ENERGY TRANSITION PARTNERSHIP

REPORT

International Experiences in Mobilising Private Capital to Support Energy Transition and Finance Structures for the Energy Sector (Vietnam)

FEBRUARY 2025

Prepared by:

LSE Consulting

DEPOCEN Development and Policies Research Center
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UNOPS

AFD Agence Française de Développement

Federal Ministry for Economic Affairs and Climate Action

Department for Energy Security & Net Zero

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Australian Government
Department of Climate Change, Energy, the Environment and Water

CIFF CHILDREN'S INVESTMENT FUND FOUNDATION

SEQUOIA CLIMATE FOUNDATION

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ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Full Form
BMZ	German Federal Ministry for Cooperation and Economic Development
BOOT	Build-Own-Operate-Transfer
COP29	The 29th United Nations Climate Change Conference
DFI	Development Finance Institution
EBRD	European Bank for Reconstruction and Development
EIB	The European Investment Bank
EMDC	Emerging Market and Developing Country
EPC	Engineering, Procurement, and Construction
ERDF	The European Regional Development Fund
ETF	Exchange-Traded Fund
FDI	Foreign Direct Investment
FiT	Feed-in Tariff
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLA	The Greater London Authority
GSSS	Green, Social, Sustainable, and Sustainability-linked
IPCC	Intergovernmental Panel on Climate Change
JETP	Just Energy Transition Partnership
LDC	Least-Developed Country
LEEF	London Energy Efficiency Fund
LGF	London Green Fund

Abbreviation/Acronym	Full Form
MDB	Multilateral Development Bank
MEEF	The Mayor of London’s Energy Efficiency Fund
MIGA	Multilateral Investment Guarantee Agency
NDB	National Development Bank
NDC	Nationally Determined Contribution
O&M	Operations and Maintenance
PPP	Public-Private Partnership
RE	Renewable Energy
SPV	Special Purpose Vehicle
VCM	Voluntary Carbon Market

1. Executive Summary

Emerging Market and Developing Countries (EMDCs) outside China are increasingly central to scaling up climate action, particularly in energy transition. This is crucial for addressing the urgent climate crisis and unlocking long-term economic benefits. These countries need approximately $2.3–2.5 trillion annually by 2030 for climate investment and about 50% of the additional clean energy investments required by 2035 to meet global climate goals, positioning them at the heart of the clean energy transformation (Bhattacharya, Songwe, Soubeyran, and Stern, 2024).

The 29th United Nations Climate Change Conference (COP29) in Baku highlighted the urgent need for a mix of domestic, external, public, and private finance to support climate action in EMDCs. Despite a new $300 billion annual climate finance target set by developed countries by 2035, a larger commitment of at least $1.3 trillion from them is essential. EMDCs, facing rising energy demands, must significantly increase clean energy investments, requiring nearly $2.1 trillion annually by 2035. Mobilising these funds is challenging due to less developed financial markets, necessitating a comprehensive approach.

Vietnam, as one of the fastest-growing economies in Southeast Asia, requires significant investments, estimated at $153.7 billion by 2030 and up to $786.7 billion between 2031 - 2050 according to the adjusted power development plan 8 (PDP8) proposal (as of February 2025). The country's rapid economic growth has driven higher energy demand, but it faces significant climate change challenges. Committed to achieving net-zero emissions by 2050, Vietnam is expanding its renewable energy generation (including hydropower), aiming for 50% by 2030 and 83% by 2050. Despite progress, coal still dominates the energy mix, highlighting the need for continued investment in renewable energy, storage, and grid infrastructure. Recognizing Vietnam’s need for economic growth, development, and job creation, the energy transition presents an opportunity to achieve 'green growth' and provide better jobs.

Attracting private sector investments and fostering regulatory reforms are crucial to accelerating the energy transition and achieving Vietnam’s net-zero commitment. Before the "solar boom" in 2018 driven by favourable feed-in tariffs, Vietnam's renewable energy development was slow and heavily reliant on international donors. Alongside initiatives like the Asia Zero Emission Community (AZEC), the Just Energy Transition Partnership (JETP) marks a significant step forward with an initial $15.5 billion pledge. However, this is far from the $650 billion needed over the coming decades and is heavily reliant on less preferential commercial loans, raising concerns about long-term financial sustainability. Vietnam must strategically deploy initial funds to attract further

private investment, despite public sector constraints and economic vulnerabilities. Mobilising substantial capital requires the active participation of both domestic and international investors, addressing common challenges among EMDCs such as high upfront costs, macro-financial impediments, and data-related constraints, as well as other country-specific barriers.

This report introduces international experiences through four case studies to synthesise lessons for Vietnam, highlighting best practices in mobilising private capital to support energy transition and finance structures for the energy sector at project, regional, and country levels. The case studies showcase models that work across key areas, including transmission, utility, energy efficiency enhancement, and just transition, in countries with socioeconomic conditions similar to Vietnam including India, Uganda, and Egypt, making them highly adaptable. Additionally, insights from the UK, a global finance centre, offers a forward-looking perspective on scaling investment. These examples underscore that, regardless of the economic development stage, mobilising private capital through suitable risk-mitigating strategies, blended finance, and innovative financial instruments is crucial to addressing market failures in the low-carbon sector and achieving climate goals.

The Pro Mini-Grids programme in Uganda, launched in 2017, used a Public-Private Partnership (PPP) model with Build-Own-Operate-Transfer (BOOT) contracts to bundle small mini-grid projects into larger tenders, attracting investors. Funded by the Ugandan Government, BMZ, and the European Union (EU), and implemented by agencies like GIZ, the programme improved procurement capacity, streamlined project development, and provided partial subsidies. This approach reduced preparation time for future projects and familiarised authorities and lenders with mini-grid development. Key lessons include structuring projects for scale, offering flexible subsidies, leveraging blended finance, and ensuring effective coordination and governance. These strategies addressed technical, financial, and regulatory challenges, promoting sustainability and economic growth in rural areas. Experiences here are relevant for a large number of small clean energy projects in Vietnam that would otherwise struggle to attract investment, demonstrating the importance of aggregation, risk-sharing mechanisms, and targeted financial support.

The Benban Solar Park project in Egypt, which focuses on refinancing the debt of six solar power plants through the issuance of Green Project Bonds, demonstrates the effectiveness of using targeted financial instruments and international sustainability standards to attract institutional investors. Supported by MIGA and EBRD, this initiative marked the first private green project bond issuance in Egypt and the southern and eastern Mediterranean region. The refinancing, achieved through a 19-year USD 334.5 million non-recourse Green Project Bond, aims to lower financial costs, enhance viability, and generate

cost savings. The project is underpinned by a 25-year power purchase agreement with the government, ensuring stable revenue. This model highlights the potential for Vietnam to expand the use of green bonds, which have gained traction recently, along with long-term refinancing mechanisms to lower capital costs and attract institutional investors. While frameworks like the Law on PPP in 2021 and Decree 80 for direct power purchase agreements (DPPAs) aim to improve the investment climate, addressing challenges such as tariff uncertainty and limited access to long-term financing will be key to unlocking private sector confidence, similar to Benban's approach.

The Mayor of London's Energy Efficiency Fund, a model of a city fund to achieve a net zero mandate, effectively attracts local capital and addresses regional decarbonisation needs. Established in 2018 to address fragmented and insufficient funding for low-carbon infrastructure, MEEF offers flexible and competitive financing to enable, accelerate, or improve the viability of low-carbon projects. The Greater London Authority (GLA) contributed £43 million from the European Regional Development Fund (ERDF) to the fund, with Amber Infrastructure Group securing an additional £556 million from private investors and the European Investment Bank (EIB). Key practices include strong internal expertise, technical assistance, pipeline development, independent fund management, strategic public fund deployment to de-risk projects, and the use of revolving instruments to reinvest returns into future projects. This model demonstrates how a dedicated city-level fund can effectively mobilize private capital for low-carbon projects, a concept that could be adapted for Vietnam's urban energy transition. While Vietnam has several national funds for environmental protection and private sector support, there is no dedicated fund for renewable energy and energy efficiency. Establishing a similar mechanism, leveraging public funds to de-risk investments and attract private financing, could help bridge this gap and accelerate sustainable urban development.

India, as one of the fastest-growing economies in the world, is at the crossroads of climate action and socioeconomic development, with the concept of a "just transition" central to its efforts. This country-level case study highlights India's commitment to achieving net-zero emissions by 2070, facing a $3.5 trillion investment gap. The "just transition" approach balances environmental and economic goals to ensure inclusivity for workers in carbon-intensive sectors. Key strategies include mobilising private capital, mitigating social risks, creating green jobs, leveraging corporate social responsibility spending, and utilising the International Financial Services Centre to attract foreign just transition investment. India's proactive steps, such as establishing a Skills Council for Green Jobs and issuing sovereign green bonds, demonstrate its commitment to integrating social and environmental priorities into its net-zero journey. These early practices in India's just transition agenda could serve as valuable insights for Vietnam as it navigates its energy transition strategy. With Vietnam also facing challenges in phasing out carbon-intensive

industries, strategies such as mobilizing private capital, creating green jobs, and leveraging policy tools like sovereign green bonds could help ensure a fair and inclusive transition. Additionally, adopting a structured just transition framework could make Vietnam more attractive to development finance institutions (DFIs), unlocking further investment to support its net-zero goals.

From there, the report also provides broader international experiences and trends in strategies and mechanisms used to enhance the risk-adjusted return it offers to investors. The clean energy transition is complex, requiring integrated strategies across sectors such as electricity generation, industrial development, transport, and social infrastructure. Effective coordination between public and private stakeholders, with strong government oversight, is essential for achieving coherence and exploiting synergies. Comprehensive financing strategies are vital, optimising the use of public finance to align with policy priorities and infrastructure investments. To mobilise private capital, public finance institutions must streamline administrative procedures, lower transaction costs for accessing risk mitigation instruments, set internal incentives to promote their use, and expand their toolkit with solutions specifically designed for renewable energy projects.

Innovative climate finance solutions, particularly blended finance, combine public, philanthropic, and private capital to drive investments in sustainable development, especially in high-risk markets. Successful blended finance projects depend on the right mix of debt, equity, and grants, along with effective risk-mitigation tools and proper investor seniority to balance losses and returns. This approach often involves deal structuring to integrate various types of capital and risk mitigation strategies, attracting investors and ensuring adequate funding.

Collaboration between the public and private sectors, such as blending public finance with private capital, can de-risk investments and internalise the social benefits of climate projects. Project-based financing, despite challenges, can target underfunded areas with positive climate impacts. Blended finance is key in mobilising private capital for green investments by combining concessional funds from donors with commercial investments from private entities and development finance institutions. Blended finance enables investments in high-impact projects that are not yet commercially viable, such as those with high upfront costs or involving emerging technologies. Concessional funds can provide partial guarantees, subordinated debt, equity, or cover development costs to incentivise project sponsors to meet targets.

In addition to blended finance, innovative financial instruments and platforms are essential for scaling up private capital. Green, social, sustainable, and sustainability-linked (GSSS) bonds offer the potential to attract private climate financing into EMDCs like Vietnam. Project aggregation platforms and securitisation vehicles can pool smaller energy

transition projects into investment-grade portfolios, overcoming size mismatches and attracting institutional investors by reducing transaction costs and diversifying risks. Voluntary carbon markets can channel resources into clean energy projects by monetising carbon credits, but require stronger oversight, standards, and verification to ensure credibility. Strengthening local capital markets, such as bond, equity, and derivatives markets, can increase domestic private investment, as seen in China and India, especially when revenue streams are in local currencies.

A useful blended finance approach to mobilise private capital for green energy projects is the Public-Private Partnership (PPP). Defined by the World Bank as a long-term contract between a private party and a government entity, PPPs enable the development of critical energy infrastructure by sharing risks and responsibilities. This model leverages private sector efficiency, innovation, and financial resources while ensuring government oversight. Various models, such as the BOOT model, have been successful in countries like Brazil, Peru, and India, reducing costs and diversifying funding sources. However, the concession model has had mixed results in some EMDCs, highlighting the need for tailored approaches that align public-private models with a country's regulatory framework and market dynamics. When well-designed, PPPs can play a crucial role in addressing funding constraints, poor planning, and maintenance challenges in green energy projects, driving innovation and sustainability.

Synthesising international experiences, this report provides ten specific recommendations for Vietnam to effectively mobilise private capital, strengthen its regulatory frameworks, and implement innovative financial instruments to accelerate its energy transition. The recommendations focus on strengthening decarbonisation and just transition strategies, establishing a transparent and supportive policy framework, developing a robust legal framework for diverse financing mechanisms, leveraging planned International Financial Centres to attract global capital, enhancing cooperation with international partners, strategically deploying public funds, ensuring strong governance and transparency, building local market capacity with international support, implementing place-based investments, and exploring regional or provincial fund models.

The next report within this project will assess Vietnam's financial landscape for energy transition, examining financial structures, instruments, and private capital mobilisation. It will analyse financing trends, debt management, and regulatory gaps while evaluating the effectiveness of investment mechanisms. In addition, it will provide strategic recommendations to enhance resource allocation, strengthen financial instruments, and improve the regulatory environment for scaling up private capital for the energy transition. Developing a clear roadmap for implementation, strengthening stakeholder engagement through regular consultations, and establishing a robust monitoring and evaluation

framework to track progress and measure outcomes are essential. Additionally, fostering knowledge sharing and capacity building through global platforms and training programs will enhance the skills and knowledge of stakeholders involved in the energy transition.

2. Introduction and Project Background

The global transition to a low-carbon economy necessitates significant investment in clean energy infrastructure, particularly in EMDCs. These nations are expected to account for nearly 50% of the required increase in clean energy investments by 2035 to meet international climate goals. However, despite their vast renewable energy potential and growing energy needs, EMDCs face severe financial constraints in mobilising the necessary capital.

Vietnam, as a rapidly industrialising economy, is at the forefront of this challenge. The country's ambitious energy transition goals, aligned with its commitment to achieving net-zero emissions by 2050, require substantial financial inflows, particularly from private sector investors. While public financing and international climate funds play a crucial role, they are insufficient to bridge the enormous investment gap. Therefore, creating an enabling environment to attract private capital is imperative with public policy playing a crucial role in this process.

This report, part of the "Facilitating Private Sector's Access to and Engagement in Vietnam's Energy Sector" initiative, examines international experiences in mobilising private capital for energy transition. It identifies best practices, finance structures, and investment strategies relevant to Vietnam. The report covers case studies, investment mechanisms, financial instruments, and models of private capital mobilisation, concluding with key recommendations and next steps for Vietnam.

2.1 The Rising Role of Investment in EMDCs' Energy Transition

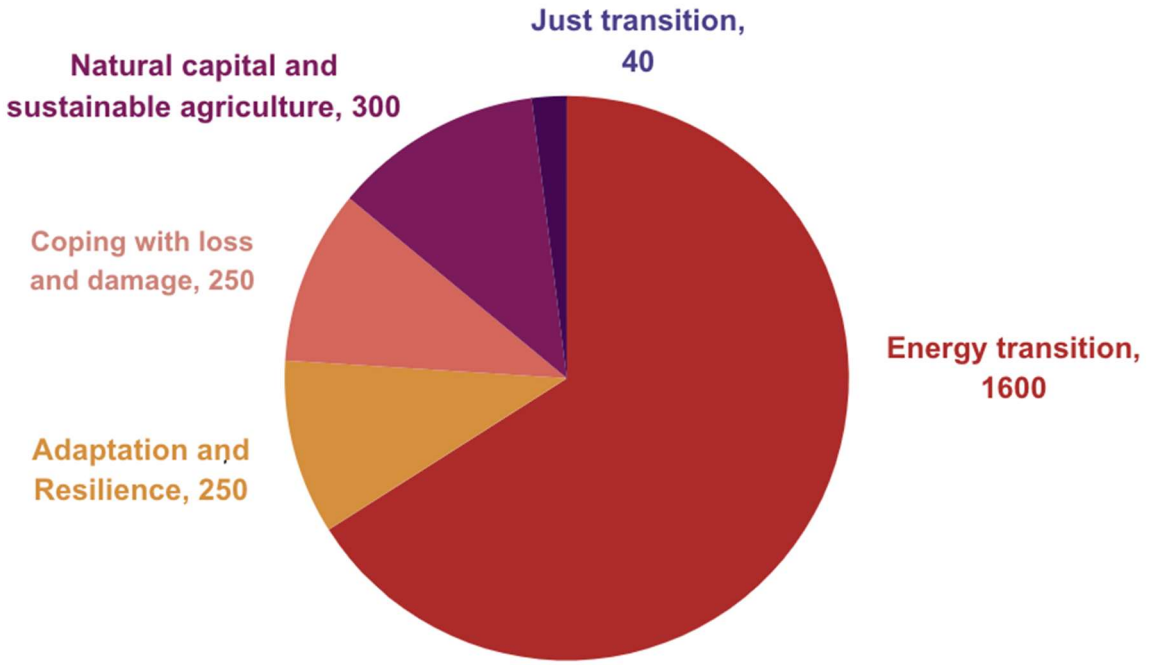
The global climate crisis is one of the most pressing challenges of our time, with the Intergovernmental Panel on Climate Change (IPCC, 2023) projecting that, under current climate policies, global temperatures could rise by a median of 2.8°C by 2100, given the current nationally determined contributions (NDCs). Such an increase would have devastating consequences, including loss of life, environmental degradation, and severe economic disruptions.

To mitigate these risks and build climate resilience, investments in climate action must increase significantly across all economies. Addressing climate change requires large-scale financial commitments in mitigation, adaptation, and resilience-building initiatives. According to Bhattacharya, Songwe, Soubeyran, and Stern (2024), global investment requirements for climate action are projected to range between $6.3 and $6.7 trillion per year by 2030. This includes $2.7–2.8 trillion for advanced economies, $1.3 - 1.4 trillion for China, and $2.3–2.5

trillion for other EMDCs. Increasing climate investments in EMDCs is critical to achieving the Paris Agreement goals and curbing the accelerating threats to nature and biodiversity.

Among climate action priorities, the energy transition sector is particularly crucial, as it serves as the backbone of global decarbonisation efforts. Of the projected $2.4 trillion in annual investment needs for EMDCs (excluding China) by 2030, approximately $1.6 trillion is required for clean energy transition alone (Figure 2.1). These investment levels are not mere negotiation benchmarks but essential commitments necessary for achieving global climate targets.

Figure 2.1 Climate and nature-related investment requirements in EMDCs other than China (US$ billion per year by 2030)



Source: Adapted from Bhattacharya, Songwe, Soubeyran, and Stern (2024).

Scaling up climate investments presents an opportunity not just to mitigate risks but also to unlock substantial economic benefits. The costs of inaction - ranging from reduced productivity and health impacts to asset damage and biodiversity loss - could amount to 15–18% of global GDP by 2030. Conversely, financial savings from transitioning to a low-carbon economy could represent 11-18% of global GDP, driven by reduced fossil fuel expenditures, lower harmful subsidies, and decreased reliance on energy imports.

Despite growing commitments to climate finance, current investment flows remain far below what is required. Global climate finance exceeded $1 trillion annually in 2021/22, with preliminary estimates for 2023 indicating growth to $1.5-1.6 trillion (Naran et al., 2024). However, this still falls significantly short of the necessary levels. Compounding this gap, direct fossil fuel subsidies surged to $1.5 trillion in 2022 (IISD & OECD, 2024), illustrating an ongoing misallocation of resources that hinders sustainable progress.

2.2 Rethinking the Finance Structure for Climate Action in EMDCs

The 29th United Nations Climate Change Conference (COP29) took place in Baku, Azerbaijan, in 2024, serving as the latest global forum for climate negotiations and policy frameworks. Amidst ongoing geopolitical uncertainties, record-breaking global temperatures, and worsening climate-related disasters, the conference produced mixed outcomes. A key achievement was the agreement on a new climate finance target, committing developed nations to contribute at least $300 billion annually by 2035. However, this figure was seen as a compromise, with some developing countries voicing frustration over its inadequacy.[1] There was also broad acknowledgement that a significantly larger financial commitment, estimated at a minimum of $1.3 trillion per year by 2035 (CCC, 2024), is essential. As such there is a growing recognition that mobilising the necessary resources will require integrating climate finance into broader public and private financial systems.

EMDCs other than China will account for nearly 50% of the additional clean energy investments required by 2035 to meet global climate goals, making them central to the clean energy transformation. These countries, driven by demographic growth and economic expansion, face rising energy demand and must build energy infrastructure from the ground up to support sustainable development. The commitments made at COP28 to triple global renewable energy capacity and double the rate of energy efficiency improvements by 2030 will require significantly greater investment increases in EMDCs than in advanced economies and China (IEA, 2024c). To remain on track with climate goals, clean energy investment in these nations must increase nearly fivefold from 2022 levels, reaching $1.6 trillion annually by 2030 and rising to $2.1 trillion by 2035 (IEA, 2024d). However, achieving these targets will be particularly challenging given the structural financing constraints many EMDCs face.

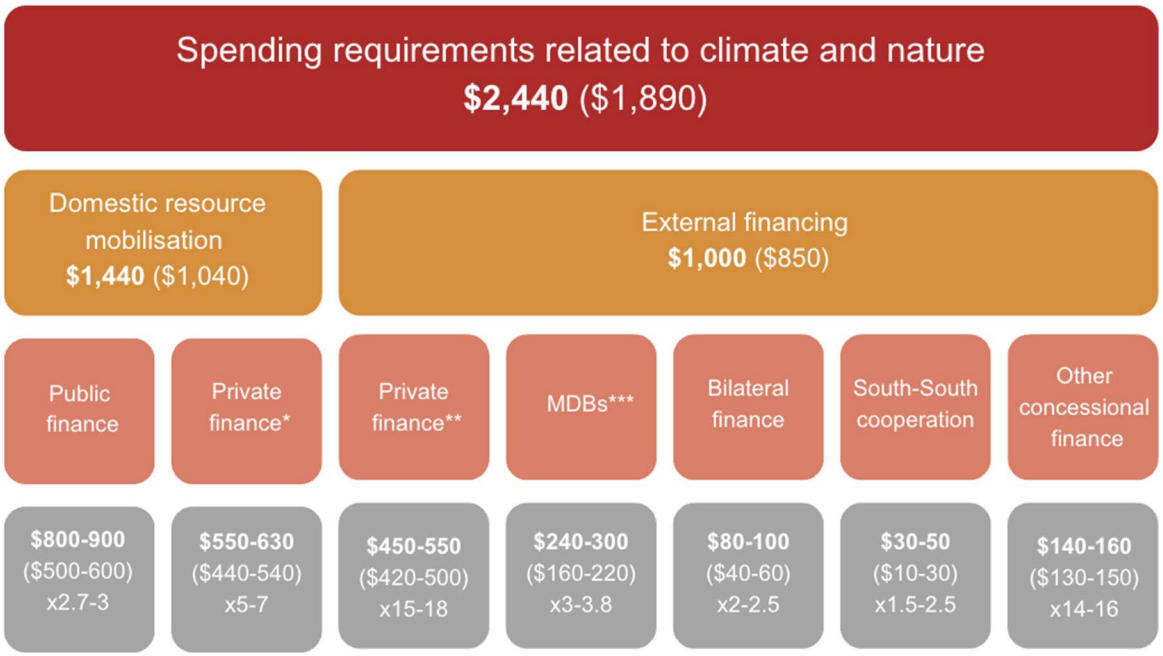
While both advanced economies and EMDCs need to scale up climate finance, mobilising investment at the required speed and scale is far more difficult for EMDCs. China, despite

[1] The problem is worsened by the US's recent decision to leave the Paris Agreement and similar considerations from countries like Indonesia, which cites fairness and high transition costs.

its significant investment needs, has a well-developed financial system capable of supporting the transition. By contrast, least-developed countries (LDCs) attract the lowest levels of private climate finance and generally have less developed financial markets (Taskin et al., 2024). There is a clear correlation between the ability to mobilise private climate finance, financial system maturity, and national income levels. Therefore, the key challenge is how to structure financing solutions to meet the investment needs of EMDCs other than China.

To meet these investment needs, all available pools of finance - domestic, external, public, and private - must be leveraged. Domestic resources currently provide about 70% of total climate finance, with public and private sources expected to contribute $1.4 trillion of the $2.4 trillion needed annually by 2030 and $1.9 trillion of the $3.2 trillion required by 2035 (Figure 2.2). As clean energy investment increasingly shifts to the private sector, domestic private finance and local development finance institutions (DFIs) will play a critical role in scaling up funding. However, this requires significant financial system development, as public finance must triple and private finance must grow seven- to eightfold by 2030.

Figure 2.2 Mobilising the necessary financing for EMDCs other than China *(US$ per year by 2030, increment from current in parentheses with x indicating growth rate in times from current)*



Source: Adapted from Bhattacharya, Songwe, Soubeyran, and Stern (2024). Notes: *Includes household savings. **A significant proportion of this private finance would be directly and indirectly catalysed by MDBs, other development finance institutions and bilateral finance. ***Includes multilateral climate funds.

External finance must bridge the remaining gap, covering $1 trillion by 2030 and $1.3 trillion by 2035. Multilateral development banks (MDBs) have been the fastest-growing source of climate finance in the last five years, currently contributing nearly half of all international funding. Their role will be crucial in mobilising private investment, and leading experts recommend that MDB financing must triple by 2030 to meet global climate targets. Bilateral climate finance, currently at $43 billion annually, must at least double to support urgent priorities. Similarly, external private finance to EMDCs, which currently stands at around $30 billion, must expand to $450–500 billion, requiring new strategies and partnerships. This will necessitate stronger risk-sharing mechanisms, blended finance models, and concessional funding to attract private investors to emerging markets.

Beyond traditional finance sources, non-traditional financing mechanisms can help bridge the climate finance gap. South-South cooperation (the collaboration between developing countries) presents significant opportunities, particularly through China's leadership in clean energy and its efforts to green the Belt and Road Initiative. By providing low-cost

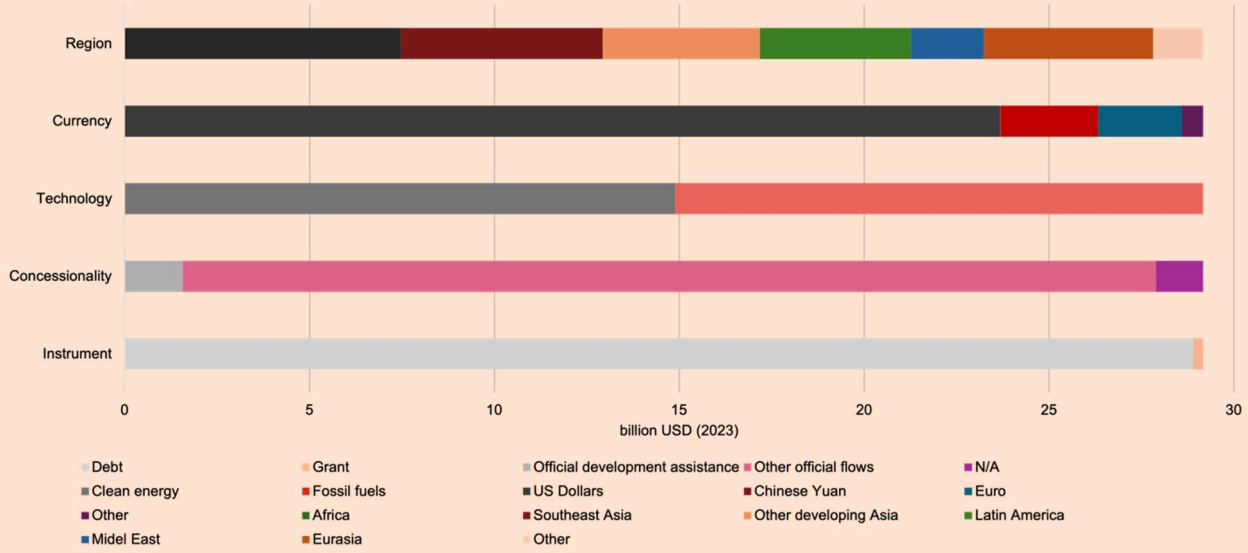
technologies and affordable financing, China can support developing nations in accelerating their clean energy transitions. Other emerging economies, such as India and Brazil, also have the potential to play a crucial role. Additionally, expanding the role of MDBs, multilateral climate funds, and regional development banks, such as the Brazilian Development Bank and South Africa's Development Bank, will be essential in mobilising new capital and ensuring a just and inclusive energy transition. Vietnam, in particular, could leverage its strong relationships with other leading developing countries to enhance support and access financing. By prioritizing accountability and transparency, Vietnam can ensure that climate finance flows are aligned with clear objectives, focusing on both the quantity and quality of support provided. Additionally, Vietnam could serve as a model by extending its own experiences to support other nations, fostering a more collaborative and resilient global response to climate change.

Box 2.1 China's Evolving Role in Global Energy Finance

China is a key player in global energy finance, with a significant focus on energy projects in developing countries. Its external finance, primarily through the China Development Bank (CDB) and the Export-Import Bank of China (CHEXIM), has historically favoured fossil fuel investments. However, there is a noticeable shift toward clean energy, aligning with China's broader strategic goals and the global push for sustainable development. At the 2024 G20 summit, President Xi Jinping emphasised the importance of enhancing clean energy investments in the Global South.

China's financing for energy projects spans multiple sectors, with notable investments in rail transportation and renewable energy. From 2013 to 2021, China financed more clean energy projects than fossil fuel projects overall. However, its role as the largest financier of fossil fuel projects among DFIs remains significant. Geographically, China directs its investments differently, with regions like Africa and parts of Asia receiving more clean energy investments, while the Middle East and Latin America continue to receive substantial fossil fuel financing, primarily to secure oil for energy security (see Figure 2.3).

Figure 2.3 Breakdown of DFI financing by instrument, concessionality, technology, currency and region, annual average in China, 2013-2021



Source: IEA (2024a).

A key moment in China's energy financing came in 2021 when President Xi pledged to stop financing new coal-fired power projects abroad. This policy shift reflected a broader change in China's strategy, focusing on green and low-carbon energy.[2] China's non-concessional financing model, which often offers long repayment periods and low interest rates, makes it an attractive source of funding for many developing countries, particularly those involved in the Belt and Road Initiative (BRI).

China's evolving approach to energy finance reflects a shift from large-scale infrastructure projects toward more commercially viable, smaller-scale initiatives with a focus on clean energy. In October 2023, China committed USD 48 billion to CDB and CHEXIM, supporting clean energy projects in Africa and other regions. However, there is a noticeable transition from state-backed DFIs to market-driven commercial banks, which may lead to higher costs for recipient countries and increase financial risks.

Despite a decrease in overall energy financing from China's DFIs in recent years, the country's strategic shift toward cleaner, sustainable projects, particularly in the context of the BRI and global climate initiatives, ensures that China remains a pivotal force in the global energy investment landscape. The changing dynamics of China's financing model are crucial to understanding the future direction of global energy infrastructure development and the challenges and opportunities for developing nations seeking to transition to a low-carbon economy.

2.3 Vietnam's Energy Sector and Investment Needs in Energy Transition

Vietnam has experienced significant economic growth, with its GDP per capita tripling over the past two decades, reaching $4,282 in 2023 This positions the country as one of Southeast Asia's fastest-growing economies. This growth is expected to continue, with annual GDP expansion targeted to exceed 8% in 2025 and average double-digit growth from 2026 to 2030. As a result, energy demand is projected to rise significantly, requiring an annual power supply expansion of 10.3%–12.5% (in the latest proposal as of February 2025), fuelled by industrialisation, urbanisation, and a rising middle class. Additionally, an expanding manufacturing sector is contributing to increased energy consumption (EREA & DEA, 2024).

However, Vietnam faces significant challenges due to its vulnerability to climate change. It ranks among the five most vulnerable countries globally, experiencing rising sea levels, extreme weather events, and shifting precipitation patterns. The World Bank estimates that climate change already costs Vietnam about $10 billion annually, or 3.2% of its GDP. If mitigation and adaptation efforts are not effectively implemented, the economic losses could escalate to 12% - 14.5% of GDP by 2050. This underlines the urgent need for action to reduce greenhouse gas emissions at both the global and national levels.

In response, Vietnam has committed to achieving net-zero emissions by 2050 and is actively implementing sustainable and resilient energy practices. Vietnam's energy sector has expanded rapidly, increasing its installed capacity from 11 GW in 2005 to 82.4 GW in 2024, with a notable shift toward renewable energy. As detailed in Box 2.2, coal still dominates the generation mix, accounting for 32% of electricity in 2024, and its capacity has grown more than fivefold in the last decade. However, renewables (including hydropower) now represent 55% of installed capacity, with solar and wind power making significant progress, growing from almost no capacity in 2018 to 21.4 GW by 2024. Despite the expansion of intermittent renewable energy sources, their share of total generation remains lower (12.8%) due to variability. This highlights the need for continued investments and development of energy storage and grid infrastructure to integrate these variable renewable sources more effectively.

The latest adjusted PDP8 proposal (as of February 2025) outlines a growth rate of 10.3% - 12.5% annually in electricity demand, which must be met while transitioning to a greener

[2] More recently in 2024, China however approved 66.7 GW of new coal-fired power capacity, with a surge in approvals in the second half of the year. Additionally, 94.5 GW of new coal projects began construction, and 3.3 GW of suspended projects resumed — the highest activity since 2015. This signals a significant expansion of coal power in the next 2–3 years, reinforcing its role in China's energy system. (CREA, 2025)

energy system. Vietnam's energy transition goals date back to Resolution 55-NQ/TW of the Politburo on Orientations of Strategy for National Energy Development by 2030, Vision Towards 2045. This foundational document, along with Vietnam's legal commitment to net-zero emissions by 2050 and regulatory frameworks such as the Power Development Plan (PDP8) and the National Energy Master Plan (NEMP), set clear pathways to decarbonise the energy sector. Additionally, initiatives like the Just Energy Transition Partnership (JETP) and the Asia Zero Emission Community (AZEC) support these efforts.

To meet these targets, significant investments are required estimated at $153.7 billion by 2030 and about $786.7 billion between 2031-2050 according to the latest proposal. The country is also working to attract private sector investments, foster regulatory reforms, and create a competitive retail electricity market by 2023, all of which are crucial to accelerating the energy transition and achieving Vietnam's net-zero commitment. Looking ahead, the latest adjusted PDP8 proposal aims to achieve a renewable energy share (including hydropower) of 50% in 2035 and 83% in 2050.

Box 2.2 Vietnam Power Sector in a Glance

Power Sources: Vietnam has rapidly expanded its power sector, growing installed capacity from 11 GW in 2005 to 82.4 GW in 2024. Coal remains dominant, generating 32% of electricity in 2024, with its capacity increasing fivefold in the past decade. Despite this, renewables have surged, now accounting for 55% of installed capacity.

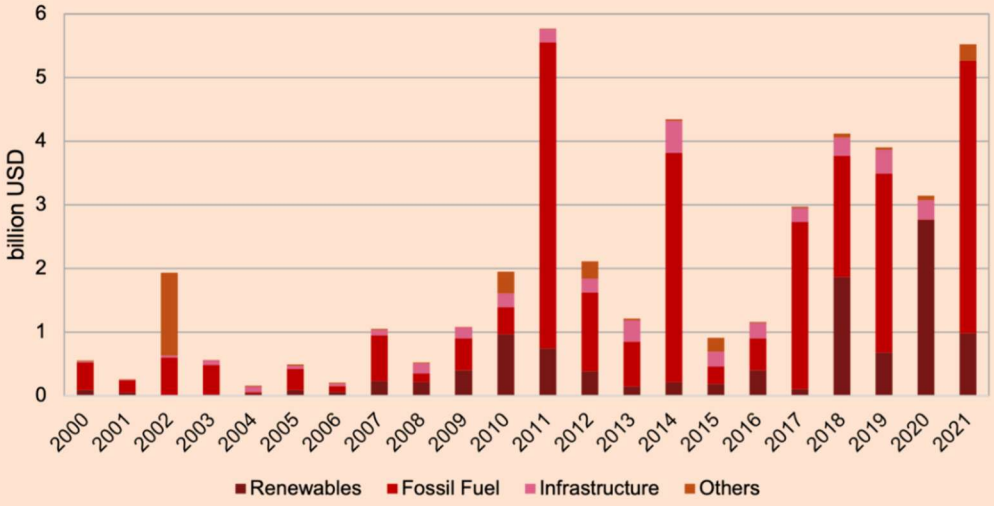
Hydropower contributes 28.7% of electricity generation, while solar and wind grew from almost zero in 2018 to 21.4 GW by 2024, representing 26% of capacity but only 12.8% of generation due to variability. Incentives like tax breaks and feed-in tariffs (which is however expired) have driven renewable growth, though recent regulatory uncertainties have slowed investments. With these advancements, Vietnam is on track to exceed its renewable energy target of 50% generation by 2045.

Figure 2.4 Historical Capacity and Generation by Fuel

Source: Ember and Vietnam Energy (for updated 2023/24 data).

Investment: Between 2010 and 2021, Vietnam's power sector saw investments of about $37 billion, with nearly two-thirds directed toward fossil fuels and only a quarter toward renewables. Renewable energy investment experienced two key surges: one around 2010 and another in the late 2010s, particularly in 2018 and 2020. Over time, funding shifted from small hydropower projects in the early 2010s to wind and solar technologies. However, in 2021, fossil fuels still attracted $4.3 billion, compared to less than $1 billion for renewables.

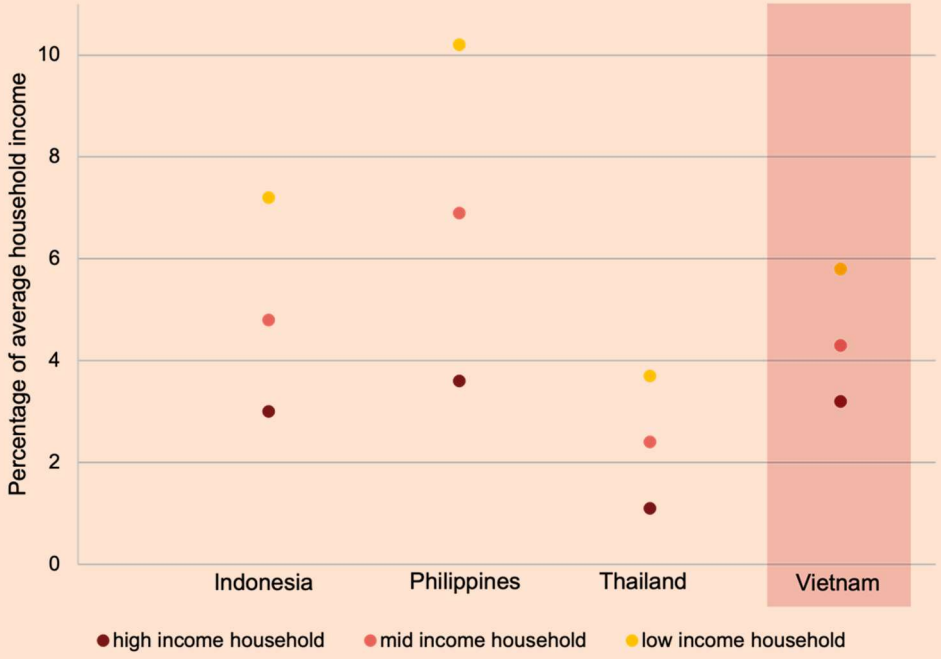
Figure 2.5 Total Investment in Vietnam's power sector



Source: Ember.

Tarriff: Retail electricity tariffs in Vietnam are significantly lower than the ASEAN and global averages. In 2019, household electricity prices ranged from 1,678 to 2,927 VND/kWh (0.07–0.12 EUR/kWh), with an average of 1,864 VND/kWh (0.08 EUR/kWh). A preferential tariff is available for low-income households. Electricity affordability, measured as tariffs relative to household income, is moderate compared to the regional average and significantly better than in Indonesia and the Philippines. Additionally, the disparity in electricity costs between low- and high-income households is smaller than in similar economies.

Figure 2.6 Electric Power Affordability



Source: Ember.

Legal framework: In July 2022, Vietnam legally committed to achieving net-zero emissions by 2050. The country has enhanced its climate goals twice, in 2020 and 2022, targeting a 16% GHG reduction by 2030, or 43.5% with international support. While rapid renewable energy adoption is a positive step, phasing down significant coal capacity remains essential to meet the 2050 climate neutrality goal.

Long term strategy and NDC commitment	- Carbon Neutrality by 2050. - 15.8% reduction below business as usual (BAU) by 2030. - 43.5% reduction below BAU by 2030 (with international support).

Key Decisions	- Resolution 55-NQ/TW and Resolution 140/NQ-CP on orientations of strategy and actions for national energy development by 2030 with a vision towards 2045. - Decision 882/QD-TTg and Decision 1658/QD-TTg on the National Strategy on Green Growth. - Decision 896/QD-TTg and Decision 888/QD-TTg on COP26 implementation - Decision 500/QD-TTg and Decision 262/QD-TTg on PDP8 - Decision 893/QD-TTg on NEMP
Just Energy Transition Partnership (JETP)	Joined in December 2022, with $15.5 billion in support from donors and the private sector until 2026–2028. Target for 2030: - Peak power sector emissions at 170 Mt CO2eq - 47% renewable energy generation share - Peak coal-fired capacity at 30.2 GW
Power Development Plan (PDP8)	Targets (2021–2030): - Increase renewable energy for power generation - Improve energy efficiency - No new coal-fired plants after 2030 - Gradual coal fleet reduction after 2035
National Energy Master Plan (NEMP)	Integrates PDP8 into a broader roadmap to: - Achieve development goals while meeting net-zero targets - Reduce reliance on energy imports - Optimise domestic resources
Green Energy Transition (Transport sector)	Develop a green transport system operating on electricity or green energy by 2050 (Decision 876/QD-TTg, 2022).
Other Measures	Cross-cutting GHG mitigation and ozone layer protection (Decree 6/2022/ND-CP).

Market Structure: Vietnam's energy market is largely controlled by the state-owned Electricity Vietnam (EVN), which holds a monopoly over transmission and distribution and accounts for 42.5% of the country's generation capacity in 2023. Other sources contributed 57.5%. However, competition is gradually increasing in production, wholesale, and retail markets, with plans to establish a competitive retail electricity market by 2023.

CATEGORY	KEY VALUES
Wholesale power market	Established 2019
OWNERSHIP	
• Generation Capacity	- 42.5% EVN and EVN-GENCOs (state-owned) - 57.4% from external sources
• Transmission	100 % of transmission grid owned by Vietnam Electricity National Power Transmission Corporation (EVN NPT)
• Distribution and retail	100% of distribution done by EVN (public)
• Horizontal Unbundling	Partially unbundled (42.6% capacity state-owned)

Regulatory Authorities: Resolution No. 140/NQ-CP of the Government, which promulgates the Action Program to implement Politburo Resolution No. 55-NQ/TW, establishes specific objectives and tasks aimed at advancing the energy transition in Vietnam. In this context, the roles and functions of various ministries (as of February 2025) in the energy transition process are reflected in the following:

Ministry	Relevance to Energy Transition
Ministry of Planning and Investment (MPI)	- Facilitates investment in sustainable energy infrastructure and prioritizes cross-regional energy connectivity. - Develops mechanisms to attract domestic and international private investments, including PPP models. - Supports Vietnamese enterprises in investing in energy projects abroad.
Ministry of Finance	- Designs financial policies and mobilizes capital for energy infrastructure investments. - Develops tax incentives and financing mechanisms to support renewable and clean energy projects. - Establishes frameworks to support public funding and PPP models in the energy sector.
State Bank of Vietnam (SBV)	- Administers flexible monetary policies in coordination with fiscal measures to support economic stability and energy sector growth. - Develops guidelines on green credit to promote renewable energy (RE) projects and green energy initiatives.

Ministry of Industry and Trade	- Leads formulation and implementation of the National Energy Development Strategy, Master Plans, and Power Development Plans. - Coordinates reforms across oil, gas, coal, and renewable energy sectors. - Shapes policies to modernize the power market and enhance national energy security.
Ministry of Natural Resources and Environment	- Oversees geological surveys and assessments of mineral and renewable resource potentials. - Regulates land use and environmental aspects of energy projects. - Develops policies for environmental protection and greenhouse gas reduction.
Ministry of Transport	- Develops and upgrades transport infrastructure (ports, coal transshipment hubs) essential for energy logistics. - Promotes energy-efficient, clean, and eco-friendly transport systems through emission standards and alternative fuels. - Coordinates transport networks to support energy project requirements.
Ministry of Science and Technology	- Drives technological innovation and research in the energy sector. - Develops and updates technical standards and pilots renewable energy projects (e.g., hydrogen energy). - Facilitates the transfer and application of modern technologies to improve energy efficiency.
Ministry of Public Security	- Reviews and enhances legal frameworks for fire prevention and control at energy facilities. - Ensures the security and resilience of energy infrastructure during the transition.
Ministry of Construction	- Develops technical standards and incentive mechanisms for energy-efficient buildings. - Supports the creation of regulations to reduce energy consumption in the built environment.
Ministry of Education and Training, Ministry of Labour, Invalids and Social Affairs	- Enhances the capacity of the energy sector through specialized training and workforce development. - Prepares engineers and technical staff to support modern energy technologies and the overall energy transition.

Source: Authors' compilation.

2.4 The Importance of Mobilising Private Capital for Energy Transition in Vietnam

Given the urgency and scale of investment required for Vietnam's energy transition, identifying funding sources is critical. International experience points to a range of potential contributors: governments, DFIs such as multilateral and national development banks, philanthropies, commercial banks, institutional investors (pension funds, insurance companies, and sovereign wealth funds), private equity funds, businesses reinvesting profits, and individual households. Globally, private-sector financing is increasingly vital, with its share of clean energy investment expected to rise from less than half today to 60% by 2035 (IEA, 2023).

Before the "solar boom" in 2018 driven by favourable feed-in tariffs, Vietnam's renewable energy development (except for hydropower) heavily relied on non-reimbursable funding from international donors such as Sweden, Denmark, and Japan, with minimal private sector involvement. As a result, progress has been slow, with small-scale RE projects in rural and remote areas delivering limited impact. More recently, Vietnam's net-zero ambition has attracted greater international support, including initiatives like the Asia Zero Emission Community (AZEC) and the Just Energy Transition Partnership (JETP). The JETP includes an initial $15.5 billion pledge ($8 billion public and $7.5 billion private), but this is far from the estimated $650 billion required over the coming decades. In addition, most of the public funding pledged comes in the form of commercial loans ($4.23 billion) rather than grants or concessional financing at discounted rates. This limits Vietnam's ability to fund early-stage projects with high-risk profiles that could otherwise catalyse private sector participation. To close this gap, Vietnam must strategically deploy initial funds to attract further private investment, despite constraints such as conditionalities tied to JETP funds.

Meanwhile, Vietnam's public sector faces significant constraints in addressing energy transition challenges. While the country's gross debt level (33.5% of GDP in 2024) is manageable and below the 60% ceiling, fiscal pressures from infrastructure investments and social spending require prudent debt management. A fiscal deficit of -2.4% of GDP in 2024 highlights the need for better public finance management and revenue generation. High inflation (3.7% in 2024) and private debt (128.68% of GDP in September 2023) add to economic vulnerabilities, limiting the private sector's ability to sustain investment.

To overcome these constraints, Vietnam prioritises fiscal prudence while mobilising external financing, emphasising the critical role of private capital. By improving public debt management and targeting clean energy investments, the government seeks to attract private investment, including foreign direct investment (FDI), to advance its energy transition and sustainable development goals.

2.5 Barriers to Mobilising Private Capital for Energy Transition in Vietnam

Mobilising substantial capital for the clean energy transition in Vietnam requires the active participation of both domestic and international investors. According to the IMF (2022), there are numerous challenges for EMDCs like Vietnam that hinder private-sector investment:

- **Supply and Demand Factors**: Various factors can translate into financial constraints and risks, which are important on macro- and microeconomic levels for countries and private sector investors. Supply-side factors include changes in energy supply, production technologies, and the deployment of carbon dioxide removal technologies. Demand-side factors involve changes in the demand for goods and services toward more sustainable options in consumption, behaviour, lifestyle, etc.

- **Macro-Financial Impediments**: The absence of adequate carbon pricing disincentivises private investment in low-carbon projects. Country risk makes it difficult to price for some EMDCs, specifically for climate-related products. Pre-existing debt vulnerabilities could be magnified by additional borrowing, including the transfer of currency and liquidity risks from private to public sector balance sheets.

- **Microeconomic Impediments**: These include long timeframes, a lack of large investment-grade investments and liquid markets, high upfront capital and transaction costs, and significant project risks.

- **Unattractive Risk-Return Profiles in Unproven Markets**: The costs associated with climate investments are substantial, involving large upfront capital expenditures and the long time horizons typical of infrastructure projects. Additionally, developing profitable business models presents its own set of challenges. The risks involved in these investments are multifaceted. They include currency risks, regulatory and political risks (such as contract renegotiation, changes in taxation, or shifts in the regulatory environment), macroeconomic and business-related risks (like demand volatility and exchange rate fluctuations), and technical risks (including construction delays, cost overruns, technological obsolescence, and force majeure events). As a result, climate investments could fail long before high carbon prices and associated competitiveness benefits materialise. This is true even when a government's commitment to a path of rising carbon prices is credible, as shorter-term costs and risks can deter investment decisions.

- **High Fossil Fuel Investments**: These investments need to be scaled down to make way for low-carbon energy sources.

- **Data-Related Constraints**: Information asymmetries related to taxonomies and large data gaps, the absence of common taxonomies, inadequate classifications for sustainable investment, home bias considerations, an overlay of other risk factors and externalities, manual, cumbersome, and costly data provision processes, and data quality issues impacting transparency, verification, and reporting all pose significant challenges.

The OECD (2022) further highlights barriers specific to clean energy, many of which align with challenges in traditional infrastructure investment. Key issues include:

- **Fossil Fuel Subsidies**: These subsidies distort competition in favour of conventional energy sources, reducing the attractiveness of energy efficiency investments.
- **Lack of Technical Capacity**: Limited domestic capacity to adopt and deploy lower-carbon technologies hinders progress.
- **High Upfront Costs**: Clean energy projects require significant initial capital and have long asset life cycles, creating financing challenges and making the return profile unattractive to commercial investors.

On top of these challenges common to EMDCs and clean energy, Box 2.3 provides a detailed overview of the country-specific barriers to mobilising private capital for the energy transition in Vietnam.

Box 2.3 Vietnam's Country-Specific Challenges for Private Sector Capital Mobilisation in Energy Transition

Vietnam is heavily investing in renewable energy as part of its commitment to net zero targets and energy security. The country aims to increase the share of renewable energy (including hydropower) to 50% in 2035 and 83% in 2050. This transition involves significant investments in biomass and ammonia as future fuel sources, alongside a gradual phase-out of coal.

Given the significant investment requirements estimated by PDP VIII, active participation from the private sector is pivotal, particularly regarding renewable energy development and grid modernisation. It is expected that the private sector will contribute 80% of the total investment for renewable energy development. The modernisation of transmission and distribution networks, while traditionally funded by the public sector, should open opportunities for private investment due to recent regulatory changes (such as the enactment of the PPP Law).

The following are some of the challenges for private sector capital mobilisation:

Policy and regulatory framework: Inconsistent policies and lack of long-term regulatory frameworks deter private investment. For instance, FITs for solar energy expired in 2020, and for wind energy in 2021, without a clear replacement policy. This uncertainty has left investors hesitant, as they cannot predict the future regulatory landscape. Additionally, the lack of a clear, long-term strategy for renewable energy has led to delays in project approvals and a general reluctance to invest in new projects.

High capital costs and financing risks: High upfront costs and long payback periods are significant barriers to renewable energy investment in Vietnam. Renewable energy projects, especially offshore wind and solar, require substantial capital investment with returns spread over many years. According to FiinRatings, around 40% of wind energy developers have a debt-to-EBITDA ratio exceeding 8x, indicating high financial leverage and associated risks. This long-term financial commitment is risky for private investors, especially without adequate financial instruments and risk mitigation strategies. The Vietnamese banking system's capacity to provide long-term loans is also limited, making it difficult for developers to secure the necessary financing.

Complicated and cumbersome permitting procedures: Regulatory and procedural hurdles, including licensing, permitting, and PPA negotiations, cause delays and increase costs for investors. The existing investment framework, which encompasses various laws and regulations, lacks a dedicated and streamlined process for energy infrastructure projects. For example, developers of solar power plants in Ninh Thuận and Bình Thuận provinces have faced significant delays due to bureaucratic red tape.

Bankability of PPAs: Concerns about the bankability of PPAs, including issues like no “take or pay” obligation, no sovereign guarantee for EVN, inflation or exchange risks, lack of statutory obligations for tariff adjustments, and the absence of remedies for law changes, pose significant risks for investors. These factors impact the financial viability and predictability of revenue streams from energy projects.

Limited green finance market: Vietnam’s green finance market remains limited. In 2023, state-owned bank BIDV was the only green bond issuer, with a volume of VND 2.5 trillion ($102 million), designed to finance green, energy-saving, and environmental protection projects.

Revenue risk: The expiration of attractive FIT schemes for solar and wind power and the lack of a new mechanism for renewable energy create significant revenue risks and investor uncertainty. Without a clear and attractive pricing mechanism, investors are hesitant to commit to new projects.

2.6 Looking Ahead and Report Roadmap

These constraints highlight the need for structural reforms, risk-sharing mechanisms, and international cooperation to mobilise private capital and accelerate Vietnam's energy transition. Addressing these challenges requires a coordinated approach with stronger public sector intervention to reduce risks and attract private investment.

The IMF (2022) suggests that the public sector can play a pivotal role in overcoming barriers to private sector climate financing. By implementing regulations, tax incentives, guarantees, subsidies, and disclosure requirements, the public sector can align incentives with climate goals and foster collective action. In emerging markets, where market failures extend beyond climate externalities, such measures are crucial to address under-investment in climate infrastructure and meet climate targets.

Public-private collaboration, such as blending public finance with private capital, can de-risk investments and internalise the social benefits of climate projects. Project-based financing, despite challenges, can target underfunded areas with positive climate impacts. The IEA (2023) highlights that blended finance is key in mobilising private capital for green investments by combining concessional funds from donors with commercial investments from private entities and development finance institutions. Blended finance enables investments in high-impact projects that are not yet commercially viable, such as those with high upfront costs or involving emerging technologies. Concessional funds can provide partial guarantees, subordinated debt, equity, or cover development costs to incentivise project sponsors to meet targets.

In addition to blended finance, innovative financial instruments and platforms are essential for scaling up private capital. Green, social, sustainable, and sustainability-linked (GSSS) bonds offer potential to attract private climate financing into EMDCs. Project aggregation platforms and securitisation vehicles can pool smaller energy transition projects into investment-grade portfolios, overcoming size mismatches and attracting institutional investors by reducing transaction costs and diversifying risks. Voluntary carbon markets can channel resources into clean energy projects by monetising carbon credits, but require stronger oversight, standards, and verification to ensure credibility. Strengthening local capital markets, such as bond, equity, and derivatives markets, can increase domestic private investment, as seen in China and India, especially when revenue streams are in local currencies.

To reduce investment costs, the public sector can:

- Provide public equity capital alongside private debt to lower borrowing costs while maintaining control over investment decisions.

- Use public-private partnerships to leverage public expertise in project selection and monitoring, reducing risks for private investors.
- Improve information sharing to enhance private sector project evaluation and reduce monitoring costs.
- Underwrite specific risks (e.g., project completion or political instability) to lower risk premiums for investors.
- Offer multi-sovereign guarantees to increase leverage and attract more capital.
- Implement public investment policies to reduce risks and support climate finance, as seen in the development of wind and solar technologies.

This report, as a part of technical assistance “Facilitating Private Sector’s Access to and Engagement in Vietnam’s Energy Sector”, is dedicated to examining international experiences in mobilising private capital for energy transition initiatives and explores finance structures relevant to the energy sector. It aims to identify successful strategies and mechanisms that can be adapted to the Vietnamese context, providing insights and recommendations for decision-makers to understand international best practices and their applicability to Vietnam.

Chapter 2 will provide case studies and highlight best practices and success factors relevant to Vietnam's energy sector. Chapter 3 will focus on strategies and mechanisms used internationally to attract private investment into energy transition projects. Chapter 4 will explore, analyse, and compare finance structures and instruments relevant to the energy sector. Chapter 5 will examine and scrutinise models of private capital mobilisation for energy projects. Chapter 6 will provide key recommendations for Vietnam and outline the next steps.

3. Case Studies and Best Practices Analysis

This section introduces international experiences through four case studies to synthesise lessons for Vietnam, highlighting best practices in mobilising private capital to support energy transition and finance structures for the energy sector. The case studies are carefully selected to offer a diverse range of experiences relevant to Vietnam's multifaceted energy transition journey.

The selection criteria focused on identifying cases that reflect diverse financing challenges, coordination at various levels, and key focus areas that align with Vietnam's energy transition needs. Specifically, the cases represent solutions for projects of different scales, approaches to mobilising both local and international capital, and strategies to address socioeconomic considerations in the transition process.

We began with two project-level case studies that address opposite but common financing challenges: how to fund clean energy projects that are either too small or too large in scale. The Pro Mini-Grids programme in Uganda provides insights into bundling small projects into larger tenders, which reduces risks and transaction costs, making them more attractive to investors. This principle is directly relevant to Vietnam, where many renewable energy projects are small in scale, requiring similar bundling approaches to enhance bankability and draw private investment. Conversely, the Benban Solar Park in the Arab Republic of Egypt, one of the world's largest solar complexes, exemplifies a large-scale initiative, comprising 32 solar plants with a total generation capacity of 1,465 MW. Attracting external financial resources for such large projects is crucial, yet there is often limited appetite from global institutional investors to engage in emerging markets. This project offers valuable lessons on enhancing investor confidence through instruments like insurance mechanisms and liquidity support from the EBRD and MIGA. Notably, these mechanisms contributed to securing an investment-grade rating of BBB+ – six notches above Egypt's sovereign rating – for a climate bond issued to raise funds for six targeted solar plants in Benban Solar Park. For Vietnam, similar financial instruments could play a pivotal role in attracting large-scale investments in renewable energy infrastructure.

Beyond individual projects, energy transition frequently demands coordination at regional and national levels. The third case study explores the Mayor of London's Energy Efficiency Fund, which demonstrates the effectiveness of a city-level fund in advancing net-zero mandates, attracting both local and international capital, and addressing regional decarbonisation needs. This model offers insights for Vietnam on establishing financial mechanisms that can support energy efficiency projects across different regions while drawing in diverse funding sources.

The final case study focuses on early good practices in India's just transition efforts. As the fastest-growing economy in the world, India faces the dual challenge of climate action and socioeconomic development, making the concept of a "just transition" pivotal. Moreover, India, as another Asian country with many socioeconomic similarities to Vietnam, offers particularly relevant lessons on coordinating domestic resources and leveraging international support. Vietnam can draw from India's experience in balancing economic growth with the social implications of transitioning from fossil fuels to renewable energy.

In addition to covering a variety of scales, the selected case studies span key areas such as transmission, utilities, energy efficiency enhancement, and just transition. The selected "best practices" provide relevant lessons that can inform Vietnam's energy transition efforts, ensuring alignment with international standards and the expectations of DFIs and international investors that could support Vietnam's energy transition. Collectively, these examples emphasise that, regardless of a country's economic development stage, mobilising private capital through suitable risk-mitigation strategies, blended finance, and innovative financial instruments is crucial for addressing market failures in the low-carbon sector and achieving climate goals.

3.1 Pro Mini-Grids Programme, Uganda

3.1.1 Background and Objectives

The **Pro Mini-Grids programme**, launched in Uganda in 2017, was a pilot project funded by the Ugandan Government with support from the German Federal Ministry for Cooperation and Economic Development (BMZ) and the European Union OECD, 2022). It was implemented by various national and international agencies, such as The Ministry of Energy and Mineral Development, and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The programme aimed to electrify 40 villages (15 in southern Uganda and 25 in the north) using an integrated procurement model.

The programme helped the government bundle mini-grid projects into larger tenders to attract investors, improve agency capacity for procurement, streamline project development through pre-prepared contracts, and provide partial subsidies for generation assets (GIZ, 2020). This allowed the Government of Uganda to issue two rounds of procurement calls under Build-Own-Operate-Transfer (BOOT) contracts, each with a 10-year concession

period.[3] Winch Energy, an off-grid energy developer and technology designer, successfully won both tenders, first in 2017 and later in 2021.

3.1.2 Strategies for Mobilising Private Capital

An integrated approach has been applied to address key challenges in scaling up mini-grid project development and financing, as shown in Table 3.1. The integrated approach helped reduce risks and transaction costs, making it easier to mobilise investment for mini-grid projects while also ensuring that the projects were aligned with national electrification plans and were financially sustainable for both developers and customers.

Table 3.1 Main strategies to address key challenges to commercial investment (adapted from OECD, 2022)

Challenges	Strategies
Projects' small scale and disaggregated nature	• Bundling projects into two multi-site tenders with single contracts • Enabling larger developers to enter the market • Facilitating equity and debt raising for larger-scale projects • Leveraging economies of scale to reduce project costs
Transaction costs	• Pre-drafted developer contracts and agreements • Determined financing mechanisms (both grant- and results-based) in advance • Eliminated the need for individual site tendering
Development Risks	• Involving the regulator in tender document preparation • Reducing risks associated with licensing, approvals, and unrecoverable planning costs

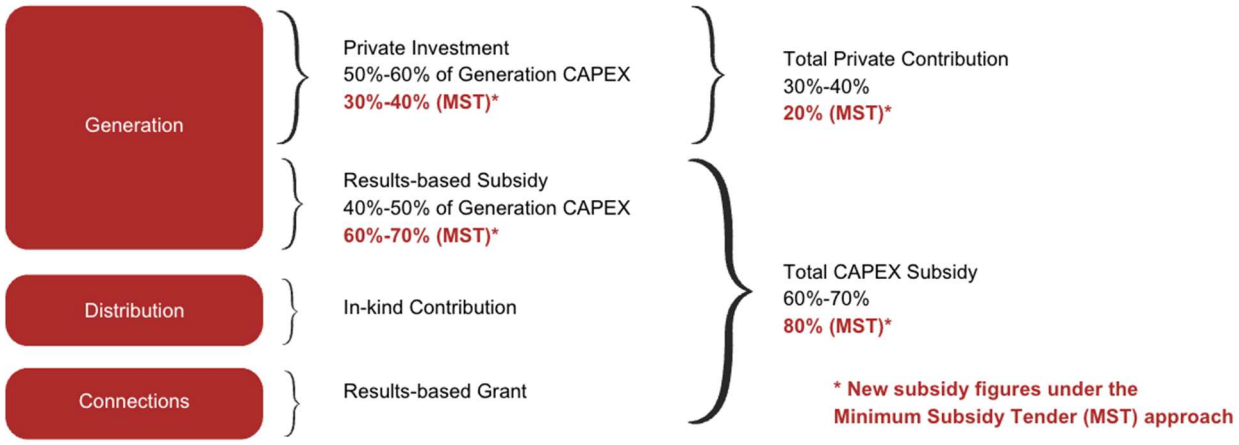
[3] BOOT is a public-private partnership (PPP) model where a private entity finances, builds, and operates a project for a set period before transferring ownership to the public sector. More details on this model and its implications will be discussed in Section 6.

Grid Connection Risks	• Involved the regulator and electrification authority in site selection • Aligned choices with the national grid extension planning
Cost recovery	• Asked developers to calculate necessary capital cost subsidies under a fixed tariff of 0.29 USD/kWh based on customers' ability to pay

The programme focuses on providing subsidies on upfront capital expenditures, determined as a proportion of the total installed capacity, rather than through ongoing government-funded subsidised tariffs. To ensure the effective use of subsidies, the programme implemented a results-based approach for disbursement. Under this model, the mini-grid developer initially funded the customer connections and was reimbursed once the connections were completed and verified to comply with regulatory standards.

Initially, the programme aimed for private investors to cover **50-60% of the capital costs** of generation, which made up about **30-40% of the total project cost** (including distribution and connection costs). However, the developers' proposed tariffs of around **$0.50 per kWh** were considered too high for many customers. To address this, the government set a **lower tariff** of **$0.29 per kWh** to make electricity more affordable. To help developers still recover their costs under this lower tariff, the government increased the **capital cost subsidies**, which reduced the amount of private funding needed. As a result, the final private contribution towards the total project costs dropped to **20%**, shown in Figure 3.1.

Figure 3.1 CAPEX financing structure of the Pro Mini-Grids programme



Source: OECD (2022).

Under this model, Winch Energy was eligible to receive up to 80% of the total upfront capital costs, covering expenses for generation infrastructure, distribution infrastructure, and customer connections. The Electricity Regulatory Authority contributed distribution infrastructure as an in-kind contribution. GIZ provided a subsidy of up to 70% of the capital costs for generation assets, which was released based on specific milestones and results. Key milestones for subsidy release included the assembly and shipping of mini-grid equipment, the construction of mini-grids in villages, and the successful connection of customers to the electricity supply.

To finance the private investment, Winch Energy raised $16 million for a total of 48 projects in both Uganda and Sierra Leone:

- $12 million came from equity contributions by Winch Energy and NEoT Offgrid Africa.
- $4 million was secured through a syndicated facility involving the Dutch entrepreneurial development bank (FMO) and the Renewable Energy Performance Platform (REEP).

Additionally, for the Uganda projects, Winch Energy obtained a $2 million loan from **SunFunder**, a financing company focused on solar energy, to cover immediate expenses until specific milestones were achieved and subsidies were disbursed.

3.1.3 Key Lessons and Best Practices

The project has successfully met one of its key objectives: reducing preparation time for future mini-grid developments. The first tender process required 18 months, as all tender documents, contracts, and agreements had to be created for the first time. In contrast, the second tender process took only six months since the necessary documents and agreements were already in place, highlighting significant progress in streamlining licensing and approvals.

Through this process, government authorities have become more familiar with mini-grid project development and the requirements favoured by international lenders. Similarly, lenders and developers have gained valuable experience with the Ugandan market.

The Pro Mini-Grids programme in Uganda provides valuable insights for Vietnam, where rural electrification remains a challenge, particularly in remote and island communities. Vietnam has made significant progress in expanding its national grid, yet some areas still rely on costly and less reliable diesel-based generation. The success of Uganda's bundled tendering approach, results-based subsidies, and blended financing mechanisms could inform Vietnam's own efforts to attract private sector investment in distributed energy solutions.

Despite its success, Uganda's Pro Mini-Grids Programme also highlights several challenges that Vietnam must carefully address:

- Tariff Affordability versus Cost Recovery:
    - In Uganda, initial private-sector-driven tariff proposals were deemed too high for rural consumers, requiring increased subsidies.
    - Vietnam faces a similar challenge, particularly in balancing cost recovery with the ability of low-income rural households to afford electricity. Ensuring that mini-grid tariffs remain competitive while attracting investors will be a key policy hurdle.
- Regulatory and Licensing Barriers:
    - Uganda's first tender process took 18 months due to regulatory uncertainties and the lack of an established framework.
    - Vietnam must streamline licensing procedures and regulatory approvals to make mini-grid investments faster and more attractive for the private sector.

While these challenges present obstacles, Uganda's experience also provides valuable lessons on overcoming them through strategic planning and innovative policy design. The success of the programme demonstrates that well-structured mini-grid approaches can

effectively tackle rural electrification challenges by integrating financial, regulatory, and technical solutions. Key lessons and best practices include:

- Structuring projects for scale and attractiveness:
    - Grouping multiple mini-grid projects into larger tenders increased their appeal to investors by offering greater scalability and reducing perceived risks.
    - GIZ highlighted that increasing the number of bundled projects to 50–100 would further enhance attractiveness for developers, enable larger developers to benefit from economies of scale, and potentially reduce the need for high upfront capital subsidies.
- Flexible subsidy structure:
    - Subsidies were offered either as upfront capital cost contributions or in-kind support. These were coupled with a results-based disbursement approach to ensure quality service delivery.
    - The subsidy levels were adjusted to balance the need for cost recovery with customers' ability to pay.
- Innovative financing mechanisms:
    - The programme leveraged a blended finance approach, combining equity, debt, and subsidies to create financially viable projects that reduced risks for developers and lenders alike.
    - Partnerships with international development banks and specialised solar financing companies provided necessary capital ensuring the availability of capital to implement and scale the mini-grid projects effectively.
- Effective Co-ordination and governance:
    - The programme was the result of effective coordination between GIZ and various Ugandan government entities.
    - The Electricity Regulatory Authority (ERA) managed the issuance of licenses, approval of tariffs, and enforcement of technical standards. By participating in tender preparations, ERA ensured that projects were licensable and that conditions for future integration with the national grid were clearly regulated.
    - Rural Electrification Program played a critical role in developing Uganda’s electrification master plans, identifying potential mini-grid sites, and hosting

the tendering process. It also managed rural electrification strategies, funds, and policies, ensuring alignment with national objectives.

3.2 Benban Solar Park, Egypt

3.2.1 Background and Objectives

The project focuses on refinancing the debt of six solar power plants located within Benban Solar Park through the issuance of Green Project Bonds. The Benban Solar Park in Egypt is among the largest solar complexes globally, comprising 32 solar plants with a combined generation capacity of 1,465 MW. It plays a vital role in the country's Sustainable Energy Strategy, which aims to produce 20% of the country's electricity from renewable sources by 2022 and with a broader vision extending to 2035. Furthermore, the park serves as a cornerstone of Egypt's Feed-in Tariff (FiT) programme, initiated by the government in September 2016 and achieving financial close in October 2017.

In April 2022, Scatec and its partners refinanced the non-recourse debt for six solar power plants within the park, with a total capacity of 380 MW. These plants, operational since 2019, are projected to generate 930 GWh of electricity annually, which is sufficient to power over 420,000 households while avoiding 423,000 tonnes of CO2 emissions each year. The refinancing was achieved through a 19-year USD 334.5 million non-recourse Green Project Bond, supported by risk mitigation tools provided by the Multilateral Investment Guarantee Agency (MIGA) and the European Bank for Reconstruction and Development (EBRD). This marked not only the first private green project bond issuance in Egypt and the southern and eastern Mediterranean region but also the first climate-certified bond in Egypt's energy sector.

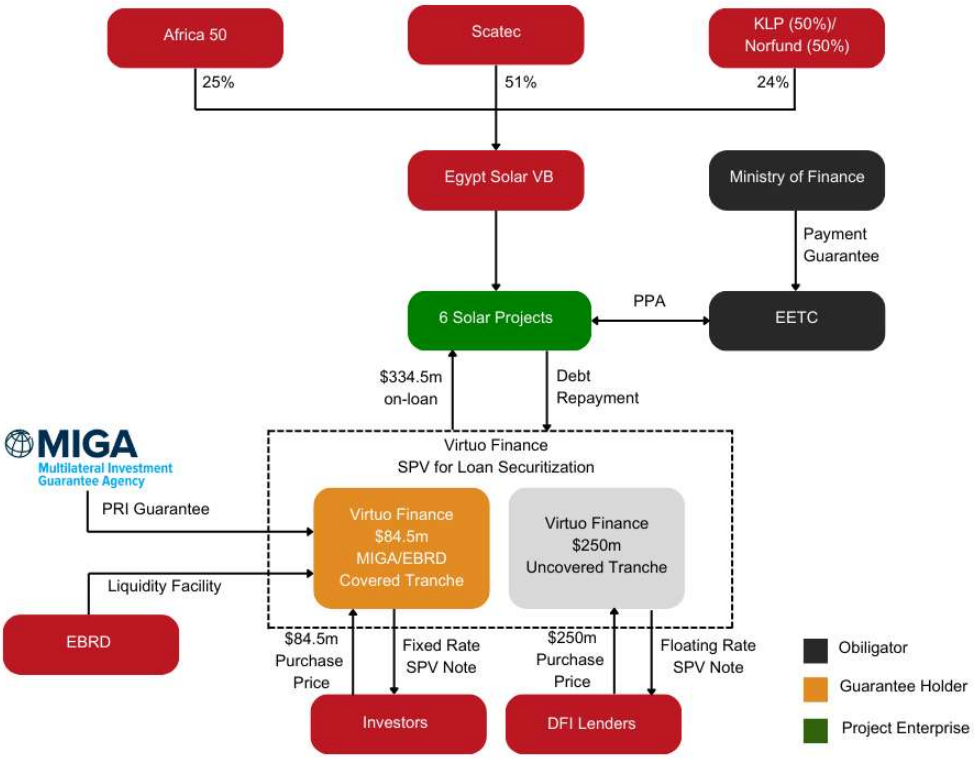
3.2.2 Strategies for Mobilising Private Capital

Global institutional investors have shown limited interest in financing renewable energy projects in emerging markets due to concerns about political instability, credit risks, and insufficient financial safeguards. However, this project identified an opportunity to combine risk mitigation instruments from MIGA and EBRD to achieve the necessary credit enhancement and ratings uplift to attract private capital.

The transaction involved refinancing the outstanding senior debt of six sub-projects through the issuance of a USD 334.5 million bond with two tranches (Figure 3.2):

(i) Tranche A, a fixed-rate note targeting institutional investors, and
(ii) Tranche B, a floating-rate note intended for Development Finance Institution (DFI) lenders, including EBRD, DFC, and FMO.

Figure 3.2 Scatec, MIGA, and EBRD Green Project Bond – project structure



Source: OECD (2022).

MIGA and EBRD collaborated to develop a credit enhancement mechanism to mitigate risks for commercial investors, a critical step in mobilising private capital, especially from institutional investors engaging in Egypt for the first time.

Tranche A benefits from MIGA's political risk insurance and a liquidity support facility provided by EBRD, which mitigates the risk of non-payment by the co-borrowers. These measures significantly enhance the bond's credit profile, attracting a broader range of investors. Conversely, Tranche B does not have the MIGA cover or liquidity support and is therefore expected to attract investors willing to take on higher risk. The proceeds from both tranches are being on-lent by the issuer to the six sub-projects via a secured 20-year loan, aligned with the bond's maturity period.

Previously, the project's debt was financed exclusively by development banks. To attract private commercial financing, a significant credit rating uplift was required. By providing political risk insurance and liquidity support, MIGA and EBRD enabled the bond to achieve an investment-grade rating of BBB+ – six notches above Egypt's sovereign rating – from European credit rating agency Scope. The climate bond will raise capital for the six solar

plants in Benban Solar Park, delivering a transformative financial structure. This ratings upgrade is expected to act as a positive signal to both countries and investors, showcasing a replicable model that can inspire a new wave of private institutional investors to adopt similar structures in other sectors and markets.

3.2.3 Key Lessons and Best Practices

This project exemplifies the collaborative potential between MIGA and EBRD, demonstrating how multilateral and bilateral development finance institutions can partner with client countries to deliver large-scale climate finance. Building on their previous success in the Elazig hospital project in Turkey, MIGA and EBRD applied a similar risk mitigation structure to support the issuance of green bonds in international debt capital markets. This innovative approach highlights the adaptability of their joint initiatives in addressing diverse financing challenges across sectors and geographies.

The bond aims to lower the project's financial costs, enhance its overall financial viability, and generate cost savings to be shared with the Egyptian government. Moreover, the project is underpinned by a 25-year power purchase agreement (PPA) with the government, ensuring a stable and reliable revenue stream. Accordingly, the PPA acts as a critical risk mitigation tool, reinforcing the attractiveness of the green bond issuance by guaranteeing a committed purchase of the generated electricity. This stability not only benefits the project but also encourages further investments in Egypt's renewable energy sector by demonstrating the effectiveness of long-term contractual arrangements in large-scale climate finance. Its success is expected to have positive ripple effects, encouraging the refinancing of other renewable energy projects in Egypt. Additionally, it is likely to inspire a new class of private investors to adopt similar financial structures in different sectors, thereby driving further growth in sustainable development.

To ensure compliance with international green finance standards, the transaction underwent independent verification by DNV, which assessed its eligibility for certification under the Climate Bond Initiative (CBI). The CBI certification, based on Climate Bonds Standard 3.0, emphasises projects that align with the greenhouse gas reduction goals of the Paris Agreement. Specifically, this transaction qualifies under the solar criteria of the CBI, reinforcing its credibility as a sustainable and impactful climate finance initiative.

The use of MIGA's political risk insurance and EBRD's liquidity facility demonstrated how targeted financial instruments can significantly enhance creditworthiness and attract institutional investors. Additionally, aligning the bond structure with international sustainability standards, such as certification by the Climate Bonds Initiative, is critical in meeting investor expectations for transparency and environmental integrity. The collaboration between MIGA, EBRD, and private entities created a financing structure that

balances risks while ensuring long-term project viability. This model can serve as a template for future renewable energy projects in other emerging markets, emphasising the importance of customising solutions to address unique market conditions and investment challenges.

Vietnam is at a key turning point in its renewable energy transition, with ambitious goals to achieve net-zero emissions by 2050. The country has witnessed a rapid expansion of solar and wind power, driven by government incentives and increasing investor interest. However, financing constraints, policy uncertainties, and high borrowing costs remain key barriers to scaling up sustainable energy projects. The Benban Solar Park refinancing model, which combines green bond issuance, long-term PPAs, and multilateral institutional support, provides a viable solution to address these challenges.

One of the key lessons from Benban is the role of multilateral financial institutions such as MIGA and EBRD in enhancing creditworthiness and mitigating investment risks. Their involvement through political risk insurance and liquidity facilities helped attract institutional investors by reducing concerns over regulatory and contractual uncertainties. Vietnam could benefit from similar partnerships with international institutions like the International Finance Corporation (IFC), Asian Development Bank (ADB), and the Green Climate Fund. These institutions could de-risk Vietnam's renewable projects by providing loan guarantees, insurance against policy changes, or funding for early-stage project development. Given Vietnam's history of power purchase agreement disputes, such partnerships could strengthen investor confidence and ensure long-term financial sustainability of renewable projects.

Vietnam has been making steady progress in developing its green bond market, with initial issuances focused on renewable energy and sustainable infrastructure. The Benban model highlights the importance of structuring green bonds to meet international standards, such as the Climate Bonds Initiative (CBI) certification, which enhances investor trust and broadens the pool of potential financiers.

A major factor behind the success of the Benban refinancing model is its 25-year PPA with the Egyptian government, ensuring a stable and predictable revenue stream. This long-term commitment minimized financial risks and made the project attractive to institutional investors. To replicate Benban's success, Vietnam would need to develop long-term PPAs with stronger contractual guarantees, possibly backed by sovereign guarantees or credit enhancement mechanisms.

Despite the relevance of the Benban model, several challenges need to be addressed before similar financial structures can be successfully implemented in Vietnam. Firstly, regulatory uncertainty remains a major concern. Secondly, currency risks and liquidity

constraints pose challenges. While the Benban project benefited from international financing in stable currencies, Vietnam's renewable projects often rely on VND-denominated revenues, exposing investors to exchange rate volatility. Finally, Vietnam's institutional capacity for structuring complex financial instruments like green bonds is still developing. While recent green bond issuances show positive momentum, further efforts are needed to train financial institutions, enhance regulatory oversight, and build investor confidence.

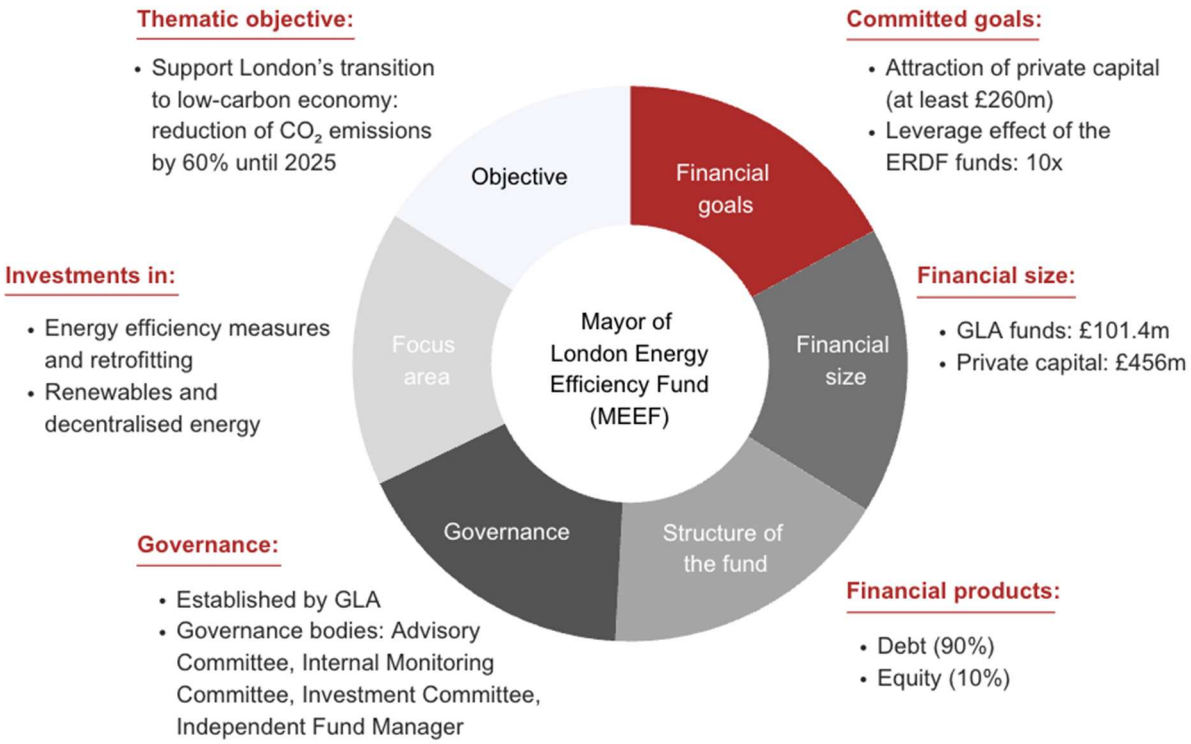
3.3 Mayor of London's Energy Efficiency Fund, UK

3.3.1 Background and Objectives

London has set a goal to achieve net zero carbon emissions by 2050, which was later brought forward to 2030, but the historical funding for its low-carbon infrastructure has been fragmented and insufficient to meet the scale needed for a rapid transition to a fossil fuel-free city (Gordon, 2023).

The Mayor of London's Energy Efficiency Fund (MEEF) (Figure 3.3) is designed to tackle these challenges. It aims to overcome market failures in London's low-carbon sector by offering flexible and competitive financing that helps to enable, accelerate, or improve the viability of low-carbon projects throughout the city.

Figure 3.3 Overview of the Mayor of London Energy Efficiency Fund

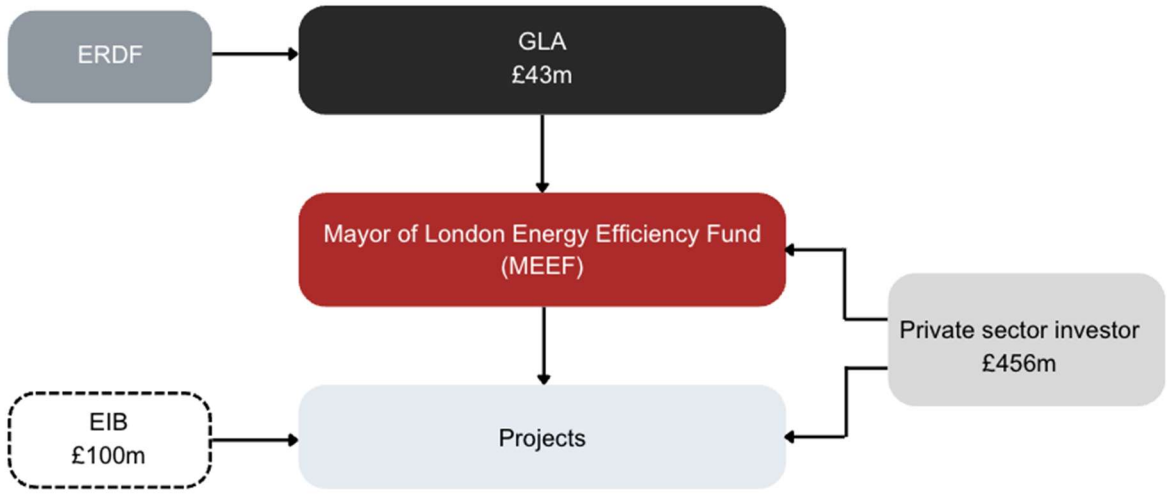


Source: Gordon (2023).

3.3.2 Strategies for Mobilising Private Capital

The Greater London Authority (GLA) established the Mayor of London Energy Efficiency Fund (MEEF) in 2018, building on the reputation and experience of its predecessor, the London Energy Efficiency Fund (LEEF), part of the London Green Fund (LGF). The GLA contributed £43 million from the European Regional Development Fund (ERDF) to the fund, with Amber Infrastructure Group (Amber) appointed as the independent Fund Manager. Amber successfully secured an additional £456 million from private investors and £100 million from the European Investment Bank (EIB), achieving leverage of 11 times the initial ERDF contribution. This model maximises the impact of public financing by attracting private capital.

Figure 3.4 Set-up of MEEF

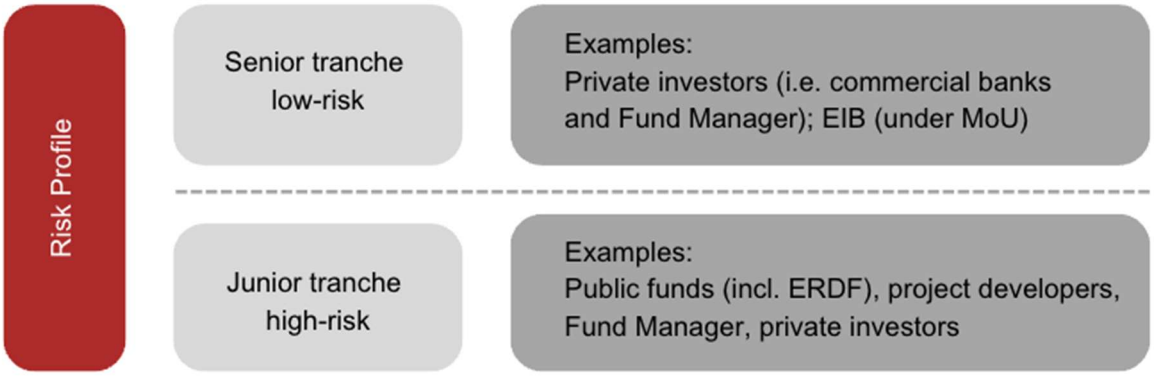


Source: EIB (2018).

MEEF operates as a separate legal entity under a Limited Partnership structure, commonly used for investment funds in the UK. The GLA serves as both an intermediate body for ERDF resources and a Limited Partner providing junior capital.

To address diverse project needs, MEEF involves investors with varying risk profiles (Figure 3.5) and investment horizons. Public funds assume higher risks to attract private investors with lower risk appetites, enabling financing for projects with long-term or high-risk profiles. Junior capital is initially provided by project promoters, with potential support from the GLA or other public authorities. Public resources bridge funding gaps, unlocking private sector and EIB capital.

Figure 3.5 Stratification of investors for the MEEF



Source: EIB (2018).

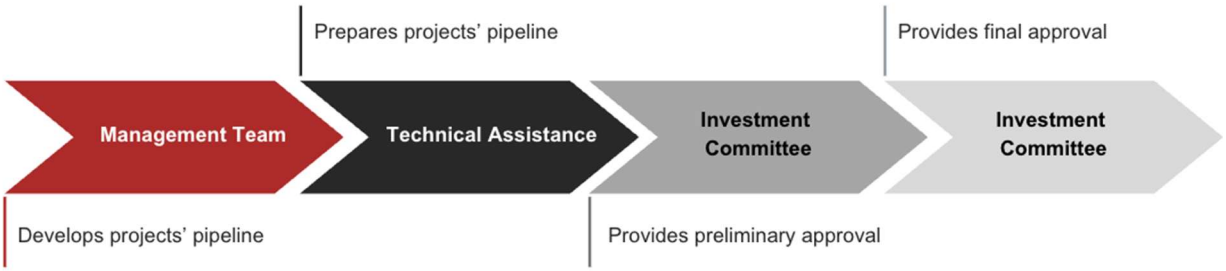
Notably, the structure of MEEF does not require private investors or the European Investment Bank (EIB) to contribute to every project. Instead, Amber Infrastructure Group, the independent Fund Manager, appraises potential projects and invites specific private sector investors to participate alongside public funds. Based on the appraisal and their understanding of the project, private investors decide their level of involvement.

Approved projects receive investment through a single agreement between MEEF and the project, with investor rights managed via inter-creditor agreements. This streamlined structure secures initial commitments from co-investors while maintaining flexibility, enabling efficient project appraisal, investment terms, and monitoring. Ultimately, this innovative model provides a robust, sustainable framework for leveraging public funds and mobilising private capital effectively.

MEEF is designed to financially support at least 30 projects, offering both equity and debt funding. Individual investments are expected to range from £1 million to £10 million, with loan tenors extending up to 20 years.

The process chart below shows the roles of different bodies in developing and preparing the project pipeline for capital investment:

Figure 3.6 Stratification of investors for the MEEF



Source: EIB (2018).

- **Fund Manager (Amber)**: Sources projects, ensures they are investment-ready, and aligns them with MEEF's strategic objectives.
- **Internal Monitoring Committee (IMC)**: Identifies potential projects, supports business case development, and connects projects to GLA's TA programmes, such as RE:FIT (energy efficiency retrofits), RE:NEW (home energy retrofits), and DEEP (decentralised energy projects). The IMC also monitors fund performance and advises on portfolio evolution.
- **Investment Committee**: Makes final investment decisions, ensuring selected projects align with the fund's goals and are fully prepared for capital investment.

MEEF has funded projects in small and medium-sized enterprises (SMEs), NHS, and Local Authority projects across London, including innovative ventures such as electric vehicle charging infrastructure with energy storage, district heat network retrofits using water source heat pumps, and energy performance contracts with guaranteed savings for the NHS. In 2020, MEEF's investment policy was expanded to include zero-emission mobility to support the Mayor's air quality goals.

From its inception in July 2018 to January 2025, MEEF has mobilised over £420 million in capital and reduced London's CO2 emissions by more than 32,100 tonnes, equivalent to removing 29,150 cars from the road. This innovative blending of public and private financing demonstrates how targeted investments can bridge funding gaps, reduce carbon emissions, and scale sustainable urban development effectively.

3.3.3 Key Lessons and Best Practices

As demonstrated in this case study, the GLA has experience utilising blended finance through the London Energy Efficiency Fund and the Mayor's Energy Efficiency Fund (MEEF). These programs have shown that regional funds are highly effective in attracting

additional local capital and addressing regional decarbonisation needs and priorities. Key good practices from MEEF, as outlined by EIB (2018), include:

- **Capability and Capacity Building**
    - **Strong Internal Expertise**: The Greater London Authority (GLA) established a capable internal team to oversee fund management, facilitate projects, and manage governance structures such as the internal Monitoring Committee.
    - **Technical Assistance (TA)**: A significant portion of returns from the London Green Fund is reinvested into TA, enabling projects to become finance-ready. This has been pivotal in ensuring the success of financial instruments.
    - **Pipeline Development**: Developing robust internal capabilities has streamlined the creation of a project pipeline and the implementation of new financial instruments.
- **Fund Set-Up and Governance**
    - **Independent Fund Manager**: To attract private investors, MEEF appointed an independent Fund Manager, ensuring unbiased investment decisions and trust from the private sector.
    - **Role of the City**: The GLA played a critical role in designing and implementing the fund's investment strategy, managing contracts, and monitoring performance. The governance structure involved multiple committees (Investment, Advisory, and Monitoring Committees) to optimise fund performance.
- **Leveraging Public Money**
    - **Risk Mitigation for Private Sector**: Public funds were deployed strategically to de-risk projects, thereby unlocking private sector investments for high-risk opportunities.
    - **Revolving Instruments**: Public capital was used through revolving mechanisms, allowing for reinvestment of returns into future projects. This approach significantly increased private sector commitments, with private finance accounting for over 90% of MEEF's total size.

Vietnam has several national funds, but their impact on renewable energy (RE) and energy efficiency (EE) remains limited. The Vietnam Environmental Protection Fund (VEPF), despite its mandate, has faced operational inefficiencies and loopholes, while the

Investment Support Fund (Decree 182/2024/ND-CP) is still in its early stages, with no clear impact assessment. Key challenges include:

- **Lack of a clear governance framework** for fund operations, investment criteria, and accountability mechanisms.
- **Limited financial diversification,** with heavy reliance on government contributions and minimal private sector participation.
- **Insufficient linkage to RE and EE,** as existing funds primarily support environmental protection and broader sustainability efforts rather than targeted clean energy investments.

To address these gaps, Vietnam can consider developing a dedicated clean energy fund at the national level while enabling key urban centres to establish specialised financing mechanisms tailored to local needs. Drawing lessons from the Mayor's Energy Efficiency Fund (MEEF), Vietnam can implement:

- A well-structured national clean energy fund with independent fund management, clear investment priorities, and mechanisms to attract private capital.
- Urban-level energy transition funds in major cities like Hanoi and Ho Chi Minh City, where demand for RE and EE investment is highest, allowing for locally driven project pipelines and governance.
- Diversified funding sources, including concessional loans, carbon markets, and institutional investors, to reduce reliance on public budgets.
- Strategic public finance deployment through guarantees, concessional loans, and revolving instruments to mitigate risks and crowd in private investment.
- Prioritisation of high-impact projects such as solar adoption, grid modernization, and energy-efficient building retrofits, with technical assistance to ensure bankability.

3.4 Just Transition Finance, India

3.4.1 Background and Objectives

India, as one of the fastest-growing economies in the world, is at the crossroads of climate action and socioeconomic development. The nation has committed to achieving net-zero emissions by 2070, a timeline that aligns with its developmental priorities while addressing global climate imperatives. However, the scale of this transformation is unparalleled. It requires the mobilisation of over $10 trillion in investments, with an estimated gap of $3.5

trillion that must be filled through private and international financing according to India's Council on Energy, Environment and Water (CEEW, 2011). The transition must not only be environmentally sustainable but also socially inclusive to ensure that workers, communities, and industries dependent on carbon-intensive sectors are not left behind.

The concept of a "just transition" is central to this effort. This approach, rooted in the principles of equity and climate justice, seeks to ensure that the transition also creates decent work opportunities, and employment and leaves no one behind. India's unique challenges include its reliance on coal for energy, the vulnerability of its rural and informal workforce, and the need to uplift underrepresented groups such as women and marginalised communities.

India's Long-Term Low-Carbon Development Strategy (UNFCCC, 2022) highlighted the critical need to both attract international financial resources and enhance domestic funding. This approach aims to ensure that the pursuit of net-zero emissions aligns with India's core priorities, including poverty reduction, job creation, income growth, and achieving greater economic prosperity. With India poised to become the world's most populous nation, the scale and urgency of its green transition offer unprecedented opportunities. For instance, solar and wind energy employed 164,000 workers in fiscal year 2022 and is expected to grow exponentially, potentially generating over 1 million jobs by 2030. In addition, investments in sectors such as electric vehicles, low-cost housing, sustainable agriculture, and circular economies hold immense potential for job creation and poverty alleviation.

The Just Transition Finance Roadmap for India (JTFR) (Modak, 2023), a collaborative initiative by the Environment Management Centre Pvt Ltd (EMC), the Grantham Research Institute on Climate Change and the Environment at the London School of Economics (LSE), and British International Investment (BII), serves as a strategic framework to achieve these goals. Created in consultation with a diverse range of stakeholders, including financial institutions, policymakers, and civil society, the roadmap outlines pathways to mobilise private capital while addressing the social aspects of the transition. Its primary objectives include:

- **Closing the Investment Gap:** Mobilising $3.5 trillion in additional investments by leveraging private and international capital to complement domestic resources.
- **Mitigating Social Risks:** Protecting workers and communities from the adverse impacts of phasing out fossil fuels, such as job losses and regional economic stagnation.

- **Seizing Opportunities:** Creating green jobs with decent working conditions, promoting gender equality, and addressing energy poverty through targeted investments.
- **Encouraging Financial Innovation:** Developing new financial instruments like just transition bonds and sustainable debt to attract investment to vulnerable sectors and regions.
- **Strengthening Governance:** Ensuring participatory and inclusive decision-making processes that empower underrepresented groups, including women and informal workers, in the transition.

India's just transition agenda also aligns with global frameworks like the Paris Agreement and the G20's focus on "orderly, just, and affordable" transitions. The country's proactive steps—such as the establishment of a Skills Council for Green Jobs and the issuance of sovereign green bonds—demonstrate its commitment to integrating social and environmental priorities into its net-zero journey.

3.4.2 Strategies for Mobilising Private Capital

Mobilising private capital to fund a just transition in India requires targeted strategies that address policy gaps, engage stakeholders, foster innovation, leverage partnerships, and empower local enterprises. These efforts ensure that investments align with India's development priorities, creating opportunities for green growth while safeguarding vulnerable communities. Early successes highlight the roadmap's potential for scaling these initiatives.

a. Embedding Just Transition into Policies and Regulations

Investors are increasingly seeking to invest in countries with credible net-zero plans. The integration of just transition factors into sustainable finance policies is becoming increasingly important in attracting long-term foreign capital (PRI, 2022). India is incorporating the concept of a "just transition" into its sustainable finance policies through several key measures:

- The Indian Task Force on Sustainable Finance is developing a tailored taxonomy of sustainable activities, which includes both environmental and social considerations from the outset. This approach aims to direct financial flows toward supporting the just transition, ensuring that both public and private sector investments contribute to sustainable development.

- The Task Force is based in the Ministry of Finance and collaborates with various entities such as Securities Exchange Board of India (SEBI), the Reserve Bank of India (RBI), the Ministry of Environment Forest and Climate Change, and the International Financial Services Centre. Once finalised, the framework will help direct funds toward infrastructure projects based on these sustainable criteria. It will also establish clear guidelines for companies and investors, promoting transparency and enabling informed decision-making.
- In 2021, SEBI introduced the Business Responsibility and Sustainability Reporting (BRSR) framework, which includes more measurable social factors like labor rights, employee well-being, human rights, and community impacts, aligning with the goals of a just transition. This framework allows investors to assess company performance on these issues and fosters corporate accountability. SEBI can enforce compliance, encouraging better alignment with just transition goals in the financial market.
- RBI is also addressing climate risks, including the social impacts of transition, such as employment and income distribution. This focus could lead to the use of broader financial tools to support a more inclusive transition.
- Finally, India's upcoming sovereign green bond is expected to set a market precedent by funding not only green projects but also social co-benefits, reinforcing the importance of a just transition in the country's financial landscape.

Box 3.1 India's Sovereign Green Bond

In January 2023, India issued its first sovereign green bond, raising $1 billion at a lower cost of capital for the government. The ten-year bond was priced with a coupon of 7.29%, which was 0.06% lower than comparable conventional sovereign debt.

International experience suggests that sovereign green bonds can stimulate wider action within a country's capital markets. The framework established for India's green bond aims to do this by defining green finance priorities aligned with relevant Sustainable Development Goals (SDGs). It also outlines how projects will be assessed for their environmental and social impact, ensuring that all projects meet minimum social safeguards.

Additionally, the Indian government has pledged to provide transparent reporting to investors, including data on carbon intensity reductions, environmental benefits, and, where possible, social co-benefits. These may include the number of households benefiting from renewable energy or the number of jobs created.

For clean transportation projects, potential social co-benefits could include job creation, support for micro, small, and medium-sized enterprises (MSMEs), and improved access to mobility. Highlighting these social benefits signals the importance of a just transition in green sectors.

Furthermore, the proceeds from the sovereign green bond could be used to develop infrastructure in regions vulnerable to the transition, which may stimulate economic activity in new sectors. As the market for green, social, and sustainable bonds expands, the development of dedicated "just transition bonds" may emerge at both the sovereign and corporate levels.

Source: Modak (2023).

b. Incorporating Just Transition in Corporate India's Net Zero Plans and Mobilising CSR Funds

The corporate sector globally is increasingly incorporating the just transition into its net zero plans. The Council for Inclusive Capitalism, with major companies like BP, Reliance, and others, has developed a just energy framework focusing on four key areas: universal net zero energy access, evolving the energy workforce, community resilience, and collaboration and transparency. Reliance has committed to universal net zero energy access through its New Energy initiative at Jamnagar and workforce evolution through job creation to achieve its carbon-neutral goal by 2035.

As the importance of the just transition grows, efforts are focusing on setting clear expectations and measuring corporate performance. The World Benchmarking Alliance (WBA) has assessed how companies are progressing on the just transition alongside net zero, covering issues like human rights, job creation, retraining, and social protection. The WBA assessed 100 oil and gas companies, 50 utilities, and 30 automotive manufacturers, including eight Indian companies. While most companies globally have not yet demonstrated significant action on the just transition, Indian companies like Bharat Petroleum, IOC, and GAIL have established policies on stakeholder engagement, employee reskilling, and green job access.

As India's corporates progress towards net zero, integrating the just transition into core business operations will become increasingly important. One way to scale up finance for this transition is by leveraging Corporate Social Responsibility (CSR) funds, which are currently allocated to health, education, and skilling initiatives.

Many companies are already supporting skilling programs through CSR, and impact funds are backing social enterprises that create local jobs. Additionally, innovative schemes from commercial banks are offering informal lending to ease borrowing restrictions for vulnerable groups, including women. CSR spending is concentrated in states like Maharashtra, Rajasthan, and Gujarat, with a focus on poverty alleviation, healthcare, education, and skills.

Scaling up CSR finance, particularly in regions vulnerable to the transition, can help meet the needs of affected communities. Notably, fossil fuel-dependent companies like NTPC, Power Grid Corporation, Coal India, IOCL, and ONGC are among the top CSR spenders and could lead efforts to link philanthropic funding to non-commercial needs related to poverty alleviation, education, and skills development tied to achieving net zero.

c. Scaling up investor action through business investment and capital allocation

Investor engagement is a vital mechanism for driving corporate action on the just transition. The Climate Action 100+ (CA100+) coalition, comprising over 700 investors managing $68 trillion in assets, coordinates efforts to engage 166 companies responsible for the majority of industrial GHG emissions. Six Indian companies—Coal India, NTPC, ONGC, Reliance Industries, Ultratech Cement, and Vedanta—are part of this initiative. In 2022, CA100+ launched a Net-Zero Company Benchmark, assessing companies on their commitments, stakeholder engagement, and actions regarding the just transition. While some Indian companies, such as Bharat Petroleum, IOC, and GAIL, have made progress, none have fully developed strategies.

For effective engagement, investors need clear expectations, performance assessments, and the ability to leverage their influence to drive improvements. The LSE's Grantham

Research Institute has created a set of seven just transition expectations, blending governance, transparency, and a focus on stakeholders, including workers, communities, and supply chains. These frameworks help guide investment decisions, shareholder engagement, and capital allocation, encouraging the integration of just transition principles across portfolios.

Incorporating the just transition into capital allocation is critical for scaling impact. Investment due diligence should consider the social implications of climate action, ensuring that financial flows are directed toward sectors and regions that require support the most. Sustainable infrastructure investments, for example, not only need to apply social safeguards but can also foster more and better-quality jobs, gender equality, and community benefits—key aspects of the just transition. In India, there is a significant opportunity to leverage infrastructure investments to drive just transition outcomes.

Additionally, the issuance of just transition bonds presents a growing opportunity. India already has a successful green and social bond market, and incorporating just transition objectives into future bond issuances could support the transition to net zero while ensuring the social dimensions are addressed. As this trend gains momentum, just transition bonds will become increasingly important for both corporate issuers and investors.

By integrating just transition principles into both investor engagement and capital allocation decisions, India can better align financial flows with sustainable and equitable development goals. As mainstream financial institutions and markets prioritise the just transition, it will be essential to support financial innovations like transition bonds and sustainable infrastructure investments to ensure a comprehensive and inclusive approach.

d. Promoting sustainable financial innovation for the just transition

Financial innovation is critical to scaling investments in regions and sectors most affected by the transition. Instruments like just transition bonds can direct funds toward coal-dependent areas to support job creation and community development. Building on the success of the $7.5 billion green, social, and sustainability (GSS) bond market in 2021, India is now exploring these bonds as a means to balance environmental and social priorities.

Additionally, the Skill Impact Bond, launched by the National Skills Development Corporation (NSDC), raised $14.4 million to train 50,000 workers for green jobs. This demonstrates the potential of impact bonds to align private returns with social outcomes. Innovative pilots, such as place-based investments in coal-dependent regions, further exemplify how financial tools can deliver localised solutions while addressing national climate goals.

e. Attracting foreign investment through the International Financial Services Centre

India has set up an International Financial Services Centre at Gujarat International Finance Tec-City (GIFT), regulated by the International Financial Services Authority (IFSCA). This centre plays a crucial role in attracting the private capital needed to close the net-zero investment gap, while also incorporating just transition priorities. With fiscal incentives, such as tax exemptions and regulatory benefits, GIFT has seen a significant uptick in green financing activity. For example, in 2021, State Bank of India (SBI) listed $650 million worth of green bonds simultaneously on India International Exchange (India INX) and the Luxembourg Stock Exchange. This marked a milestone for India's green bond market and paved the way for smaller issuances of impact, sustainability-linked, and just transition bonds.

In addition to green bonds, the IFSCA has actively promoted sustainable finance, identifying transition bonds as essential for accelerating decarbonisation. The authority has proposed specific guidelines for these bonds and has invited public comments on a framework for sustainability-linked lending by financial institutions. The IFSCA has also formed a committee to assess disclosure standards, product innovations, and the regulation of sustainable finance. The centre’s initiatives have not only attracted interest from global investors but also fostered innovation in just transition finance. With a platform in place for these advancements, India is positioning itself as a leader in the just transition financing space, especially as the market for sustainable finance continues to expand.

d. Leveraging global and domestic partnerships

MDBs and DFIs have been instrumental in driving financial sector initiatives to support a just transition to net zero, primarily due to their dual role as policy-driven entities. They offer advisory services to policymakers and provide access to capital for both the public and private sectors. These institutions are central to shaping and implementing international public finance, particularly by leveraging private capital at scale and pioneering new financial structures and industry taxonomies.

For India, the challenge lies in tapping into the expertise and financial capacity of MDBs and DFIs to advance its domestic just transition goals. Additionally, India must focus on fostering collaboration between MDBs, DFIs, and private finance to co-invest in scaling just transition solutions. Many of India’s prominent MDB and DFI partners not only have clear just transition policies but are also turning these into tangible financial flows. While MDBs can take a strategic role in policy and economic planning, DFIs are well-positioned to mobilise finance for private businesses pursuing just transition goals.

Key areas for MDBs and DFIs to support just transition finance in India include:

- Incorporating Just Transition into Safeguarding Processes

- Supporting Long-Term Regional and Sectoral Development
- Mobilising Private Sector Investment for Just Transition
- Providing Anchor Investments
- Using development policy finance for the just transition

DFIs can significantly influence the wider adoption of just transition principles by pushing for their incorporation into the Environmental and Social Management Systems (ESMS) of financial intermediaries. Often, ESMS are focused mainly on compliance and risk mitigation, rather than recognising the opportunities to support the net-zero transition. By shifting this focus, DFIs can also inspire capital market innovations, such as bond issuances that promote the just transition.

In addition, MDBs and DFIs are in a prime position to develop blended finance solutions tailored to the just transition. These solutions can attract private investment through a combination of grants, technical assistance, concessional financing, and credit guarantees. Given the fear of credit risks that banks and private investors may have regarding direct involvement in the just transition, DFIs can help by bolstering microfinance institutions, particularly in volatile sectors, to encourage private sector participation.

International cooperation on the just transition was highlighted at COP27, where governments agreed on a new work programme under the UN Framework Convention on Climate Change. This initiative underscored the importance of social dialogue and the need to empower all stakeholders to engage in climate action. Looking ahead to 2023, there is a significant opportunity to deepen international collaboration, especially within the UNFCCC and the G20, to explore how to mobilise climate finance in ways that contribute to achieving broader sustainable development goals.

Box 3.2 The ADB's approach to financing the just transition

In 2021, the ADB updated its energy policy, prioritising affordable, reliable, sustainable, and modern energy for all, aiming to eliminate extreme poverty and reduce social inequalities. The ADB recognises that planning for a just transition is crucial, focusing on minimising negative socioeconomic impacts, supporting affected workers and communities, and promoting inclusive and resilient livelihoods. While its initial work on just transition has centred on the energy sector, the ADB emphasises that this challenge spans the entire economy.

To facilitate rapid, inclusive decarbonisation, the ADB is exploring the Energy Transition Mechanism (ETM), designed to replace coal-fired power plants and unlock investments in

renewable energy. ETM operates through two funds: one for carbon reduction, which buys coal plants, and another to invest in clean energy expansion. The ADB collaborates with Developing Member Countries (DMCs) to ensure ETM is scalable and adaptable.

At COP27, the ADB launched the Just Transition Support Platform, aimed at providing technical assistance to help DMCs plan, implement, and finance just transition strategies. This platform is designed to manage negative impacts, maximise social and economic benefits, and support equitable climate action to achieve net zero in Asia and the Pacific.

Source: ADB (2021a, 2021b, 2022)

e. Empowering Entrepreneurs and MSMEs

Micro, Small, and Medium Enterprises (MSMEs) and startups are critical for generating green jobs and fostering local innovation. MSMEs account for 45% of India's employment, with 50% located in rural areas. Transition strategies must include targeted financial support to help these enterprises adapt to and benefit from green growth.

Initiatives like Startup India, which supported over 41,000 startups and created 470,000 jobs between 2016 and 2020, demonstrate the potential for entrepreneurship to drive climate innovation. Expanding seed-stage funding for startups working in renewable energy, circular economies, and sustainable agriculture will ensure that local enterprises are not left behind. Impact investors are already channelling funds into social enterprises addressing issues like energy access and sustainable livelihoods, showcasing how inclusive financing models can drive widespread economic benefits.

3.4.3 Key Lessons and Best Practices

The above section discusses how private investment can be mobilised for just transition financing in India. It also underscores the importance of taking additional actions beyond private investment to ensure the transition not only leaves no one behind but also fosters key development objectives such as poverty eradication, job creation, income growth, and overall prosperity. At this early stage of India's just transition agenda, it highlights initial practices and crucial steps to move forward. Drawing on feedback from policy, finance, investment, and NGO stakeholders, Modak (2023) presents ten recommendations for mobilising private investment in India's just transition, with a specific emphasis on green jobs and skills development. These recommendations are also highly relevant for Vietnam, given the similarities in both countries' challenges and opportunities in transitioning to a sustainable, net-zero economy.

- Strategy: Incorporate just transition principles into sustainable finance policy to provide the incentives and regulatory signals for private investors, including an operational definition of the just transition.
- Business: Stimulate India's corporate sector to establish a just transition task force to include key social factors in their net zero plans, actions, and disclosures.
- CSR: Integrate just transition priorities into CSR spending programs by businesses.
- Investors: Investors, banks, and capital markets should factor in just transition principles in their net zero plans, business engagement, and capital allocation.
- Innovation: Encourage just transition financial innovation and pilot place-based investments in coal-dependent regions.
- Foreign investment: Utilise the International Financial Services Centre at GIFT to attract foreign just transition investment.
- MSMEs: Develop a dedicated just transition strategy to enhance access to finance for India's MSMEs.
- International public finance: Deploy capital and expertise from MDBs and DFIs to support the just transition as part of achieving India's long-term climate goals, with a particular focus on supporting green jobs and skills development.
- Blended finance: Leverage MDBs and DFIs to introduce blended finance solutions to crowd in private capital for the just transition.
- International cooperation: Cooperate with international partners to scale up climate finance for the just transition in India, as well as within the G20 and UN.

Vietnam and India share several key similarities as lower-middle-income economies navigating the complex balance between economic growth, energy security, and decarbonization. Both countries have historically relied on coal for power generation—accounting for nearly 50% of Vietnam's electricity mix and over 70% in India—making the transition to cleaner energy both urgent and challenging. Additionally, both nations have large, labour-intensive economies where energy transition policies must account for social impacts, job displacement, and economic restructuring, particularly in coal-dependent regions.

Vietnam can draw valuable lessons from the Just Finance India initiative to support its energy transition while ensuring social equity. First, strategically deploying public funds to de-risk high-impact projects can attract private capital to sectors like renewable energy and

energy efficiency. Developing a clear policy framework, such as a green taxonomy, ensures investments align with national sustainability goals. Targeted technical assistance and capacity-building programs can enable workers, small businesses, and communities to adapt to and benefit from the transition. Vietnam should also prioritise place-based investments, focusing on coal-dependent regions and vulnerable communities, to minimise social and economic disruptions. Collaborating with international development finance institutions and leveraging innovative financial instruments, such as green and just transition bonds, can provide critical resources for scaling sustainable projects. These approaches will help Vietnam achieve its net-zero ambitions while fostering inclusive economic growth.

4 Strategies and Mechanisms Used

4.1 The Clean Energy Policy and Investment Ecosystem

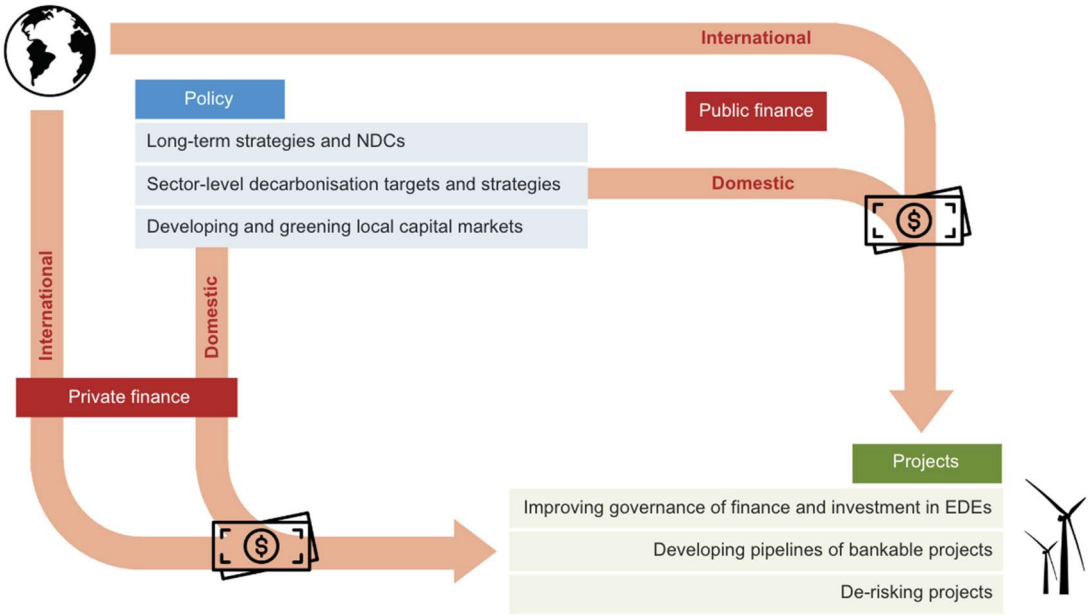
The clean energy transition is complex, requiring integrated strategies across sectors such as electricity generation, industrial development, transport, and social infrastructure. Effective coordination between public and private stakeholders, with strong government oversight, is essential for aligning policies, optimizing investments, and maximizing synergies across sectors. Comprehensive financing strategies are vital, optimising the use of public finance to align with policy priorities and infrastructure investments.

According to OECD (2022), key elements for successful external coordination represented in Figure 4.1 include:

- developing clear decarbonisation strategies with measurable targets;
- leveraging donor expertise to standardise project documentation;
- collaborating with financial institutions to identify funding sources;
- addressing market barriers with private sector input;
- and building local capital markets with international support.

Robust governance is crucial for managing relationships, resolving challenges, and monitoring progress. Effective coordination ensures that public finance, including blended finance, is strategically deployed where it will have the most significant development impact, supporting the creation of sustainable, bankable projects and strengthening local investment ecosystems.

Figure 4.1 The clean energy policy and investment ecosystem



Source: OECD (2022).

Public sector support is essential in reducing constraints and catalysing private-sector climate financing. The public sector can use regulations, taxations, guarantees, subsidies, and disclosure requirements to align incentives with climate objectives, encouraging collective action from other stakeholders (IMF, 2022). These instruments help reduce risk perceptions, lower financing costs, and mobilise private investment while minimising the capital burden on public finance institutions. Box 4.1 outlines five key areas that could be addressed by the public sector to lower risks and stimulate renewable energy investment (WEF, 2021).

Box 4.1 Five important practices for renewable energy investment.

1. Regulated, transparent power agreements: Broadly, policies must establish transparency and predictability, which provides confidence for investors in the ability to recover investments in power generation. Examples of such policy include allowing independent power producers (IPPs); having bankable, standardised power purchase agreement (PPA) templates; holding transparent auctions; and having transparent and fair rate adjustments and public participation. One example is a recent transmission line auction in Brazil, which failed to attract investors when it was first launched in 2016. Revised terms, which included higher maximum tariffs and a transparent tariff revision

formula that was based on inflation and long-term interest rates, encouraged BTG Pactual and other investors to participate.

2. Specific clean energy/ climate incentives: Having an integrated, multi-year energy strategy with short-term targets for retiring fossil fuel plants, if applicable, and building renewable energy helps lay the foundation for conducive policies. Establishing a carbon market or other carbon-pricing mechanism, as well as governance/legislation around carbon removal, is also of value. Chile offers an example: it passed a binding decommissioning schedule for coal-fired power plants; engaged with private power plant owners to develop coal phase-out schedules; and implemented a tax on carbon for larger coal-fired power plants.

3. General business-friendly measures: There exist several general (that is, not necessarily specific to energy) policies that can facilitate renewable energy investment. These include tax policy (such as not withholding taxes on profits, and no VAT on clean power sales), allowing foreign direct investment (FDI), improved permitting processes, and foreign currency/ability to repatriate profits.

4. Innovative financing mechanisms: Financing mechanisms of different types can be useful in mitigating risk, offering additional return potential, or creating more investment opportunities. Masala bonds, which are Indian Rupee-denominated bonds issued in foreign countries for investment in India, offer an example of risk mitigation (in this case providing a currency hedge). Separately, the cost of financing, and therefore a project's financial return, can be conditioned on achieving decarbonisation targets. For example, the European Bank for Reconstruction and Development's €56 million bond investment in a €233 million offering by Tauron Polska Energia includes lower financing costs if Tauron meets its 2030 decarbonisation objectives.

Other financial innovations being considered seek to create more renewable energy investment opportunity. Examples include:

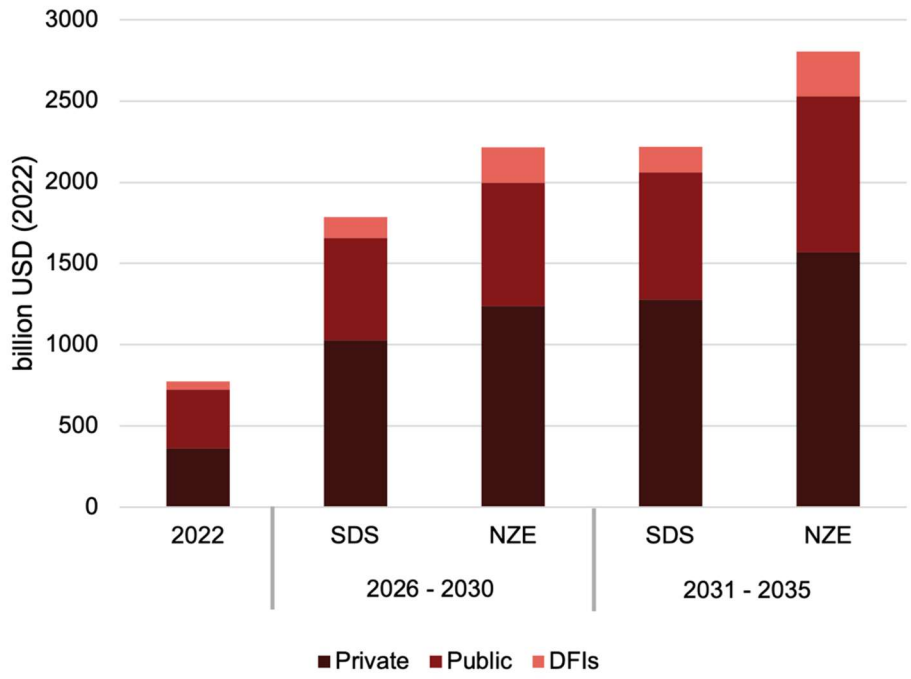
- Synthetic corporate power purchase agreements (CPPAs): can offer a hedge against a corporate buyer's fluctuations in power cost while providing demand for renewable energy
- An energy transition mechanism (ETM): which gives investors the opportunity to buy high carbon-emitting assets, retire them and replace them with renewable energy (financial returns in an ETM investment come from operating the high carbon and renewable-energy assets supplemented by, for example, carbon credits for accelerated retirement).

5. Early risk assumption: Several successful projects have included an early sponsor who was willing to assume various risks. Once certain risks in the project had been ameliorated, the sponsor was able to attract additional, or less expensive, capital. BTG Pactual in the aforementioned transmission project in Brazil was one such example. The company assumed full equity risk initially but was able to find debt financing once construction was completed. This role can also be fulfilled, or at least supplemented by, international development organisations. For example, InfraCo Asia's early-stage equity in a smart solar network in the Philippines supported the initial 4,000 homes of a 200,000 home pre-paid mobile-based metering clean energy project and only later found another investor.

Source: WEF (2021).

On the other hand, the private sector and households play vital roles in scaling up clean energy deployment and the majority of financing needs to come from the private sector. Currently, less than half of clean energy investment in EMDCs is financed privately, but this share needs to rise. To meet climate and sustainable development goals, private sector financing must contribute at least 60% of clean energy investments in EMDCs by 2035. This requires a significant increase in private investment, with private financing expected to triple while public financing roughly doubles over the next decade, as shown in Figure 4.2.

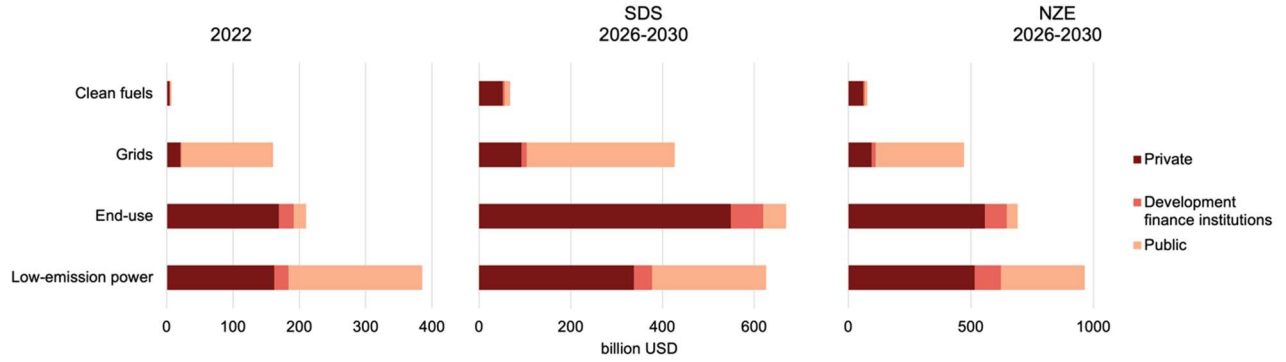
Figure 4.2 Estimated sources of finance for clean energy investment in EMDCs in the NZE Scenario and SDS



Source: IEA (2023). *Notes:* Annual investment in clean energy in 2022 and average annual investment between 2026 and 2030 and 2031 and 2035 in the NZE Scenario and the SDS; DFI = development finance institutions; public sources of finance include funds from governments, state-owned commercial banks, SOEs and sovereign wealth funds; DFIs include funds from national development banks, and bilateral and multilateral development banks.

The private sector is expected to lead in low-emission power deployment, excluding nuclear and large hydropower, and play a key role in transforming end-use sectors through investments in efficiency and electrification, as represented in Figure 4.3. Public sources will still dominate in grid infrastructure, with Development Finance Institutions (DFIs) playing a growing role in structuring bankable projects, providing financial de-risking mechanisms, and co-financing with private capital providers. DFIs also extend credit lines and offer guarantees for energy efficiency projects.

Figure 4.3 Estimated sources of finance for clean energy investment in EMDCs by sector in the NZE Scenario and SDS



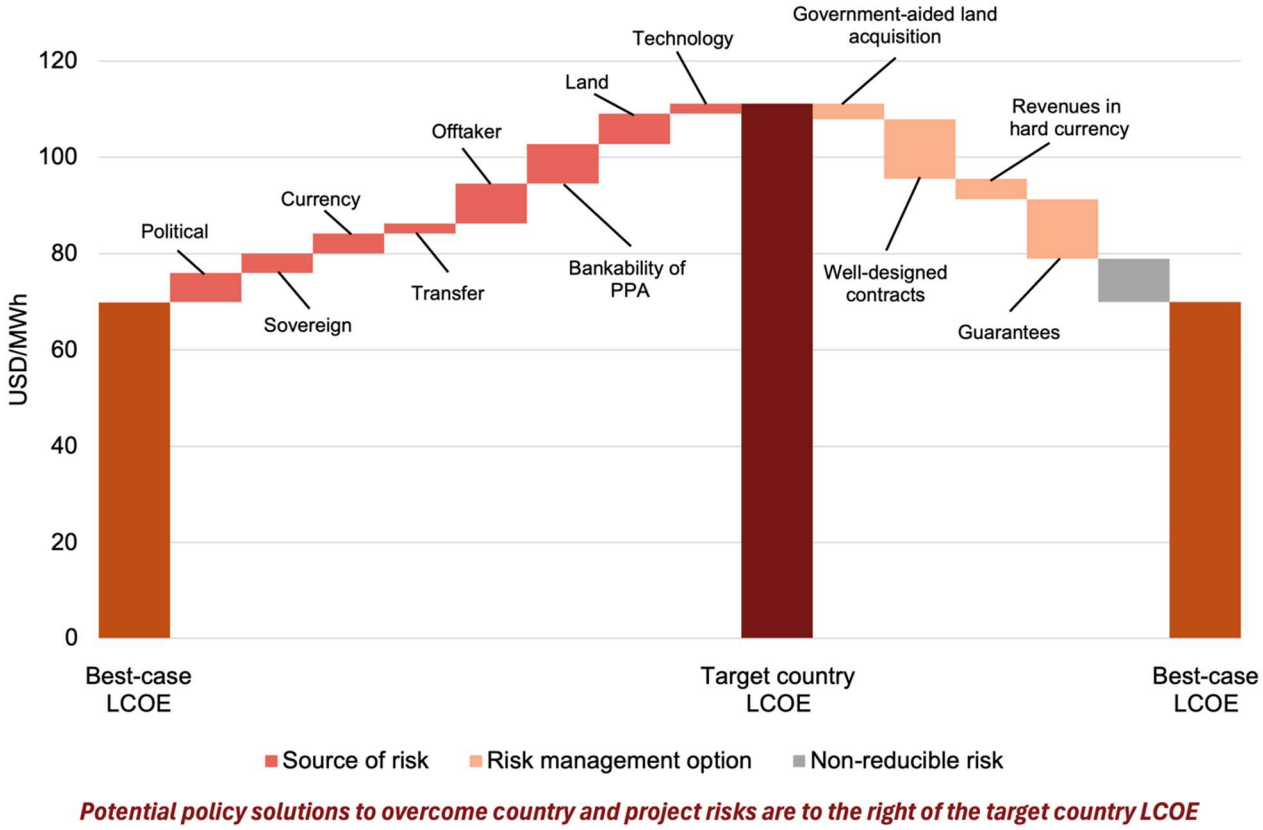
Source: IEA (2023). *Note:* Annual investment in clean energy in 2022 and average annual investment between 2026 and 2030 in the NZE Scenario and the SDS.

4.2 The Roles of Risk-Adjusted Returns in Unlocking Private Investment

The transition to sustainable energy demands substantial private capital to achieve the scale and speed needed to meet global climate goals and ensure energy security. However, energy transition projects face unique challenges that can deter private investment. These challenges include high upfront costs, extended payback periods, and exposure to risks related to regulation, markets, and technology. To overcome these barriers, it is essential to implement effective strategies and mechanisms that foster an enabling environment for private sector participation and investment.

The attractiveness of an investment is primarily determined by the risk-adjusted return it offers to investors. Higher risk levels compel investors to demand higher nominal returns due to the increased likelihood of financial losses. Thus, to attract private capital at the scale and pace required, it is critical to increase the pipeline of clean energy projects that align with investors' risk-return expectations. Moreover, it is important to improve access to effective risk mitigation instruments to address uncertainties. Figure 4.4 underscores the importance of managing risks in target countries, where higher risk levels significantly increase the Levelized Cost of Electricity (LCOE) compared to best-case scenarios. Effective risk management strategies (e.g., guarantees) can narrow this cost gap, though some non-reducible risks (e.g., country-specific challenges) remain unavoidable.

Figure 4.4 Risks affecting variations in the LCOE and the role of risk management options in improving the LCOE



Notes: LCOE = levised cost of electricity; PPA = power purchase agreement.

Sources: (IEA, 2023)

4.3 Risk-Mitigating Strategies and Mechanisms

To mobilise private capital, public finance institutions must streamline administrative procedures, lower transaction costs for accessing risk mitigation instruments, set internal incentives to promote their use and expand their toolkit with solutions specifically designed for renewable energy projects. Table 4.1 outlines strategies and mechanisms to address the unique challenges faced at different stages of renewable energy development. For instance, capacity-building initiatives and partnerships with international experts can alleviate technical expertise gaps, while regulatory reforms and innovative financial products, like green bonds, can help develop underdeveloped financial markets. By systematically addressing these challenges, governments and public finance institutions can significantly

enhance the bankability of renewable energy projects, setting the stage for a low-carbon future fuelled by substantial private investment.

Table 4.1 Strategies and Mechanisms to Mitigate Risks in Clean Energy Projects

Phase	Constraints	Description	Strategies
Project Conceptualisation and Development	Limited Experience in the Financial Sector	Financial institutions may lack the expertise to assess and manage renewable energy projects.	• Capacity-building programs for financial institutions • Partnerships with experienced international investors • Development of sector-specific financial products.
	Availability of Investment-Ready Projects	A shortage of well-prepared and viable projects ready for investment.	• Support for early-stage project development through grants and technical assistance • Creation of project preparation facilities.
	Limited Access to Capital	Difficulty in securing sufficient funding, especially for innovative or large-scale projects.	• Introduction of concessional financing • Establishment of public-private partnerships • Promotion of impact investing and green bonds.
	Limited Technical Expertise	Lack of local technical expertise to develop and manage renewable energy projects effectively.	• Training and certification programs for local professionals • Collaboration with international technical experts

			• Establishment of local research and development centers.
	Underdeveloped Financial Markets	Immature financial markets can limit the availability of sophisticated financial instruments necessary for large-scale renewable energy investments.	• Development of local capital markets • Introduction of financial instruments like green bonds and climate funds. • Regulatory reforms to enhance market liquidity.
	Social Acceptance and Community Engagement	Local opposition to projects can delay or halt development.	• Early and continuous stakeholder engagement • Community benefit-sharing schemes. • Transparent communication about project impacts and benefits.
Investment Risk and Management	Political Risk	Changes in political landscape or government policies affecting project viability.	• Political risk insurance • Long-term government policy commitments. • Stable and transparent regulatory frameworks.
	Policy and Regulatory Risk	Uncertainty or changes in regulations, incentives, or tariffs for renewable energy projects.	• Clear and consistent policy frameworks • Regular stakeholder consultations. • Use of regulatory impact assessments to evaluate changes.

	Counterparty Risk (Power Off-Taker Risk)	Risk that the counterparty in a power purchase agreement (PPA) will not fulfil their obligations.	• Credit enhancements and guarantees. • Diversification of offtakers • Strengthening of utility financial health and creditworthiness.
	Grid Interconnection and Transmission Line Risk	Challenges in connecting projects to the grid and ensuring adequate transmission capacity.	• Investment in grid infrastructure • Implementation of grid connection policies and procedures • Development of smart grid technologies.
	Currency Risk	Exchange rate fluctuations impacting project costs and revenue, especially for projects funded by foreign capital.	• Use of hedging instruments • Access to local currency financing • Policy measures to stabilise exchange rates.
	Liquidity and Refinancing Risk	Difficulty in accessing liquid financial markets for refinancing debt or raising new capital.	• Development of secondary markets for project finance • Access to long-term financing • Use of blended finance to reduce refinancing risks.
	Resource Risk	Variability and uncertainty in the availability of natural resources (e.g., wind, solar).	• Comprehensive resource assessments • Diversification of renewable energy sources

			• Use of advanced forecasting technologies.
	Technology Risk	Risks associated with the performance and reliability of renewable energy technologies.	• Investment in research and development • Adoption of proven and reliable technologies • Performance guarantees from technology suppliers.
Scaling Up Investment	Insufficient Investment Size and High Transaction Costs	Smaller project sizes and high transaction costs can deter large institutional investors.	• Aggregation of smaller projects into larger investment portfolios • Standardisation of project documentation • Reduction of transaction costs through digital platforms.
	Financial Regulations Restraining Illiquid and Riskier Investments	Regulations limiting the ability of financial institutions to invest in less liquid or riskier assets.	• Regulatory reforms to allow for greater investment flexibility • Development of risk-sharing mechanisms • Promotion of long-term investment vehicles
	Environmental Regulations	Stringent environmental regulations can add to project costs and development time.	• Streamlining of environmental permitting processes • Adoption of best environmental practices • Collaboration with environmental agencies.
	Underdeveloped Climate	Lack of comprehensive	• Development of climate information systems

	Information Architecture	climate data and forecasting tools to support investment decisions.	• Access to climate data and forecasting tools • Collaboration with meteorological agencies.
	Market Transparency Issues	Lack of transparency in market operations and financial reporting standards.	• Implementation of transparency and reporting standards • Regular publication of market data • Adoption of international best practices in financial reporting.
	Minimum Sovereign Credit Rating Requirements	Institutional investors often require a minimum sovereign credit rating to invest in a country.	• Credit rating improvements through economic reforms • Use of credit enhancements and guarantees • Diversification of investor base.
	High Capital Costs	Higher cost of capital due to perceived risks and economic conditions in emerging markets.	• Reduction of capital costs through concessional financing • Use of blended finance to improve project economics • Risk mitigation measures to lower perceived risks.
	Mismatch Between Project Returns and Investor Expectations	Clean energy projects in emerging economies may not meet the high return	• Adjustment of investor expectations through education and awareness • Improvement of project returns through subsidies and incentives

		expectations of investors.	• Use of innovative financing structures to enhance returns.

Source: Adapted from IRENA (2016).

4.4 Lessons Learned and Recommendations for Vietnam

This section provides a comprehensive overview of the strategies and mechanisms employed to mobilise private capital and support the energy transition from an international perspective, focusing on the context of EMDCs similar to Vietnam. It highlights the role of public finance and regulation in creating a favourable environment and mitigating various risks to make clean energy projects attractive to the private sector. Risk management is central, emphasising the need for stable political and regulatory environments, political risk insurance, credit enhancements, and robust regulatory frameworks to attract private investment. Additionally, innovative financial mechanisms, such as aggregation of smaller projects, concessional financing, and blended finance, are crucial for scaling up investment.

Vietnam faces significant barriers in project conceptualisation, such as limited access to capital and a shortage of investment-ready projects. Capacity-building programs for financial institutions and the establishment of project preparation facilities can help address these gaps. Investment risk management, long-term policy commitments, and transparent regulatory frameworks are essential to foster investor confidence. Strengthening the financial health of power off-takers and addressing grid connection and transmission challenges are also pertinent. Scaling up investment in Vietnam's renewable energy sector requires reducing high capital costs and improving project returns. Risk-sharing mechanisms, regulatory reforms to enhance market liquidity and transparency, and community engagement are critical factors.

Below, we revisit case studies in Section 2 to highlight some specific lessons applicable to Vietnam in these areas.

- The **Pro Mini-Grids programme** in Uganda highlights the importance of bundling multiple mini-grid projects into larger tenders to attract investors by offering scalability and reducing perceived risks. Flexible subsidy structures and innovative financing mechanisms, such as blended finance, were crucial in creating financially viable projects and reducing risks for developers and lenders. Effective coordination and governance, along with streamlined licensing and approval processes, significantly reduced preparation time for projects. Capacity-building initiatives and collaboration

with international stakeholders enhanced project viability and familiarity with market requirements.

- The **Benban Solar Park** project in Egypt demonstrates the effectiveness of using green project bonds, supported by risk mitigation tools such as political risk insurance and liquidity support, to attract private capital. The collaboration between MIGA and EBRD significantly enhanced the bond's credit profile, making it more appealing to institutional investors. Additionally, aligning the bond structure with international sustainability standards, such as the Climate Bonds Initiative certification, ensured transparency and environmental integrity, further boosting investor confidence. The project also highlighted the importance of leveraging government support and partnerships with stakeholders to address the scarcity of investment-ready initiatives.
- The **Mayor of London's Energy Efficiency Fund (MEEF)** demonstrates the effectiveness of blended finance in attracting additional local capital and addressing regional decarbonisation needs. Key practices include establishing strong internal expertise, providing technical assistance to make projects finance-ready, and developing a robust project pipeline. The use of an independent Fund Manager ensures unbiased investment decisions and builds trust with private investors. Public funds are strategically deployed to de-risk projects, unlocking private sector investments for high-risk opportunities. Revolving financial instruments allow for reinvestment of returns into future projects, significantly increasing private sector commitments.
- The **Just Finance India** initiative highlights the importance of embedding just transition principles into policies and regulations to attract long-term foreign capital. Key measures include developing a sustainable finance taxonomy, introducing frameworks like the Business Responsibility and Sustainability Reporting (BRSR), and addressing climate risks through broader financial tools. Leveraging Corporate Social Responsibility (CSR) funds and scaling up investor action through business investment and capital allocation are also crucial. The initiative underscores the role of financial innovation, such as just transition bonds, and the importance of attracting foreign investment through platforms like the International Financial Services Centre (GIFT). Partnerships with MDBs and DFIs are essential for mobilising private sector investment and providing anchor investments.

Vietnam can adopt these lessons by focusing on de-risking strategies and mechanisms to make renewable energy projects more attractive to private investors. Grouping small renewable energy projects into larger tenders can increase their appeal by offering scalability and reducing perceived risks. Implementing flexible subsidies will further support project viability. Streamlining regulatory procedures and investing in capacity-building initiatives for financial institutions will improve project development efficiency, ensuring that projects are well-prepared and attractive to investors.

Effective coordination among government entities and international partners, along with establishing transparent and consistent regulatory frameworks, will foster investor confidence and accelerate Vietnam's transition to a sustainable energy future. Issuing green project bonds and leveraging risk mitigation instruments like political risk insurance and liquidity support can enhance creditworthiness. Attracting international development banks such as MIGA and EBRD can provide the necessary credit enhancement and ratings uplift to draw private capital.

Leveraging government support and forming partnerships with stakeholders can help address the scarcity of investment-ready initiatives. Providing early-stage technical assistance and concessional financing will build a pipeline of viable projects. Establishing city or provincial funds dedicated to supporting the energy transition is crucial. Developing internal organisations with trained experts to manage fund operations and build a pipeline of clean energy projects will ensure transparency and investor confidence. Public funding should be used strategically to mitigate risks for private investors, employing tools such as guarantees, concessional loans, or revolving financial instruments.

Integrating just transition principles into sustainable finance policies and regulations is vital. Developing a tailored taxonomy of sustainable activities and introducing frameworks similar to BRSR can help direct financial flows toward sustainable development. Leveraging CSR funds and encouraging corporate engagement in just transition goals will be essential. Vietnam should explore financial innovations like just transition bonds and attract foreign investment through dedicated financial platforms. Collaborating with MDBs and DFIs can provide the necessary expertise and financial capacity to advance just transition goals, mobilise private sector investment, and develop blended finance solutions tailored to the just transition. Empowering local enterprises and fostering partnerships will ensure a comprehensive and inclusive approach to Vietnam's energy transition.

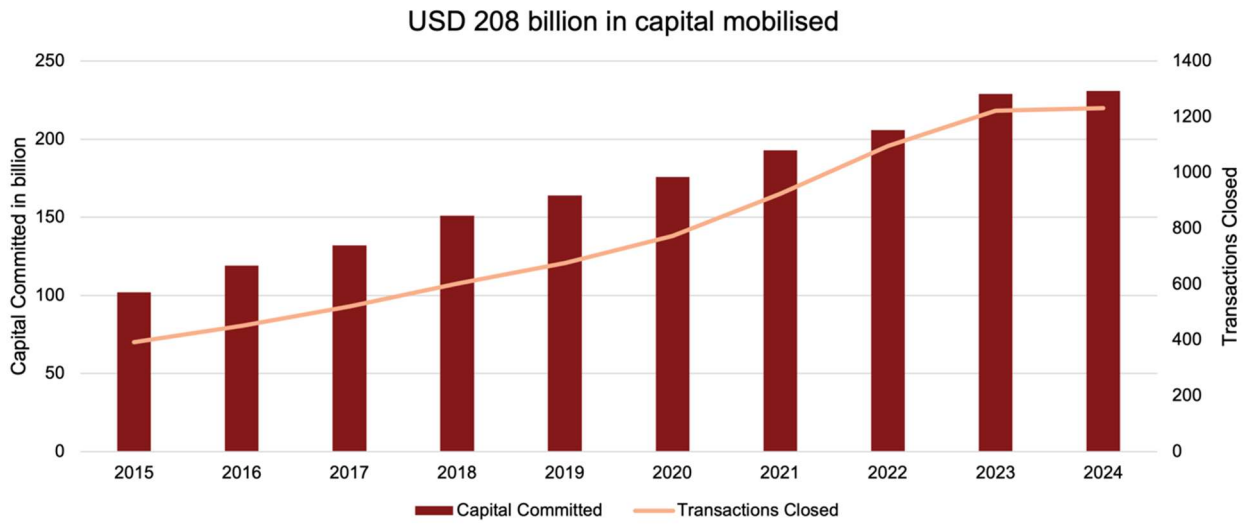
5 Finance Structures and Instruments

Achieving successful clean energy transitions in EMDCs will require a substantial increase in private-sector funding. Innovative climate finance solutions, particularly blended finance, combine public, philanthropic, and private capital to drive investments in sustainable development, especially in high-risk markets. International experiences have shown that strategically deploying concessional capital, and blended finance helps reduce investment risks and improve project viability, making private sector participation more attractive.

5.1 Blended Finance Structures

The evolution of blended finance has driven the creation of numerous initiatives to support its continued growth and development. Many blended finance structures have achieved notable success on a global scale, effectively attracting greater capital and supporting an increasing number of impactful projects worldwide, as illustrated in Figure 5.1.

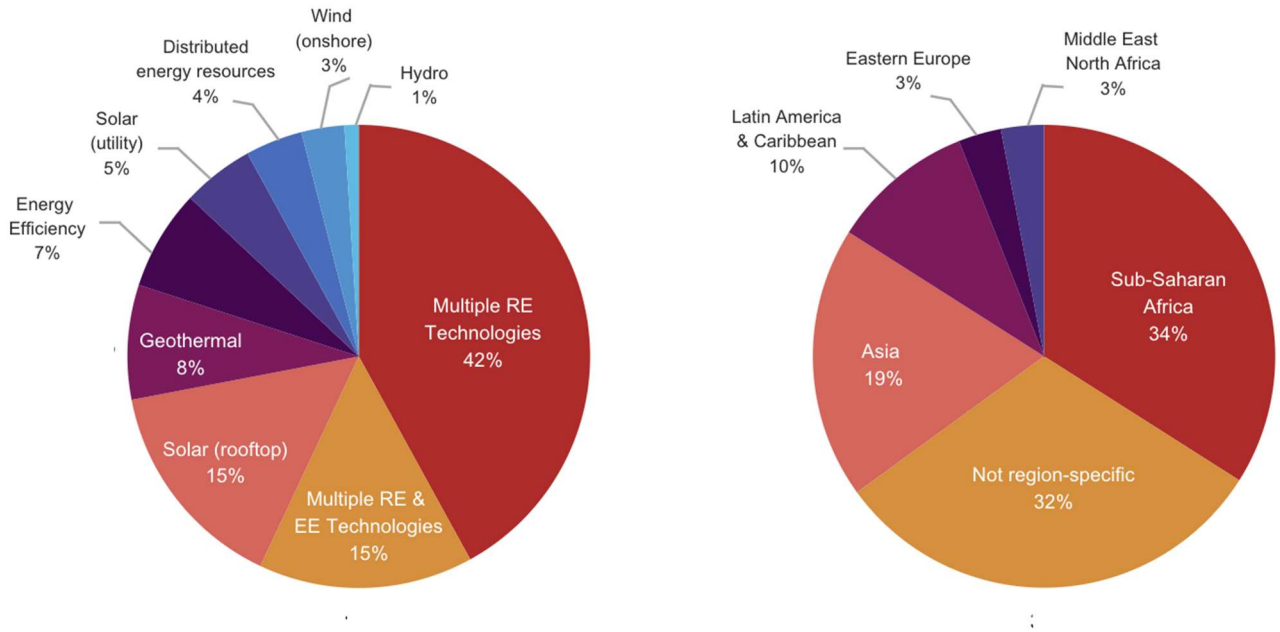
Figure 5.1 Growth of Annual Blended Finance Activities



Source: Convergence Blended Finance (2024).

Blended finance initiatives have seen remarkable growth, with notable successes in key regions such as Sub-Saharan Africa and ASEAN, driven by innovative financial structures and strategic sectoral focus. In Sub-Saharan Africa, blended finance attracted 61% of global concessional financing in 2020, primarily supporting climate-smart agribusiness and energy projects (Figure 5.2).

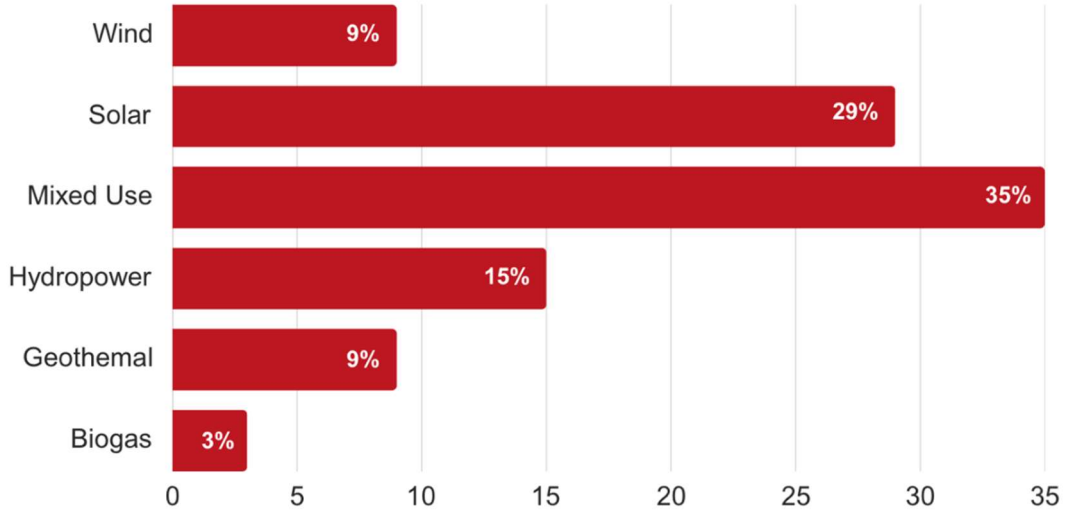
Figure 5.2 Clean energy blended finance initiatives by sectoral (left) and geographic coverage (right).



Source: Climate Policy Initiatives (2018).

In the ASEAN region, Convergence's Historical Deals Database (HDD) has tracked 99 blended finance transactions, with renewable energy as a central focus. These transactions totalled USD 19.75 billion, accounting for 13% of global climate blended finance. Solar (29%) and hydropower (15%) dominate ASEAN's renewable energy investments, whereas globally, solar and wind projects are more prevalent (Figure 5.3).

Figure 5.3 Breakdown of ASEAN renewable energy blended finance transactions by energy technology



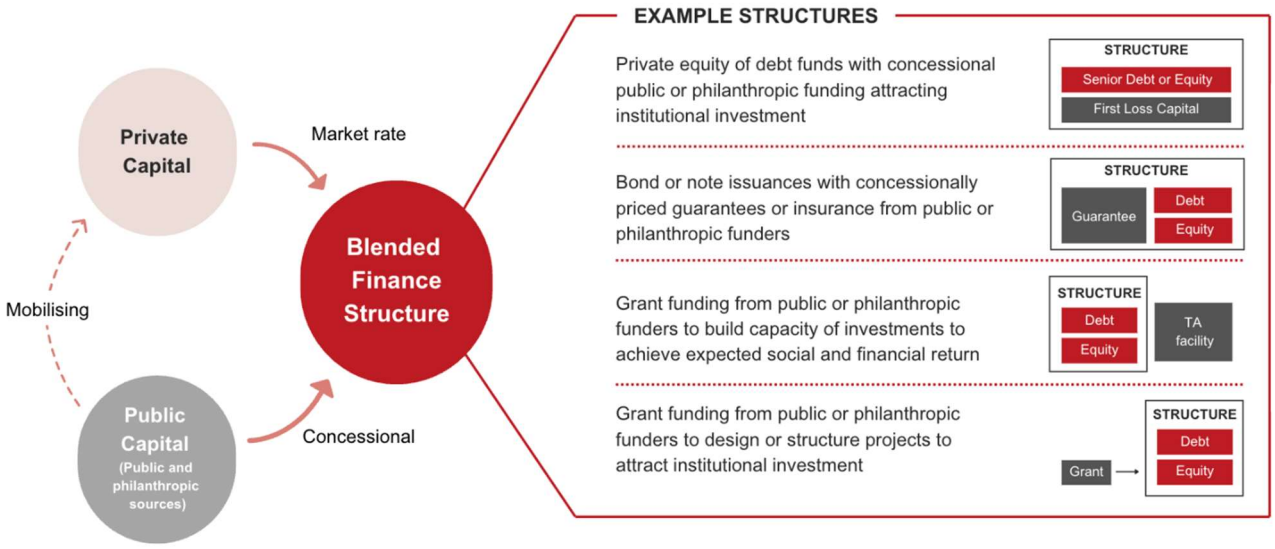
Source: Convergence Blended Finance (2024).

Successful blended finance projects depend on the right combination of debt, equity, and grant financing, along with effective risk-mitigation tools and the proper seniority of investors to balance losses and returns. This approach often involves deal structuring, which integrates various types of capital and risk mitigation strategies to attract investors and ensure adequate funding, as illustrated in the first two structures of Figure 5.4.

Defining the optimal capital mix requires an adaptive approach that adjusts financing structures as risks evolve throughout the project life cycle (OECD, 2021). Concessional funding is typically most critical during the high-risk development phase to improve project bankability, while mechanisms such as partial guarantees and first-loss capital help de-risk private investment in the construction phase. As projects reach the lower-risk operational phase, concessional support should gradually phase out, making way for commercial financing through loans, bonds, and institutional equity investments.

However, not all blended finance interventions require active participation in deal structuring. For instance, offering design-stage grants can improve a project's bankability and increase its chances of reaching financial close. Similarly, using technical assistance funds can enhance project viability and optimise impact outcomes. By continuously monitoring risk allocation and aligning the financing structure with project maturity, blended finance can effectively mobilize private capital and support sustainable development.

Figure 5.4 Blended Finance Structure



Source: Convergence Blended Finance (2024).

5.2 Concessional Instruments

The selection of financial instruments is associated with the need for concessional capital, targeting specific investment risks or market inefficiencies. This approach ensures that concessional funding is used efficiently, with only the minimum amount required to achieve the intended development impact (IFC, 2021). Blended finance instruments can help overcome common barriers to private investment in EMDC climate projects by adjusting the risk-return profile or offering incentives that encourage capital allocation toward positive development goals.

According to IEA (2023), there are 6 key blended financial instruments to support clean energy transitions, as shown in Table 5.1. These instruments can be structured in two primary ways, each with varying capacities to absorb risk based on the return expectations of donors and contributors: **capital-preserving (returnable capital)** solutions and **flexible capital solutions**. The choice between these structures depends on the project's risk profile, stage of development, and the desired impact.

Table 5.1 Blended finance instruments

Instrument	Details
Concessional loan	Concessional senior loan, priced below market; or subordinated loan in liquidation and/or in payments to all senior lenders, also priced concessionally.
Guarantee	• First loss cover, up to an agreed maximum amount. Can be protected as a (funded or unfunded) guarantee on a single loan, or as a pooled first-loss guarantee on a portfolio of loans. • Particularly in the context of power generation projects, liquidity support guarantee can be provided on a revolving standby letter of credit (LC), that can be drawn by the project company if the offtaker fails to honour its payment obligation.
Concessional equity	"Lower-priced" equity with a lower internal rate of return to offer affordable equity funding; or subordinated equity with cash waterfall (distribution of all proceeds including exit and dividends according to a waterfall).
Investment grant	• Performance-based incentive (PBI): rebates to provide incentives and disincentives to achieve desired outcomes or results (e.g. tie at least a portion of payments to achievement and aim to reward innovation and successful implementation). • Viability gap funding (VGF): capital grant provided up to certain percentage of total investment costs for projects that are not commercially viable yet due to long gestation period.
Bond investment	Instruments similar to a loan, can be traded privately or publicly, offshore or onshore. Can be used with PBIs.
Local currency support	Concessional funds to provide fully or partially subsidised currency hedge; or concessional loan with a subsidised spread (or with a swap-cost buydown) to absorb the high cost of currency hedge.

Source: IEA (2023).

Flexible capital solutions are most effective for supporting high-risk, early-stage technologies where donors do not expect a return on principal. These instruments, such as **grants** and **deeply concessional facilities**, focus on risk absorption to encourage the market entry of emerging climate technologies. In contrast, **capital-preserving solutions** are designed to protect the principal invested, often with modest return expectations. These instruments are more suitable for lower-risk, mature technologies where revenue generation is more predictable.

An example of flexible capital solutions in practice can be seen in the Pro Mini-Grids programme, which tested new approaches to energy access in underserved areas. Mini-grids and other emerging renewable energy technologies are often high-risk investments, particularly in regions like Uganda, where infrastructure may be underdeveloped. The capital required to develop such technologies is substantial yet returns remain uncertain in the early stages. In this context, GIZ provided a subsidy of up to 70% of the capital costs for generation assets, disbursed based on specific milestones and results. The Pro Grid mini project case study illustrates the practical application of these mechanisms, where subsidies are contingent on achieving milestones, ensuring both accountability and progress.

On the other hand, the Mayor of London Energy Efficiency Fund (MEEF) primarily utilises flexible capital solutions through its blended finance structure. By leveraging public funds to absorb risk, the fund effectively mobilises private capital to support innovative low-carbon projects. However, the fund also incorporates elements of capital-preserving solutions for more predictable, low-risk projects, ensuring that a diverse range of projects with varying risk profiles can be effectively supported. The success of the MEEF serves as a strong example of how flexible financing can scale sustainable urban development, attract private investment, and contribute to ambitious environmental goals, such as achieving net-zero carbon emissions.

One of the most compelling aspects of blended finance is its ability to “crowd-in” additional capital. This effect is often referred to as “leverage”, which represents the ratio of commercial financing (from DFIs, sponsors, and private financiers) to concessional funds. According to IFC's experience, for every USD 1 of concessional donor funding, nearly USD 7 of additional finance is mobilised - comprising USD 3-4 from IFC's own funds and USD 3-4 from commercial third-party capital. A similar study estimated that co-financing through syndicated lending could mobilise approximately USD 7 of bank credit for each USD 1 provided by MDB (Broccolini et al., 2021).

According to IMF (2022), MDBs and NDBs play a crucial role in channelling funds to address climate challenges. These institutions provide countercyclical intervention in the credit market through direct lending, credit guarantees, or purchasing loans and securitised products. They also offer long-term or concessional resources, often promoting private-sector involvement through schemes like on-lending. MDBs are uniquely positioned to leverage their capital through bond issuances, which is influenced by their capital adequacy frameworks. To safeguard their ratings, MDBs have traditionally been conservative in their financial management. However, equity stakes allow the public sector to share in the upside potential while also leveraging private capital to a significant extent. This is especially important in EMDCs, which are already burdened by excessive debt. Therefore, MDBs can play an essential role in helping countries structure financial products that attract private-

sector capital through equity stakes. Public equity investments are critical in achieving the annual $100 billion commitment made by developed countries to support climate action in EMDCs.

5.3 Innovative Financial Instruments

According to IEA (2023) and IMF (2022), **innovation in financial instruments** can facilitate the mobilisation of private finance to support the clean energy transition. These innovations provide strong incentives for private-sector financial institutions to develop climate-related products and collaborate with the public sector and multilateral development banks (MDBs) to create joint products and partnerships.

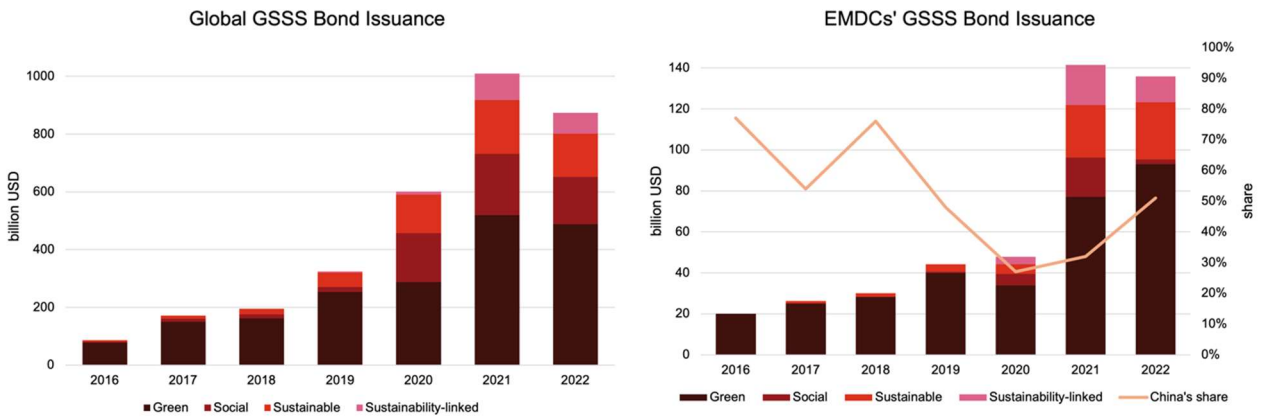
A significant portion of this progress has been driven by the issuance of **green, social, sustainable, and sustainability-linked (GSSS) bonds**, detailed in Table 5.2. Collectively, these bonds raised USD 3.3 trillion between 2016 and 2022 (left panel in Figure 5.5). GSSS bond issuance in EMDCs has expanded rapidly, tripling from USD 48 billion in 2020 to USD 141 billion in 2021, and remaining strong at USD 136 billion in 2022, accounting for 16% of the global total (right panel in Figure 5.5). China has been the leading issuer among EMDCs, contributing 45% of cumulative issuance in the region.

Table 5.2 GSSS bonds and loans definitions

Instrument	Definition
Green bond/loan	Fixed-income instruments with proceeds earmarked exclusively for projects with environmental benefits
Social bond/loan	Fixed-income instruments with proceeds directed towards projects that aim to achieve positive social outcomes
Sustainable bond/loan	Debt instruments that finance a combination of green and social projects
Sustainability-linked bond/loan	Performance-based debt instruments whereby financial or structural objectives, such as the coupon rate, are adjusted depending on predefined sustainability objectives

Source: IEA (2023).

Figure 5.5 Annual GSSS Bond Issuance, 2016 - 2022



Source: Amundi (2022).

Carbon credit markets represent another innovative mechanism to drive climate investments by leveraging revenues generated from projects that reduce or remove greenhouse gas emissions. These credits are tradable in voluntary carbon markets (VCMs)**,** which are self-regulated systems where companies voluntarily buy and sell carbon credits to offset their emissions. Additionally, new financial instruments based on carbon credits are emerging. For instance, the securitisation of carbon credit revenues can unlock access to capital markets, while instruments such as carbon mutual funds and carbon exchange-traded funds (ETFs**)** allow investors to participate in carbon credit futures, introducing a promising new asset class for climate-focused investments. VCM demand increased significantly, with retired credits rising from 47 million tCO2-eq in 2017 to 161 million tCO2-eq in 2021**.** Trading in VCMs reached USD 2 billion in 2021, with a transacted volume of 493 million tCO2-eq. By 2030, the VCM market could grow to USD 10–100 billion**,** underscoring its potential as a key climate investment tool.

Co-investment models, syndication platforms, and pooled investment vehicles are essential for attracting institutional investors to clean energy projects by aggregating smaller initiatives, mitigating risks, and increasing scalability. DFIs play a pivotal role by investing their own capital alongside private investors and offering unfunded support like credit insurance. The Managed Co-Lending Portfolio Program (MCPP), a portfolio syndication platform, has raised over USD 11 billion from 11 partners to invest in new EMDC loan portfolios, showcasing its success in mobilising capital. Similarly, infrastructure investment trusts (InvITs) allow developers to recycle capital by selling revenue-generating assets to institutional investors such as pension funds, sovereign wealth funds, and private equity firms. For instance, India's IndiGrid Trust, a listed InvIT in the power sector, owns solar and

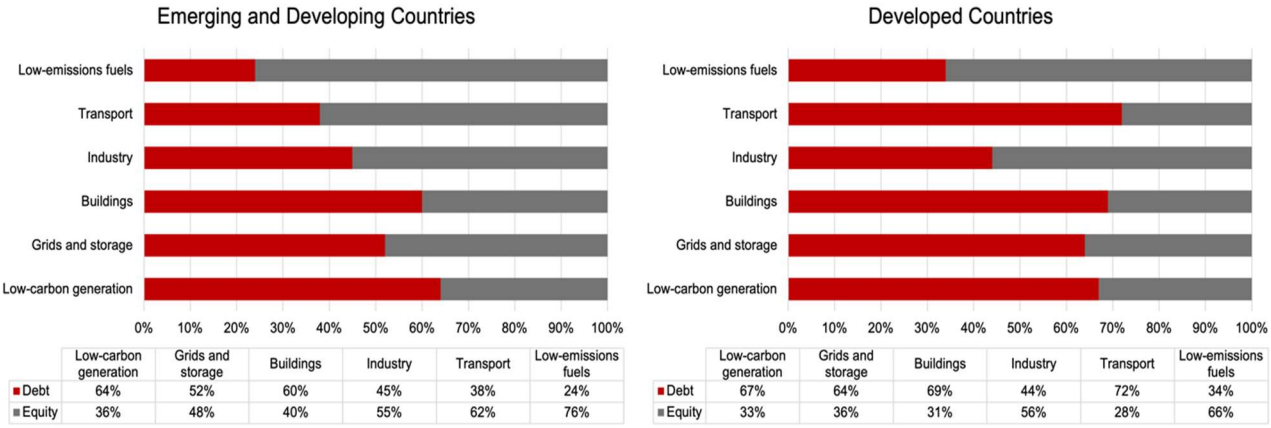
transmission projects, enabling developers to secure funding for new initiatives while providing investors with structured opportunities to support sustainable energy infrastructure.

Finally, **developing robust domestic financial markets** is crucial for scaling clean energy investments in EMDCs. Strengthening local bond, equity, and derivatives markets enables projects to secure funding domestically, reducing reliance on external financing. Local currency swaps play a pivotal role in securing financing in local currencies, particularly in underdeveloped capital markets, by mitigating exchange rate risks and ensuring stability. A mature domestic financial market not only enhances the ability to mobilise private capital but also sustains long-term investments in clean energy, fostering resilience and self-reliance in funding the energy transition.

5.4 Blended Finance in EMDCs

Clean energy investments in EMDCs rely more heavily on equity than debt compared to advanced economies, as shown in Figure 5.6. This is primarily due to weaker macroeconomic conditions, limited investment climates, and shallow local capital markets, which result in higher borrowing costs.

Figure 5.6 Typical capital structure of clean energy investments in emerging and developing economies and advanced economies



	Low-carbon generation	Grids and storage	Buildings	Industry	Transport	Low-emissions fuels
Debt	64%	52%	60%	45%	38%	24%
Equity	36%	48%	40%	55%	62%	76%

	Low-carbon generation	Grids and storage	Buildings	Industry	Transport	Low-emissions fuels
Debt	67%	64%	69%	44%	72%	34%
Equity	33%	36%	31%	56%	28%	66%

Source: IEA (2021).

To address these challenges, numerous climate funds have been created to stimulate climate investments in EMDCs (IMF, 2022). These initiatives have demonstrated the capacity to attract substantial private sector investment in climate projects and have collaborated effectively with development finance institutions (DFIs) to offer blended finance

solutions. However, challenges such as fragmentation, slow fund disbursement, and low accreditation rates persist, largely due to lengthy and complex procedural requirements. Below are some prominent examples of these funds (OECD, 2022; IEA, 2023):

- **The Green Climate Fund (GCF),** established in 2010 under the UNFCCC framework at COP15 in Copenhagen, aims to mobilise USD 100 billion annually by 2020. It receives contributions from developed countries, the private sector, and other sources in the form of grants, loans, and capital. During its initial resource mobilisation in 2014, the fund raised USD 8.3 billion and secured over USD 10 billion from 34 contributors in its first replenishment period (2020–2023), with an additional USD 1 billion committed by the United States in April 2023. Through its Private Sector Facility, the GCF catalyses private sector investment using instruments such as concessional loans, equity investments, guarantees, and first-loss protection. Between 2015 and 2020, the GCF co-financed or directly financed climate adaptation and mitigation projects worth USD 23.4 billion across 117 developing countries. However, challenges persist, including slow disbursements and low accreditation rates due to prolonged and complex processes (Fouad et al., 2021).

- **The Climate Investment Funds (CIF)**, established in 2008 by global leaders, is an USD 8.5 billion multi-donor trust fund designed to support climate investments in EMDCs. Collaborating with the private sector, governments, and six MDBs, CIF provides a platform to pool and leverage financial resources from partners. It also de-risks investments through concessional financing and other financial products. By the end of 2020, CIF had channelled over USD 60 billion from its global partners to co-finance green projects, including climate technology, sustainable forests, climate-smart cities, and renewable energy integration. In 2021, the G7 committed up to USD 2 billion to further enhance CIF's capacity to finance climate investments in EMDCs.

- **The Global Energy Alliance for People and Planet (GEAPP)** was established at COP26 in 2021 by the Rockefeller Foundation and its partners, backed by USD 10 billion in investments. GEAPP aims to catalyse a just energy transition by mobilising public and private capital to provide reliable, clean, and abundant power to one billion people across multiple continents. The alliance works with various partners to deliver technical assistance, grants, and investment capital to regions with the greatest need. Its investment strategy progresses from grant-supported pilot projects to fully matured initiatives capable of achieving scale through private funding.

- **The Green Growth Equity Fund (GGEF)** is a newly launched initiative designed to transfer and replicate advanced technologies. Anchored by India's National Investment and Infrastructure Fund (NIIF) and the UK Foreign, Commonwealth, and Development Office (FCDO), and managed by EverSource (Mumbai), GGEF

operates as a fund-of-funds structure with a target to raise USD 900 million. This capital will come from institutional investors and development financial institutions (DFIs), with concessional funding in the form of subordinated equity provided by the GCF through Dutch development bank FMO. GGEF aims to deploy equity capital through sectoral platforms, focusing on climate technology growth firms in renewable energy, e-mobility, energy services, and resource efficiency projects, prioritising those with significant innovation potential.

- **The IFC Managed Co-Lending Portfolio Program (MCPP)** facilitates private capital flows into infrastructure projects in emerging markets. This innovative model mobilises development financing by combining funding from insurance companies, project origination and credit enhancement from IFC, and public sector donor support. Each MCPP Infrastructure facility uses a portfolio syndication process, providing investors with a diversified loan portfolio that mirrors IFC's own. To enhance the investment-grade profile, IFC invests in the first-loss tranche, reducing risk for private investors. By mirroring IFC's portfolio, MCPP investors gain the opportunity to co-lend in all new IFC-originated loans that meet their criteria, benefitting from IFC's diversification across countries and sectors while ensuring equal investment amounts between IFC and MCPP participants.

- **The Multilateral Investment Guarantee Agency (MIGA)**, part of the World Bank Group, promotes private-sector green investments through its guarantee programmes. In the 2021 financial year, MIGA issued US$1.35 billion in guarantees—accounting for 26% of its total new business volume—to support climate adaptation and mitigation initiatives in 22 countries. These investments span renewable energy, infrastructure, agriculture, and other climate-focused sectors. By offering political risk insurance and credit enhancement, MIGA enables cross-border green investments, safeguarding investors and lenders against sovereign risks, though it does not cover project-specific risks.

- **The Amundi Planet Emerging Green One (EGO) Fund**, launched in 2018 by Amundi and the IFC, focuses on investing in green bonds issued by emerging market banks to drive green infrastructure development in EMDCs. Initially valued at $1.42 billion and projected to reach $2 billion, the fund uses a credit enhancement model to attract private investors by allocating riskier tranches to DFIs and safer senior tranches to private investors. Supported by the IFC Green Bond Technical Assistance Program, the fund addresses informational asymmetries and aims to mobilise private capital while leveraging public sector expertise. By 2020, it had invested in green bonds across nine countries, funding renewable energy, clean transport, water, and waste management projects.

In conclusion, the diverse array of climate funds and financial instruments discussed above highlights the growing commitment to addressing climate challenges in EMDCs. Through strategic partnerships, blended finance models, and innovative funding mechanisms, initiatives have successfully attracted substantial private investment while advancing climate resilience and sustainable development. However, the effectiveness of these efforts is still hindered by challenges such as slow disbursement, complex procedures, and fragmented efforts. As these funds continue to evolve, overcoming these barriers will be crucial to unlocking their full potential. Moving forward, greater collaboration among stakeholders, including NDBs, MDBs, and private investors, will be essential to accelerating the transition to a low-carbon economy and ensuring that climate investments can scale to meet the urgent needs of EMDCs.

5.5 Lessons Learned and Recommendations for Vietnam

In Vietnam, where blended finance remains limited and concessional funding mechanisms are still underdeveloped, the deployment of concessional funds should be accompanied by thorough assessments to confirm the need for subsidies and evaluate their potential to unlock significant development impact. Given the lack of well-defined blended finance frameworks, it is crucial to design subsidy mechanisms that not only fill financing gaps but also create conditions for future commercial viability.

Following the principles established by the DFI Working Group on Blended Finance in 2017 (Box 5.1), it is important to ensure that concessional funding is applied efficiently, with only the minimum amount necessary to make a project viable and with a clear path to commercial viability. Developing clear regulatory guidance and building investor confidence will be essential to expanding blended finance solutions in Vietnam.

Box 5.1 DFI Enhanced Principles for Blended Concessional Finance

1. **Rationale for blended concessional finance:** Making a contribution that is beyond what is available, or that is otherwise absent from the market without crowding out the private sector.
2. **Crowding-in and minimum concessionality:** Helping to catalyse market development and the mobilisation of private sector resources, with concessionality not greater than necessary.
3. **Commercial sustainability:** The impact achieved by each operation should be sustainable and contribute towards commercial viability.
4. **Reinforcing markets:** Addressing market failures effectively and minimising the risk of market distortion or crowding out private finance.
5. **Promoting high standards:** Encouraging adherence to high standards, including in areas of corporate governance, environmental impact, integrity, transparency and disclosure.

Source: IFC et al (2017).

Governance and transparency are key in Vietnam's blended finance strategy. Strong governance structures and transparent decision-making processes must be in place to prevent conflicts of interest and ensure that concessional funds are allocated appropriately. In particular, Vietnam government should establish clear roles for contributors and implementers of blended finance to maintain a balance between public and private sector interests.

Furthermore, blended finance projects in Vietnam should undergo thorough scrutiny, with a focus on ensuring that concessional capital is used only when absolutely necessary. This ensures that the funds are directed to projects that are most likely to succeed and have a positive, lasting impact on the country's clean energy transition.

Overall, these lessons can be summarised as follows:

- **Strengthening Governance Frameworks**: Establishing strong governance structures with clear roles and responsibilities for all stakeholders involved in blended finance projects will ensure that decisions are made transparently and without conflict of interest.
- **Thorough Project Assessment**: Emphasising comprehensive assessments to determine the need for concessional funding and to ensure that subsidies are used effectively. This includes evaluating risks, market conditions, and the potential development impact of clean energy projects.
- **Fostering Public-Private Collaboration**: Encouraging more partnerships between NDBs, MDBs, private investors, and climate funds will be essential to scaling investments and enhancing the financial instruments available for clean energy projects in Vietnam. The government and development finance institutions should

collaborate with local financial markets to develop and introduce innovative financial instruments tailored to overcome specific financing challenges.

- **Ensuring Transparency in Resource Allocation**: Implementing transparent systems to track the allocation and use of concessional resources will help mitigate any misuse of funds and build investor confidence.
- **Focus on Equity Financing**: Given that clean energy investments in Vietnam face limited access to long-term debt financing due to high interest rates, currency volatility, and constrained domestic credit availability, the government and development finance institutions should explore more equity-focused blended finance structures. These structures should attract private capital through mechanisms such as equity funds and co-investment models,

Vietnam has yet to develop a fully functional blended finance ecosystem, but by establishing strong governance, structured financial instruments, and transparent allocation mechanisms, the country can unlock significant private-sector investment. A well-designed blended finance framework will enable Vietnam to de-risk projects, attract sustainable capital, and accelerate investment in critical sectors such as clean energy, infrastructure, and climate resilience.

6 Model for Private Capital Mobilisation - Public-Private Partnership

This session is dedicated to cross-comparing and scrutinising models of private capital mobilisation for energy projects, with a particular focus on different types of Public-Private Partnerships (PPP) drawn from international experiences. The significance of PPPs is highlighted in Resolution No. 55-NQ/TW, which outlines the orientation of Vietnam's National Energy Development Strategy to 2030. The resolution emphasises the importance of "renovating financial policies toward encouraging and strongly attracting non-state investment capital; facilitating energy investment projects in line with the Public-Private Partnership (PPP) model."

In practice, PPP energy projects in Vietnam have successfully attracted substantial investments, with Build-Operate-Transfer (BOT) power projects proving particularly effective. However, in a consultation workshop within this project ("Facilitating Private Sector's Access to and Engagement in Vietnam's Energy Sector"), Ms. Vu Quynh Le, Deputy Director of the Public Procurement Agency at the Ministry of Planning and Investment of Vietnam, highlighted emerging challenges that are slowing the momentum of PPP development[4]. Drawing on international experiences can provide insights for refining Vietnam's PPP framework, improving project bankability, and attracting the private capital needed to support sustainable energy development.

6.1 Overview

A useful blended finance approach to mobilise private capital for green energy projects is the Public-Private Partnership (PPP). Though the definition of PPP varies, a useful definition from the World Bank (WB, 2017) describes it as "a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance".

PPP addresses the limitations of public financial resources, enabling the development of critical energy infrastructure. Collaboration between public and private entities is crucial in financing, developing, and managing infrastructure projects and green energy investments,

[4] For example, the transition of coal-fired power projects faces significant barriers, including difficulties in signing contracts due to limited financing from international financial institutions amid the global energy transition. Additionally, many current transition projects remain heavily reliant on international financing, which comes with strict conditions such as government guarantees and long-term commitments. Furthermore, the large-scale capacity of many projects has created challenges in securing off-take agreements, making it more difficult to attract the required investment.

allowing for a mutually beneficial sharing of risks. The private sector relies on guarantees to manage policy and financial uncertainties, while the public sector benefits from private capital investment and management expertise. This model harnesses the private sector's efficiency, innovation, and financial resources while ensuring government oversight to address public needs effectively.

PPP policies vary significantly across countries, particularly concerning project size, contract types, and sectoral focus (WB, 2017). In Australia, the National PPP Guidelines suggest that PPPs are likely applicable for projects exceeding $50 million to ensure value for money. Similarly, Brazil's National PPP Law mandates that PPPs are utilized for projects over 20 million reais. In Colombia, the National PPP Law specifies that total investment in a PPP project must surpass 6,000 times the minimum legal monthly wage, which is approximately $1,460,000.

In terms of sector focus, Indonesia's Presidential Regulation No. 67 specifies eight eligible infrastructure sectors for PPPs: transportation (including ports and railways), roads, water channels for freshwater flows, potable water distribution, wastewater management, telecommunications, electric power, and oil and natural gas. In contrast, Senegal's PPP Contracts Law and Order of Application apply PPP provisions to all sectors except those subject to special regulations, particularly mining, telecommunications, and energy.

Regarding contract types, Brazil recognizes two specific PPP contract types: sponsored concessions, where private party returns derive from user fees and government transfers, and administrative concessions, where all returns to the private party come from government transfers. Concessions not requiring government transfers are not considered PPPs in Brazil, and the law stipulates that the concession must be at least five years long to qualify as a PPP. Chile's Concessions Law specifies a maximum duration for concession contracts of 50 years. In Colombia, PPP contracts must assign the private investor responsibility for operations and maintenance and must be for less than 30 years; extensions require approval from the National Council on Economic and Social Policy. Mexico's PPP Law defines PPPs as long-term contractual relationships between public and private entities to provide services to the public sector or the general public, aiming to enhance social well-being and investment levels in the country. These contracts must not exceed 40 years in duration, including extensions; longer contracts require legal approval.

These distinctions underscore how countries tailor their PPP policies to align with specific economic, legal, and infrastructural contexts, influencing the size, contractual arrangements, and sectoral focus of projects. The selection of a suitable business model often depends on a country’s regulatory capacity, as certain models demand stronger governance and

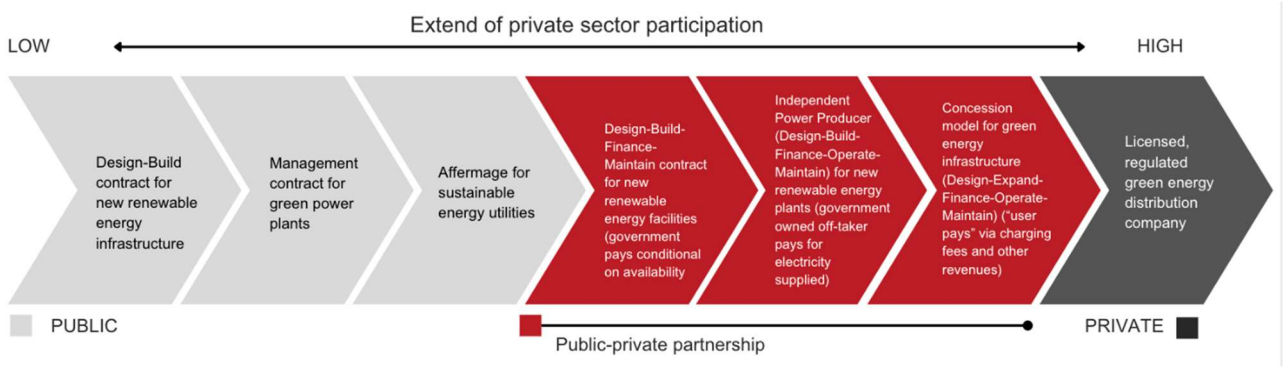
implementation. This balanced partnership supports the advancement of sustainable energy initiatives.

PPP models offer a potential solution to finance Vietnam's green energy transition while mobilising private capital for large-scale infrastructure projects. However, successful implementation depends on addressing key financial, regulatory, and procedural challenges, including clear project thresholds, streamlined approval processes, reliable payment mechanisms, and strong transitional regulations.

6.2 PPP Contract Types

The spectrum of PPP contract types, adapted from WB (2017) for the context of green energy projects, highlighting varying levels of private sector involvement, can be illustrated in Figure 6.1. At the lower end, contracts like the Design-Build contract for new renewable energy infrastructure involve minimal private participation, where private firms are responsible only for construction, while the public sector manages financing, operation, and maintenance. Progressing along the spectrum, models such as the Management contract for green power plants and Affermage for sustainable energy utilities introduce greater private involvement in operations and maintenance, though the government retains asset ownership and investment responsibilities.

Figure 6.1 The spectrum of PPP Contract Types



Source: Adapted from WB (2017).

Transitioning to more collaborative partnerships, the Design-Build-Finance-Maintain (DBFM) contract for renewable energy facilities shifts financial and maintenance obligations to the private sector, with government payments linked to energy production performance and sustainability targets. Further along, the Independent Power Producer (IPP) model significantly increases private sector responsibility by requiring firms to design, build, finance, operate, and maintain renewable energy plants, such as wind or solar farms, while selling electricity to the public grid, thus encouraging innovation and efficiency. Similarly, the

concession model for green energy infrastructure, such as electric vehicle charging networks, allows private firms to expand and operate systems while generating revenue directly from users, enhancing market-driven sustainability solutions.

At the highest level of private participation, licensed, regulated green energy distribution companies are fully privately owned and operated, subject to environmental regulations to ensure alignment with national decarbonisation goals. This progression demonstrates how increasing private sector involvement can drive investment, innovation, and efficiency in green energy transitions, while also underscoring the need for strong regulatory frameworks to safeguard environmental and public interests. A central characteristic of a PPP contract is that it bundles together multiple project phases or functions. Table 6.1 outlines key PPP terminology and illustrates how each term corresponds to the asset types, functions, and payment mechanisms.

Table 6.1 Infrastructure Contract Nomenclature

Contract Nomenclature	Overview Description and Reference	Type of Asset	Functions Transferred	Payment Source
Design-Build-Finance-Operate-Maintain (DBFOM); Design-Build-Finance-Operate (DBFO); **Design-Construct-Manage-Finance (DCMF)**	These PPP contract types are classified based on the functions delegated to the private sector. The maintenance function is sometimes omitted from the description; for instance, a contract transferring design, build, finance, operate, and maintain functions might simply be labelled as DBFO, with maintenance understood to be included within operations. Another similar term is Design-Construct-Manage-Finance (DCMF), which is essentially equivalent to a DBFOM contract.	New infrastructure	As captured by the contract name	Can be either the government or user pays
Build-Operate-Transfer (BOT), Build-Own-Operate-Transfer (BOOT), Build-Transfer-Operate (BTO)	This method of describing PPPs for new assets highlights the legal ownership and control of project assets. In a BOT project, the private company retains ownership of the assets until they are transferred at the end of the contract. BOOT is often used synonymously with BOT, as noted by Yescombe (2007). Conversely, in a Build-Transfer-Operate (BTO) contract, ownership is transferred immediately after construction is completed. As Delmon (2015, pp. 20–21)	New infrastructure	Typically, design, build, finance, maintain, and some or all operations Under some definitions, BOT or BTO may not include private finance, whereas	Can be either government or user pays

	explains, ownership rights primarily influence how the handover of assets is managed at the conclusion of the contract.		BOOT always includes private finance	
Rehabilitate-Operate-Transfer (ROT)	In either of the naming conventions mentioned above, “Rehabilitate” can replace “Build” when the private party's responsibility involves rehabilitating, upgrading, or extending existing assets rather than constructing new ones.	Existing infrastructure	As above, but *rehabilitate* inst ead of *build*	As above
Concession	The term “concession” is applied to various types of contracts, as outlined by Delmon (2010, Box 1, p. 9). Its meaning can vary by jurisdiction; in some cases, it refers to a specific contract type, while in others, it is used more broadly. Within the PPP context, a concession typically refers to a user-pays PPP. For instance, in Brazil, the Concession Law exclusively governs user-pays contracts, whereas a separate PPP Law applies to contracts requiring government payments. Conversely, in some cases, “concession” serves as a general term encompassing a wide range of PPP types. For example, in Chile, all recent PPPs, including fully government-funded contracts, have been implemented under the Concession Law.	New or existing infrastructure	Design, rehabilitate, extend or build, finance, maintain, and operate—typically providing services to users	Usually user pays—in some countries, depending on the financial viability of the concession, the private party might pay a fee to government or might receive a subsidy
Private Finance Initiative (PFI)	The United Kingdom was among the first countries to adopt this PPP concept and introduce it under the term Private Finance	New infrastructure	Design, build, finance, maintain— may	Government pays

	Initiative (PFI). PFI is commonly used to describe a PPP approach for financing, constructing, and managing new infrastructure projects.		include some operations, but often not providing services directly to users	
Operations and Maintenance (O&M)	O&M contracts for existing assets can be classified as PPPs when they are performance-based, long-term, and require substantial private investment. These are sometimes referred to as performance-based maintenance contracts.	Existing infrastructure	Operations and maintenance	Government pays
Affermage	In this framework, PPP contract types are classified based on the functions delegated to the private sector. The maintenance function is sometimes omitted from the description; for instance, a contract transferring design, build, finance, operate, and maintain functions might simply be labelled as DBFO, with maintenance understood to be included within operations. Another similar term is Design-Construct-Manage-Finance (DCMF), which is essentially equivalent to a DBFOM contract.	Existing	Maintain and operate, providing services to users	User pays - private party typically remits part of user fees to government to cover capital expenditures
Management Contract	The state retains ownership of the assets, and the public sector is responsible for capital expenditure, while the private sector manages operation and maintenance. Such contracts typically have a duration of 3 to 5 years.	Existing	Operations and maintenance	Management fees extended to the contractor

Source: WB (2017).

Among EMDCs, the BOOT model has seen significant success, particularly in South American nations like Brazil, Chile, Colombia, and Peru, as well as in India for interstate transmission lines. The BOOT model allows private investors to finance, construct, own, and operate transmission infrastructure for a specified period before transferring ownership back to the government. This model not only helps reduce system costs but also diversifies funding sources. Evidence from Brazil and Peru shows that competitive bidding under the BOOT framework often results in transmission prices significantly below regulator cost estimates, with Brazil averaging a 30% discount over 20 years and Peru achieving a 36% discount across 15 tenders between 1998 and 2013 (WB, 2017). India's BOOT projects have also gained investor confidence, successfully issuing AAA-rated non-recourse bonds and refinancing project debt.

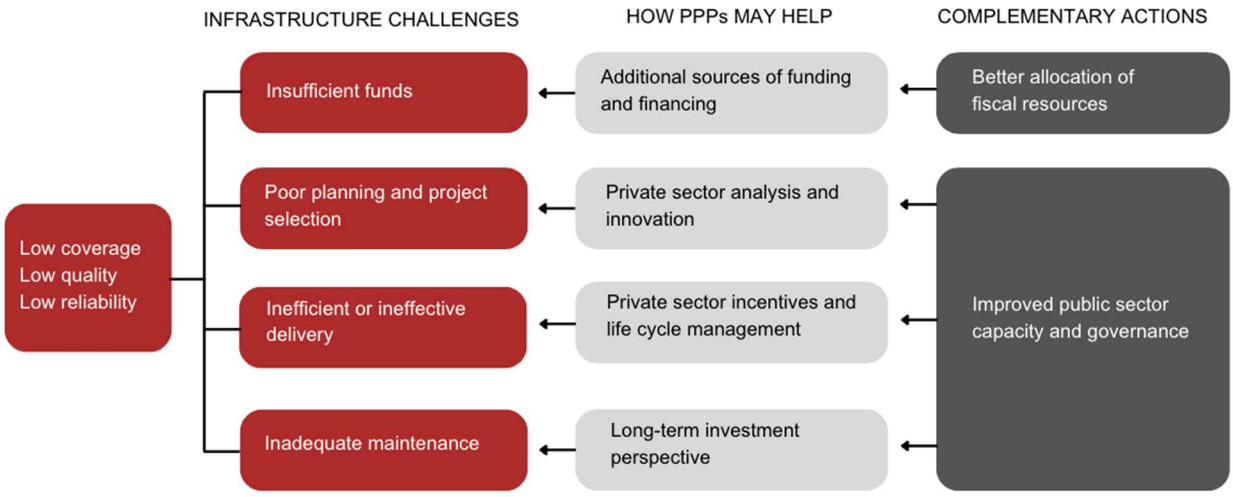
On the other hand, the concession model has been applied with mixed results in various EMDCs. For example, in the Philippines, a private consortium combining international and local investors secured a concession from 2009 to 2034 to operate, maintain, and expand the transmission network, while the government maintained ownership of the infrastructure. However, similar concession agreements in Cameroon, Mali, and Senegal faced challenges, resulting in early terminations or the government reclaiming majority ownership. Turkey's power sector reforms highlight the importance of combining regulatory improvements with pricing policies and utility restructuring—such as separating transmission from generation and distribution and privatising distribution networks—to effectively mobilise private capital. These diverse global experiences underscore the need for tailored approaches in designing public-private models that align with a country's regulatory framework and market dynamics to successfully attract private investment in energy infrastructure.f

6.3 The Rationales for PPPs

Infrastructure plays a vital role in driving economic development and promoting environmental sustainability. However, inadequate infrastructure poses a significant barrier to growth and adversely affects quality of life, especially in developing countries. To address

these challenges, PPPs are essential for delivering effective solutions to critical infrastructure needs in the green energy sector across EMDCs (Figure 6.4).

Figure 6.2 The Challenges with Infrastructure and How PPPs Can Help



Source: WB (2017).

To begin with, renewable energy projects often face funding constraints due to the substantial upfront costs of technologies such as solar farms, wind turbines, and energy storage systems. In response, PPPs can address this issue by unlocking additional funding and financing opportunities, encouraging private investment to expand clean energy infrastructure. Moreover, strategic public measures, like the more efficient allocation of fiscal resources, can further enhance the flow of funds towards sustainable initiatives. In addition, poor planning and project selection pose significant barriers to the successful implementation of green energy projects, particularly when governments lack the technical expertise needed for emerging technologies. To tackle this, PPPs leverage private sector analysis and innovation, leading to more efficient project design and deployment.

Additionally, addressing inefficient or ineffective delivery is equally critical, as delays or poorly executed projects can slow the energy transition. Here, private sector incentives and life cycle management can enhance project performance, ensuring timely and cost-effective implementation. Furthermore, green energy systems demand continuous upkeep to maintain efficiency, yet inadequate maintenance remains a persistent challenge. PPPs can resolve this by adopting a long-term investment perspective, aligning maintenance incentives with the entire lifecycle of green infrastructure. These advantages are maximised when combined with improved public sector capacity and governance, ensuring accountability, regulatory compliance, and alignment with climate objectives. Overall,

integrating PPPs into green energy projects can drive innovation, efficiency, and sustainability, accelerating the global shift towards clean energy.

One notable example of the critical role of PPPs in addressing energy shortages and driving development is the case of Pamir Energy in Tajikistan (Jumaev, 2016). Following independence from the Soviet Union and a devastating civil war, the Gorno-Badakhshan Autonomous Region faced severe energy crises, which severely hindered economic and human development. To tackle this, the Government of Tajikistan signed a 25-year PPP agreement with Pamir Energy, supported by the Aga Khan Fund for Economic Development, the World Bank, the Swiss Economic Cooperation Office, and the IFC. The project focused on upgrading and operating the region's outdated hydroelectric infrastructure.

Despite significant challenges in securing contractors and materials, the project was completed on time and within budget by 2006. Initial hurdles, such as resistance to higher energy tariffs and a culture of non-payment, were gradually overcome, enabling Pamir Energy to expand its operations and even export electricity to Afghanistan. By 2016, the initiative provided renewable energy to 226,000 people in Tajikistan and 28,500 in Afghanistan, with plans to expand to an additional 170,000 in Afghanistan over the following five years. This case highlights how PPPs can effectively mobilise resources, leverage international expertise, and deliver sustainable energy solutions, fostering regional development and cross-border energy cooperation.

6.4 PPP Project Structure

The structuring and implementation of Public-Private Partnership (PPP) projects require a robust framework that addresses critical regulatory and financial considerations. While PPP frameworks vary by country, successful programs share key principles, such as effective risk allocation, transparent legal frameworks, sound financial structuring, and strong institutional oversight. Governments worldwide have developed structured PPP models that define clear policies, regulations, and financial risk management mechanisms, ensuring long-term sustainability. As highlighted in the PPP Reference Guide by the WB (2017), a strong PPP framework should establish governance structures that facilitate private sector participation while maintaining public sector oversight. Table 6.2 provides a structured overview of key PPP areas, primary considerations, and global best practices.

Table 6.2. Key considerations in PPP structuring and implementation

Key PPP Area	Primary Consideration	Global Best Practices
Risk Allocation and Mitigation	Define a risk-sharing mechanism that allocates financial, operational, and regulatory risks to the most capable party.	South Africa's structured risk transfer approach enhances value-for-money; Chile and Australia integrate contingent liability assessments into project screening to manage fiscal risks.
Legal and Regulatory Framework	Establish a strong legal framework with clear government commitments, contract enforcement, and regulatory oversight.	South Africa and Chile align PPPs with national infrastructure plans while controlling fiscal risks; India and South Africa have dedicated PPP units to oversee project approvals.
Financial Structuring and Funding Mechanisms	Diversify financing sources, including government support, viability gap funding, blended finance, and guarantees, to enhance project feasibility.	India’s Infrastructure Project Development Fund (IPDF) supports early-stage PPP development; Chile and South Africa have structured fiscal policies for managing contingent liabilities.
PPP Screening and Project Appraisal	Implement a rigorous multi-stage screening process to ensure only feasible, commercially viable, and fiscally responsible projects advance.	South Africa’s framework includes structured screening factors; Korea, Chile, and Australia use a multi-stage appraisal process for value-for-money assessments.
Contract and Performance Management	Define clear performance metrics and contract enforcement mechanisms to ensure accountability in long-term PPP agreements.	Chile’s Concessions Unit monitors PPP compliance through audits; South Africa incorporates structured approval stages for transparency.

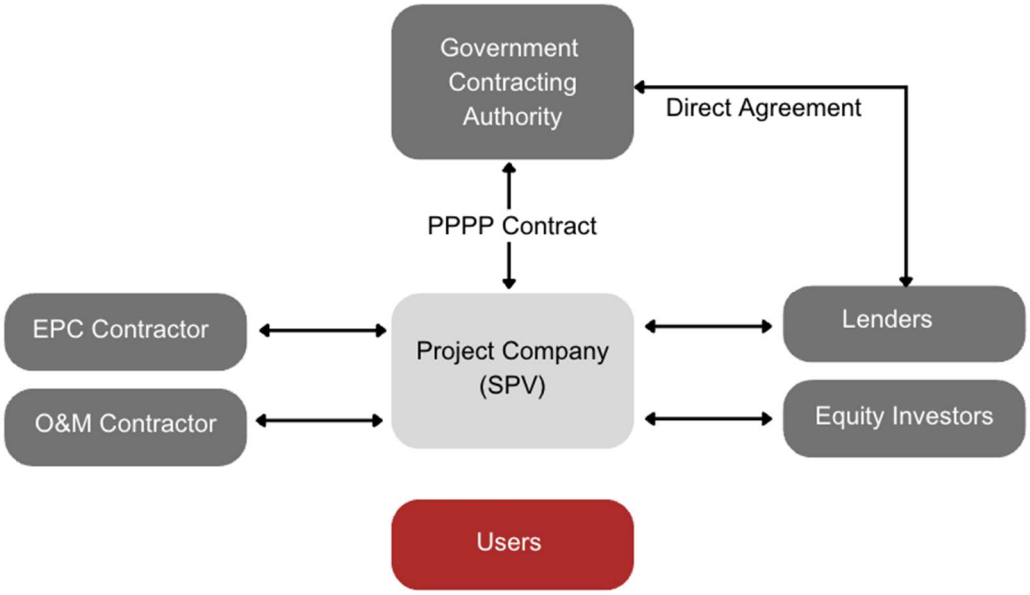
Market Maturity and Private Sector Participation	Maintain a transparent PPP pipeline and competitive procurement processes to foster investor confidence.	Chile and Canada publicly disclose their PPP pipelines; the UK, and Australia use competitive dialogue and bidder conferences to refine procurement.

Source: Author's compilation based on WB (2017).

Within this broader framework, Special Purpose Vehicles (SPVs) serve as a key structural element in the financial and contractual organization of PPP projects. As can be seen in Figure 6.3, most PPP contracts involve a Special Purpose Vehicle (SPV), a project company specifically created to manage the project. The SPV is responsible for securing project financing, overseeing construction and operations, and allocating risks between public and private stakeholders.

To finance the project, the SPV relies on a combination of equity, provided by its shareholders, and debt, obtained from banks, bonds, or other financial instruments. Notably, equity investors—often project developers, engineering firms, infrastructure management companies, or private equity funds—bear the highest risk, as they are "first in, last out" in the event of losses. In contrast, debt providers, such as commercial banks, development banks, and institutional investors, face lower risks due to their senior repayment rights.

Figure 6.3 PPP Project Structure

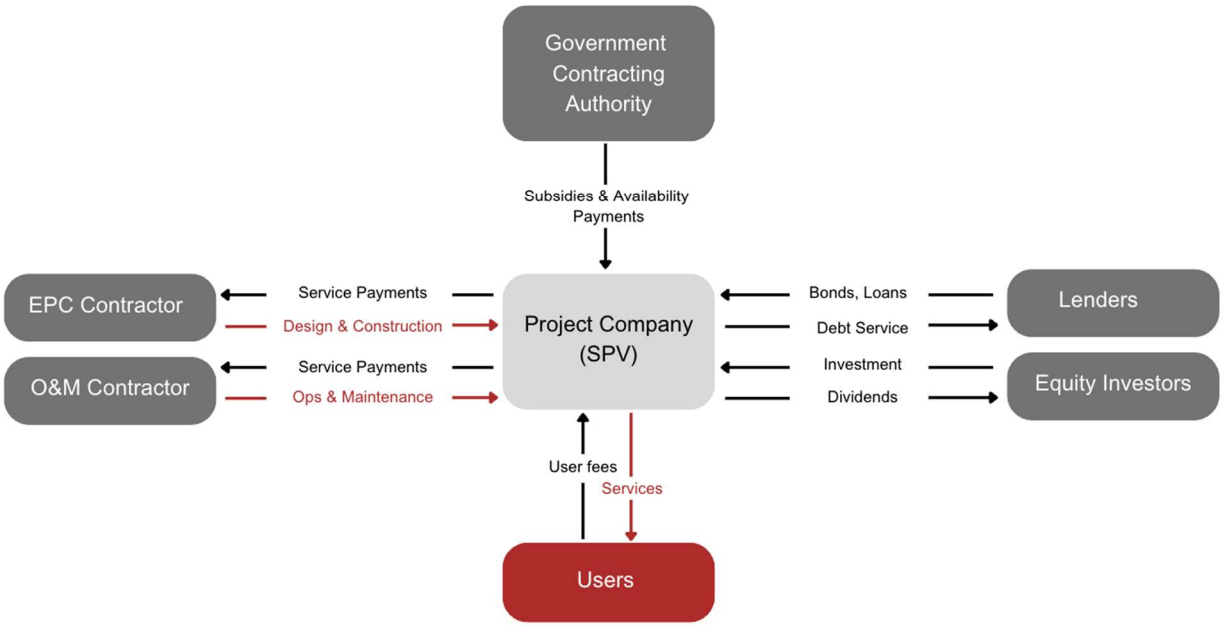


Source: WB (2017).

Furthermore, the SPV's contractual structure includes agreements with the government and contractors responsible for engineering, procurement, and construction (EPC), as well as operations and maintenance (O&M). Typically, equity investors aim to minimise financing costs by incorporating a high proportion of debt, which is comparatively cheaper than equity. Additionally, financial modelling adjusts debt repayment and dividend flows to align with projected revenues from user fees and government payments, alongside construction and operational expenditures. Finally, the proportion of equity and debt varies by project and country, depending on the specific risks assumed by the PPP operator.

Figure 6.4 illustrates the flow of funds in a PPP structure commonly used for green energy projects. The Government Contracting Authority provides subsidies and availability payments to ensure the financial viability of the project, addressing potential revenue gaps and incentivising private sector participation. A Project Company (SPV), created specifically for the project, serves as the central hub, managing financing, construction, operations, and maintenance. This entity secures funding from two primary sources including Equity Investors, who provide capital in exchange for dividends generated from project revenues, and Lenders, such as banks or climate funds, offering loans or bonds that are repaid through debt service.

Figure 6.4 Flow of Funds



Source: WB (2017).

The SPV then uses this funding to hire two contractors: the EPC Contractor, responsible for the design and construction of the green energy infrastructure (e.g., wind turbines or solar farms), and the O&M Contractor, who ensures the smooth operation and maintenance of the facility after construction. Both contractors are compensated via service payments from the SPV. Revenues for the SPV come from User Fees, paid by end-users consuming the green energy (e.g., households, businesses, or the electricity grid), and government payments. This financial structure ensures risk-sharing between the public and private sectors, facilitates large-scale capital investment, and supports the delivery of environmentally sustainable energy projects. It balances financial returns for private stakeholders while achieving public goals such as renewable energy adoption and reduced carbon emissions.

6.5 Lessons Learned and Recommendations for Vietnam

Power sector projects, especially those involving the development of power generation and transmission infrastructure, require significant capital investment. This is particularly evident in many developing countries, where rapid population and economic growth are driving a surge in electricity demand, creating a substantial infrastructure gap. Public-Private Partnerships (PPPs) can effectively address this challenge by providing governments with

access to private sector funding, advanced technology, and expertise. Given the diverse nature of power projects, PPPs in this sector can take various forms, each tailored to specific needs. Therefore, the design and structure of a PPP or a broader PPP programme must be carefully customised to align with the unique circumstances of a country, region, or individual project.

As demonstrated in the Pro Mini-Grids Programme case study, a key feature was the application of the Build-Own-Operate-Transfer (BOOT) contract model, a form of PPP particularly well-suited to EMDCs. BOOT contracts enable the private sector to build and operate infrastructure projects for a specified period before transferring ownership to the public sector. This model reduces upfront government expenditure, ensures risk-sharing, and attracts private investment by offering structured concession periods. Under the programme, BOOT contracts with 10-year concession periods were implemented, with Winch Energy successfully winning both rounds of procurement tenders in 2017 and 2021.

The programme facilitated government efforts to bundle mini-grid projects into larger tenders, attracting private investment and streamlining development. Partial subsidies for generation assets and pre-prepared contracts further enhanced investor confidence. The Electricity Regulatory Authority (ERA) ensured that projects met licensing, tariff, and technical standards, and regulated conditions for future integration with the national grid. Meanwhile, the Rural Electrification Programme aligned mini-grid development with national electrification objectives by identifying potential sites, managing rural electrification strategies, and overseeing the tendering process. This coordinated approach highlights how PPP models, such as BOOT, can successfully address energy access challenges in EMDCs by leveraging the strengths of both the public and private sectors while ensuring alignment with long-term development goals.

In Vietnam’s context, particularly in the development of green energy infrastructure, one potential new PPP contract model (see Box 6.1 for existing PPP contract type legalised in Vietnam) that could be considered is the BOOT. This model offers several advantages tailored to the country's needs for sustainable energy development.

Box 6.1 Existing PPP contract types in Vietnam’s Law.

Vietnam has made notable progress in establishing a legal framework for PPPs, aiming to attract financial and technological investments, particularly in renewable energy. The country views PPP as a strategic tool to mobilise domestic and international capital for energy development. On June 18, 2020, the National Assembly of Vietnam passed the law on public-private partnership (PPP)

investment, which regulates investment activities and private investment attraction in several important and essential infrastructure areas under the PPP model. The law aims to create a sufficiently strong legal framework for relevant parties to fulfill their obligations in PPP contracts. It focuses on five essential areas: transport; power grid and plants; irrigation, clean water supply, water drainage, and wastewater and waste treatment; healthcare and education – training; and information technology infrastructure. Key regulations governing energy PPPs also include several decrees on financial management, project assessment, and regulatory implementation. A recent 2024 decree also defines the transfer of private power infrastructure to EVN as public property.

Accordingly, a PPP project involves proposals for investing in public products and services through activities such as the construction, operation, and business of infrastructure; the renovation, upgrading, expansion, modernisation, operation, and business of existing infrastructure; and the operation and business of available infrastructure. PPP investment refers to a form of investment characterised by fixed-term cooperation between the state and a private investor through a PPP project agreement, aimed at encouraging private sector participation in such projects**.** Article 45 of this law lists a range of PPP contract types as follows:

- **Contracts with Direct Fee Collection or Underwriting for Public Services:**
    a. **BOT** (Build-Operate-Transfer): The investor builds and operates infrastructure for a set term, then transfers it to the State.
    b. **BTO** (Build-Transfer-Operate): The investor builds infrastructure, transfers it to the State after completion, and then operates it for a specified period.
    c. **BOO** (Build-Own-Operate): The investor builds, owns, and operates infrastructure for a set term, then terminates the contract.
    d. **O&M** (Operate & Manage): The investor operates and manages existing infrastructure for a set term, then terminates the contract.
- **Contracts with State Payment Based on Service Quality:**
    a. **BTL** (Build-Transfer-Lease): The investor builds infrastructure, transfers it after completion, and supplies public services based on operation. The State leases the service and pays the investor.
    b. **BLT** (Build-Lease-Transfer): The investor builds infrastructure, supplies public services during operation, and transfers it to the State after a specified period. The State leases the service and pays the investor.
- **Mixed Contracts:**
    a. These combine elements from the above contract types to suit specific project needs.

The PPP Law defines the sectors eligible for PPP investments and sets minimum investment thresholds and equity contribution requirements for each sector. For power transmission and distribution projects, the minimum investment is VND 200 billion, while projects in economically disadvantaged areas require at least VND 100 billion. Furthermore, under the PPP Law, private investors must contribute a minimum of 15% of the total investment capital as equity.

The approval process for PPP projects involves multiple stages of evaluation, including feasibility studies, environmental impact assessments, public consultations, and bidding processes. Investors must comply with complex licensing requirements from regulatory bodies such as:

- **Ministry of Planning and Investment (MPI):** overseeing financial approvals and structuring.
- **Ministry of Industry and Trade (MOIT):** managing energy regulations and grid integration.
- **Vietnam Electricity (EVN):** approving power purchase agreements (PPAs) and transmission connections.

As Vietnam transitions from a Feed-in Tariff (FiT) system to competitive bidding, the government has introduced transitional regulations to ensure market stability. These regulations provide clarity on (1) the treatment of existing projects developed under the FiT regime; (2) the new competitive auction framework, where energy pricing is determined through market-based bidding; and (3) contract renegotiation mechanisms for projects affected by policy changes. These measures aim to reduce investor uncertainty while ensuring a fair and competitive energy market.

Under the PPP framework, the government can contribute up to 50% of project capital for key infrastructure sectors, including renewable energy. The state capital is primarily allocated for:

- Site clearance and land acquisition, which remains a significant cost in energy infrastructure development. Delays in land allocation and site clearance can increase project costs and stall energy developments
- Initial funding for high-risk projects, such as offshore wind and large-scale grid expansion.
- Subsidies for public-interest projects, ensuring that essential infrastructure remains financially viable.

Source: Vietnam's National Assembly (2020).

First, significant new infrastructure is needed to meet its growing energy demands and reduce reliance on fossil fuels. The BOOT model enables the private sector to finance, design, and build the required green energy infrastructure, such as solar, wind, or hydroelectric power plants. The government retains ownership once the concession period ends, which helps address the infrastructure gap while reducing immediate fiscal burdens on the government.

Second, renewable energy projects, especially in the power sector, require substantial investment. The BOOT model allows the private sector to finance the construction and operation of green energy projects, with the private partner recouping their investment over time through the operation of the plant under a fixed concession period. This structured

approach often includes guaranteed returns, thereby reducing the immediate fiscal burden on the government.

Third, the expertise and technology required for green energy technologies such as solar and wind can be complex. The BOOT model allows the private sector to bring in the necessary technology and expertise to efficiently build and operate the infrastructure. The BOOT model enables the government to meet these energy goals while still maintaining ownership of the assets at the end of the concession period. The government can also negotiate specific conditions to ensure alignment with national sustainability targets, such as emission reduction commitments.

Finally, BOOT can help facilitate risk mitigation. Power sector projects are often subject to fluctuations in demand, regulatory changes, and operational risks. In the BOOT model, risks are shared between the public and private sectors, with the private investor assuming much of the construction and operational risk. This helps the government manage its exposure to such risks. The use of concessions can also provide flexibility in structuring the agreements, such as offering preferential tariffs or access to green energy credits. Finally, the long-term sustainability of renewable energy infrastructure is a major consideration. The BOOT model is well-suited for projects that require ongoing maintenance and operation over time. The private partner is incentivised to maintain the infrastructure in good working condition during the concession period, ensuring operational longevity and reliable energy generation.

The BOOT (Build-Own-Operate-Transfer) and the common BOT (Build-Operate-Transfer) models both involve the private sector in infrastructure projects, but they differ in key aspects. In a BOOT model, the private sector builds, owns, and operates the infrastructure for a specified period before transferring ownership to the government, allowing for full control and responsibility during the concession period. This model often attracts private investment by offering long-term security and incentives, crucial for capital-intensive projects like renewable energy. Conversely, the BOT model involves the private sector building and operating the infrastructure, but ownership is transferred to the government immediately after construction is completed, with the private sector operating the project for a set period before handing over operational control. This typically involves less risk for the private sector since ownership is transferred sooner, and the government may bear more of the financial burden and operational risks after the initial construction phase

Incorporating the BOOT model in clean energy projects in Vietnam could be beneficial due to its ability to attract private investment, bring in advanced technology and expertise, and reduce the immediate fiscal burden on the government. However, it is essential to carefully consider the higher risks for private investors and the potential for complex negotiations. Vietnam can explore the diversification of PPP activities to create more flexible options to attract private sector participation in building, operating, and upgrading its infrastructure.

This is especially relevant in the context of the energy transition, by researching and legalising new types of PPP contracts such as BOOT to fit the context of Vietnam, leveraging success stories from international experiences while avoiding unexpected outcomes.

In addition, as discussed in Section 6.4 and Table 6.2, a comprehensive PPP framework should integrate several critical success factors for effective implementation. These include risk-sharing mechanisms, legal and regulatory clarity, financial incentives, and the bankability of contracts. Below are the key elements to consider:

- **Risk-sharing mechanisms and guarantees**: Clear frameworks for allocating risks - such as construction delays, demand shortfalls, and regulatory changes - are essential. Government-backed guarantees and partial subsidies can de-risk investments, improving project bankability. Chile and South Africa have successfully employed contingent liability frameworks to protect public finances while attracting private capital.
- **Financial viability and subsidies**: For projects with limited commercial returns (e.g., rural electrification or offshore wind), tools such as viability gap funding, feed-in premiums, or availability payments can enhance investment attractiveness while serving public interests.
- **Regulatory and institutional capacity**: Strong, transparent, and predictable regulatory environments are fundamental. Dedicated PPP units, like those in South Africa and India, play a vital role in project screening, appraisal, and monitoring. Vietnam could improve inter-agency coordination - especially with the ongoing government restructuring - between MPI, MOF, MOIT, and EVN to streamline approvals and reduce investor uncertainty.
- **Bankability and long-term contract enforcement**: Standardized power purchase agreements (PPAs), effective dispute resolution mechanisms, and protections against retroactive policy changes are crucial for securing financing from both domestic and international lenders.

7 Conclusions and Next Steps

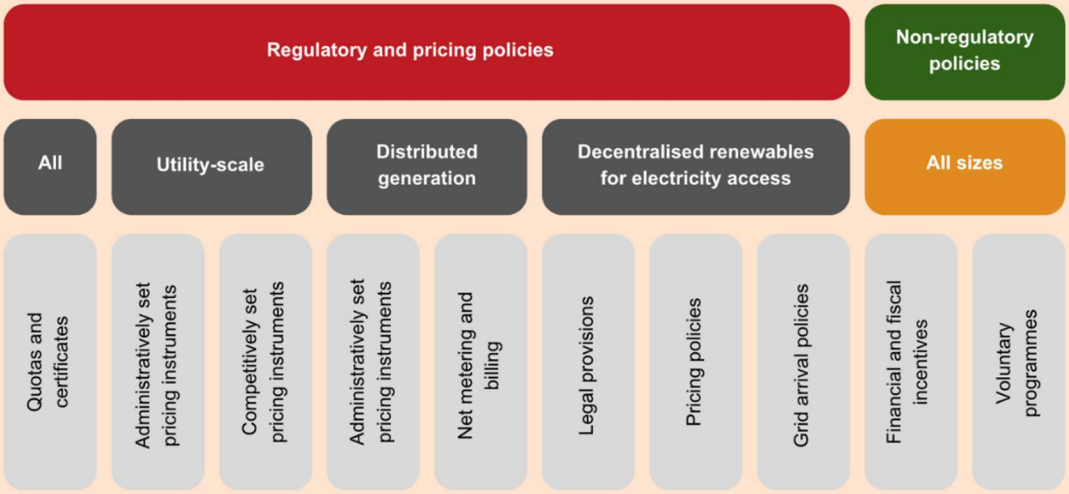
This report underscores the critical importance of a multifaceted approach to effectively mobilise private capital resources, drawing on specific case studies, best practices, and a comprehensive review of international trends and practices. Key elements of this approach include robust policy support, diverse financing mechanisms, risk mitigation strategies, and active stakeholder engagement. Box 7.1 outlines general recommendations by the IEA (2023) to catalyse private capital in the energy sector for emerging markets and developing countries (EMDCs).

Box 7.1 Global experiences in mobilising private capital to support energy transition and finance structures for the energy sector

Mobilising private finance at the scale and pace required for clean energy projects necessitates coordinated action on several fronts.

Creating an Enabling Environment: Governments in EMDCs must establish a supportive environment for private investment. This involves strengthening the institutions responsible for energy sector operation and governance, ensuring that policies and regulations foster private sector engagement and confidence.

Figure 7.1. Policies facilitating private sector capital in clean energy sector



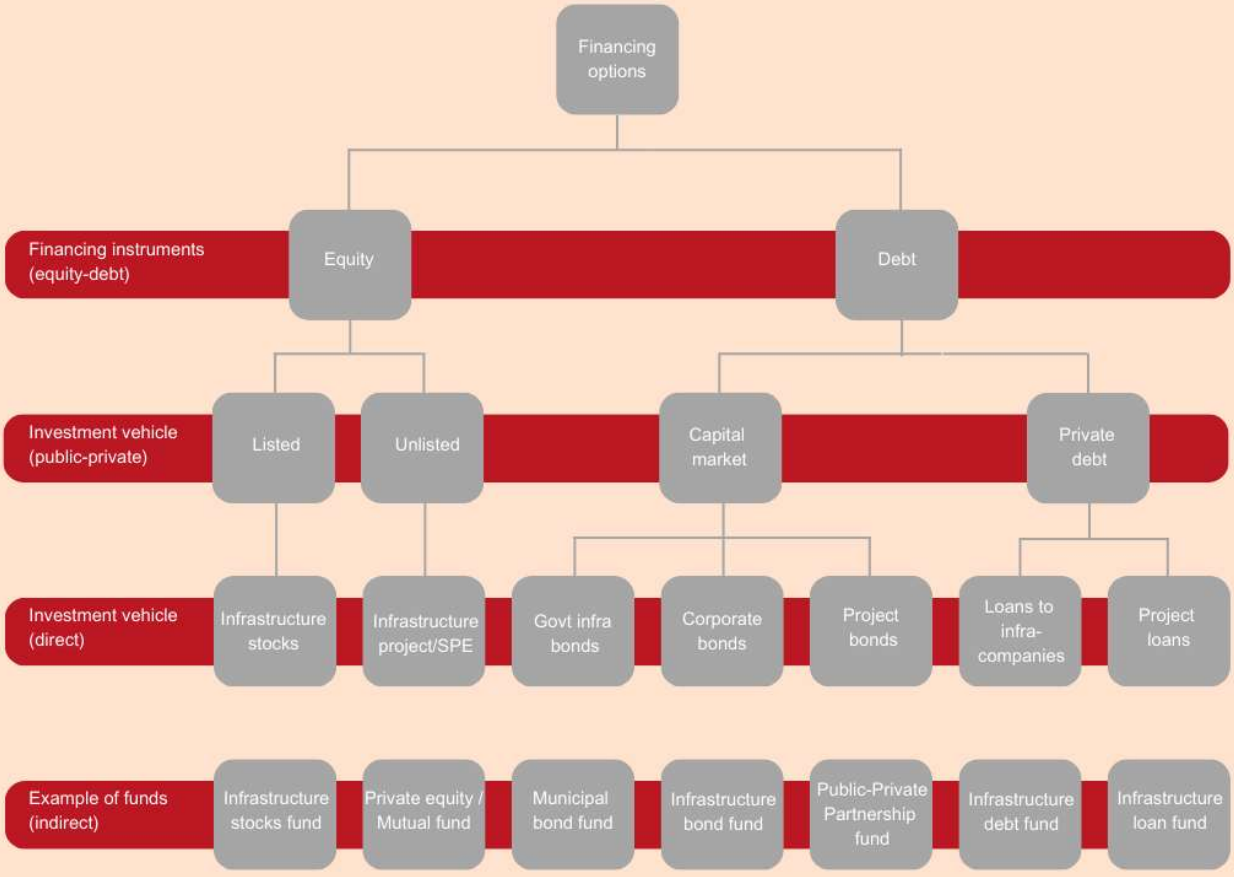
Source: IEA (2023).

Scaling Up Concessional Finance: To attract private investors, substantial increases in concessional finance are crucial. Concessional finance, including guarantees, senior or

subordinated debt, equity, performance-based incentives, and other financial instruments, can mitigate country and project risks, enhance credit quality, and improve financing terms. These measures help address the risks associated with clean energy projects and make them more appealing to private investors.

Enhancing Green Financing Instruments: New green financing instruments and platforms, such as green bonds, sustainability-linked loans, project aggregation platforms, and voluntary carbon markets, need to be further developed and refined. These innovations must be designed to attract international investment capital at scale, supporting credible and robust transition plans for clean energy projects.

Figure 7.2. Examples of energy project financing and investment options



Source: IEA (2023).

Deepening Capital Markets: To scale domestic private investment in clean energy, EMDCs need to develop deeper capital markets and more robust financial systems. This includes creating more sophisticated financial instruments and mechanisms that facilitate

local investment and integrate seamlessly with international capital flows. Blended finance can play a crucial role by enhancing financial structuring flexibility, particularly in areas such as loan tenors and risk mitigation mechanisms. This is especially important for long-term public-private partnerships (PPPs), where cash flow uncertainties can deter private investment.

Building on the analysis and insights from previous sections, the following specific recommendations are proposed to facilitate the mobilisation of private capital in Vietnam's energy sector:

1. **Strengthening Decarbonisation and Just Transition Strategies:** Vietnam has made significant strides in developing a decarbonisation strategy, including the integration of just transition principles to support affected workers and communities. Building on this foundation, the focus should now shift to strengthening implementation mechanisms, tracking progress against measurable targets, and streamlining processes to ensure timely and effective outcomes. To remain aligned with global climate goals and international agendas, Vietnam should establish a process for regularly updating its strategy, incorporating the latest technological advancements, policy innovations, and international best practices. A robust just transition framework not only ensures social equity but also serves as a compelling factor for attracting DFIs and international donors, who increasingly prioritise projects that combine environmental sustainability with inclusive development. By refining the roadmap for coal phase-out, accelerating renewable energy deployment, and expanding support for vulnerable communities, Vietnam can advance a more sustainable and equitable energy transition while positioning itself as a proactive participant in the global climate agenda.

2. **Establish a Transparent and Supportive Policy Framework:** Vietnam should develop a clear and transparent policy framework, such as a green taxonomy, to guide investments and ensure alignment with national sustainability goals. This framework should be supported by enabling regulations, including feed-in tariffs, tax incentives, and streamlined approval processes for green projects, to encourage private sector participation. Addressing market barriers through active engagement with the private sector will be essential to create a conducive environment for investment. Additionally, the framework should be regularly reviewed and updated to reflect evolving international standards and market dynamics, ensuring Vietnam remains competitive in attracting global capital for its energy transition.

3. **Develop a Robust Legal Framework for Diverse Financing Mechanisms:** Vietnam should establish a comprehensive legal framework to enable a wide range of de-risking mechanisms, blended finance models, and innovative financial instruments. This includes fostering Public-Private Partnerships (PPPs) by introducing flexible contract structures, such as BOOT models, and expanding the use of concessional finance tools such as guarantees, senior or subordinated debt, equity, and performance-based incentives. These instruments can mitigate country and project risks, enhance credit quality, and improve financing terms, making clean energy projects more attractive to private investors. Additionally, the framework should support the development of green financing instruments, such as green bonds, sustainability-linked loans, project aggregation platforms, and voluntary carbon markets, to attract international investment at scale. By creating an enabling environment for these mechanisms, Vietnam can address the risks associated with clean energy projects and mobilise private capital more effectively.

4. **Leverage International Financial Centers (IFCs) to Attract Global Capital:** Vietnam's plans to establish International Financial Centers (IFCs) in Ho Chi Minh City and Da Nang present a unique opportunity to attract foreign investment for the energy transition. These IFCs can serve as hubs for global financial services, offering a platform for international investors, financial institutions, and green technology providers to collaborate on sustainable projects. By aligning the IFCs' operations with global best practices in green finance, Vietnam can position itself as a regional leader in mobilising capital for clean energy and just transition initiatives. The IFCs should also facilitate the development of innovative financial instruments, such as green bonds and sustainability-linked loans, while providing a conducive regulatory environment to attract private capital. This strategic move will not only enhance Vietnam's access to international funding but also strengthen its role in the global green finance ecosystem.

5. **Enhance Cooperation with International Partners**: Strengthening partnerships with international organisations and leveraging multilateral and national development banks (MDBs and NDBs) can scale up climate finance. Ensure that Vietnam's energy policies align with global trends and developments, especially in light of the US's recent decision to leave the Paris Agreement and similar considerations from countries like Indonesia. Innovative financial instruments, such as green and just transition bonds, should be explored to mobilise resources. Standardising project documentation with donor expertise will also improve efficiency and transparency.

6. **Deploy Public Funds Strategically**: Public funds should be strategically deployed to de-risk high-impact projects, particularly in renewable energy and energy

efficiency. Concessional funding should be used judiciously, following the principles of the DFI Working Group on Blended Finance, to ensure that subsidies are applied only when necessary and with a clear path to commercial viability.

7. **Ensure Strong Governance and Transparency**: Robust governance structures and transparent decision-making processes are critical to prevent conflicts of interest and ensure the appropriate allocation of concessional funds. Clear roles for contributors and implementers of blended finance should be established to balance public and private sector interests. Projects should undergo rigorous scrutiny to ensure concessional capital is used effectively and directed toward high-impact initiatives.

8. **Build Local Market Capacity with International Support**: Targeted technical assistance and capacity-building programs are essential to empower workers, small businesses, and communities to adapt to and benefit from the energy transition. Strengthening local capital markets, including bond, equity, and derivatives markets, will increase domestic private investment, particularly for projects with revenue streams in local currencies.

9. **Implement Place-Based Investments**: Place-based investments should focus on coal-dependent regions and vulnerable communities to minimise social and economic disruptions. These targeted approaches will help Vietnam achieve its net-zero ambitions while fostering inclusive economic growth.

10. **Explore Regional/Provincial Funds**: Vietnam can bridge its clean energy financing gaps by establishing a national clean energy fund with independent management, clear investment priorities, and mechanisms to attract private capital while enabling major cities like Hanoi and Ho Chi Minh City to develop urban-level energy transition funds tailored to local needs. Drawing from the Mayor's Energy Efficiency Fund (MEEF) model, Vietnam should diversify funding sources—including concessional loans, carbon markets, and institutional investors—to reduce reliance on public budgets. Strategic public finance deployment through guarantees, concessional loans, and revolving instruments can help mitigate risks and attract private investment. High-impact projects such as solar adoption, grid modernization, and energy-efficient building retrofits should be prioritized, with technical assistance ensuring their bankability.

To translate these recommendations into actionable outcomes, the following next steps are proposed:

1. **Conduct an In-Depth Study of Vietnam's Context**: The next report within this project will assess Vietnam's financial landscape for energy transition, examining

financial structures, instruments, and private capital mobilisation**.** It will analyse financing trends, debt management, and regulatory gaps while evaluating the effectiveness of investment mechanisms. In addition, it will provide strategic recommendations to enhance resource allocation, strengthen financial instruments, and improve the regulatory environment for scaling up private capital for the energy transition.

2. **Develop a Roadmap for Implementation**: A clear roadmap should be developed to outline the steps, timelines, and responsibilities for implementing the recommendations. This roadmap should prioritise high-impact initiatives and align with Vietnam's broader climate and development goals.

3. **Strengthen Stakeholder Engagement**: Ongoing engagement with stakeholders, including government agencies, private sector actors, international partners, and local communities, will be critical to ensure buy-in and collaboration. Regular consultations and feedback mechanisms should be established to address emerging challenges and opportunities.

4. **Monitor and Evaluate Progress**: A robust monitoring and evaluation framework should be established to track progress, measure outcomes, and ensure accountability. Lessons learned should be documented and used to refine strategies and improve future initiatives.

5. **Foster Knowledge Sharing and Capacity Building**: Vietnam should actively participate in global knowledge-sharing platforms and leverage international expertise to build local capacity. Training programs, workshops, and peer-learning exchanges can enhance the skills and knowledge of stakeholders involved in the energy transition.

By adopting these recommendations and next steps, Vietnam can effectively mobilise private capital, strengthen its regulatory frameworks, and implement innovative financial instruments to accelerate its energy transition. Learning from global best practices while tailoring strategies to its unique context will enable Vietnam to achieve a sustainable, resilient, and inclusive energy future.

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