ENERGY
CATALYST

Country Guide: Vietnam

June 2020

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Vietnam, officially the Socialist Republic of Vietnam, is the easternmost country in mainland Southeast Asia. With an estimated 95.5 million inhabitants as of 2018, it is the 15th most populous country in the world. Vietnam shares its land borders with China to the north, and Laos and Cambodia to the west. Vietnam's land is mostly hilly and densely forested, with level land covering no more than 20%. Mountains account for 40% of the country's land area, and tropical forests cover around 42%. Vietnam's climate is a monsoon-influenced tropical climate typical of mainland Southeast Asia. Due to differences in latitude and variety in topographical relief, Vietnam's climate tends to vary considerably in each region. In the north, the climate is monsoonal with four distinct seasons, while in the south, the climate is tropical monsoonal with two seasons.

Figure 1: Map of Vietnam. Source: d-maps

Government

Vietnam is a one-party socialist republic and is one of the two communist states in Southeast Asia. However, although Vietnam remains officially committed to socialism as its defining creed, its economic policies have grown increasingly capitalist. In the medium-term, Vietnam's economic outlook is positive, with real GDP growth projected to remain robust at around 6.5% in 2020 and 2021. Vietnam's population reached 97 million in 2018 (up from about 60 million in 1986) and is expected to expand to 120 million by 2050. Currently, 13% of the population is in the middle class, but this is expected to reach 26% by 2026. While Vietnam has seen remarkable growth and development in the last 30 years, energy consumption and industrial pollution continue to rise, making the need to lower the environmental footprint an urgent matter.

Economy

Vietnam's ranking in the World Bank's Ease of Doing Business 2020 list is 70th, making it the 5th best country for conducting business in Southeast Asia (Figure 2). Vietnam continues to be successful in attracting foreign direct investment (FDI). As of October 2019, FDI into Vietnam rose by 7.4% year-on-year, showing an increase in investor confidence. With improvements in access to credit information, and reforms of the electronic system for managing the tax payment process for businesses, Vietnam has made strides in improving efficiency and transparency.

Figure 2: The ease of doing business scores and rankings of ASEAN countries in The World Bank's Doing Business 2020 report. Data from: World Bank Group, 2020

The energy sector in Vietnam

As of 2019, Vietnam had an installed electricity generation capacity of about 55.34 GW. This is made up of 20.14 GW of hydropower, 18.9 GW from coal, 9.1 GW from gas, and 5.75 GW of renewable energy (solar, wind, biomass). The country is expecting energy demand to grow up to 10% annually, and plans to more than double power generation capacity by 2030. The revised Power Development Master Plan VII (PDP 7) "aimed at ensuring national energy security, and sufficiently supplying power for fast and sustainable socio-economic development." The government plans to expand renewable energy infrastructure to ensure renewables (excluding hydropower) make up 15-20% of the power generation mix by 2030.

Vietnam has a high potential for renewable energy (RE), including hydro, solar, wind, biomass, and waste. The RE share in the total primary energy supply (TPES) was 37% in 2007. However, this share has been gradually reduced to 22% in 2017. Until recently, biomass and hydropower have been the main types of RE in Vietnam. In 2017, biomass and hydropower accounted for approximately 51% and 49% of the RE energy mix, respectively, while solar and wind accounted for very small amounts in TPES.

Table 1: Vietnam at a glance

Capital	Hanoi
Area	331,210 km²
Population	95.54 million (2017)
Official languages	Vietnamese
Rural Population	61.2 million
GDP	US$ 223.9 B (2017)
GDP Per Capita	US $ 2,343.12 (2017)
Currency	Vietnamese Dong (VND)
Exchange rate 2020	1 GBP = 28,988 VND
Exchange rate 2018	1 GBP = 29,508 VND
Access to Electricity	100%
On grid electricity access	NA
Off grid electricity access	NA

Up until 2019, the medium and large hydropower sources (larger than 30 GW capacity potential) have been almost fully utilised. The small hydropower resource has a total potential of about 6.7 GW, with more than 2 GW already in operation. The total technical potential of biomass resources is about 7 GW for power production, while solid waste power is 1.5 GW, of which currently only 0.3 GW is utilised. RE sources with high future potential for development are wind and solar power. There was only a small amount of solar and wind capacity in operation before 2018, but it has increased significantly in 2019 (with 4.5 GW of solar and 0.45 GW of wind at the end of June 2019).

Table 2: Key stakeholders in the Thai energy sector

Institution	Role
The Ministry of Industry and Trade (MOIT)	Supervises the energy sector. Within the MOIT, the General Directorate of Energy (GDE) administers the energy sector through three Departments: Electricity and Renewable Energy, Petroleum and Coal, and Energy Saving and Sustainable Development.
The Electricity Regulatory Authority of Vietnam (ERAV)	Developing regulations to implement and regulate competitive power markets Developing performance standards for power distribution and transmission, and for monitoring compliance Monitoring electricity tariff review and tariff setting Recommending measures to achieve supply–demand balance Monitoring implementation of power projects
Institute of Energy	Conducts research on national energy strategies, policies, and development plans Forecasts future demand for energy Prepares project feasibility studies Identifies new technologies to improve energy efficiency and supply
The Energy Efficiency and Conservation Office	Responsible for implementation of the Vietnam Energy Efficiency Program and the energy efficiency and conservation laws, decrees, and regulations
Department of National Resource and Environment (DoNRE)	Responsible for land administration management and the review and approval of environmental impact assessment for RE projects
The Ministry of Science and Technology (MoST)	Appraises draft master plans of energy sector development
The Ministry of National Resources and Environment (MoNRE)	Organises assessment of impacts of climate change on natural conditions, humans and socio-economic conditions
The Ministry of Planning and Investment	Coordinates and allocates funds for energy projects
The Ministry of Finance	Has jurisdiction over taxation related to energy activities
Vietnam Electricity (EVN)	A state-owned corporation responsible for Vietnam's power generation and transmission. It includes three Gencos, five trading corporations, the National Power Transmission Corporation and National Load Dispatch Centre.

Small hydropower

Currently, hydropower is the main source of energy for the country, representing 40% or 20,140 MW of the power generation mix, including small and mini-hydropower plants. While nearly all large hydropower (LHP) potential is exploited, there may be feasible small hydropower (SHP) projects to develop. Of all Southeast Asian countries, Vietnam has the most installed small hydro capacity at 2,143 MW and the country has another 2,205 MW of small hydro development potential. As a percentage of the total installed capacity, the share of hydropower is predicted to decline from 40% to 23.0% in 2030, which is expected to be replenished by an increase in non-hydro renewable energy sources and coal.

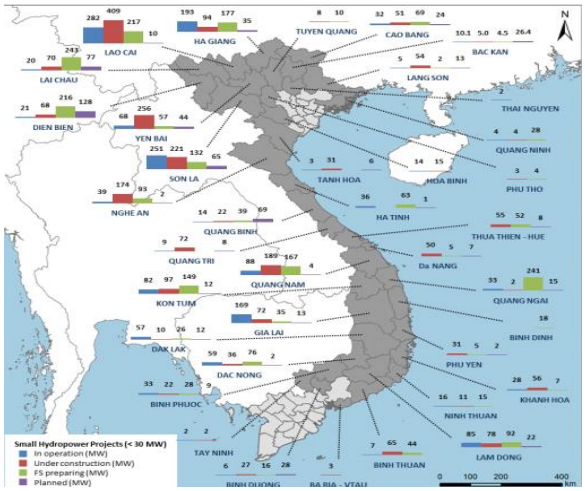

Figure 3: Current and future situation for SHP. Source: The World Bank, 2017

Solar Energy

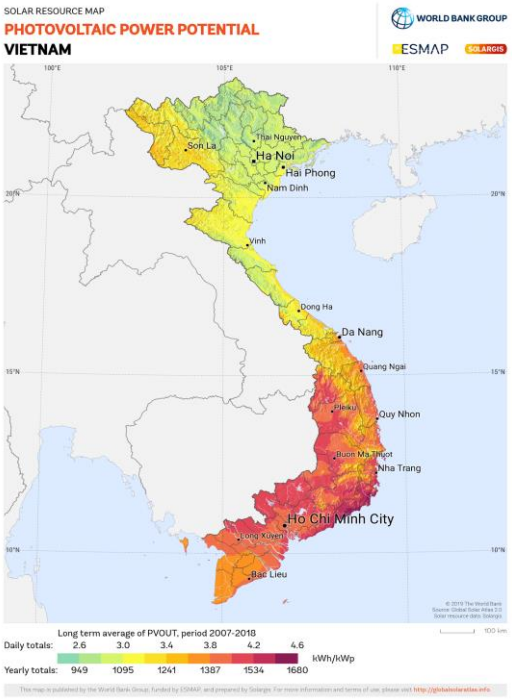

Figure 4: PV Potential for Vietnam. (2019 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis)

In Vietnam, solar PV has the greatest potential, although limited by the demand for land use (the average land use rate is about 1.1-1.2 ha/MW depending on efficiency). The solar potential is up to 380 GW (economic potential), but the distribution is not uniform across regions but concentrated in the South, South Central, and Highlands regions.

On April 11, 2017, the government issued Decision No. 11/2017/QD-TTg (dated April 11 2017), on the implementation of a Feed-in-tariff mechanism, where the solar feed-in tariff is 9.35 US cents/kWh for projects put into operation before June 2019. Due to this solar promotion mechanism, solar power projects are currently booming in Vietnam. By August 2019, the total size of registered investment projects reached about 32 GW of which 10.3 GW is approved for additional planning up until 2025; however, this may not all be realised. With the large expansion being approved, the transmission grid development is having difficulties in meeting the operational schedule of all projects, since procedures for construction, investment and capital arrangement are causing delays in transmission projects.

Recently, the government issued Decision No. 13/2020/QD-TTg (dated April 6 2020), on the implementation of a Feed-in-tariff mechanism, where the solar feed-in tariff is 7.69 US cents/kWh for floating solar projects, 7.09 US cents/kWh for ground-mounted solar projects and 8.38 US cents/kWh for rooftop solar projects, for projects put into operation before December 31 2020. The mechanism received positive feedback from the solar industry. However, concerns have been raised regarding the short time period of implementation (just seven months), and it is expected that the government should create a longer term strategy and plan for the industry to grow in a sustainable manner.

Wind Energy

The total technical potential of onshore wind power in Vietnam is around 217 GW (with wind speeds over 4.5 m/s, at heights of 80 m, mainly concentrated in the South, Highlands, and South Central regions).

In addition, Vietnam has a long coastline and a great potential for offshore wind, especially in the South and South Central regions, which have a relatively shallow seabed, convenient for offshore wind construction. According to an assessment (ESMAP & World Bank, 2019), the total technical potential of offshore wind energy within 200 km of coast in Vietnam is 475 GW.

The government issued Decision No. 39/2018/QD-TTg (dated September 10 2018) on the feed-in tariff at 8.5 US cents/kWh for onshore wind projects and 9.8 US cents/kWh for offshore projects in operation before November 2021. With this mechanism, many investors have developed and submitted wind power projects. According to a report from MOIT to the Prime Minister, up until March 20 2020, 78 wind projects of 4,800 MW are included in the power master plan, 11 wind projects of 377 MW are in operation and 31 wind projects of 1662.25 MW have signed PPA. MOIT has also received the request to be included in the master plan of 250 projects of 45 GW (including threee offshore wind projects of 4.9 GW).

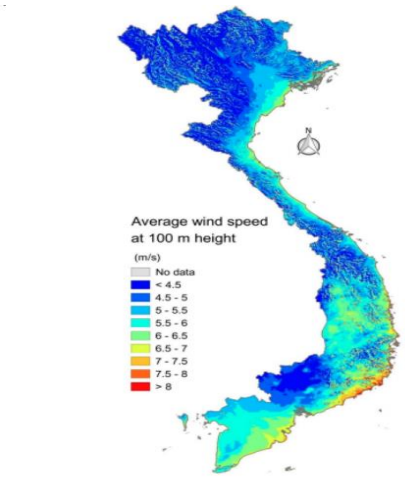

Figure 5: Avg. Wind Speed at 100 m. Source: Netherlands Enterprise Agency, 2018

Although wind power has a large potential and uses a limited amount of land (limit of direct land-use is 0.35 ha/MW), only the best wind locations can compete with the rapidly decreasing costs for solar power.

Under a new Planning Law intended to develop the nation's power infrastructure in a comprehensive manner, the government suspended the addition of energy projects to Vietnam's power master plan. Approval for all wind projects to be included in the master plan and connected to the grid was delayed by almost a year, narrowing the window within which developers could finish construction before the feed-in-tariff deadline.

The law was meant to spur the government to set forth a strategic vision for Vietnam's energy production, distribution, and consumption that better reflects current challenges, such as the dire need for a grid upgrade to deal with renewables' wildly fluctuating power production.

Biomass Energy

On March 5, 2020, the Prime Minister of Vietnam issued Decision No. 08/2020/QD-TTg, on amending and supplementing some articles of Decision No. 24/2014/QD-TTg (dated March 24 2014), on the support mechanism for the development of biomass power projects in Vietnam.

Previously, the mechanism of supporting the development of grid-connected biomass power projects in Vietnam (stated in Decision 24/2014/QD-TTg dated March 24 2014) is that the feed-in tariff for biomass power is 5.8 US cents/kWh. The feed-in tariff (FIT) for biomass power projects has had noticeable adjustments. The biomass power price applied for co-generation heat power projects is 7.03 US cents/kWh, while the biomass power price for other types of biomass projects is 8.47 US cents/kWh.

This is crucial foundation for attracting more investment in the biomass electricity sector. It aims to achieve the objectives of the revised PDP VII (Decision No. 482 / QD-TTg), setting the goal for

biomass electricity production to 660 MW, 1,200 MW and 3,000 MW in 2020, 2025 and 2030 respectively. In 2019, only 175 MW of installed biomass capacity were feeding into the grid.

Waste to Energy

Waste to energy should be an important part of renewable energy in Vietnam, but the development of this sector is still limited. There is an endless supply of waste fuel, but its quality is often limited. Typically, the waste includes a vast part of organic materials and during the rainy season is literally dripping water, having a moisture content in general of 70-85%. Big cities like Ho Chi Minh City produce up to 8000 tons/day of municipal solid waste on top of the industrial, medical and hazardous waste. The country is full of communes providing 150-300 tons/day of waste and several years' worth of accumulated landfills which often are part of the deal, with authorities expecting the operators to burn these as well.

The current mechanism to support the development of solid waste electricity projects is stated in Decision No. 31/2014/QD-TTg (dated May 5 2014): that the purchase price for direct solid waste-fired power plants is 10.05 US cents/kWh, and the purchase price for landfill solid waste-fired power plants is 7.28 US cents.

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Exploring an alternative pathway for Vietnam's energy future
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Official UK Government travel advice for Vietnam
https://www.gov.uk/foreign-travel-advice/vietnam

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