

Energy Sector Flash Note

May 15, 2023

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Power Development Plan (PDP) VIII approved on May 15

On May 15, 2023, the Prime Minister signed Decision No. 500/QD-TTg, approving the National Power Development Plan for 2021-2030, with a vision to 2050 (PDP VIII). PDP VIII guides for a national electricity consumption CAGR of 9% in 2021-2030, with an assumption for GDP growth of 7% p.a. during the period. PDP VIII also emphasizes the transition to green energy as renewable power (including hydropower) is targeted to account for up to 39%-47% and 72% of total electricity production by 2030 and 2050, respectively (see more on page 2).

In our view, the long-awaited approval of PDP VIII should benefit stocks with direct or indirect exposure to renewable power such as PVS, HDG, REE, PC1 and GEG. We currently have BUY ratings for PVS, HDG and REE (respective target prices of VND33,000/share, VND40,800/share and VND85,300/share) and MARKET PERFORM ratings for PC1 and GEG (respective target prices of VND29,400/share and VND12,900/share). According to HDG, its giant An Phong wind farm project (300 MW) is included in PDP VIII, which should help the company to achieve its target of doubling its capacity to 1,000 MW over the next five years.

PDP VIII provides a strong legal framework for the development of the Block B project, which benefits PVS, PVD and GAS (see more on page 5). According to PVS and PVD's management, the new Oil & Gas Law that comes into effect July 1, 2023, will facilitate many domestic oil & gas projects starting in 2024, including Block B. For PVS, even though the domestic offshore wind power target is 6,000 MW by 2030 (1,000 MW lower compared to the November 2022 draft), the company will still benefit from the offshore wind power capacity that it will co-develop with Singaporean company Sembcorp (which was not included in the master plan, according to PVS). On February 10, PVS signed a joint-development agreement with Sembcorp to co-develop offshore wind power projects (initial capacity of 2,300 MW and ~USD5bn of capex) and export electricity generated from these wind farms to Singapore through a high-voltage submarine power cable starting in 2030.

Figure 1: Stocks under our coverage with exposure to renewable power

Code	Rating	Market Cap USD mn	State O'ship %	Foreign Limit %	Foreign Avail USD mn	ADTV 30D USD mn	Share price VND ps	Target price, VND ps	Upside %	Div yield %	12M TSR %
PVS	BUY	544	51.4	49	156	4.7	26,700	33,000	23.6	2.6	26.2
HDG	BUY	356	0	50	135	2.0	34,150	40,800	19.5	0.0	19.5
REE	BUY	1,023	0	49	0	0.8	67,500	85,300	26.4	1.5	27.9
PC1	M-PF	331	0	49	149	1.7	28,800	29,400	2.1	0.0	2.1
GEG	M-PF	220	0	49	29	1.0	16,050	12,900	-19.6	0.0	-19.6

Source: Bloomberg, Vietcap (data as of May 15, 2023)

Figure 2: Summary valuations (based on reported earnings)

Code	Share price, VND ps	EPS g 2022 %	EPS g 2023F %	EPS g 2024F %	P/E TTM (x)	P/E 2022 (x)	P/E 2023F (x)	P/E 2024F (x)	EV/ EBITDA 2023F (x)	ROE 2023F %	P/B LQ (x)	Net D/E LQ (%)
PVS	26,700	47.0	-5.3	39.1	16.4	16.4	17.3	12.5	6.1	6.3	1.0	-71.0
HDG	34,150	0.0	-18.8	46.6	7.1	7.8	9.7	6.6	6.4	15.6	1.5	78.5
REE	67,500	45.1	-1.8	10.4	8.7	8.9	9.0	8.2	7.4	15.9	1.5	44.2
PC1	28,800	-33.8	8.7	73.0	22.8	18.2	16.8	9.7	8.9	9.5	1.5	116.7
GEG	16,050	15.0	-23.3	44.6	21.7	17.3	22.5	15.6	7.3	5.7	1.2	160.6

Source: Bloomberg, Vietcap (data as of May 15, 2023)



PDP VIII summary

PDP VIII targets to provide enough electricity for the country and for Vietnam to become one of the top four countries in ASEAN in terms of having a reliable power supply and electricity accessibility by 2030. In general, PDP VIII will help to address potential power shortages in northern Vietnam (from 2023) and southern Vietnam (from 2024-2025).

PDP VIII emphasizes the transition to green energy as renewable power (including hydropower) is targeted to account for 31%-39% of Vietnam's electricity production by 2030. In addition, the Ministry of Industry and Trade (MoIT) notes that if Vietnam receives the pledged USD15.5bn of support from the Just Energy Transition Partnership (JETP), renewable power is likely to account for up to 47% of total electricity production by 2030; the figure for 2050 is 68%-72%. As a result, the power sector's total CO₂ emissions are targeted to be 204-254 million tonnes by 2030 and 27-31 million tonnes by 2050, which is lower than the cap of 35 million tonnes set by the Prime Minister and thus meets Vietnam's commitment of net-zero emissions by 2050 that was made at the UN Climate Change Conference 26 & 27 (COP26 & COP27). Furthermore, PDP VIII targets to develop a renewable energy ecosystem and establish two renewable energy centers for power generation, power transmission, renewable energy equipment manufacturing, construction, installation and related services in the future.

Key changes compared to November 2022 draft include: 1) higher solar power capacity guidance and lower wind power and LNG guidance to encourage rooftop solar for self-consumption; 2) target for 15,000 MW of offshore wind power to produce hydrogen by 2035; 3) target for 3,000-4,000 MW of renewable energy capacity for export.

PDP VIII guides for robust electricity consumption

PDP VIII guides for national electricity consumption CAGRs of 9% in 2021-2030 and 3%-6% in 2031-2050, with an assumption for annual GDP growth of 7% and 6.5%-7.5% in the respective periods. The elasticity ratio between the GDP growth rate and electricity consumption growth rate is guided to be 1.2-1.3x in 2021-2030 and 0.4-1.0x in 2030-2050. These CAGRs are similar to those in the November 2022 PDP VIII draft, which were based on assumptions for annual GDP growth rates of 7.2%-7.5% in 2021-2030 and 5.8%-6.6% in 2030-2050. We note that the electricity consumption volume for 2030F in the official PDP VIII is guided to be 5% lower than it was in the November 2022 draft, which we think is more reasonable.

Our 2023F electricity consumption growth forecast, which we reduce from 8% to 6% (see page 6), is more conservative compared to PDP VIII. We maintain our 2024-2027F electricity consumption growth forecast of ~9%, which is similar to the MoIT's guidance.

Figure 3: Forecast of Vietnam's electricity consumption in PDP VIII

Billion kWh	2020	2030F	2040F	2050F			
Official PDP VIII (May 2023 – high-load case)							
Electricity consumption	217	505	922	1,255			
10-year CAGR		9%	6%	3%			
Draft PDP VIII (November 2022 – high-load case)							
Electricity consumption	217	530	938	1,246			
10-year CAGR		9%	6%	3%			

Source: MoIT (Official PDP VIII, November 2022 PDP VIII draft), Vietcap

National power capacity to more than double by 2030

PDP VIII guides for total national installed capacity of 158 GW (2.2x of the 69 GW capacity in 2022 capacity) and 573 GW (8.3x of 2022 capacity) by 2030 and 2050, respectively, which are 1% and 6% higher compared to the respective targets in the November 2022 draft.

PDP VIII has an emphasis on the development of renewable energy — mainly offshore wind power — to produce hydrogen and green ammonia without a capacity limit. We note that part of the hydrogen/green ammonia will be used to produce electricity for domestic consumption, while



the remainder will be exported. The MoIT estimates that offshore wind power capacity for hydrogen/green ammonia production will be 15 GW by 2035 and 240 GW by 2050.

Renewable capacity (wind & solar) is targeted to nearly triple to ~50,000 MW by 2030 and become the biggest source of Vietnam's national power.

Solar power capacity targeted to be 20,591 MW and 189,294 MW by 2030 and 2050, respectively, which are 26% and 6% higher compared to the respective figures in the November 2022 PDP VIII draft. Of the 4,100 MW difference between the official 2030 capacity guidance and that in the November 2022 draft, 2,600 MW is expected to be from solar power for self-consumption (i.e., rooftop solar). The official PDP VIII also notes that the development of solar power for self-consumption is encouraged without a capacity limit, while the 2,600 MW is an estimated installed capacity by 2030.

Wind power capacity is expected to be 27,900 MW by 2030, which is a slight decrease compared to 28.5 GW in the November 2022 PDP VIII draft. This is mainly because offshore wind power is projected to be 6,000 MW instead of 7,000 MW as in the November 2022 draft. However, the official PDP VIII states that 2030 offshore wind power capacity could increase further if technology and pricing allow. Meanwhile, the guidance for 2050 wind power capacity is 168,550 MW — 10% higher compared to target in the November 2022 draft.

Hydropower capacity to increase at a CAGR of 3.5% in 2021-2030

According to PDP VIII, Vietnam's hydropower has a maximum potential of 40,000 MW, with more than half already exploited. Hydropower capacity is targeted to be 29,356 MW and 36,016 MW by 2030 and 2050, respectively. Therefore, the contribution of hydropower is expected to drop from 30% of the national power capacity in 2020 to 19% in 2030 and 6% in 2050.

Gas & LNG-fired capacity will increase 5x to ~37,000 MW in 2021-2030

Gas-fired power capacity is targeted to more than double by 2030 (compared to 2020) to 14,930 MW. However, PDP VIII guides for a reduction in gas-fired power capacity after 2030 to 7,900 MW by 2050. The difference is to be supplied by hydrogen (transitioned from gas-fired power).

The official PDP VIII guides for an LNG-fired power capacity of 22,400 MW by 2030, which is 9% lower compared to the figure in the November 2022 draft. The estimated volume of imported LNG is 18.2 billion cbm in 2030 is to accommodate this new source of power, while the figure is reduced to 6.2 billion cbm to reflect Vietnam's transition from using LNG to hydrogen by 2050. We note that by 2050, only 4,500 MW is targeted to come from LNG-fired power combined with hydrogen, whereas 20,900 MW will be purely from hydrogen (transitioned from LNG-fired power).

Coal-fired power capacity will increase by 50% to ~30,000 MW in 2030

Coal-fired power will continue to play a major role in Vietnam's power capacity expansion until 2030, but no additional capacity is to be developed after 2030. The official PDP VIII also aims for coal-fired plants to end their operation after 40 years of technical life and perform gradual transitions to using biomass/ammoniac.

Significant increase in imported power

Vietnam plans to import 5,000 MW of power capacity over the next 10 years — ~4x higher compared to the current amount.

Huge needs for investment capital

According to PDP VIII, Vietnam plans to invest USD135bn in the power sector in 2021-2030, which is 10% higher than that in the November 2022 draft. This amount translates to an annual capital requirement of USD13.5bn — ~3% of Vietnam's GDP. Specifically, USD120bn is planned for power generation and USD15bn planned for power transmission capacity.



Figure 4: Vietnam's capex requirement for power generation and transmission projects

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USD bn	2021-2030	2031-2050
Power generation	120	364-511
Power transmission	15	35-39
Total	135	399-523

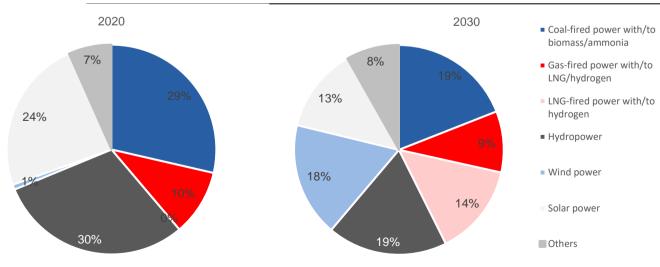
Source: MoIT (Official PDP VIII), Vietcap

Figure 5: MoIT's forecast for Vietnam's power capacity (MW)

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(MW)	2020A	2025F	2030F	2035F	2040F	2045F	2050F
Onshore wind power	539	13,416	21,880	30,400	46,100	62,250	77,050
Offshore wind power	-	-	6,000	18,000	45,500	79,500	91,500
Solar power	16,491	17,891	20,591	56,866	94,866	135,824	189,294
Biomass, cogeneration & others	1,750	2,630	4,970	6,590	9,460	9,710	10,515
Hydropower	20,789	26,795	29,346	33,654	34,414	35,139	36,016
Pump-storage hydropower & energy battery storage	-	50	2,700	9,450	19,950	33,750	45,550
Gas-fired power (domestic gas) switching to use LNG	7,076	7,076	14,930	7,900	7,900	7,900	7,900
Gas-fired power (domestic gas) switching to use LNG and hydrogen (*)	-	-	-	7,030	7,030		-
Gas-fired power (domestic gas) to hydrogen	-	-	-	-	-	7,030	7,030
LNG-fired power	-	2,700	22,400	22,700	12,200		
LNG-fired power (with hydrogen)	-	-	-	2,700	13,200	21,900	4,500
LNG-fired power to hydrogen	-	-	-	-	-	3,500	20,900
Coal-fired power	19,825	28,757	30,127	23,137	15,337	3,635	=
Coal-fired power (with biomass/ammoniac) (**)	-	-	-	6,990	14,790	18,642	-
Coal-fired to biomass/ammoniac	-	-	-	-	-	6,900	25,632
Oil-fired power	1,596	1,221	-	-	-	-	-
Imported power	1,272	4,453	5,000	7,742	10,242	11,042	11,042
Flexible power plants	-	-	300	9,000	23,100	33,900	46,200
Total installed capacity	69,338	104,989	158,244	242,159	354,089	470,622	573,129
Five-year CAGR		8.7%	8.6%	8.9%	7.9%	5.9%	4.0%

Source: MoIT (official PDP VIII), Vietcap (* Hydrogen: An alternative fuel for natural gas; when burned with oxygen for energy generation, it only produces steam instead of carbon dioxide. (**) Biomass: Made of material from living organisms such as plants, animals and waste. Ammonia: A fuel that helps to reduce carbon emissions.)

Figure 6: Vietnam's power capacity breakdown by type (%)



Source: MoIT (official PDP VIII), Vietcap



700,000 Others 600,000 ■ Solar power 113,307 500,000 97,392 Wind power Hydropower 400,000 189.294 179,409 LNG-fired power to hydrogen 300,000 LNG-fired power with hydrogen Gas-fired power to 200,000 hydrogen 168.550 153,050 Gas-fired power with LNG/hydrogen 28,480 27,880 100,000 36.016 28,946 36,016 29,346 ■ Coal-fired power to biomass/ammonia 24,500 22,400 7,500 25,632 25,632 Coal-fired power with biomass/ammonia 2030G 2050G 2030 G 2050 G PDP VIII Draft Official PDP VIII

Figure 7: Power capacity breakdown in official PDP VIII vs November 2022 draft (MW)

Source: MoIT (official PDP VIII and November 2022 PDP VIII draft), Vietcap

(November 2022)

PDP VIII provides a strong legal framework for the development of key oil & gas projects, including Block B

(May 2023)

With gas-fired power capacity targeted to double to 14,900 MW by 2030, the master plan targets to accelerate the development of key upstream projects such as Block B and Blue Whale as well as key downstream projects such as the O Mon II, III & IV gas-fired power plants (total capacity of 3,150 MW) and Mien Trung I & II and Dung Quat I, II & III (total capacity of 3,750 MW). In addition, we expect Vietnam's revised Oil & Gas Law, which becomes effective July 1, 2023, will facilitate exploration & production activities in Vietnam.

Several developments regarding Block B gas project. In Q4 2022, the MoIT concluded that Block B (1) will receive a final investment decision by June 2023 at the latest and (2) extract its first gas by Q4 2026 at the latest. We currently assume this gas field will extract its first gas in 2028. Gas prices from Block B are expected to not be competitive with imported LNG prices. However, we believe the development of Block B is critical as it ensures national energy security and creates work for oil & gas companies as well as jobs for Ca Mau Province. An earlier-than-expected groundbreaking for this project should imply upside risk for GAS, PVS and PVD. GAS is the biggest beneficiary of Block B, while PVS is set to be the earliest beneficiary with potential mechanical & construction contracts worth USD500mn starting in 2024. In addition, PVD estimates there will be more than 1,000 wells for this large project, which should require three of PVD's rigs starting at the



beginning of 2026. In addition to its potential drilling contracts, PVD plans to join bidding for well technical services and drilling-related services for the Block B project, and it is considering the most feasible options to participate in.

Blue Whale gas project. We currently assume this gas field will extract its first gas in 2030. We believe the approval of this project will benefit PVS and PVD; however, we see no impact for GAS.

Figure 8: Jobs for oil & gas stocks from Block B and Blue Whale projects (in the order of the earliest/most significant stock to benefit from these projects)

Companies with potential workload	Block B	Blue Whale	
GAS	Pipeline investment and gas transporting	No	
PVS	1 central production platform (CPP) + 46 well head platforms (WHP)	1 WHP	
PVD	3 rigs	1 semisubmersible rig	
Vietsovpetro + PXS	1 CPP + WHPs (subcontractor)	1 WHP (subcontractor)	
PVB		Pipeline coating	
PVC	Mud and chemicals for drilling		
Contract value	2		

Contract value (USD mn)	Block B	Blue Whale
GAS	1,118 (*)	N/A
PVS	500	830
PVD	574	
PVB	152	
Vietsovpetro + PXS	1,271	Not yet enough data to estimate
PVC	335	estimate
Others	173	
Total capex for upstream (USD mn)	4,123	4,600

Source: Vietcap (* GAS has a 51% stake in the gas pipeline; PXS: Petroleum Equipment Assembly & Metal Structure; PVB: PetroVietnam Coating; PVC: PetroVietnam Chemical & Services)

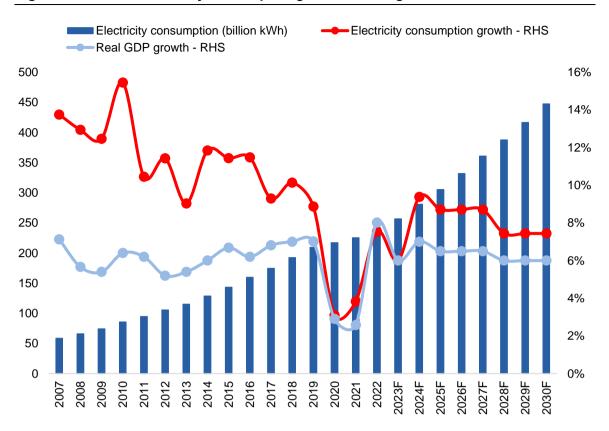
We forecast Vietnam's electricity consumption to increase 6% YoY in 2023

We lower our 2023 electricity consumption growth forecast from 8.0% to 6.0% following lower-than-expected electricity consumption in Q1 2023 and the recent reduction in our 2023 GDP growth forecast from 6.5% to 6.0% due to the stronger-than-expected negative impact of the global economic slowdown on Vietnam's exports and production in Q1 2023. Please see our Macro Update Report, dated April 7, 2023, for more details.

Vietnam's electricity consumption to rise ~9% p.a. in 2024F-2027F. Our macro team forecasts Vietnam's GDP growth rate in 2024 at 7%, which is the basis for our projected 2024 electricity consumption growth rate of 9.4% (assuming an elasticity ratio of 1.3x). With assumptions for Vietnam's annual GDP growth rate of 6%-7% in 2025-2027F (guided by the MoIT) and energy elasticity of ~1.3, we estimate that Vietnam is likely to experience electricity consumption growth of ~9% p.a. in 2025-2027F.



Figure 9: Vietnam's electricity consumption growth vs GDP growth forecasts*



Source: EVN, Vietcap (* We note that the real GDP growth rates shown for 2023-2024F are Vietcap's GDP growth forecasts; numbers for 2025-2030F are based on the MoIT's guidance)



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