option Program (GEOP).**

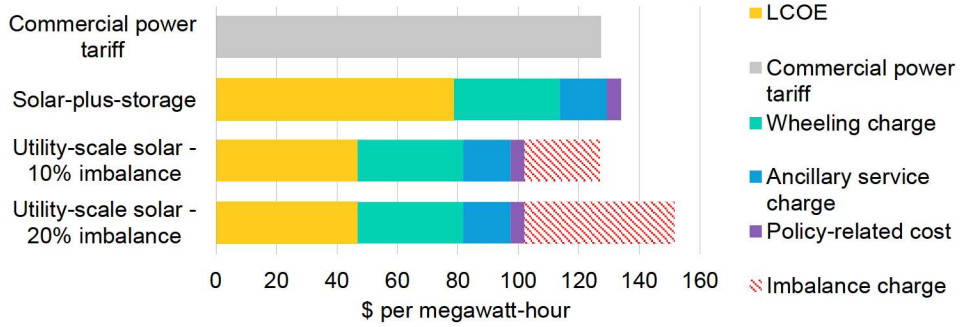
The RCOA program allows power users with an average monthly peak demand of at least 100 kilowatts to choose their own electricity providers. Corporate buyers such as data centers can procure clean power under the RCOA by issuing requests for proposals to power retailers with their own specifications, such as 100% renewable electricity supply. After selecting a bid, they sign power contracts with retailers and pay transmission and distribution charges to the distribution utility (DU) in their area, such as the Manila Electric Company (Meralco). While procuring clean power is not necessarily cheaper than buying conventional grid electricity, developers told BNEF that renewable electricity could be procured at comparable rates.

GEOP allows power users with an average monthly peak demand of at least 50 kilowatts to contract directly with **renewable energy suppliers**. Historically, suppliers had to provide round-the-clock renewable supply, making firm renewable technologies such as geothermal and hydropower important complements to variable solar and wind generation. Revised rules introduced in January 2026 eased this constraint by allowing GEOP suppliers to source at least 50% of replacement power from renewables in the next five years. Commercial customers, including offices, hotels and shopping malls, account for most GEOP electricity demand, while industrial customers remain a smaller share of the market (Figure 33).

Thailand

BNEF estimates the landed cost of electricity from solar-plus-storage under the direct PPA program at $134/MWh, 5% more than the retail electricity tariff of $128/MWh for commercial customers connected at 70 kilovolts or more (Figure 34). Electricity generated by a standalone utility-scale solar project has a lower landed cost of $102/MWh, but imbalance charges could increase the total to $127/MWh with a 10% generation deviation and $152/MWh with a 20% deviation.

Figure 34: Estimated direct power purchase agreement solar costs compared with retail power tariffs in Thailand



Source: BloombergNEF, Energy Regulatory Commission. Note: LCOE refers to the levelized cost of electricity. Assumes four-hour battery capacity equivalent to 50% of solar capacity and a grid connection voltage of at least 70 kilovolts. The applicable commercial tariff is 4,102 Thai baht per megawatt-hour. Assumes no imbalance charge for solar-plus-storage and an exchange rate of $1 = 32.225 baht. Calculations as of December 2025.

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This penalty structure creates uncertainty for renewable project revenues and narrows – or even eliminates – the cost advantage of standalone solar relative to grid tariffs. Imbalance charges do not apply to deviations of up to 2% from scheduled power generation, and IPPs can use battery energy storage to reduce higher deviations.

The imbalance charge mechanism is designed to shift the responsibility of managing intermittency and grid balancing from EGAT to renewable power producers. For corporate buyers evaluating DPPA options, solar-plus-storage may offer better long-term value despite its higher upfront cost.

Vietnam

Vietnam allowed corporate offsite clean power procurement in 2024 with the introduction of its direct power purchase agreement (DPPA) mechanism. Large power users with monthly consumption of at least 200MWh can sign PPAs directly with renewable generators and procure electricity using the national grid. Eligible technologies for the national-grid model include solar, wind and biomass projects above 10MW. Electricity under a DPPA can be delivered through a direct transmission line connecting the renewable power project to the customer's facility or through national transmission lines. Under the latter model, customers must pay DPPA surcharges for using the national grid infrastructure.

Vietnam's offsite DPPA market secured its first transaction nearly two years after the policy was introduced

Vietnam's offsite DPPA market secured its first transaction nearly two years after the policy was introduced. **Gia Lai Electricity Company (GEC**) commissioned the country's **inaugural solar-plus-storage project** in May. **Samsung Electronics**, through its local subsidiary Samsung Electronics Vietnam Thai Nguyen (SEVT), agreed to buy power from the project, which has 41MW (alternating current) of capacity paired with 5MW/10MWh of battery storage. The inaugural project benefits from the strategic profile of the buyer. Samsung Electronics is Vietnam's largest foreign investor with a registered investment of $23 billion.

Reforms to industrial retail tariffs create economic uncertainty over the competitiveness of DPPAs

The cost of solar power projects under **the DPPA mechanism is already lower than existing retail tariffs** for industrial customers. However, reforms to industrial retail tariffs, including **new time-of-use** tariffs and a **pilot two-part retail tariff**, create **economic uncertainty** over the competitiveness of DPPAs (Figure 35, Figure 36). Under the new time-of-use retail tariffs approved in April 2026, a standalone solar DPPA project with a fixed strike price does not offer immediate cost reductions because the removal of morning peak hours reduces the value of standalone solar generation. **Solar-plus-storage projects under DPPAs stand to be more competitive** instead because electricity discharged from batteries can help corporate buyers reduce their exposure to higher nighttime peak tariffs.

The pilot two-part tariff could also reduce the cost-competitiveness of DPPAs if the current capacity and energy rate are officially implemented. The pilot is ongoing and is expected to run until the end of 2026. Under the pilot, large manufacturers with monthly consumption of at least 200MWh are required to pay both energy and demand charges rather than a standard energy charge alone. Under the pilot two-part tariff, customers connected at 110kV and above will pay a premium, while customers connected at 22-110kV will see little cost reduction from solar-plus-storage DPPAs with a fixed strike price (Figure 36). This is largely because the energy tariff under the pilot is 16% lower than under the existing tariff. Any rate revisions under the final two-part tariff could therefore have a significant impact on DPPA economics.

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Figure 35: Vietnam's offsite DPPA standalone solar average cost versus industrial retail tariffs, August 2024-July 2026

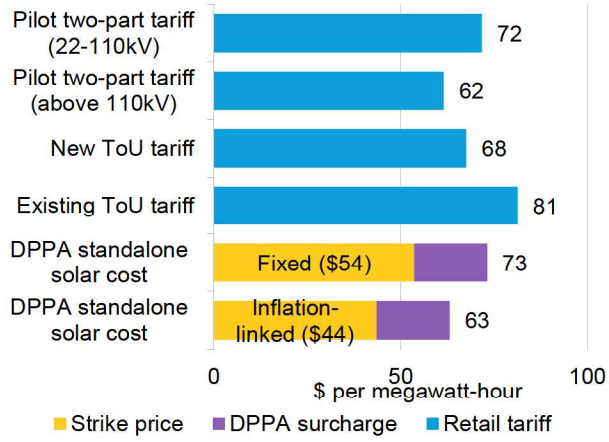
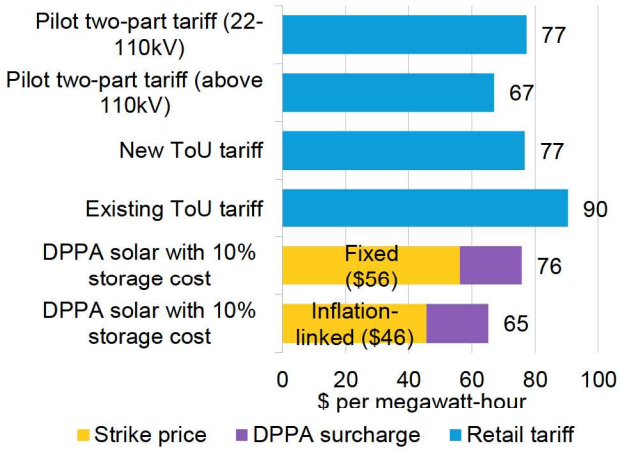


Figure 36: Vietnam's offsite DPPA solar plus storage average cost versus industrial retail tariffs, August 2024-July 2026



Source: BloombergNEF, Vietnam Electricity Group (EVN). Note: Assumes $1 = 26,310 Vietnamese dong. Retail tariffs compared with direct power purchase agreement (DPPA) standalone solar and DPPA solar-plus-storage costs are average tariffs from 7 a.m. to 5 p.m. and 9 a.m. to 7 p.m., respectively. Battery storage is assumed to have a two-hour duration and to charge from solar power generation for two hours. ToU is time of use. LCOE is levelized cost of electricity. The pilot two-part industrial tariff includes energy and capacity charges for facilities connected at different voltage levels. The capacity charge is calculated based on EVN Southern Power Corp.'s report. Strike prices are based on BNEF's mid-case LCOE assumptions, with separate values for inflation-linked and fixed-price revenue structures.

Insights from other Asia-Pacific corporate PPA markets

BNEF's surveys of corporate PPA participants in Australia, Japan, South Korea and Taiwan reveal several common challenges for clean power offtakers and sellers (Table 3). Many of these issues also apply to Southeast Asian countries with corporate PPA programs, namely Singapore, the Philippines, Malaysia and Vietnam. Indonesia and Thailand, which do not yet allow offsite corporate PPAs, could draw on lessons from these markets when developing their own corporate PPA policies.

Table 3: Common challenges for offsite corporate PPA buyers and sellers in Australia, Japan, South Korea and Taiwan

Common challenges	For buyers	For sellers
Regulatory and policy uncertainty	• Complex and unstable regulatory environment makes it challenging to navigate corporate PPA market	
Pricing and volatility	• Cost-competitiveness of corporate PPAs versus retail tariffs • Wholesale price fluctuations	• Difficulty in determining offtake prices • Uncertainty around retail tariffs
Contract negotiations	• Negotiating favorable terms with energy suppliers • Risks associated with long-term fixed contracts	• Negotiating favorable terms with energy buyers • Risks associated with long-term fixed contracts

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Supply/counterparty access	• Shortage of eligible developers or green projects	• Limited buyer interest • Developing suitable renewable projects for buyers
Expertise and internal alignment	• Lack of expertise within the company • Insufficient official information and reference cases • Lengthy transaction process	• Lengthy transaction process • High transaction costs educating prospective buyers

Source: BloombergNEF

3.3. State of data center development

Southeast Asia has 3.2GW of live IT capacity as of June 2026, with 10 times that amount in the project pipeline

Southeast Asia is fast becoming an important data center market, currently accounting for 5% of global live information technology (IT) capacity. The region has 3.2GW of live IT capacity as of June 2026, with 10 times that amount in the project pipeline. Growth in compute capacity translates directly into higher power demand, requiring new generation capacity and, increasingly, better access to corporate clean power procurement.

Malaysia accounted for 41% of Southeast Asia's live IT capacity (Figure 37) and 55% of the region's data center pipeline as of June 2026 (Figure 38). Growth was initially spurred by Singapore's 2019-2022 moratorium on new data center builds, which pushed development across the border into Johor. Malaysia has since sought to build on that early advantage, including by attracting hyperscalers expanding artificial intelligence infrastructure. The country attracted $23 billion in data center and cloud computing investment in the first half of 2026.

Figure 37: Live IT capacity of data centers in Southeast Asia

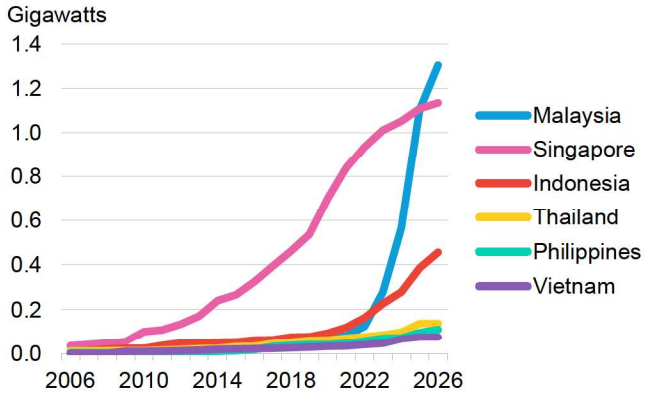
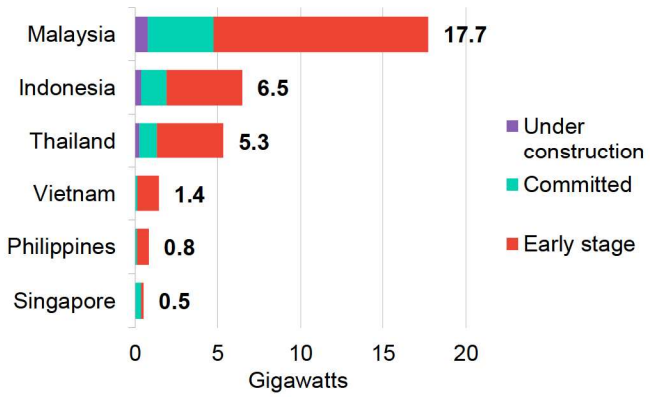


Figure 38: Upcoming IT capacity of data centers in Southeast Asia

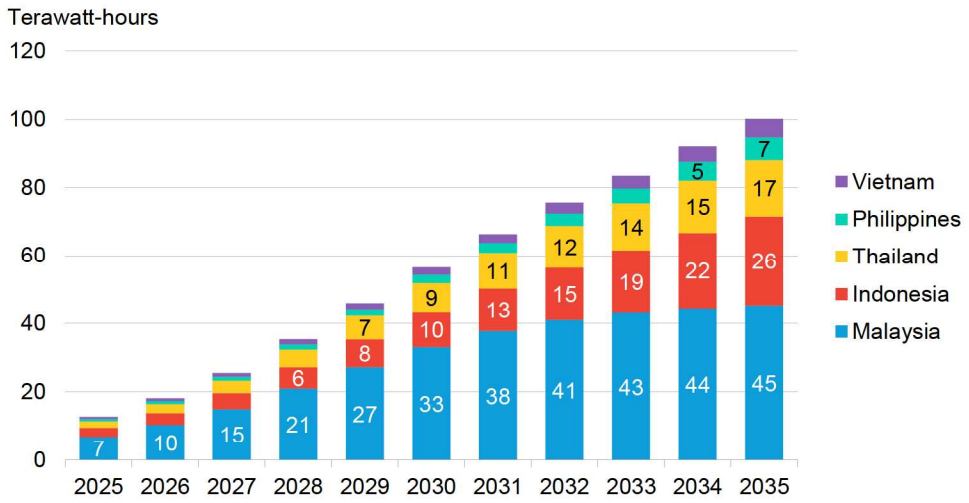


Source: BloombergNEF, DC Byte. Note: Data as of June 10, 2026.

BNEF's latest outlook sees data center annual electricity demand in Malaysia, Indonesia, Thailand, the Philippines and Vietnam collectively growing to 100 terawatt-hours by 2035 from 13TWh in 2025 (Figure 39). The 87TWh of new demand is equivalent to about 30% of Vietnam's total power consumption in 2025. Nearly 90% of this additional electricity consumption occurs in Malaysia (38TWh), Indonesia (23TWh) and Thailand (15TWh).

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Figure 39: Southeast Asia's data center power demand in BNEF's Economic Transition Scenario



Source: BloombergNEF, DC Byte. Note: The Economic Transition Scenario is BNEF's assessment of how the energy economy could evolve due to cost-based technology changes to 2050. It combines near-term market activity, the uptake of new consumer-facing energy products, least-cost system modeling and trend-based analysis to describe the deployment of commercially available technologies.

Data centers are already major clean PPA offtakers in Singapore and Malaysia

Data centers are already major clean PPA offtakers in Singapore and Malaysia, where they have signed deals to purchase 0.86GW and 1.73GW, respectively (Figure 40 and Figure 42). All but one of these agreements involved solar power. The exception is **Google**'s 10-year deal to buy 9MW of bioenergy from **Sobono Group** and **V8 Environmental**'s waste wood-to-energy plant in Singapore.

Data center PPAs in Singapore are almost entirely supplied by **EDP Renovaveis** – the renewables arm of Portuguese utility EDP – and Singaporean utility **Sembcorp** (Figure 41). In contrast, more clean power generators are active in the Malaysian market. Other than those shown in Figure 43, companies exploring electricity sales through corporate PPAs include **BGMC**, **reNIKOLA**, **Brookfield**, **Ditrolic Energy**, **Gamuda**, **Gentari**, **SD Guthrie, HLGY Energy** and **UEM Lestra**.

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Figure 40: Cumulative volume of PPAs signed by data center developers in Singapore, by offtaker

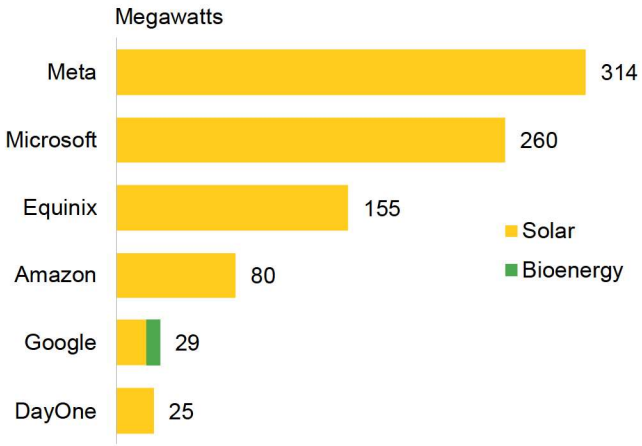


Figure 41: Cumulative volume of PPAs signed by data center developers in Singapore, by supplier

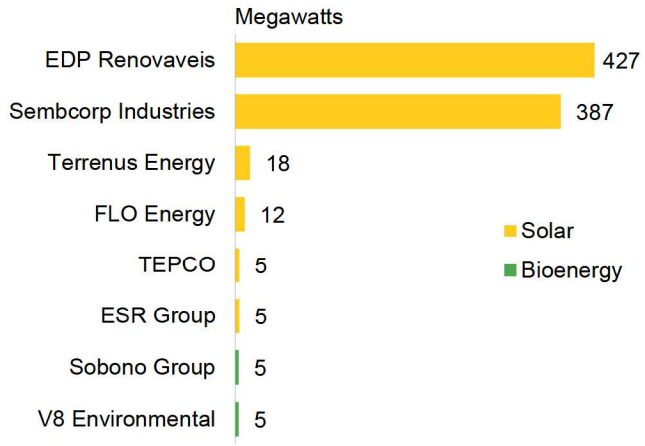


Figure 42: Cumulative volume of PPAs signed by data center developers in Malaysia, by offtaker

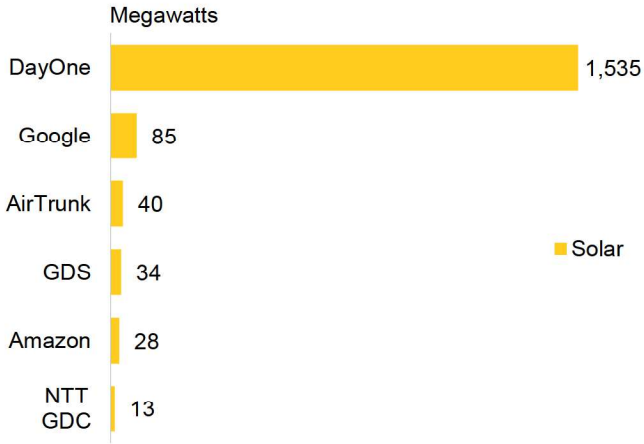
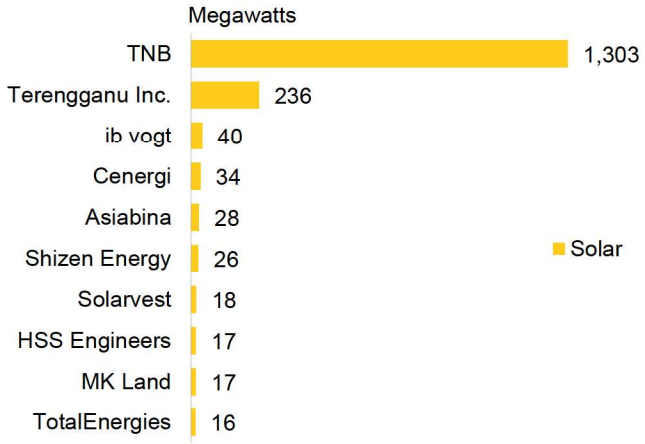


Figure 43: Cumulative volume of PPAs signed by data center developers in Malaysia, by supplier



Source: BloombergNEF. Note: Charts show only offsite corporate power purchase agreements (PPAs) that are publicly disclosed or submitted directly to BNEF by market participants and meet a set of minimum requirements. Only PPAs with contract durations of more than one year are included. For PPAs with more than one offtaker or supplier, capacity is assumed to be equally split unless disclosed otherwise. Solar deals record module capacity. Data as of Oct. 14, 2026.

Enabling corporate clean power procurement increases the likelihood that additional electricity need is met by low-carbon energy sources

Data centers are far from the only sizable source of new power demand

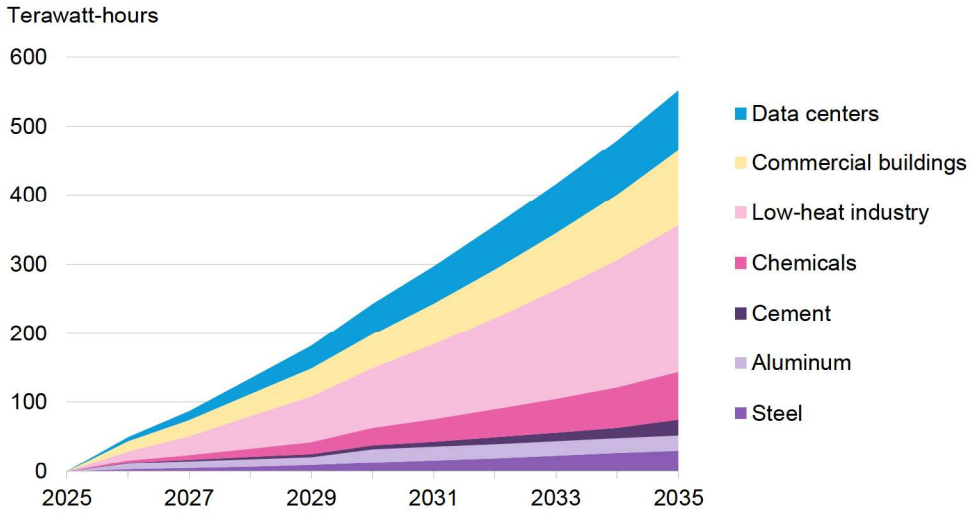
While data centers are driving the increase in corporate PPA volumes around the world, they are not the only industry whose electricity consumption is on the rise. Power demand from other industries such as steel, aluminum, cement and chemicals production in Southeast Asia is also set to grow (Figure 44).

Enabling corporate clean power procurement increases the likelihood that this additional electricity need is met by low-carbon energy sources. This can help decouple economic expansion from emissions growth and increased dependence on fossil fuel imports, allowing Southeast Asian countries to industrialize and develop their economies while increasing energy

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security and producing fewer greenhouse gases. Furthermore, wider access to affordable clean power makes it easier for industries to electrify their processes, which BNEF's modeling suggests is necessary to reach net-zero emissions by 2050.

Figure 44: Selected drivers of future electricity demand in Southeast Asia, net change from 2025 – Net Zero Scenario



Source: BloombergNEF. Note: Chart includes data for Indonesia, Malaysia, the Philippines, Thailand and Vietnam. "Commercial buildings" exclude data centers. "Low-heat industry" includes food and tobacco, paper, pulp and printing, wood and wood products, textile and leather, machinery, transport equipment, construction, mining and quarrying, and other industry not further specified.

3.4. State of cross-border power grid interconnections

Cross-border interconnections enable power demand centers to procure affordable and clean electricity from renewables-rich areas in other countries

The Association of Southeast Asian Nations (ASEAN) first proposed the idea of the ASEAN Power Grid (APG), a regional network that links member states' national grids together, back in 1997. Cross-border interconnections enable power demand centers to procure affordable and clean electricity from renewables-rich areas in other countries, thus reducing the need to build thermal power plants to meet rising demand while providing revenue and job opportunities for the exporters. In addition, grid interconnectors can boost the flexibility and robustness of each national power system.

The region has 16 operating cross-border grid-to-grid interconnectors with a total transmission capacity of 3.5GW (Table 4). In addition, there are about 8-9GW of generator-to-grid connections to export hydro, wind and coal power from Laos to Thailand and Vietnam.

A widespread and high-capacity interconnection system across countries is essential to maximize Southeast Asia's renewables uptake and pave the way toward multilateral power trading among member states. At present, countries in the continental half of Southeast Asia are relatively well-connected to one another, but those in the archipelagic half are almost entirely isolated, both from each other and their continental neighbors.

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Table 4: Existing cross-border grid-to-grid interconnections in Southeast Asia

Country 1	Country 2	Country 1 substation	Country 2 substation	Capacity (megawatts)	Commissioning year
Malaysia (Peninsular)	Singapore	Plentong	Woodlands	1,000	1985
Laos	Thailand	Bang Yo	Sirindhorn 2	300	2020
		Thakhek	Nakhon Phanom	200	2010
		Kenethao	Tha Li	100	2020
		Dongphosy	Nong Khai	100	2007
		Pakxan	Bueng Kan	100	2002
		Pakbo	Mukdahan 2	100	1996
		Thanaleng	Nong Khai	100	1968
Malaysia (Peninsular)	Thailand	Bukit Keteri	Sadao	300	2002
		Gurun	Khlong Ngae	80	1980
Cambodia	Laos	Strung Treng	Ban Hat	300	2019
Cambodia	Thailand	Poi Pet Industrial Estate	Aranyaprathet	250	2007
Indonesia (West Kalimantan)	Malaysia (Sarawak)	Bengkayang	Mambong	230	2015
Cambodia	Vietnam	Takéo	Châu Đốc	200	2009
Malaysia (Sarawak)	Malaysia (Sabah)	Lawas	Mengalong	100	2025
Laos	Myanmar	Muang Long	Kenglat	30	2022

Source: BloombergNEF, ASEAN Center for Energy, Energy Market Authority, United Nations Economic and Social Commission for Asia and the Pacific, Greater Mekong Subregion Economic Cooperation Program.

Some of Southeast Asia's grid-to-grid interconnections have relatively low utilization

Government data suggests at least some of Southeast Asia's grid-to-grid interconnections have relatively low utilization. For instance, the 230MW West Kalimantan-Sarawak link recorded less than 50% annual utilization from 2021 to 2025 (Figure 45). This does not automatically mean Indonesian corporations can use the remaining capacity to import hydropower from Sarawak, however, as Indonesia's state utility PLN has a monopoly wherever it operates.

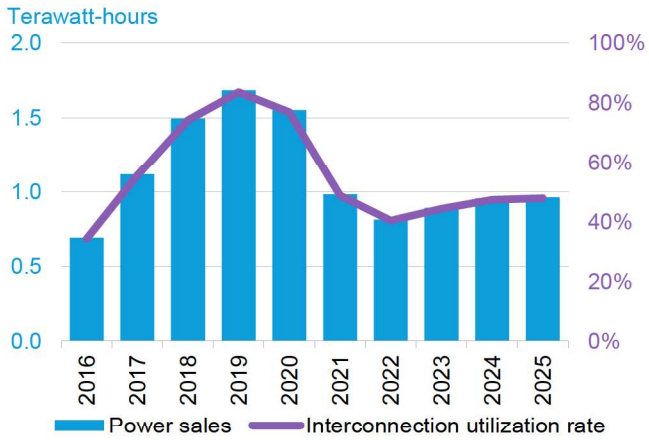
Another example that is more relevant for corporate clean power procurement is the 1GW interconnection linking Peninsular Malaysia and Singapore. This line has recently carried no more than about 0.15GW of power generated in Laos and Malaysia to Singapore, leaving much transmission capacity unused (Figure 46). Additionally, Singapore and Malaysia are conducting a joint feasibility study for a new 2GW interconnector, potentially bringing the total cross-border grid capacity to 3GW by 2030.

The power flows from Laos and Peninsular Malaysia to Singapore are enabled by the Laos–Thailand–Malaysia–Singapore Power Integration Project (LTMS-PIP), ASEAN's first multilateral cross-border electricity trading initiative and an important pathfinder for the APG. The first phase commenced in June 2022, enabling Singapore to import up to 100MW of hydropower from Laos through Thailand and Malaysia, using existing regional transmission infrastructure. The second phase commenced in September 2024, doubling the electricity trading capacity to 200MW and introducing multidirectional power trade, with additional electricity supplied from Malaysia to Singapore.

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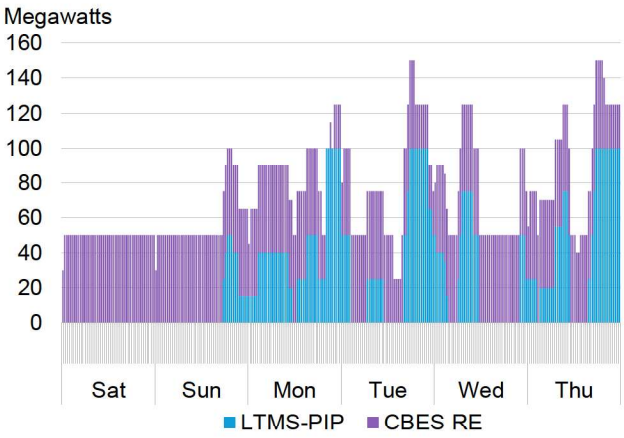
Existing trade through the Energy Exchange Malaysia (ENEGEM) platform provides an early pathway for Peninsular Malaysia–Singapore renewable electricity trade. Separately, Singapore's Energy Market Authority (EMA) in August 2026 granted conditional approvals to **Ditrolic Energy** and a consortium led by **Sembcorp** to import a total of 900MW of firmed solar power from Johor starting in 2029. BNEF expects them to sell at least some of the imported electricity through corporate PPAs. Potential buyers include four data center projects awarded under Singapore's DC-CFA2 tender, which are required to meet at least 50% of their power demand with green electricity.

Figure 45: Volume of electricity sales from Malaysia's Sarawak to Indonesia's West Kalimantan



Source: Indonesia's Ministry of Energy and Mineral Resources. Note: Utilization rate compares actual power sales against the theoretical maximum amount of electricity that could be transmitted through the 230-megawatt Bengkayang-Mambong interconnection in a year.

Figure 46: Singapore's power import flow from Laos and Peninsular Malaysia



Source: Malaysia's Grid System Operator. Note: Chart shows average data over two periods: Aug. 22-27, 2026 and Sept. 12-17, 2026. LTMS-PIP refers to the Laos-Thailand-Malaysia-Singapore Power Integration Project. CBES RE is Malaysia's Cross-Border Electricity Sales for Renewable Energy program.

Singapore's EMA has awarded conditional approvals or conditional licenses to 13 cross-border power trade projects with a total import capacity of 9.25GW

In total, EMA has awarded conditional approvals or conditional licenses to 13 cross-border power trade projects with a total import capacity of 9.25GW (Table 5). Project developers' target commissioning years range from 2028 to beyond 2035. BNEF expects 2029 to be the earliest year that power flows can realistically start.

The institutional framework for Singapore-Indonesia cross-border energy trading evolved in July 2026, when both governments reaffirmed their intention to accelerate bilateral electricity trade and Indonesia designated its sovereign wealth fund Danantara to spearhead the effort. This provides a stronger government-led platform for coordinating investment and project development, although export licensing, transmission, domestic-content requirements and environmental-attribute recognition remain important implementation issues.

To be competitive with domestic clean power, these export projects need to generate electricity and transmit it to Singapore at a cost that is comparable to the combined cost of purchasing domestically generated electricity in the city-state (proxied by the Uniform Singapore Energy Price, USEP[2]) and procuring renewable energy certificates (RECs). This is much more difficult to achieve after REC prices in Singapore fell substantially from 2025 to 2026.

[2] USEP is the weighted average of half-hourly nodal electricity prices at all offtake nodes in Singapore.

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Table 5: Projects targeting renewable electricity exports to Singapore

Host country	Developer	Power source	Import capacity (GW AC)	Conditional approval	Conditional license	Target COD
Australia	SunCable	Solar	1.8	October 2024	-	After 2035
Cambodia	Keppel Energy	Solar and hydro	1	March 2023	-	After 2030
Indonesia	Singa Renewables (TotalEnergies and RGE)	Solar	1	September 2023	June 2025	2029
	PacificLight, Medco Energy, Gallant Venture	Solar	0.6	September 2023	September 2024	2031
	Alamtri Resources Indonesia	Solar	0.4	September 2023	September 2024	2028
	Equator Renewables Asia	Solar	0.4	September 2023	September 2024	2028
	Shell and Vena Energy	Solar	0.4	September 2024	-	2030
	Keppel Energy	Solar	0.3	September 2023	September 2024	2028
	Vanda RE (Gurin Energy and Gentari)	Solar	0.3	September 2023	September 2024	2028
Malaysia	Sembcorp Industries, Sarawak Energy	Hydro	1	October 2025	-	2035
	Ditrolic Energy	Solar	0.6	August 2026	-	2029
	Sembcorp Industries, KPRJ Environment, Qua Energy	Solar	0.3	August 2026	-	2029
Vietnam	Petrovietnam Technical Services Corporation, Sembcorp Industries	Offshore wind	1.2	October 2023	-	2033
	Petrovietnam Technical Services Corporation, Sembcorp Industries, MY Energy Consortium (Tenaga Nasional Berhad and Petronas)	Offshore wind	1.3	-	-	2034

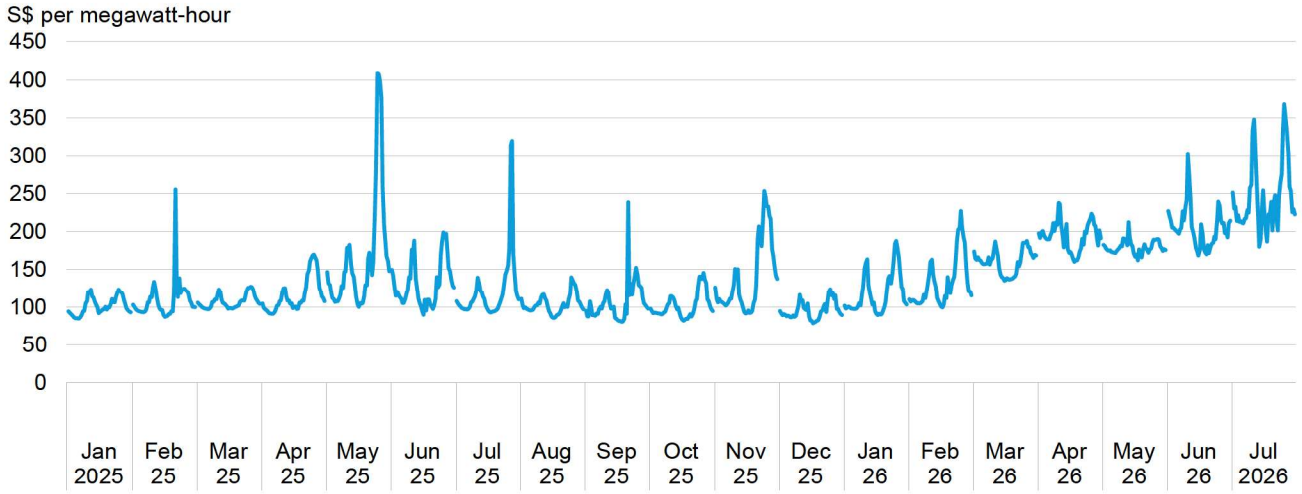
Source: BloombergNEF, Singapore's Energy Market Authority (EMA). Note: Conditional approval and conditional license are the first and second stages in EMA's three-step import project authorization process. COD stands for commercial operation date. Capacity shown in gigawatts (alternating current).

The Iran war and the resulting increases in global gas prices have contributed to a rise in the USEP (Figure 47) and thus the relative financial appeal of low-carbon electricity imports, but such one-off events may not be enough to justify the long-term economics of building the infrastructure required to enable power imports. Electricity exporters thus need to carefully design their projects to boost revenue, for example by maximizing power export from batteries during evening peak demand hours to benefit from elevated power prices, or by striking offtake deals with new data centers, which are required to source 50% of their electricity from low-carbon sources.

USEP fluctuations notwithstanding, price competitiveness alone will not determine project bankability. Cross-border projects also depend on coordinated delivery of generation and transmission infrastructure, durable export and import licenses, clear allocation of cross-jurisdiction regulatory risk, and confidence that the environmental attributes attached to imported power will be recognized by corporate buyers and reporting frameworks.

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Figure 47: Average intraday half-hourly Uniform Singapore Energy Price (USEP) profiles



Source: BloombergNEF, Energy Market Company. Note: For each month, the USEP profile shows the average intraday half-hourly power price, calculated by averaging prices for each half-hour settlement period across all days in the month.

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Section 4. Outlook

This chapter utilizes BNEF's *New Energy Outlook* to explore the power sector transition pathways for Indonesia, Malaysia, the Philippines, Thailand and Vietnam.

The New Energy Outlook considers two scenarios. The Economic Transition Scenario (ETS) is BNEF's base-case assessment of how the energy economy might evolve from today as a result of cost-based technology change. It combines near-term market activity, the uptake of new consumer-facing energy products, least-cost system modeling and trend-based analysis to describe the deployment and diffusion of commercially available technologies and their tipping points through 2050. It is not a policy scenario, as it only accounts for existing policies and assumes no new policies are introduced after these have run their course.

The Net Zero Scenario (NZS) sets out a credible maximum-effort pathway to keep warming well below 2C by staying within a fixed carbon budget and reaching net-zero emissions in 2050. It includes limited overshoot and moderate reliance on net-negative emissions beyond 2050. It follows a sector-led decarbonization approach, where national carbon budgets reflect economic structure and sectoral growth rather than historical responsibility or access to finance. The scenarios do not consider build-out of new international inter-connections beyond those already in place or already under construction. For more information on the modeling methodology, see Appendix A.

In both scenarios, renewables – comprising solar, wind, hydro, geothermal and bioenergy – dominate the power mix in 2050 in all five countries. In the ETS, as a share of annual generation in 2050, renewables provide at the low end 48% of the Philippines' electricity and at the high end 74% of Vietnam's. Renewables' contribution is much higher in the NZS, ranging from 80% of the generation mix in the Philippines to 98% in Malaysia.

To address hourly and seasonal variability of solar and wind, each market will need a diverse complementary mix of other renewable resources and energy storage. Any shortfalls will need to be addressed by low-carbon dispatchable power technologies such as nuclear, thermal power plants equipped with carbon capture and storage and hydrogen/ammonia-fueled turbines. Alternatively, the need for low-carbon dispatchable power can be reduced via expansion of interconnections with neighboring countries to enable clean power trading.

4.1. Indonesia

Thermal power plants, led by coal, supplied 81% of Indonesia's electricity in 2025, while renewables accounted for 19%

Thermal power plants, led by coal, supplied 81% of Indonesia's electricity in 2025, while renewables accounted for 19% (excluding captive generation). Indonesia's clean power policy ambition increased materially this year. In August 2026, President Prabowo Subianto launched a 100GWp solar program, starting with 15 projects totaling 5.3GWp in capacity. The scale of this plan is very ambitious relative to Indonesia's recent solar deployment rates. This program's successful implementation would therefore require substantial improvements in grid development, project procurement, financing and delivery.

Under BNEF's ETS, Indonesia adds 18GW of new renewable capacity – including 11GW of solar – and 7GW of battery storage from 2026 to 2030 (Figure 48). This raises renewables' annual share of electricity supply to 22% by 2030, while meeting growth in electricity demand. Continued

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expansion of renewables and energy storage capacity enables renewables alone to supply 43% of annual generation in 2040 and 60% in 2050.

Faster renewables deployment is required for Indonesia to reach net zero by 2050. In the NZS, Indonesia installs 35GW of renewables capacity, led by 19GW of solar, and 10GW of battery storage from 2026 to 2030. This lifts the share of renewables in the country's generation mix to 32% in 2030, which rises further to 65% by 2040 and 94% by 2050.

Geothermal, hydro and bioenergy power plants match well with corporations that require highly stable power supply, such as data centers

Indonesia needs a mix of renewable energy technologies to fully decarbonize its power system. Solar will become the dominant source of power in the NZS and ETS with 71% and 41%, respectively, of electricity generation in 2050 (Figure 49). Indonesia's abundant geothermal, hydro and bioenergy resources enable these technologies to supply 18% of the country's electricity by 2050 in both BNEF scenarios. While their contribution is small relative to solar, these power sources' stable output means they are highly valuable to the overall system as baseload generators. Geothermal, hydro and bioenergy power plants match well with corporations that require highly stable power supply, such as data centers, alumina refiners and steel producers.

Figure 48: Indonesia's installed electricity capacity, by technology – Economic Transition Scenario and Net Zero Scenario

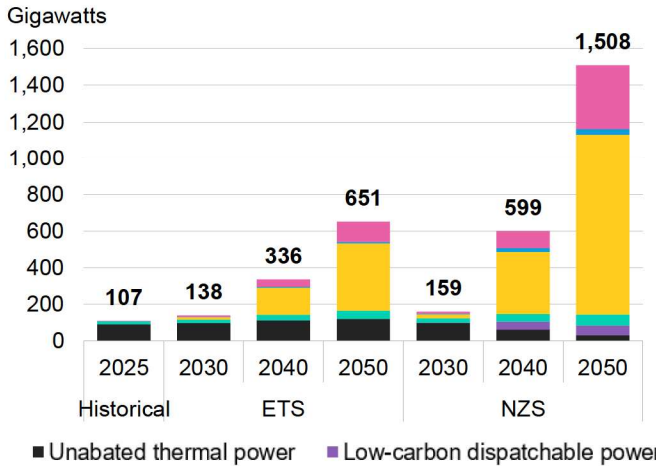
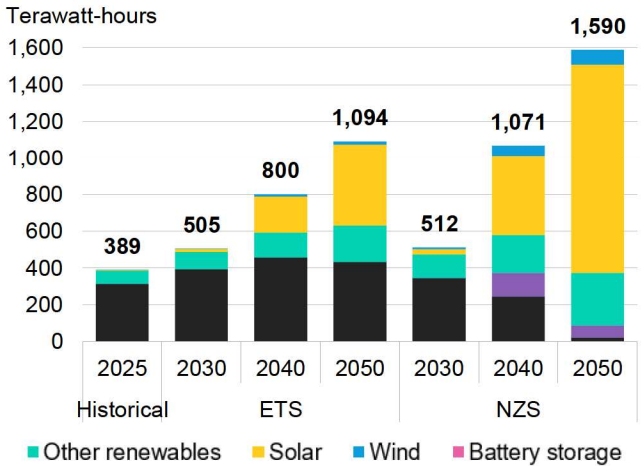


Figure 49: Indonesia's electricity generation, by technology/fuel – Economic Transition Scenario and Net Zero Scenario





Source: BloombergNEF. Note: "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives. ETS is Economic Transition Scenario and NZS is Net Zero Scenario.

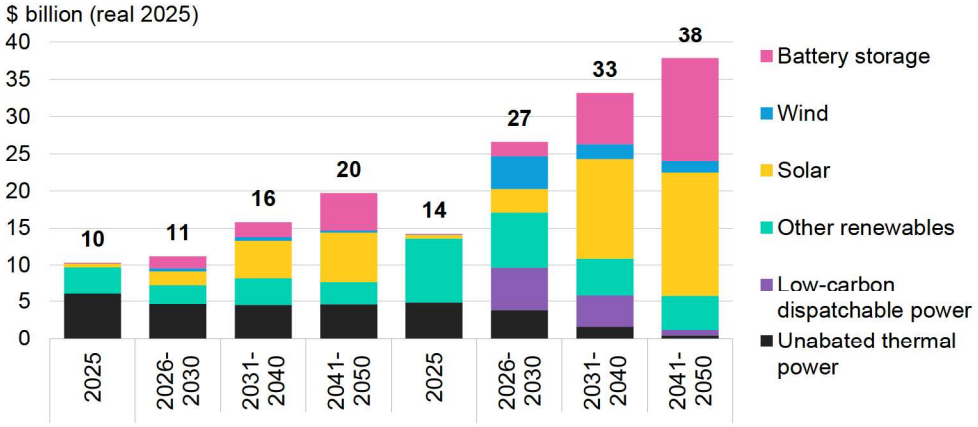
From 2026 to 2050, Indonesia needs to invest $804 billion in clean power and storage capacity expansion to get its electricity system on track for decarbonization by 2050

To complement solar and wind generation, Indonesia needs to scale up its battery storage capacity to 111GW (ETS) and 347GW (NZS) by 2050 from less than 1GW today. Low-carbon dispatchable power sources, namely nuclear, thermal plants fitted with CCS, and hydrogen or ammonia combustion are too costly to play a part in the ETS, but they are necessary to reach net zero by 2050.

From 2026 to 2050, Indonesia needs to invest $804 billion in clean power and storage capacity expansion to get its electricity system on track for decarbonization by 2050, four times the investment required under the ETS (Figure 50). Enabling corporate clean power procurement can unlock a deep pool of private funding that is critical to reach the required level of investment and help the government meet its 100GWp solar target.

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Figure 50: Indonesia's annualized power capacity investment in NEO scenarios



Source: BloombergNEF. Note: Data shows average annual investment for each time period. "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives.

4.2. Malaysia

Thermal power plants, led by coal, supplied 81% of Malaysia's electricity in 2025, while renewables accounted for 19%. Under the NZS, Malaysia adds 28GW of new renewable capacity – including 20GW of solar and 4GW of wind – and 9GW of energy storage from 2026 to 2030 (Figure 51). This doubles renewables' annual share of its electricity supply by 2030, while meeting growth in electricity demand. Continued expansion of renewables and energy storage capacity enables renewables alone to supply 81% of annual generation in 2040 and 98% in 2050, effectively decarbonizing the country's power sector (Figure 52).

Malaysia's clean power fleet is dominated by hydro and solar

Malaysia's clean power fleet is dominated by hydro and solar. For the country to get its power sector decarbonization on track, Malaysia needs to significantly accelerate its solar capacity expansion and link the Peninsular and Sarawak grids, such that the latter's sizable hydro resources can meet rapidly rising power demand in the Peninsular states.

By 2050, solar and wind account for 67% and 12%, respectively, of Malaysia's generation mix in the NZS, while hydro and bioenergy have a combined share of 19%. These shares are significantly higher than in the ETS, where solar and wind contribute 41% and 4%, respectively, of electricity supply in 2050, with hydro and bioenergy providing a combined 13%.

BNEF modeling indicates that nuclear, carbon capture and storage and hydrogen combustion have a limited role in cutting Malaysia's power sector emissions

BNEF modeling indicates that low-carbon dispatchable technologies have a limited role to play in cutting Malaysia's power sector emissions. In the NZS, such generators account for just 1-2% of the country's power mix in 2040 and 2050, and none in the ETS. However, they are still useful to have in times of power demand peaks or unusually low renewables generation.

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Figure 51: Malaysia's installed electricity capacity, by technology – Economic Transition Scenario and Net Zero Scenario

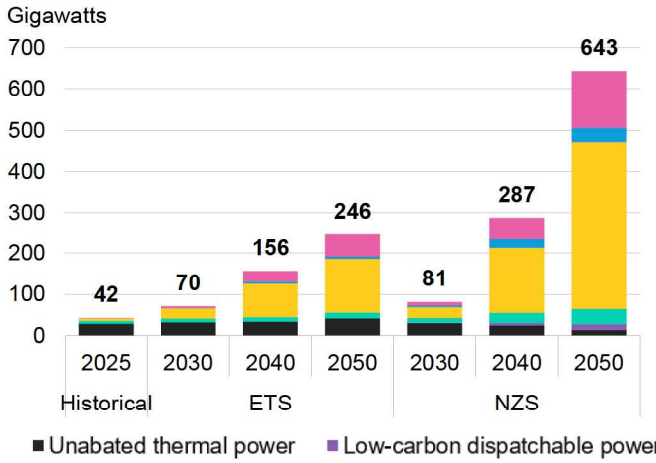
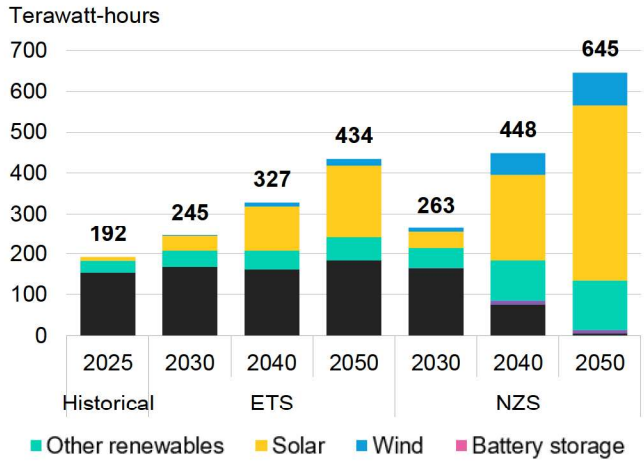


Figure 52: Malaysia's electricity generation, by technology/fuel – Economic Transition Scenario and Net Zero Scenario



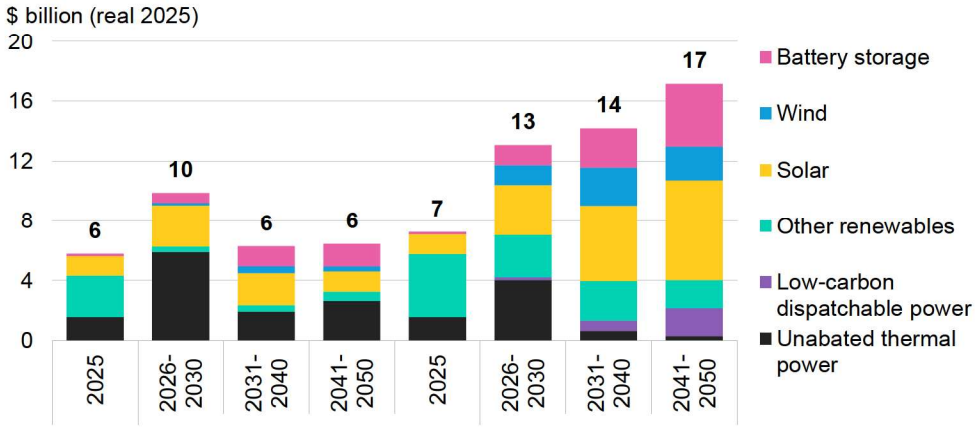


Source: BloombergNEF. Note: "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives. ETS is Economic Transition Scenario and NZS is Net Zero Scenario.

Malaysia needs to invest $349 billion for clean power capacity from 2026 to 2050 to reach net zero by mid-century

Malaysia needs to invest $349 billion for clean power capacity from 2026 to 2050 to reach net zero by mid-century, 60% of which goes to solar and battery storage (Figure 53). The country's corporate clean power procurement programs, CGPP and CRESS, have started to channel capital into these two sectors. BNEF expects much more solar and storage investment to be made in the coming years as Malaysia continues to attract power-hungry data centers and AI-related equipment manufacturers from around the world.

Figure 53: Malaysia's annualized power capacity investment in NEO scenarios



Source: BloombergNEF. Note: Data shows average annual investment for each time period. "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives.

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4.3. Philippines

The Philippines has led Southeast Asia in clean power auctions and tenders over the past four years

Thermal power plants supplied 75% of Philippine electricity in 2025, with the rest coming from renewables. The country has led Southeast Asia in clean power auctions and tenders over the past four years as it seeks to achieve its target of a 35% renewables generation share by 2030, up from 25% in 2025. Under both BNEF scenarios, the Philippines achieves its 2030 target, with renewables accounting for 39% of electricity supply under the ETS.

Under the NZS, renewables supply 80% of electricity in 2050, with solar and wind accounting for 76% of total generation. Fossil fuel-fired power plants paired with carbon capture and storage (CCS) supply the remainder. Under the ETS, unabated coal and gas power plants continue to provide 52% of electricity by 2050.

To reach a 43% renewables share by 2030 under the NZS, the Philippines would need to add a total of 39GW of renewable and energy storage capacity over the remainder of this decade – comprising 28GW of solar, 4GW of wind and 6GW of battery energy storage (Figure 54). Continued expansion of renewables and energy storage capacity enables renewables alone to supply 50% of annual generation by 2040 (Figure 55).

Figure 54: The Philippines' installed electricity capacity, by technology – Economic Transition Scenario and Net Zero Scenario

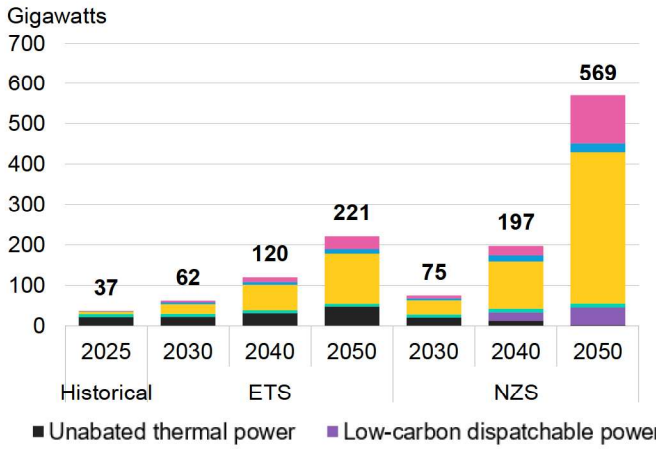
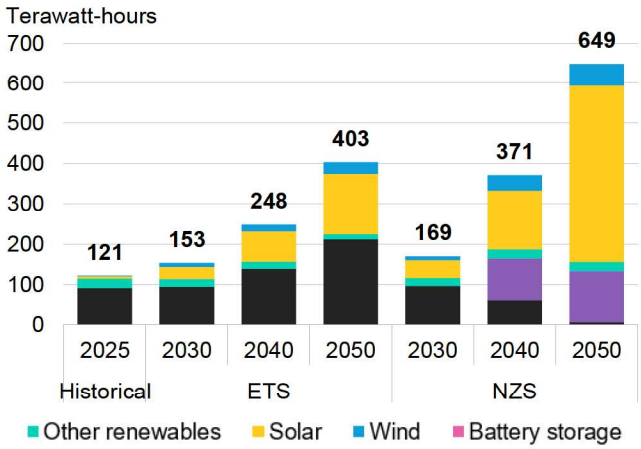


Figure 55: The Philippines' electricity generation, by technology/fuel – Economic Transition Scenario and Net Zero Scenario



Unabated thermal power | Low-carbon dispatchable power | Other renewables | Solar | Wind | Battery storage

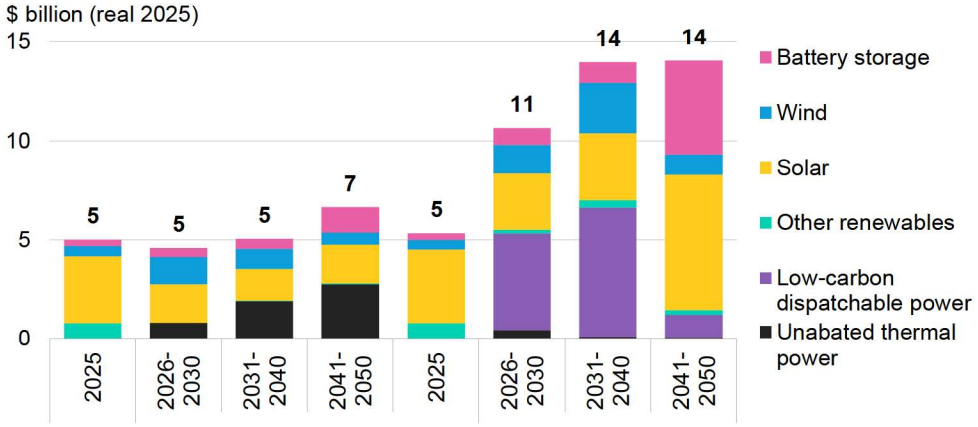
Source: BloombergNEF. Note: "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives. ETS is Economic Transition Scenario and NZS is Net Zero Scenario.

Investment in new renewable energy projects in the Philippines reached $2.9 billion in 2025, according to BNEF's Renewable Energy Investment Tracker. The country has led Southeast Asia in renewable energy investment since 2023, driven by the rollout of clean power auctions and the implementation of the Renewable Portfolio Standard (RPS), the renewable energy mandate for electricity suppliers.

Under the NZS, the Philippines needs $21 billion for renewable power capacity and $4 billion for battery energy storage over the remainder of this decade (Figure 56). This means an average annual investment of $5.1 billion in renewables and storage between 2026 and 2030, 1.8 times the 2025 level.

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Figure 56: The Philippines' annualized power capacity investment in NEO scenarios



Source: BloombergNEF. Note: Data shows average annual investment for each time period. "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives.

4.4. Thailand

Thermal power plants, led by gas power plants, supplied 78% of Thailand's 2025 electricity, with the rest coming from renewables. Under the NZS, Thailand adds 26GW of new renewable capacity and 5GW of energy storage from 2026 to 2030 (Figure 57), raising renewables' share of annual electricity supply to 36% by 2030 while meeting growth in electricity demand. The renewable additions include 20GW of solar and 2GW of wind. Continued expansion of renewables and energy storage capacity enables renewables alone to supply 71% of annual generation in 2040 and 93% in 2050 (Figure 58).

Thailand needs to scale up its battery storage capacity from less than 1GW today to 76GW under the ETS and 168GW under the NZS by 2050 to complement solar and wind generation. Low-carbon dispatchable power sources, namely nuclear, thermal plants equipped with CCS, and hydrogen or ammonia combustion are too costly to play a large role under the ETS. However, under the NZS, their share in Thailand's generation mix reaches 14% by 2040.

Thailand needs $356 billion of investment in clean power and storage capacity expansion from today through 2050 to put its electricity system on track for decarbonization by mid-century

Thailand needs $356 billion of investment in clean power and storage capacity expansion from today through 2050 to put its electricity system on track for decarbonization by mid-century, more than twice the amount under the ETS (Figure 59). Allowing corporate customers to sign offsite PPAs with renewable energy developers, as Thailand is considering, would be critical to attracting more investment and accelerating renewable deployment.

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Figure 57: Thailand's installed electricity capacity, by technology – Economic Transition Scenario and Net Zero Scenario

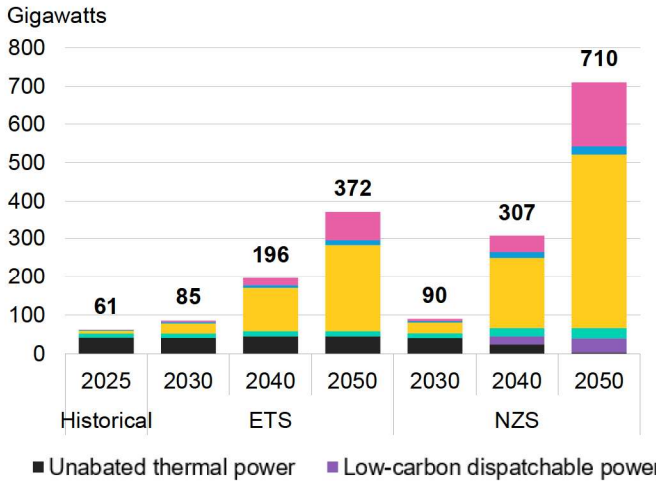
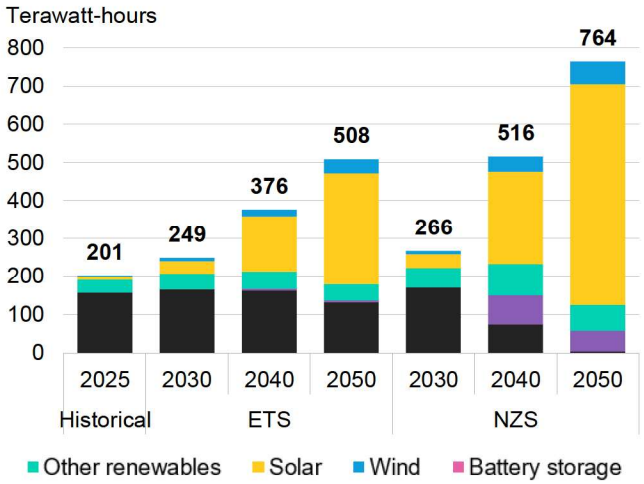
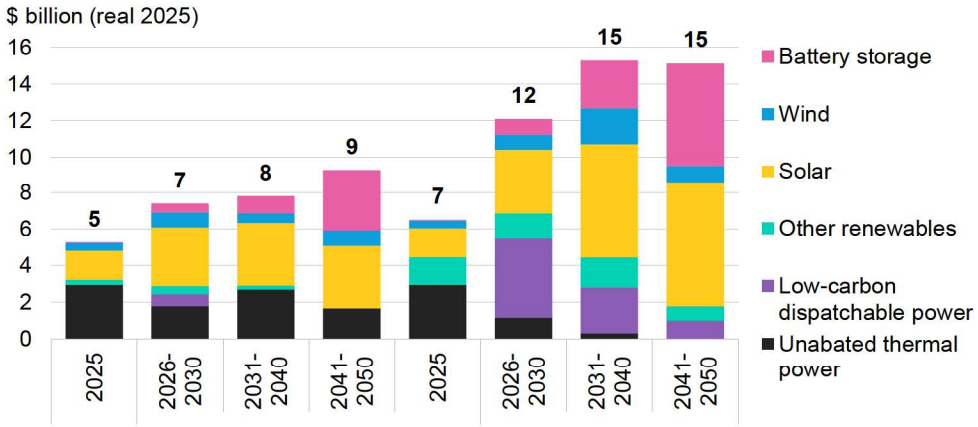


Figure 58: Thailand's electricity generation, by technology/fuel – Economic Transition Scenario and Net Zero Scenario



Source: BloombergNEF. Note: "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives. ETS is Economic Transition Scenario and NZS is Net Zero Scenario.

Figure 59: Thailand's annualized power capacity investment in NEO scenarios



Source: BloombergNEF. Note: Data shows average annual investment for each time period. "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives.

4.5. Vietnam

Thermal power plants supplied 53% of Vietnam's 2025 electricity, with the rest coming from renewables. Vietnam has the highest share of renewable electricity supply among the markets

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covered in this report. Under the NZS, Vietnam adds 58GW of new renewable capacity – including 36GW of solar and 13GW of wind – and 8GW of energy storage from 2026 to 2030 (Figure 60), raising solar and wind's share of annual electricity supply to 27% by 2030 from 12% in 2025 while meeting growth in electricity demand. Continued expansion of renewable and energy storage capacity enables solar and wind alone to supply 62% of annual generation by 2040 (Figure 61).

Figure 60: Vietnam's installed electricity capacity, by technology – Economic Transition Scenario and Net Zero Scenario

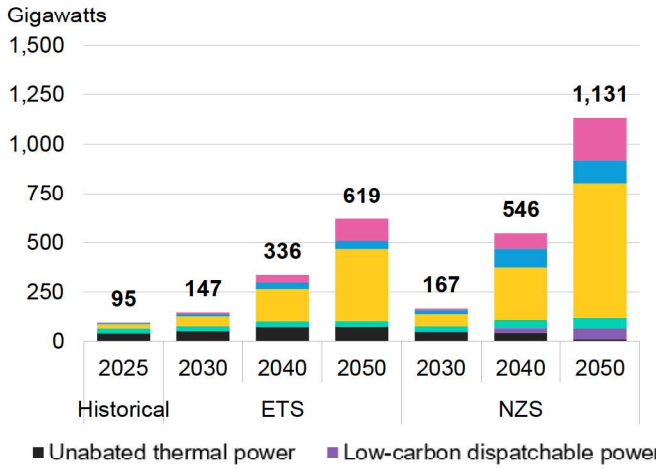
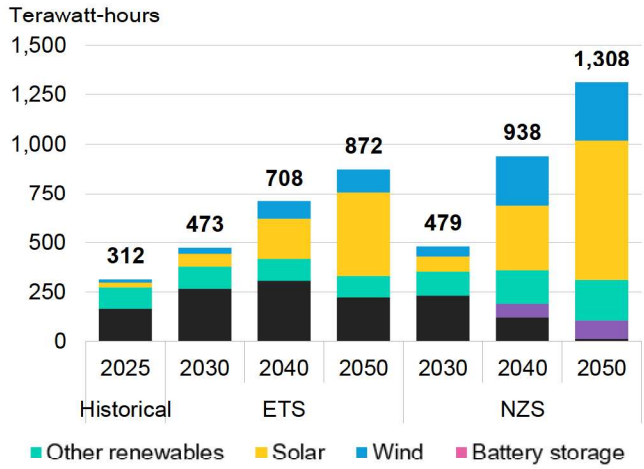


Figure 61: Vietnam's electricity generation, by technology/fuel – Economic Transition Scenario and Net Zero Scenario



Source: BloombergNEF. Note: "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives. ETS is Economic Transition Scenario and NZS is Net Zero Scenario.

Over the remainder of this decade, Vietnam needs to increase its renewable and energy storage capacity 2.9-fold under the NZS. The country's latest renewable and battery storage capacity targets could put the country on a path to net zero by 2050 if they are achieved. Under the revised Power Development Plan VIII, 2030 capacity targets are 46GW for solar, 26GW for wind and 10GW for batteries. The NZS has 33% more solar capacity and 26% less wind capacity than the revised PDP VIII.

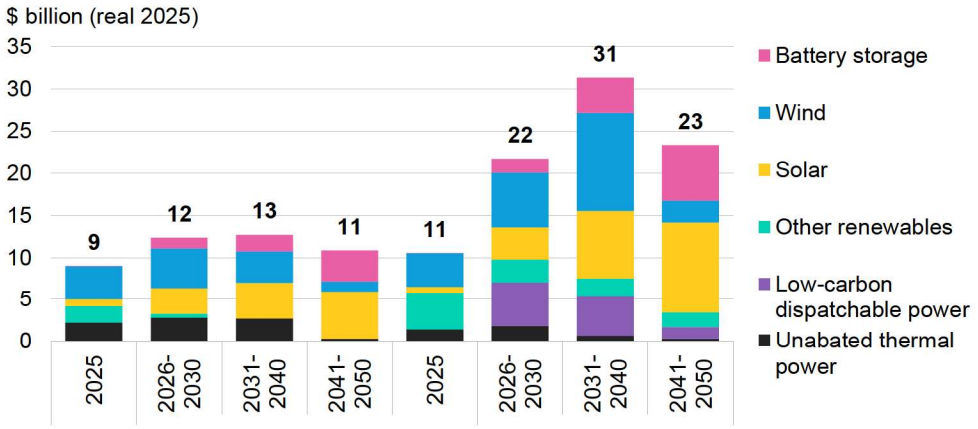
Under the NZS, Vietnam needs $65 billion of investment in renewable power capacity and $8 billion in battery energy storage over the remainder of this decade

Under the NZS, Vietnam needs $65 billion of investment in renewable power capacity and $8 billion in battery energy storage over the remainder of this decade (Figure 62). From 2018 to 2020, Vietnam experienced rapid growth in solar and wind investment, driven by its feed-in tariff program. A new wave of investment is emerging in 2026, with BNEF tracking $4.2 billion in the first half, four times the level in the same period of 2025. This put Vietnam ahead of other Southeast Asian markets for renewable energy investment for the first time in five years. Ambitious renewable targets, new clean power tenders and the direct power purchase agreement scheme could support further investment.

Vietnam was the largest electricity-consuming market for RE100 companies in Southeast Asia in 2025, with members operating in the country consuming 8TWh. Enabling 24/7 carbon-free energy procurement options for these companies could help mobilize investment for Vietnam's clean power capacity and grid expansion.

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Figure 62: Vietnam's annualized power capacity investment in NEO scenarios



Source: BloombergNEF. Note: Data shows average annual investment for each time period. "Other renewables" include bioenergy, hydro, geothermal and pumped hydro storage. "Low-carbon dispatchable power" includes nuclear, thermal power plants equipped with carbon capture and storage and/or those fueled by clean hydrogen and its derivatives.

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Section 5. Policy options

The preceding sections show that expanding affordable clean power procurement options across Southeast Asia can increase energy transition investment and strengthen energy security. However, regulatory barriers continue to constrain access. Previous studies, including the International Energy Agency's *Advancing Decarbonisation Through Clean Electricity* and BNEF's *24/7 Carbon-Free Energy Procurement in APAC: Pathways for Companies and Countries*, have explored potential solutions. This section draws on those studies, as well as feedback from renewable developers and corporate clean power buyers active in the region and their experiences in these markets.

Regulators can consider five policy options to broaden corporate access to affordable clean power:

1. **Open electricity markets and networks for different clean power procurement options:** Regulators need to ensure their electricity market design and grid rules allow corporate electricity consumers to sign different types of PPAs, such as physical PPAs, sleeved PPAs, and virtual/financial PPAs with renewable electricity generators. Furthermore, wheeling charges applied to offsite PPAs need to be based on transparent, cost-effective and predictable formulas.
2. **Strengthen transparency and credibility of electricity sources and environmental attributes:** Regulators need to require utilities – specifically electricity retailers – to provide more granular data, for instance at least hourly, on the sources of the electricity they sell to corporate consumers. Similarly, renewable energy certificates (RECs) as well as utility green tariffs (UGTs) should include more granular temporal electricity sourcing information. Coupled with other policy options outlined below, this step boosts the credibility of UGTs and RECs as viable and affordable clean power procurement options.
3. **Incorporate "additionality" in the design of utility green tariffs and renewable energy certificate issuance:** Strengthen the integrity and impact of UGTs and RECs by ensuring clear environmental-attribute ownership, robust tracking, avoidance of double issuance or claiming, and sufficient information on project vintage and sourcing to allow buyers to assess additionality. Where possible, utility green products should also be designed to support development of new renewable supply.
4. **Modernize grid regulation to reward efficient performance and support greater renewable integration:** Regulators need to ensure the rules governing grid infrastructure incentivize network operators to use their existing infrastructure efficiently, as well as invest in grid expansion and new technologies that enable greater uptake of renewables, such as battery energy storage systems. To improve utilization of existing grid infrastructure and lower the need to curtail renewables, network operators can adopt measures such as dynamic line rating. Regulators across Southeast Asia also need to accelerate the realization of the long-awaited ASEAN Power Grid. As discussed in this report and in a prior report by the Asia Clean Energy Coalition, the ASEAN Power Grid can both accelerate and lower the cost of decarbonization in Southeast Asia.
5. **Develop interoperable frameworks for cross-border electricity trade accounting and certification:** As the ASEAN Center for Energy has already identified, there are still major gaps in regional frameworks for cross-border trading of clean electricity and RECs across Southeast Asia. Harmonizing these accounting frameworks will benefit both markets blessed

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with greater renewable energy resources such as Indonesia and Vietnam, and those with limited domestic resources such as Singapore. The region's energy regulators should construct mutually agreed frameworks that link physical electricity flows with corresponding environmental attributes, establish accepted registries and residual-mix treatment, and provide transaction-level assurance against double claiming. Addressing these considerations can directly affect corporate offtake appetite and therefore project bankability. The partnership between Singapore's Ministry of Energy, Trade and Industry, the Energy Market Authority (EMA), and International Tracking Standard Foundation to develop a cross-border framework for REC trading is an important step forward in this regard.

Recognizing the differing circumstances across Southeast Asian economies, the measures above can be distilled into specific steps for Indonesia, Thailand, Vietnam, Malaysia and the Philippines.

Indonesia

As Southeast Asia's largest economy, Indonesia has significant potential to expand clean power procurement. However, high regulatory barriers, particularly rules governing the role of state-owned utility PLN, make it one of the region's most challenging markets for buyers. The Indonesian government also needs to improve coordination of clean-power procurement policies across relevant ministries, such as the Ministry of Energy and Mineral Resources, the Ministry of Industry, as well as various investment authorities, supported by structured consultation with corporate buyers. The newly formed Coordinating Ministry for Industrial Downstreaming and Energy Transition could be a suitable vehicle to spearhead this effort. The following five measures could help address some of the key challenges:

1. **Enable corporate direct PPAs via PLN's grid under a transparent power-wheeling framework:** Similar to measures undertaken in recent years by Malaysia and Vietnam, regulators in Indonesia need to enact reforms to allow corporate electricity consumers to sign PPAs with renewable developers, while utilizing PLN's grid infrastructure. This policy widens access to clean power for businesses, boosts Indonesia's appeal as an investment destination, unlocks a new source of demand for project developers and creates a new source of revenue for PLN.
2. **Turn PLN's Dedicated Source program into a standardized, scalable UGT option**: The Dedicated Source deals signed separately by Amazon and Microsoft with PLN provide good examples for establishing a standardized, scalable utility green tariff (UGT). Establishing such a UGT would enable PLN to secure new revenues to fund renewable supply expansion while corporations would gain more corporate clean power procurement options. As stated before, the UGT needs to be designed with *additionality* in mind. PLN can improve the transparency and appeal of this program by publishing eligible or project-linked generation sources, cost structure, commissioning timelines and environmental attributes, while progressively improving temporal sourcing information.
3. **Use aggregated corporate demand to support competitive procurement of new renewable and storage capacity:** Regulators can modify the 10-year strategic power planning process, RUPTL (*Rencana Usaha Penyediaan Tenaga Listrik*), to include competitive auctions based on (aggregated) corporate offtake demand for renewables and energy storage. This would provide a realistic option for attracting the investment required to fulfill the latest RUPTL's ambitious 42.6GW renewables and 10.3GW energy storage target. Under such a scheme, PLN would retain system balancing responsibilities and apply transparent wheeling charges to any offtake agreements between corporate buyers and IPPs. The same concept could also be applied to the government's 100GWp solar program.

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4. **Remove constraints against behind-the-meter power procurement and aggregation of distributed energy resources:** Under the current regulatory environment, corporations wishing to install rooftop solar face a myriad of challenges, such as local capacity quotas and twice-yearly application windows. Regulators should progressively relax rooftop solar quotas where system conditions allow and streamline application windows and permitting to allow corporations to maximize the use of behind-the-meter resources and aggregate distributed energy resources. PLN can be compensated for the use of its distribution network by these corporate consumers, but the distribution network charges need to be set in a transparent manner reflective of the cost of services provided by PLN to these customers. In addition, policymakers also need to clarify REC ownership for grid-connected rooftop solar and establish a fair framework for curtailment and energy storage.
5. **Expand corporate access to geothermal, hydro, energy storage and hybrid portfolios:** Indonesia is blessed with significant geothermal and hydro resources that can complement variable renewables such as solar and wind, alongside energy storage. The government can introduce new corporate offtake mechanisms and tenders to enable corporations to sign agreements for hydro, geothermal and energy storage to complement solar and wind, including options that support firmer or time-matched clean electricity supply. This would be particularly attractive for corporate customers pursuing 24/7 carbon-free energy procurement.

Thailand

Thailand's launch of utility green tariffs – UGT1 for non-specific power sources in 2025 and UGT2 for specific power sources in 2026 – materially improved corporate access to clean power. However, barriers remain, particularly for third-party offsite PPAs. The following steps could help expand corporate clean power procurement:

1. **Accelerate implementation of the direct PPA framework and provide a pathway to broader corporate participation:** Thailand's Energy Regulatory Commission (ERC) has been exploring a pilot program to enable up to 2GW direct power procurement by data centers from renewable IPPs. Although the government temporarily paused data center projects that were under construction or planned in September 2026, Thailand has continued taking steps to enable clean power procurement in the sector. Furthermore, the government earlier this year lifted the direct PPA program's 2GW cap and expanded its offtaker eligibility to all industrial sectors. However, this program's success would require finalizing the Third-Party Access Code, wheeling and system charges, imbalance treatment, contractual arrangements and an implementation timetable.
2. **Establish transparent and stable third-party network access and wheeling charges:** The direct PPA pilot for data centers includes third-party network access and wheeling charges. The ERC needs to publish transparent methodologies for wheeling, connection, ancillary-service, imbalance and other system-related charges, while providing sufficient long-term predictability for corporate PPAs and ensuring fair allocation of system costs. Corporate buyers need long-term cost visibility to evaluate the financial viability of direct PPAs potentially lasting 10 to 20 years.
3. **Expand UGT2 eligibility and eligible carbon-free energy resources:** UGT2 provides more granular sourcing information and greater additionality than UGT1 but its use is currently limited to large general service and specific business service classes, excluding many small and medium enterprises. The ERC could broaden customer eligibility and allow UGT2 to draw from a wider portfolio of carbon-free resources, including dispatchable renewables, hybrid generation and storage-supported supply where technically and commercially feasible, while improving source transparency and enabling products that better match corporate

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demand profiles. Over time, the ERC could also allow corporations to contract with a portfolio of technologies to match their demand, including 24/7 carbon-free energy procurement.

4. **Shift from feed-in tariffs to competitive auctions for renewables:** Thailand could shift from administratively determined feed-in tariff pricing toward transparent and competitive procurement for new renewable electricity. Competitive auctions and other market-based procurement mechanisms can improve price discovery, reduce procurement costs and support efficient renewable deployment, while maintaining appropriate safeguards for project bankability and system reliability.
5. **Use Thailand's central grid position to support corporate clean power procurement through the ASEAN Power Grid:** Thailand already plays a crucial role in the Lao PDR–Thailand–Malaysia–Singapore Power Integration Project because of its central location in Southeast Asia. Working with other ASEAN partners, in particular Singapore, Thailand could further accelerate development of the ASEAN Power Grid, including by establishing affordable and transparent wheeling charges for cross-border clean power trading.

Vietnam

Vietnam has made significant progress in expanding corporate clean power procurement in recent years, most recently through Decree No. 243/2026/ND-CP. The following measures could further expand access to affordable clean power.

1. **Progressively lower the DPPA consumer eligibility threshold:** Current DPPA rules limit clean power procurement through the national grid to customers with average monthly electricity consumption of at least 200MWh. Vietnam's Ministry of Industry and Trade (MoIT) could progressively lower this threshold to expand eligibility.
2. **Expand national-grid DPPA eligibility to all renewable technologies as well as projects smaller than 10MW:** Current DPPA rules limit renewable electricity procurement through the national grid to solar, wind and biomass projects larger than 10MW. Lowering the project-size threshold and expanding technology eligibility to include other renewables such as hydro would increase the pool of renewable supply available for power procurement.
3. **Build on Decree 243 to allow broader aggregation of demand for clean power procurement:** Decree 243 has expanded demand aggregation within individual industrial parks and supply eligibility to rooftop solar. Many multinational corporations also want to support clean power procurement by their Vietnamese suppliers, including by aggregating demand from small and medium-sized suppliers across multiple locations. However, the current rules do not allow such demand aggregation beyond industrial parks. The government could establish mechanisms for aggregating corporate and supply-chain electricity demand across multiple locations, with clear rules on buyer eligibility, contract structures, settlement and environmental-attribute allocation.
4. **Provide long-term visibility on DPPA network, settlement and market charges:** Corporate offtakers need long-term visibility of clean power procurement costs. The government could support this need by avoiding sudden changes to existing rules about wheeling charges and grid fees and other surcharges. As Vietnam continues to implement its ambitious power market reforms, timely and transparent communication with stakeholders will be key to limiting uncertainty.
5. **Integrate DPPA demand into transmission and renewable energy planning:** The government could incorporate corporate clean power demand into long-term power development planning. It could also introduce options for corporates seeking 24/7 carbon-free energy to support investment in energy storage and cross-border grid connections.

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Malaysia

Over the last five years, Malaysia has significantly improved corporate clean power procurement access in the country, first with the introduction of the Green Electricity Tariff (GET), a UGT, followed by the Corporate Green Power Programme (CGPP), enabling virtual PPAs, and most recently by the Corporate Renewable Energy Supply Scheme (CRESS) enabling third-party network access and physical PPAs. While some of these programs have had challenges, the government and regulators have tried to be responsive, for example by reducing the system access charges (wheeling charges) applied under CRESS. Malaysia can continue to build on its leading position in Southeast Asia with the measures below.

1. **Improve transparency on the CRESS system access charges:** charges remain high for variable renewable sources, such as standalone solar and wind, at double the rate for firm renewables (40 sen/kWh versus 20 sen/kWh). The methodology behind the system access charge derivation has also not been publicly disclosed. Greater transparency on charge determination would improve long-term cost predictability, boosting project bankability and appeal to offtakers.
2. **Expand the definition of firming under CRESS to include portfolio and system-wide options:** The current firming definition under CRESS guidelines (clauses 8.14 and 8.15) only considers battery energy storage systems (BESS) with variable renewables. For example, a solar developer needs to install a 4-hour BESS with capacity equivalent to at least 50% of the solar project's capacity to be recognized as firm supply. These guidelines are overly rigid and do not account for variability in both demand and supply, as well as other technologies and approaches beyond just BESS. It would be beneficial to expand the menu of available firming options, for example a portfolio of different renewable technologies and energy storage options in consideration of the offtaker's demand profile, in setting the system access charges.
3. **Clarify treatment and monetization of excess energy under CRESS:** Clean power projects may produce excess electricity at times of high supply or unusually low demand. The treatment of this excess energy materially affects project revenue and bankability. Even with an attractive SAC, projects may remain difficult to finance if developers and offtakers cannot predict how excess generation is valued and who owns the associated environmental attributes. Regulators should clarify excess energy allocation, sell-back arrangements, and ownership of environmental attributes to eliminate this uncertainty.
4. **Broaden access and aggregation under CRESS:** The current CRESS guidelines limit renewable energy project size eligibility to a single project 30MW or larger. On the demand side, only individual medium- and high-voltage customers are eligible for participation; demand aggregation across multiple locations is not allowed. Lowering the minimum project size and allowing renewable projects to be aggregated would increase the affordable renewable supply available under CRESS and enable smaller developers to participate. Allowing aggregation of demand across different sites and industrial parks under a single contract would also enable more corporate electricity consumers to benefit from CRESS.
5. **Expand GET into a long-term, project-linked program and add 24/7 carbon-free option:** The current GET has been very successful, as exemplified by the full subscription of TNB's 2026 GET quota. TNB can consider increasing the GET quota by linking additional demand directly with specific new renewable energy projects. It can also add more premium GET menu options, whereby the customers' hourly demand is matched with hourly renewable generation to meet the needs of corporations keen on 24/7 carbon-free energy procurement.

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Philippines

Alongside Singapore, the Philippines is the only other market covered in this report with a liberalized competitive electricity market. The Energy Regulatory Commission's (ERC) decision to lower the electricity retail contestability threshold from 500kW to 100kW effective June 26, 2026, has expanded eligibility for clean power procurement. The government could take additional measures to improve access to affordable clean power:

1. **Continue lowering retail and green-power eligibility thresholds and expand aggregation:** Customer eligibility thresholds for the Retail Competition and Open Access (RCOA) and the Retail Aggregation Program (RAP) have already been lowered to 100kW, while the threshold for the Green Energy Option Program (GEOP), a UGT, has been lowered to 50kW. The ERC could progressively lower these thresholds and relax aggregation rules to expand access for small and medium-sized enterprises.
2. **Expand GEOP to include hourly green electricity retail options:** The ERC can introduce rules allowing renewable electricity suppliers and electricity retailers to offer optional project-specific and time-matched UGT options backed by interval metering and time-stamped RECs.
3. **Prioritize grid connections for auctioned and corporate-backed renewables:** The Philippines Department of Energy has issued Circular No. DC2026-01-0001 and Circular No. DC2026-02-0007 to accelerate transmission network expansion in support of renewable energy growth. Implementation should include a transparent connection queue for new renewable projects and electricity demand. The policies also provide scope for the National Transmission Corporation (TransCo) and renewable developers and investors to cooperate on financing and developing transmission infrastructure needed to connect new projects.
4. **Incorporate corporate-offtake and 24/7 carbon-free energy options into the Green Energy Auction Program:** The Green Energy Auction program has supported the buildout of standalone renewable projects and, more recently, renewables paired with energy storage. The government has also unveiled a 10-year plan targeting 25GW of new renewable capacity by 2035. To implement this ambitious plan, the Department of Energy could further develop the auction design to incorporate different combinations of renewables and energy storage alongside corporate demand for clean power at different times. This could include options supporting 24/7 carbon-free energy procurement.
5. **Continue reforming distributed-energy and net-metering rules to enable greater aggregation:** The Philippines reformed net-metering rules in 2025, introducing credit banking and mandatory publication of transformer-level capacity. Additional distributed-energy resource reforms were proposed in 2026. To enable greater aggregation of distributed energy resources and demand, further reforms could be undertaken, for example simplifying application timelines, raising size limits for commercial and industrial installations, and allowing multi-site or virtual aggregation of rooftop solar and batteries.

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Appendices

Appendix A. NEO modeling methodology

Scenario design

The *New Energy Outlook* presents two carefully calibrated scenarios, the Economic Transition Scenario and the Net Zero Scenario. In addition, BNEF has developed a range of global, sector-based, and country-level scenarios, including detailed modeling in the transport sector.

Scenarios are future-focused simulations combining a number of uncertain parameters into an internally consistent narrative. They are predominantly used for medium- to long-term investigative studies. Long-term scenarios are different from forecasts, which are usually shorter-term predictions of what BNEF thinks may actually happen.

Scenarios in the *New Energy Outlook* are best understood as carefully calibrated reference scenarios, instead of sensitivities or stress-testing scenarios.

Table A.1: Scenarios in the New Energy Outlook

Economic Transition Scenario (ETS)	Net Zero Scenario (NZS)
• Exploratory base case that describes how the power, industry, transport and buildings sectors might evolve as a result of cost-based technology changes.	• Normative climate scenario outlining a credible maximum-effort pathway to limit warming to well below 2C using existing technologies.
• Consistent with a global warming outcome of 2.4C by 2100 (67th percentile).	• Consistent with peak warming of 1.81C by 2049 and 1.73C by 2100.
• Accounts for firm near-term policies but assumes no further support beyond existing measures.	• Delivers net zero across power, transport, industry and buildings sectors by 2050 under defined sectoral carbon budgets.
• The low-carbon transition is largely limited to the power and transport sectors.	• Includes limited overshoot and moderate post-2050 carbon removals.
• Uses bottom-up sub-sector models, instead of a top-down general equilibrium model or integrated assessment models.	
• Uses consistent macro-economic inputs across both scenarios.	
• Leverages proprietary data and expertise of 200 analysts.	
• Models at yearly granularity for transport, industry and buildings sectors and hourly granularity in the power sector to 2050.	
• Offers data transparency on country- and sector-level data inputs and results.	

Source: BloombergNEF

Economic Transition Scenario

The Economic Transition Scenario (ETS) is BNEF's base-case assessment of how the energy economy might evolve to 2050, driven by cost-based technology change. It combines near-term market activity, consumer uptake of new energy technologies, least-cost system modeling and trend-based analysis to describe the deployment of commercially available technologies and their tipping points.

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Technology transitions occur only where they reduce system costs or offer an attractive payback for consumers. Therefore, the ETS describes how the energy sector might evolve in the absence of further major climate policy intervention, but in a world where clean technologies can compete on a level playing field.

BNEF scenarios are economics-led, incorporating near-term policy only where it is legislated and materially affects competitive economics. They do not assume that country-level or corporate long-term climate targets are met. Policy is reflected through in-model mechanisms, short-term technology and market forecasts, and analyst-informed assessments of company commitments. Carbon pricing is included where compliance schemes are already in place.

BNEF scenarios take a demand-led approach. Population and economic growth drive rising demand for energy-intensive materials, transport services and buildings. As incomes increase, demand grows for mobility, industrial output and energy services such as heating, cooling and electricity use in homes and businesses. In the model, electricity intensity evolves with economic structure, while energy efficiency improves gradually across both demand and supply.

Greenhouse gas emissions under our *New Energy Outlook 2026* ETS are consistent with a 67% chance of limiting global temperature rise to 2.4C by 2100.

Net Zero Scenario

The Net Zero Scenario (NZS) sets out a credible maximum-effort pathway to keep warming **well below 2C** by staying within a fixed carbon budget and reaching net-zero emissions in 2050. It includes limited overshoot and moderate reliance on net-negative emissions post-2050. It follows a sector-led decarbonization approach, where national carbon budgets reflect economic structure and sectoral growth rather than historical responsibility or access to finance.

Technology choices are primarily economics-driven, while also reflecting countries' strategic priorities, legislated policies and domestic resource endowments. Instead of carbon pricing, the NZS relies on economics-led technology displacement to meet demand for energy services under a carbon constraint. The NZS is an economics-led scenario, but also takes into account real-life constraints. In practice, this means applying least-cost optimization models across sectors such as power and industry using detailed cost forecasts for technologies, complemented by sector-specific analysis to identify the most realistic and cost-effective decarbonization pathways in end-use sectors.

The NZS accelerates deployment of renewables, nuclear and other low-carbon dispatchable power, alongside rapid electrification and cleaner fuels such as bioenergy and hydrogen in end-use sectors. Carbon capture and storage become available from the early 2030s, enabling limited continued fossil-fuel use in power and industry. Increased recycling and efficiency further reduce emissions. The NZS therefore represents a structural shift in the energy system rather than a continuation of existing policy trajectories.

Greenhouse gas emissions under the NZS in *New Energy Outlook* 2026 are consistent with a 67% chance of limiting peak temperature rises to 1.81C by 2049 and 1.73C by 2100.

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