AVPI Policy Briefing

Clean Electricity Transition in Vietnam: Trends, Challenges and Enablers

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Australia Vietnam Policy Institute (AVPI)

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The AVPI enables and facilitates discussions on strategic and economic issues in the Australia-Vietnam bilateral relationship. Through disseminating the latest research, identifying upcoming trends and sharing practical insights from people with on-the-ground experience, the AVPI helps to advance a cooperative and secure environment for business and investment.

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Vietnam Sectoral Dialogues

Executive Summary

The shift towards clean electricity has gathered pace in Vietnam, with the country increasing its support for alternatives to coal. Asia Society Australia (ASA) has partnered with the Australia Vietnam Policy Institute (AVPI) to develop this briefing paper on the changing electricity landscape.

It identifies key issues and challenges faced by renewable energy investment. It also looks at potential areas where Australia can work with Vietnam to help facilitate investment in renewable energy and achieve a transition better aligned with the Paris Agreement goals. Insights from consultations with ten sector experts conducted between May and June 2023 constitute the primary resource material for the paper.

Key Findings

Private investment

This is crucial for turning Vietnam's ambitions for cleaner electricity future into actual progress. The investment required for an electricity transition surpasses the capacity of the country's public sector, which has funded most past power projects. This is especially so when the government is trying to control the public debt and spending.

Barriers to entry

Like other developing countries, private investors face project-specific issues (e.g., land acquisition and regulatory complexity), alongside sector-wide challenges for the market entry and integration of renewable energy. These challenges undermine risk-adjusted returns for investors and so limit the availability of bankable projects. Broader issues include currency risks and underdeveloped local capital markets.

Risk assessment

These issues mean private investors may favour renewable energy projects in lower risk, mature economies, which presents a significant just transition challenge to countries like Vietnam seeking sufficient funding for their climate aspirations.

Australia's role

Aid and planning support could help Vietnam address these challenges. This could provide opportunities for Australian enterprises across various areas including generation (e.g., rooftop solar PV, offshore wind), storage (e.g., green hydrogen and battery storage), grid planning and operation with high levels of renewable integration (such as smart grid technologies), and advice on project preparation and execution.

New architecture

Expanding new energy opportunities requires actions that go beyond standard business and financial strategies. There should be fundamental changes to improve the power sector's foundational architecture, to lower the risks and costs of renewable energy projects and to support private investment, both domestic and foreign. These actions should extend to planning practices, permitting processes, regulatory frameworks, governance structures, and financial mechanisms.

The outlook

The ramifications of these sector-wide changes are complex spanning individual lives to the broader economic structure. They cut across diverse policy domains, including energy security, economic development, and social wellbeing. Some issues Australian stakeholders should consider in relation to helping Vietnam navigate the transition to clean electricity include:

Hydropower:

The transition needs to reconcile the complexity of the process with the urgent need for swift action to combat the climate crisis. Initial emphasis on established renewable technologies like hydropower can help achieve such a reconciliation by reducing the immediate need for major sector reconfiguration. However, the role of hydropower in the long-term electricity generation mix as a dispatchable renewable capacity, needs careful reconsideration due to the growth of extreme weather events, often with more frequent drought conditions.

LNG Infrastructure:

The risk of stranded assets associated with LNG import facilities, which are required to support the rapid expansion of gas generation contemplated in the latest Power Development Plan (PDP 8), as gas-fired power plants are set to be gradually converted to use hydrogen after 2030.

Political economy factors:

Clean electricity transition is much more than a technological substitution process, with fossil-based generation replaced by clean alternatives. It also involves a reconfiguration of the sector, encompassing all its elements including grid infrastructure, market rules, regulatory frameworks, and consumer behaviours, to accommodate the changing technological landscape. This reconfiguration comprises intricate socio-technological processes with tensions between multiple stakeholders.

Regional power connectivity:

Deeper regional power connectivity could enable more effective use of complementary renewable energy resources (e.g., hydro, wind) that are distributed unevenly across the Mekong region. However, electricity-importing countries like Vietnam could face challenges if trading partners fail to export electricity. While electricity-exporting countries have incentives (e.g., revenues from electricity sales) to ensure a stable supply, it is also important to recognise that any supply failures represent only missed profit-making opportunities for the exporting country. These supply failures would, in contrast, incur real economic costs for the importing country, including power shortages, production curtailments, and job losses.

Beyond the electricity:

Facilitating Vietnam's clean electricity transition requires not only sufficient investment to support a rapid deployment of renewable energy technologies and systems, but also ensuring that such investment serves as a catalyst for upgrading local industries, creating job opportunities, and ultimately, fostering more sustainable development to bring long-term prosperity to the people of the country. Such positive outcomes would give policymakers confidence that they can go further and faster by setting more ambitious targets for driving the transition, creating ambitious loops. To achieve this, substantial additional efforts are required to maximise the development impact of renewable energy investment.

Introduction

The biggest challenge that lies ahead for countries across the globe, including Vietnam, is to build a future that fosters economic growth which is inclusive and sustainable. In the four years to 2021, the country's solar generation rose from almost nothing to nearly 26 TWh, accounting for about 11% of total electricity generation. Consequently, Vietnam has become the world's tenth-largest producer of solar power. In tandem, the country's share of fossil generation declined to 57% in 2021, from about 65% in the mid-2010s.

The country's transition towards a clean electricity future is very likely to deepen in the coming years, as it tries to further wean itself off fossil fuels for electricity generation. Specifically, it has committed to reaching peak carbon emissions from electricity generation by 2030, as part of the recently announced Just Energy Transition Partnership (JETP) agreement. The agreement also emphasises limiting coal production capacity at 30.2 GW, down from 37 GW contemplated in the current Power Development Plan (PDP) and having at least 47% of electricity generated from renewable sources by 2030.

Turning these commitments into real progress is not an easy task, especially considering the need, in the context of a fast-growing economy, to secure the supply of sufficient clean power to support the developmental aspirations of the country while progressing its decarbonisation agenda. As Vietnam grapples with the challenging task of achieving a clean electricity future, the demand for international support to assist the transition will increase dramatically.

Against this backdrop, the main purpose of this paper is to analyse Vietnam's changing electricity landscape, with specific emphasis on identifying key issues and challenges faced by renewable energy investment in the country, and potential areas where Australia can help facilitate significant investment in renewable energy projects, especially from the private sector.

Insights obtained from consultations with ten domain experts conducted between May and June 2023 constitute the primary resource material for the analysis in the paper. The experts are from a diverse range of organisations that have actively engaged in Vietnam's power sector. These organisations include public agencies, energy companies, consulting firms, international donor agencies, non-governmental organisations, and think tanks.

The rest of this paper is organised as follows. Section 2 provides an overview of the power sector in Vietnam and highlights the importance of increased private investment in driving the country's clean electricity transition. Based on inputs provided by domain experts, Section 3 presents key issues and challenges faced by renewable energy investment in Vietnam. Section 4 reflects on potential areas for a closer Australia-Vietnam cooperation to facilitate significant investment in renewable energy projects and unlock growth opportunities for Australian business.

Powering Vietnam:

Trends and developments

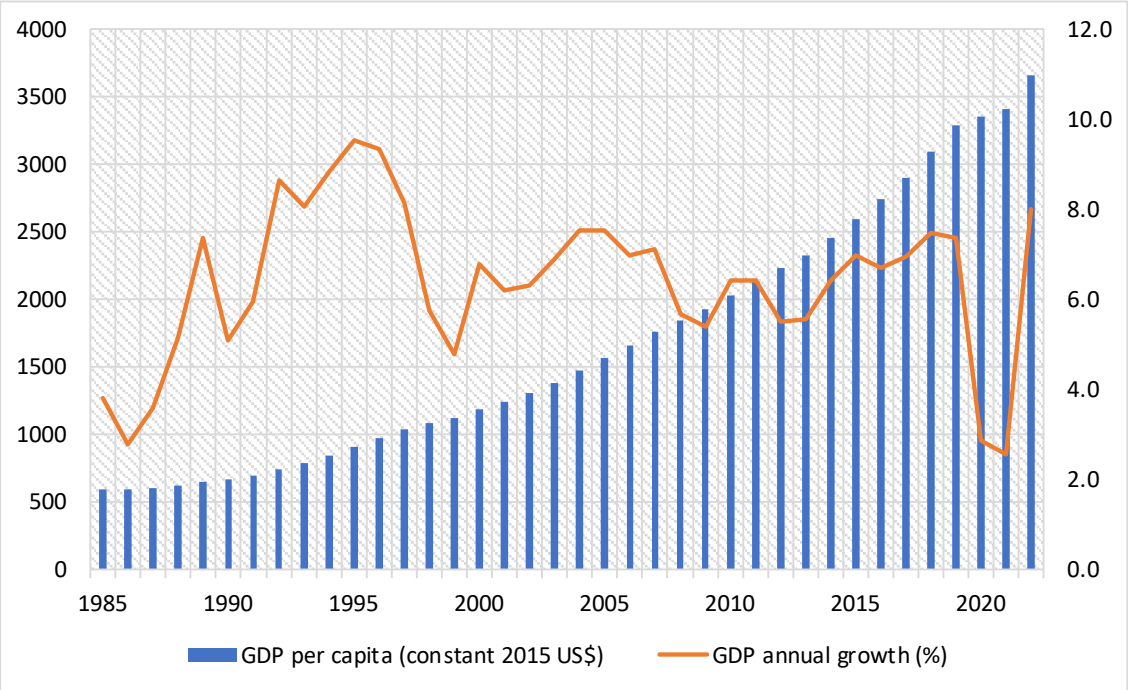
This section provides an overview of the power sector, with specific emphasis on the country's historical reliance on coal as a fuel (Section 2.1), the recent policy developments to promote the uptake of renewable energy to satisfy its fast-growing demand for electricity (Section 2.2), and the large investment required to support this uptake, especially from the private sector (Section 2.3).

2.1 RELIANCE ON COAL POWER

Vietnam initiated the Đổi Mới reform in 1986, aimed at moving from a centrally planned economic system to a market-oriented one. The reform gained further impetus in 1993, when the country gained access to concessional international financing and the trade embargo was lifted. In the following years, Vietnam became a member of several international and regional organisations, including the Association of Southeast Asian Nations (ASEAN) in 1995, the Asia-Pacific Economic Cooperation group (APEC) in 1998, and the World Trade Organization (WTO) in 2007.

These developments have played a vital role in driving Vietnam's remarkable economic growth over the past three decades, lifting it from being one of the world's poorest nations to a middle-income economy within a single generation (World Bank, 2022a). During 1985 to 2022 Vietnam maintained an average annual GDP growth rate of 6% and its GDP per capita (constant 2015 US$) has increased six-fold from around US$600 in 1985, to nearly US$3,700 in 2022 (see Figure 1).

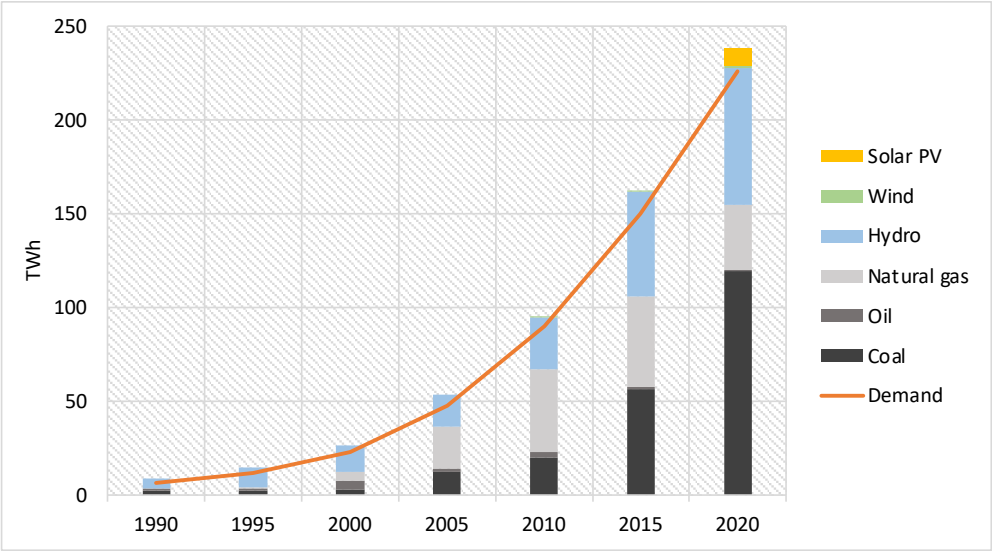
Figure 1: GDP per capita and annual growth in Vietnam



Source: Developed by the authors based on information obtained from World Bank database.

Vietnam's strong economic growth caused a significant surge in electricity demand (see Figure 2). Between 2010 and 2020, demand grew at an average annual rate of 15%, primarily driven by an industrialisation (IEA, 2022b). However, supply capacity did not keep up with demand, causing widespread concerns about electricity supply security and its potential to curb economic growth. It was reported that the Ministry of Industry and Trade (MOIT), the government body responsible for managing Vietnam's energy sector, anticipated power shortages to occur as early as 2020, especially in the manufacturing hub of Ho Chi Minh City (Do et al., 2020). To address these concerns, Vietnam embarked on an ambitious plan to expand its coal-fired power capacity in the mid-2010s, as outlined in the National Power Development Plan (PDP) 7 (Gallagher et al., 2021).

Figure 2: Electricity supply and demand in Vietnam, 1990 to 2020



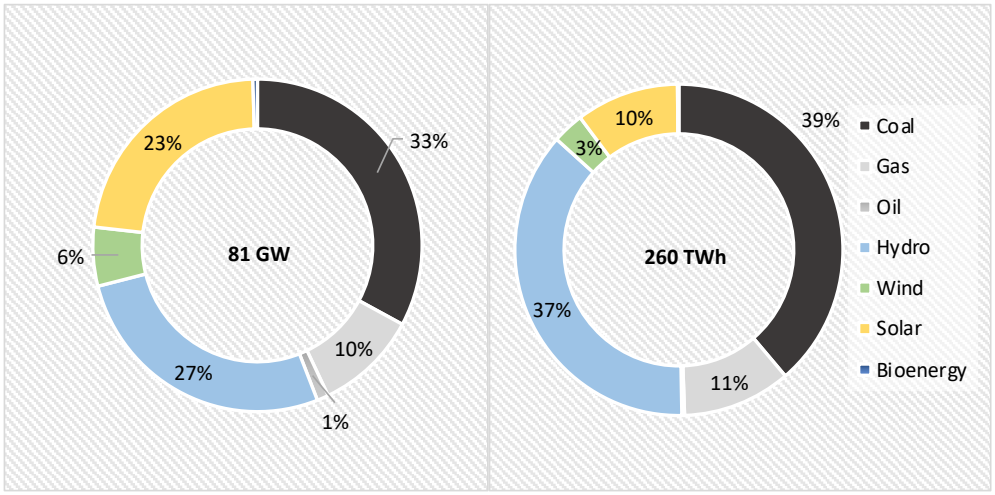
Source: Developed by the authors based on information obtained from IEA database.

This expansion made coal the country's primary source of electricity in 2016, surpassing hydropower. In 2022, coal power accounted for 31% of the total installed capacity and contributed 39% of the total generation. In comparison, hydropower, the second-largest source of electricity in Vietnam, constituted 28% of installed capacity and contributed to 37% of the total generation, while gas accounted for 10% of installed capacity and 11% of total generation (see Figure 3).

2.2 MOMENTUM TOWARDS A CLEAN ELECTRICITY FUTURE

In 2016, Vietnam ratified the 2015 United Nations Framework Convention on Climate Change (known as the Paris Agreement), signalling the government's commitment to addressing carbon emissions. Since then, the policy focus has shifted to promoting renewable energy to meet the country's fast-growing demand for electricity. In 2017, the government introduced highly favourable feed-in tariffs (FiTs) for utility-scale solar power plants commissioned before June 30, 2019. These plants would be eligible for a 20-year preferential FiTs that allow them to sell electricity at US$93.5/MWh. Later in April 2020, the FiTs were adjusted to a range between US$70.9 and $83.8 per MWh (Do et al., 2020). Despite the reduction, this still provided investors with ample profit potential, especially considering that the levelised cost of energy (LCOE) for solar PV in Vietnam was in the range US$66 to US$76 per MWh between 2019 and 2020 and is expected to fall further as technology advances (Do et al., 2021). Furthermore, the government offered a range of incentives to solar project developers, including tax breaks and equipment import tariff exemptions.

Figure 3: Installed capacity and generation in 2022



Source: Developed by the authors based on information obtained from (Ember, 2023).

Between 2017 and 2021, Vietnam experienced a solar boom, with solar generation rising from practically nothing to 25.8 TWh, representing 10.5% of total electricity generation. This made Vietnam the world's tenth-largest solar power producer. However, more than 16 GW solar capacity came online between 2018 and 2020 alone, overwhelming the power grids and forcing the Vietnam Electricity Corporation (EVN), the national utility, to curtail solar generation in order to maintain system reliability and stability. It was reported in 2021 that the National Power Dispatching Center planned to curtail 500 GWh of solar power (Sang, 2021), with the curtailment rate at the country's largest solar power plant in Thuan Nam, with a capacity of 450MW, standing at roughly 40% (Vu, 2022).

Despite the challenges of solar integration, Vietnam has demonstrated a strong commitment to reducing its reliance on fossil fuel-based electricity. In November 2021, it joined 44 other countries and the European Union in supporting the Global Coal to Clean Power Transition Statement at COP 26, the regular review of the Paris Agreement. Vietnam fully endorsed all four clauses of the statement: 1) accelerating the deployment of clean power generation and energy efficiency measures; 2) rapidly scaling up technologies and policies in this decade to transition away from unabated coal power generation in the 2040s (or as soon as possible thereafter) globally; 3) stopping the issuance of new permits for unabated coal power plants; and 4) ensuring a fair and inclusive transition away from unabated coal power.

It is notable that among the three major coal power producers in Southeast Asia (Indonesia, the Philippines, and Vietnam), who signed the statement, Vietnam is the only one that endorsed all four clauses, signifying its strong commitment to a clean electricity future. This commitment was further reaffirmed in December 2022, when Vietnam reached an agreement with the International Partners Group, including G7 countries, the European Union, Denmark, and Norway to establish a Just Energy Transition Partnership (JETP). The JETP aims to mobilise US$15.5 billion of public and private capital to accelerate Vietnam's energy transition in the next three to five years, with particular emphasis on achieving the following targets:

- Bringing forward the projected peaking date for greenhouse gas (GHG) emissions generated by the power sector in Vietnam from 2035 to 2030.
- Reducing peak annual GHG emissions from the power sector by up to 30%, from 240 megatons to 170 megatons.
- Peaking Vietnam's coal power capacity at 30.2 GW, down from a current planning figure of 37 GW.
- At least 47 per cent of electricity generated from renewable energy sources by 2030.

2.3 INCREASED PRIVATE PARTICIPATION IS CRUCIAL

In May 2023, the Vietnamese government approved the long-awaited Power Development Plan VIII (PDP8) for the period of 2021 to 2030, with a vision to 2050.

This plan is expected to provide a long-term guidance for the country's transition towards clean electricity. It assumes a rapid GDP growth of 6.5% to 7.5% annually from 2023 to 2050. To support this economic growth, total installed capacity is expected to more than double by 2030, rising from about 70 GW in 2020, to 150 GW in 2030. By 2050, total installed capacity will surpass 490 GW in Vietnam, representing an almost six-fold increase from the current levels.

In the years up to 2030, nearly 80% of the planned capacity additions will come from wind, hydro, and gas (based on both domestic gas supply and LNG). Between 2030 and 2050, wind and solar are expected to provide most of the planned capacity additions, while existing thermal power plants will be gradually converted to use ammonia, hydrogen, and/or LNG.

The implementation of the plan requires a total investment of US$135 billion in the years to 2030, supporting the planned expansion of generation capacity and infrastructure facilities. The investment requirement will range from US$400 billion to US$520 billion over the period from 2030 to 2050. Increased private participation is crucial for the successful implementation of this plan, as the large investment required for a clean electricity future would be extremely challenging for the country's public sector - historically the largest funder of power generation projects - to mobilise.

To put this financial challenge in perspective, Southeast Asia's total public investment in the entire energy sector amounted to about US$20 billion over the period 2016-2020 (IEA, 2022a). This amount is far less than the investment needed for progressing Vietnam's planned capacity expansion to 2030 alone. It is also challenging for the country's public sector to increase funding for renewable energy projects and grid infrastructure when the government faces competing demands for budget spending and also wants to curb public debt.

Renewable energy investment:

The issues and challenges

The preceding discussion suggests there is a shift towards decarbonisation in Vietnam's power sector and an awareness of the significant investment required for such an endeavour, particularly from the private sector.

This section examines the key issues and challenges that could affect increased private participation in renewable energy projects. These issues and challenges are grouped into four broad categories: grid infrastructure (Section 3.1); regulatory framework (Section 3.2); market mechanisms (Section 3.3); and official development assistance (Section 3.4).

This discussion is occurring amid the substantial cost reduction in wind and solar generation over the past few years, as measured by levelised costs of electricity. Consequently, these technologies have become cost-competitive with fossil fuel generation in many places. However, it is essential to emphasise that private investors' decisions are largely informed by their assessment of the absolute and relative profitability of different generation technologies. The profitability of a power generation project is clearly shaped by costs, but not reducible to them.

3.1 GRID INFRASTRUCTURE

Power grids play a critical role in facilitating the integration of renewable energy while ensuring the security and reliability of electricity supply.

In Vietnam, limited grid capacity has become an important issue in recent years, causing solar curtailments and significant delays in grid

connections. One expert pointed out that "high FiTs attract developers and make a lot of projects, but there are some problems on the transmission lines." This is partly due to "the lack of experience with managing new technologies, like solar power," another expert noted, adding that "government needs to adapt ... they need to learn how to deal with variable renewable energy, because previously the power sector is dominated by baseload coal and hydro power."

Several experts also highlighted land as an important factor contributing to Vietnam's grid constraints for solar integration. One pointed out that "solar irradiation is high in central Vietnam, but the demand is in south and north...land is

expensive, and developers sometimes face lengthy negotiations with local communities." Another added that **"land clearing is an issue in grid expansion. State-owned companies cannot pay above market prices to procure land. And some of the projects are in remote areas, and sometimes in forest areas."**

In 2022, Vietnam made a significant update to its main legal document governing the power sector, the Law on Electricity 2004, allowing for private participation in grid development. While these amendments have been seen as a positive step, challenges still remain. These arise from the complex nature of grid infrastructure, the need to adhere to strict security standards, and the problems associated with integrating private initiatives into the existing state-controlled power system.

Addressing the grid constraints will take significant time and effort. This partly explains why the Vietnamese government is now prioritising offshore wind and rooftop solar PV. As explained by one expert, "the potential (for offshore wind) is more equally distributed in the north, central and south ... on-site solar power, like rooftop solar, does not need much effort on grid augmentation."

3.2 REGULATORY FRAMEWORK

Several experts noted the need for a clearer and streamlined regulatory framework in the governance of renewable energy projects and investments.

This is particularly acute for emerging technologies such as offshore wind, battery storage, and green hydrogen. One person explained that "investors need to clear several administrative steps, including environmental impact assessment, construction licence, grid connection approval and so on, and the procedures for obtaining these approvals are not clear and often lack details. The investors often don't know what procedures to follow."

One important issue lies in the lack of coordination among different public agencies responsible for overseeing various aspects of renewable energy project development. There are notable gaps in the regulatory framework for offshore wind, primarily caused by the lack of

coordination between different public agencies in developing the necessary legal framework including the Ministry of Industry and Trade, the Ministry of Natural Resources and Environment, and the People's Committee for Planning on Marine Spatial Planning. This presents a significant challenge in securing the right to survey the sea and efficiently assigning investors to develop offshore wind projects. Similar concern was emphasised in relation to rooftop solar power due to the lack of mechanisms to ensure effective coordination between the Ministry of Industry and Trade, the Ministry of Natural Resources and Environment, the Ministry of Construction, and the Ministry of Public Security, all of which play a role in governing the installation and operation of rooftop solar.

Another concern is related to project procurement and pricing. An expert noted that "there is no longer a feed-in tariffs mechanism, and the method of determining the electricity price bracket (i.e., the price ranges at which electricity generated by renewable energy power plants will be purchased) for renewable energy projects still has many shortcomings, causing difficulties in agreeing on negotiated prices with project developers ... the auction mechanism has not been fully institutionalised ... the process for allowing RE power plants to participate in the market is still unclear." Another respondent added that "renewable energy project investors now have to negotiate with EVN on an individual project basis to sell electricity according to a new MOIT policy."

An expert emphasised the need to put in place clear and consistent pricing mechanisms and the use of more standardised Power Purchase Agreements (PPA) for renewable energy projects. Some key aspects that need to be considered for the design of the PPAs include price stability and long-term certainty, plant dispatch and curtailments, and requirements for participation in the spot market.

3.3 MARKET MECHANISMS

The electricity market in Vietnam is structured based on a single-buyer model, operated by state-owned enterprise EVN.

As one expert explains this arrangement requires further reform "to increase the transparency and independence in system operation, including the dispatch of power plants." This reform could help "improve the investors' confidence that their facilities are fairly treated in terms of when and how much electricity they are allowed to generate, while also providing justification for any curtailments." This viewpoint was echoed by another observer who emphasised the need "to create a fair market mechanism between state and private businesses, and to improve the transparency in system operation, power plant dispatching, and curtailments."

Another important issue is retail pricing. Retail electricity prices in Vietnam are regulated and heavily subsidised, which places considerable strain on the EVN's budgets. This situation is particularly concerning because the retail prices often do not reflect the full costs of electricity

supply, affecting the financial health of EVN and its ability to meet its payment obligations for the purchased electricity, including those from renewable energy power plants. An expert explained that "currently, as an interim arrangement, each renewable project developer has to negotiate the price within the price bracket set by the MOIT, and the price bracket is set at a level much lower than the previous FiT. With EVN still making loss, it is unlikely renewable will receive more favourable treatment in the near term, especially when retail tariffs remain low."

3.4 DEVELOPMENT ASSISTANCE

Similar to many other developing countries, Vietnam requires significant international support, often provided in the forms of official development assistance, to manage the complex financing mechanisms involved in procuring renewable energy projects.

This is partly due to the complexity of implementing public-private partnerships (PPP) in project finance, which requires specific and sufficient knowledge of financing structure, risk allocation, contract management, dispute resolution, etc. **One expert noted the urgent need to strengthen the approval process for ODA, with particular emphasis on improving transparency and accountability, thereby ensuring better management of funds.**

Clean Electricity Transition:

A path ahead

4.1 CRITICAL NEEDS

Achieving a rapid expansion of renewable generation largely depends on the availability of financial resources, especially from the private sector. The investment required for facilitating clean electricity transition along Paris-aligned pathways surpasses the capacity of the public sector, historically the largest funder of power projects, to mobilise, especially considering the government's intention to control the levels of public debt and manage competing demands for public spending.

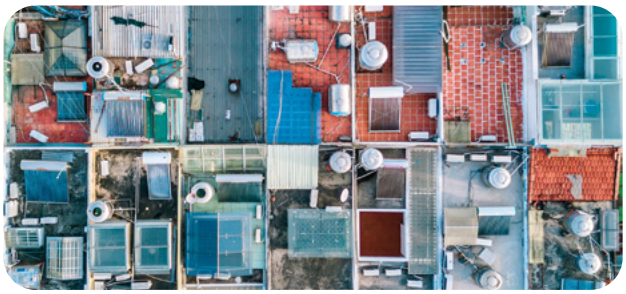
Mobilising sufficient private investment to support renewable energy projects in Vietnam, like many other developing countries, is affected by a wide range of project-specific issues, such as land acquisition, regulatory complexity and uncertainty for project development, and the presence of multiple public agencies in the governance of renewable energy projects with overlapping and sometimes unclearly defined roles and responsibilities.

These project-specific issues are often compounded by system-wide challenges for the integration and market entry of renewable energy, as well as macro-economic factors, such as currency risks and underdeveloped local banking systems and capital markets. Together, they undermine risk-adjusted returns for investors, leading to a lack of bankable projects. In this situation, private investment would naturally prioritise renewable energy projects in lower risk, mature economies, posing a significant just transition challenge to Vietnam.

Addressing this conundrum is crucial, because securing sufficient investment in renewable energy projects is not only about advancing Vietnam's decarbonisation agenda and fulfilling its international climate commitments. It is also widely considered to be a critical step towards ensuring the provision of reliable and clean electricity at affordable prices, while also creating growth-generating opportunities through industrial upgrading and job creation. These together are expected to pave the way for a more sustainable mode of development that would bring long-term prosperity to the citizens.

The governments of Australia and Vietnam are committed to closer cooperation in climate action and clean energy transition. At the 2021 UN climate conference (COP 26), they unveiled the Vietnam–Australia Joint Statement on Practical Climate Action, emphasising immediate emissions reduction and renewable energy deployment. In 2023, Australian Prime Minister Anthony Albanese announced increased support with a $105 million development package, targeting investments in renewable energy technologies, along with other priorities and objectives.

Several programs and financial mechanisms have been established to channel Australian resources and expertise to facilitate renewable energy investment in Vietnam. In addition to helping Vietnam catalyse more investment in renewable energy projects and systems, this support also holds the potential to foster growth opportunities for Australian enterprises across various areas. Key such areas include renewable energy deployment (e.g., rooftop solar PV, offshore wind), energy storage solutions (e.g., green hydrogen, and battery storage), grid planning and operation with high levels of renewable integration (such as smart grid technologies), and advisory services on renewable project preparation and execution.



The extent and breadth of these opportunities depend significantly on the progress of Vietnam's electricity transition and the size and durability of Australian assistance. Facilitating the transition process requires actions that go beyond standard business and financial strategies. In fact, it demands more fundamental changes to improve the sector's foundational architecture, to lower the risks and costs of renewable energy projects and to support significant private investment, both domestic and foreign. This architecture covers various aspects such as planning practices, permitting processes, regulatory frameworks, governance structures, and financial mechanisms.

The consequences of these sector-wide changes and their interdependencies create a proliferation of complexity, spanning individual lives to local and the national economies, and cutting across diverse policy domains, including energy security, economic development, and social wellbeing.

4.2 KEY ENABLERS

Australia can leverage its extensive experience in renewable energy development to provide vital support in helping Vietnam navigate the complexities involved in its transition towards a clean electricity future. Some key aspects that Australian stakeholders should consider while devising their support to Vietnam are:

Hydropower:

The inherent complexity of the electricity transition highlights the need to reconcile the dichotomy between a typically long transition process and the need to achieve a rapid transition to save the world from the climate crisis. One way to achieve such a reconciliation is to focus initial efforts on promoting renewable energy technologies, such as hydropower that already play an important role in the generation mix, which could reduce immediate demand for major sector reconfiguration and hence ensure a quick start to transition.

This helps explain why hydropower is a main focus of the PDP8 with an anticipated capacity increase from 21.9 GW in 2022 to 29.3 GW in 2030. Reservoir-based hydropower facilities are one of the most commonly used sources of dispatchable renewable energy. Hydropower's dispatchability could alleviate immediate pressure on the grid by reducing the need for significant flexibility capacity (e.g., battery storage) to manage unexpected variations in wind and solar power while progressing Vietnam's electricity decarbonisation agenda. Nonetheless, this approach might encounter challenges, particularly considering the growing prevalence of extreme weather conditions, often characterised by more frequent and prolonged droughts.

Table 1: The key enablers for Vietnam's clean electricity transition

Hydropower		
Reconciling a usually longed transition process and the present need to achieve rapid carbon reductions.	A main element of the existing power system and so able to reduce the immediate demand for major system overhaul.	More frequent occurrence of prolonged droughts highlights the need for options to manage long duration variations in hydropower.
LNG infrastructure		
A rapid ramp-up in the development of LNG import facilities to support the planned expansion of gas generation.	Stranded asset risks, as gas-fired power plants are set to be converted to use hydrogen after 2030.	
Political economy factors		
Intricate socio-technological processes with power interplay between multiple stakeholders.	Getting the political economy right is critical for actual progress.	
Regional power connectivity		
More effective sharing of complementary renewable resources while ensuring supply reliability and security.	Hold-up problem if trading partners fail to supply electricity.	
Beyond the electricity		
Renewable energy investment as a catalyst for long-term, sustainable development.	Positive outcomes create ambitious loops.	Demand for additional policy support to maximise the development impact of renewable energy investment.

The previous year witnessed prolonged heat waves and severe drought across various Asian countries. 2023 saw the highest global temperatures ever recorded for the month of June. The drought has significantly affected power supplies in northern Vietnam, resulting in rolling blackouts and power cuts. As extreme weather becomes a new norm, there is an urgent need to reconsider the role of hydropower in the future electricity generation mix. Several important questions arise in this context. They include: how reliable is hydropower given the more frequent occurrence of extreme weather conditions; what strategies and technologies can be adopted to manage long duration variations in hydropower and ensure supply reliability and security; and how to coordinate with countries along the Mekong River to balance the competing demands for scarce water resources?

LNG infrastructure:

Gas-fired power plants are set to become a crucial source of electricity in Vietnam by 2030, with installed capacity exceeding 37 GW, rising from 8 GW in 2022.

Much of the fuel for powering these plants is likely to come from imported liquified natural gas, given the depletion of existing gas fields for domestic production. This necessitates a rapid ramp-up in the development of LNG import infrastructure, which may become stranded, as the country's gas-fired power plants are set to be gradually converted to use hydrogen after 2030. Moreover, the significant fluctuations in LNG prices on international markets could also complicate EVN's ability to keep electricity prices at affordable levels while maintaining financial stability.

Political economy factors:

Even with a clear and well-defined technical transition pathway, actual progress faces significant socio-economic, and hence, political challenges.

Indeed, the transition is more than just a technological substitution process, wherein fossil-based technologies are replaced by their clean alternatives. It also entails a sector reconfiguration, encompassing all its constitutive elements including network infrastructure, market rules, regulatory frameworks, and consumer practices. These elements interact with each other in a myriad of complementary and interlocking relationships to ensure a sound functioning of the power sector. This means that the availability of clean electricity technology is not in itself sufficient to accelerate a clean electricity transition. Innovative and nationally-customised deployment plans and strategies – hinging on regulatory and market reforms, increased private participation and their effective implementation – are also important factors for accommodating the changing electricity technological landscape while ensuring supply security and reliability.

Reconfiguring a complex industrial sector like the power sector is not easy, as it comprises intricate socio-technological processes with tensions between multiple stakeholders. Oftentimes, conflicting interests and limited capability at the implementation level could impede or delay major policy and market reforms, causing disparities between intended and actual transition outcomes. The initial phase of electricity market reforms in Vietnam, which the government committed to as far back as 2004, was successful in terms of private participation in power generation in the forms of independent power producers (IPPs). However, subsequent phases have progressed slower than expected.

Regional power connectivity:

It is widely agreed that deeper regional cross-border power connectivity could allow more effective sharing of complementary renewable resources (especially, hydro, wind and solar) that are distributed unevenly across the Mekong region, thereby reducing the need for expensive reserve and backup capacity. The PDP8 places significant emphasis on the development of transmission infrastructure, including cross-border regional interconnections. The progress of power connectivity in the Mekong region is not only about addressing issues internal to the power sector, such as insufficient infrastructure, lack of technical competence, and uncoordinated regulatory processes. It also requires navigating the complexities associated with energy security and import dependence.

As dependence on electricity imports develops over time, an electricity-importing country like Vietnam may face a hold-up problem if its trading partners fail to export electricity. It can be argued that cross-border electricity trade is a mutually dependent relationship. An exporting country, keen to benefit from electricity trade (e.g., revenues from electricity sales), would be incentivised to ensure continued electricity exports. It is, however, also worth noting that any supply failure represents only missed opportunities for the exporting country but real economic costs for the importing country, such as power shortages, production curtailments, and job losses. These economic costs are likely to have geo-strategic implications of import-dependence on neighbouring countries to keep the light on during challenging periods.

Beyond the electricity:

Facilitating Vietnam's clean electricity transition requires sufficient investment to support a rapid deployment of renewable energy technologies and systems, as well as ensuring that this investment serves as a catalyst for upgrading local industries, creating job opportunities, and ultimately, fostering more sustainable development. These positive outcomes would give policymakers confidence that they can go further and faster by setting more ambitious targets to drive the transition.

To achieve this, substantial additional efforts are required to translate clean energy investment into a catalyst for long-term, low-carbon development. These efforts include, for example, introducing industrial and trade policies to promote local manufacturing of clean energy equipment and facilities (e.g., service vessels for offshore wind) and to facilitate its integration into global supply chains. Incentivising innovations and new business models (e.g., solar panels plus farming) that create spill-over effects on other related sectors will be important. So too will innovation policies to promote technology upgrading and commercialisation. Finally, education and labour market policies to address potential skill and knowledge gaps in emerging clean energy industries are essential.

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Images

CravenA, Aerial view of large sustainable electrical power plant with many rows of solar photovoltaic panels for producing clean ecological electric energy in countryside with sunset sky in Tra Vinh, Vietnam. Photograph. Shutterstock. 9 Sep 2023.

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Martinxmarie, Electrical power lines running across the mountains of Vietnam. Photograph. Shutterstock. 9 Sep 2023.

Nguyen Quang Ngoc Tonkin, Aerial view of Solar panel, photovoltaic, alternative electricity source - concept of sustainable resources on a sunny day, Phuoc Minh, Thuan Nam, Ninh Thuan, Vietnam. Photograph. Shutterstock. 9 Sep 2023.

Nguyen Quang Ngoc Tonkin, Landscape with Turbine Green Energy Electricity, Windmill for electric power production, Wind turbines generating electricity on rice field at Phan Rang, Ninh Thuan, Vietnam. Clean energy concept. Photograph. Shutterstock. 9 Sep 2023.

Paul Evan Green, Massive towers carrying high tension and high voltage power lines in rural Vietnam. Photograph. Shutterstock. 9 Sep 2023.

Saiko3p, Riverfront promenade in Danang city in Vietnam. Photograph. Shutterstock. 9 Sep 2023.

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