

A Race to the Top

2024

SOUTHEAST ASIA





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The Global Solar Power Tracker is a worldwide dataset of utility-scale solar photovoltaic and solar thermal facilities. It includes solar farm phases with capacities of 20 megawatts (MW) or more (10 MW or more in Arabic-speaking countries) and medium utility-scale projects down to 1 MW globally. The Global Wind Power Tracker is a worldwide dataset of utility-scale, on and offshore wind facilities. It includes wind farm phases with capacities of 10 megawatts (MW) or more.

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FURTHER RESOURCES

For additional data on proposed and existing solar projects, see [Summary Data](#) of the Global Solar Power Tracker. For links to reports based on the Global Solar Power Tracker data, see [Reports & Briefings](#). To obtain primary data from the Global Solar Power Tracker, see [Download Data](#).

For additional data on proposed and existing wind projects, see [Summary Data](#) of the Global Wind Power Tracker. For links to reports based on the Global Wind Power Tracker data, see [Reports & Briefings](#). To obtain primary data from the Global Wind Power Tracker, see [Download Data](#).

Supplementary information on the methodology used for this report can be found on our [methodology wiki page](#).

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A Race to the Top 2024: Southeast Asia

Operating solar and wind capacity in Southeast Asia grows by a fifth since last year, but only 3% of prospective projects are in construction

INTRODUCTION

ASEAN countries¹ collectively have one of the [fastest-growing economies](#) in the world, with an increasing energy demand to match. As the average global energy demand [grew by 16%](#) between 2015 and 2021, ASEAN demand grew by 22% in the same time period. According to the International Energy Agency (IEA), energy demand across ASEAN countries is expected to [grow by 3%](#) annually until 2030.

Despite their economic resources, ASEAN countries face a dual challenge in seeking to fulfill energy transition targets amidst rapid growth, given the effects of climate change. [Among the most vulnerable](#), these countries are already experiencing [flooding](#), [drought](#), [rising sea levels](#) and [heat waves](#), all of which are [straining electricity supplies](#) in the context of growing energy demand.

ASEAN member states have set a collective renewable energy capacity target of [35%](#) by 2025. Including all types of renewable power, the region is already close to meeting its goal by currently having [32%](#) of its total capacity sourced from renewables. The region currently has 28 gigawatt (GW) of large utility-scale² solar and wind power in operation — accounting for 9% of total electrical capacity in the region. ASEAN would have to build 17 GW of utility-scale wind and solar capacity by 2025 to reach this goal. With only a 3% renewable capacity increase necessary to meet this target, ASEAN countries are expected to not only [meet this goal](#), but [surpass it](#).

1. The Association of Southeast Asian Nations (ASEAN) member states include Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. Although Timor Leste is not yet an official member state of ASEAN, it is considered the [11th member](#) in principle and was present at [ASEAN's 43rd Summit](#) in Indonesia. Therefore, for the purpose of this report, Timor Leste is considered a part of ASEAN. Please refer to the [methodology page](#) for a full list of countries in the report.

2. GEM catalogs all solar installations 20 MW and greater and all wind installations greater than 10 MW. Both “large utility-scale solar” and “utility-scale solar” are used throughout the text to refer to such projects.

At the same time, however, continued support for gas and coal, regulatory hurdles, and policies unsupportive of renewable energy buildout are stymying the rapid transition that is necessary to break the region's dependence on gas and coal and progress renewable energy in ASEAN countries. While the region has potential to increase its renewables capacity seven-fold — this report documents over 220 GW of documented prospective³ utility-scale solar and wind capacity — only 3% of ASEAN countries' total prospective capacity is currently in construction. The global average, barring China, is over twice that of ASEAN countries, at 7% prospective capacity under construction.

Key findings

- ASEAN countries have over 28 GW of operating utility-scale solar and wind capacity and a 20% increase in operating capacity since January 2023 and make up 9% of ASEAN countries' total electrical capacity.
- Vietnam has the largest share of operating utility-scale solar and wind capacity in the region (19 GW). Thailand and the Philippines follow, each with 3 GW of operating utility-scale solar and wind capacity.
- The Philippines and Vietnam are emerging leaders globally. With 99 GW and 86 GW respectively for prospective utility-scale solar and wind, they have the 8th and 9th largest prospective capacity worldwide.
- The ASEAN countries have almost five times more prospective offshore wind power than prospective onshore wind in the region, while prospective offshore capacity in the region (124 GW) is nearly twice that of the current global offshore operating capacity (69 GW).
- In order for ASEAN countries to meet their goal of 35% installed renewable energy capacity by 2025, 17 GW of additional utility-scale solar and wind capacity needs to become operational among ASEAN members in the next two years, yet only 3% (6 GW) of its 220 GW of prospective utility-scale solar and wind is currently in construction.

3. Prospective projects are any projects that are either announced, in pre-construction, or under construction. Additional terminology information can be found [here](#).












I. ASEAN COUNTRIES HAVE INCREASED OPERATING UTILITY-SCALE SOLAR AND WIND BY 20% SINCE JANUARY 2023

Global Energy Monitor's Global Solar Power Tracker and Global Wind Power Tracker currently catalog more than 28 GW of operating utility-scale solar and wind capacity across ASEAN countries, a 20% year-over-year increase in operating capacity since January 2023. While utility-scale solar contributes the bulk of the overall capacity increase (3 GW or 17% growth),

it was operational wind capacity that saw the largest comparative rise (2 GW, or 29% growth) since January 2023. Offshore wind development accounts for 2 GW of a total of 9 GW of operating utility-scale wind capacity; this is noteworthy given the technical challenges and associated [higher costs](#) of offshore wind compared to onshore wind.

Table 1: Operating Utility-Scale Solar & Wind Power in Southeast Asia

Country-level operating utility-scale solar & wind power capacity, in megawatts (MW)

Country	Operating Solar	Operating Wind	Operating Solar & Wind
 Vietnam	13,035	6,466	19,501
 Thailand	1,041	2,092	3,133
 Philippines	2,343	675	3,018
 Malaysia	1,577	0	1,577
 Cambodia	429	0	429
 Myanmar	190	0	190
 Singapore	186	0	186
 Indonesia	21	157	178
 Brunei	0	0	0
 Laos	0	0	0
 Timor-Leste	0	0	0

Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more and wind project phases with a capacity of 10 MW or more.

Source: Global Solar Power Tracker, Global Wind Power Tracker

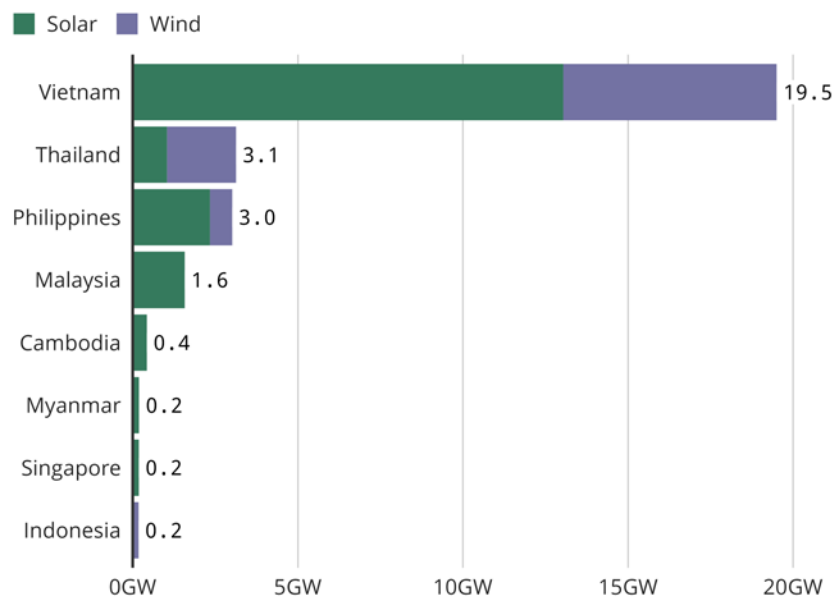
Vietnam has the largest operating capacity of utility-scale solar and wind, followed by Thailand and the Philippines

Vietnam is the current regional leader in terms of operating utility-scale solar and wind capacity, with more than double the capacity of the other member countries combined (over 19 GW compared to 9 GW). Operational utility-scale solar and wind capacity make up 25% of Vietnam's total energy mix, compared to the average among ASEAN nations of 9%.⁴ Starting in 2017, Vietnam deployed a series of competitive and incentivized investment policies to bring utility-scale solar projects into operation, leading to a boom in solar development. Two [feed-in-tariff \(FIT\) programs](#) were deployed by Vietnam's state-owned utility from

[2017 to 2020](#). Upon the expiration of these programs, Vietnam failed to administer a replacement [pricing policy](#). Coupled with COVID-19 pandemic-led supply chain [disruptions](#), many projects were not operational before FIT cut-off dates, and were left without long term [guidance](#) for further project development and grid integration. Though Vietnam still added over 12 GW of utility-scale solar capacity from 2019–2021, gaps in renewable energy policy have curtailed the operationalization of utility-scale solar and wind, with 2022 seeing the commissioning of 1 GW compared to nearly 4 GW in 2021.

Figure 1: Operating Solar & Wind Power in Southeast Asia

Total operating utility-scale solar & wind power capacity by county, in gigawatts (GW)



Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more and wind project phases with a capacity of 10 MW or more.

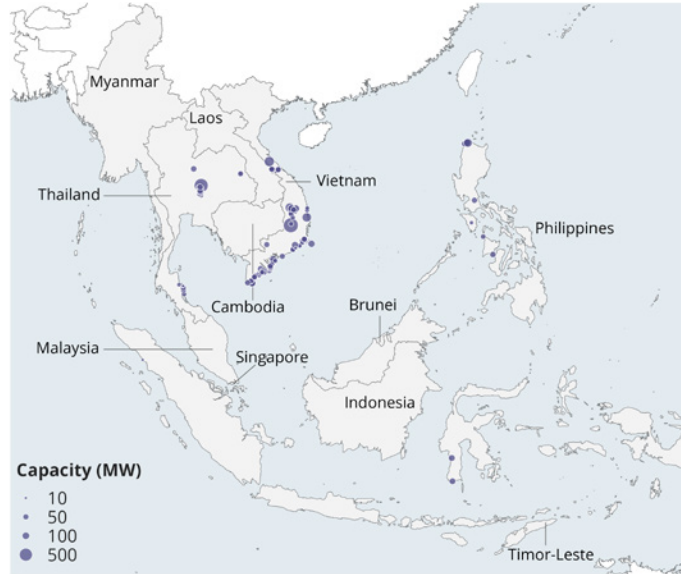
Brunei, Laos, and Timor-Leste do not have any operating capacity.

Source: Global Solar Power Tracker, Global Wind Power Tracker

4. For details on definitions and methodology see the [methodology page](#).

Map 1: Southeast Asia's Operating Wind Farms

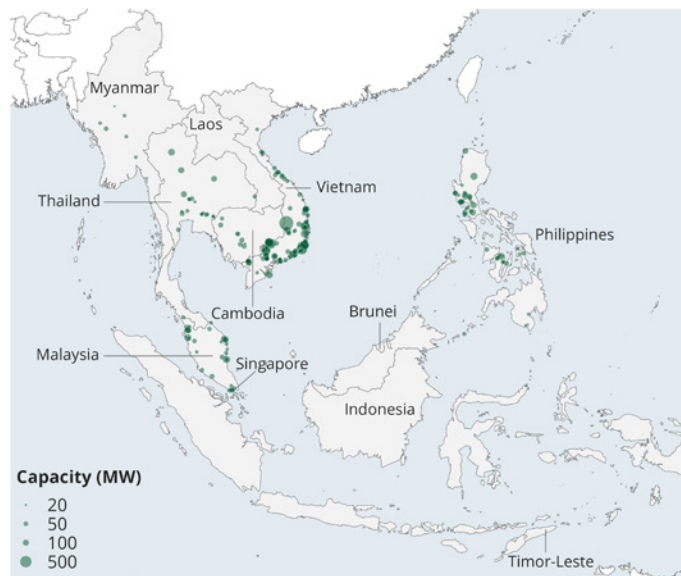
Locations of operating wind power in Southeast Asia, circles sized by megawatt (MW) capacity



Note: Data only includes wind project phases with a capacity of 10 MW or more.
Source: Global Wind Power Tracker

Map 2: Southeast Asia's Operating Solar Farms

Locations of operating utility-scale solar power in Southeast Asia, circles sized by megawatt (MW) capacity



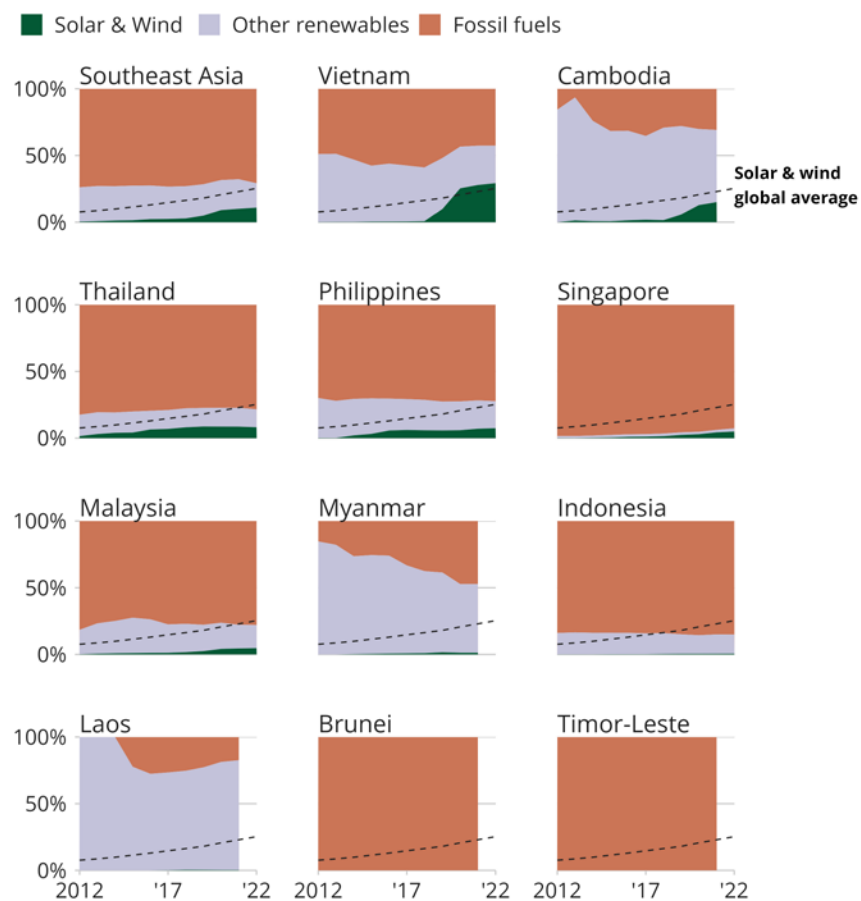
Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more.
Source: Global Solar Power Tracker

Thailand and the Philippines each have more than 3 GW of operating utility-scale solar and wind capacity. Thailand has the second largest economy of ASEAN nations, and is seen as a low-risk country, with few barriers for investment in utility-scale solar and wind projects. This view has facilitated the growth of Thailand's 3 GW of operational utility-scale solar and wind capacity, nearly 67% of which is from onshore wind

development. The Philippines hosts a streamlined project bidding system, with predominantly privatized power generation, allowing for an unencumbered pipeline for project development. Three-quarters of the Philippines' operational utility-scale solar and wind capacity comes from solar.

Figure 2: Solar & Wind Power Capacity in Southeast Asia

Proportion of power capacity broken down by aggregate power source; dashed line shows global average for solar and wind



Source: Ember Climate

II. THE PHILIPPINES AND VIETNAM CONTRIBUTE 80% OF ASEAN'S PROSPECTIVE UTILITY-SCALE SOLAR AND WIND CAPACITY, BUT CONSTRUCTION RATES REMAIN LOW












The leaders for prospective utility-scale solar and wind capacity among ASEAN countries are the Philippines and Vietnam, with over 185 GW in announced, pre-construction, and construction status. Collectively, these countries contribute over 80% of ASEAN's prospective utility-scale solar and wind capacity. Over 60% of this prospective capacity comes from offshore wind development in Vietnam and the Philippines (72 GW and 52 GW respectively). However, only 6.3 GW (3%) of all prospective capacity in ASEAN is currently under construction.

The Philippines alone is responsible for nearly half (45%) of the prospective capacity of ASEAN countries. This is more than five times the prospective capacity of any other ASEAN country, barring Vietnam. The

Philippines has established its [Green Energy Auction Program \(GEAP\)](#) to grow its renewable energy sector. The Philippines' latest auction, in March 2023, (GEA-2) encouraged over [300 bids](#) to develop [3 GW](#) of solar, onshore wind, and bioenergy with 2024–2026 start dates. As GEA-2 was initially set up to facilitate the development of over 11 GW, the auction was evidently [largely undersubscribed](#). On the bright side, however, the capacity won by bidders demonstrated a [75% increase](#) over the first auction in 2022, indicating growing interest in the Philippines' renewable energy sector. Offshore wind comprises the majority (52%) of the Philippines' prospective utility-scale renewable power capacity, with five times more offshore wind than onshore. In April 2023, the Philippines administered an [executive order](#) to outline cooperation

Table 2: Prospective Utility-Scale Solar & Wind Power in Southeast Asia

Country-level prospective utility-scale solar & wind power capacity, in megawatts (MW)

Country	Prospective Solar	Prospective Wind	Prospective Solar & Wind
 Philippines	36,587	62,809	99,396
 Vietnam	10,195	76,023	86,218
 Indonesia	16,530	2,486	19,016
 Myanmar	340	4,732	5,072
 Laos	304	3,680	3,984
 Thailand	2,702	435	3,137
 Cambodia	2,470	0	2,470
 Malaysia	2,372	0	2,372
 Singapore	624	50	674
 Brunei	30	0	30
 Timor-Leste	0	0	0

Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more and wind project phases with a capacity of 10 MW or more.

Source: Global Solar Power Tracker, Global Wind Power Tracker

between private investors and the government in the administration of offshore wind power. Since the order’s enactment, offshore wind [contracts more than doubled to nearly 80](#), for a [total capacity](#) of 61 GW.

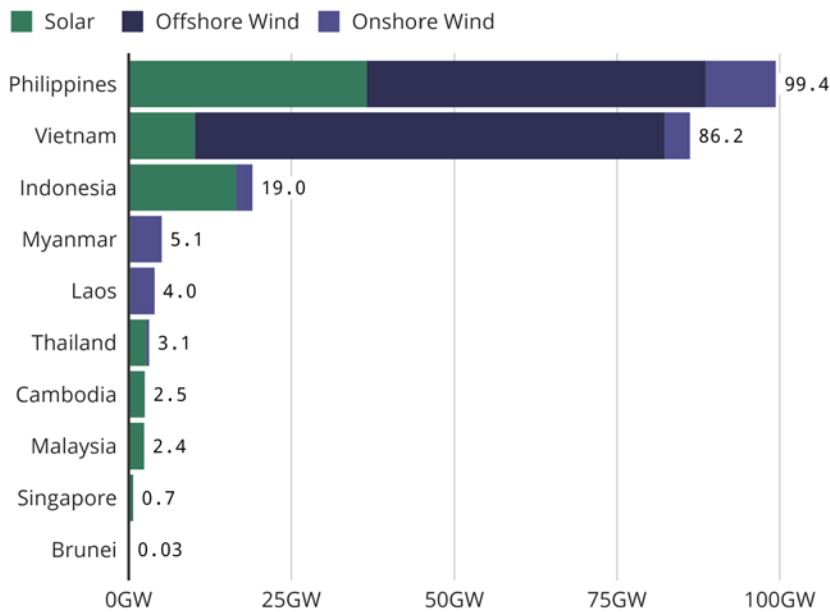
While Vietnam has over 86 GW of prospective capacity, including 72 GW of prospective offshore wind capacity, only 2% is in the construction phase. The discrepancy between prospective and in-construction capacity is due in part to Vietnam’s lack of concise and reliable renewable energy [policies](#) that could serve as a crucial roadmap for project implementation. This has left many financiers without incentive to [move forward](#) with development. Global Energy Monitor has cataloged nearly 40 GW of utility-scale solar and wind projects in Vietnam that have seen no progression or announcements in the past two years — at which point these projects are considered shelved — further

demonstrating a lack of incentive to prioritize solar and wind construction and grid connection in the country.

An additional challenge that Vietnam’s renewable energy efforts are facing is the enabling of a [Just Energy Transition Partnership \(JETP\)](#), with the support of G7 countries, in order to establish mechanisms to accelerate Vietnam’s energy transition and reduce the financial hurdles to develop a robust renewable energy economy, as it backs away from fossil fuel dependence. In May 2023, Vietnam released its delayed [National Electricity Development Plan for 2021–2030](#), also known as the Power Development Plan 8 (PDP8). Along with mapping out Vietnam’s future energy mix, this document outlines the trajectory of Vietnam’s power development strategy on improving the transmission of electricity for domestic

Figure 3: Prospective Solar & Wind Power in Southeast Asia

Total prospective utility-scale solar & wind power capacity by country, in gigawatts (GW)



Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more and wind project phases with a capacity of 10 MW or more.

Timor-Leste does not have any prospective capacity.

Source: Global Solar Power Tracker, Global Wind Power Tracker

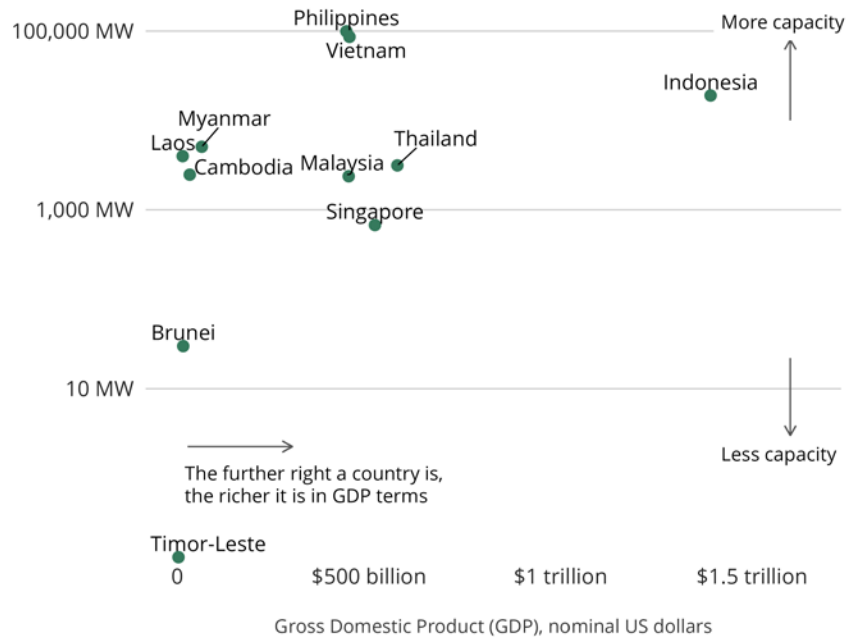
use. For instance, PDP8 states Vietnam’s goal of achieving over 27 GW of operational wind capacity by 2030, a fourfold increase on its current operational capacity of 6.5 GW. The true impact of Vietnam’s JETP and PDP8 on the development of utility-scale solar and wind power in Vietnam are yet to be determined, as the alignment of these policies and funding schemes are still in development.

Indonesia has 19 GW of prospective utility-scale solar and wind capacity, 16.5 GW of which is solar. Thirteen GW (70%) of this 19 GW of prospective capacity is in announced phases. No projects are currently under construction.

Within ASEAN countries, Laos stands out for its substantial prospective utility-scale solar and wind capacity relative to the size of its economy. Notably, Laos’ prospective utility-scale solar and wind capacity rivals that of Thailand (both exceed 3 GW), despite Laos’ economy being only 2% of the size. Furthermore, with an economy just 3% of that of Malaysia’s, Laos’ prospective utility-scale solar and wind buildup surpasses Malaysia’s by more than 150%, highlighting Laos’ ambition to punch above its economic weight. Laos’ development of utility-scale solar and wind is fueled by financial collaboration with ASEAN partners. Impressively, Laos is set to house ASEAN’s largest onshore wind farm, Monsoon wind farm, which is currently in construction with an expected capacity of 600 MW.

Figure 4: How Does Prospective Solar & Wind Capacity Relate to Economic Wealth in Southeast Asia?

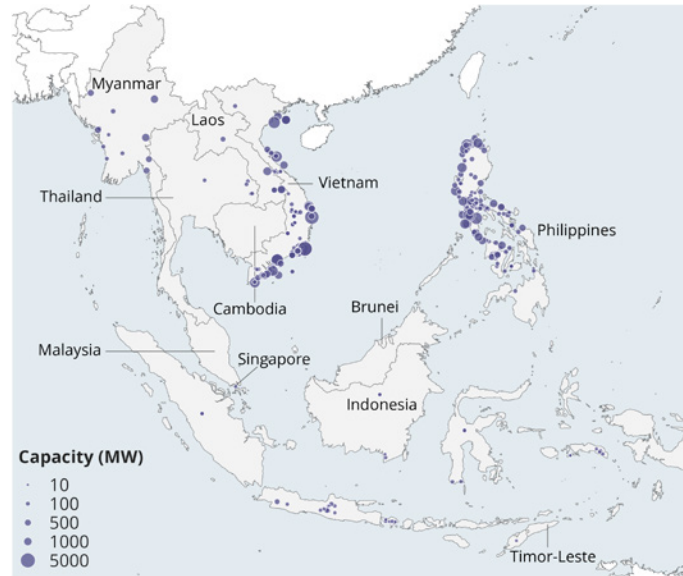
Total prospective utility-scale solar & wind power capacity by country in megawatts (MW) in log scale aligned with wealth in GDP



Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more and wind project phases with a capacity of 10 MW or more.
 Source: Global Solar Power Tracker, Global Wind Power Tracker, IMF

Map 3: Southeast Asia's Prospective Wind Farms

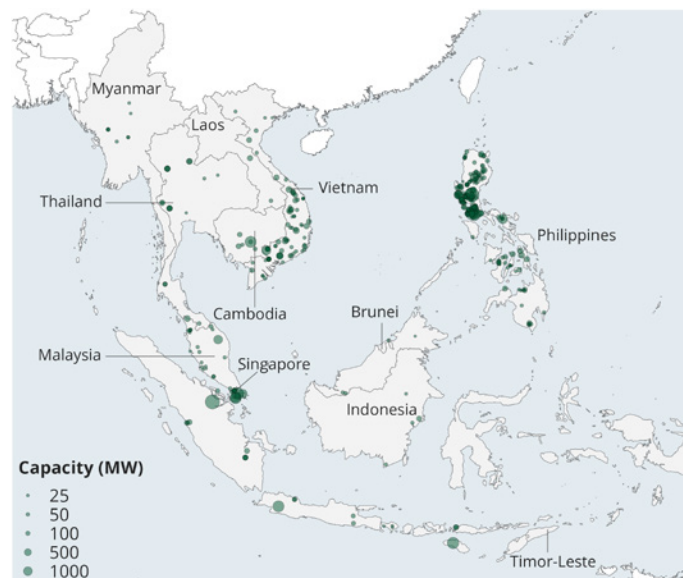
Locations of prospective wind power in Southeast Asia, circles sized by megawatt (MW) capacity



Note: Data includes only wind project phases with a capacity of 10 MW or more.
Source: Global Wind Power Tracker

Map 4: Southeast Asia's Prospective Solar Farms

Locations of prospective utility-scale solar power in Southeast Asia, circles sized by megawatt (MW) capacity



Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more.
Source: Global Solar Power Tracker

III. ASEAN ABILITY TO REACH REGIONAL 2025 RENEWABLE ENERGY TARGETS HINGES ON REDUCING GAS AND COAL USE

While ASEAN member states are working towards transparent and supportive energy policy, [ASEAN's target of 35%](#) of total operating energy capacity by 2025 from renewable power is easily attainable and ultimately unambitious for ASEAN. ASEAN countries already have an [operating renewable energy capacity of 32%](#), including operating [hydropower, geothermal, bioenergy, solar, and wind](#).

Indeed, the gap between operational capacity and the targeted 35% can be [easily met](#) with utility-scale solar and wind already in ASEAN countries' prospective pipelines. Even in the context of ASEAN countries' rapid growth in energy demand — an estimated 3% [annual rise](#) until 2030 — ASEAN countries only need to commission their 6.3 GW of utility-scale solar and wind currently in construction, plus an additional 10.7 GW by 2025, in order to meet this goal.⁵ With over 220 GW of prospective utility-scale solar and wind in prospective phases of development, and 23 GW of this set to become operational by 2025, ASEAN countries have the potential to surpass this goal.

Furthermore, this relatively unambitious regional target allows countries with significant existing hydro-power and renewable energy, like Laos, Cambodia, Malaysia, and Vietnam, where the average renewable energy mix stands at 58%, to compensate for countries that continue to rely heavily on fossil fuels, such as Indonesia with less than 15% renewable energy. Although national policies designed to attract renewable power investments are a clear sign that ASEAN countries are gearing up to increase their solar and wind capacity, this mobilization is undermined by

entrenched fossil fuel infrastructure which restricts new investment in utility-scale solar and wind.

Gas and coal each account for approximately [30%](#) of ASEAN countries' total installed capacity, and coal-fired power plant capacity has seen an annual growth rate of [7%](#) since 2017. Fossil fuel use is likely to continue, as [rising](#) energy demands are outpacing utility-scale solar and wind development in ASEAN countries, and demand is instead being met with a [young coal fleet](#). Likewise, [national energy policies](#) tout the use of gas as an [alleged](#) “stepping stone” in the energy transition; ASEAN nations are therefore likely to be [net importers](#) of gas by 2025 to accommodate the new buildout of gas-fired power plants, further entrenching ASEAN countries in fossil fuel [dependence](#). [Indonesia, the Philippines, Vietnam, Malaysia and Thailand](#) represent ASEAN countries with the highest consumption and production of fossil fuels, a concerning status as continued [fossil fuel use](#) stifles efforts to reach net zero goals.

Insufficient investment in reinforcing the grid infrastructure is another persistent hurdle for integrating utility-scale solar and wind power into countries' electrical grids. For example, Vietnam's latest solar fleet has experienced an [onslaught of obstacles related to grid integration](#), which may serve as a bellwether to investors of the challenges they could face in ASEAN countries opening solar and wind markets.

However, it is evident from progress in national energy policies that ASEAN countries are making an effort to attract private investment in solar and

5. For details on definitions and methodology see the [methodology page](#).

wind development to help alleviate this hurdle. These investments are being courted not only from outside the region, but also among ASEAN countries. [Multilateral power purchasing](#) and [transmission infrastructure](#) between ASEAN countries is seeing rapid development, such as [Singapore's partnerships](#)

[with Indonesia and Cambodia](#) to import 3 GW of renewable energy by 2028. Intentional and transparent policy can guide ASEAN countries and send clear signals to investors that they are committed to the energy transition.

Figure 5: Only a Fraction of Prospective Solar & Wind Power in Southeast Asia Is Currently In Construction

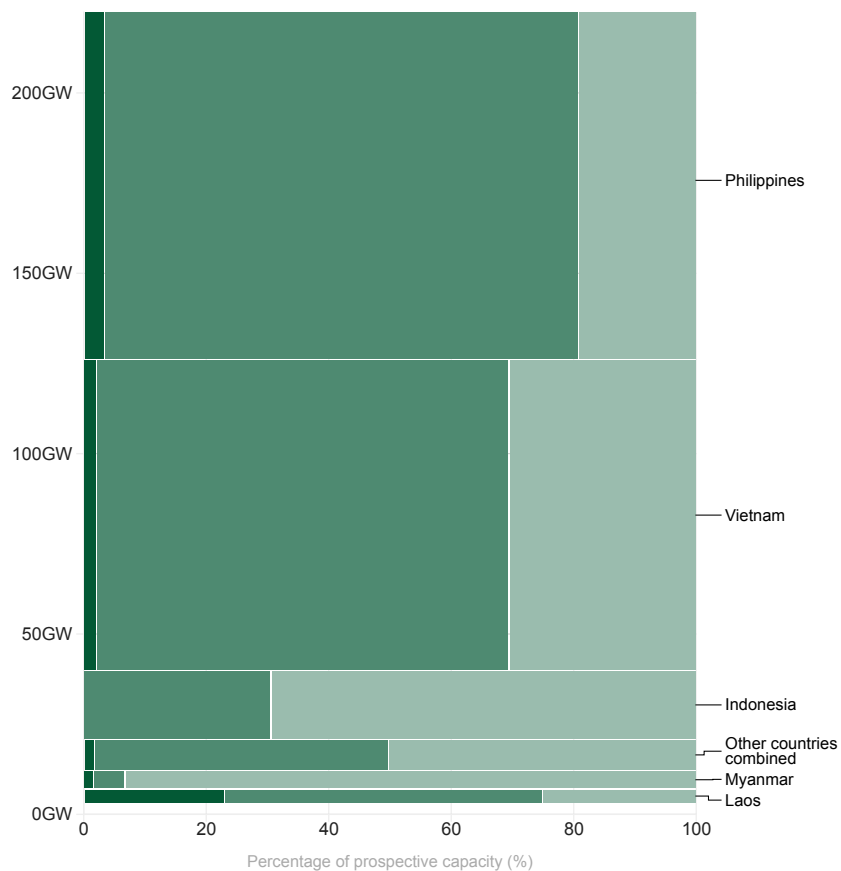
Status of prospective utility-scale solar & wind power capacity, in gigawatts (GW)

How to read this chart:

width of bars = % of prospective capacity by status

height of bars = total prospective capacity, in gigawatts (GW)

■ Construction ■ Pre-Construction ■ Announced



Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more and wind project phases with a capacity of 10 MW or more.

Other countries combined includes Thailand, Cambodia, Malaysia, Singapore, and Brunei. Timor-Leste does not have any prospective capacity.

Source: Global Solar Power Tracker, Global Wind Power Tracker

IV. COUNTRY HIGHLIGHTS

Brunei

Brunei aims to produce [200 MW](#) of solar power by 2025 and attribute at least 30% of total power generation by 2025 to solar energy. This is an increase from earlier goals of [100 MW](#) for the same period. While efforts are being made to facilitate distributed solar generation, there are no utility-scale solar or wind power projects in operation. With only 30 MW of prospective utility-scale solar, Brunei must double down in order to achieve their laudable 2025 target. While there are efforts to facilitate private sector [involvement](#) in the development and financing of renewable energy, gas contributes the [largest share of energy supply](#), and gas and crude oil account for [65%](#) of Brunei's GDP and 95% of exports. The country has also recently [sanctioned](#) gas reserves to further address gas demands.

Cambodia

In 2023, Cambodia developed its [first national energy power plan](#) addressing expansion in energy demands and mapping out renewable energy goals. This plan features [low investment requirements](#) and a [robust roadmap](#) for the development of renewable energy. Cambodia is also committed to net zero emissions by 2050. The country has seen a 415% increase in prospective utility-scale renewable power since January 2023, composed entirely of solar power development. However, there are currently no utility-scale solar or wind projects in construction. In March 2023, Cambodia and Singapore agreed to electricity imports from Cambodia of 1 GW each year of low-carbon electricity. It is expected that a portion of this energy will come from [solar power](#) produced in Cambodia. This signifies motivation for intraregional collaboration to meet ASEAN's renewable energy goals.

Indonesia

Utility-scale solar and wind power contribute less than 1% of Indonesia's total operating capacity.⁶ 19 GW of utility-scale solar and wind power are in development, with over 85% of this power coming from utility-scale solar power development, yet none of this capacity is currently in construction. Indonesia has set goals to have 29 GW of solar and 9 GW of wind by [2030](#), and has set net zero emissions targets for [2060](#). Indonesia's renewable energy development is complicated by the heavy grasp that fossil fuels have on the country's energy sector. Indonesia is in negotiations with G7 countries over stipulations of the [\\$20 billion JETP](#) in light of its latest Renewable Energy Bill. Agreements over the partnership are being drafted even as Indonesia continues to ramp up [gas power](#) and stalls on phasing out its [captive coal plants](#).

Laos

Laos currently has no utility-scale solar or wind power in operation. However, the country has almost 4 GW of prospective renewable power, 90% of which is wind power development. Laos also has committed to net zero emissions targets for [2050](#). The [Monsoon wind farm](#) is set to be one of the largest wind farms in the region, and the generated power will be sold to Vietnam for 25 years. 80% of power produced by Laos is sold to Thailand and Vietnam, and renewable energy is [anticipated](#) to follow this trend. Laos is also working with China to [facilitate transmission](#) of renewable power to China's Yunnan province.

6. For details on definitions and methodology see the [methodology page](#).

Malaysia

Malaysia has 1.5 GW of large-scale solar in operation and no wind power in operation. However, Malaysia has targets to produce [31%](#) of the country's installed operating capacity to come from renewable energy by 2025. In addition, the country's 2022 National Energy Policy included utility-scale solar power in its plans to reach [18.4 GW of renewable capacity by 2040](#), and net zero emissions by [2050](#). Malaysia's 1.5 GW of operating utility-scale solar contributes 4% of the country's total electrical capacity.⁷ Malaysia has an additional 2.4 GW of utility-scale solar and wind power in prospective stages.

Myanmar

Myanmar has 190 MW of utility-scale solar power currently in operation, with 5 GW of prospective solar and wind power in development; over 90% of this prospective power is in the form of announced wind projects. Myanmar's renewable energy sector is complicated by its low electrification rate, the lowest amongst ASEAN countries, with just half of its population [connected](#) to Myanmar's national grid. In addition, progress on renewable energy in Myanmar is complicated by a sustained social and [humanitarian crisis](#). 1.3 GW of utility-scale solar and wind have been cancelled in Myanmar, owing in part to the [banning of Chinese firms](#) that won the majority of bids to develop solar power projects in the country prior to the government coup. There also is [concern](#) that Myanmar will invest resources in the [development of gas and hydropower](#) over solar and wind power, in order to address [electricity access challenges](#) that have resulted from the conflict and depleting gas reserves.

The Philippines

The Philippines has 3 GW of utility-scale solar and wind in operation, which contributes 11% of the Philippines' total electrical capacity. The Philippines' national energy goals include increasing wind power capacity to 2,345 MW by [2030](#), an over threefold increase from its current 675 MW utility-scale wind capacity in operation. The Philippines' latest efforts to promote renewable energy in the country are through its implementation of the Green Energy Auction Program (GEAP), which started in [2022](#) and allows energy developers to bid for specified generation capacities. The Philippines also faces challenges with [grid integration](#) of projects that become operational through GEAP, as well as fossil fuel dependence. Coal and gas power continues to play a key role in energy production in the Philippines, with nearly [60% of electricity generation](#) in 2022 coming from coal power, a 75% [increase](#) from 2015 to 2021. However, the Philippines continued to uphold a [moratorium](#) on new coal-fired power plants, gesturing at a [commitment](#) to renewable energy development in the country, despite having no net zero emissions goals yet established.

Singapore

Singapore has a low renewable energy potential due to its high population density and limited land area. Over 50% of Singapore's utility-scale renewable capacity in development comes from the [SolarNova Programme](#), a national initiative to facilitate distributed solar power across Singapore. Singapore is also party to cross-border electricity transmission initiatives. Singapore signed its [first partnership in 2022](#), receiving hydropower from Laos through transmission systems that span Thailand and Malaysia. Singapore is also expected to receive up to 3 GW from renewable sources from Cambodia and Indonesia to reach an energy import target of [4 GW per year by 2025](#). Additionally, Singapore is angling to [receive 1.75 GW](#) of renewable sources from Australia by way of subsea transmission cables.

7. For details on definitions and methodology see the [methodology page](#).

Thailand

Thailand is one of the largest producers of utility-scale solar and wind power in ASEAN, with over 3 GW of renewable capacity. Two-thirds of this capacity comes from onshore wind power. Thailand's national energy [targets](#) include 10 GW of solar and 4 GW of wind in operation by 2030 and net zero emissions goals for [2065](#). Prospective utility-scale renewable power development from Thailand consists largely of utility-scale solar power, with 2.7 GW in announced and pre-construction phases. However, Thailand has no utility-scale renewable capacity in construction.

Timor-Leste

Timor-Leste currently has no utility-scale solar or wind projects in any stage of development. Timor-Leste is working with the [United Nations](#) to increase access to energy through distributed solar power projects, which is a [major priority](#) for the country in order to provide reliable electricity to the majority of its population. Timor-Leste has also committed to net zero emissions by [2050](#).

Vietnam

Wind and large utility-scale solar power contribute nearly 25% of Vietnam's national capacity, the largest proportion of capacity of utility-scale solar and wind in the region.⁸ However, Vietnam has had problems integrating all the electricity produced by its renewable energy projects, with some projects curtailed to up to [13%](#) production capacity due to insufficient [grid capacities](#) and the [prioritization of fossil fuel operation](#) over renewable energy. In [2022](#), Vietnam pledged to meet net zero emissions goals by 2050. In 2023, Vietnam released its latest energy roadmap, PDP8, [two years behind schedule](#). The roadmap outlines Vietnam's trajectory to detransition from coal and lays out ambitions to include nearly 28 GW of wind capacity and 13 GW of utility-scale solar capacity [by 2030](#). In response to Vietnam's solar boom and bust, it shifts new solar project [commissioning dates](#) until after 2030, to allow projects constructed and ready for grid integration to receive first priority. PDP8 also expresses plans to develop gas power infrastructure to reduce Vietnam's reliance on coal. These developments have further [hindered efforts](#) to start implementing Vietnam's \$15.5 billion JETP financing deal.

8. For details on definitions and methodology see the [methodology page](#).

V. CONCLUSION

Renewable energy deployment is crucial for ASEAN countries to reduce their dependence on fossil fuels as well as meet growing energy demands. The region has vast potential, with 220 GW of prospective utility-scale solar and wind capacity, compared to its current operating capacity of 28 GW. The majority of ASEAN countries have set national targets and have started integrating these targets into national policy. National policies supportive of bringing prospective capacity into operation are not only necessary to meet national and ASEAN-wide energy targets, but to encourage

further investment in the renewable energy sector. While there is clear effort being made to ramp up renewable energy development, this is complicated by a buildout of fossil fuels and low solar and wind construction rates across the region. By doubling down on bringing as much of the 220 GW of prospective utility-scale solar and wind projects into fruition, ASEAN countries will be poised to not only meet regional renewable energy targets, but pave the way to detransition from fossil fuels.

VI. DATA GAPS AND FUTURE RESEARCH

For additional information on the methodology used in this report, please refer to the [methodology wiki page](#). The Global Solar Power Tracker and Global Wind Power Tracker are updated annually. However, due to potential lags or gaps in project-level, publically available data sources, as well as data collection timing compared to data publication date, both trackers may be missing some projects that meet the inclusion criteria. Distributed solar, off-grid installations, and grid-connected utility-scale solar below the Global

Solar Power Tracker's 20 MW threshold for inclusion is estimated to represent roughly 29% of ASEAN's total operating solar capacity.⁹ Globally, solar installations above 1 MW constitute only 56% of all operating solar capacity. Global Energy Monitor is currently evaluating strategies for incorporating <= 20 MW solar data in future dataset releases. Finally, while it is rare for wind projects to be below Global Energy Monitor's 10 MW wind threshold, we estimate such projects constitute 6% of global capacity.¹⁰

9. Comparing GEM's 18.8 GW of operating capacity in ASEAN to the 26.5 GW of capacity published by [IRENA](#).












10. GEM's global operating wind capacity is 847 GW. [IRENA](#) estimates a global total of 898 GW at the end of 2022.

VI. APPENDIX

Country-level summary data tables for wind and solar capacities are provided below.

Table A1: Wind Power in Southeast Asia

Country-level wind power capacity, in megawatts (MW)

Country	Operating	Construction	Pre-Construction	Announced	Prospective*	Shelved	Cancelled
ASEAN Total	9,390	2,130	111,805	36,280	150,215	40,623	2,055
 Brunei	0	0	0	0	0	0	0
 Cambodia	0	0	0	0	0	260	0
 Indonesia	157	0	797	1,689	2,486	0	140
 Laos	0	850	1,830	1,000	3,680	0	0
 Malaysia	0	0	0	0	0	0	0
 Myanmar	0	0	0	4,732	4,732	263	30
 Philippines	675	358	59,448	3,003	62,809	5,176	821
 Singapore	0	0	0	50	50	0	0
 Thailand	20,92	0	435	0	435	0	220
 Timor-Leste	0	0	0	0	0	0	0
 Vietnam	6,466	922	49,295	25,806	76,023	34,924	844












* Prospective is the sum of Construction, Pre-construction, and Announced.

Note: Data includes only wind project phases with a capacity of 10 MW or more.

Source: Global Wind Power Tracker

Table A2: Utility-Scale Solar Power in Southeast Asia

Country-level utility-scale solar power capacity, in megawatts (MW)

Country	Operating	Construction	Pre-Construction	Announced	Prospective*	Shelved	Cancelled
ASEAN Total	18,822	4,163	35,453	32,538	72,154	10,296	3,559
 Brunei	0	0	0	30	30	30	0
 Cambodia	429	0	470	2,000	2,470	0	150
 Indonesia	21	0	5,022	11,508	16,530	1,090	50
 Laos	0	64	240	0	304	0	0
 Malaysia	1,577	150	906	1,316	2,372	329	598
 Myanmar	190	80	260	0	340	30	1,290
 Philippines	2,343	2,975	17,461	16,151	36,587	4,030	510
 Singapore	186	0	461	163	624	60	0
 Thailand	1,041	0	1,882	820	2,702	0	158
 Timor-Leste	0	0	0	0	0	0	0
 Vietnam	13,035	894	8,751	550	10,195	4,727	803

* Prospective is the sum of Construction, Pre-construction, and Announced.

Note: Data includes only solar project phases with a capacity of 20 megawatts (MW) or more.

Source: Global Solar Power Tracker