The Power Sector Transition in Southeast Asia

A technical reference for financial institutions

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About RMI

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Executive Summary

The power sector in Southeast Asia (SEA) is central to the region's economic development and decarbonization pathway. Accounting for 65% of the emissions reductions needed to meet national commitments, the sector presents both substantial transition risks and major investment opportunities. Yet, clean-energy investment in SEA remains insufficient to align with national and global climate goals.

This report provides a technical reference to support financial institutions (FIs) in conducting robust transition assessments of power sector companies in SEA. Moving beyond headline climate targets and capital allocation figures, transition assessments need to integrate operational and contextual realities through three core analytical pillars:

- **Transition footprint mapping** — Identifying a company's current emissions-intensive activities and assets to locate areas of risk and opportunity
- **Investment alignment** — Evaluating whether the company's investment pipeline aligns with its stated targets as well as sector and regional pathways
- **Dependency mapping** — Assessing how market dynamics, technology developments, and policy environments influence what is possible and on what timeline

By offering analytical methods, regional data, and regional benchmarks, this guide reduces the burden on FIs to perform this asset-level analysis from scratch. Building on this analysis, FIs can apply similar approaches to individual companies, empowering them to answer questions such as:

- What is this company's current asset base? Does it have coal-powered assets that could conflict with national coal-phaseout objectives? From there, an FI can work with the company on early coal-retirement strategies.
- What does the company's project pipeline look like? Is the company on track to meet its climate targets? Is it on track to align with local policy objectives? Misalignment with climate targets provides an avenue for engagement, identification of future project opportunities, and unblocking of existing ones. Assessing alignment-to-policy pathways can inform risk management and determine if the company will be well positioned to take advantage of changing policy environments.
- What barriers to transitioning does the company face? Is it dependent on new grid infrastructure (e.g., transmission or storage), favorable policies, or other enabling factors? This is another avenue for risk management and business development, by identifying mitigating measures for these dependencies, which can reduce risk and present new investment opportunities.

This report aggregates asset-level data from Global Energy Monitor, an open-source data provider, to address these questions at the regional and national level, but this and other data sources can likewise be used for asset-level analysis of individual companies.

SEA governments have articulated energy-transition strategies through their nationally determined contributions and power development plans (PDPs), yet execution largely lags ambition. Comparison

of transition pathways for the region suggests that current policies will not yield absolute emissions reductions, and additional policy support will be needed to deploy renewables at the rate required to meet national and global climate goals.

Additionally, analysis of the current renewables project pipeline reveals investment shortfalls relative to PDP deployment targets in the five SEA countries evaluated in detail:

- The Philippines is the only country with a renewables project pipeline exceeding its 2035 PDP target.
- Indonesia and Vietnam could meet targets only if almost all currently announced and preconstruction projects are realized.
- Malaysia and Thailand are currently not on track to meet their 2035 renewable capacity goals.

A large share of this pipeline is offshore wind, as well as some floating solar, driven by land-use constraints in SEA, as renewables would compete for space with an economically important agricultural sector in some areas. Deployment of the current and future renewables pipeline will also be dependent on investments in grid infrastructure for transmission, storage, and demand-response capability.

The SEA power sector is an example of the significant financial opportunity presented by the energy transition. The analyses in this report are intended to support FIs to take advantage of that opportunity through decision-useful transition assessments of SEA power companies.

Introduction

Transition assessment practices by financial institutions (FIs) focus mainly on a company's climate targets, governance structures, and aggregated transition-aligned capital expenditures. However, they rarely examine the operational realities behind these figures. For most emissions-intensive companies, the assets they operate drive both their revenues and their emissions. Understanding what those assets are, where they are located, how they might be affected under different transition scenarios, and what investments the company is making provides FIs with a much clearer picture of future risks and opportunities.

A more robust approach to transition assessments integrates feasibility and context into the analysis through three core elements:[1]

- **Transition footprint mapping:** Identifying a company's current emissions-intensive activities and assets to locate areas of risk and opportunity
- **Investment alignment:** Evaluating whether the company's investment pipeline aligns with its stated targets as well as sector and regional pathways
- **Dependency mapping:** Assessing how market dynamics, technology developments, and policy environments influence what is possible and on what timeline

This approach produces more business-relevant insights for FIs than the existing approaches focused on targets, but it can also be costly to implement at scale because of the required inputs of time and data. This report seeks to lower that burden by performing this analysis for the power sector in Southeast Asia (SEA), providing foundational regional context, data sources, transition pathways, analytical methods, and example dependencies relevant to this sector and region. This provides FIs with a head start on performing effective corporate transition assessments in the SEA power sector in line with the three elements bulleted above.

The SEA region is pivotal to the global energy transition. Rapid economic growth and rising energy demand mean electricity will be central to development and decarbonization. In fact, the power sector accounts for 65% of the emissions reductions needed to meet national commitments in SEA. Yet, clean-energy investment in the region continues to lag.[2]

This analysis is presented at the regional level (SEA), with additional country-level insights for the largest economies — Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. This provides important context for the current state of the transition of the SEA power sector, but assessments would further need to be applied at the company level to draw out the most decision-useful insights.

It should be noted that this reference is intended to be instructive for performing transition assessments in the SEA power sector, but it is not exhaustive. The focus of this report is the outlook for coal phaseout and deployment of utility-scale renewables, but there are many additional factors relevant to the transition that were not explored in detail in this paper. These include the construction of new natural gas power plants and the implications for natural gas importers, progress in financing mechanisms for early coal retirement, the impact of changing weather patterns on hydropower availability, and changing power-demand profiles due to data centers, electrification, and increased cooling demand.

State of the Power Transition in SEA

What you'll find in this section

This section summarizes conditions in SEA power markets since 2013, focusing on:

- Greenhouse gas emissions
- Power demand and generation
- Capacity growth and technology mix
- Coal dependence and phaseout

This section also provides an overview of the structures of national power markets in the region.

The goal of this section is to provide the local context needed to begin a regionalized assessment of power companies in SEA.

How to use this section

This section provides a starting point for forward-looking assessments of the energy transition in SEA power markets. It provides information about national progress toward emissions targets and insights into structural constraints and opportunities. This context is critical for interpreting the transition alignment and progress of companies within these countries.

This information may be useful for FIs to compare companies against local benchmarks and peers and better understand local market structures and associated transition dynamics. These insights can inform strategy development, guide business opportunities, and strengthen risk management.

In addition to providing regional context, FIs applying this analysis at the company level could investigate:

- What is the company's current asset base and generation mix? How does this compare with the region and peers?
- Does the company have coal-powered assets that could conflict with national coal-phaseout objectives? Are there opportunities for early coal retirement?

Carbon emissions in SEA are growing faster than the global average

Growth in power demand and absolute emissions from power in SEA have outpaced global trends in recent years. In Association of Southeast Asian Nations (ASEAN) member states, absolute emissions grew at more than twice the global rate (see Exhibit 1). At the same time, power emissions intensity decreased at a slower rate than the global average.

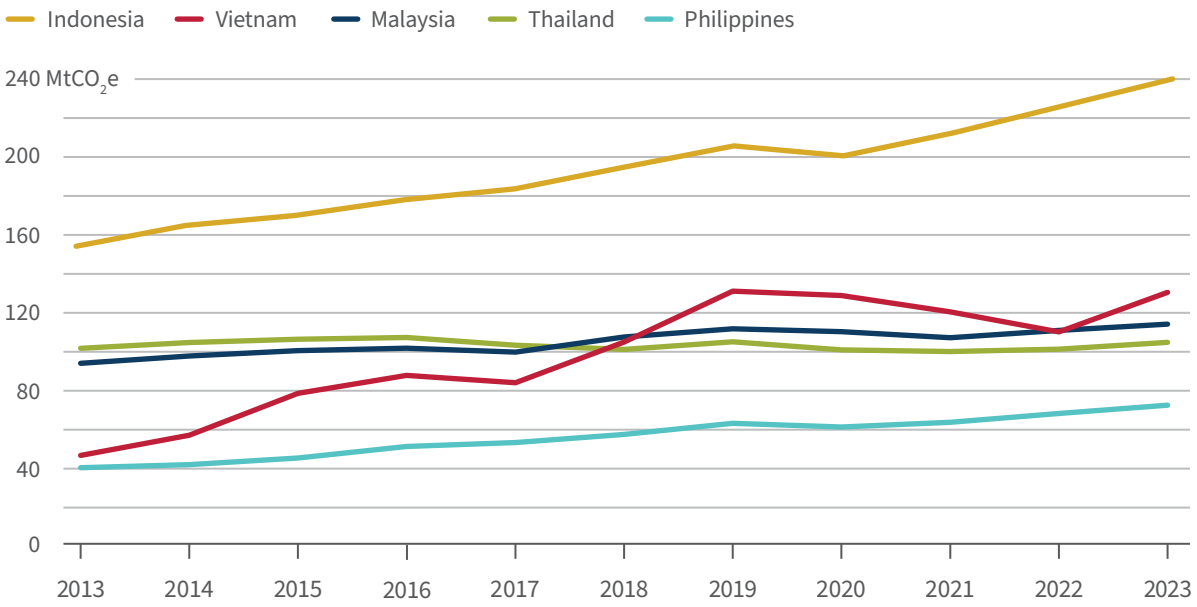
However, this trend is not uniform across SEA. Indonesia and Vietnam were major drivers of emissions growth, with total power-related emissions growth of 35% and 49%, respectively, from 2016 to 2023. In contrast, Thailand's domestic power-related emissions decreased by 2.5% over the same period as demand growth was largely met by imports.[3] See Exhibit 2 for the country-level trends from 2013 to 2023.

Exhibit 1 Comparison of global and ASEAN power-related emissions and demand

	Percentage change from 2016 to 2023	
Parameter	**Global**	**ASEAN**
Power demand	20%	30%
Power absolute emissions	11%	25%
Power emissions intensity	–7%	–4%

RMI Graphic. Sources: International Energy Agency (IEA) *World Energy Outlook 2017* and IEA *World Energy Outlook 2024*

Exhibit 2 Power-related emissions growth by country between 2013 and 2023



Note: $MtCO_2e$ = million tons of carbon dioxide equivalent.

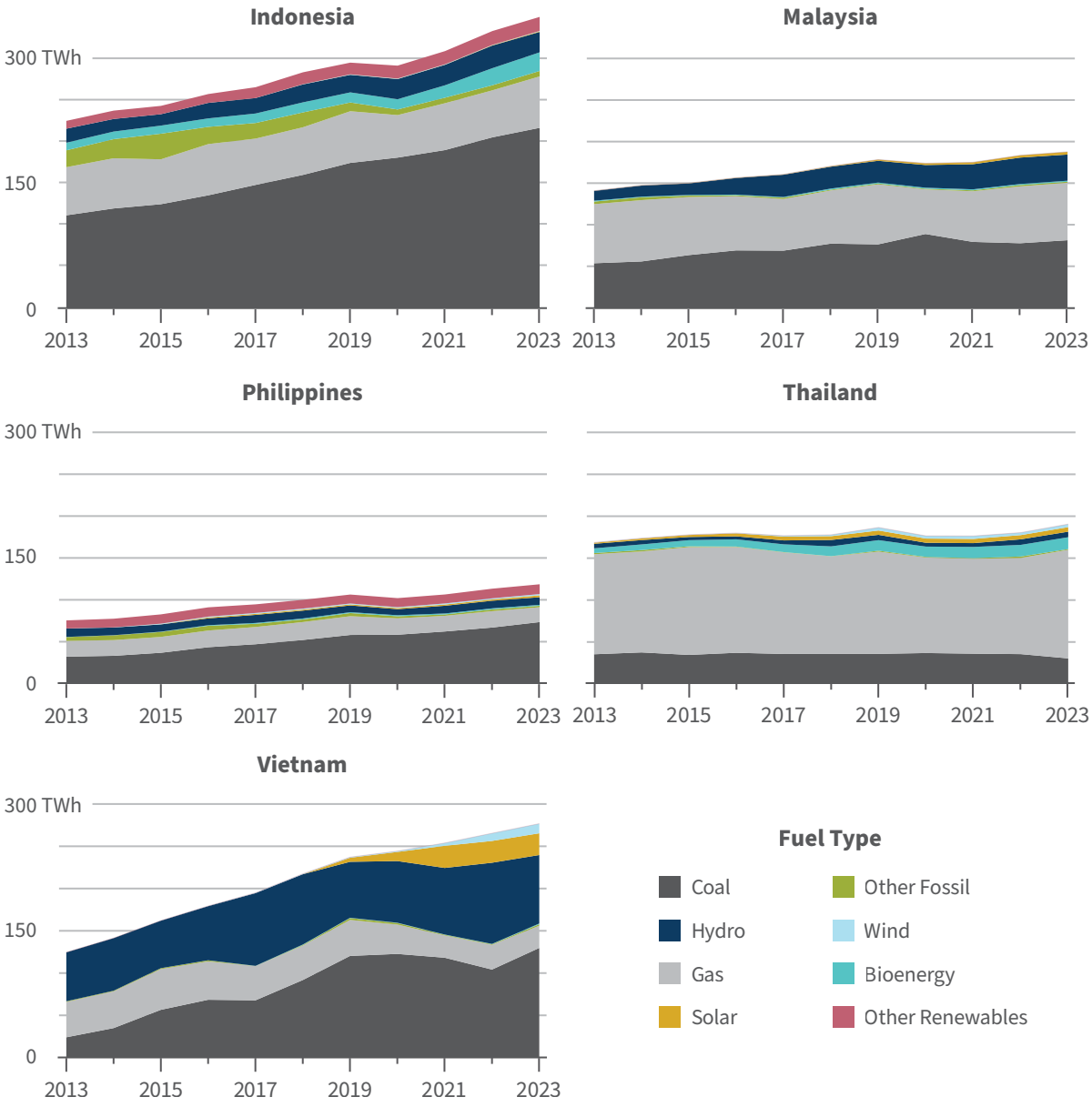
RMI Graphic. Sources: "Ember Electricity Data Explorer," **ember-energy.org/data/electricity-data-explorer/**; and RMI analysis

Emissions growth is driven by rising demand being met with fossil fuels

Power demand is increasing in each of the countries in focus, though not uniformly. Demand in Indonesia, the Philippines, and Vietnam has been rising at 4.5%, 4.6%, and 8% annually, respectively, compared with Malaysia and Thailand, which have seen less than 3% annual average growth.[4] In most countries, demand growth has been met in large part by an increased supply of coal power. The only exception is Thailand, where increased natural gas has been more prevalent. In recent years, Vietnam has also begun to see growth in solar supply, though coal still dominates the generation mix (see Exhibit 3).

Demand growth across the region is expected to continue; see the *Energy-Transition Pathways* section for more discussion of the demand outlook.

Exhibit 3 Annual power generation by energy source



RMI Graphic. Source: "Ember Electricity Data Explorer"; and RMI analysis

Young coal fleets pose a barrier to achieving stated coal retirement goals

Despite significant deployment of coal in recent years, several SEA nations have set coal-phaseout targets and placed moratoriums on further coal power deployment (see Exhibit 4). However, the existing young coal fleets already pose a challenge to achieving coal-phaseout targets in many SEA countries. Based on Global Energy Monitor (GEM) data, the global average coal asset age is 22 years, compared with 12 years across Indonesia, Malaysia, the Philippines, Thailand, and Vietnam.

Thailand and Vietnam do not have coal moratoriums in place. However, Exhibit 3 shows that Thailand has focused on gas power, rather than coal, and has seen minimal coal capacity growth in recent years. Vietnam has a mandate for 4 gigawatts (GW) of new coal power by 2030.

These young coal plants throughout SEA could lock in emissions for decades and risk countries' ability to meet national climate goals. Without early retirement strategies, some of the younger coal assets could continue to operate after national coal-phaseout target years have passed. Exhibit 4 shows how much coal capacity could still be operational after national coal-phaseout target dates in each country, based on stated retirement dates, commercial operations dates, and the average global coal plant life span. This capacity assumes that coal assets will operate for the average life span (37 years) unless a different retirement date has been publicly stated. Where capacity remains after phaseout target years, early coal asset retirement will be required to meet stated climate goals

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Exhibit 4 Coal moratoriums, phaseout target years, and coal capacity beyond target years

Parameter	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Coal-fired power plant upcoming additions	Moratorium on new coal plants since 2022, with exceptions for nationally strategic projects.	Moratorium on new coal plants since 2022, but existing plants have long-term power purchase agreements (PPAs).	Moratorium on new coal plants, except for expansion of existing plants, and projects already in the pipeline and scheduled between 2023 and 2027.	No moratorium, but no new coal planned.	Completion mandate for five key projects by 2030 (4 GW) in PDP VIII.
Coal phase out target year	2050*	2044	No target***	2050	2050
Operational capacity beyond target year (GW)	34	2.9**	6.8	0.7	22

*Indonesia also has a 2040 phaseout target which is conditional upon international financial support through the Just Energy Transition Partnership. The unconditional target is 2050. The operational capacity beyond a 2040 phaseout is 48 GW.
** Malaysia's 2044 commitment to a coal phaseout is dependent on government adherence to its plan to not renew current 25-year coal plant PPAs, the last of which expire in 2044. It is expected that after this point, coal plants will not be able to sell power outside of PPAs and thus will retire. The 2.9 GW figure here is based on a 37-year lifespan of assets rather than the PPA length.
*** The Philippines does not have an explicit coal phaseout target. In this case, 2050 was used as a substitute.

RMI Graphic. Sources: *The Jakarta Post*, **https://apbi-icma.org/media-article/new-task-force-no-guarantor-of-progress-in-coal-retirement**; Malaysia Ministry of Economy, **https://ekonomi.gov.my/sites/default/files/2023-08/National%20Energy%20Transition%20Roadmap.pdf**; Republic of the Philippines Department of Energy, **https://legacy.doe.gov.ph/sites/default/files/pdf/announcements/advisory-moratorium-endorsement-greenfield-coal-fired-power%20project.pdf**; and Frasers Law Company, **https://www.frasersvn.com/api/uploads/Legal_Update_The_Revised_PDP_8_EN_April_2025_5cec48fd6d.pdf**

In addition to this conflict with phaseout targets, coal utilization rates have been decreasing over the past decade in Indonesia and Malaysia.[5] In a liberalized market (see the *National power market structures* section, which follows, for a definition), this could be an indicator of a growing stranded-asset risk, as lower revenue from decreased coal power generation reduces a plant's ability to pay back project lenders and sponsors.

However, Indonesia and Malaysia structure coal offtake through long-term power purchase agreements (PPAs). These coal PPAs often have minimum offtake requirements and take-or-pay provisions that guarantee a minimum return and protect plants from stranded-asset risk, even as renewables generation becomes cheaper. In cases where long-term contracts aren't in place (e.g., in liberalized markets) or coal power contracts lack take-or-pay provisions, the rapid deployment of low-cost renewables could present a risk to these fossil fuel assets by driving continued decreases in coal asset utilization.

National power market structures

The structure of the power market varies significantly across jurisdictions and has important implications for risks, operational norms, and country and utility transition strategies. Understanding market structure can help third-party analysts apply assumptions that are relevant to local context.

Most power companies in the SEA countries highlighted in this report have a single-buyer market structure, in which the sole power purchaser is typically a vertically integrated, state-owned utility that procures electricity and manages grid planning. Important features of this structure that market participants must consider include:

- **Central planning:** An integrated resource plan or other master planning document developed by the state-owned utility with support from government agencies typically drives the overall strategy for capacity expansion and other market investments.
- **Regulated returns:** Utility revenues are usually controlled by a regulated rate of return set by the government and calculated into the base electricity tariff.
- **Long-term contracts:** Independent power producers (IPPs) must sell to the utility to participate in the market, typically through 20-to-25-year contracts, which can lead to resource lock-in.

In liberalized power markets, IPPs can compete for customers in an open market by submitting a bid price into the power pool, in addition to the option of signing medium- and long-term bilateral power supply agreements. Participants in liberalized markets in SEA likely operate under the following conditions:

- **Multiple offtake pathways:** Unlike in regulated markets, which are dominated by long-term contracts, IPPs in liberalized markets may sell power either through bilateral contracts or the spot market.
- **Variable contract lengths:** Although bilateral contracts remain common in liberalized markets, their lengths vary from just a few years to 10 years or more.
- **Merchant exposure:** Although spot markets exist in liberalized markets, this does not guarantee that high merchant exposure is the norm. Many IPPs still rely on bilateral contracts to manage risk.[6]

Exhibit 5 (next page) provides a summary of the market structures of the five SEA countries highlighted in this report.

Exhibit 5 Electricity market structures in Indonesia, Malaysia, the Philippines, Thailand, and Vietnam

Country	Power purchasers	Transmission network	Power generators
Indonesia	**Single-buyer market** structure with state-owned, vertically integrated utility Perusahaan Listrik Negara (PLN) as sole power purchaser	State-owned PLN owns and operates all transmission and distribution networks	PLN owns 45 GW of 73 GW in installed generation capacity, with IPPs owning most of the remainder
Thailand	**Single-buyer market** structure with vertically integrated state-owned utility Electricity Generating Authority of Thailand (EGAT) as the sole power purchaser	EGAT operates a monopoly on power transmission and distribution	EGAT owns 33% of Thailand's 50 GW power system; IPPs own the largest share of generation (~53%), while the final ~15% of annual demand is met through power imports from PPAs with Laotian companies
Vietnam	**Single-buyer market** structure with vertically integrated state-owned utility Vietnam Electricity (EVN) as the sole power purchaser	EVN operates a monopoly on transmission and distribution	EVN and its GENCOs (subsidiary generation companies) own roughly 55% of installed capacity, while IPPs own most of the rest
Malaysia	**Single-buyer market** in Sabah and Sarawak with vertically integrated state-owned utilities SESB and Sarawak Energy as primary power purchasers **Liberalized power generation market** developing in Peninsular Malaysia, selling into a single-buyer arm of state-owned utility TNB	State-owned utilities SESB and Sarawak Energy serve as distributors in Sabah and Sarawak, respectively; most utility and IPP generation in Peninsular Malaysia flows through the transmission network of a single-buyer arm of state-owned utility TNB, but some commercial and industrial customers can bilaterally procure power from generators	IPPs own and operate a significant portion of the power generation in Malaysia, particularly in Peninsular Malaysia, while each of the three grids operate under a single-buyer structure (described in Malaysia's power purchasers section of this table)
Philippines	**Liberalized wholesale power market**, with a mixture of medium- and long-term power supply agreements (PSAs) and a bid-based power pool; financial, physical, and renewable PSAs are eligible for 10-, 15-, and 20-year contract lengths, respectively; 87% of peak demand was contracted under PSAs in 2022	Transmission assets are owned by state-owned Transco, but are operated by the National Grid Corporation of the Philippines under a 25-year contract that began in 2009 to operate, maintain, and build out the transmission network	IPPs own and operate more than 90% of the country's 30 GW installed generation capacity with the largest players being Aboitiz, ACEN, and First Gen

RMI Graphic. Sources: Companies, S&P Capital IQ; Philippines Department of Energy, **https://legacy.doe.gov.ph/sites/default/files/pdf/electric_power/2023-2032-Distribution-Development-Plan.pdf**; and GEM Global Integrated Power Tracker, **https://globalenergymonitor.org/projects/global-integrated-power-tracker/methodology/**

Additional country-level context

Indonesia

Market structure: Indonesia has the highest market concentration of the highlighted countries, with state-owned Perusahaan Listrik Negara (PLN) accounting for nearly 70% of power market revenue and 62% of generation capacity.[7]

Utilization: A steady decline in coal asset utilization in Indonesia is likely caused by oversupply, especially in the Java–Bali grid, which accounts for most of the country's power supply and demand. Indonesia's power development plans (PDPs) overestimated demand by approximately 2% per year between 2015 and 2023.[8] This caused surges in coal-plant investment and an overbuild of supply, which was exacerbated by the county's archipelagic transmission network. Grid interconnection between islands is difficult, and excess capacity cannot be transmitted outside of oversupplied grids. PLN aims to end oversupply by 2028, an extension from its previous 2026 target.[9]

Coal: Although Indonesia has a moratorium on future coal capacity for utility consumption, it also has the youngest coal fleet of any of the countries in focus. Thirty-four GW of Indonesia's coal capacity is at risk of operating past its coal-phaseout target year of 2050 if it operates for its full assumed technical life.[10] Additionally, captive coal is not subject to this moratorium.[i] Off-grid coal capacity is expected to continue growing through 2030, largely to meet the demand of the critical minerals industry.[11]

Policy support: Indonesia's domestic market obligation (DMO) policy creates a highly favorable incentive for coal generation. The DMO sets a price cap of $70 per ton for coal purchasers, creating a ceiling on electricity tariffs in regions rich with coal generation.[12] Renewable-energy projects need to be profitable near that price point to compete in the market.

Malaysia

Market structure: Although Malaysia has a single-buyer market structure, in 2024, the Corporate Renewable Energy Supply Scheme created a pathway for electricity "wheeling" in Peninsular Malaysia. Wheeling allows IPPs to sell power directly to customers, imposing a system access charge or "wheeling fee" for use of grid infrastructure and services. This policy is intended to stimulate the renewable energy market by connecting renewable energy producers with motivated buyers.[13]

Utilization: In Malaysia all coal-fired power plants sell power through 25-year PPAs (the last of which will expire in 2044). Currently, these coal PPAs are still cost competitive in Peninsular Malaysia's power generation mix. This, combined with high coal plant–availability requirements under the PPA terms has kept coal plant utilization in Malaysia higher than in other SEA countries. However, the Malaysian government has stated plans to let all current PPAs expire without renewal, which would be required to meet Malaysia's 2044 coal phaseout target.[14]

i "Captive coal" refers to coal-fired power plants that are operated off-grid and usually solely dedicated to powering industrial processes.

The Philippines

Market structure: The Philippines has the only fully liberalized power market among countries examined in this guide. (Singapore also has a fully liberalized market but is not a focus country for this analysis.) The Philippines also has low market concentration. The largest power company in the Philippines, Manila Electric Company, accounts for 23% of power market revenue, much of which is derived from transmission and distribution operations, but accounts for less than 3% of generating assets.[15]

Policy support: Between 2005 and 2008, the Philippines began applying a 12% value-added tax to gasoline and started further incentivizing renewables by offering tax exemptions for renewables workers, renewables equipment imports, and carbon credits. Domestically produced renewables equipment also has additional tax advantages.[16] The result has been solid growth of solar power in the Philippines.

Thailand

Emissions growth: Thailand had the lowest emissions growth rate of any of the countries in focus, at just 0.3% on average, annually. This is likely driven by two factors: low demand growth and reliance on imports from Laos, of mainly hydropower, to meet demand.[17]

Coal: Although Thailand has no moratorium on new coal capacity, it has the least capacity at risk of operating beyond its 2050 coal-phaseout target because of its heavy investment in natural gas capacity in recent years, rather than coal.

Vietnam

Emissions growth: Vietnam had the highest annual power demand and emissions growth in the region between 2016 and 2023, at 8.1% and 10.9% respectively.[18] This growth was driven by the rapid expansion of Vietnam's manufacturing sector, which significantly outpaced other countries during this period.[19] Vietnam's manufacturing sector grew at 8.4% on average annually, compared with 3.6% and 3.3% in the countries with the next highest growth rates (the Philippines and Indonesia, respectively).[20]

Coal: Vietnam is the only country in focus with no moratorium on coal and significant coal capacity still in its pipeline. Although Vietnam does not have a moratorium in place, it does have a coal-phaseout target of 2050. The technical life of coal plants and typical PPA length raise significant risks that Vietnam will not meet the phaseout target.

Existing renewables: Vietnam has the largest existing share of intermittent renewables in its generation mix.[ii] Further intermittent renewables penetration in Vietnam will have more significant grid implications in the near term than in other SEA countries.[21] This makes grid infrastructure and flexibility solutions particularly important dependencies for renewables investment in Vietnam.

ii Intermittent renewables are renewable energy sources — such as solar and wind — that generate electricity only when natural conditions allow, making their output variable and not continuously available.

Energy-Transition Pathways

What you'll find in this section

This section outlines a sample of transition pathways for the SEA power sector. These are:

- International Energy Agency (IEA) Stated Policies Scenario (STEPS)
- IEA Announced Pledges Scenario (APS)
- ASEAN Member States (AMS) Targets Scenario (ATS)
- Joint Research Centre (JRC) 1.5°C Scenario

STEPS provides a business-as-usual (BAU) case for the outlook under current policy regimes; APS and ATS provide two different outlooks based on nationally determined contributions (NDCs) and other targets (i.e., announced but not enacted policies); and JRC provides a high-ambition outlook aligned with a 1.5°C world.

There are many more pathways available for the power sector in the SEA region. RMI has developed a transition pathway repository that characterizes over 30 transition pathways for the power sector in SEA.[22] FIs can reference this repository to find benchmarks suited to their use case.

How to use this section

The pathways presented in this section, and those available in the transition pathway repository, can be used as benchmarks for evaluating company-level targets and project pipelines. Evaluating targets and pipelines in this way puts them into context to understand their ambition level, alignment with technology trends, and alignment to local policy objectives.

No single pathway can answer every question an FI has about a client or investee. This section shows the value in using a diverse range of complementary pathways for a variety of use cases. At the same time, these pathways provide additional context on the outlook for the power sector in SEA and the outcomes that may be possible.

Regional scenarios and the outlook for the power sector

All major SEA governments have committed to transitioning their energy systems, with a common focus on meeting rising demand at a reasonable cost. At the same time, each country is pursuing unique strategies to achieve this transition, shaped by its specific constraints and opportunities. These country-level strategies and the transition pathways based on them serve as useful benchmarks for evaluating the investment pipeline of a country and its utilities.

Two more categories of transition pathways can also provide useful benchmarks: predictive (commonly BAU) pathways and normative (emissions target based) pathways. Predictive pathways serve as a reference point for how the power system might evolve with no additional policy support or major market shifts. Normative temperature-based pathways provide a reference point for ambition and an indication of the global climate outcomes an investment pipeline or policy regime is aligned to.

Exhibit 6 introduces four useful scenarios with region-level outputs — which cover the four pathway categories described above — to indicate how the energy transition might progress in SEA. These are SEA-specific roadmaps or global roadmaps with sufficient geographic granularity to isolate the pathway for SEA. These pathways can be used to determine ambition across a range of temperature outcomes, with the JRC 1.5°C Scenario being the most ambitious. The IEA STEPS, IEA APS, and AMS ATS pathways provide outcomes across varying degrees of policy support for the transition.[23]

The IEA STEPS pathway provides a BAU reference if current policy regimes persist. The IEA APS and AMS ATS scenarios provide different analyses for how the transition might evolve if SEA nations meet their NDC objectives.

Exhibit 6 Sample transition pathways for the power sector in SEA

Pathway name	Pathway type	Temperature alignment	Interpretation
IEA STEPS	BAU	2.4°C	Region-level reference for BAU under current policy regimes
IEA APS	Exploratory	1.7°C	Region-level reference for the transition if NDC objectives are met
JRC GECO	Normative	1.5°C	Region- and country-level reference for the ambition required to align with a 1.5°C future
AMS ATS	Exploratory	N/A	Region-level reference for the transition if PDP and unconditional NDC objectives are met

RMI Graphic. Sources: IEA World Energy Outlook 2024, **https://www.iea.org/reports/world-energy-outlook-2024**; JRC GECO 2024, **https://joint-research-centre.ec.europa.eu/projects-and-activities/global-energy-and-climate-outlook/geco-2024_en**; and 8th ASEAN Energy Outlook, **https://aseanenergy.org/publications/the-8th-asean-energy-outlook/**

Exhibit 7 Power generation–related emissions

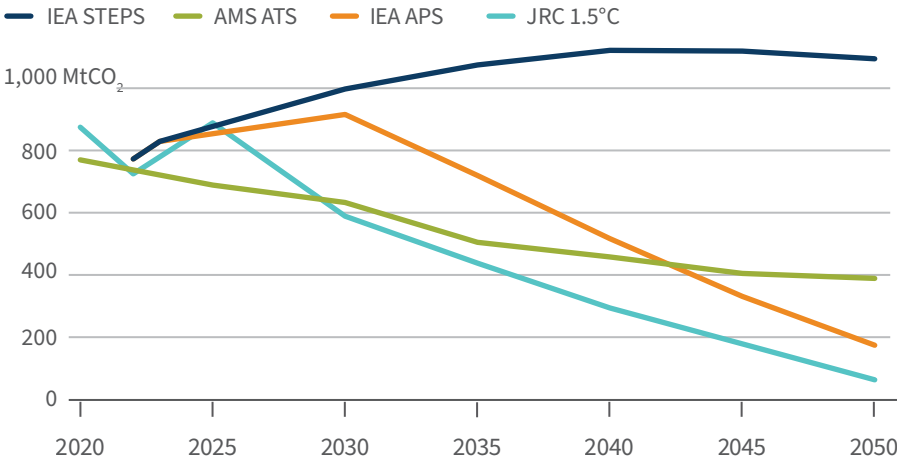


Exhibit 8 Power demand

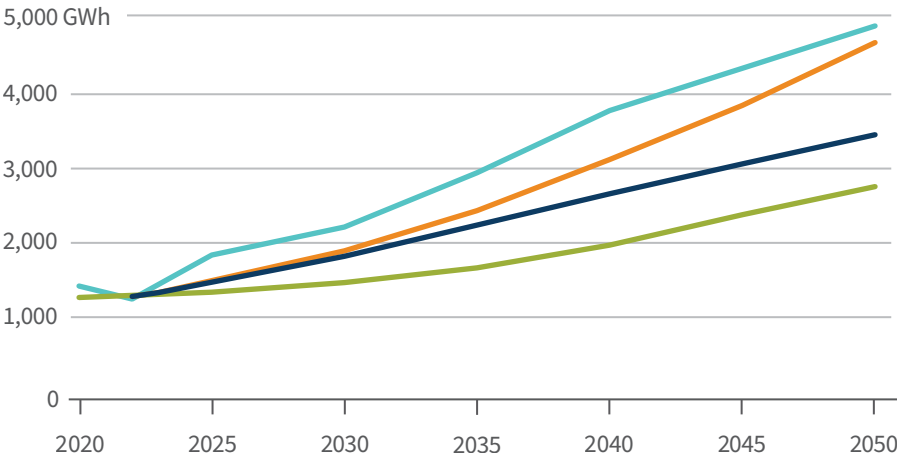
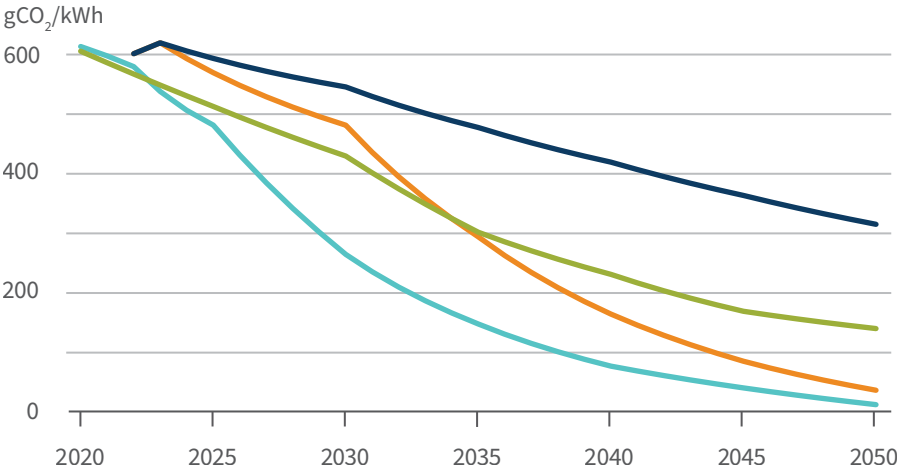


Exhibit 9 Power-generation emissions intensity



RMI Graphics. Sources: IEA World Energy Outlook 2024; JRC GECO 2024; and 8th ASEAN Energy Outlook

Exhibits 7, 8, and 9 provide a graphical summary of these pathways. Exhibit 7 shows that additional policy support will be needed to deviate from the STEPS pathway and achieve NDC objectives, as current policies will not drive any absolute emissions reductions below current levels. Renewables will be deployed on the grid and drive a reduction in emissions intensity under STEPS, but this will not be enough to counteract the increase in total emissions amid rising demand.

The JRC 1.5°C Scenario scenario forecasts faster demand growth compared with the other pathways as other industries rapidly electrify to decarbonize. Combined with the reduction required in absolute emissions under a 1.5°C scenario, this requires a rapid reduction in power-generation emissions intensity driven by renewables deployment.

APS and ATS are based on achieving policy objectives but have different approaches. ATS is primarily focused on meeting short-term targets, such as PDPs, but does not account for conditional NDCs or long-term net zero goals. APS ensures that all NDC targets and net-zero aspirations are met and models technology-specific changes to meet them, even if technology and sector-specific targets do not exist. Where they further diverge is in their assumptions about electricity demand. ATS assumes relatively low demand growth, whereas APS assumes very high growth as other industries electrify to decarbonize.

The stark contrast between STEPS and both APS and ATS shows that there is a significant gap in the required policy support for the SEA region to achieve its near-term and long-term climate objectives. STEPS shows a moderate decrease in emissions intensity as renewables deployments increase, driven by their low cost and the coal moratoriums. However, when paired with demand growth, this results in increasing near-term emissions and a longer-term plateau. Bringing this curve down in line with the APS and ATS pathways to meet policy objectives will require increased tangible policy support.

Rising power demand in every scenario is driven by expanding access to electricity, demand for cooling, a growing manufacturing sector, and data centers in the STEPS scenario.[24] The STEPS scenario assumes near universal access to electricity by 2030, which paired with growing incomes, facilitates demand for appliances, air conditioning, and the power they require. Additional demand growth in the APS and GECO scenarios then is driven by additional industry and transport electrification and green hydrogen production. As noted above, the eventual outcome will be determined by the level of policy support for electrification.

Nationally determined contributions and power development plans

At the country level, NDCs and PDPs provide the most pertinent transition benchmarks to evaluate how a company is navigating the policy landscape in the jurisdiction(s) where it operates. Exhibit 10 (next page) provides an overview of the major NDC and PDP benchmarks in SEA that are used to evaluate the alignment of planned investments in *The Renewables Project Pipeline in SEA* section, which follows. It should be noted that NDCs are economy wide and PDPs are focused on the power sector.

Comparisons of NDCs across countries are not always straightforward because targets vary in how they are formulated (absolute emissions versus intensity based), structured (cumulative emissions versus endpoint), benchmarked (against BAU scenarios or historical baselines), and how sectoral boundaries are defined (energy versus power sector). To simplify the analysis, the key benchmark in focus for the analysis in

The Renewables Project Pipeline in SEA section will be renewables-capacity expansion by 2035. This is a simple and consistent metric that removes the need to estimate the impact of deploying renewables on emissions, has a direct relationship to policy objectives, and is comparable across countries.

Exhibit 10 NDC and PDP targets in major ASEAN countries

Parameter	Indonesia	Malaysia	Philippines	Thailand	Vietnam
NDC unconditional 2030 emissions-reduction target	29% absolute emissions reduction compared with BAU	45% emissions intensity reduction compared with 2005	2.7% cumulative absolute emissions reduction for 2020–2030 compared with BAU	30% absolute emissions reduction compared with BAU	15.8% absolute emissions reduction compared with BAU
NDC conditional 2030 emissions-reduction target	41% absolute emissions reduction compared with BAU	No conditional target	75% cumulative absolute emissions reduction for 2020–2030 compared with BAU	40% absolute emissions reduction compared with BAU	43.5% absolute emissions reduction compared with BAU
Year net zero is reached in NDC	2060	2050 (targeted in PDP rather than NDC)	No target year	Carbon neutral by 2050, net zero by 2065	2050
Emissions reduction in PDP	Power emissions should peak in 2030, and in-grid emissions should be net zero by 2050	32% reduction in energy sector emissions by 2050 compared with 2019	No explicit target*	59% reduction in power generation emissions in 2050 compared with 2020	56% reduction in power generation emissions in 2030 compared with BAU
Renewables-share target in PDP	40%–45% of capacity by 2035	31% of capacity by 2025, 40% by 2035, and 70% by 2050	35% of generation by 2030 and 50% by 2040	68% of generation by 2040 and 74% by 2050	28% to 36% of generation (excluding hydropower) by 2030 and 74% to 75% by 2050
Renewables capacity-expansion target (GW) in PDP	30.6 from 2024 to 2035	10.5 from 2025 to 2035	27 from 2023 to 2035	29.4 from 2024 to 2035	68.7 from 2025 to 2030**

* Though the Philippines has no explicit target, it does reference two clean-energy scenarios that outline potential emissions reductions.
** Vietnam provides target ranges by technology, the lower end of which has been aggregated into a single figure here. Vietnam also sets a total-capacity target rather than a capacity-expansion target. This total capacity has been converted to an estimated capacity-expansion target using baseline capacity data from GEM and the Vietnam Ministry of Industry and Transport.

RMI Graphic. Sources: Centre for Research on Energy and Clean Air, **https://energyandcleanair.org/wp/wp-content/uploads/2025/09/CREA_EN-IDN-Briefing-Indonesias-RUPTL-2025-2034_-Fossils-first-renewables-later.pdf**; Malaysia Ministry of Economy, **https://ekonomi.gov.my/sites/default/files/2023-08/National%20Energy%20Transition%20Roadmap.pdf**; Republic of the Philippines Department of Energy, **https://legacy.doe.gov.ph/sites/default/files/pdf/electric_power/development_plans/Power%20Development%20Plan%202023-2050.pdf**; *Bangkok Post*, **https://www.bangkokpost.com/business/general/2814454/a-closer-look-at-the-new-energy-plan**; and KPMG, **https://kpmg.com/vn/en/home/insights/2025/07/revised-pdp-8.html**; and United Nations, **https://unfccc.int/NDCREG**

The Renewables Project Pipeline in SEA

What you'll find in this section

This section makes use of GEM's asset-level dataset to evaluate the pipeline of power projects in SEA, their alignment to national PDPs, and the maturity of projects and technologies in the pipeline. This analysis reveals each country's current outlook for meeting its renewable power expansion targets.

The key benchmarks and data explored in this analysis are:

- Renewables capacity in the project pipeline by country
- Maturity of projects in the pipeline by country, according to the GEM typology (i.e., "announced," "preconstruction," or "under construction")
- Technology mix and technology maturity of the pipeline by country

This analysis focuses primarily on renewables capacity expansion because emissions trajectories and benchmarks were not comparable in this region. NDC emissions targets were set with different baseline years, greenhouse gases, and accounting scopes making it difficult to compare across countries without major additional assumptions. Note that this section is focused on the utility-scale project pipeline. The GEM methodology sets thresholds for the size of projects included in its dataset. The threshold for solar and wind projects is 1 megawatt (MW) and 10 MW respectively.[25] As a result, this pipeline and existing asset data exclude distributed renewables, such as rooftop solar.

There are also a number of technologies of interest that are not covered in detail here but would warrant further investigation in the transition assessment of a company. This includes transmission, demand response, and battery energy storage systems (BESS). These technologies will be critical to ensure the stability of the grid as average demand increases, peak demand grows and moves, and intermittent renewables become a larger part of the generation mix.

How to use this section

The information in this section can be used for three purposes:

- To understand the current trajectory of the sector to support national and portfolio-level transition planning.
- To identify systemic risks and opportunities for the sector as it transitions and to proactively manage economic impacts or portfolio exposure. This information is useful not just for FIs to assess companies, but for regulators and policymakers who are also concerned with systemic risks.
- To be an example exercise for benchmarking a portfolio company's targets and investment pipeline against national pathways. FIs assessing prospective clients could perform a similar analysis at the utility level to show how the utility's project pipeline supports progress against emissions targets (if any) and policy objectives.

The benchmarks used for comparison in this section are based on PDP objectives, but a more nuanced analysis of an individual company could use a range of pathways to contextualize its pipeline. This includes any of the pathways outlined in the previous section or in the transition pathway repository.

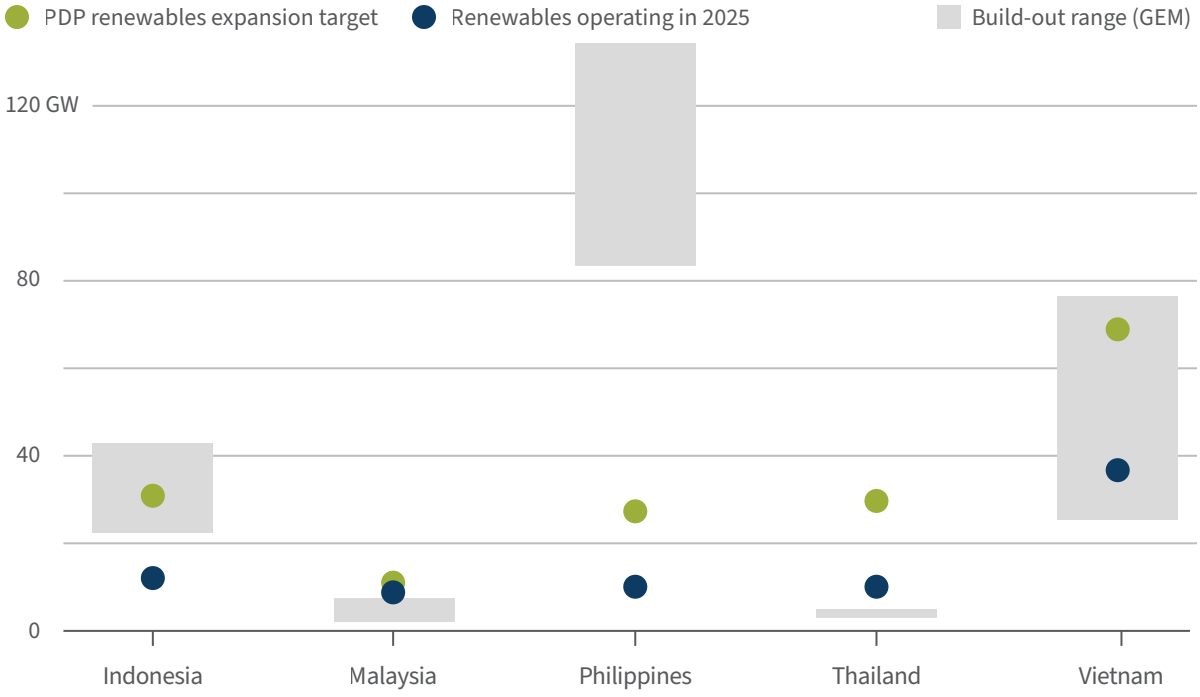
Renewable energy pipelines lag PDP objectives in many cases

Exhibit 11 shows the current capacity of low-carbon technologies (solar, wind, hydro, geothermal, and nuclear) and the total capacity of low-carbon technologies in the project pipeline by country, compared with the corresponding 2035 (2030 for Vietnam) government target listed in its PDP (and noted in Exhibit 10). For each country, renewables-capacity targets are provided as capacity-expansion volumes, not absolute-capacity figures. For example, Malaysia's target is to increase capacity by 10.5 GW from 2025 to 2035, not to achieve a nationwide renewables capacity of 10.5 GW in 2035.[26]

The pipeline minimums and maximums are derived from GEM data.[27] The pipeline minimum is the aggregation of all assets in the GEM database with a status of announced, preconstruction, or construction and a start year prior to 2035 (2030 for Vietnam). The pipeline maximum has the same status requirement but also includes assets with an unknown start year.

Note again that GEM data includes only projects above a given capacity threshold, which varies by technology. For solar and wind, these are 1 MW and 10 MW, respectively. This is particularly relevant in Vietnam, where rooftop solar capacity is already above 10 GW,[28] and is targeted to account for 2.6 GW of solar-capacity growth by 2030.[29]

Exhibit 11 Existing renewables capacity, renewables-project-pipeline capacity, and PDP capacity target



RMI Graphic. Sources: GEM Global Integrated Power Tracker and RMI analysis

Key takeaways:

- The current capacity of renewables in Indonesia, Malaysia, the Philippines, and Thailand is 8–12 GW and the capacity in Vietnam is 36.5 GW. Malaysia has the lowest expansion target, which still requires more than doubling the current capacity of renewables by 2035. These pipelines and targets represent a massively growing market that will require corresponding investments in local supply chains and workforces.
- The Philippines is the only nation with a healthy project pipeline in excess of its PDP target.
- Indonesia could also reach and exceed its target, but only if all projects are built out and operational before 2035, including those with an unknown start year.
- Thailand and Malaysia have relatively little renewables capacity in their project pipelines and are currently not on track to meet their 2035 renewables deployment targets.
- Vietnam has a large share of projects with an unknown start year (more than 50%), and most of those projects with an unknown start year would need to be completed by 2030 to reach the country's PDP VIII target.

Not all of the projects in the pipeline will reach the operation stage. However, it is difficult to estimate the fraction that will as there is very little historical data for renewables projects in the region. In any case, the success rate for projects is not 100%, and the pipeline would need to be well over the capacity-expansion target to ensure confidence that the expansion target would be reached.

Given the current underinvestment in the renewables pipeline, significant additional investment will be needed for these SEA nations to meet their PDP objectives. This presents an opportunity for financiers to take advantage of the growing market and a challenge to policymakers to create the necessary enabling environment for utilities, developers, and financiers to invest.

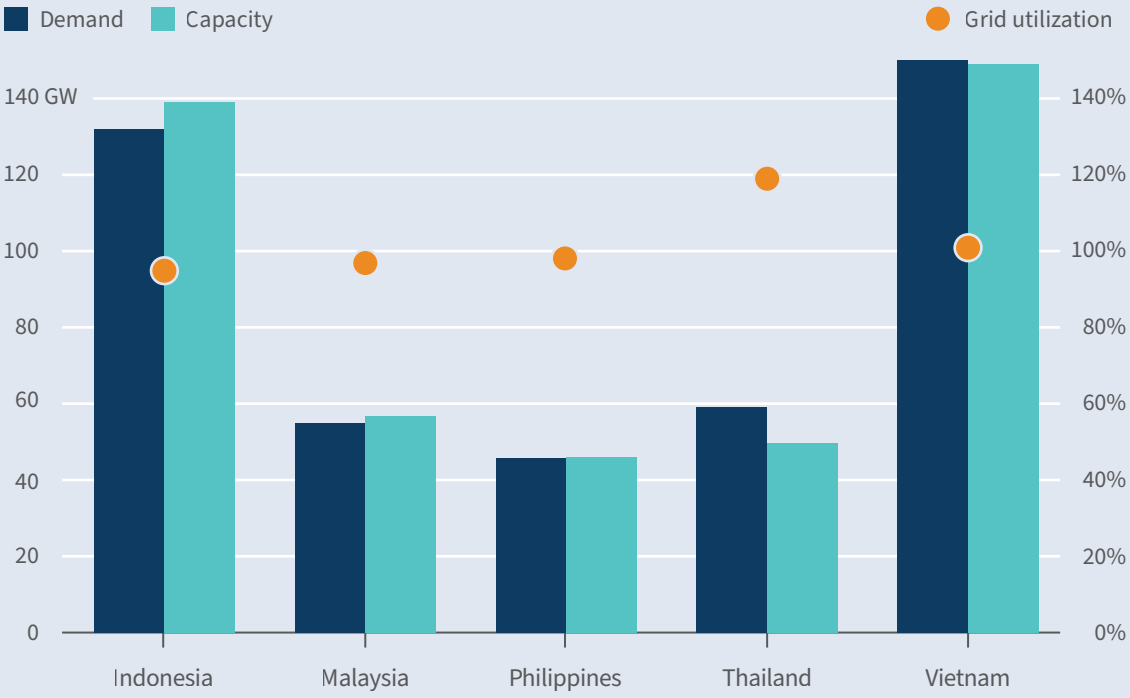
Grid infrastructure is a critical dependency

Regardless of technology type, all power plants need to access the grid to deliver electricity to consumers. Transmission system buildout is a key dependency influencing the viability of expanding generation capacity. Forecasts of average 2035 power demand against transmission capacity in TransitionZero's BAU scenario demonstrate the need for additional transmission infrastructure.[30] This scenario assumes no new investments in transmission and reveals the significant shortfalls that would result without such investment (see Exhibit 12, next page). This is not a realistic or predictive case but is intended to demonstrate the need for additional investments.

Without further investment, Vietnam and Thailand's forecasted average grid capacity utilization rates would each exceed 100%, and all other focus countries would be above 95% grid utilization. Accounting for peak demand and subnational grid constraints would further accentuate the shortfall. Delivering for the growing power demand in SEA will require significant investment in transmission infrastructure within each country. Additionally, the location of current fossil fuel generation may not be the same as where new renewables are being deployed. This will require additional grid investment irrespective of demand growth, to ensure the new generation resources can be connected to load centers.

Beyond transmission, there are other grid technologies, such as demand-response programs and BESS, which will be increasingly important. These technologies improve grid flexibility to reduce peak demand and take advantage of excess power from intermittent renewables during periods of low demand.

Exhibit 12 2035 power demand, transmission capacity, and resulting grid utilization



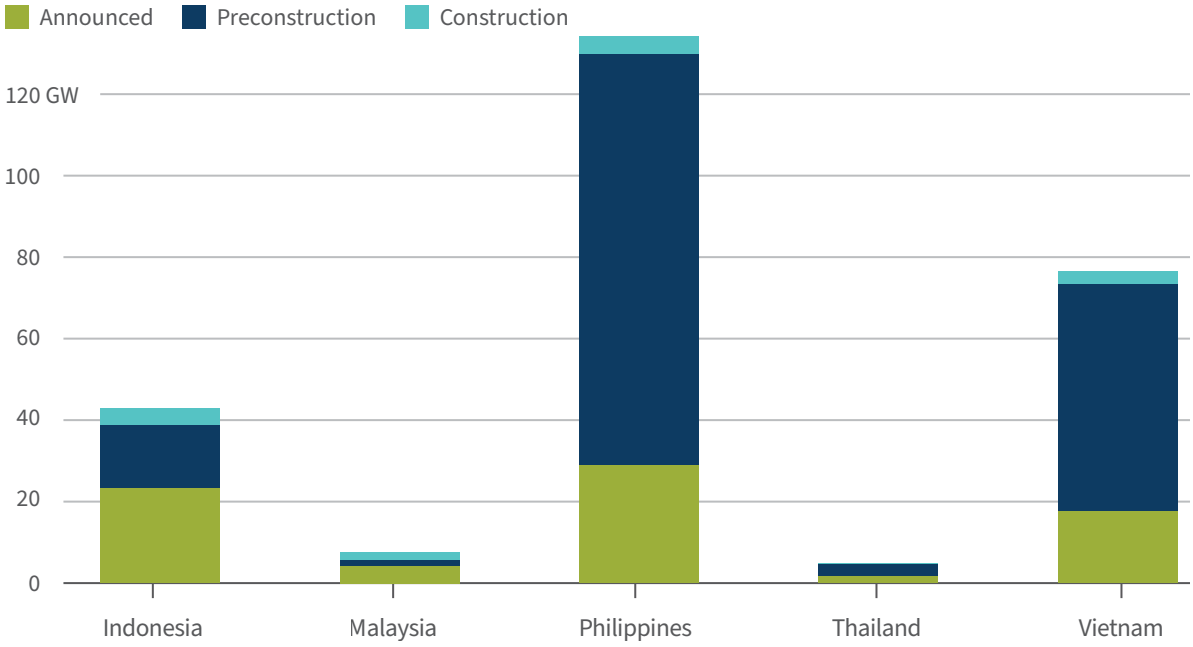
RMI Graphic. Sources: "TZ-APG," TransitionZero, **https://www.transitionzero.org/products/tz-asean-power-grid-model**; and RMI analysis

Renewable energy pipelines are concentrated in early project stages

In the GEM methodology, projects are **announced** if they "have been described in corporate or government plans, but have not yet taken concrete steps such as applying for permits." Projects are in **preconstruction** if they "are actively moving forward in seeking governmental approvals, land rights, or financing" and in **construction** if "site preparation and equipment installation are underway."[31]

Exhibit 13 (next page) zooms in on the countries' project pipelines and differentiates them by project status as labeled by GEM. A larger share of projects in the "announced" category compared with "preconstruction" and "construction" indicates that a country's pipeline will likely take more time to materialize.

Exhibit 13 Renewables-project-pipeline capacity by country and project status



RMI Graphic. Sources: GEM Global Integrated Power Tracker, **https://globalenergymonitor.org/projects/global-integrated-power-tracker/**; and RMI analysis

Key takeaways:

- Overall, the share of projects under construction is low. Malaysia has the highest with 25% of pipeline projects under construction, but the pipeline is small.
- Among the other countries in focus, none has more than 9% of pipeline projects under construction.
- This indicates just how new the energy transition is in SEA, despite the significant cost declines in renewables seen in other regions.
- Many projects are still in the "announced" and "preconstruction" phases, highlighting the need for financing to support these projects and the significant opportunity for financiers to gain market share in a new and growing segment of the market.

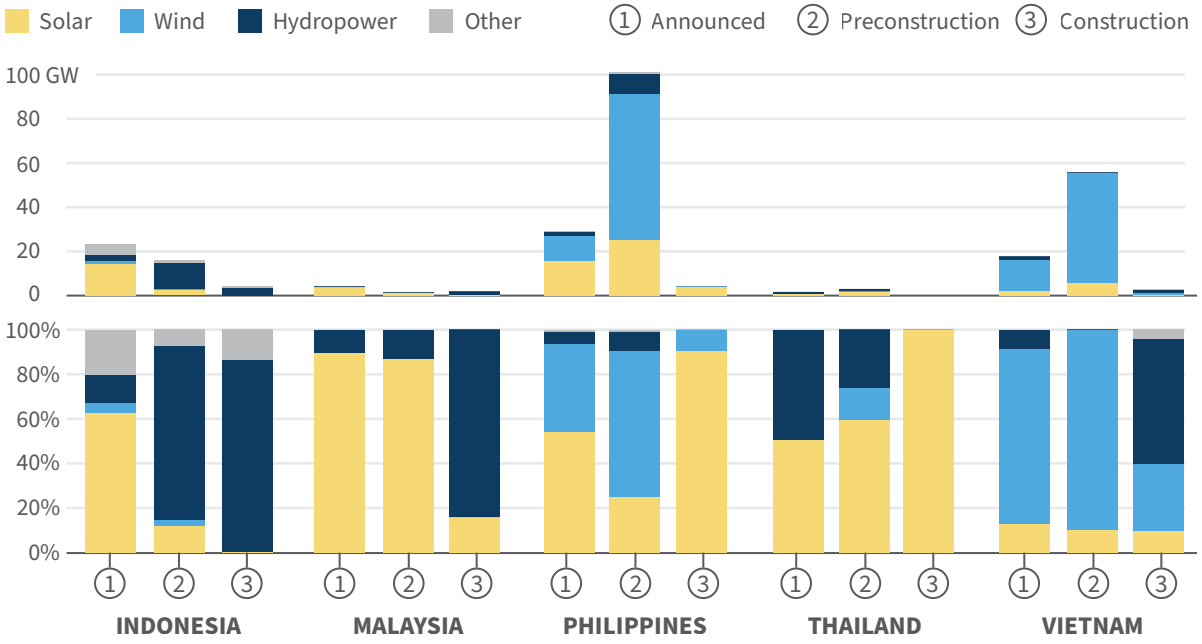
It is important to further contextualize these takeaways with the conclusion from Exhibit 11 that these pipelines are too small to meet PDP objectives in most cases. This fact, paired with the small fraction already under construction, is a signal to policymakers of the need for additional policy and regulatory support to ensure the success of the current pipelines and strengthen the pipelines with new projects.

FIs can further use these benchmarks to gauge if portfolio companies are progressing toward implementation faster or slower than their peers and how they're aligning with local policy objectives under the PDP. Laggards on renewables investment risk losing market share as the generation mix shifts and would not be well positioned to take advantage of policy support if it materializes.

Solar and offshore wind dominate the renewables pipeline

Building on the pipeline maturity analysis, Exhibit 14 further breaks down each project-status category by technology. Hydropower, solar, and wind are by far the most common technologies. Geothermal and nuclear power are in the "other" category. Geothermal represents most of the "other" category in Indonesia, and Vietnam has one geothermal plant under construction in the "other" category.

Exhibit 14 Capacity and share of renewable technologies in each stage of countries' project pipelines



RMI Graphic. Sources: GEM Global Integrated Power Tracker and RMI analysis

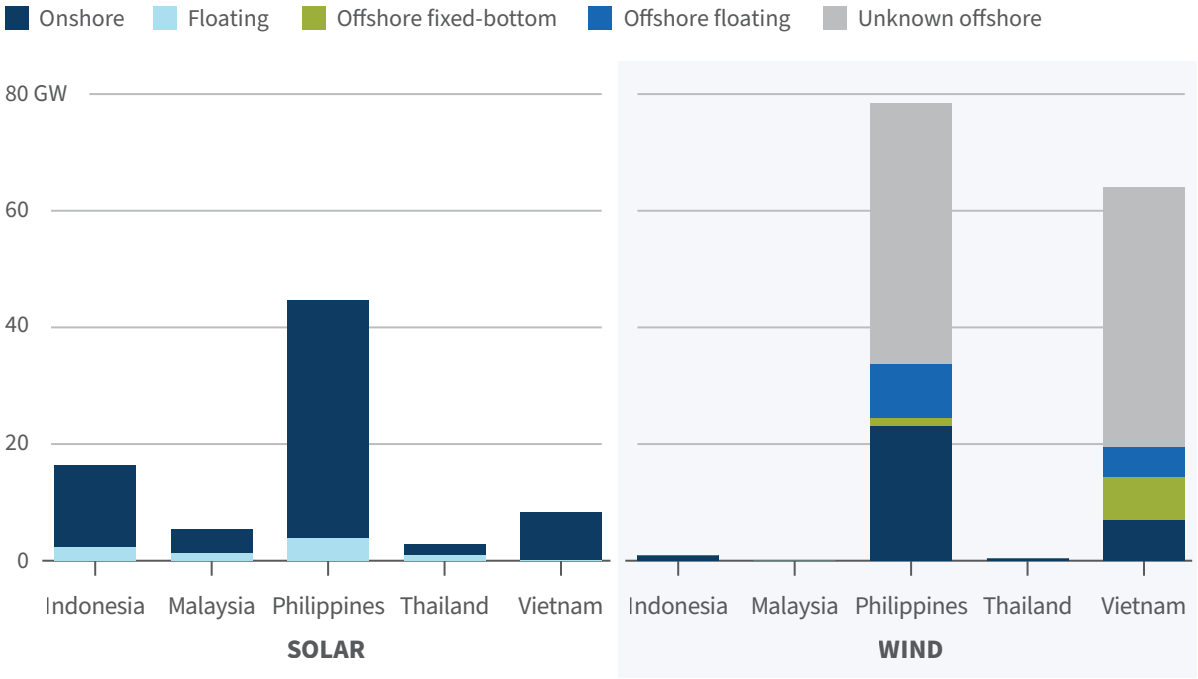
Key takeaways:

- The technology mix in the "construction" category looks very different from the technology mix in the "announced" and "preconstruction" categories, in most cases. Indonesia's pipeline is currently shifting from hydro to solar, Vietnam's from hydro to wind, and the Philippines is further increasing solar while significantly expanding wind.
- The Malaysia and Thailand pipelines are much smaller in comparison, so it is harder to draw conclusions about the current trends in technology investment because they are more heavily influenced by individual projects.
- The pipeline mix is shifting quickly as generators are investing in technologies that are relatively new to the region. FIs in the region also need to develop expertise in these technologies that are relatively new to the region to position themselves to secure deals.

Exhibit 15 shows the solar and wind pipelines detailed by type. Wind is broken down into onshore, offshore fixed-bottom, and offshore floating. Solar is broken down into onshore and floating photovoltaic (PV). Offshore fixed-bottom wind and floating solar PV have been deployed at scale in other regions but are more technically complex and have not yet been deployed at scale in SEA. However, offshore floating wind has not been deployed in other regions at the scale proposed in SEA.

Offshore wind and floating solar have particular appeal in SEA because of land-use constraints common in the region.[32] Utility-scale onshore solar and wind projects would compete with agriculture for land, which is already scarce in many areas because of high population density. As agriculture is a major employer, further competition over land would create practical, political, and environmental challenges.

Exhibit 15 Solar and wind capacity in project pipeline by type



RMI Graphic. Sources: GEM Global Integrated Power Tracker and RMI analysis

Key takeaways:

- Vietnam has a heavy dependence on offshore wind. Although Exhibit 13 showed that Vietnam may meet its PDP target, this is contingent on the success of offshore wind projects in the region by 2030. Currently, 250 MW of offshore fixed-bottom wind is under construction, with an additional 7,000 MW in preconstruction. But 3,900 MW of the preconstruction offshore wind is higher-risk floating wind. The vast majority of offshore wind was not specified as fixed-bottom or floating, but assuming a mix of the two technologies suggests that this is a high-risk pipeline for deployment by 2030. Some of this shortfall could be made up with Vietnam's continued focus on rooftop solar, which is not covered in the GEM data, but this is unlikely to compensate for the scale of shortfall if floating wind projects are delayed.

- The Philippines, likewise, has a significant pipeline of offshore wind, particularly floating wind. However, this is balanced with a similarly robust pipeline of onshore wind and onshore solar. This may be related to the liberalized market structure in the Philippines, which enables generators with competitive advantage in these technologies to more easily enter the market.
- Although Malaysia has one of the smallest project pipelines, it has a high concentration of onshore solar, one of the lowest-risk technologies and one that has already seen some market penetration in the region.
- Indonesia also has a high concentration of onshore solar projects. These are concentrated in earlier stages of the pipeline (see Exhibit 11), suggesting higher risk of noncompletion, but the low technical risk of the pipeline may compensate for this.

For an FI, comparing a company's pipeline share of emerging technologies against the country-level pipeline can help assess the risk level of the company's pipeline compared with its peers. Where a company deviates significantly from national trends, it may be worth engaging to understand its proposed competitive advantage in a given technology.

Resource potential dictates which technologies are viable

Technology selection and renewables deployment are ultimately driven by the resource potential in a given geography. Deploying wind and solar requires the wind to be blowing and the sun to be shining above a minimum threshold to be viable. At the same time, these resources require significant areas of land for utility-scale deployment, competing with other important uses, such as agriculture. These physical limitations inform the existing generation mix and the technology mix of the project pipeline. They should also inform where and what regulatory support would be most effective to meet PDP objectives.

Indonesia has a large domestic supply of coal, giving coal an advantage in an era when energy security is paramount. Indonesia also has moderate potential for solar and offshore wind and high resource potential for geothermal.[33] Geothermal is in the Indonesia pipeline but not at the scale of its solar pipeline. This may be due to the greater complexity of developing geothermal resources compared with solar, which is modular and commoditized.

The Philippines has high resource potential across the renewables landscape; its hydro and geothermal industries are relatively mature, and its resources are well developed. However, solar and wind have much more room to grow. Many large regions can generate more than 1.3 MWh per square meter (MWh/m^2) annually, with more than 96% of the country capable of PV solar power generation at capacity factors above 24.5%.[34]

The Philippines has relatively deep coastal waters and low fixed-bottom wind technical potential, but winds offshore of the Philippines regularly average over 7 meters per second (m/s), comfortably above the estimated 5.8 m/s threshold for the economic viability of utility-scale floating offshore wind.[35]

Malaysia has unfavorable weather patterns for wind generation, which informs the absence of wind projects in its national transition strategy. However, its solar resource potential is high and well

distributed across the country, with most regions capable of generating more than 1.5 MWh/m^2 annually from a commercial project.[36]

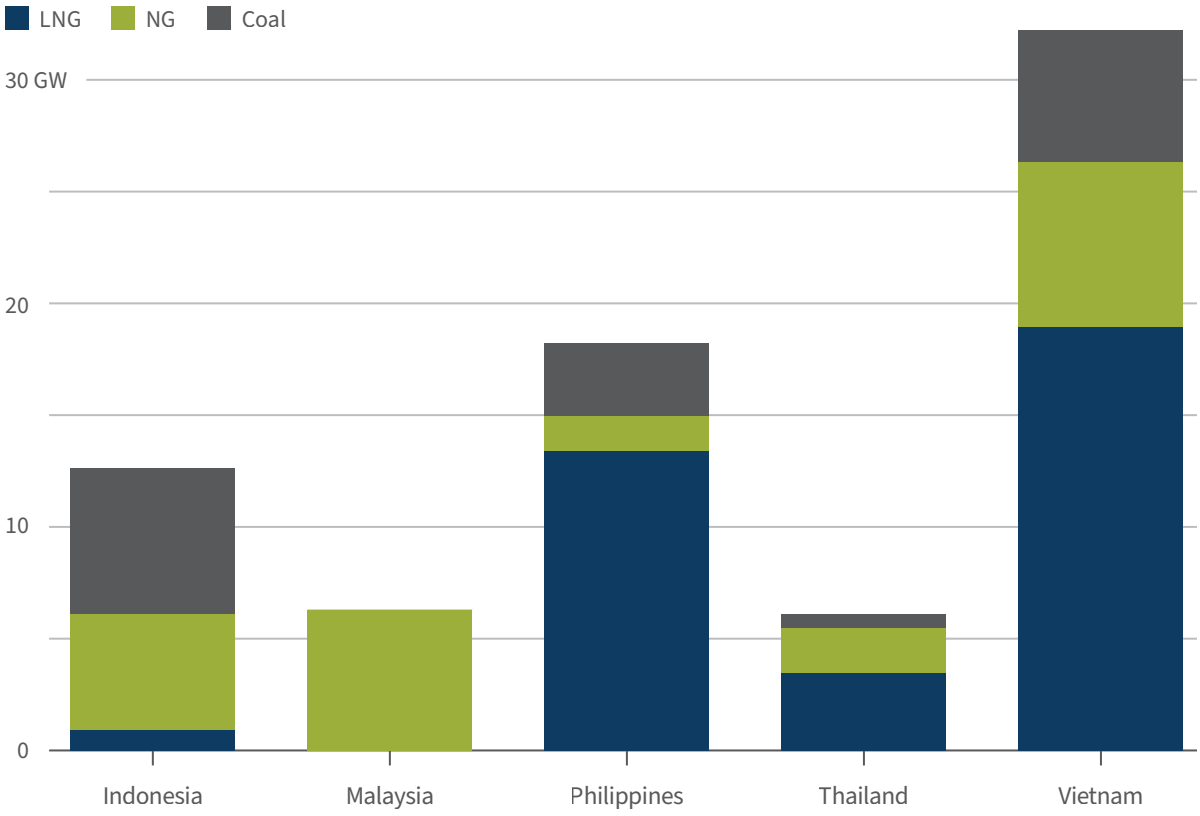
Similarly, Thailand has unfavorable weather patterns for wind generation. However, its solar resource potential is even higher than Malaysia's, with most regions capable of generating as much as 1.8 MWh/m^2 annually from a commercial project.[37]

Vietnam has significant offshore wind resources that are close to demand centers in the north and south.[38] This resource is in areas with a mix of water depths; much of it could be fixed bottom but there are also large areas which would require floating turbines.

Fossil fuels remain a significant share of the project pipeline

In addition to the renewables project pipeline, investment in fossil fuel-based power-generation capacity continues in parallel, as system operators plan for projected demand growth and the need to scale the domestic renewables supply chain and complementary technologies to keep up with that demand. Exhibit 16 shows the project pipeline for fossil fuel–power plants by country based on GEM data, including projects with a start date up to 2035, as well as projects with no listed start year.

Exhibit 16 Fossil fuel–based power-generation pipeline capacity



RMI Graphic. Sources: GEM Global Integrated Power Tracker and RMI analysis

Key takeaways:

- Building these fossil fuel assets now could lock them in for decades, including their associated costs, emissions, and operational constraints in an evolving grid. Any new assets in the pipeline should be assessed against power-sector needs and goals, such as reliability, affordability, and energy security. For example, as the share of intermittent renewables in the grid increases, assessing plants and their contracts against their ability and cost-effectiveness in supporting grid flexibility and renewables integration will be important. Minimum take-or-pay obligations could result in curtailing renewable resources (and keeping prices high), and some fossil fuel–generation technologies are less suited to the flexible operation and fast ramping that can support renewables integration.[39]
- Coal projects have historically been cost-competitive in SEA policy and market environments but could become less competitive as low-cost renewables and energy storage scale in the region. These coal assets may be guaranteed returns (and therefore face lower stranded-asset risk) by their long-term PPAs, but offtakers can be left locked in to higher prices as a result.
- A large share of the pipeline in the Philippines, Thailand, and Vietnam is liquefied natural gas (LNG), which can be assumed to be mostly imported. This exposes these assets to not only the shifting local policy landscape, but also policies in LNG exporting jurisdictions and LNG fuel price volatility.

Key Data Sources Used

Emissions-related disclosures by major utilities in SEA vary in thoroughness. In a survey of 16 utilities operating in SEA (the 10 largest by generation capacity, an additional 4 with high stranded-asset risk, and 2 more with significant renewables buildout plans):

- Nine report absolute Scopes 1 and 2 emissions.
- Ten report emissions intensity.
- Five report partial Scope 3 emissions, and an additional one reports only employee commuting and business travel for Scope 3.
- Four report no emissions-related disclosures.

Reporting norms have improved in recent years with increasing disclosures, but obtaining accurate corporate data remains an important gap. For this analysis, two data sources, in particular, were used to fill this gap:

- **Ember:** Data used included historical emissions, demand, and power capacity by country and energy source.
- **GEM:** Data used included coal plant age, coal plant life spans, coal plant start years, and all project-pipeline data.

These sources streamlined the analysis by centralizing asset-level data and removed corporate transparency as a limiting factor.

Ember is a global think tank that aims to accelerate the clean-energy transition with data and policy insights. It gathers and curates data such as electricity generation, capacity, and emissions at the country level over time.

GEM is the main data source for the project pipeline because it offers a uniquely comprehensive and transparent mapping of power-plant assets worldwide. The dataset includes critical attributes such as plant capacity, generation technology, ownership details (including ownership shares), commissioning and retirement years, and precise geographic location.

All GEM data is fully accessible, including links to the original sources, which significantly enhances the credibility, auditability, and traceability of the information. This level of transparency is particularly valuable for asset-level assessments, where data quality and provenance are essential. Additionally, GEM includes the most recent known status update for each asset, tracking when status updates are missing for a couple of years and projects may have stopped.

Conclusion

The coal moratoriums in SEA present a significant opportunity for the energy transition and for FIs looking for business opportunities, and opportunities to deliver on their emissions and transition-finance targets. Continued growth in power demand will need to be met with alternative power sources, and many SEA countries have set ambitious targets for deployment of renewable generation. Although natural gas will meet some of this demand, there is a significant volume of renewables projects in the early stages of the project pipeline, particularly in the Philippines, Vietnam, and Indonesia, with more investment still needed.

FIs looking to take advantage of this opportunity and support the deployment of these projects will need to navigate a range of challenges and risks. This report provides a region- and country-level view of some of the analyses and considerations that an FI would need to account for when assessing a company's alignment to the energy transition. An FI conducting an assessment at the corporate level could apply this analysis to:

- Identify the company's coal-fired power plants, how their operational lifetime could conflict with coal-phaseout targets, and options for early retirement
- Evaluate the company's project pipeline against PDP targets and regional transition pathways to determine the level of climate ambition and alignment with local policy objectives
- Evaluate the technology mix of the company's project pipeline to determine potential technical risks and the viability of climate targets
- Identify company-specific dependencies, such as resource potential, grid-infrastructure requirements, land availability, and market structure

There will be additional dependencies and risk factors specific to individual companies and their operating environments that were not captured by this report. FI sustainability teams can use this high-level analysis as a starting point but should also explore other unique challenges and opportunities presented by individual companies for a complete analysis.

Endnotes

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