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Vietnam: A Glimpse of What Power Development Plan VIII Would Look Like

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Vietnam's guiding energy industry policy for the next decade, Power Development Plan VIII ("**PDP VIII**"), was originally scheduled for release in 2020. After much back and forth between the main drafter, the Ministry of Industry and Trade ("**MOIT**"), and the Government of Vietnam, it remains in the draft form. In various statements to the Government, MOIT outlined the main content of the plan and some of the rationale behind it. Below we summarize key takeaways from the most recent proposal, namely Proposal 7194/TTr-BCT dated November 11, 2022 ("**Proposal 7194**"). These takeaways present an overview of the country's current power situation and reveal its intentions for developing power generation projects, including renewables.

1. One country, three power system regions

There are three regions that make up Vietnam's electricity system: the North (from Ha Tinh northwards), the Central (from Quang Binh to Khanh Hoa, including the four Central Highlands provinces), and the South (from Ninh Thuan southwards).

Power sources are unevenly distributed across these regions (mainly coal-fired thermal power plants and hydroelectricity in the North, hydroelectricity in the Central, and gas-fired thermal power plants in the South). The operation of the system is not economically viable because of seasonal dependence and long distance transmission of electricity.

Over 90% of the country's electricity is consumed in the North and South. Only a small percentage, less than 10%, is attributed to the central region.

The North's share of electricity consumption tends to increase gradually (39.2% in 2011 and 44.1% in 2020); the South's share of electricity consumption tends to decrease gradually (51.1% in 2011 and 47% in 2020).

In comparison to the development of power sources, the grid has developed slowly, and this is particularly true for renewable energy sources, which are fragmented, small to medium-sized, and can be constructed relatively rapidly, resulting in local congestion and some curtailments.

2. Coal-fired Power Plants

Coal-fired thermal plants generate a large portion of the nation's electricity (about 50% of the total electricity produced as of now). At the end of September 2022, Vietnam had 39 coal-fired power plants with a total capacity of 24,674 MW in operation.

PDP VIII would put a stop to new coal-fired power plants after 2030 and outlines the fuel conversion process in Vietnam for 2050 as follows:

(i) After 20 years of operation, coal-fired power plants will burn biomass fuel or ammonia, starting at 20% and gradually increasing to 100%.

(ii) By 2050, there will be no coal-fired thermal power plants in the power system.

3. Hydroelectricity

PDP VIII would maximize the country's hydropower potential with due consideration to environmental protection, forest protection and water source security. The plan would prioritize multi-purpose hydropower projects, develop small and medium hydropower projects selectively, and exploit hydropower potentials in irrigation reservoirs, water reservoirs, and low-head hydroelectric projects. Approximately 27,353-28,946 MW of hydroelectric power is expected to be developed by 2030.

It is also intended that PDP VIII will promote the development of various types of pumped storage plants. In addition, it also will facilitate research into other forms of renewable energy such as geothermal energy and ocean waves.

4. Gas-fired Power Plants

PDP VIII aims at enhancing the autonomy of the electricity industry, and maximize domestic primary energy resources for electricity production, while reducing reliance on foreign sources. Thus it would give maximum priority to the development of thermal power projects using domestic natural gas sources.

From now until 2030, the focus would be on developing two gas-electricity chains, Block B and Ca Voi Xanh (Blue Whale), with a total capacity of 6,900 MW.

It is also expected that after 2030 gas-fired power plants also will burn hydrogen, starting at 20% and gradually increasing to 100%. As the technology matures, the price of hydrogen will decrease, making it possible to construct new generation power plants using 100% hydrogen. The majority of gas-fired power plants would switch to hydrogen by 2050.

Annex 1 contains a list of power plant projects using domestic natural gas sources and their proposed schedules.

5. LNG-fired Power Plants

It is expected that by 2030, 24,500 MW of electricity using LNG will be built, including the 11 projects with a total capacity of 17,900 MW which have been approved under the current power development plan (PDPVII). PDP VIII would only add five new LNG-using projects with a total capacity of 6,600 MW in the North, including Thai Binh (1,500 MW), Nghi Son (1,500 MW), Quynh Lap (1,500 MW), Quang Trach II (1,500 MW) and Cong Thanh (600 MW). Thai Binh and Nghi Son are the only two brand-new projects among them. The other three projects, Quynh Lap, Quang Trach II and Cong Thanh, will switch from coal to LNG-fired power plants.

After 2035, no new LNG-fired power plants would be approved. LNG-fired power plants are expected to gradually switch to hydrogen fuel after 10 years of operation. Hydrogen would be the predominant fuel for most gas-fired power plants by 2050.

Annex 2 contains a list of prioritized LNG-fired power plant projects and their proposed schedules.

6. Solar Power

During the 2016-2020 period, 175 solar power projects were approved under PDP VII with a total capacity of 15,400 MW. They are concentrated mainly in the Central and Southern regions (accounting for over 96%).

MOIT proposes to continue developing only the 11 solar power projects whose investors have been approved, adding a total capacity of 726.02 MW from now until 2030, provided that these projects follow

the relevant laws regarding investment, land and construction, among others. Moreover, these projects only will be deployed if they are compatible with the regional power grid infrastructure and the national power system absorption capacity (MOIT will assign EVN to calculate and verify this for each project).

By the end of 2020, more than 105,000 rooftop solar power systems had been put into operation with a total capacity of 7,755 MW. As part of PDP VIII, rooftop solar power would be encouraged for self-use, reducing the burden on the grid. Soon, MOIT will develop a mechanism to encourage the development of such projects.

The price of solar power may drop to 5.5 UScents/kWh by 2030 and 3.4 UScents/kWh by 2050.

7. Wind Power

Currently, there are 4,126 MW of wind farms operating in Vietnam. PDPVII approved 188 wind power projects (with the total capacity of 11,741 MW). As of today, 146 projects (8,171.48 MW) have secured power purchase agreements with the national offtaker, Vietnam Electricity (EVN). At the time of the expiration of the preferential feed-in tariff scheme under Prime Minister's Decision 39/2018/QD-TTg, there were approximately 88 wind power projects (4,119.9 MW) operating.

Almost all of wind power projects (187 projects/11,621 MW) are located in the central and southern regions. It is expected that by 2030, the onshore wind power capacity will reach 21,480 MW, and the offshore wind power capacity will be 7,000 MW (4,000 MW in the North alone).

The price of onshore wind power will decrease from 7.74 UScents/kWh in the period before 2025 to 6.35 UScents/kWh by 2030 and 5.3 UScents/kWh by 2050. Offshore wind power prices may drop from 10.1 UScents/kWh today to 8.4 UScents/kWh in 2030 and 5.2 UScents/kWh by 2050.

The table in Annex 3 illustrates offshore wind power capacity by region from now until 2050.

8. Biomass

PDP VIII would identify biomass electricity as a priority for using agricultural byproducts and promoting afforestation. It's predicted that biomass power will reach 2,270 MW by 2030.

9. Hydrogen

The demand for hydrogen to replace gas and to produce ammonia to replace coal is estimated at 23 million tons by 2050, produced from wind and solar power sources.

10. Electricity Imports

Electricity imports from neighboring countries would increase under PDP VIII. About 4,000-5,000 MW are expected to be imported by 2030, primarily from Laos, and may increase even more if there is a possibility of importing extra.

11 Average Electricity Prices

It is expected that the average electricity price (converted to the dollar exchange rate in 2020) will gradually increase from 7.9 UScents/kWh in 2020 to 8.1-9.0 UScents/kWh in 2030. During the period 2031-2050, it is estimated that average electricity prices will be 10.2-10.5 UScents/kWh.

Different stakeholders may react differently to Proposal 7194. In fact, it was released during the 27th Conference of the Parties to the UN Framework Convention on Climate Change (or “COP27” for short) at which Vietnam reportedly failed to reach a "Just Energy Transition Partnership" financing deal with the Group of Seven nations. And there is no guarantee that it will be approved. However, since Proposal 7194 is the 8th statement that the MOIT has made to the government, while PDP VIII is long overdue, it might be close to the final version and thus would serve as a preview of the nation’s energy master plan.

Annex 1

List of Power Plant Projects Using Domestic Natural Gas Sources (MW)

Project/Year	2021-2025	2026-2030	2031-2035
Dung Quat I		750	
Dung Quat III		750	
Dung Quat II		750	
Mien Trung (Central) I		750	
Mien Trung (Central) II		750	
Quang Tri (Bao Vang)		340	
O Mon III (Block B)	1,050		
O Mon IV (Block B)	1,050		
O Mon II (Block B)	1,050		
O Mon I	660		

Annex 2

List of Priotized LNG-fired Power Plant Projects (MW)

Project/Year	2021-2025	2026-2030	2031-2035	Notes
LNG Quang Ninh I		1,500		
LNG Thai Binh		1,500		
LNG Nghi Son		1,500		
LNG Cong Thanh		600		To switch fuel from coal to gas
LNG Quynh Lap		1,500		
LNG Quang Trach II		1,500		
LNG Thermal Power (North)			4,500	Potential locations include: • Quynh Lap, Vung Ang III • Thai Binh, Nam Dinh, Nghi Son, Thanh Hoa, etc.
LNG Hai Lang		1,500		
LNG Chan May			1,500	
LNG Ca Na		1,500		
LNG Son My II		2,250		
LNG Son My I		2,250		
LNG Long Son		1,500		
LNG Nhon Trach 3 & 4	1,500			
LNG Hiep Phuoc (Phase 1)	1,200			
LNG Long An I		1,500		
LNG Long An II			1,500	
LNG Bac Lieu	800	2,400		
LNG South			1,500	Potential locations include: • Tan Phuoc • Hiep Phuoc 2, Ben Tre, Mui Ke Ga, Ca Mau, etc.

Annex 3

Offshore Wind Power Capacity By Region

(MW)

Region	Until 2030	Until 2050
North (from Ninh Binh northwards)	4,000	17,000
North Central (from Thanh Hoa to Quang Binh)		5,000
Central Central (from Quang Tri to Quang Ngai)		3,000
South Central (from Binh Dinh to Binh Thuan)	3,000	46,500
South (from Ba Ria Vung Tau southwards)		15,500
Total	7,000	87,000

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