

Clean Industry

Renewable Energy in Manufacturing

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Introduction

At a time when Vietnam's electricity demand is surging in response to commercial, industrial, and population growth, a common concern has emerged that rising economic activity will shift carbon emissions from China and other manufacturing hubs to Vietnam. However, our experience through the Clean Energy Investment Accelerator (CEIA) initiative in Vietnam indicates that private-sector demand for renewables has the potential to overcome policy barriers and catalyze significant scaling up of clean energy deployment in emerging markets. Vietnam's 2019-2020 rooftop solar boom and anticipated surge in wind and solar virtual power purchase agreements for corporate offtakers in 2020 and beyond are the results of public-private collaboration on issues that simultaneously advance government and private-sector interests, offering important lessons for other markets in pursuit of sustainable development.

Background

Vietnam is a developing economy with a population of nearly 100 million and annual GDP growth of 6 to 7 percent, making it one of Asia's fastest-growing economies, which has been true for decades. Foreign direct investment (FDI) was close to \$18 billion in 2018, which accounted for approximately 24 percent of total investment in the economy.¹

More than 10,000 foreign companies are estimated to operate or have supply chain manufacturing in Vietnam, including many of the world's largest companies from a variety of sectors.² For decades, Vietnam has been home to labor-intensive industries such as apparel and footwear production. Many of the world's

1. "Overview," World Bank, <https://www.worldbank.org/en/country/vietnam/overview>.

2. Sebastian Eckardt, Deepak Mishra, and Viet Tuan Dinh, "Vietnam's manufacturing miracle: Lessons for developing countries," Brookings Institution, April 17, 2018, <https://www.brookings.edu/blog/future-development/2018/04/17/vietnams-manufacturing-miracle-lessons-for-developing-countries>.

most prominent apparel and footwear brands have significant manufacturing bases in Vietnam and have increased their presence in recent years.

More recently, technology-focused, higher-value manufacturing has also increased. Major electronics makers, including Samsung, Intel, and LG, own factories in Vietnam, and the likes of Microsoft and Google have recently indicated a ramp-up of their Vietnam manufacturing presence.³ Smartphones and associated spare parts alone accounted for more than \$51 billion of Vietnam's exports last year.⁴ By itself, Samsung made up nearly a quarter of Vietnam's exports.⁵

Overall, FDI companies account for about 70 percent of Vietnam's total exports, a figure which is expected to be boosted by the country's recent entry into the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the EU-Vietnam Fair Trade Agreement.

It is clear that foreign-owned companies, their capital inflows, and associated exports are vital ingredients to further expanding Vietnam's manufacturing and production industries and, more broadly, to maintaining the country's impressive, sustained economic growth.⁶

Industry and Power Sector Transformation

The growing economy, paired with an expanding population, has resulted in an increased demand for electricity—approximately 8 to 10 percent per annum—a trend that is forecasted to continue for the next 10 to 15 years. The economy's rapid growth, largely driven by industrialization, has led to final energy consumption tripling over the past decade, growing faster than output.⁷ Processing and manufacturing industries grew 8.9 percent in 2019 and are expected to remain a key component of Vietnam's economy.⁸

Vietnam's growing economy is projected to require a 100 to 150 percent increase in overall power generation capacity in the next 10 years, increasing from approximately 50 gigawatts (GW) today up to approximately 130 GW by 2030.

Commercial and industrial (C&I) sectors are the largest energy consumers in the country, accounting for approximately 60 percent of national energy consumption. In addition, C&I sectors are projected to have the highest economic growth rate (7.4 percent) per annum out of all sectors in Vietnam.⁹

Electricity demand is geographically distant from much of the country's power generation. The country's industrial activity is concentrated in the south—60 percent of the country's industrial parks are in the

3. Cheng Ting-Fang and Lauly Li, "Google, Microsoft shift production from China faster due to virus," *Nikkei Asian Review*, February 26, 2020, <https://asia.nikkei.com/Spotlight/Coronavirus/Google-Microsoft-shift-production-from-China-faster-due-to-virus>.

4. Hyunjoo Jin, "Samsung to shift some smartphone production to Vietnam due to coronavirus," Reuters, March 6, 2020, <https://www.reuters.com/article/us-health-coronavirus-samsung-elec/samsung-to-shift-some-smartphone-production-to-vietnam-due-to-coronavirus-idUSKBN20T10T>.

5. "US-China Trade War Seen as Boosting Vietnam Growth," VOA, January 12, 2020, <https://www.voanews.com/east-asia-pacific/us-china-trade-war-seen-boosting-vietnam-growth>.

6. "International media highlights Vietnam's economic success in 2019," Ministry of Industry and Trade, February 1, 2020, <https://moit.gov.vn/web/web-portal-ministry-of-industry-and-trade/tin-chi-tiet/-/chi-tiet/international-media-highlights-vietnam-s-economic-success-in-2019-17722-1305.html>.

7. "Overview," World Bank.

8. "Vietnam posts GDP growth above 7% for second year running," *Nikkei Asian Review*, December 28, 2019, <https://asia.nikkei.com/Economy/Vietnam-posts-GDP-growth-above-7-for-second-year-running>.

9. Ministry of Foreign Affairs of Denmark, *The Vietnam Energy Outlook Report 2019* (Copenhagen: Ministry of Foreign Affairs of Denmark, 2019), <https://vietnam.um.dk/en/green-growth/vietnam-energy-outlook-report/>.

south and Mekong economic regions—where companies and the government are increasingly concerned about power supply disruptions. Power generation, on the other hand, is largely in the north.¹⁰ The Ministry of Industry and Trade (MOIT) has stated that Vietnam’s electricity demand will outpace its supply by 6.6 billion kilowatt hours (kWh) in 2021, increasing to 15 billion kWh by 2023—equivalent to about 5 percent of the overall demand projected for that time period.¹¹

Amid the challenge of significantly scaling up the country’s power generation capacity and transmission and distribution (T&D) infrastructure—expected to require new investments of about \$10 billion annually—the government of Vietnam is working toward a goal of reducing greenhouse gas (GHG) emissions from energy by 25 percent by 2030 compared to business-as-usual scenarios. The energy sector currently contributes more than 50 percent of Vietnam’s national emissions. Vietnam’s Nationally Determined Contribution (NDC) under the Paris Agreement is to reduce its overall GHG emissions by 8 percent by 2030 or achieve a 25 percent reduction with international support.

The government has explicitly indicated its hope and expectation that the private sector will play a significant role in investing into and developing the country’s electricity infrastructure moving forward. To this end, Vietnam has started a long-term market liberalization process, shifting from the single-buyer model (centered on a government-owned utility, EVN) to a competitive environment that enables independent power producer (IPP) investment and transparent wholesale and retail markets.

Private-sector Clean Energy Demand

A core component of Vietnam’s power sector transformation is driven by the private sector actively advancing clean energy solutions in the country. This is part of a global trend, as companies and financial institutions begin to recognize the cost-saving potential of renewable energy and respond to consumer and shareholder concerns about climate change. A number of high-profile initiatives, including the Science Based Targets Initiative (SBTi), the United Nations Framework Convention on Climate Change (UNFCCC) Fashion Industry Charter for Climate Action, RE100, and We Mean Business, provide platforms for companies to set global climate and energy commitments. Over 800 companies have set global GHG reduction targets and are taking near-term action toward meeting these goals through procurement of renewable energy, energy efficiency measures, and other solutions.¹²

Similarly, the financial sector is shifting from coal-focused investments to lower-carbon areas. Approximately 100 banks and insurers across the globe now have formal coal exit policies, including 40 percent of the top 40 global banks and 20 major insurers collectively representing \$10 billion.¹³ However, banks and export credit agencies from China, Japan, and South Korea are continuing to actively promote coal investments in Vietnam and other markets abroad.¹⁴ These global companies and investors are now factoring clean energy into their decisionmaking processes as they seek to do business in markets where cleaner production is possible.

10. “Report on establishment and development of IZs and EZs in the first 6 months of 2019,” Ministry of Planning & Investment, June 28, 2019, <http://www.mpi.gov.vn/Pages/tinbai.aspx?idTin=43533&idcm=207>.

11. Khahn Vu, “Vietnam will face severe power shortages from 2021: ministry,” Reuters, July 31, 2019, <https://www.reuters.com/article/us-vietnam-energy/vietnam-will-face-severe-power-shortages-from-2021-ministry-idUSKCN1UQ11M>.

12. “Science Based Targets,” Science Based Targets, <https://sciencebasedtargets.org>.

13. Sarah Janne Ahmed, “Southeast Asian power companies are seizing renewable opportunities,” AsianPower, February 26, 2020, <https://asian-power.com/power-utility/commentary/southeast-asian-power-companies-are-seizing-renewable-opportunities>.

14. “Global Coal Public Finance Tracker,” EndCoal, <https://endcoal.org/finance-tracker/>.

Our Clean Energy Investment Accelerator (CEIA) team—jointly led by Allotrope Partners, the World Resources Institute, and the U.S. National Renewable Energy Laboratory (NREL)—is supporting the private sector to turn ambitious goals into action. We work in key emerging markets, including Vietnam, facilitating public-private collaboration to remove policy barriers and enable clean energy deployment in C&I sectors to scale.

In Vietnam, policy, market, and financing barriers have prevented C&I energy users from procuring large volumes of renewable energy to meet their goals at scale. Primary barriers include the following:

- National law, until the April 2020 approval of the newest solar regulation Decision 13, didn't clearly define a pathway for foreign investors to provide third-party financed RE solutions to C&I customers or allow business-to-business transactions between generators and consumers on the national grid which prevented off-site PPAs and created legal uncertainty for on-site PPAs.
- Rooftop solar projects are limited to 1 megawatt (MW) peak capacity unless they are registered in the National Power Development Plan, which is a lengthy, burdensome process that discourages larger system sizes.
- Lack of national technical standards on solar equipment, design, and installation practices can impact system quality and presents challenges for banks conducting due diligence.
- C&I consumers are oftentimes unfamiliar with qualified solar vendors active in the market as well as the nuances of the business models offered by vendors.
- Permitting and interconnection with the national grid has been lengthy in some areas, depending on local-level EVN experience with solar systems.
- Lending availability and suitable debt options from local banks have been limited due to the nascent nature of project finance in Vietnam and banks' limited understanding of business-to-business contracts and business models for solar and wind power.
- Until 2019, rooftop solar developers had difficulty reaching parity with EVN grid pricing due to low retail electricity prices for the manufacturing sector for industrial power users.

In recent years, the CEIA has facilitated public-private dialogues and capacity building for global, regional, and local companies in Vietnam to collaborate with the government to address these barriers and unlock scaled clean energy deployment. We work closely with the USAID Vietnam Low Emission Energy Program (V-LEEP), the national platform on Partnering for Green Growth and the Global Goals 2030 (P4G), and other important partners.

Our experience in this market illustrates how private sector demand for clean energy solutions can positively impact national-level policies and programs. As C&I clean energy demand has grown, companies have quickly deployed hundreds of megawatts of rooftop solar and supported the development and design of new policy mechanisms that will allow gigawatts of renewable energy to come online in the future.

Alignment of Government and Company Interests

Because government and business interests have intersected in key areas, and technical assistance (TA) partners such as the CEIA have supported the development of mutually beneficial solutions, Vietnam's solar market has experienced an unprecedented boom. The government of Vietnam is motivated to

sustainably grow its economy, overcome its debt burden, improve energy supply security, and take necessary steps toward electricity market liberalization. Demand from both buyers and investors of C&I renewables is also an incentive to pursue these objectives in the country.

For example, the government wants to attract more FDI to support continued economic growth and at the same time is committed to meeting its NDC and other climate and development goals. Major international, regional, and local businesses want to see an improved renewable energy-enabling environment so they can meet their respective climate and energy commitments in Vietnam. Thanks to this alignment of interests, and with these businesses representing an opportunity to privately finance progress toward Vietnam's NDC without relying exclusively on public funds, the CEIA and other TA partners have been able to facilitate effective public-private dialogues resulting in major policy advancements.

In order to maintain industrial growth at the current pace, power generation capacity in Vietnam needs to more than double in the next 10 years. With demand already outstripping supply, C&I consumers are eager to see more renewables come online quickly, improving near-term electricity supply security for their operations.

The country is at a unique moment. As Vietnam's economy continues to grow, international development assistance is decreasing, and government officials have expressed concerns about the national debt limit. In particular, EVN is facing serious financial challenges due to historically low tariffs and is quickly approaching its debt limits.¹⁵ Simultaneously, private capital from across the globe is seeking renewable projects in Vietnam and other emerging markets, representing new sources of revenue for the government if renewable energy programs are designed to allow such investments. Enabling private-sector investment in renewable energy projects, as well as business-to-business transactions like off-site PPAs, will reduce the amount of capital that EVN has to invest and decrease the need for government subsidies.

By opening mechanisms for private investment in renewable energy, Vietnam is taking the first step in its market liberalization process. According to our theory of change, successful proof-of-concept transactions will attract further investment and harness the strong interest among private investors to scale renewable energy across the country.

Rooftop Solar

Looking back to 2016, Vietnam only had 4 MW of solar installed nationwide, mainly for research purposes and rural electrification, and only a handful of small grid-connected projects had been developed for C&I customers (each in the range of 100 to 300 kW).¹⁶ Vietnam enacted Decision 11, its milestone national solar regulation, in 2017 to pave the way for all forms of solar power, ranging from household rooftop solar to utility-scale solar farms. While the regulation included a feed-in-tariff (FIT) of 9.35 cents per kWh and a net-metering mechanism, minimal investment and megawatts resulted in the first 18 months.

The tide turned in 2019, and Vietnam quickly became one of the most active and attractive solar markets in the Asia-Pacific region. Nearly 5,000 megawatt-peak (MWp) of utility-scale, ground-mounted solar farms holding 20-year PPAs with EVN were commissioned in a roughly 12-month span. Further, the

15. "EVN's borrowings burden Vietnam's public debt: World Bank," *Hanoi Times*, February 6, 2019, <https://english.vietnamnet.vn/fms/business/216720/evn-s-borrowings-burden-vietnam-s-public-debt--world-bank.html>.

16. ADB, *Renewable Energy Developments and Potential in the Greater Mekong Subregion* (Manila: 2015), <https://www.adb.org/sites/default/files/publication/161898/renewable-energy-developments-gms.pdf>.

country's installed capacity of rooftop solar increased by more than 40 times in 18 months, growing from 18 MWp at the beginning of 2019 to approximately 745 MWp by the end of June 2020.

Private-sector demand has played a significant role in the rise of rooftop solar; approximately two-thirds (67 percent) of installations in Vietnam to date are for C&I facilities. Several high-profile multinational companies eager to begin making progress in Vietnam toward their global climate and clean energy commitments have added solar to their owned-and-operated facilities, including Heineken, Intel, ABB, Schneider Electric, and AB InBev.

But global brands are not the only drivers of this trend; significant adoption of rooftop solar has also been led by local and regional supply chain manufacturers, particularly in the apparel and footwear sectors as well as makers of technology and electronics components. Supply chain manufacturers are acting on the growing recognition that, by adopting clean energy and other climate-oriented solutions, they can secure energy cost savings and become more attractive suppliers to the multinational companies with ambitious sustainability commitments.

While reputation, marketing, and publicity are integral drivers of many companies' decisions to explore renewable energy solutions, in the case of rooftop solar in Vietnam, attractive project economics and immediate electricity expense savings for C&I facilities are also key reasons rooftop solar has scaled so quickly.

Corporate energy users in both EVN electricity tariff categories ("business" and "industrial") are capable of securing long-term contracts (typically structured as leases) that offer solar electricity at a 5 to 20 percent discount against EVN rates.

These attractive project offerings emerged in the last year as the rapid rise of Vietnam's rooftop solar market unfolded, driven by a national policy environment encouraging investment and specific attributing factors, including the following:

- Government authorities currently allow building owners as well as third-party investors to invest, own, and operate rooftop solar assets. "Off balance sheet" rooftop solar procurement models such as long-term leases have enabled many businesses to contract solar electricity with no upfront investment or ownership, which has played a major role in the attractiveness of rooftop solar for business owners.
- EVN electricity prices increased more than 8 percent in March 2019, a significant point at which rooftop solar demonstrated parity with grid prices for all types of ratepayers.
- EVN issued a series of guidelines and instructions between October 2018 and March 2019 to streamline and clarify a myriad of implementation hurdles that had slowed solar investors, including:
 - Definition of rooftop solar projects;
 - Solar investor application process;
 - Interconnection procedure;
 - Commissioning test procedure;
 - Tax and invoice clarification; and
 - Roof lease models explanation.
- Local investor and lender awareness increased due to the influx of billions of dollars into the utility-scale solar boom. Similarly, the utility-scale solar wave also increased local technical capacity of electricians, installers, and technical consultants.

Vietnam also benefited from an array of local and international organizations championing the rooftop solar industry and advocating for policy and regulatory improvements. For example, many private-sector-led voices from international and domestic investors were channeled through the Vietnam Business Forum (VBF), the “chamber of chambers,” to advocate for private-sector policy priorities. Overseas development assistance (ODA) programs led by USAID and the German development agency GIZ have provided close advisory support to the government of Vietnam, and the Vietnam Energy Partnership Group (VEPG)—a working group between MOIT and a multitude of international development partners—also contributed to ongoing improvement of solar regulations and guidelines.

The CEIA played a unique role by engaging a wide spectrum of market stakeholders. The initiative used its quarterly Renewable Energy Buyers Working Group to build the technical capacity of market stakeholders and collect policy-related feedback from solar project developers and C&I offtakers to deliver clear messaging to Vietnamese policymakers. In parallel, CEIA also provided technical assistance to factory operators, multinational companies, and industrial park operators to support the development of aggregated rooftop solar procurement strategies designed to achieve economies of scale, lower costs for buyers and sellers, and ultimately contribute to accelerating the volume of clean energy procured and consumed by corporate entities in Vietnam.

Direct Power Purchase Agreement (DPPA) Pilot Program

While Vietnam’s national solar regulation paved the way for C&I entities to use rooftop solar solutions on their premises, the country’s regulated electricity market and underlying legal framework were not designed to enable consumer choice of grid-based green energy options—a necessity for industrial power users seeking to meet 100 percent renewable energy targets and an increasingly important characteristic sought by global companies when planning to expand in new markets. For example, Facebook’s director of global energy, site, and selection, Bobby Hollis, stated in the press, “Access to new renewable energy projects that are close to our data center facilities [in Southeast Asia] is a key factor for deciding where to place a new data centre.”¹⁷

Momentum in Vietnam for corporate access to off-site sources of renewable energy started to formulate in 2017. The government was incrementally progressing in its more than decade-long liberalization process of the electricity market, and a key next phase included opening the door to more private generators (IPPs) and developing a transparent wholesale power market. In parallel, by 2017, dozens of the country’s largest FDI investors—ranging from Nike, H&M, and Unilever to Samsung and Apple—were beginning to realize their renewable energy goals would not be achievable unless significant changes came to Vietnam’s electricity market. Buyers, sellers, regulators, and policymakers realized a pathway to enable business-to-business buying and selling of large volumes of off-site renewable electricity needed in-depth consideration.

To kickstart momentum and focus policymakers’ attention toward the issue, the CEIA partnered with USAID V-LEEP and over two dozen major companies to release a “DPPA Declaration,” which delivered a unified message publicly signaling the private sector’s strong demand for off-site renewable energy procurement options:

17. Zafirah Zein, “Can Southeast Asia quench corporate thirst for renewable energy?,” *Eco-Business*, October 31, 2019, <https://www.eco-business.com/news/can-southeast-asia-quench-corporate-thirst-for-renewable-energy/>.

We strongly support the Government of Vietnam’s effort to simplify and expand access to renewable energy. We welcome new approaches to attract investments and provide more options for procuring renewable energy such as the announced Direct Power Purchase Agreement (DPPA) mechanism . . . Expanded access to renewable energy will allow us to grow our businesses and help champion a global transition to clean power.

The initial group of DPPA Declaration signatory companies, with their supply chains, stated that they “purchase more than 16 million megawatt-hours of electricity annually, an amount comparable to the consumption of 28.4 million Vietnamese households” and had a total investment of \$1.4 billion in the country.

The DPPA Declaration, launched in November 2017 on the sidelines of the Asia-Pacific Economic Cooperation (APEC) Summit in Vietnam, marked the beginning stage of a two-year process to design and propose a pilot program that would lay the foundation for an innovative long-term policy mechanism.

Throughout 2018 and 2019, USAID V-LEEP led close consultations with the Electricity Regulatory Authority of Vietnam (ERAV) and broader stakeholders within MOIT and the Vietnamese government to design the pilot program to enable a first phase of off-site PPA transactions to occur.

Technical assistance programs such as CEIA and V-LEEP engaged FDI investors and industrial power users, solar and wind project developers and investors, financial institutions, and other potential market participants in stakeholder workshops to ensure continuous and substantial private-sector feedback was incorporated into the DPPA mechanism design process.

The two-year consultation, study, and program design process culminated in January 2020 with MOIT submitting Proposal No.544/TTr-BCT and the Draft DPPA Decision to the prime minister for final signature, proposing to allow a pilot program at a scale ranging from 400 MW to 1,000 MW to enable virtual PPAs (also known as “synthetic” and “financial” PPAs) between private solar and wind power producers and private industrial end-users.

As of July 2020, the DPPA pilot program is still awaiting approval from the prime minister. If the program proceeds as proposed, key conditions will include the following.¹⁸

Power generators: Eligibility for wind and solar projects having an installed capacity larger than 30 MW and having obtained approval for inclusion in the power development plans. Priority given to projects in geographic areas with no or few risks of grid congestion.

Corporate off-takers: Eligibility exclusively for power consumers from industrial manufacturing sectors. Priority given to industrial manufacturers with international commitments toward “implementing targets on the environment, climate change mitigation and sustainable development.”

With the planned launch of the DPPA pilot program later this year, 2020 is expected to bring a pivotal shift for scaling corporate renewable energy procurement opportunities in Vietnam. The pilot program is being designed with inputs from key market participants, such as the system operator, regulator, and local-level EVN companies, to help anticipate and address potential barriers to successful implementation, such as grid congestion, curtailment of renewable assets, and land constraints. As the

18. “Vietnam’s Draft Decision Provides New Opportunities for Renewable Energy Developers and Private Power Consumers,” Baker McKenzie, February 7, 2020, <https://www.bakermckenzie.com/en/insight/publications/2020/02/vietnam-draft-decision-pilot-ppa>.

DPPA pilot moves into the execution phase, it will be important to document the ongoing challenges and incorporate lessons learned into longer-term policies and programs.

Looking Forward

To maintain impressive growth in Vietnam’s renewable energy market, additional policy, technical, and financial-sector changes are needed. The recently issued National Energy Development Strategy to 2030 with a vision to 2045 (Resolution No. 55 from Vietnam’s Politburo) signals the government’s commitment to develop “breakthrough mechanisms and policies” for scaling renewable energy throughout the country. This includes a vision for greatly expanding private-sector participation in renewable energy development through new government mechanisms that promote DPPA and other bidding or auctioning frameworks for renewable generation as well as enabling industrial parks and export processing zones to utilize renewable power plants on site.

In the near term, market stakeholders expect the rooftop solar market to be bolstered by continued FIT incentives and improved procedural guidelines. In April 2020, the prime minister approved new national solar regulations after the expiration of the milestone Decision 11 in mid-2019. With the new solar policy in place, investors and project developers have renewed confidence and are expected to continue developing rooftop solar projects that utilize FIT incentives and net billing to provide cost-effective solutions to businesses and residences.

In the coming years, Vietnam’s rooftop solar growth is expected to continue. The government has communicated in its Rooftop Solar PV Promotion Program (through a decision approved by the prime minister in 2019) the goal to materialize at least 1,000 MW of rooftop solar projects from 2020 to 2025.¹⁹ Separately, as of mid-2020, industry stakeholders expect that at least 1,000 MW of rooftop solar projects will be operating by the end of 2020. In fact, EVN has publicly stated it predicts up to 2,000 MW of rooftop solar will be implemented by the end of 2020. The state-owned utility’s leadership has been publicly supportive of increased rooftop solar capacity as a means to help reduce grid transmission costs and alleviate tariff pressure.²⁰

While the market has demonstrated positive momentum to date, key questions remain about Vietnam’s transition toward cleaner production and a low-carbon economy.

How will the market build upon the momentum of the DPPA pilot? In the coming years, the government of Vietnam is expected to formalize and expand the program through a national-level policy that will unlock gigawatts of potential projects for private investment. Such policies will need to address issues such as grid integration and land constraints while also encouraging private investment into grid modernization, as the T&D systems will need to keep pace with renewable generation growth from new DPPA and FIT projects. Recently, the government approved the country’s first private investment into grid infrastructure, which could set a precedent for more widespread private-sector involvement moving forward.²¹

19. “MOIT Decision 2023/QĐ-BCT on the Approval of the Rooftop Solar PV Promotion Program,” Viet Nam Energy Partnership Group, July 2, 2019, http://vepg.vn/legal_doc/moit-decision-2023-qd-bct-on-the-approval-of-the-rooftop-solar-pv-promotion-program/.

20. “Vietnam to have 2,000MW of rooftop solar power capacity in 2020,” Vietnam Investment Review, February 9, 2019, <https://www.vir.com.vn/vietnam-to-have-2000mw-of-rooftop-solar-power-capacity-in-2020-70273.html>.

21. “Vietnam supports private investment in electricity transmission lines,” Vietnam Net Global, November 17, 2019, <https://vietnamnet.vn/en/business/moit-supports-private-investment-in-electricity-transmission-lines-588334.html>.

How will tracking systems for renewable energy attributes evolve to keep pace with the market? The growth in rooftop solar and DPPA projects will also emphasize the need for a new set of policies and transparent systems for tracking renewable energy attributes in Vietnam to avoid double counting and ensure these projects meet international standards for corporate offtakers and other investors. The Ministry of Natural Resources and Environment has already released a draft decree signaling its plans to launch Vietnam's domestic carbon market, enter the international carbon market in 2021, and create industrial and sectoral GHG inventories.²²

How will the finance sector support the transition? The finance sector also carries great potential for supporting the next major shift in Vietnam's renewable sector, and national-level legal changes for the banking sector could help unlock additional finance for renewables. To date, domestic lenders have not been adequately equipped with knowledge and funds to lend at the tenors and rates that would be suitable for renewable energy projects. The DPPA pilot program will present a unique opportunity for local banks to gain further experience in this sector and unlock financing for renewables at scale. Local lenders will not only need to learn to evaluate DPPA business models and increase their comfort level with these new types of transactions in Vietnam, but they will also need appropriate financial products and capital for these DPPA projects.

In conclusion, Vietnam's experience responding to corporate renewable energy demand provides important lessons for other emerging markets. By identifying and collaborating on key issues that simultaneously advance government and private-sector interests, countries have the ability to unlock the resources needed to advance their sustainable development ambitions.

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22. "Vietnam's Proposed New Draft Regulations on Greenhouse Gas Emissions Reductions and Other Climate Change Adaptation Measures," Baker McKenzie, February 10, 2020, <https://www.lexology.com/library/detail.aspx?g=309de181-fd60-4547-93ed-3f5f01fd3a>.