



Developing Blended Finance Pathways for Renewable Energy in Southeast Asia



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Within Convergence, the work was led by **Andrew Apampa**, Associate Director, Market Insights, and **Ishwari Sawant**, Senior Associate, Market Insights. Valuable contributions were provided by **Ritesh Thakkar**, Senior Advisor and Head of Asia Pacific, and **Neil Bose**, Senior Associate, Asia Pacific.

Within the IEA, the lead author was **Lauren Chan**, who designed and directed the report with **Cecilia Tam**, Head of the Energy Investment Unit, with input from **Tim Gould**, Chief Energy Economist and **Sue-Ern Tan**, Head of the IEA Regional Cooperation Centre. Valuable contributions were made by **Haneul Kim** (concessional finance) and **Yinglun Teng** (Southeast Asia). Feedback and essential support were provided by colleagues within the IEA, including Zoe Hemez, Natalie Kauf, Akiko Sasakawa, Max Schoenfisch, and Hasti Wiandita.

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A photograph of several wind turbines in a green field under a clear sky. The turbines are white with three blades each. The field is lush green, and the sky is a pale blue. The image is used as a background for the top section of the page.

EXECUTIVE SUMMARY

Renewable energy investment in Southeast Asia needs to accelerate to meet energy security, development, and climate goals. While coal has historically underpinned the region's rapid expansion of electricity demand, interest in renewable energy is quickly growing to meet this demand, improve energy access, and reduce dependency on volatile fuel prices and imports, especially considering the continued interruptions in fuel supply from the Middle East. In all International Energy Agency (IEA) scenarios, investment in the power sector in Southeast Asia needs to grow rapidly, with low-emissions sources of generation playing a central role. The economic and policy underpinnings for some renewable power projects are sufficiently robust that they can successfully attract commercial capital. However, some types of renewable energy projects struggle to progress from early-stage development to financial close and implementation, reflecting constraints affecting project bankability. Where these constraints can be addressed through financial structuring, blended finance can play a role in moving projects forward.

This report, prepared jointly by the IEA and Convergence, focuses on private capital mobilization in Indonesia, the Philippines, and Viet Nam for rooftop solar, decentralized solutions such as mini-grids or standalone systems, offshore wind, and battery energy storage systems (BESS). The investment required in these three countries and four sectors is significant. We estimate that, in order to get on track for the development and emissions reduction goals targeted by these countries for 2035, around \$3.7 billion in international public finance will be required, some of which will be deployed within blended finance structures.

Blended finance is a part of the capital mobilization toolkit. Its value is greatest where financing constraints are project-specific and commercially addressable.

Since 2016, Southeast Asia has mobilized \$17.9 billion in concessional and commercial financing for renewable energy through blended finance, mainly through project finance and fund structures. Blended finance is a structuring approach that can improve the risk-return profile of investments by using concessional capital to absorb, share, or mitigate risks that commercial investors are unwilling or unable to bear alone. It can also be used to help structure investment opportunities that are at a suitable scale to attract private capital. However, it is not equally suited to all investment barriers: it is most effective where it addresses clearly defined risks that can be mitigated at the project level and more limited where investment barriers are primarily structural or regulatory. The principle of minimum concessionality should guide blended finance, with concessional capital targeted to where it delivers clear financial additionality and strong development impacts by mobilizing otherwise unavailable commercial investment.

In more mature technologies such as solar photovoltaic, blended finance should focus on market segments where commercial models are established but financing constraints persist. In rooftop solar, aggregation can create scale and lower transaction costs, while guarantees and risk-sharing facilities can address offtaker credit risk. The case for such support is strongest in Indonesia, while being more limited in the Philippines and Viet Nam, where financing ecosystems are more mature. Decentralized solutions in Indonesia and the Philippines face different challenges: aggregation and risk-sharing can improve access to finance, but many last-mile electrification projects cannot generate commercial returns. Where underlying economics remain unviable, highly concessional capital such as grants are more appropriate than structures designed primarily to mobilize private capital.

For early-market technologies, blended finance should be targeted to projects with credible revenue pathways and sufficiently developed commercial frameworks. BESS is beginning to scale in the Philippines and Viet Nam. Blended finance can play an important role by helping to establish operational, contractual, and financing precedents for further investment. Meanwhile, in Indonesia, blended finance is more relevant for hybrid projects with identifiable revenue streams, but its role is limited where regulatory frameworks remain underdeveloped. Offshore wind is at a more formative stage of market development in both the Philippines and Viet Nam. Concessional support for project preparation is the immediate priority, with blended finance at the investment stage becoming more relevant once credible procurement and revenue frameworks are in place.

Where structural barriers are binding, blended finance cannot substitute for policy, regulatory, and system-level reforms. Bankability rests on clear contractual arrangements, predictable remuneration frameworks, and transparent procurement procedures, which remain incomplete in the three markets, particularly for BESS and offshore wind. It also depends on physical readiness, including transmission and distribution networks and port infrastructure for offshore wind. Even where these foundations are in place, domestic financing constraints such as counterparty exposure limits and limited long-term currency hedging can restrict the availability of finance. Blended finance can cushion the effects of these constraints where they translate into identifiable project-level risks, but it cannot resolve them. Sustained mobilization of private capital depends on durable policy reforms, credible market frameworks, improved power system readiness, and deeper domestic financing capacities.

To scale up blended finance for renewable energy in Southeast Asia, capital providers and governments should be guided by five priorities:

- 1 **Deploy concessional capital within blended finance structures where it is additional and at the minimum level required.** Concessional capital providers should target support to segments with bankability gaps and strong development impact, rather than sectors as a whole. Support should be reduced or phased out using pre-defined exit indicators as commercial viability improves.
- 2 **Tailor instruments to the nature of the financing constraint.** Project preparation and technical assistance grants can address early-stage development risks; guarantees and risk-sharing mechanisms can address defined credit and execution risks; co-financing and hedging mechanisms can help address tenor and currency constraints. Risks should be allocated to the actors best placed to absorb, manage, or mitigate them.
- 3 **Scale aggregation and pooled financing platforms,** particularly where small transaction sizes, fragmented pipelines, and high transaction costs are investment barriers. Aggregation can create investable scale, diversify project-level risks, and reduce transaction costs, helping smaller projects access commercial capital.
- 4 **Improve data transparency and standardization** to support the measurement of additionality and the replication of proven financing approaches. More consistent data on financing terms, concessionality, mobilization, and performance can help capital providers assess additionality and identify structures that can be replicated or scaled.
- 5 **Enhance capacity building efforts for structuring and executing blended transactions** for governments, concessional capital providers, and commercial capital providers. This includes strengthening capabilities to identify financing constraints, allocate risks, and structure transactions effectively. Over the longer term, capacity building should also support stronger procurement, regulatory, and institutional frameworks for sustained private capital mobilization.



CHAPTER 1

INTRODUCTION

Southeast Asia is a driver of future global growth. It accounts for nearly 20% of global energy demand growth to 2035 under today's policy settings, yet today, the region represents only around 9% of the world's population and 3% of global energy investment. How this demand is met will have major implications for energy security, affordability, and sustainability. The conflict in the Middle East and associated disruptions in global fuel markets has exposed vulnerabilities linked to import dependence and volatile fuel prices, moving energy security higher on the regional policy agenda. The crisis is reinforcing the role of domestic sources of energy such as renewables in strengthening energy security: investments in renewable energy, efficiency, and electrification since 2015 saved the region around \$30 billion in import costs in 2025.¹

Expanding renewable energy depends on a rapid scale up in investment. This is visible in all the energy scenarios produced by the International Energy Agency IEA, and particularly in the Announced Pledges Scenario (APS), which outlines an energy sector pathway where all national targets, including Nationally Determined Contributions (NDCs) and net zero emissions targets, are met in full and on time. In the APS, energy sector investment in Southeast Asia grows by over 90% in the next decade to reach nearly \$190 billion in 2035. Of this, nearly \$70 billion is directed to low-emissions power, more than four times 2025 levels. This growth requires a mobilization of capital across a wide range of sources and financial instruments that have different risk-return profiles.

Governments can improve project bankability and help mobilize private capital by strengthening the wider enabling environment, including policy, regulatory, and institutional frameworks. Blended finance can help mobilize capital where commercial investment is constrained by risks that private investors are unwilling or unable to bear.

Convergence defines blended finance as the use of concessional capital from public or philanthropic sources to increase private sector investment in developing countries for sustainable development.

It is a structuring approach, not an investment approach, where different forms of concessional capital are deployed to address specific risks and financing constraints that limit private investment. This distinguishes blended finance from conventional public private partnerships (PPPs), which do not necessarily involve the use of concessional capital to mobilize private investment. Blended finance can help address two key barriers faced by the private sector: (i) high perceived and real risk and (ii) insufficient returns for the risk relative to comparable investments. This report applies the principles of financial additionality and minimum concessionality to examine where blended finance is genuinely additional, where concessional capital may be best deployed outside blended structures, and which instruments are most relevant.

In general, blended finance is most effective where it addresses clearly defined risks that can be mitigated at the project level, such as using guarantees or risk-sharing mechanisms to mitigate offtaker credit risk; and more limited where investment barriers are primarily structural or regulatory. Where structural or regulatory constraints are binding, blended finance may improve project bankability but cannot substitute for reforms to the underlying enabling environment. Not all concessional finance should therefore be deployed through blended finance structures. Where commercial investment is not yet viable, or where the objective is to address wider constraints within the enabling environment, concessional finance may instead be directed towards system-level interventions through tools such as technical assistance, capacity building, and policy or regulatory

support. This could include, for example, support to develop remuneration frameworks for battery energy storage systems (BESS) or procurement and regulatory frameworks for offshore wind.

This report examines the role blended finance can play in supporting renewable energy investment in Southeast Asia, with a focus on rooftop solar, decentralized solutions (such as mini-grids and standalone systems), battery storage, and offshore wind in Indonesia, the Philippines, and Viet Nam. These sectors face different combinations of risks and span different levels of market maturity, from established technologies with less mature market segments to early-stage technologies and business models. Drawing on interviews with investors, project developers, development finance institutions (DFIs), multilateral development banks (MDBs), commercial financial institutions, and governments, alongside an analysis of investment conditions and financing costs, the report assesses where blended

finance can most effectively mobilize private investment and where broader structural constraints continue to limit deployment.

Chapter 2 outlines key trends in renewable energy deployment and energy investment across Southeast Asia. Chapter 3 discusses how blended finance can be used effectively, while Chapter 4 provides an overview of blended finance trends in the region. Chapter 5 provides an in-depth analysis on the selected sectors in Indonesia, the Philippines, and Viet Nam. Chapter 6 outlines the international public finance requirements for the selected sectors and provides recommendations for how blended finance can be targeted and structured most effectively. Finally, Chapter 7 includes case studies of how blended finance approaches have been applied to support renewable energy technologies in the region, highlighting lessons on financial additionality, structuring, and scalability.

CHAPTER 2

THE STATE OF CLEAN ENERGY IN SOUTHEAST ASIA

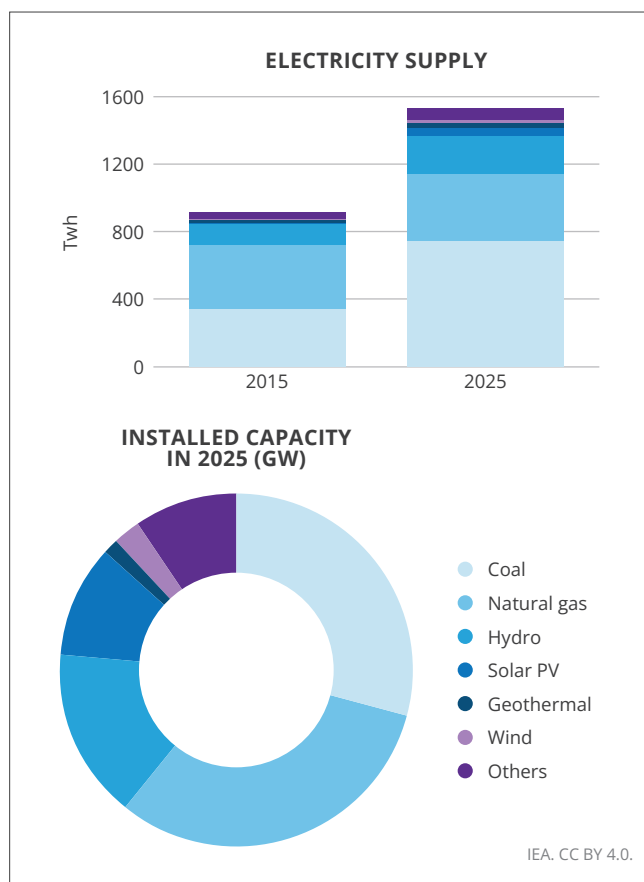
2.1 DEPLOYMENT TRENDS

Electricity demand in Southeast Asia has grown at around 6% per year in the last decade, nearly twice the global average. This is a result of economic development, population growth, urbanization, industrialization, and rising access to energy services. Coal has traditionally been the fastest growing electricity source, underpinning most of the expansion in regional electricity generation. Today, coal accounts for around 70% of generation in Indonesia and almost two-thirds in the Philippines. Natural gas-fired generation also plays a central role, satisfying over a quarter of power demand – it provides almost all generation in Singapore and about two-thirds in Thailand, while playing an important balancing role elsewhere. Hydropower is also an important resource particularly in Viet Nam, Lao People's Democratic Republic (Lao PDR), and Myanmar, with installed capacity in the region exceeding 60 gigawatts (GW) in 2025.

While coal and gas dominate most power systems across the region, there has been an increase in the share of renewables in the region's electricity mix. Installed solar photovoltaic (PV) capacity exceeded 40 GW in 2025, a massive jump from 3 GW in 2015. Installed wind capacity grew from less than 1 GW in 2015 to 10 GW in 2025, primarily through onshore wind installations in Viet Nam, the Philippines, Thailand, and Lao PDR. Geothermal capacity reached around 5 GW in Indonesia and the Philippines, countries along the Pacific Ring of Fire.

An important driver for renewable energy investment is supportive government plans and regulatory frameworks. Eight out of the 11 countries in the Association of Southeast Asian Nations (ASEAN) have put forth carbon neutrality and/or net zero emissions

Figure 1: Electricity supply and installed electricity generating capacity in Southeast Asia by source, 2015-2025



Notes: Others = Oil and bioenergy
Source: IEA analysis

targets. At the regional level, the ASEAN Plan of Action for Energy Cooperation 2026-30 sets a target of having 45% renewable energy in installed power capacity by 2030, up from 30% today.² Solar, wind, and battery storage feature prominently in national power sector development plans.

Scenarios in the IEA's Southeast Asia Energy Outlook 2026

The scenarios used in this report are based on the Southeast Asia Energy Outlook 2026, with two scenarios providing a frame of reference for the region's possible energy trajectories under different policy pathways.

The **Stated Policies Scenario (STEPS)** assesses how Southeast Asia's energy sector could develop based on existing and announced policy measures, including energy, climate, industrial, and financial policies. It incorporates these policies only to

the extent that they are backed by concrete implementation plans, providing a grounded view of the region's prevailing direction.

The **Announced Pledges Scenario (APS)** assumes that all national targets, including updated NDC and net zero emissions pledges, are achieved in full and on time. It outlines a pathway consistent with governments' stated ambitions, while recognizing the gap between these commitments and current measures.

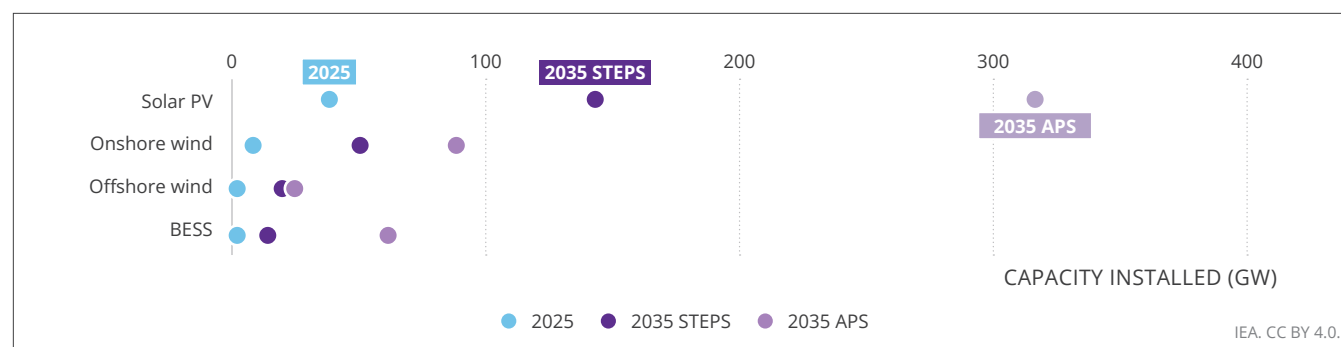
In the STEPS and the APS the rise in renewable energy is driven by continued growth in solar PV installations. This is supported by favourable government policies and continued declines in solar panel prices, partly due to imports of lower-cost solar modules from China. In the STEPS, solar PV capacity grows from 40 GW in 2025 to more than 140 GW in 2035, while in the APS capacity installed exceeds 315 GW. Wind power capacity increases as well, reaching 70 GW in the STEPS and over 110 GW in the APS, with onshore wind accounting for most installations. BESS expands from a low base to accommodate growing shares of solar and wind energy and provide other flexibility services to the grid.

Growth in deployment of low-emissions sources is a way to boost regional energy security.

Declining regional oil output and tightening gas

balances are increasing the region's reliance on imports and its exposure to international price shocks and supply disruptions. In the short term, the conflict in the Middle East could temporarily increase reliance on coal for power generation, a resource widely available in the region. In the medium term, rapid expansion of renewable power contributes to an increasing share of domestic energy production, diversifying generation mixes, and reducing reliance on imported gas and diesel. There have been early signs that countries in the region are increasing their prioritization of solar, wind, and storage. Net solar panel exports from China to Southeast Asia doubled between the first six months of 2025 and 2026. In particular, the Philippines was China's third-largest solar panel export market in the first half of 2026.

Figure 2: Capacity installed across selected renewable energy technologies in Southeast Asia in the IEA's Stated Policies Scenario and Announced Pledges Scenario, 2035



Notes: BESS = Battery energy storage systems; STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario
Source: IEA analysis

The role of hybrid systems

Hybrid systems combine generation and storage technologies within a single project or operating configuration. Typically, this refers to a configuration where a renewable technology, most often solar PV, wind, or hydro, is paired with BESS and in some cases integrated with existing diesel generators. The role of hybrid systems is increasingly recognized in power planning across Southeast Asia.

In grid-connected systems, co-located renewable energy and BESS installations can provide flexibility services, reduce curtailment of renewable generation, and optimize the use of existing grid infrastructure. In Indonesia, the Rencana Usaha Penyediaan Tenaga Listrik (RUPTL) 2025-34 includes 3.6 GW of hybrid installations, primarily solar plus

BESS. Additionally, President Prabowo Subianto's push for 100 GW of solar includes 80 GW of solar power and 320 GWh of co-located BESS.³

Hybrid systems also play an important role in decentralized settings. Across Southeast Asia, many rural and island communities continue to rely on diesel generators for electricity supply, leaving them exposed to high operating costs and fuel price volatility. In these settings, integrating solar PV and BESS into existing diesel-based systems can reduce fuel consumption and improve reliability and availability. In the Philippines, the National Power Corporation aims to achieve full hybridization of its 272 power plants by 2028, with most of them running on diesel today.^{4,5}



2.2 INVESTMENT LANDSCAPE

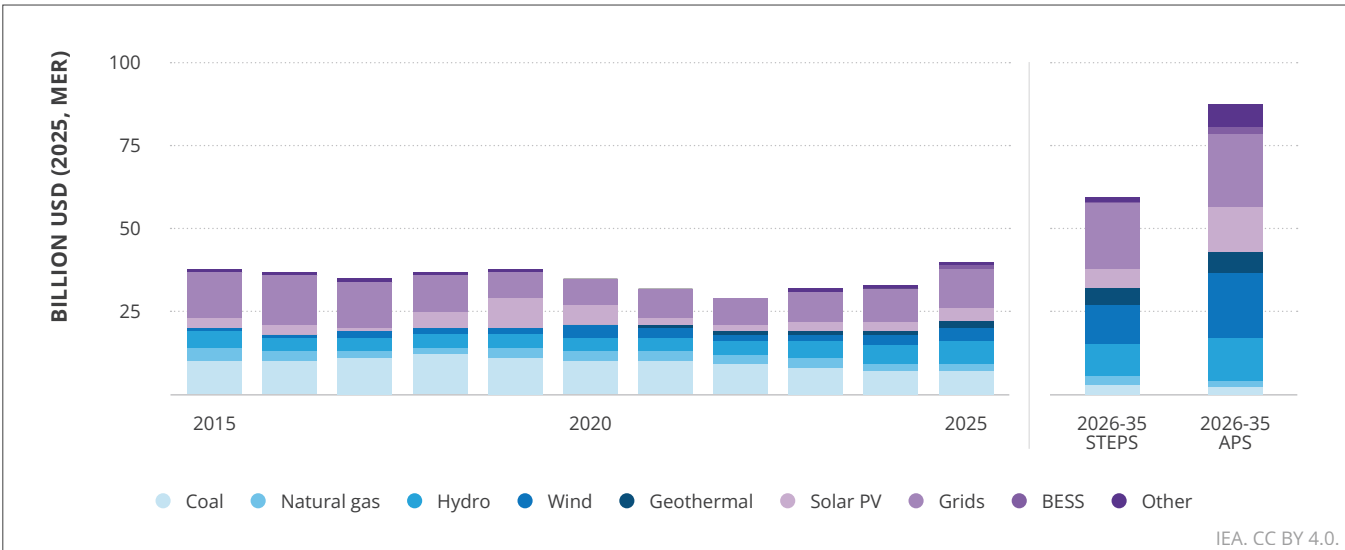
2.2.1 Investment trends

Total energy investment in Southeast Asia exceeded \$100 billion in 2025, with power sector spending amounting to \$45 billion. Renewable energy investment reached \$17 billion in 2025, surpassing the previous peak in 2019, which was primarily driven by rapid solar deployment in Viet Nam. Moreover, countries spent over \$12 billion on transmission and distribution to meet demand growth and improve system resilience, marking an acceleration after several years of underinvestment. Meanwhile investments in BESS started growing in recent years as costs have declined, reaching more than \$550 million in 2025.

Investment in renewable energy grows across IEA scenarios. Spending on solar PV is sustained at around \$5.5 billion in the next decade in the STEPS, benefiting from continued cost declines, while under the APS, the faster pace of capacity additions requires growth in spending to average

\$14 billion in the next decade. Spending on wind power becomes the largest source of low-emissions generation investment due to the higher capital outlays required and the slower progress of development in the last decade. Annual average investment in wind power over the next decade maintains at around \$12 billion in the STEPS while approaching \$20 billion in the APS. Meeting demand growth and integrating the surge in solar and wind energy requires significant grid reinforcements: investment in transmission and distribution continues to grow in the next decade, averaging over \$20 billion in both the STEPS and APS. Battery storage spending also grows across all pathways. In the APS, where battery storage capacity increases exponentially from today's levels, spending averages \$2.3 billion annually in the next decade, up from over \$550 million in 2025.

Figure 3: Power sector investment in Southeast Asia, 2015-2025, and annual average investment volumes between 2026 and 2035 across IEA scenarios



Notes: BESS = Battery energy storage systems; Other = Power generation from oil and bioenergy. STEPS = Stated Policies Scenario. APS = Announced Pledges Scenario.
Source: IEA analysis

2.2.2 Challenges facing renewable energy investment

Policy and market structure constraints

Across Southeast Asia, investment in renewable energy is growing and investor interest remains considerable. However, projects can often struggle to progress from early-stage development to financial close and implementation. This reflects a broad set of constraints that shape capital deployment across the region.

Structural advantages held by thermal generation, including coal and gas power, continue to constrain the pace and scale of renewable energy deployment.

As electricity demand grows, renewables compete with thermal generation in power systems where fossil fuel subsidies and existing market structures continue to favour coal and gas generation. In 2024, fossil fuel subsidies across Southeast Asia totalled \$40 billion.⁶ In addition, perceived risks that the deployment of variable renewable energy (VRE) could compromise system stability may persist, even though most ASEAN member states can integrate higher VRE shares using proven measures, without major system overhauls.⁷ Although several countries in Southeast Asia have committed to reducing the share of coal in the generation mix, coal remains critical to meeting power demand in the region.⁸ This is reinforced by the region's relatively young coal fleet, where 110 GW of installed coal capacity has an average age of 14 years. In several countries, moreover, coal plants are shielded from competitive market pressures by inflexible long-term power purchase agreements (PPAs), including guaranteed offtake or payment obligations. Together, these factors may make it more difficult for renewables to displace existing thermal capacity and meet a larger share of electricity demand.

Political and regulatory risks are the most frequently cited concerns for investors in the region.⁹ Renewable energy investments are particularly sensitive to financing costs because they typically involve high upfront costs and require stable assumptions around pricing, dispatch, and contractual enforcement. Evolving regulatory environments as well as unclear, lengthy, and complex procurement frameworks can directly affect financing costs and return expectations. These factors contribute to a broader cost-of-capital challenge in Southeast Asia, where renewable energy and storage projects are estimated to face financing costs over twice as high as in advanced economies.¹⁰

The third largest risk, according to regional investors, is transmission infrastructure risks.¹¹ Transmission and distribution networks need to expand and modernize to keep pace with rising demand and to manage the increasing variability of supply and demand. However, in Southeast Asia, spending on grids in the last decade has not kept pace with investment in power generation, in part due to long development timelines and complex permitting processes. Under-developed transmission infrastructure could mean projects see delays in getting a grid connection or lead to lost revenue through curtailment. For instance, in Viet Nam, rapid deployment of solar PV and wind capacity outpaced grid expansion, particularly in the South-Central provinces, where curtailment risk has often been borne by the investor.

These risks are reflected directly in contractual frameworks. Bankability depends on predictable and enforceable revenue streams, yet in several markets, power purchase agreements lack clarity around termination provisions, compensation mechanisms, and risk allocation, particularly in relation to curtailment.¹² International financiers may also be less willing to enter markets where PPAs lack certain provisions such as international arbitration mechanisms or US dollar indexation, as these provisions help mitigate contractual and currency risks.

Market design and pipeline visibility further influence investment decisions. Investors require a credible and sustained pipeline of opportunities to justify long-term market engagement. Where project opportunities are brought to market on a more fragmented basis, participation tends to remain more limited, particularly among international developers and financiers that prefer scale and continuity. Structured procurement mechanisms, including competitive auctions, can provide clearer market signals and improve investor visibility. However, execution risks remain. Procurement mechanisms are only effective when awarded projects can move through contracting, permitting, and grid connection procedures on predictable timelines. Where projects face long delays, developers may price this risk into bids or reduce their participation, which could weaken investor confidence.

Taken together, these constraints highlight an important distinction for renewable energy financing. Some risks,

such as early-stage development risk or contractual risk can be isolated and addressed at the project level through financial structuring or risk-sharing instruments. Others, such as fossil fuel lock-in, grid infrastructure constraints, and uncertain regulatory frameworks arise from the broader power system environment.

Domestic financing system constraints

Domestic actors play an important role in financing renewable energy across Southeast Asia. Large corporations, often subsidiaries of diversified conglomerates, are among the largest domestic investors and frequently act as project sponsors. For example, in the Philippines, domestic investment in clean energy is predominantly driven by private actors (80%), with corporates (41%) and commercial banks (36%) providing the largest shares of financing.¹³

Local commercial banks provide significant capital, although their participation is often constrained by tenor mismatches, as renewable energy projects typically require longer repayment periods than domestic banks are willing to offer. In addition, many domestic lenders continue to require full corporate guarantees from project sponsors in Indonesia and Viet Nam.^{14 15} Such requirements may disproportionately disadvantage smaller developers that lack the balance sheet capacity to absorb these guarantees.

Another financing bottleneck stems from counterparty exposure limits. Banks are typically subject to regulatory or internal limits on lending to a single borrower or a group of connected counterparties. In single-buyer electricity markets such as Indonesia or Viet Nam, where state-owned utilities act as the primary offtakers, loans extended to multiple independent power producers (IPPs) are often treated by banks as concentrated exposure to the same underlying counterparty.¹⁶ These limits create a ceiling on additional domestic debt for projects, even where projects are otherwise commercially viable. Concentration can also occur on the developer side. When project development is dominated by a small number of sponsors, lending across multiple projects could be considered as exposure to the same corporate group. However, the effects are less binding than offtaker concentration, as some countries have introduced regulatory adjustments in response: for

instance, the Philippines has granted banks additional single-borrower limits to eligible green projects, allowing greater exposure.¹⁷ Nonetheless, as banks approach borrowing limits, whether to state-owned utilities or to developers, the availability of additional debt financing for new renewable energy projects may become increasingly constrained.

Institutional investors remain relatively underrepresented in Southeast Asia's capital markets. As of 2023, equity holdings of institutional investors accounted for approximately 45% of market capitalization globally and 18% across Asia, compared to just 7% in the Philippines and roughly 8% in Indonesia and Viet Nam.¹⁸ Their participation in renewable energy financing can also be constrained by factors including credit quality and rating requirements, instrument format, liquidity, and limited familiarity with emerging-market assets. This doesn't imply a lack of domestic financing more broadly, as corporates and commercial banks play an important role in financing renewable energy across the region. DFIs and MDBs can provide additional support where commercial financing gaps remain, although their role varies considerably by market.

The financial sector enabling environment also matters for domestic capital mobilization. Prudential requirements, investment regulations, and other financial sector rules can affect the ability of banks and institutional investors to finance renewable energy.¹⁹ Where these constraints are binding, transaction-level credit enhancement alone may not be sufficient to mobilize domestic capital.

Taken together, these constraints suggest that the challenge is not simply a shortage of capital, but the terms on which it is available. Domestic lending is constrained by factors including tenor, collateral requirements, counterparty exposure, and the technical capacity of project sponsors. Where these constraints are binding, projects often turn to international lenders, which typically lend in US dollars or euros, while revenues are generated in local currencies. This creates a mismatch that can raise financing costs where longer-tenor hedging instruments are limited. These constraints are more pronounced for smaller-scale projects and newer technologies such as BESS and offshore wind.

CHAPTER 3

TARGETING BLENDED FINANCE EFFECTIVELY

3.1 DEFINING BLENDED FINANCE AND CONCESSIONAL FINANCE

The suitability of a blended finance structure depends on the nature of the constraint: some can be addressed within a transaction structure, while others reflect wider policy, regulatory, and technology challenges that may require different types of interventions. This section examines where blended finance can be additional, when concessional finance may be better deployed outside blended structures, and which instruments are most relevant to renewable energy investment in Southeast Asia.

Concessional finance is a type of capital, while blended finance is a way of structuring both concessional and private capital. For example, grant funding is a type of concessional capital which can be part of a blended finance structure where it supports a transaction or financing approach intended to mobilize private investment.

Another key distinction for this report is between PPPs and blended finance. A PPP is a contractual arrangement between public and private actors to deliver infrastructure or services and share associated risks.²⁰ It becomes blended finance only when concessional capital, guarantees, or other

Table 1: Definitions of blended finance and concessional finance

TERM	HOW IT'S USED IN THIS REPORT
Blended finance	A structuring approach in which concessional capital from public or philanthropic actors is used to address specific risks or financing constraints to enable or mobilize private investment to realize the Sustainable Development Goals (SDGs). In these structures, concessional capital is provided within a transaction's capital structure to lower the borrower's cost of capital and/or provide additional downside protection to senior investors.
Concessional finance	Public or philanthropic capital provided on terms more favourable than market terms. It may be deployed within or outside a blended finance structure.

catalytic instruments are used to mobilize private investment that would not otherwise participate on similar terms.²¹ The distinction therefore lies in the additionality of concessional support, not the PPP structure itself.

3.2 PROJECT-LEVEL AND SYSTEM-LEVEL CONSTRAINTS

An assessment of the effectiveness of blended finance starts from distinguishing between project-level and system-level risks. Project-level risks, such as early-stage development uncertainty, construction risk, technology performance risk, and first-mover challenges associated with emerging sectors, can often be addressed through financial instruments and transaction structuring. In these cases, blended finance can improve risk-return profiles, strengthen

creditworthiness, and support private sector participation. By contrast, system-level risks apply across a market rather than a single project. These risks can be institutional, financial, or physical in nature.

Blended finance can play a bridging role where wider policy, regulatory, or financing constraints translate into identifiable project level risks, such as limited availability of long-tenor commercial financing,

lender exposure limits, and limited currency hedging options. However, systemic risks such as inadequate grid capacity, weak systems planning, or the absence of credible remuneration frameworks cannot be resolved through financial structuring. Addressing these constraints depend on measures to strengthen procurement systems, contractual frameworks, regulatory predictability, and enabling infrastructure. The AC Wind Energy case study (Chapter 7.3) illustrates this distinction: concessional support could mitigate specific project-level revenue risks but could not address wider transmission constraints or the effects of expiring wind feed-in tariff (FIT) deadlines. While transmission, distribution, and regional interconnection fall outside the detailed assessment in this report, the scale of investment required as renewable energy deployment increases makes the potential role of blended finance and other public-private financing approaches in supporting grid infrastructure an important area for further research.

The role of blended finance can therefore be best understood as temporary and catalytic, rather than a permanent substitute to policy reforms: it can improve project-level economics, absorb selected risks, support pilot projects, and generate practical experience for policymakers and regulators to refine emerging regulatory and commercial frameworks. Sustained capital mobilization, however, ultimately depends on the strength and credibility of the wider investment environment.

3.3 FINANCIAL ADDITIONALITY AND MINIMUM CONCESSIONALITY

Concessional capital in blended finance structures should be targeted to where it can deliver the clearest financial additionality – by mobilizing commercial capital that would otherwise be unavailable or available only on terms that prevent an otherwise viable investment from proceeding.

Two related metrics are used to describe capital mobilization in blended finance transactions. The leverage ratio measures the amount of commercial capital mobilized for each dollar of concessional capital, including commercial capital from DFIs, MDBs, and private investors. The private capital mobilization ratio is narrower, measuring only private sector capital mobilized per dollar of concessional capital.



The degree of financial additionality depends on the nature and risk appetite of the concessional capital, as well as the pathway to commercial sustainability for the underlying investment. While blended finance can support projects that are not yet fully commercially viable, it can also play an important role in near-bankable projects where concessional support is more targeted. In such cases, concessional support should be limited to the level necessary to avoid subsidizing commercial returns and crowding out private investment, with the allocation of risk and return across investors remaining proportionate to the constraint being addressed.

In more commercially mature sectors, such as utility-scale solar and onshore wind, concessional capital may demonstrate lower financial additionality where projects are financeable, private investors are comfortable with the underlying risks, and the broader macroeconomic environment is stable. In such cases the level of concessionality required is typically limited and could crowd out private investment. However, additionality can remain high and concessionality could be higher even within mature technologies where financing constraints facing specific market segments or geographies continue to limit commercial investment. For instance, small project size, remote locations, weak offtakers, and limited access to affordable long-tenor local currency debt can dampen bankability even for

projects based on commercially viable technologies and proven business models.

Given the lower financial additionality of these two renewable energy technologies, this report does not examine their potential blended finance applications in detail. Instead, it focuses on emerging sectors and market segments where blended finance can be more additional and effectively targeted.

Emerging sectors and less mature technologies such as offshore wind, BESS, and certain distributed or off-grid renewable energy applications, may present a stronger case for blended finance where there are identifiable and financeable risks that lower investment viability. These include revenue model uncertainty, operational integration, early market risk, and limited awareness or track record of technology performance. However, technological or market immaturity does not in itself justify the deployment of a blended finance structure: where deployment is principally constrained by unresolved regulatory frameworks, unclear revenue models, or other system-level barriers, financial structuring alone may have limited effectiveness.

Market maturity is not the only determinant of financial additionality, nor the volume of private capital mobilized. Transactions in harder-to-reach markets or higher-risk segments may require greater concessionality and mobilize less commercial

Table 2: Assessing financial additionality and minimum concessionality

QUESTION	HOW TO ASSESS IT
1. Is the intervention financially additional?	Assess the counterfactual through current market sounding: without concessional support, would the investment (i) not proceed at all, (ii) proceed more slowly, (iii) proceed at a smaller scale, or (iv) proceed on less sustainable financing terms over the project life? Identify the specific financing constraint and consider whether commercial financing would otherwise be unavailable or insufficient on comparable terms.
2. What is the minimum concessionality required?	This assessment may vary across individual projects and over the project lifecycle as financing appetite and market conditions change. It should be validated against feedback from different stakeholders rather than solely relying on the financing terms sought by the project developer and co-financers. Where a case for financial additionality exists, assess whether the level of concessionality is proportionate to the expected development impact, private sector mobilization, and the degree of additionality achieved. It should be sufficient to address the identified constraint and mobilize commercial investment. As markets mature and commercial investors become better able to absorb the underlying risks, support should be reduced or withdrawn.

Note: For further guidance on assessing financial additionality and minimum concessionality, see the [Convergence and UNDP Strategic Framework for Blended Finance](#) and the [OECD DAC Blended Finance Guidance 2025](#).

capital while still delivering meaningful financial additionality. However, there is no necessary inverse relationship between additionality and mobilization, and highly additional transactions can also achieve high private sector mobilization. Meanwhile, high mobilization ratios may indicate low additionality where commercial investors would have participated on similar terms without concessional support. In practice, assessing financial additionality requires considering whether commercial capital would have been available on comparable terms in the absence of concessional support.

Financial additionality is the primary test for whether blended finance structures are justified and how concessional capital is deployed within blended finance structures, but it is not the only one. As blended finance is explicitly directed to

sustainable development objectives, its use should also be measured against development additionality: whether the investment achieves impact beyond what would otherwise be achieved without that support, as defined by the OECD (2025). This includes outcomes such as expanded electricity access, emissions reductions, lower air pollution, and energy affordability. According to the OECD (2024), value additionality refers to non-financial contributions such as technical assistance and capacity building that is provided alongside investments to improve development outcomes that standard capital markets cannot offer. These types of additionality interact and complement each other, where the highest form of additionality combines financial, development, and value additionality.

3.4 BLENDED FINANCE INSTRUMENTS AND APPLICATIONS

There are various options for structuring blended finance transactions so that they reflect the risk characteristics of the underlying project and the risks are allocated according to the ability of different parties to manage or absorb it. Convergence's [Private Investment Mobilization Models \(PIMMs\)](#) provide a framework for understanding replicable approaches to addressing common financing constraints.

Broadly, blended finance structures can be grouped into two categories:

CAPITAL STACKING is an approach typically used within blended debt or equity funds, where cash flows are allocated into tranches according to their risk level. The key is to strike the right balance between concessional capital, which can absorb more risk but is limited in size, and commercial debt/equity, which offers greater scalability but has a lower risk tolerance. Capital stacking functions as a buffer that absorbs risk through subordination and the use of first-loss capital. It is particularly effective for volatile transactions such as merchant deals or variable power assets with limited operating history.

CAPITAL SEQUENCING refers to deploying capital first from investors with a higher risk appetite, and then progressively introducing lower-risk financing as development advances. Since project risk generally declines as development progresses, providing funding early in the lifecycle can be an effective way to take on risk. Financial institutions typically disburse funds once lending conditions are met, but senior debt, despite its scalability, usually does not take on development-stage risk. For this reason, financing can be structured to match both the risk profile and funding needs by using grants for feasibility studies and engineering design, deploying sponsor equity together with concessional debt/equity during the development stage, and mobilizing senior loans at construction. Capital sequencing is particularly effective for transactions that require a long development period, or where development and completion risk is high.

Guarantees and insurance can also serve as effective risk-transfer mechanisms for structures with significant tail risk. They are especially useful for addressing events that could jeopardize the transaction, such as policy change risk or natural disasters.

Table 3: Selected instruments and structures used in blended finance

INSTRUMENT / STRUCTURE	DESCRIPTION	RISK / CONSTRAINT ADDRESSED
Project preparation / technical assistance grants	Support feasibility studies, transaction structuring, legal work, environmental and social (E&S) assessments	Early-stage development risk
Viability gap funding	Grants, convertible grants, or concessional loans to cover part of upfront investment costs where project revenues cannot support the full capital requirement	Financial viability and affordability gap where tariffs or consumer payments are insufficient to cover project costs
Credit guarantees	Cover a defined share or all of scheduled debt-service losses if the borrower fails to repay	Weak borrower or counterparty creditworthiness
Political risk guarantees / insurance	Protects against risks such as expropriation, currency inconvertibility, and breach of contract	Political and regulatory risk where projects depend on policy, licenses, or state-owned enterprises
Risk-sharing facilities	Shares losses across a portfolio of loans or investments of a domestic commercial bank to support on-lending in local currency	Portfolio credit risk and limited lender appetite; limited local currency financing
Bridge financing	Short term concessional capital to cover funding gaps until longer-term capital or refinancing becomes available	Timing and liquidity constraints
A/B loan structures	An MDB or DFI provides an A-loan from its own account alongside B-loans funded by commercial lenders, with the MDB/ DFI acting as lender of record. In blended structures, concessional loans or grants may be layered alongside the loan package to absorb specific risks	Limited availability of long-tenor commercial bank financing and access to international capital
Subordinated / mezzanine capital in blended funds	Typically used in three-tiered blended debt or equity funds, where a mezzanine tranche serves two purposes: it provides an additional loss-absorbing buffer for senior investors, and reduces the amount of junior concessional capital required, supporting the principle of minimum concessionality	By blended funds: Small transaction sizes, concentration risk, high transaction costs, and risk-return profiles that may not meet senior investors' requirements By mezzanine capital: Risk-return profiles that exceed the risk tolerance of senior commercial investors
Concessional foreign exchange (FX) hedging	Concessional capital subsidizes part of the cost of FX hedging instruments, such as cross-currency swaps, while the hedger provider continues to price the underlying currency risk on a market basis	Currency mismatch where project revenues are in local currency, but financial obligations are in hard currency

3.5 METHODOLOGY: ASSESSING BLENDED FINANCE SUITABILITY

The concepts introduced in Chapter 3 provide the foundation for the methodology used in this report, which is applied in Chapter 5 through the country spotlights.

The methodology assesses the suitability of blended finance across four renewable energy technologies in Southeast Asia and is grounded in two principles: first, blended finance should demonstrate financial additionality; second, concessional capital should be deployed only to the extent necessary to address the identified financing constraint. The

assessment therefore distinguishes between project-level constraints, which can often be addressed directly through transaction structuring or risk-sharing instruments, and system-level constraints, which generally require broader regulatory, policy, institutional, or infrastructure reform. Blended finance can sometimes provide temporary mitigation or support demonstration transactions where system-level constraints remain, but it cannot sustainably substitute for an enabling environment.

3.5.1 Assessing the enabling environment

For each technology and country, the analysis first assesses the constraints affecting investment across five dimensions.

The assessment is intended to identify what is constraining investment and whether that constraint

is financeable, rather than simply ranking markets according to maturity. For each sector and country, every constraint is rated from low to high to assess the strength of the enabling environment and identify where blended finance may be most relevant.

Table 4: Assessment criteria for investment constraints

CONSTRAINT	KEY FACTORS CONSIDERED	NATURE OF CONSTRAINT
Revenue certainty & contractual readiness	PPA tenor and payment structure; direct PPA availability; offtaker credit quality; curtailment and termination compensation; tariff mechanisms and FX indexation	Primarily project-level
Market depth, project pipeline & sector maturity	Pipeline visibility and auction cadence; VRE penetration; grid flexibility; maturity of sectors	Project- and system-level
Financial sector capacity	Diversity of financiers; local bank liquidity; collateral requirements; availability of non-recourse finance	Project- and system-level
Policy & regulatory framework	Market structure; foreign investment restrictions; local-content requirements; inter-agency coordination; clarity of long-term roadmaps; overall regulatory predictability	Primarily system-level
Cost of capital	Sovereign credit rating; ⁱ indicative sector weighted average cost of capital; local debt tenor and lending rates; collateral and recourse requirements	Primarily project-level ⁱ

ⁱ Although sovereign risk can influence the borrowing costs and credit profile of domestic issuers and projects, this constraint is treated as primarily project-level, as guarantees and other credit-enhancement instruments can help mitigate the risk to a certain degree.

3.5.2 Translating constraints into blended finance suitability

Blended finance suitability can be thought of as an inverted-U relationship. At one end, sectors with few material financing constraints generally require little or no concessional support, because commercial capital can already participate and the additionality of blended finance would be limited. At the other end, sectors dominated by unresolved system-level constraints may also have limited suitability for transaction-level blended finance,

because financial structuring cannot resolve the underlying barrier.

The strongest case for blended finance therefore typically lies between these two extremes: where projects are fundamentally viable or near-bankable, but identifiable financing or risk constraints prevent commercial capital from participating on acceptable terms.

3.5.3 Interpretation of the suitability matrix

Suitability for blended finance is assessed on a low - medium - high scale, based not simply on the severity of the constraint, but on whether blended finance can meaningfully address it.

For example, high constraints around revenue certainty or cost of capital may still imply medium or high suitability for blended finance. By contrast, severe policy or regulatory constraints generally imply lower suitability, as these

require broader system-level reform rather than transaction-level financial structuring.

The resulting matrix is therefore not a ranking of sector attractiveness or the severity of constraints. Rather, it assesses the extent to which blended finance is an appropriate tool for addressing the constraints identified in each sector.

Table 5: Assessment of suitability for blended finance

SUITABILITY	INTERPRETATION
Low	The constraint is primarily structural, regulatory, or system-level. Blended finance may support pilots or temporary mitigation, but cannot sustainably address the underlying barrier.
Medium	The constraint reflects both project-level and wider market or system-level weaknesses. Blended finance can support transactions and build a track record, but complementary market development is also needed.
High	The constraint is primarily project- or transaction-level and can be materially reduced through blended finance instruments such as guarantees, concessional capital, or risk-sharing structures.



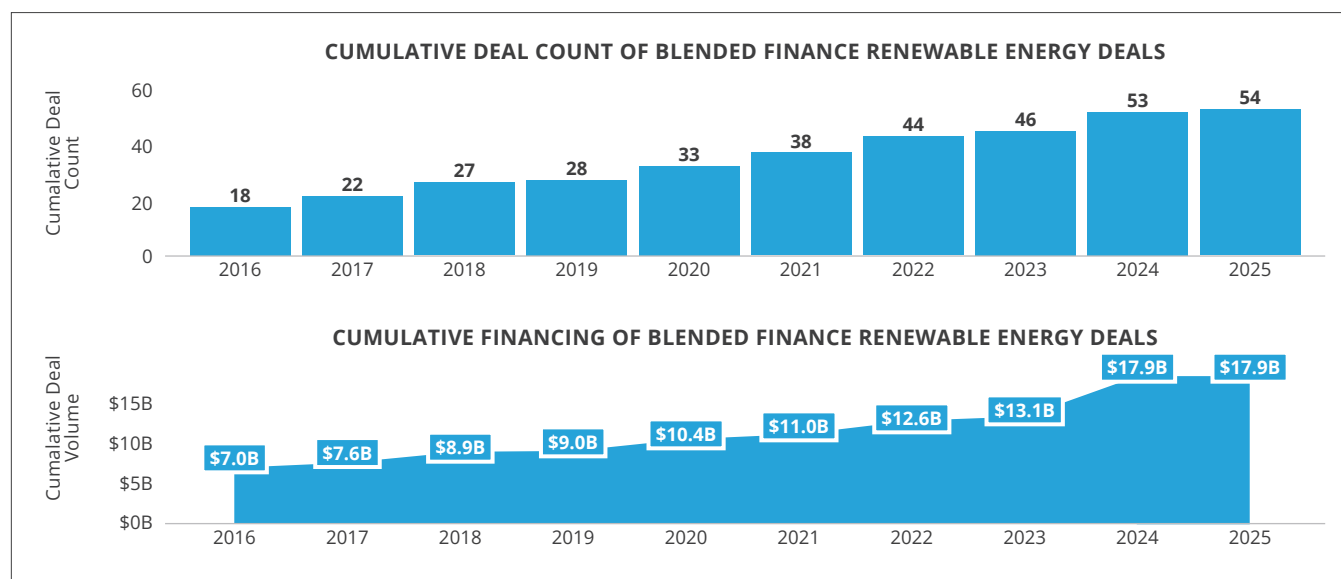
CHAPTER 4

BLENDED FINANCE IN SOUTHEAST ASIA

To date, Convergence has captured 171 blended finance transactions in Southeast Asia, representing a combined deal volume of approximately \$33.7 billion. Of these, 54 deals specifically targeted renewable energy and BESS, accounting for roughly \$17.9 billion in financing. While renewable energy transactions represent only about 30% of total deals, they account for more than half of total deal volume in the region. This concentration becomes even more apparent when comparing deal sizes: the median transaction stands at approximately \$158.5 million, significantly larger than the roughly \$60 million median observed across other sectors, such as agriculture and financial services.

On average, every \$1 of concessional capital in renewable energy transactions in the region mobilizes approximately \$1.40 of private capital, compared to \$1.63 globally. The relatively small gap suggests that private sector mobilization in the region is broadly in line with global patterns. When commercial capital from DFIs and MDBs is also included, the regional leverage ratio rises to 3.01, compared to 3.79 globally.ⁱⁱ These ratios describe the capital structure of transactions and should not be interpreted as a measure of financial additionality.

Figure 4: Blended finance deals targeting renewable energy in Southeast Asia, 2016-25

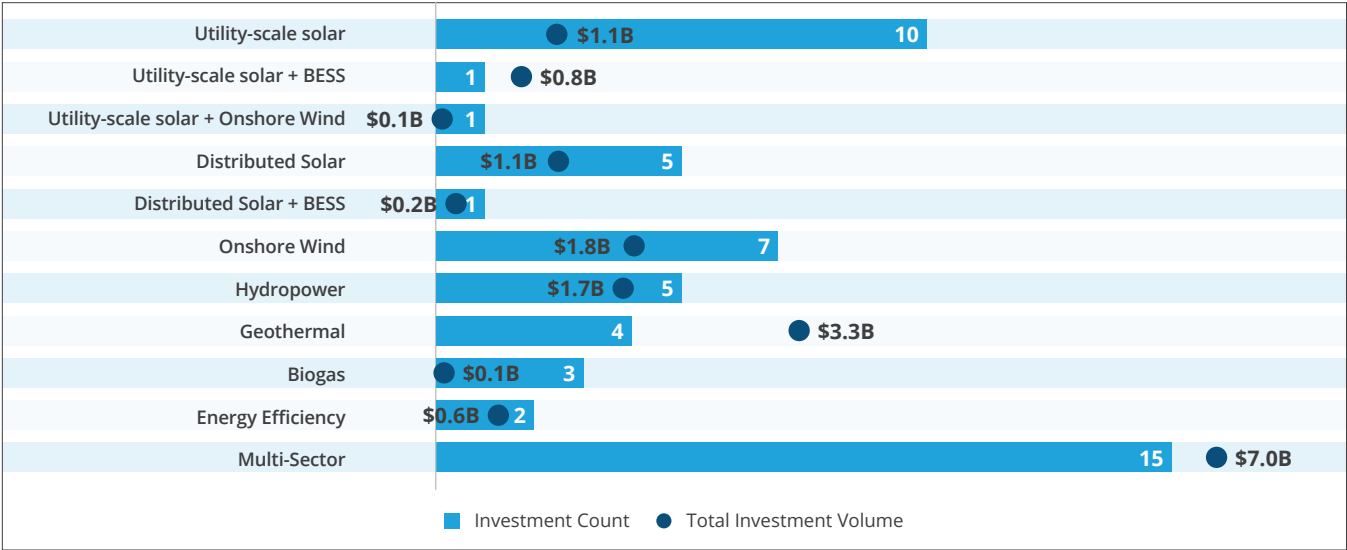


Notes: Southeast Asia includes ASEAN member states, excluding Singapore.

Source: Convergence Market Data as of May 2026

ii The broader leverage ratio includes commercial capital provided by DFIs and MDBs, as well as private investors. While DFI and MDB financing may be priced on commercial terms, these institutions have development mandates and different risk appetites from purely private investors; it is therefore distinguished from private-capital mobilization.

Figure 5: Breakdown of deals in Southeast Asia by renewable energy technology



Notes: Southeast Asia includes ASEAN member states, excluding Singapore. BESS = battery energy storage systems
Source: Convergence Market Data as of May 2026

As shown in Figure 5 above, renewable energy and BESS transactions in Southeast Asia primarily target multiple technologies simultaneously, with 15 deals, largely through blended finance funds and facilities. Among individual technologies, utility-scale solar accounts for the largest number of deals, with 10 transactions totalling approximately \$1.2 billion. Notably, geothermal energy, despite accounting for only four deals, has attracted roughly \$3.3 billion in financing, reflecting the large capital requirements associated with the sector.

Among the three focus countries, Viet Nam is the most frequently targeted market, appearing in 33% of renewable energy and BESS deals in the region, followed by Indonesia (26%) and the Philippines (17%).ⁱⁱⁱ

Two additional patterns are worth noting. First, BESS financing in Southeast Asia has largely occurred through hybrid projects rather than as standalone storage assets. For example, the \$820 million [Gulf Solar and Solar with Battery Energy Storage Systems](#) project launched in Thailand in 2024 supports the construction of eight solar PV plants (393 megawatt [MW]) alongside four solar-plus-storage projects (256 MW capacity with 396 MW hours [MWh] of storage). The Asian Development Bank (ADB) used a blended A/B loan structure to mobilize commercial capital



from institutions including the Export-Import Bank of China and KEXIM Global. Second, Convergence Market Data does not currently capture any blended finance transactions targeting offshore wind, in Southeast Asia or elsewhere globally, despite growing policy interest in the technology. This reflects the sector's very early stage of development, with no offshore wind transactions in the region yet identified as having been supported through blended finance.

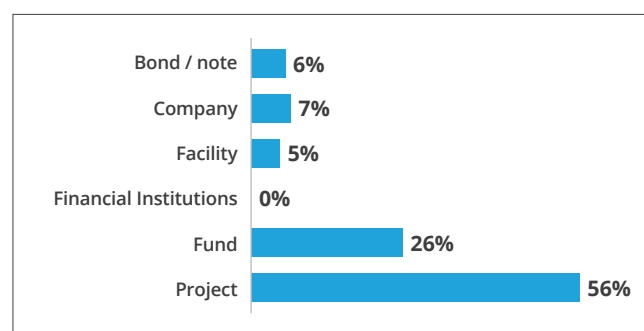
As depicted in Figure 6, project-level finance accounts for most blended finance transactions in the sector (56%),

ⁱⁱⁱ Although blended finance has supported BESS elsewhere in Southeast Asia, its use across the three focus countries remains limited, with BESS-specific transactions recorded only in the Philippines.

followed by funds (26%),^{iv} which are typically structured as multi-sector investment vehicles (the “multi-sector” category in Figure 5). The growing use of fund structures also reflects the operational challenges associated with structuring concessional transactions individually, including small transaction sizes, higher borrower credit risk, and limited diversification. Standardized investment vehicles can help reduce transaction complexity, streamline negotiations across heterogeneous investor groups, lower transaction and due diligence costs, shorten execution timelines, and improve scalability by creating repeatable financing frameworks.

Figure 7 shows that donor-funded concessional pools and multilateral climate funds remain the dominant providers of concessional capital for renewable energy and BESS blended finance transactions in Southeast Asia. This includes concessional finance windows managed by MDBs, the Clean Technology Fund (CTF), and Green Climate Fund (GCF). These actors primarily provide concessional debt, which accounts for 42% of concessional commitments, followed by concessional equity at 16%. This reflects the dominance of project-based investment structures within the region’s market, as highlighted previously in Figure 6. By contrast, the use of concessional guarantees and insurance remains

Figure 6: Proportion of renewable energy blended deals in Southeast Asia by vehicle type

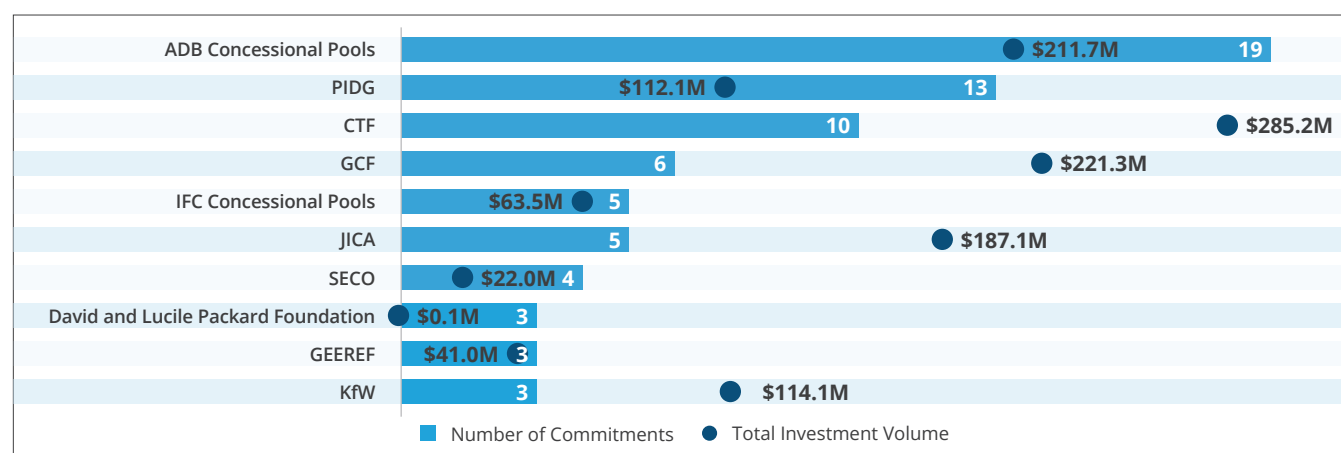


Source: Convergence Market Data as of May 2026.

relatively limited, representing only 10% of concessional commitments. Japan’s Leading Asia’s Private Infrastructure Fund (LEAP), managed by the ADB, stands out with seven investments and approximately \$112 million in concessional debt commitments.^v

Foundations and non-governmental organizations currently play only a limited role in providing concessional capital, accounting for roughly 7% of total investments in the sector. As shown below, this activity has been driven primarily by international foundations, while participation from regional foundations remains limited.

Figure 7: Top concessional capital providers in blended renewable energy and BESS transactions in Southeast Asia by number of commercial capital commitments



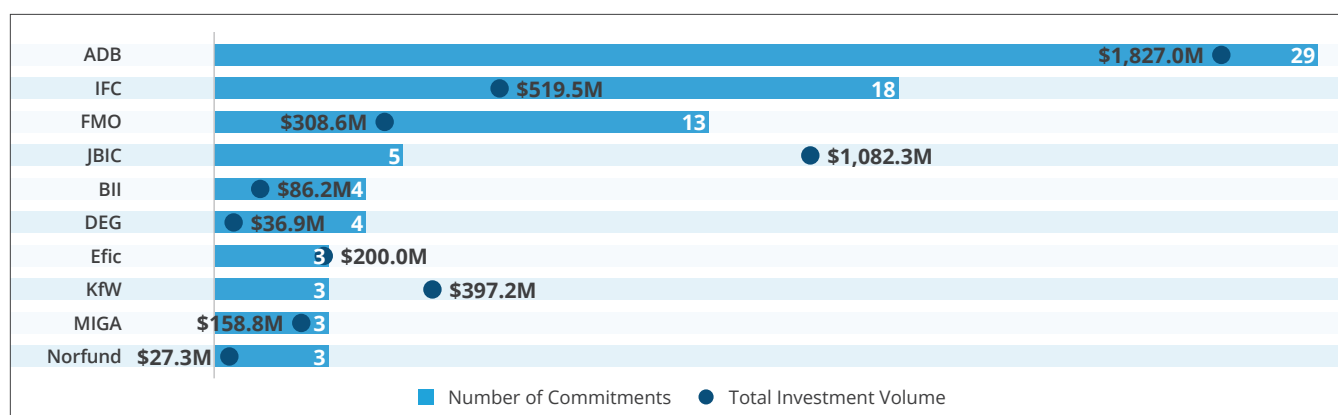
Note: ADB = Asian Development Bank; PIDG = Private Infrastructure Development Group; CTF = Clean Technology Fund; GCF = Green Climate Fund; IFC = International Finance Corporation; JICA = Japan International Cooperation Agency; SECO = Swiss State Secretariat for Economic Affairs; GEEREF = Global Energy Efficiency and Renewable Energy Fund; KfW = Kreditanstalt für Wiederaufbau (KfW Development Bank).

Source: Convergence Market Data as of May 2026.

^{iv} Here, blended funds refer to pooled investment vehicles that combine concessional and commercial capital and are primarily launched and managed by private fund managers.

^v MDB-managed donor trust funds are typically established with specific mandates. LEAP, for example, was created to provide concessional financing for infrastructure projects.

Figure 8: Top 10 DFIs & MDBs in renewable energy transactions in Southeast Asia by number of commercial capital commitments



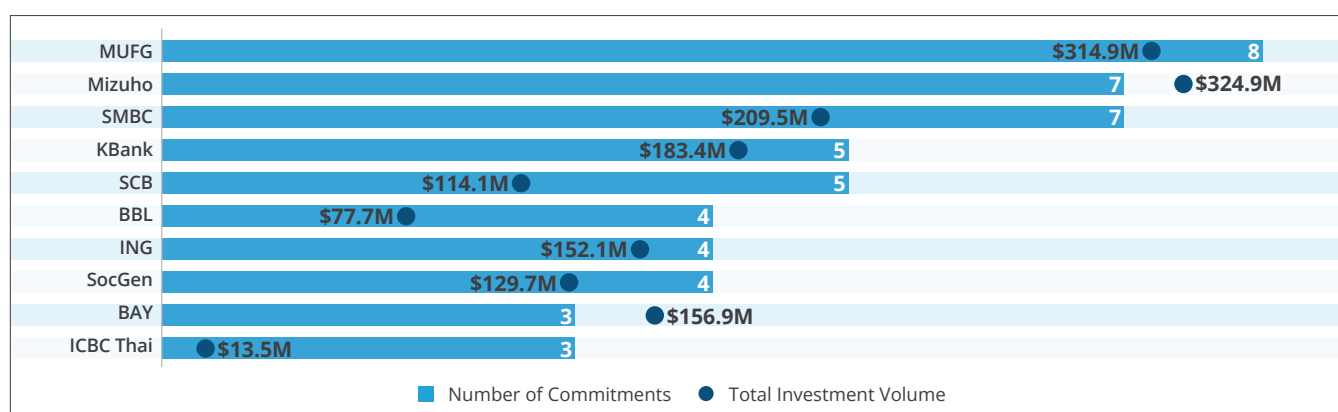
Note: ADB = Asian Development Bank; IFC = International Finance Corporation; FMO = Dutch Entrepreneurial Development Bank; JBIC = Japan Bank for International Cooperation; BII = British International Investment; DEG = Deutsche Investitions- und Entwicklungsgesellschaft (German Investment and Development Company); Efic = Export Finance and Insurance Corporation (now Export Finance Australia); KfW = Kreditanstalt für Wiederaufbau (KfW Development Bank); MIGA = Multilateral Investment Guarantee Agency; Norfund = Norwegian Investment Fund for Developing Countries.
Source: Convergence Market Data as of May 2026.

Among DFIs and MDBs, the ADB leads with 29 commitments and approximately \$1.8 billion in commercial capital mobilized, followed by the International Finance Corporation with 18 investments totalling roughly \$520 million (Figure 8). Japan Bank for International Cooperation, Japan's export credit agency, also stands out, having provided approximately \$1.1 billion in commercial capital across just five investments. Like donor-funded vehicles, MDBs and DFIs primarily rely on debt instruments for renewable energy financing, with debt accounting for 67% of investments.

Commercial banks are the dominant private sector participants in blended finance transactions in the

sector (Figure 9). Mitsubishi UFJ Financial Group (MUFG) leads with eight investments and approximately \$315 million in committed capital. Commercial investors provided 65% of their capital through loans. However, they made somewhat greater use of equity than DFIs and MDBs, with equity accounting for 28% of commercial investor commitments compared to 25% for DFIs and MDBs. Figure 9 also highlights the role that regional banks can play as renewable energy financiers. Banks based closer to the three focus countries may be well positioned to pursue investment opportunities as the market expands; for example, Kasikornbank and Bangkok Bank have participated in several notable solar transactions in the region.

Figure 9: Top 10 private investors in renewable energy transactions in Southeast Asia by number of commercial capital commitments



Note: MUFG = Mitsubishi UFJ Financial Group; Mizuho = Mizuho Bank; SMBC = Sumitomo Mitsui Banking Corporation; KBank = Kasikornbank; SCB = Siam Commercial Bank; BBL = Bangkok Bank; ING = ING Bank; SocGen = Société Générale; BAY = Bank of Ayudhya; ICBC Thai = Industrial and Commercial Bank of China (Thai).
Source: Convergence Market Data as of May 2026.

Notably, banks often co-finance projects alongside MDBs; among the 30 deals involving both commercial banks and MDBs, 56% included at least two commercial banks. The [Monsoon Wind Power Project](#) in Lao PDR, which exports electricity to Viet Nam, illustrates this model well, with ADB providing a \$100 million A-loan alongside \$50 million in concessional loans through three ADB-managed funds and a \$10 million grant to help mitigate potential curtailment risk, while mobilizing approximately \$450 million in B-loans and parallel financing from private investors, including Siam Commercial Bank and Sumitomo Mitsui Banking Corporation (SMBC).

Another notable trend is the use of blended debt platforms by large multinational banks to avoid the high transaction costs and complexity associated with project-by-project financing. For example, MUFG partnered with FinDev Canada and the GCF to launch [GAIA](#), a blended debt fund targeting climate mitigation

and adaptation across 19 countries. Singapore's [Financing Asia's Transition Partnership \(FAST-P\)](#) initiative comprises three partnerships including the Green Investments Partnership (GIP), managed by Pentagreen Capital. GIP provides debt financing to sustainable infrastructure projects that are outside of the remit of traditional lenders. The Singapore government has committed up to \$500 million to first-loss capital across FAST-P, to be matched by other catalytic capital providers. GIP illustrates how this catalytic capital can be structured: its junior tranche absorbs first losses, providing subordination beneath more senior capital and improving the risk-return profile for participating investors. This approach can also help mobilize private capital into parts of an infrastructure project's capital structure that traditional lenders cannot finance, or into sub-investment-grade project portfolios that fall outside banks' risk appetite.^{vi} See Chapter 7.1 for a more detailed illustration of how GIP's layered capital structure works in practice.



vi Platform capitalization does not necessarily equal capital deployment; actual drawdown and pipeline conversion are better indicators of whether capital is reaching projects. These vehicles can nevertheless create repeatable financing channels for projects that are too small, complex, or risky for standalone bank lending.

CHAPTER 5

COUNTRY SPOTLIGHTS

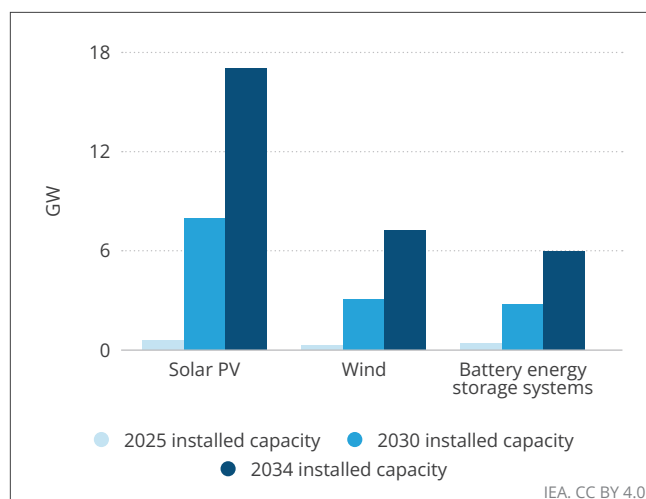
5.1 INDONESIA

5.1.1 Overview of power sector

Indonesia is Southeast Asia's largest economy, largest energy consumer, and largest coal producer. Its electricity demand is expected to grow by nearly 6% on average annually between 2026 and 2030 (IEA, 2026). Power generation in Indonesia today is dominated by coal-fired power plants, with over 50 GW of installed capacity generating over 70% of the country's electricity. Hydro and geothermal represent 9% of generation, while solar PV and wind are currently a small share, at around 0.5%.

The country's electricity sector is centralized under vertically integrated, state-owned PT Perusahaan Listrik Negara (PLN). PLN has a monopoly over transmission and distribution, is the primary generator, and is also the sole offtaker for independent power producers. Nearly 70% of electricity generation is generated or purchased by PLN.²³ A large share of PLN's existing generation fleet and transmission assets are financed on its corporate balance sheet, but a growing portion of capacity is financed through special purpose vehicles (SPVs) in which PLN generation subsidiaries (such as PLN Indonesia Power) take equity stakes alongside private partners and raise debt against long-term PPAs with PLN.²⁴ PLN is therefore frequently both an equity holder in an IPP and the offtaker of its output. In 2025, PLN was integrated under Danantara, Indonesia's sovereign investment holding company, adding a layer to the institutional structure through which state-owned electricity assets are governed and financed.

Figure 10: Indonesia's installed capacity and capacity additions in the RUPTL 2025-2034



Notes: Solar PV includes utility-scale solar PV and hybrid systems; battery energy storage systems refer to standalone systems.
Source: RUPTL 2025-2034

International public finance also plays a role in financing renewable energy. The Indonesia Just Energy Transition Partnership (JETP), established in 2022, aims to mobilize \$20 billion in private and public financing, with the Comprehensive Investment and Policy Plan identifying priority investments, policy actions, and financing needs.²⁵ As of September 2026, the Indonesia JETP has mobilized \$3.92 billion.²⁶

Looking ahead, the RUPTL 2025-34, or Electricity Supply Business Plan, includes a target to increase the share of renewable energy to 34% of the national power mix by 2034.²⁷ Meeting this target requires the installation of more than 42 GW of renewable capacity,

including 17 GW of solar PV and 7 GW of wind.^{vii} Indonesia is also implementing a de-dieselization programme for 3,378 operating units, including through the conversion of 2,230 units to renewable or hybrid systems. Moreover, President Prabowo Subianto has announced a national programme to build 100 GW of solar PV, including 20 GW of utility-scale solar, the rest being hybrid installations, with 80 GW of solar power and 320 GWh of co-located BESS.²⁸ This programme is expected to cost around \$62 billion.²⁹

To implement these targets, a series of regulations clarify procurement, pricing, and PPA arrangements

for renewable power projects that may reduce risk for renewable energy developers. Ministry of Energy and Mineral Resources (MEMR) Regulation 5/2025, for instance, includes policies for shifting foreign exchange risk in PPAs to PLN, allowing IPPs to retain ownership of renewable energy assets through build-own-operate schemes, and requiring compensation for curtailment where electricity cannot be delivered.³⁰ MEMR Regulation 2/2024 sets the framework for rooftop solar deployment, while MEMR Regulation 19/2025 provides a regulatory basis for hybrid power plants, including hybrid systems incorporating battery energy storage.^{31 32}

5.1.2 Structural constraints shaping deployment

Indonesia's centralized power sector structure means that renewable energy deployment depends heavily on the planning, procurement, and offtake decisions of PLN. In the RUPTL 2025-34, there is a growing role for IPPs, with local and regional developers projected to develop nearly 70% of new capacity, although PLN would in many cases be equity holders in SPV structures.

Structural features of Indonesia's power system shape the deployment of renewable energy. Long-term coal-fired power purchase agreements, often structured on a take-or-pay basis and extending over 20 to 25 years, create fixed obligations that persist regardless of demand.³³ Combined with Indonesia's Domestic Market Obligation policy, which subsidizes coal through capped domestic pricing, these arrangements contributed to oversupply conditions in the Java-Bali grid, reducing the need for additional capacity, although demand growth has since eased this imbalance.³⁴ Network capacity presents a further barrier, where in some locations, grid infrastructure is insufficient to absorb new renewable generation, and connection times can be long. Moreover, operational practices matter alongside capacity: dispatchable baseload generation is often preferred over variable output, although Indonesia's VRE share remains at a level where integration challenges can be managed without major system overhauls.³⁵ Overall, these factors shape the deployment of renewable energy, independent of investor interest.

Project viability in Indonesia is also affected by tariff-setting, minimum local content requirements, and procurement visibility. Renewable energy tariffs have historically been benchmarked against existing average generation costs, often lower than the true cost of generation due to contribution of subsidized coal power, limiting the ability of projects to achieve returns that reflect their underlying risks. Since the issuance of Presidential Regulation No. 112/2022, renewable energy tariffs have been transitioning to reflect benchmark prices with variations by technology, size, and location.³⁶ Local content requirements, which impose a minimum proportion of locally sourced goods and services for electricity infrastructure to support local supply chains, can raise costs and compress margins, although this is less of an issue for solar due to healthy local manufacturing capability.³⁷ Furthermore, procurement remains fragmented and largely non-programmatic, with limited visibility on long-term project pipelines. While large international developers continue to participate given the market's long-term potential, this uncertainty can increase required risk premiums and raise the cost of capital.

Stakeholder interviews reveal different views on where the main financing constraints lie, with public actors focusing more on project readiness rather than on the availability of capital, while investors emphasize project economics and risk allocation. Some public sector and state-linked actors emphasized that liquidity is broadly available for commercially

vii 17 GW of solar PV includes 3.6 GW of hybrid solar plus BESS installations.

viable renewable energy projects, arguing that the more significant challenge concerns project pipeline readiness, procurement execution, and the pace at which bankable opportunities can be brought to market. These concerns are broadly consistent with international investor feedback under the JETP, where pipeline implementation and visibility remain important constraints. Domestic and international private investors and lenders additionally point to pricing expectations, contractual risk allocation, policy predictability, and long-term revenue certainty. Misaligned pricing expectations within procurement processes can compress project margins and weaken bankability, particularly for emerging technologies and projects facing higher development or infrastructure

costs. For example, some international investors commented that equity internal rate of return (IRR) benchmarks used by PLN were below investor return expectations of around 13–16%. At the same time, higher procurement prices need to be balanced against their implications for PLN's costs and the government's electricity subsidy burden.

In practice, this suggests that Indonesia's most binding constraints operate at the system level.

Its financing constraints are less about the absolute availability of capital than about whether projects can meet the risk-adjusted return and bankability requirements necessary to attract sustained private investment.



5.1.3 Overview of selected sectors

ROOFTOP SOLAR

According to the Institute for Energy Economics and Financial Analysis (2026), rooftop solar capacity in Indonesia reached around 850 MW in 2025, driven largely by commercial and industrial (C&I) installations. The RUPTL 2025-34 designated a 3 GW quota over its implementation period, with annual quotas decided each year.³⁸ At the start of 2026, the government set a quota of 485 MW of rooftop solar, however there is a large backlog in installation due to high demand, over 300 MW were allocated to projects that have been on the waitlist from the previous year.³⁸ Rooftop solar

is financed typically on corporate balance sheets, with capital from local banks, microfinance institutions, and private developers. Leasing models for rooftop solar are available through companies such as Xurya, which delivered over 300 projects by the end of 2025.⁴⁰ For households and small businesses, high upfront installation costs could limit the commercial attractiveness of rooftop solar, particularly as low PLN tariffs reduce the potential for bill savings. The removal of net metering under MEMR Regulation 2/2024 further weakens the financial incentive for self-generation.

DECENTRALIZED SOLUTIONS

According to Antara News (2026), Indonesia's electrification rate reached 99.8% in the first quarter of 2026, with the remaining access gap concentrated in the eastern regions of Maluku, Papua and Nusa Tenggara. The Program Listrik Desa (or Village Electricity Program), is a PLN initiative to electrify disadvantaged, frontier, and outermost regions to support the government's objective of full electricity access by 2029.⁴¹ While grid extensions are the primary means to provide access, when grid connection is too technically complex or costly, micro-grid and standalone

systems, primarily with solar PV are deployed. From a regulatory perspective, MEMR Regulation 19/2025 clarifies procurement procedures for hybrid power plants, particularly projects replacing diesel generation in remote or isolated areas of Indonesia. However, projects continue to face elevated risks linked to small project sizes and high logistical costs. Access programmes are funded on PLN or IPP balance sheets, but also with financing from international sources, such as through the Result-Based Loan for Accelerating Indonesia's Clean Energy Transition.⁴²

BATTERY ENERGY STORAGE SYSTEMS (BESS)

BESS are increasingly recognized by the government as a technology to support system flexibility and renewable integration. The RUPTL's Accelerated Renewable Energy Development Scenario adds 6 GW of standalone BESS and 3.6 GW of hybrid installations.⁴³ To support the implementation of these targets, Presidential Regulation 112/2022 and MEMR Regulation 19/2025 recognize hybrid systems, establishing

the basis for procurement and tariff arrangements. However, there is not yet an established framework for remuneration of BESS services nor clarity on contractual and technical parameters. Standalone systems face additional bankability challenges, as there is not yet a regulatory framework in Indonesia specifically recognizing standalone storage systems as network assets.⁴⁴

OFFSHORE WIND

The wind market in Indonesia remains at an early stage. In 2025, the country had 150 MW of installed wind capacity, all from onshore wind farms in South Sulawesi.⁴⁵ The RUPTL 2025-34 targets 7 GW of wind power but does not distinguish between onshore and offshore projects.⁴⁶ Given market conditions, this capacity is expected to come from onshore wind.

Indonesia does not yet have a regulatory framework for the offshore wind sector, nor any planned or operational projects. Reflecting this early-stage market context, offshore wind is not considered in the analysis for Indonesia.

5.1.4 Financing conditions and cost of capital

Indonesia benefits from investment grade ratings from all three major agencies. However, Fitch and Moody's changed their outlook to negative in the first quarter of 2026, citing rising policy uncertainty and sustained revenue pressures, such as the financing and governance of Danantara.^{47 48}

Concerns linked to fiscal, policy, and currency risks are reflected in the 10-year sovereign bond yield, which rose from 6% in January 2026 to around 7.2% at the end of September, against a US 10-year Treasury yield of around 5.2%.⁴⁹ Sovereign yields provide an important reference point for local-currency risk pricing, but they do not determine

project-level financing costs on their own. The cost of debt and expected equity returns also depend on risks specific to the project, sector, and company.

Rooftop solar, particularly C&I installations, benefit from an emerging commercial track record but individual projects may still be near-bankable due to customer credit risk and low commercial tariffs. Decentralized solutions face higher indicative financing costs because projects are smaller, in harder to reach areas, and depend on government subsidies. BESS projects have a lower cost of capital estimate, but projects are not bankable in the absence of established regulatory frameworks and associated revenue certainty.

Table 6: Cost of capital and key risks: Indonesia

TECHNOLOGY	COST OF CAPITAL (DATA FROM 2024)	KEY RISKS
Rooftop solar	Not available	• Offtaker credit risk for micro, small, and medium-sized enterprises (MSMEs) • High transaction costs for small projects • Revenue risk from low PLN tariffs
Decentralized solutions	Not available	• High transaction costs for small projects • Construction and logistics risks • Offtaker credit risk
BESS	9.0-11.0%	• Incomplete regulatory frameworks • Revenue risk • Limited market development

Note: Cost of capital value for BESS refers to a 40-MW utility-scale battery energy storage system. Offshore wind for Indonesia is not considered in this analysis.
Sources: IEA (2025), Cost of Capital Observatory and from industry and stakeholder discussions

5.1.5 Blended finance market evidence

Convergence Market Data identifies 48 blended finance transactions targeting Indonesia, with a combined financing volume of approximately \$11.3 billion. Of these, 14 transactions specifically targeted renewable energy, representing \$5.2 billion in total financing.

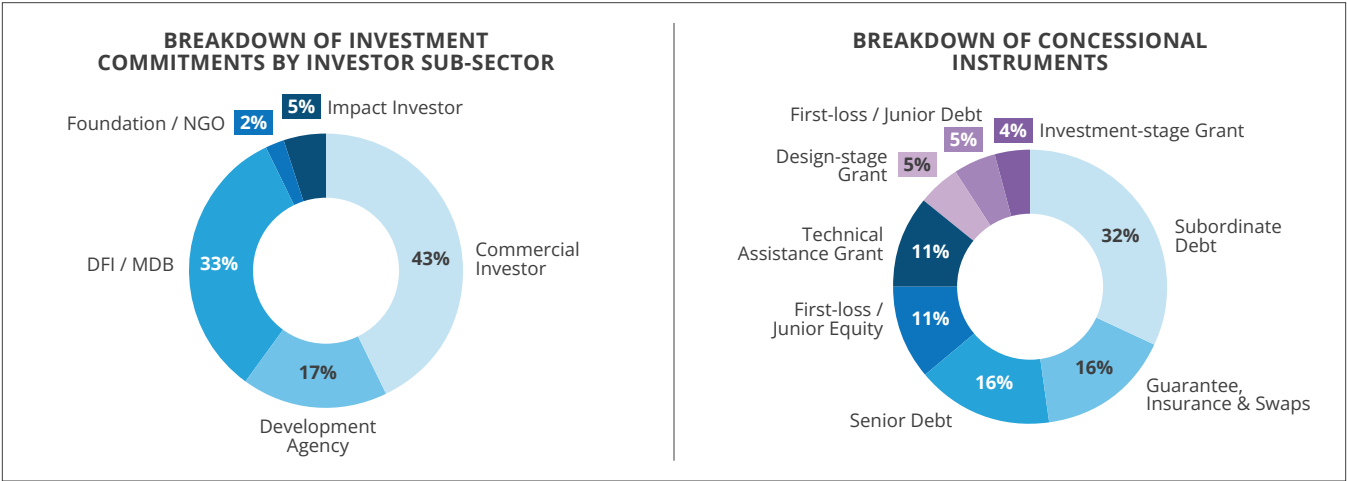
Indonesia is unique in having a government-led blended finance platform, [SDG Indonesia One](#), managed by PT Sarana Multi Infrastruktur (PT SMI). PT SMI has played an important role in supporting early-stage project development by financing feasibility studies and technical assistance, as well as funding high-risk geothermal exploration activities, including drilling and

resource evaluation, that commercial banks typically avoid.⁵⁰ The institution also provides standby loan facilities to enhance creditworthiness and bridging finance to help projects proceed when other lenders face processing or administrative delays. Geothermal is the most targeted renewable energy sector for blended finance in Indonesia, with four transactions mobilizing \$3.3 billion in capital. While blended finance has not yet been deployed to support BESS in Indonesia, its use for geothermal energy demonstrates the potential to facilitate early-stage development of emerging clean energy technologies.

As shown in Figure 11, commercial investors account for a substantial share of financing; however, DFIs and MDBs remain critical sources of capital for the sector. The ADB has been an important financier of geothermal development and has participated in A/B loan structures alongside major commercial banks, including

MUFG, Mizuho Bank, and SMBC. Subordinated debt (32% of investments), followed by guarantees (16%), and senior concessional debt (16%), primarily provided by donor countries, are the most commonly observed concessional instruments in Indonesia’s renewable energy blended finance transactions.

Figure 11: Blended finance investment trends for Indonesia in renewable energy



Notes: Investment commitments in the left chart include both commercial and concessional capital. The right chart shows the composition of concessional commitments by instrument. Investment commitments represent the count of individual investor investments, not the amount invested. Development agencies include bilateral aid agencies, such as JICA, multi-donor funds, such as GCF and donor-funded concessional pools managed by MDBs, such as LEAP, which is managed by the ADB.
Source: Convergence Market Data as of May 2026.

5.1.6 Suitability for blended finance

This matrix assesses the readiness of each sector across five dimensions that influence whether blended finance can suitably and realistically address investment barriers.

In Indonesia, the most binding constraints are linked to PLN's central role in planning, procurement, and pricing: it can mitigate specific project-level risks such as offtaker credit risk and small transaction size, but cannot substitute for regulatory development and policy reforms.

Concessional capital deployed in blended finance structures can improve access to financing for **rooftop solar projects**. For larger projects, such as those serving C&I customers, credit guarantees can reduce lender exposure to borrower or project-level risks, enabling longer tenors or lower collateral requirements. Smaller projects face greater financing constraints, such as limited transaction size, high transaction costs, and customer credit risk. However, the lack of net metering and low PLN tariffs reduce customer incentive to deploy rooftop solar; these are policy barriers that cannot be resolved through blended structures alone.

Decentralized solutions often face weak economics, reflecting small project sizes, remote locations, and high delivery costs. Aggregation can improve viability by creating scale and reducing transaction costs. There are already some examples of aggregation in Indonesia. PLN has explored clustering small renewable energy projects

in remote areas, PT SMI is developing a programme to support renewable energy in remote areas, including diesel replacement, and the Indonesia JETP has also supported de-dieselization such as through the MENTARI programme. In addition to blended fund structures, portfolio guarantees and risk-sharing facilities with local financial institutions expand lending to off-grid solar developers and operators while reducing lenders' net loss exposure. Where project economics remain insufficient to generate commercial returns even at portfolio scale, highly concessional public finance or grant support may therefore be more appropriate than blended finance.

The regulatory framework for **battery storage** in Indonesia is not yet complete and there is a limited track record of deployment. Blended finance can play a role in de-risking hybrid projects as regulations emerge, particularly during the design and construction stages. Project preparation and technical assistance grants can cover feasibility studies and system-needs assessments, while also supporting broader pipeline development. Given the several GW of BESS planned under the RUPTL, viability gap funding could also help offset high upfront costs and support early market development. However, the value of blended finance for early-stage project risk is contingent on the emergence of government regulations on standalone projects.

Table 7: Overview of enabling environment in selected sectors: Indonesia

LEVEL OF CONSTRAINT	ROOFTOP SOLAR	DECENTRALIZED SOLUTIONS	BESS	OFFSHORE WIND
Revenue certainty and contractual readiness				N/A
Market depth, project pipeline, and sector maturity				N/A
Financial sector capacity				N/A
Policy and regulatory framework				N/A
Cost of capital				N/A
Suitability for blended finance	Medium	Medium	Low - Medium	N/A

 High constraint  Moderate-high constraint  Moderate constraint  Moderate-low constraint  Low constraint

Note: Offshore wind is not considered in the analysis of Indonesia.

5.2 THE PHILIPPINES

5.2.1 Overview of power sector

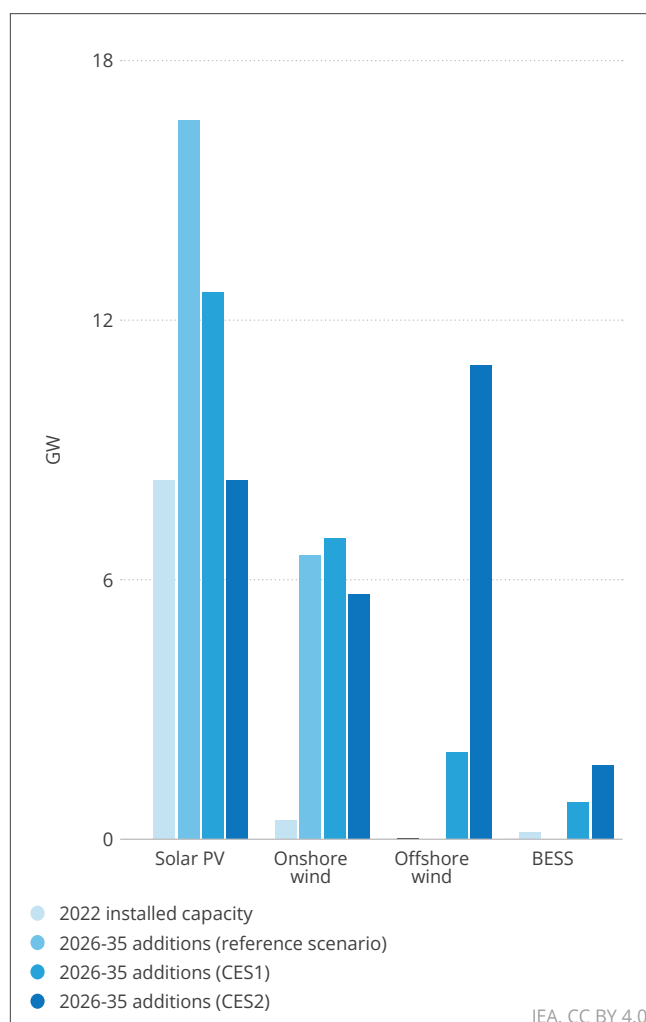
The Philippines has achieved an electrification rate of 94.8%, with its remaining access deficit concentrated in remote islands.⁵¹ The Philippines consists of three interconnected grid systems in Luzon, Visayas, and Mindanao, operated under a whole-of-grid concession by National Grid Corporation of the Philippines (NGCP), a joint venture of the State Grid Corporation of China (40%) and Filipino entities. Off-grid and missionary areas not connected to the national power transmission network rely on over 600 MW of oil-based generation which are exposed to fuel price volatility and face reliability issues – in 2025, 70% of total domestic diesel demand was imported.^{52 53}

The Philippines is one of two liberalized electricity markets in ASEAN, with a competitive power generation market offering multiple routes to market including through the wholesale electricity market, power supply agreements (PSAs) with distribution utilities and retailers, and direct supply to corporate buyers. The credit profiles of offtakers differ greatly: they range from large publicly-listed distribution utilities such as Meralco and multi-national corporations, to over 120 electric cooperatives serving rural areas, many of which face financial constraints.⁵⁴

The government of the Philippines aims to increase the share of renewables in the power generation mix to 35% by 2030 and 50% by 2040 – up from the 22% achieved in 2024.⁵⁵ In addition, a key policy priority as set out in the National Total Electrification Roadmap 2023-2028 is to achieve universal electrification by 2028, with 35,000 unserved and underserved households to be electrified through microgrids and one million through stand-alone home systems.⁵⁶ In addition, National Power Corporation Small Power Utilities Group targets full hybridization (solar plus diesel plus storage) of its diesel generation portfolio of around 217 assets by 2028.

In recent years the Philippines has attracted significant commercial interest into its renewable energy sector, driven by large-scale competitive auctions through its Green Energy Auction Programme (GEAP). In the fourth auction, 10.2 GW of solar and wind was tendered and 3.3 GW of offshore wind is progressing under the fifth.⁵⁸ A further 10-year auction pipeline of 25 GW to

Figure 12: The Philippines installed capacity and capacity additions in Power Development Plan 2023-50, 2022-35



Notes: BESS = Battery energy storage systems; Reference Scenario aligns with renewable energy (RE) generation capacity in generation mix target of 35% by 2030 and 50% by 2040; CES1 = Clean Energy Scenario 1 incorporates a combination of more than 50% RE share by 2050, introduction of nuclear power and coal repurposing; CES2 = Clean Energy Scenario 2 introduces additional offshore wind deployment. Source: Philippines Department of Energy, Power Development Plan 2023-50 Volume 1

2035 has been announced.⁵⁹ The Philippines is also a regional leader in BESS deployment, driven by ancillary services procurement by NGCP and participation in the wholesale market. Recently, the Department of Energy introduced a requirement for large-scale VRE installations over 10 MW MW to integrate energy storage systems equivalent to at least 20% of installed capacity.⁶⁰ The transmission network remains a major constraint, with delays in transmission build-out resulting in completed VRE projects waiting for grid connections.

To date, deployment of generation capacity has been driven by large, well-capitalized conglomerates such as Aboitiz, Ayala, San Miguel Corp, and First Gen, often in partnership with foreign developers. Since the easing of foreign ownership limits for renewable energy in 2022, foreign investors have also participated as majority owners. Since then, fully foreign-owned companies have secured 65 renewable energy service contracts totalling approximately 17.8 GW across solar and wind projects.⁶¹ Lending from domestic commercial lenders – some of which under the same ownership structure as major developers – is well-established and

5.2.2 Structural constraints shaping deployment

Despite these advantages, major constraints continue to emerge during project execution and delivery.

A key issue is the gap between awarded capacity and operational deployment. In the GEAP, winning bidders are typically required to provide performance bonds equivalent to roughly 20–30% of project costs, renewed annually until commercial operations begin.⁶² Combined with engineering, procurement, and construction bottlenecks, these requirements can significantly increase financial pressure on developers with smaller balance sheets. As a result, larger sponsors with established track records generally secure financing more readily.

Moreover, while a more liberalized market creates greater market competition and procurement opportunities, it also introduces more fragmented counterparty risk. Domestic commercial banks that are central to providing capital for renewable energy projects are often hesitant to finance projects tied to smaller electric cooperatives, particularly in the absence of a large state-owned utility that can backstop payment obligations.

A related constraint concerns the sequencing between project development and financing requirements.

competitive. Concessional lending may also be offered by domestic DFIs, such as the Development Bank of the Philippines, as well as by MDBs and other DFIs.

Structured procurement mechanisms and strong private sector participation have created a more commercially driven renewable energy market than in Indonesia or Viet Nam. Investor participation is relatively broad, and several renewable energy technologies already attract substantial commercial interest.

While this challenge isn't unique to the Philippines, it's particularly relevant given the gap between awarded capacity and project execution. Developers often require early-stage financial support to advance permitting, interconnection planning, and project preparation activities, while commercial lenders typically require a higher degree of project maturity before committing capital. This creates a financing gap during the transition from awarded capacity to bankable project execution.

Finally, currency risk and financing mismatches continue to create additional pressure, particularly where revenues are peso-denominated while financing obligations remain linked to foreign currency. Limited hedging capacity and coordination challenges around permitting and approvals can further delay project execution and financing timelines.

In practice, this suggests that the Philippines' most binding constraints operate primarily at the project level. These constraints point to a market where the broader investment framework is relatively functional, but where deployment depends heavily on resolving bottlenecks related to execution, financing alignment, and infrastructure delivery.

5.2.3 Overview of selected sectors

ROOFTOP SOLAR

The Philippines installed an estimated 1.3 GW of rooftop solar by mid-2026.⁶³ Installations are expected to grow. Rising electricity costs, partly linked to the conflict in the Middle East, have strengthened the case for self-generation. The sector also benefits from a clear and streamlined permitting regime and net metering regulations for installations up to 100 kW which allow unused electricity to be exported and sold to the grid.⁶⁴

The financing ecosystem for rooftop solar is mature, with a variety of commercial and public financing options. Moreover, the extended Roof-Mounted Solar Programme creates additional routes to market for rooftop solar developments above 100 kW to supply to distribution utilities through PSAs or to large corporates through the Green Energy Option Programme.⁶⁵

DECENTRALIZED SOLUTIONS

Investment in decentralized solutions in the Philippines is linked closely to its missionary electrification agenda. While most off-grid power plants operated by the Small Utilities Power Group are run on diesel, the government's Accelerated Hybridisation Program is promoting the use of solar PV technologies, combined with battery storage, to electrify remote islands and to supplement or replace diesel.⁶⁶ Public support is essential for decentralized solutions, particularly through the Universal Charge for Missionary

Electrification, with electric cooperatives serving as intermediaries that channel public funding into communities. Although previous micro-grid auctions set by the Department of Energy were under subscribed, the government is continuing to seek private sector financing, for example by offering concessional support.⁶⁷ Land Bank's PHP 800 million Maharlika Consortium to develop and operate 16 microgrids in Palawan is one example.⁶⁸

BATTERY ENERGY STORAGE SYSTEMS (BESS)

The liberalized electricity market in the Philippines has enabled early investment into BESS. Co-located BESS is included as a technology in the fourth round of the GEAP. BESS is also recognized as a provider of ancillary services, which are procured by the National Grid Corporation of the Philippines through ancillary services

procurement agreements. To date, much of the growth in BESS has been financed by large conglomerates, such as San Miguel Global Power and AboitizPower. There are remaining regulatory uncertainties: monetization pathways, including revenue stacking, remain limited.⁶⁹

OFFSHORE WIND

Offshore wind is a strategic priority for the Philippines. Executive Order 21 established a policy framework in 2023 for the sector and integrated offshore wind permitting into the Energy Virtual One-Stop Shop.⁷⁰ The fifth round of the GEAP offers 3.3 GW of capacity for delivery by 2030.⁷¹ Winning bidders receive a 20-year long power supply agreement with a fixed price regime.

Several projects are advancing through the process, including the 901 MW San Miguel Bay offshore wind project, jointly owned by Copenhagen Infrastructure Partners and ACEN Corporation.⁷² However, the auction was suspended to address port readiness, permitting, and supply chain constraints, thus there is not yet an established route to market for offshore wind.⁷³

5.2.4 Financing conditions and cost of capital

The Philippines holds an investment-grade credit rating from all three major credit agencies, with Moody's citing the country's strong access to domestic and international funding markets.⁷⁴ While interest rates set by the central bank Bangko Sentral ng Pilipinas climbed to a peak of 6.5% in 2024, they have since reduced to levels of 4.25-4.75% in the first two quarters of 2026.⁷⁵

Cost of capital in the Philippines sits at levels below that of Indonesia and Viet Nam. This is helped by a relatively lower cost of debt from domestic commercial lenders and national DFI's and well-capitalized and experienced project developers. While 77-88% of market transactions were sold through bilateral contracts in 2025, typically structured as take-or-pay PSAs, projects selling to the wholesale market are exposed to merchant risk.⁷⁶

Table 8: Cost of capital and key risks: Philippines

TECHNOLOGY	COST OF CAPITAL (DATA FROM 2024)	KEY RISKS
Rooftop solar	Not available	• Offtaker risk, particularly for MSMEs
Decentralized solutions	Not available	• Offtaker credit risk for certain distribution utilities and electric cooperatives • Construction risk for remote islands • High transaction costs for small projects
BESS	7.5%-8.5% (indicative)	• Merchant risks for assets participating in wholesale market • Incomplete regulatory frameworks
Offshore wind	9.0%-10.0% (indicative)	• Transmission infrastructure risks • Limited market development • Execution risks

Note: Cost of capital value for offshore wind refers to a 250 MW plant; for BESS it refers to a 40-MW utility-scale battery energy storage system.
Sources: IEA (2025), Cost of Capital Observatory and from industry and stakeholder discussions



5.2.5 Blended finance market evidence

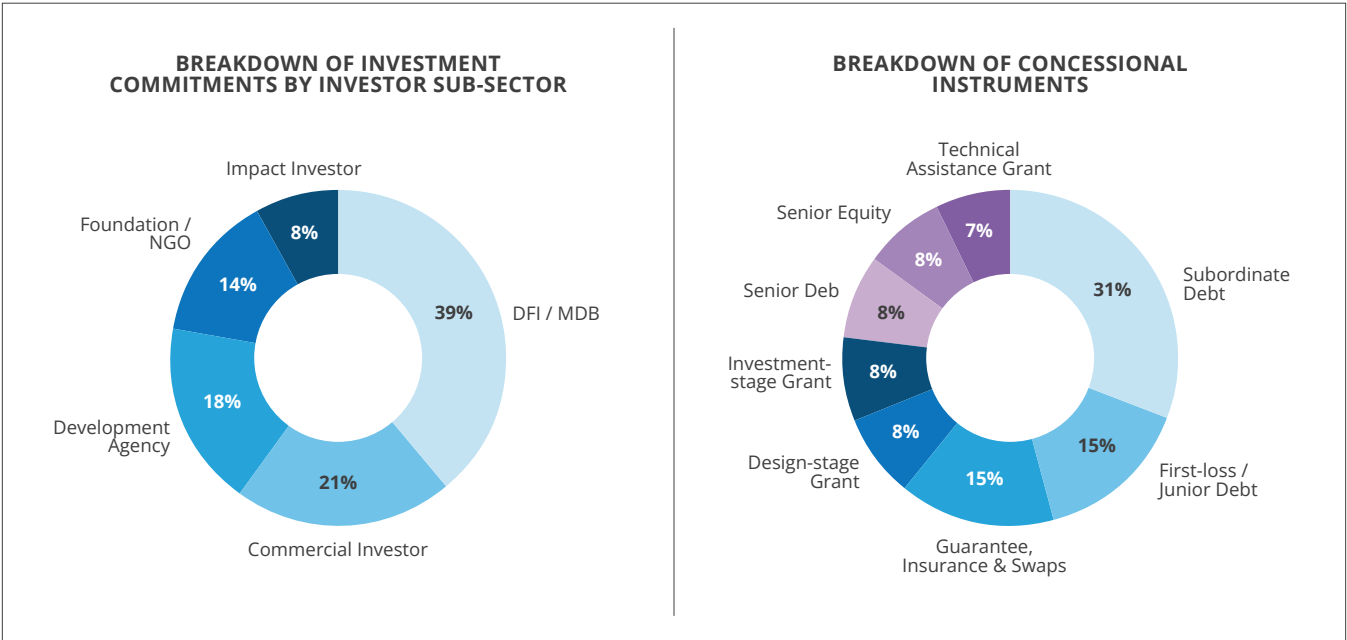
To date, the Philippines has recorded 36 blended finance transactions with a combined value of \$4.7 billion, significantly below the volumes observed in Indonesia and Viet Nam. Of these, nine transactions targeted renewable energy, representing \$1.4 billion in total financing. Despite the smaller market size, the Philippines' blended finance experience highlights the role of aggregation in financing smaller renewable energy projects that may otherwise struggle to attract institutional capital.

Of the nine transactions identified in the renewable energy sector, five were structured as blended funds; these were multi-sector vehicles rather than transactions focused on a single renewable energy technology.^{viii} Commercial investors accounted for 21% of total investment, significantly below the shares

observed in Indonesia and Viet Nam, while DFIs and MDBs provided a larger share of commercial capital, suggesting that blended finance has so far mobilized private sector capital only to a limited extent.

Subordinated debt (31%) is the most used concessional instrument, followed by first-loss or junior debt (15%); both have been primarily used within fund structures to absorb losses and de-risk senior tranches. Foundations and impact investors play a larger role in the Philippines, primarily through subordinated debt and first-loss instruments, which account for 50% and 25% of their investments, respectively. This differs from the role of development agencies, which, in addition to providing subordinated debt (33%), also serve as important providers of technical assistance grants (17%) and concessional guarantees (17%).

Figure 13: Blended finance investment trends for the Philippines, renewable energy



Notes: Investment commitments in the left chart include both commercial and concessional capital. The right chart shows the composition of concessional commitments by instrument. Investment commitments represent the count of individual investor investments, not the amount invested. Development agencies include bilateral aid agencies, such as JICA; multi-donor funds, such as GCF; and donor-funded concessional pools managed by MDBs, such as LEAP, managed by ADB.
Source: Convergence Market Data as of May 2026

viii These funds are regional in scope and invest across multiple countries, rather than exclusively in the Philippines.

5.2.6. Suitability for blended finance

This matrix assesses the readiness of each sector across five dimensions that influence whether blended finance can realistically address investment barriers.

In the Philippines, a more liberalized market structure, established procurement mechanisms, and a domestic lending base provide a foundation for strong commercial activity in renewable energy markets. Blended finance can concentrate on execution-risk mitigation in rooftop solar, decentralized solutions, early BESS projects, and market building for offshore

wind. However, where regulatory gaps remain, such as for offshore wind and BESS, blended finance cannot substitute for resolving them.

Blended finance plays a limited role in **rooftop solar** in the Philippines as it has a mature commercial financing ecosystem backed by government policies and incentives.

By contrast, it can play a larger role in **decentralized solutions** where projects can be aggregated to lower transaction costs and create sufficient scale and

Table 9: Overview of enabling environment in selected sectors: The Philippines

LEVEL OF CONSTRAINT	ROOFTOP SOLAR	DECENTRALIZED SOLUTIONS	BESS	OFFSHORE WIND
Revenue certainty and contractual readiness				
Market depth, project pipeline, and sector maturity				
Financial sector capacity				
Policy and regulatory framework				
Cost of capital				
Suitability for blended finance	Low	Medium	Medium-High	Low-Medium

 High constraint
  Moderate-high constraint
  Moderate constraint
  Moderate-low constraint
  Low constraint

diversification to attract commercial capital. This can be coupled with grants to support project preparation. The Association of Isolated Electric Cooperatives has begun adopting a portfolio approach that bundles multiple mini-grid projects together to improve bankability and attract capital. For projects with weaker underlying commercial economics however, greater reliance on public or grant-based support may still be required. The credit profile of offtakers varies substantially, with over 120 electric cooperatives with differing financial health.⁷⁷ Partial credit guarantees can support developers to access bank loans to supply electricity to electric cooperatives and corporate offtakers with weaker creditworthiness. The Philippine Guarantee Corporation supports this role through its Sustainable Energy Credit Guarantee Facility, which helps de-risk clean energy lending.

Blended finance can play a large role in scaling up commercial capital to **BESS** in the Philippines. Concessional co-financing and first-loss structures can improve the risk-return profile and mobilize commercial capital. However, remaining regulatory uncertainties such as unclear prospects and revenue stacking cannot be addressed within a blended finance structure.

Offshore wind is at an earlier stage of development than BESS in the Philippines. Technical assistance and project preparation support are particularly important for early-stage planning, project development, and transaction structuring. Moreover, projects require high upfront development expenditure for activities such as marine spatial planning, seabed surveys, data collection, and feasibility studies. Viability gap funding can help improve project economics and support initial market development, but this is contingent on the establishment of a route to market through the GEAP.

Grants from multi-donor funds or bilateral donor agencies can support the Philippines government's upstream public-sector work needed to make BESS and offshore wind projects investable, rather than financing the projects themselves. This can include developing procurement rules, market frameworks, and standardized contracts that create clearer routes to market for both sectors. While this type of grant-funded support would not itself constitute blended finance, it can still be critical to creating the enabling conditions for investments in both technologies.



5.3 VIET NAM

5.3.1 Overview of power sector

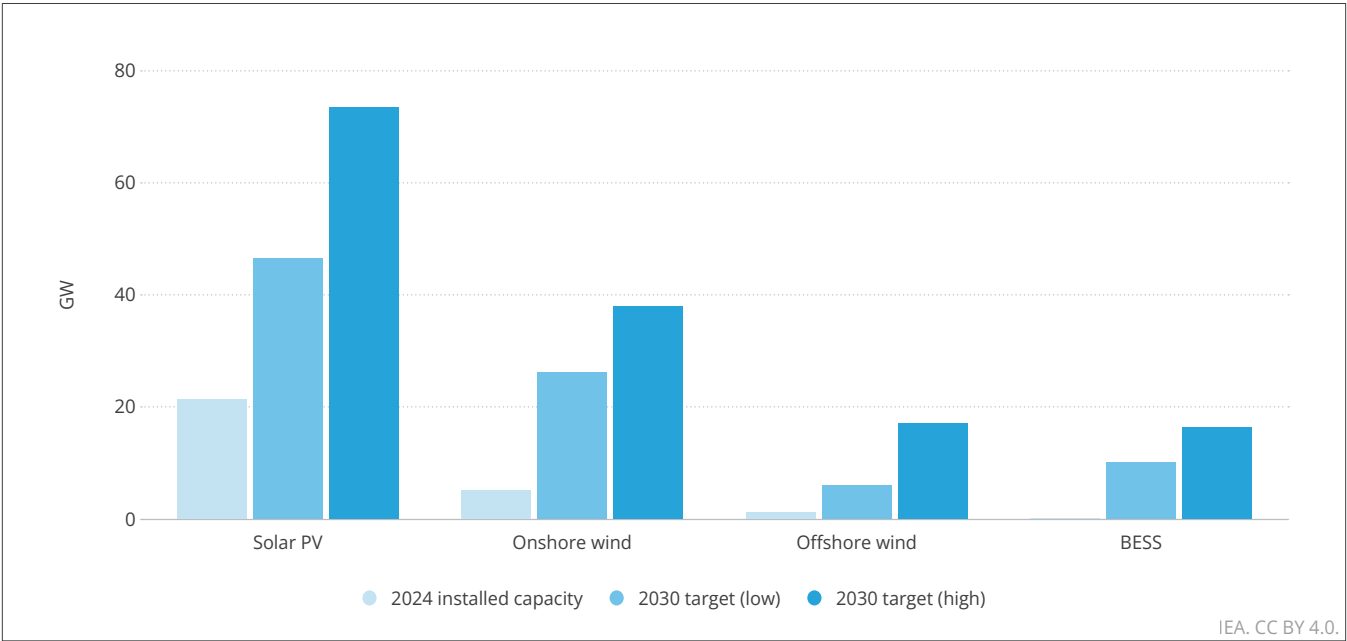
Viet Nam has achieved near-universal access and is experiencing rapid electricity demand growth, expected at 6.3% per annum between 2026-30, driven by industrial expansion.⁷⁸ The electricity sector has traditionally operated as a single-buyer market, with state-owned utility Viet Nam Electricity (EVN) retaining control over transmission and owning over 31 GW of generation assets.⁷⁹ EVN also purchases electricity from IPPs through long-term PPAs. The market is moving towards liberalization, with the implementation of the Competitive Wholesale Electricity Market and introduction of the Direct Power Purchase Agreement scheme, which allows generators to contract directly with corporate buyers.

Viet Nam remains ASEAN's leading market for deployment of solar and wind, with its 27.5 GW capacity installed representing over 60% of regional capacity.⁸⁰ This was driven by generous FITs introduced in 2019, leading to a surge of investment; annual spending has since levelled off. Rapid deployment of solar and wind, particularly in the South Central Region, outpaced transmission expansion, leading to grid congestion,

curtailment, and revenue instability where take-and-pay PPAs are applied. Going forward, Viet Nam's revised Power Development Plan VIII (PDP8) sets out the power sector trajectory to 2030 with a vision to 2050. It targets a growth in VRE generation to between 28-36% of power generation by 2030.⁸¹ This is complemented by over 35,000 kilometres of transmission grid upgrades and expansions by 2030.

Project development is led by an array of domestic developers – including major conglomerates such as Truongnam Group, TTC Group, and VinGroup. Joint ventures with international developers, contributing scaled capital and technical expertise, contributed 27% of investment between 2018-2023.⁸² Lending is dominated by domestic financial institutions, including state-owned commercial banks. International public finance still has an important role in financing state-owned enterprises and the private sector. The JETP, launched in 2022, has mobilized \$800 million of public capital from a total commitment of \$15.5 billion as of July 2026, primarily towards hydropower and transmission network expansion.⁸³

Figure 14: Viet Nam installed capacity of selected technologies and Revised PDP8 target, 2024-30



Note: BESS = Battery energy storage systems.
Sources: IEA Renewable Energy Progress Tracker; ASEAN Centre For Energy (2025) Policy Insight: Viet Nam's Revised PDP8 and Indonesia's RUPTL 2025-2034

5.3.2 Structural constraints shaping deployment

The rapid expansion of renewable energy has exposed weaknesses in Viet Nam's investment framework.

A central issue is policy uncertainty. Protracted disputes over eligibility for FiTs and payment of FiT rates have raised fears of significant losses and defaults among international investors. The ongoing dispute could affect 173 renewable energy projects deployed in 2019-2020, representing 12 GW of capacity and a combined investment value of \$13 billion.⁸⁴ The speed and way in which these disputes are resolved will have a bearing on investor confidence for future projects.

Viet Nam's PPAs have also struggled to meet international lender expectations for bankability. Its PPAs typically operate under domestic law and do not allow for international arbitration. There are also no sovereign guarantees backing EVN's payment obligations and limited protections for debt compensation in the event of project termination due to EVN default or curtailment. Moreover, the removal of US dollar indexation provisions has also increased investor exposure to exchange rate volatility, while restrictions on taking security over land continue to constrain foreign lending. In addition, domestic developers may not always undertake environmental and social assessments to the standards required by international financiers, creating an additional barrier to accessing international capital.

Domestic banks face many of the same structural constraints observed elsewhere in Southeast Asia,

including counterparty exposure limits and limited experience with non-recourse project finance. Lending decisions often rely more heavily on sponsor balance sheets, existing banking relationships, and physical collateral rather than projected project cash flows, which can disadvantage smaller developers.

Despite some growth in green bond issuance, market development in Viet Nam remains uneven. Interviews suggest that the absence of a domestic verification system aligned with international standards, combined with limited familiarity with the green taxonomy among domestic banks, continues to constrain the market. Most developers are private joint-stock companies that do not qualify for public bond offerings, while their credit ratings need significant credit enhancement through guarantees to attract capital. Although borrowers are attracted to bonds due to longer tenors and fixed discount rates, limited hedging markets and the continued dominance of traditional bank lending have restricted the scalability of capital market-based renewable energy financing.

Taken together, these dynamics have not prevented developers from accessing domestic financing, but financing gaps remain, particularly for projects requiring longer tenors, larger ticket sizes, or international capital. Concerns around policy durability, contractual enforceability, and the ability of the grid and power system to absorb new renewable energy capacity may therefore become increasingly important constraints on future capital deployment.



5.3.3 Overview of selected sectors

ROOFTOP SOLAR

Viet Nam aims to achieve at least 10% adoption of rooftop solar in public offices and households nationwide.⁸⁵ It is already a leader in rooftop solar adoption in the region, with some estimates indicating around 7 GW installed by the end of 2025.⁸⁶ Decree 243/2026/ND-CP allows rooftop solar systems to sell surplus power equivalent of up to 50% of electricity generation to the grid, with the purchase price based on the previous year's average electricity market

price.⁸⁷ The regulation also established a route to market for direct PPAs between renewable energy generators and power retailers supplying industrial parks as well as large consumers with an average electricity consumption above 20,000 kWh/month. However, there remains considerable uncertainty about implementation. The financing ecosystem for rooftop solar is quite mature, with involvement by local commercial banks such as Agribank and HDBank.

DECENTRALIZED SOLUTIONS

Viet Nam has experienced one of the fastest rural electrification rates in history, with almost universal electricity access today compared to 2.5% in 1975.⁸⁸

With 99.9% of households connected to the national grid, decentralized solutions are not considered in the analysis of Viet Nam.⁸⁹

BATTERY ENERGY STORAGE SYSTEMS (BESS)

The government has established a target to install 10 – 16.3 GW of BESS by 2030, growing to 96 GW in 2050, one of the most ambitious targets in the region.⁹⁰ In July 2026, EVN Hanoi Power Corporation commissioned five BESS installations totalling 50 MW/100 MWh at substations in Hanoi to support operation, load regulation, and enhance system flexibility.⁹¹ Deployment is supported by growing installations as well as the buildup of domestic manufacturing capacity, with GG Power opening a 5 GWh production plant in April

2026.⁹² However, policy and regulatory frameworks required to support large-scale deployment remain at an early stage. Circular 12 offers guidance on co-located projects while Circular 62 establishes a pricing framework for standalone grid-connected BESS, but there is less clarity on other BESS applications.⁹³ Moreover, Circular 62 caps the IRR at 12%, limiting potential upside while not providing equivalent downside protection.

OFFSHORE WIND

Viet Nam has a technical offshore wind potential of 600 GW.⁹⁴ Its revised PDP8 has set out a goal to install 6-17 GW of offshore wind by 2030, primarily in the Southern and South-Central regions.⁹⁵ Developments remain at an early stage. Two projects were approved at the end of 2025 under the List of Nationally Important and Priority Energy Projects; in 2026 state-owned companies EVN and Petrovietnam were given areas in Haiphong and Lam Dong for site surveys.⁹⁶ The regulatory framework for offshore wind is being

rapidly developed. Decree No. 56/2025/ND-CP includes guidelines on site selection and investment approval and further introduces price-based competitive bidding for developer selection.⁹⁷ Under the draft Revised Petroleum Law, Petrovietnam is set to play a central role in the sector including mandates to propose offshore wind development areas, organize the investor selection process, and negotiate project management and supervision contracts.

5.3.4 Financing conditions and cost of capital

Viet Nam holds a BB+ credit rating from Fitch, BB+ from S&P, and Ba2 from Moody's, reflecting robust gross domestic product growth supported by foreign direct investment into export-oriented industries, government investment, and supportive credit policy. Following a period of falling commercial lending rates in 2023 and 2024 under direction from the State Bank of Viet Nam, strong demand for loans are placing pressure on short term liquidity.⁹⁸

At the same time, currency risk and limited long-term foreign exchange hedging capacity remain key constraints for project bankability. The removal of US dollar indexation provisions within renewable energy PPAs has further increased investor exposure to currency fluctuations and revenue uncertainty.

Table 10: Cost of capital and key risks: Viet Nam

TECHNOLOGY	COST OF CAPITAL (DATA FROM 2024 UNLESS OTHERWISE STATED)	KEY RISKS
Rooftop solar	Not available	• Offtaker risk, particularly for MSMEs
BESS	9.5%-10.5%	• Incomplete regulatory framework • Low market maturity • Revenue risk
Offshore wind	10.5%-12% (2023, indicative values)	• Incomplete regulatory framework • Low market maturity • Curtailment risk, where not compensated by take-or-pay PPAs

Note: Cost of capital value for offshore wind refers to a 250 MW plant, BESS refers to a 40-MW utility-scale battery energy storage system. Decentralised solutions are not considered for Viet Nam as it has achieved near-universal access through grid connections.
Sources: IEA (2025), Cost of Capital Observatory and from industry and stakeholder discussions

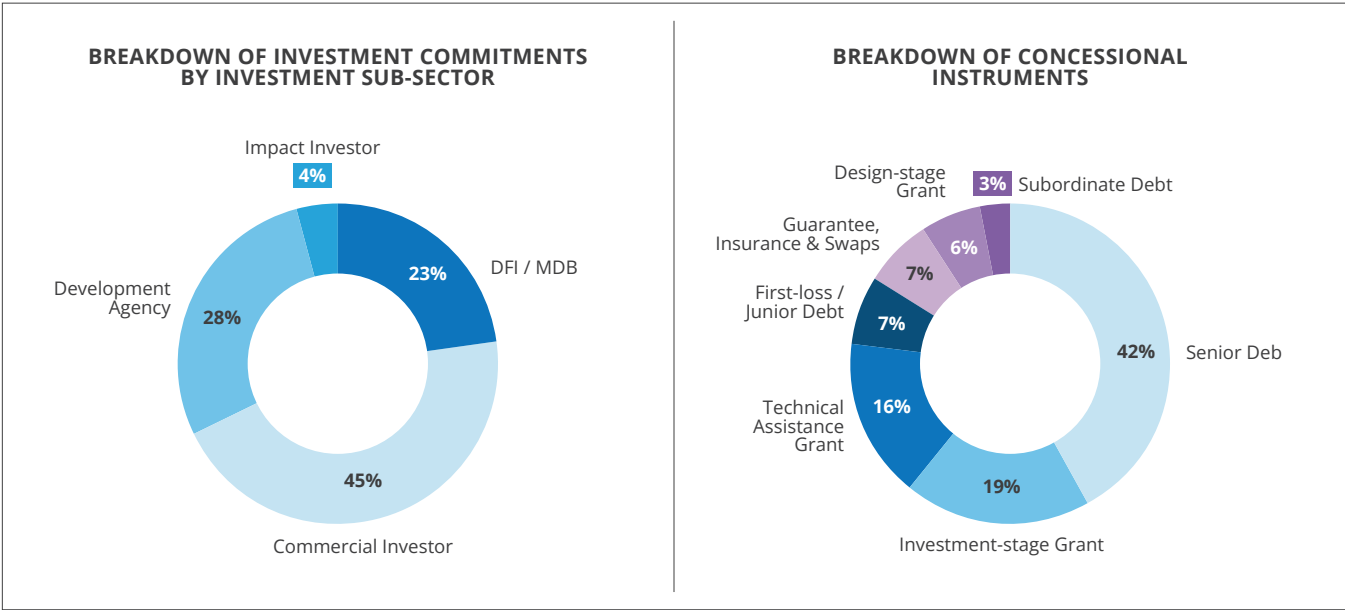


5.3.5. Blended finance market evidence

To date, 53 blended finance transactions have targeted Viet Nam, with a combined financing volume of \$10.1 billion. Of these, 18 transactions targeted renewable energy, representing \$3.9 billion in total financing. Unlike Indonesia and the Philippines, where fund structures were more prominent, project-level structures accounted for 78% of renewable energy blended finance transactions in Viet Nam. Funds represented just 11% of deals.

Six utility-scale solar projects supported through blended finance mobilized approximately \$647 million, with capacities ranging from 50 MW to 250 MW and an average deal size of \$108 million. Three onshore wind projects mobilized nearly \$1.4 billion, with capacities ranging from 88 MW to 600 MW and an average deal size of \$464 million. Viet Nam’s blended finance experience therefore underscores the importance of a strong enabling environment in driving investment.

Figure 15: Blended finance investment trends for Viet Nam, renewable energy



Note: Investment commitments in the left chart include both commercial and concessional capital. The right chart shows the composition of concessional commitments by instruments. The right chart shows the composition of concessional commitments by instrument. Investment commitments represent the count of individual investor investments, not the amount invested. Development agencies include bilateral aid agencies, such as JICA, multi-donor funds, such as GCF and donor-funded concessional pools managed by MDBs, such as LEAP, which is managed by the ADB.
Source: Convergence Market Data as of May 2026.

As shown in the graph above, commercial investors account for the largest share of investment commitments in blended renewable energy transactions in Viet Nam. Blended finance transactions in the country have attracted relatively greater participation from multinational banks and private project developers, while DFIs and MDBs account

for a smaller share of commercial capital than in Indonesia and the Philippines. Development agencies play a key role in providing concessional capital. Senior concessional debt is the most commonly used instrument (42%), followed by investment-stage grants (19%), both of which help support project co-financing alongside commercial banks.

5.3.6. Suitability for blended finance

This matrix assesses the readiness of each sector across five dimensions that influence whether blended finance can realistically address investment barriers.

In Viet Nam, blended finance can play a targeted role in rooftop solar, particularly in the C&I segment. It can also support the commercial viability of early BESS and offshore wind projects, but it cannot resolve PPA bankability concerns or fill regulatory gaps – these require contractual and regulatory reform.

In **rooftop solar**, where the market in Viet Nam is relatively mature, blended finance should target specific gaps, such as weaker corporate offtakers, limited access to long-tenor local-currency financing, and portfolio structures that aggregate smaller projects and create investable scale. The Verdant Energy case study (Chapter 7.2) illustrates how credit enhancement and portfolio aggregation can be used in practice to address these constraints and mobilize domestic institutional capital.

Table 11: Overview of enabling environment in selected sectors: The Philippines

LEVEL OF CONSTRAINT	ROOFTOP SOLAR	DECENTRALIZED SOLUTIONS	BESS	OFFSHORE WIND
Revenue certainty and contractual readiness		N/A		
Market depth, project pipeline, and sector maturity		N/A		
Financial sector capacity		N/A		
Policy and regulatory framework		N/A		
Cost of capital		N/A		
Suitability for blended finance	Low - Medium	N/A	Medium-High	Low - Medium

 High constraint  Moderate-high constraint  Moderate constraint  Moderate-low constraint  Low constraint

Note: Decentralized solutions are not considered for Viet Nam as it has achieved near-universal access through grid connection.

By contrast, for BESS and offshore wind, both nascent markets in the country, blended finance can play a more catalytic role in supporting early deployment and establishing scalable financing structures that improve lender familiarity with these technologies. Concessional support for both technologies should become increasingly targeted as regulatory frameworks mature, commercial track records develop, and private financing becomes available on viable terms.

For **BESS**, Circular 62, which sets the regulatory framework for energy storage remuneration, caps potential IRR upside at 12% without providing equivalent downside protection.⁹⁹ Blended finance can help rebalance the risk-return profile. A/B loan structures, combined where appropriate

with concessional co-financing, can help mobilize commercial lenders alongside MDBs or DFIs, while first-loss or junior tranches in investment funds can absorb initial losses and protect senior investors. This is particularly relevant where BESS exposure in blended finance is achieved through fund structures rather than direct projects. However, support should be time-bound and limited to the minimum level required, with the aim of building a track record that supports revisions to the remuneration framework.

Support for **offshore wind**, could come in the form of technical assistance, project preparation, and viability gap funding for upfront development expenditure. As projects move toward construction, blended finance can also help mitigate execution risks, including those

associated with supply-chains, marine engineering, and installation, which are particularly acute for first-of-a-kind projects.

However, blended finance cannot fully resolve PPA bankability concerns that constrain investment. The absence of take-or-pay provisions and the lack of international arbitration provisions are contractual barriers that blended finance cannot resolve. The AC Wind Energy case study (Chapter 7.3) shows that MDB participation can nevertheless help mitigate some of the financing implications of these risks: ADB helped

structure long-tenor, limited-recourse financing and mobilize international lenders despite underlying PPA bankability concerns. Transaction-specific solutions are possible. For instance, a \$10 million grant was disbursed to fund a curtailment debt-service reserve account for the Monsoon Wind project developed in Lao PDR for cross-border export to EVN. However, replicating this across a large pipeline would be costly and would not resolve the underlying contract terms. Sustained private investment therefore depends on reforms to PPA structures.

CHAPTER 6

RECOMMENDATIONS

6.1 KEY FINDINGS

Table 12: Suitability for blended finance across selected countries and sectors

	ROOFTOP SOLAR	DECENTRALIZED SOLUTIONS	BESS	OFFSHORE WIND
Indonesia	Medium	Medium	Low-medium	N/A
The Philippines	Low	Medium	Medium-high	Low-medium
Viet Nam	Low-medium	N/A	Medium-high	Low-medium

Note: The ratings should be interpreted as broad market-level indications of the suitability of blended finance for mobilising commercial capital under current market conditions, rather than assessments of every individual project or of the need for public support more broadly. Low suitability for blended finance may still coincide with a need for concessional capital outside blended finance structures, including for technical assistance, project preparation or broader enabling-environment support.

The suitability of blended finance in Indonesia, the Philippines and Viet Nam across rooftop solar, decentralised solutions, BESS and offshore wind depends on the nature of the constraint affecting project bankability.

Rooftop solar technology is relatively mature and larger C&I projects can generally be financed on commercial terms. However, access to financing remains constrained for MSMEs and residential customers, where lender appetite is limited due to offtaker risk and small transaction sizes. Concessional capital can address these constraints within blended finance structures through aggregation, guarantees and risk-sharing mechanisms. The case is stronger in Indonesia, where commercial financing for smaller segments is least developed, and weaker in the Philippines, where a mature commercial financing ecosystem limits additionality. However, blended finance cannot overcome systemic barriers that weaken project economics, such as the lack of net metering and low PLN tariffs in Indonesia.

Decentralized solutions can support Indonesia and the Philippines in reaching their electricity access goals, but financing is challenging for last-mile electrification, where project economics remain weak. Blended finance can extend the reach of commercial capital, for example, by using fund structures to create scale and reduce transaction costs. Portfolio guarantees and risk-sharing facilities can also support the expansion of commercial lending. However, where projects remain unviable even on a portfolio scale, highly concessional public finance outside of blended structures, such as grants, would be more effective.

BESS is a key enabler of renewable integration and system stability, with investment expected to scale up over the next decade. Its suitability for blended finance varies more across countries than the other sectors due to different levels of regulatory development. In Indonesia, where there is no remuneration framework yet for standalone assets, concessional support is best directed to project preparation, technical assistance, and regulatory development, while blended finance

would be largely limited to hybrid projects. In the Philippines and Viet Nam, blended finance can play a larger role through instruments such as concessional co-financing and first-loss structures, although uncertainties over revenue stacking in the Philippines and capped returns in Viet Nam cannot be addressed through these instruments alone.

Offshore wind is at an early stage in the Philippines and Viet Nam, and no blended finance transactions have targeted the sector to date. Technical assistance and project preparation support are

particularly important for early-stage planning, project development, and transaction structuring. This can be deployed within blended structures, alongside viability gap funding to support initial market development, although this is contingent on the development of regulatory frameworks for offshore wind that create the preconditions for the sector to become more established. The Philippines has a policy framework, but there is insufficient readiness for auctioning to move ahead, while in Viet Nam, barriers are linked to contractual readiness.

Table 13: Key investment constraints and implications for blended finance by technology and country

TECHNOLOGY	INDONESIA	THE PHILIPPINES	VIET NAM	BROAD IMPLICATION FOR BLENDED FINANCE
Rooftop solar	Customer credit risk; small transaction sizes and high transaction costs; revenue risk from low PLN tariffs	Relatively mature financing market; offtaker risk, particularly for MSMEs	Relatively mature financing market; offtaker risk, particularly for MSMEs	Target specific financing gaps, particularly weaker offtakers, aggregation and access to long-tenor financing
Decentralized Solutions	Small project sizes and high transaction costs; construction and logistics risks; offtaker risk; weak economics in remote areas	Offtaker risk; remote-island construction and physical risks; weak economics for last-mile electrification	N/A	Aggregation and risk-sharing can increase commercial interest, but concessional finance outside of blended structures may be needed where underlying economics remain weak
BESS	Incomplete regulatory framework; uncertain revenue model; limited market development	Merchant and revenue risk; incomplete monetisation and revenue-stacking framework	Incomplete regulatory framework; limited market maturity; capped upside and availability penalties	Target early projects where financing can address defined first-mover or risk-allocation gaps; wider regulatory and revenue frameworks remain critical
Offshore wind	N/A	Early market development; transmission, permitting and execution risks	Early market development; incomplete regulatory framework; contractual and curtailment risks	Project preparation and targeted catalytic support can help early projects, but cannot substitute for bankable procurement, contracts and enabling infrastructure

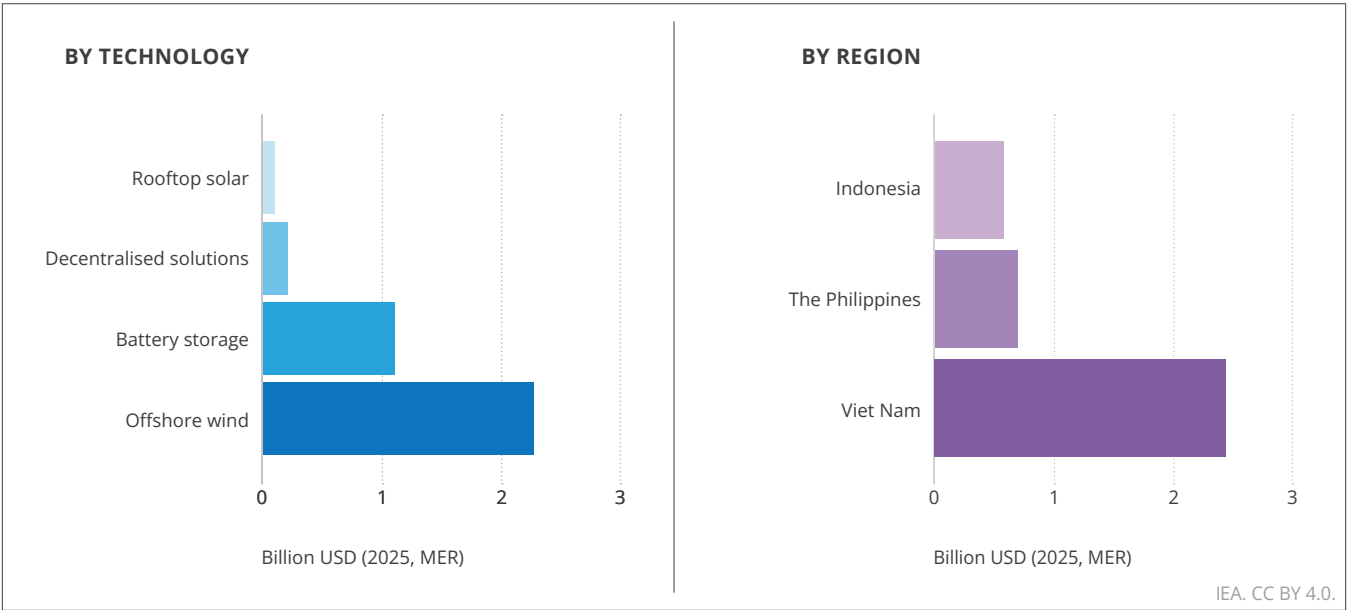
Note: Decentralized solutions are not considered for Viet Nam given its near-universal grid access, while offshore wind is not considered for Indonesia given the sector's limited market and regulatory development.

6.2 INTERNATIONAL PUBLIC FINANCE NEEDS

Across the four selected sectors, an estimated **\$3.7 billion in international public finance is needed in Indonesia, the Philippines, and Viet Nam between 2026 and 2035 under the IEA's APS**. This estimate refers to the scale of external public support required to meet deployment needs in the selected sectors. International public finance can vary substantially in the level of concessionality, including grants and highly

concessional loans that qualify as Official Development Assistance (ODA) and other official flows that are less concessional than ODA or are not primarily development oriented. A portion of international public finance is deployed on concessional terms to mobilize additional private or commercial finance through blended finance structures.

Figure 16: International public finance across selected technologies and sectors, cumulative 2026-35, in the IEA's Announced Pledges Scenario



Note: BESS = Battery energy storage systems; decentralised solutions include mini-grids and standalone systems. International public finance is defined as finance provided by public sector institutions, including bilateral and multilateral development finance institutions, export credit agencies and climate funds to support investment in emerging and developing economies. This includes Official Development Assistance (ODA), a specific class of finance intended to promote economic development and welfare of recipient countries that meet defined concessionality criteria; and other official flows (OOF), which comprise official sector transactions that do not meet the criteria for ODA, including transactions that are insufficiently concessional or are not primarily development oriented. A portion of international public finance may be deployed on concessional terms to mobilize additional private or commercial finance through blended finance structures.
Source: IEA analysis

Rooftop solar in Indonesia, the Philippines, and Viet Nam accounts for around \$100 million in international public finance over the next decade. Capital should be targeted narrowly at market segments where financing constraints persist rather than the sector as a whole. Around half of this capital would be deployed to Indonesia, where access to commercial financing is the least developed, in part due to barriers that weaken project economics, such as the lack of net metering and low PLN tariffs.

Decentralized solutions account for over \$200 million in international public finance between 2026 and

2035 for Indonesia and the Philippines. Financing needs vary considerably across projects. Aggregated portfolios of diesel replacement projects, for instance, can create sufficient scale to attract commercial debt, particularly with predictable revenue and contractual arrangements. Other last-mile electrification projects are small and exposed to high logistics, construction, and operating costs. While blended structures can help address project-level constraints, highly concessional support from international public finance such as through grants, may be more appropriate for projects where underlying economics are unviable, but development impact is high.

Battery storage accounts for an estimated \$1.1 billion in international public finance. International public finance is particularly important for technical assistance and regulatory development, as the scale-up of BESS requires credible procurement and remuneration mechanisms, which are at varying stages of development across the three countries. Technical assistance is particularly important for Indonesia, where regulations for standalone storage remain absent. In the Philippines and Viet Nam, the constraint is primarily on the mobilization of commercial capital, enabling blended finance to play a larger role, where international public financiers can enter structures through instruments such as concessional co-financing and first-loss structures.

Offshore wind accounts for nearly \$2.3 billion in international public finance in the next decade, the largest of the four sectors due to its capital intensity. This capital is primarily directed towards Viet Nam due to its large offshore wind target in PDP8 compared to the targets outlined by the Philippines. International

public finance is needed for project preparation, technical assistance, resource assessment, spatial planning, and financial support for early projects. Participation in blended finance structures could become more relevant as regulations become sufficiently developed to support private investment. Until then, international public finance should focus on reducing early-stage development risk and strengthening the enabling environment for bankable projects.

The sectoral estimates for international public finance reveal its important role in supporting deployment across the selected sectors, but the appropriate use of that finance varies substantially. In more commercially mature sectors, support should be targeted towards underserved segments or financing bottlenecks, while in more emerging sectors and in projects with high development impact, such as last-mile electrification, a larger share of international public finance may need to be deployed outside blended finance structures.



6.3 RECOMMENDATIONS FOR BLENDED FINANCE

Drawing on the analysis in the preceding chapters, this section sets out recommendations on how blended finance can be structured and targeted most effectively.

Table 14: Overview of recommendations for scaling blended finance

RECOMMENDATION	PRIMARY STAKEHOLDERS
Deploy concessional capital within blended finance structures where it is additional and at the minimum level required	DFIs, MDBs, and public development banks (PDBs)
Tailor instruments to the nature of the underlying financing constraint	DFIs, MDBs, PDBs, and commercial financial institutions
Scale aggregation and pooled financing platforms	DFIs, MDBs, PDBs, and commercial financial institutions
Improve data transparency and standardisation	Governments, regulators, and concessional capital providers
Scale up capacity-building efforts for public and private actors	DFIs, MDBs, and governments

6.3.1 Deploy concessional capital within blended finance structures where it is additional and at the minimum level required

Providers of concessional capital should diagnose the binding constraint before determining how to deploy their capital. Where the constraint can be isolated and allocated within a transaction, a blended structure can shift risk-return profiles to bring in commercial capital. Where deployment is principally constrained on a systems level, concessional capital within a blended finance structure can improve bankability, but it could also be applied outside a blended structure, such as by providing policy support for regulatory development.

Two principles can guide the deployment of concessional capital within blended structures. First, financial additionality determines whether commercial financing would be unavailable, insufficient, or available only on terms that prevent an otherwise viable investment from proceeding. This should be assessed at the transaction level and reassessed as market conditions and investor appetite evolve. This keeps the focus on financial additionality rather than solely the amount of commercial capital mobilized. Second, minimum concessionality determines how much support is needed: it should be limited to the level necessary to address the identified constraint.

Applying these principles suggests that concessional support should be targeted at the segment level

rather than the sector level. While a sector may attract significant commercial financing overall, specific segments may struggle to reach bankability, due to project size, geography, project stage, or the type of participant. For instance, rooftop solar has established business models for larger C&I installations, but concessional support may remain additional for MSMEs and residential customers, where financing is limited by offtaker credit risk and small transaction sizes.

Moreover, as projects, portfolios, and markets evolve, the need for concessional support should be reassessed. Capital sequencing provides a useful framework, with concessional capital gradually replaced by non-concessional finance as risks decline and commercial viability strengthens. Blended finance can also support capital recycling through refinancing. As illustrated by the AC Wind Energy case study (Chapter 7.3), replacing sponsor capital committed during construction with long-term project finance once operations begin can free up developer balance sheets for subsequent renewable energy investments.

In addition, blended finance structures should include clear exit strategies from the start. Exit indicators should be defined upfront, linked to evidence of financial sustainability, such as predefined return

thresholds or the achievement of deployment goals. Transactions can also be designed with future syndication, transferability, and securitization in mind to create pathways for concessional capital to exit and local investors to participate.

Financial additionality and minimum concessionality should not be considered in isolation, but should be assessed alongside expected development and climate outcomes, as well as the potential to mobilize

commercial capital. Allocation decisions should therefore consider these dimensions together, recognizing that no single metric is sufficient on its own. An intervention with high financial additionality may not necessarily warrant priority if alternative uses of concessional capital could deliver greater development benefits, such as expanding electricity access, supporting underserved communities and MSMEs, or reducing emissions.

6.3.2 Tailor instruments to the nature of the underlying financing constraint

The choice of instrument deployed within a blended finance structure should follow the diagnosis of the underlying constraint. It should also reflect the nature of the financing need, recognizing that constraints may arise from gaps in particular financing products rather than from project-level bankability alone. This includes considering whether capital is required at the project, developer or company level and whether debt, equity, or other forms of capital are most appropriate.^{ix}

Different instruments are suited to different barriers: project preparation grants can address early-stage development risk; guarantees and risk-sharing mechanisms can address defined credit, political, or execution risks; subordinated or mezzanine capital can improve risk allocation between investors; co-financing structures can help address lender exposure or tenor constraints; and hedging mechanisms can reduce currency exposure.

Table 15: Potential blended finance responses to selected financing constraints

UNDERLYING FINANCING CONSTRAINT	POTENTIAL BLENDED FINANCE RESPONSE	RELEVANT APPLICATIONS IN THIS REPORT
Early-stage development risk	Project preparation and technical assistance grants	BESS in Indonesia and Viet Nam; offshore wind in Viet Nam and the Philippines
Weak borrower or counterparty creditworthiness	Credit guarantees	Rooftop solar in Indonesia and Viet Nam; decentralized solutions in the Philippines
Portfolio credit risk and limited lender appetite	Risk-sharing facilities and portfolio guarantees	Decentralized solutions in Indonesia and the Philippines; rooftop solar
Limited availability of long-tenor commercial financing or lender exposure constraints	A/B loans and blended bonds	Rooftop solar, battery storage and offshore wind projects facing domestic lender exposure or tenor constraints
Small transaction sizes, fragmented pipelines and high transaction costs	Aggregation platforms, pooled/blended funds and portfolio structures	Rooftop solar; decentralized solutions in Indonesia, Viet Nam and the Philippines
First-mover risk and elevated perceived risk	Junior and subordinated capital within blended debt/equity funds	BESS and offshore wind, particularly in Viet Nam and the Philippines
Financial viability or affordability gaps	Viability-gap funding	Early BESS deployment in Indonesia; offshore wind in the Philippines and Viet Nam
Currency mismatch	FX hedging and currency-risk mitigation mechanisms	Renewable energy projects with local currency revenues and foreign currency financing

ix Refer to Case Study 6.1 on the Green Investments Partnership for further detail on how this approach can be applied in practice.

The choice of instrument should reflect which actor is best placed to manage, absorb or price the risk, recognizing that investors within the same broad category may have different mandates, expertise, risk appetites, and return requirements. Engaging prospective commercial investors early in transaction design can help ensure that their requirements inform the choice and calibration of risk-mitigation instruments. Not all financing constraints require additional capital or risk-sharing.¹⁰⁰ Where projects or companies are not yet investment-ready, technical assistance and capacity building may be needed to strengthen their ability to absorb financing before larger-scale commercial capital can be mobilized.

Blended finance structures should make greater use of risk-transfer instruments where the binding constraint is risk allocation rather than financing costs. To date, blended finance for renewable energy and BESS has focused more heavily on grants and below-market-rate debt. Guarantees, insurance,

and swaps represent around 15% of concessional commitments in renewable energy and BESS in Indonesia and the Philippines, and 6% in Viet Nam. However, risks such as portfolio credit risk or political risk are often better addressed through guarantees and other risk-sharing facilities rather than additional concessional lending. The Verdant Energy green bond in Viet Nam (Chapter 7.2) illustrates this: GuarantCo's payment-default guarantee did not eliminate the underlying C&I solar risks but transferred payment-default risk away from bondholders, enabling long-tenor, fixed-rate financing from domestic institutional investors that would not otherwise have participated. The case study also shows that guarantees are particularly relevant for rooftop solar and decentralized solutions, where weaker offtakers can limit access to financing. Currency mismatch is also a common risk across the three countries that requires targeted use of hedging and liquidity facilities, as a temporary solution while a local currency financing ecosystem develops.



6.3.3 Scale aggregation and pooled financing platforms

In Southeast Asia, 26% of blended finance transactions are currently structured as funds, compared to 56% as projects. The examples examined in this report, including platform-based approaches such as FAST-P (Chapter 7.1) and domestically led platforms such as PT SMI's SDG Indonesia One, illustrate how pooled structures can combine concessional and commercial capital across a portfolio rather than requiring each transaction to be blended individually. This can provide greater flexibility in deploying concessional capital and allow concessionality to be calibrated to the risks being

addressed across the portfolio. The case studies also illustrate how aggregation can create sufficient scale for commercial investors and diversify exposure across underlying investments. This is particularly relevant for investment in rooftop solar and decentralized solutions, where the technology is already commercially mature, but transaction size, customer credit risk, and fragmentation continue to constrain financing. Pooling projects can also reduce transaction and due diligence costs associated with project-by-project financing.

6.3.4 Improve data transparency and standardization

Scaling blended finance requires greater transparency on the use, additionality, and performance of concessional capital, as well as the outcomes of the investments it supports. Limited data on investment returns, defaults, mobilization, concessionality, and the cost of capital can make it difficult for commercial investors to assess risk and for concessional capital providers to determine whether support remains additional. Governments should strengthen domestic data availability and disclosure on financing terms, investment performance, and mobilization, while DFIs, MDBs, and other concessional capital providers should increase transparency on the performance of the transactions and structures they support.

Better performance data can help identify financing approaches that are suitable for standardization and replication, reducing the need to redesign structures on a transaction-by-transaction basis, thereby lowering transaction and due diligence costs. However, replication should not mean reproducing structures exactly; their design should remain responsive to the risk-return characteristics of the underlying investments. Stronger performance data and demonstrated track records can also help investors assess unfamiliar structures and facilitate external credit assessments or ratings where required. Over time, this could help reduce the need for concessional support as commercial investors become better able to assess and absorb the underlying risks.

6.3.5 Scale up capacity-building efforts for structuring and executing blended transactions

Blended finance can only become scalable if public and private actors are willing and able to participate in these structures. This depends not only on the availability of concessional capital but also on whether there is adequate technical understanding and institutional capacity to structure and execute blended transactions. For public actors, this includes strengthening the capacity of ministries, regulators, utilities, and national development banks to assess project proposals. For private sector actors, capacity building should focus on increasing domestic

commercial bank involvement and assisting local project developers in creating a pipeline of projects suitable for blended finance. Technical assistance can be integrated into blended finance structures to address early-stage development risk. It can also be deployed as concessional capital outside of blended finance structures to support broader improvements to the enabling environment that currently hinder effective private sector engagement. This includes supporting local financial market development and regulatory and policy reforms.



CHAPTER 7

CASE STUDIES

7.1 GREEN INVESTMENTS PARTNERSHIP AND CITICORE SOLAR

Country: Southeast Asia, with an investee example from the Philippines

Sector: Solar PV and battery energy storage

Blended Finance Intervention: Junior and mezzanine capital in three-tiered debt fund

The Green Investments Partnership (GIP) is a \$800 million blended finance fund managed by Pentagreen Capital that provides debt financing to capital-constrained sustainable infrastructure across Southeast and South Asia. Its pipeline spans renewable energy and storage, EV infrastructure, sustainable transport, and water and waste management.¹⁰¹ As the sustainable infrastructure pillar of Singapore's FAST-P, GIP combines a diversified portfolio with a layered capital structure designed to mobilize commercial capital and support forms of financing that are less readily available from conventional lenders. Its \$55 million financing for Citicore Solar Energy Corporation in the Philippines illustrates how this approach seeks to address the financing gap between conventional project debt and sponsor equity.

Context and financing challenge

Pentagreen Capital was established by the Hongkong and Shanghai Banking Corporation Limited (HSBC) and Temasek to address a structural financing gap for sustainable infrastructure in emerging Asia. Although substantial pools of capital are available globally, there is a mismatch between the risk appetite and investment requirements of conventional financiers and the financing needs of mid-market infrastructure developers. GIP's target investments typically include single-B and double-B credits, greenfield projects, less-established business models, and financing structures such as holding-company and mezzanine debt that fall

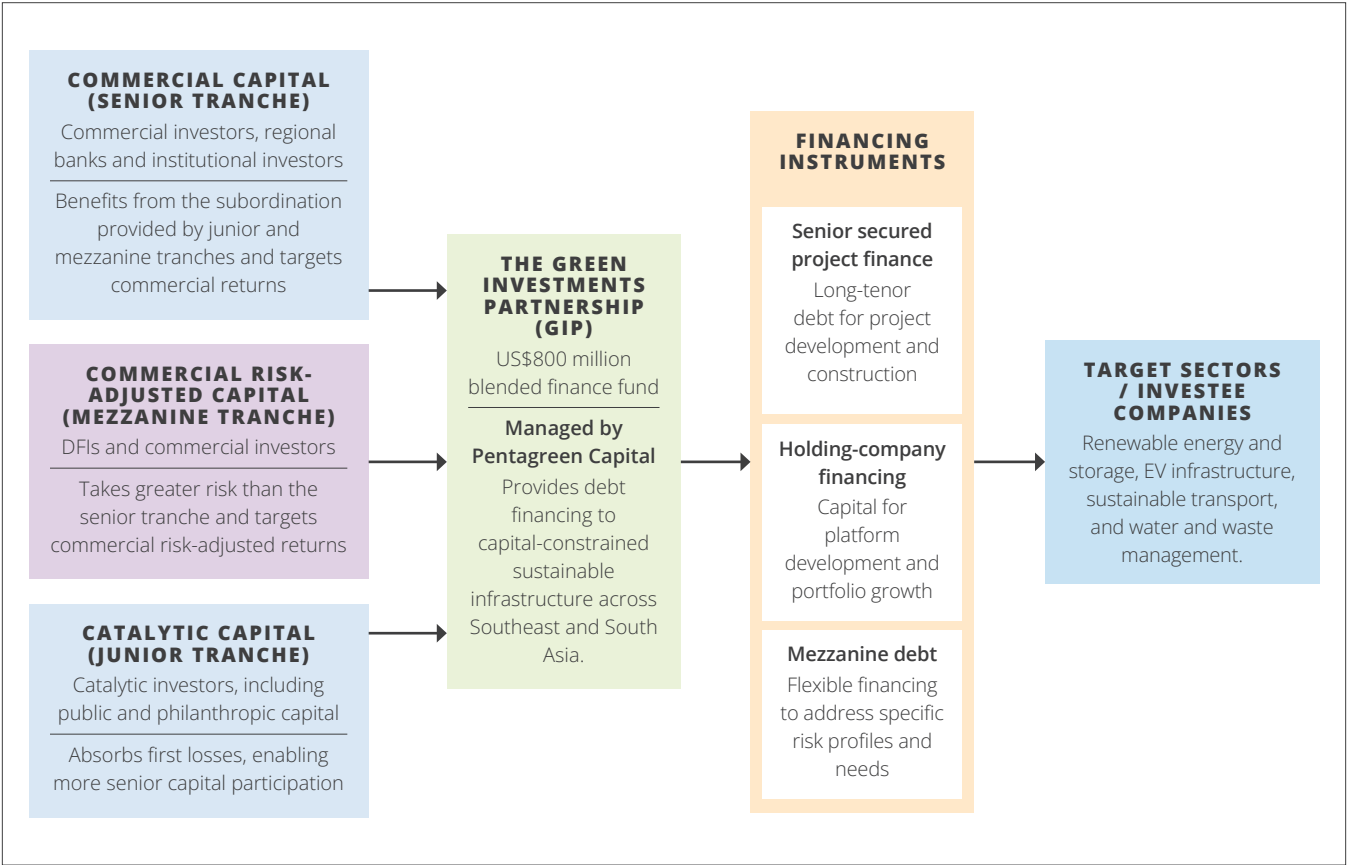
outside many banks' conventional lending frameworks.

GIP forms part of the Monetary Authority of Singapore (MAS)'s FAST-P initiative and was the first FAST-P platform to reach closing.¹⁰² FAST-P was designed partly in response to the difficulty of scaling blended finance when transactions are structured individually at the asset level. It instead seeks to create diversified thematic portfolios supported by catalytic capital. Under the broader FAST-P initiative, the Singapore government committed up to \$500 million to first-loss tranches, to be matched dollar-for-dollar by other catalytic capital providers, with an overall ambition of mobilizing \$5 billion.

GIP's capital structure was designed around two objectives: minimizing the amount of scarce concessional capital required and creating an investable proposition for commercial investors. Pentagreen determined that a simple two-tranche structure would require a larger first-loss layer and therefore adopted a three-tier structure comprising junior, mezzanine, and senior capital.

The junior tranche absorbs first losses and includes capital from MAS alongside catalytic investors. The mezzanine tranche offers a commercial, risk-adjusted return and is particularly suited to commercial investors and DFIs seeking higher equity-like returns while willing to assume greater exposure to emerging-market and construction risk. Above these sits a senior debt tranche with substantial subordination beneath

Figure 17: Blended finance mechanism of the Green Investments Partnership



Source: Based on consultations with Pentagreen Capital.

it, designed to provide commercial investors with a lower risk appetite with a risk-return profile closer to conventional fixed-income investments. Some investors can participate across multiple tranches depending on their mandates and risk appetite.

Importantly, the capital structure was built around the economics of GIP's prospective investments rather than imposed on them. Pentagreen had already developed a pipeline and could assess expected risk and return across instruments such as senior secured project finance (debt provided directly to projects and secured against project assets and cash flows), holding-company financing (debt provided at the developer or holding-company level rather than to individual projects), and mezzanine debt (higher-risk debt that sits between senior debt and equity in the capital structure). This allowed the structure to be developed from the underlying portfolio and the amount and type of risk-bearing capital required at the fund level.

However, the structure does not remove all barriers to commercial participation. Insurance companies

and other institutional investors frequently require externally rated instruments, yet rating methodologies can be difficult to apply to new blended finance funds without established portfolios or historical performance data. Subordination alone may therefore not be sufficient to mobilize every category of institutional investor. Regulatory requirements, instrument format, liquidity, and familiarity with emerging-market assets all influence whether commercial capital can participate.

Regional banks have proved particularly well suited to the senior tranche. Their familiarity with Southeast Asian markets and ability to assess the underlying risks may help explain their participation in the structure. This highlights the importance of identifying commercial investors whose existing expertise, mandates, and return expectations are compatible with the underlying assets.

The involvement of MAS also provided an important convening function. Government backing helped facilitate engagement with prospective catalytic and commercial investors, although the structure still had to satisfy their individual investment requirements.

The layered structure allows Pentagreen to provide financing at different levels of the capital structure, including holding-company and mezzanine financing, that remain scarce in the underlying market. The Citicore transaction illustrates how this works in practice.

INVESTEES EXAMPLE

Citicore Solar: filling the developer financing gap in the Philippines

GIP's financing of Citicore Solar Energy Corporation, an established Philippine renewable energy developer with a substantial project pipeline, addresses a financing constraint common among fast-growing renewable energy developers. Banks may typically finance approximately 70–75% of individual project construction costs, leaving developers responsible for providing the remaining 25–30% of capital. As developers expand their portfolios, aggregating this cumulative equity can become a significant constraint on growth.

In more developed financial markets, holding-company or mezzanine financing can help developers bridge this gap without repeatedly raising new equity. However, these financing products remain comparatively scarce in Southeast Asia. GIP therefore provided Citicore with an initial \$55 million greenfield holding-company financing facility. The financing supports the development and construction of approximately 500 MW peak of solar projects across Pangasinan, Pampanga, Batangas, and Negros Occidental, while helping unlock a broader pipeline of up to 2 GW-peak of generation capacity and up to 760 MWh of battery energy storage, an emerging segment of the Philippine power market.

The facility complements rather than replaces conventional project finance. By providing capital at the holding-company level, GIP helps Citicore meet part of the capital requirement needed alongside senior financing at the individual project level. In this way, the facility helps catalyze subsequent commercial lending by providing part of the capital required alongside senior project finance.

The structure also includes a development expenditure tranche for early-stage activities that conventional lenders typically cannot finance. Rather than restricting financing to a predefined portfolio, Citicore can draw capital against pre-agreed eligibility criteria as individual

projects mature. This enables projects to advance toward bankability and construction readiness while providing the developer with flexible, non-dilutive growth capital.

The transaction's additionality therefore lies in addressing a missing layer of the financing ecosystem. Citicore can access senior project debt, but the limited availability of holding-company growth capital can constrain its ability to bring multiple projects forward simultaneously. GIP is not substituting for commercial project lenders; its financing helps complete the developer's capital stack and can thereby unlock or "crystallize" senior project financing at the asset level.

The initial portfolio is expected to generate approximately 758 MWh of renewable electricity annually and avoid an estimated 526,000 tonnes of carbon dioxide emissions. According to the transaction documentation, this would be sufficient electricity to power approximately 200,000 Filipino households annually. Citicore's projects will also incorporate battery storage, supporting grid stability and allowing renewable electricity to be dispatched beyond daylight hours. These are expected rather than realized outcomes at this stage.

Lessons and implications

GIP and the Citicore transaction point to several broader lessons for blended finance in Southeast Asian renewable energy markets.

First, blended finance can address financing product gaps rather than simply project-level bankability. Citicore already has access to commercial project finance. Its constraint lies further up the capital structure, where the limited availability of subordinated holding-company financing can restrict the pace at which a developer can convert a large pipeline into financed projects. GIP's intervention therefore complements an existing commercial market rather than substituting for it.

Second, portfolio-level blending can provide a more flexible and potentially scalable way of deploying catalytic capital, while allowing concessionality to be calibrated to the risks being addressed. FAST-P and GIP pool catalytic and commercial capital within a diversified fund rather than requiring a new blended structure for every asset. GIP's design also sought to limit the amount of concessional support required:

Pentagreen adopted a three-tier structure because a two-tier model would have required a larger first-loss layer to support a commercial tranche.

Third, the structure needs to reflect both the underlying investment strategy and the requirements of prospective investors. GIP's three-tranche model was developed based on the expected risks and returns of its pipeline, while commercial investors, DFIs, and catalytic providers brought different risk-return expectations, impact objectives, and institutional requirements. Developing the fund required working through these differences with investors while seeking to simplify governance where possible, including through a common exclusion and E&S governance framework.

Finally, replication requires adapting the structure to the underlying portfolio rather than reproducing GIP's capital stack exactly. The appropriate level and form of subordination depend on the risk-return characteristics of the investments being financed. Greater performance evidence across multiple funds and complete investment cycles could gradually increase commercial investor familiarity with emerging-market infrastructure and potentially allow future vehicles to operate with less subordination. However, standardization remains difficult where DFIs and

other development investors apply different policies and interpretations even within broadly common frameworks.

This points to a longer-term objective of reducing dependence on catalytic capital. As commercial investors gain experience with the performance of blended portfolios and their underlying assets, future vehicles may be able to operate with thinner subordinated layers, allowing scarce catalytic capital to be reduced or recycled into other market gaps. A similar graduation logic applies at the investment level: the objective is to help mid-market developers build sufficient scale and a track record to access commercial financing increasingly independently.

GIP remains relatively new, so evidence on realized portfolio performance and whether catalytic capital can ultimately be reduced is not yet available. Nevertheless, GIP provides an example of how catalytic capital can be structured at the fund level to improve the risk-return proposition for commercial investors while supporting financing products that remain relatively scarce in the underlying market. Citicore illustrates the mechanism at the transaction level: flexible holding-company capital fills a developer-level financing gap, helping unlock conventional project debt and expand the pipeline of renewable energy projects able to reach construction.

This aligns with [PIMM 9: Private Sector Debt Blended Finance Fund](#), which uses diversification and subordinated capital within a three-tier fund structure to improve the risk-return profile for senior commercial investors. In GIP, the junior tranche absorbs first losses, while the diversified portfolio and layered capital structure enable investors with different risk appetites to participate.

7.2 VERDANT ENERGY C&I BOND

Country: Viet Nam

Sector: Commercial and industrial (C&I) solar

Blended Finance Intervention: Credit Guarantee for Green Bond

Verdant Energy is a Singapore-headquartered renewable energy developer active across Asia Pacific, with a C&I solar platform in Viet Nam totalling 39 MW. The proceeds of its green bond issuance will finance the construction of an additional 58 MW of C&I solar capacity, expected to avoid approximately 31,000 tonnes of carbon dioxide equivalent annually.¹⁰³ The transaction represents the first certified green bond financing for C&I solar in Viet Nam and Verdant Energy's first capital-markets issuance globally, providing an example of how capital-market financing can be used to scale distributed renewable energy portfolios.

Context and financing challenge

Despite the relative maturity of C&I rooftop solar in Viet Nam, developers still face financing constraints linked to the small and distributed nature of projects, private corporate offtaker risk, and limited access to long-term capital. Small project sizes can create high transaction and due diligence costs, while limited historical performance and credit data can make it difficult for lenders and institutional investors to assess portfolio risk. Locally, lending policies have restricted banks to financing C&I projects on a project-by-project basis, constraining developers' ability to scale.

The credit profile of underlying cash flows is also important. Unlike utility-scale projects selling to EVN, Verdant's revenues depend on private C&I customers across sectors including apparel and manufacturing. Public data on the offtakers is often limited and the credit quality of the offtakers can vary significantly.¹⁰⁴ As such, their ability to meet payment obligations over long-term PPAs may be difficult to assess, which can in turn affect the creditworthiness of the bond issuers. As a result, even where the technology itself is mature, standalone issuers may not have the credit quality required by institutional investors for a 15-year bond.

This challenge is compounded by the limited availability of long-term Vietnamese dong (VND) financing at fixed rates and exposure to VND–USD volatility

where foreign-currency financing is used. Although Viet Nam's green bond market has grown,^x issuances have remained concentrated amongst banks and larger infrastructure transactions, with limited use for distributed C&I solar.¹⁰⁵ For smaller developers, long-term debt that matches the duration of rooftop solar cash flows therefore remains difficult to obtain.

Institutional investors such as insurers are potentially well suited to these assets because of their preference to match with long term cash inflows from the insured, but they generally require issuers with minimum ratings and/or more established repayment histories. Since this was its first bond issuance, Verdant's limited capital-markets track record added another constraint, alongside institutional investors' limited capabilities to assess structured or project finance structures, as they are more familiar with corporate or financial institution issuances. The financing challenge was therefore not the commercial maturity of rooftop solar projects itself, but how to aggregate distributed assets, strengthen the credit profile of the resulting portfolio, and create a long-tenor instrument that institutional investors could hold.

Blended finance mechanism

The transaction addresses these financing constraints through a combination of portfolio aggregation and credit enhancement. By aggregating multiple C&I solar assets into an institutional-scale financing and adding a full payment-default guarantee, the transaction created a long-tenor instrument suitable for institutional investors.

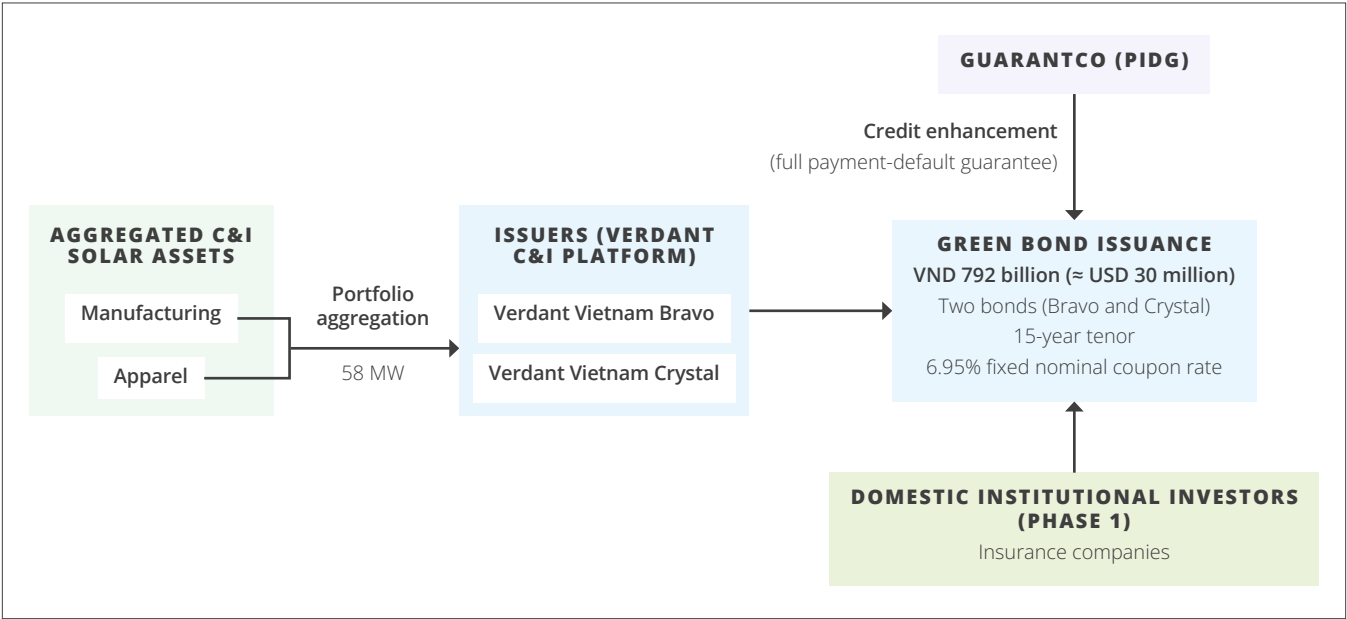
GuarantCo, part of the Private Infrastructure Development Group (PIDG), provides local-currency credit enhancement to help infrastructure projects access bank and capital-market financing. In this transaction, it provided a payment-default guarantee over VND 792 billion (approximately \$30 million) of green bonds issued through Verdant Energy's Vietnamese C&I platform, including its Verdant Vietnam

x Since 2021, there have been 14 green bond issuances in Viet Nam, of which GuarantCo has provided guarantees for 6, totalling USD 162 million in VND.

Bravo and Verdant Vietnam Crystal subsidiaries. As the underlying PPAs are denominated in VND, local-currency financing was important both to avoid a currency mismatch between project revenues and debt service and to mobilize domestic institutional investors. The two bonds, as well as the guarantee, have a 15-year

tenor, unusually long for this segment of the market, with a fixed nominal coupon rate of 6.95% per annum.^{xi 106} The bonds are being issued in two phases through the end of 2026, with the first phase fully subscribed by domestic institutional investors, primarily insurance companies.

Figure 18: Financing structure of the Viet Nam Verdant C&I Solar Bond



Source: Convergence analysis based on desk research and stakeholder interviews.



^{xi} Comparable commercial bank financing for individual C&I solar projects is typically limited to around 60–70% loan-to-value, on floating-rate terms and with tenors of up to 10 years.

The guarantee materially strengthened the credit profile of the issuance. GuarantCo is rated AA- (stable) by Fitch and A1 (stable) by Moody's.¹⁰⁷ The two Vietnamese issuing subsidiaries were rated BB+ by FiinRatings, while the guaranteed bonds received AAA ratings.¹⁰⁸ FiinRatings attributed the uplift to GuarantCo's comprehensive, unconditional, and irrevocable payment guarantee. Without this support, available bank financing would instead have been shorter-tenor, floating-rate, and typically provided at the individual-project level. The instrument therefore helped bridge the gap between the credit quality required by institutional investors and the standalone credit profile of a relatively new C&I solar platform.

Aggregation was equally important. Pooling distributed rooftop assets into a larger financing vehicle reduced constraints associated with small project sizes and created sufficient scale for institutional participation.

Lessons and implications

First, the transaction demonstrates the role of effective risk allocation and transfer, rather than risk elimination, in mobilizing institutional capital towards emerging infrastructure asset classes. The underlying construction, asset-performance, and corporate-offtaker risks remain with the project, while GuarantCo's guarantee protects bondholders against payment

default. By transferring the credit risk to GuarantCo, a highly rated guarantor with specialist infrastructure expertise, the guarantees enabled institutional investors to bridge gaps in risk perception and management to gain exposure to the green asset class through a more familiar investment format.

Second, the transaction shows how blended finance can help open capital-market access for distributed renewable energy developers. Through asset aggregation with credit enhancement, Verdant was able to issue a long-tenor bond to domestic institutional investors despite the relatively small and distributed nature of its underlying assets. Renewable developers also gain access to a new source of capital beyond traditional bank financing, which is especially useful as bank liquidity and structural constraints are also limiting availability of capital in banking markets. As investors gain familiarity with the asset class, similar structures may become easier to replicate and could potentially require less catalytic support over time.

Third, the VND-denominated bond helps Verdant better match its debt obligations with local revenues while reducing reliance on foreign-currency financing. It also demonstrates that long-term domestic institutional capital can be mobilized for distributed renewable energy, supporting broader capital-market development in Viet Nam.

This aligns with [PIMM 3: Project-Level Guarantees](#), where a full, unconditional guarantee on a loan or bond can enhance the borrower's credit quality up to that of the guarantor. In practice, investors are relying primarily on the guarantor's ability to repay rather than the borrower's, while also benefiting from stronger protection if the borrower defaults.

7.3 AC WIND ENERGY

Country: Viet Nam

Sector: Onshore wind

Blended Finance Intervention: A/B loan

The 88 MW Ninh Thuan Wind (BIM Wind) project in Ninh Thuan Province in Viet Nam was developed by BIM Group, a domestic private conglomerate, and ACEN Renewables International, a subsidiary of ACEN Corporation, which is majority-owned by Ayala Corporation in the Philippines.

The project had a total cost of approximately \$155 million and began commercial operations in 2021. It is expected to generate around 339 GWh of renewable electricity annually and avoid approximately 215,000 tonnes of carbon dioxide equivalent emissions each year.¹⁰⁹ The project brought together ACEN's regional renewable energy experience and BIM Group's local development capabilities.

Context and financing challenge

Viet Nam's early wind market faced both financing and operational constraints. Although an FiT and standard PPA were introduced in 2011, only three wind projects totalling 153.2 MW had reached commercial operations by 2018. The limited uptake reflected both an insufficient tariff and concerns among international lenders that the standard PPA was not bankable on a non-recourse project finance basis.

Financing was further constrained by currency risk. Local lenders had limited capacity to provide the long-term US dollar financing needed to match the project's US dollar-indexed tariff, while international lenders remained reluctant to provide non-recourse project finance because of concerns around the standard PPA. Compared to solar, onshore wind requires longer development and construction timelines, which made the shorter FiT eligibility windows more difficult to navigate.

Importantly, operating-stage risks remained material. Viet Nam's rapid renewable energy build-out put pressure on transmission infrastructure, particularly in renewable-energy hubs such as Ninh Thuan and Binh Thuan. EVN had already warned in 2020 that transmission capacity in both provinces was overloaded

as developers raced to commission projects ahead of the wind FiT deadline.¹¹⁰ This created broader curtailment and revenue risk for projects in the region, alongside persistent concerns around EVN's standard PPA.

Blended finance mechanism

The Ninh Thuan Wind project is notable because the blended finance intervention occurred after construction rather than before it. To meet Viet Nam's November 2021 FiT deadline for new projects to qualify for the wind FiT passed in November 2021,¹¹¹ the sponsors funded construction upfront, enabling construction to begin in June 2020 and the project to reach commercial operations in September 2021.¹¹² The sponsors therefore carried the project's construction-financing and FiT-timing exposure before external project debt was in place, using bridge financing to fund the project through completion.¹¹³ They then refinanced this exposure through long-term project debt once the plant was operational.

The project became operational on schedule, but COVID-19 restrictions prevented lenders' advisers from completing site visits, delaying due diligence and pushing financial close beyond the project's September 2021 commercial operation date.

ADB acted as mandated lead arranger and bookrunner for the \$107 million 15-year limited-recourse financing package for the operational phase.¹¹⁴ The A-loan comprised \$25 million from ADB's own account while the B-loan included a \$25 million concessional loan from JICA as well as \$57 million from commercial lenders: \$13 million from Hong Kong Mortgage Corporation Limited, \$17 million from Sumitomo Mitsui Banking Corporation, \$18 million from ING Bank, and \$9 million from Cathay United Bank.¹¹⁵ The JICA loan was provided on more favourable terms than the commercial debt, helping reduce the project's overall financing costs. Together, the A- and B-loans refinanced a substantial portion of the sponsors' upfront bridge

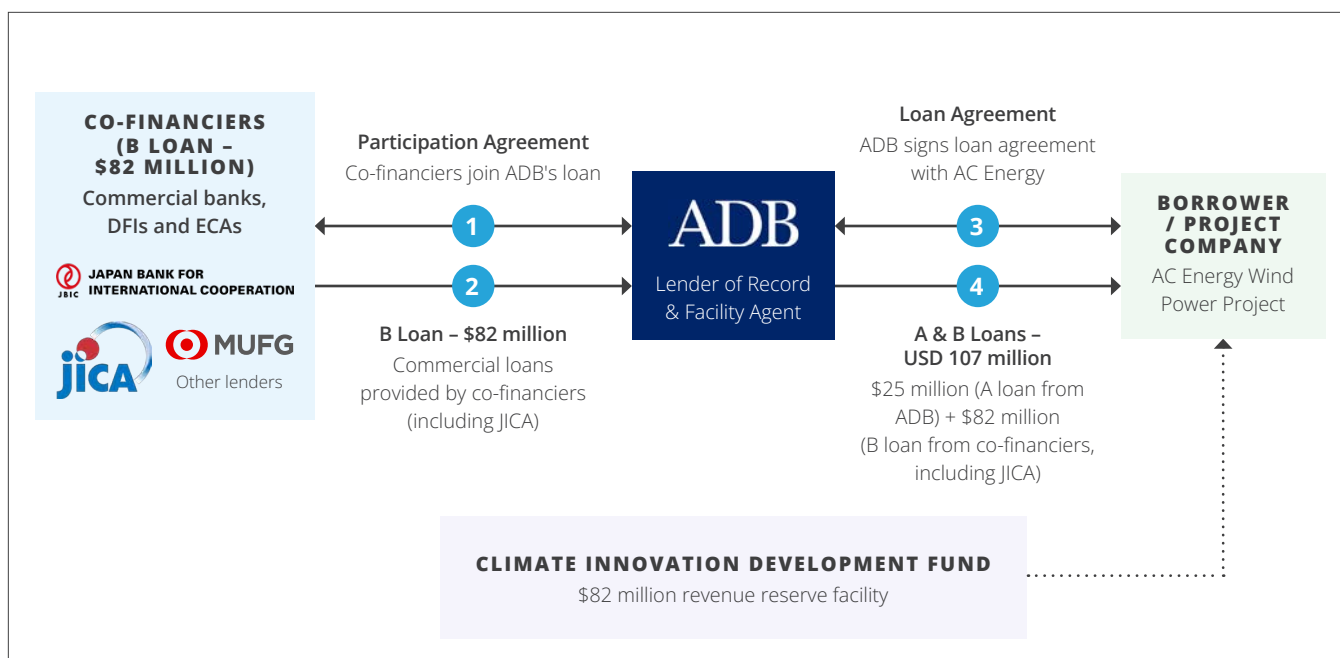


Figure 19: Financing structure of the AC Energy Wind Power Project

Source: Convergence analysis based on desk research.

financing, transitioning the project toward a more conventional 70:30 debt-to-equity structure.¹¹⁶ The financing was supported by the project's 20-year PPA with EVN, under which electricity is sold at a FiT of \$0.085/kWh.¹¹⁷ Although payments are made in VND, the tariff is indexed to the US dollar, helping reduce the currency mismatch associated with long-term USD-denominated debt.

The structure also addressed a specific post-construction operational risk. The Climate Innovation Development Fund, an initiative of the Bloomberg Family Foundation Inc. and the Goldman Sachs Charitable Gift Fund, established a \$5 million revenue reserve facility that could be drawn upon if environmental or social safeguard requirements led to curtailment.¹¹⁸ ADB's environmental and social review identified operational risks, including shadow-flicker impacts on nearby communities and potential impacts on migratory birds.¹¹⁹ The reserve therefore protects against revenue losses arising from safeguard-related curtailment, reducing operational cash-flow and debt-service risk for lenders.

Lessons and implications

ADB's role illustrates how MDB participation can mobilize renewable energy financing even where underlying PPA bankability risk remains. In this case,

ADB helped structure long-tenor, limited-recourse financing that refinanced sponsor capital and brought international lenders into Viet Nam's wind sector. Currency risk was addressed separately through the US dollar indexation of the tariff.

Refinancing after the project began commercial operations can also have a broader mobilization effect by recycling sponsor capital. By replacing funds committed during construction, long-term project finance can free up developer balance sheets for investment in subsequent renewable energy projects.

The timing of the financing is also instructive. ACEN and BIM Group brought the project into operation before the long-term debt package was in place to meet the expiring wind FiT deadline, requiring the sponsors to absorb construction and timing risk upfront. This highlights the importance of sponsor balance-sheet strength: smaller developers may be unable to carry projects through construction while waiting for permanent financing, even where project fundamentals are strong. Hard policy deadlines can therefore favour larger, better-capitalized developers. In other transactions, earlier-stage risk-sharing may be needed where smaller developers lack the balance-sheet capacity to absorb construction and timing risks on their own.

A/B loans for operational-stage BESS projects may also be relevant where commercial lenders face identifiable project-level risks such as battery degradation, performance and availability risk, replacement or augmentation costs, and uncertainty around meeting contracted operating requirements.¹²⁰ These risks can affect project cash flows and debt-service capacity, making long-tenor A/B financing particularly valuable. By contrast, offshore wind in Southeast Asia remains more constrained by upstream issues such as permitting, site studies, and grid planning, meaning earlier-stage support will be more relevant before A/B loan structures can be applied at scale.

At the same time, the transaction illustrates the limits of project-level blended finance. Concessional capital can mitigate specific project-level revenue risks, such as safeguard-related curtailment, but it cannot resolve system-level constraints such as insufficient transmission capacity. These require coordinated grid investment, planning, and regulatory reform. Stable and predictable policy frameworks are therefore important alongside blended finance, as abrupt deadlines can force developers to advance projects before long-term financing and supporting infrastructure are in place.

This A/B loan structure aligns with [Private Sector Project Development Funding \(PIMM2\)](#), which is designed to take on risks beyond the willingness or capacity of conventional MDB and DFI financing. In this context, the concessional loan from JICA can absorb or price risks that commercial lenders are less willing to take, while the B-loan mobilizes additional private capital alongside the MDB/DFI.

ANNEX A: DEFINITIONS

Battery storage: Energy storage technology that uses reversible chemical reactions to absorb, store and release electricity on demand.

Blended finance: A structuring approach in which concessional capital from public or philanthropic actors is used to address specific risks or financing constraints to enable or mobilize private investment to realize the SDGs. In these structures, concessional capital is provided on below-market terms within a transaction's capital structure to lower the borrower's cost of capital and/or provide additional downside protection to senior investors.

Bonds / Notes: Debt securities issued through private placements or listed on public exchanges. Blended finance can support bond issuance through credit guarantees, first-loss protection or other credit enhancement, helping issuers achieve longer tenors, lower financing costs or access new investor groups.

Companies: Direct debt or equity financing provided to businesses, including venture capital, growth equity and corporate debt. Blended finance can be used to reduce financing constraints faced by companies with limited track records or higher perceived risk.

Cost of capital: The expected financial return, or the minimum required rate of return, to justify an investment in a company or a project.

Decentralised solutions: Decentralised solutions, or decentralised energy systems, are small- to medium-scale power solutions, often renewable based, that generate electricity near the point of use, especially in areas beyond the reach of the central grid. They utilise renewable sources like solar, wind, hydro, bioenergy, and green hydrogen, often paired with energy storage and diesel generator as back-up. These solutions encompass stand-alone systems and mini grids.

Development finance institutions (DFIs): National or international public financial institutions with a development mandate.

Facilities: Vehicles that combine earmarked public or concessional resources with commercial capital for deployment across multiple transactions.

Financial Institutions: Concessional credit, debt, equity, guarantees, or risk-sharing agreements to mobilize private sector lending from domestic banks, microfinance institutions, or non-banking financial institutions.

First-loss debt / equity: The most junior capital in a structure and the first to absorb losses if an investment underperforms. It is often provided on concessional terms by public or philanthropic investors to protect more senior investors and mobilize additional commercial capital.

Funds (blended): Pooled investment vehicles, including debt, equity and infrastructure funds, that invest across multiple projects or companies. Blended funds can combine concessional and commercial capital through different risk-sharing structures, including junior or subordinated tranches that absorb greater risk, or concessional debt/equity invested *pari passu* alongside commercial investors but on more favourable terms. In this report, this also includes investment platforms such as FAST-P and its underlying partnerships, which pool catalytic and commercial capital for deployment across a project pipeline.

Guarantees (concessional): Risk-sharing instruments in which a public, philanthropic or development finance provider agrees to cover specified losses if a borrower or project fails to meet its obligations. Guarantees can take different forms: full guarantees may cover the entire exposure and can strengthen the borrower's effective credit profile; first-loss guarantees absorb losses up to a defined threshold before senior investors are affected; and partial credit guarantees cover only a portion of principal, interest or both, often targeting specific risks or phases of a transaction.

Investment-stage grants: Non-repayable contributions used to support a specific project where expected revenues or returns are insufficient to attract the full amount of private capital required, despite strong development or climate benefits. It can be used to close a viability gap, cover defined upfront costs, fund reserve accounts, or improve the overall financing structure so that the project can proceed.

Leverage ratio: The ratio of concessional capital (below market price) to all commercial capital (market-priced) in a transaction. Commercial capital includes capital from private, public, and philanthropic sources.

Multilateral development banks (MDBs): Supranational institutions set up by sovereign states with a development focus.

Offshore wind: Refers to electricity produced by wind turbines that are installed in open water, usually in the ocean. Includes fixed offshore wind (fixed to the seabed) and floating offshore wind.

Offtaker: An entity that purchases the services or the output of an infrastructure project, typically under a long-term contract.

Private sector mobilization ratio: The ratio of concessional capital (below-market-price) to commercial capital from private sector sources only.

Projects (blended): Greenfield or brownfield projects and programmes financed through a combination of market-rate and below-market-rate capital.

Subordinated / Mezzanine capital: Capital that ranks below senior debt in the repayment hierarchy and therefore absorbs losses before senior investors. Mezzanine capital typically sits between senior debt and junior or first-loss capital and can take the form of subordinated debt, preferred equity or quasi-equity. It is used to provide an additional loss-absorbing buffer and improve the risk-return profile for senior investors.

Technical assistance grants: Grant-funded support that strengthens the readiness, viability, sustainability or developmental impact of investments, institutions or markets by addressing technical, operational or market constraints.

Variable renewable energy (VRE): Sources of renewable energy, usually electricity, where the maximum output of an installation at a given time depends on the availability of fluctuating environmental inputs. VRE includes a broad array of technologies such as wind power, solar PV, run-of-river hydro, concentrating solar power where no thermal storage is included, and marine (tidal and wave).

Weighted average cost of capital (WACC): The weighted average cost of capital is expressed in nominal terms and measures a company's required return on equity and the after-tax cost of debt issuance, weighted according to its capital structure.

ANNEX B: ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
APS	Announced Pledges Scenario
ASEAN	Association of Southeast Asian Nations
BESS	Battery energy storage system
C&I	Commercial and industrial
CES1	Clean Energy Scenario 1
CES2	Clean Energy Scenario 2
CTF	Clean Technology Fund
DFI	Development finance institution
DOE	Department of Energy
DPPA	Direct power purchase agreement
E&S	Environmental and social
EVN	Viet Nam Electricity
FAST-P	Financing Asia's Transition Partnership
FDI	Foreign direct investment
FIT	Feed-in tariff
FX	Foreign exchange
GCF	Green Climate Fund
GEAP	Green Energy Auction Programme
GIP	Green Investments Partnership
IEA	International Energy Agency
IFC	International Finance Corporation
IG	Investment grade
IPP	Independent power producers
IRR	Internal rate of return
JBIC	Japan Bank for International Cooperation
JETP	Just Energy Transition Partnership
KEXIM	Export-Import Bank of Korea
LEAP	Leading Asia's Private Infrastructure Fund
MDB	Multilateral Development Bank
MEMR	Ministry of Energy and Mineral Resources
MNC	Multinational corporations
MOIT	Ministry of Industry and Trade
MSME	Micro, small and medium-sized enterprises
MUFG	Mitsubishi UFJ Financial Group
NDC	Nationally Determined Contribution
NGCP	National Grid Corporation of the Philippines
NGO	Non-governmental organisation
NPC	National Power Corporation
NPC-SPUG	National Power Corporation Small Power Utilities Group

NREP	National Renewable Energy Program
PDB	Public development bank
PDP	Power Development Plan
Lao PDR	Lao People's Democratic Republic
PEP	Philippine Energy Plan
PHP	Philippine Peso
PIMMs	Private Investment Mobilisation Models
PLN	PT Perusahaan Listrik Negara
PPA	Power Purchase Agreement
PR	Presidential Regulation
PSA	Power Supply Agreement
PT SMI	PT Sarana Multi Infrastruktur
PV	Photovoltaic
RE	Renewable energy
RUPTL	Rencana Usaha Penyediaan Tenaga Listrik (Electricity Supply Business Plan)
SMBC	Sumitomo Mitsui Banking Corporation
SPV	Special purpose vehicle
STEPS	Stated Policies Scenario
USD	United States Dollar
VND	Vietnamese Dong
VRE	Variable renewable energy
VWEM	Viet Nam Wholesale Electricity Market
WACC	Weighted Average Cost of Capital
WESM	Wholesale Electricity Spot Market

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