

Sector Note



**Power sector**  
**Firing up thermal power**

- We see gas-fired and coal-fired power using domestic coal to enjoy higher output mobilization under the weakening of hydropower in 2023F.
- We see the new development phase for RE market is being formed, prioritizing DPPA mechanism, but progress is still slow.
- We see the return of thermal power and the new future for RE will be the main sector's theme in 2023F, thus, we choose **PC1** and **POW**.

**Power consumption growth will stay below PDP8's forecast in 2023F**

For 2023F, we expect a more conservative power consumption growth of 6% yoy, 28% lower than the PDP8's low-case scenario as we see the construction sector will be hit by weaker demand from property market, lingering through at least the rest of 2023F. Thus, we expect steel and cement sectors to be hampered. However, we find expectations of a hotter summer will drive higher power consumption from residential sector during summer days. In 2024-30F period, we see Vietnam total power consumption will continue to grow in accordance with the base-case scenario of 8.4% CAGR in the PDP8 draft.

We see a high potential that EVN's retail price will increase in 2023F after four years of unchanged thanks to the newly issued price band of VND1,826-2,444/kWh increasing VND220-528/kWh from the previous range. We see the new retail price, if officially rising, will support EVN financial position in term of fullness cash flow as well as larger space to mobilize from higher price power sources.

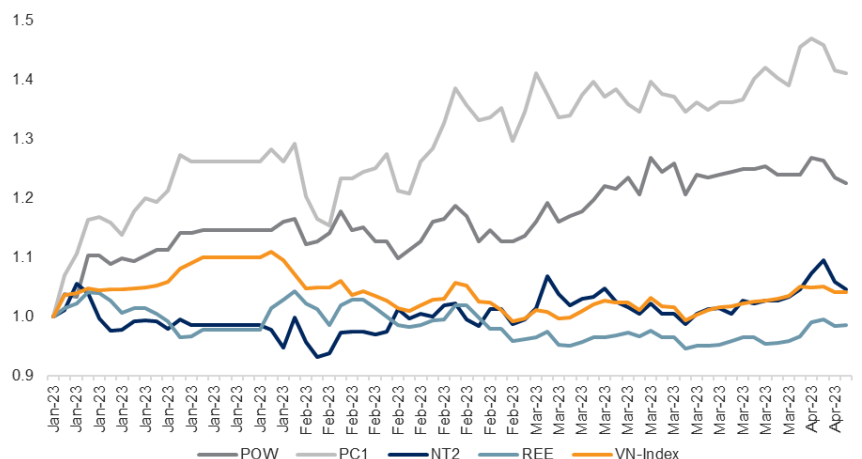
**Thermal power output will rise thanks to the weakening of hydropower in 2023F**

We see thermal power in general and specifically gas-fired power will enjoy higher mobilization thanks to 1) The weakening of hydropower will leave larger space for other power sources; 2) we forecast lower Brent oil price of US\$85-80/barrel over 2023-24F from 2022 peak will support gas-fired power price competitiveness amid the high imported coal price expected to linger. For coal-fired power, we see the coal-fired power plants that using domestic coal, especially in the North will be benefited thanks to low price and stable coal input volume. Besides, we expect hotter weather in this region to be the primary factor, supporting these plants to record a positive output mobilization in 2023F.

**Our stock picks including POW, and PC1**

In 2023F, we expect **POW** – leading gas-fired power firm to enjoy positive results thanks to brighter outlook of gas-fired power sector. On the other hand, although there are uncertainties in the new development phase of RE power amid the sector's policy bottlenecks, we are still putting our faith in an official price mechanism to be carried out in this year. Thus, when everything is settled down, we see RE construction segment including power plants EPC and transmission grid build to rise soonest. Therefore, we see **PC1** – the leading EPC wind power contractors will be the first enterprise to ride on this trend.

**Figure 1: P/B performance of Power stock picks versus the VN-Index since 2023 to date**



Analyst(s):



**Tung Nguyen**

Tung.nguyenduc@vndirect.com.vn

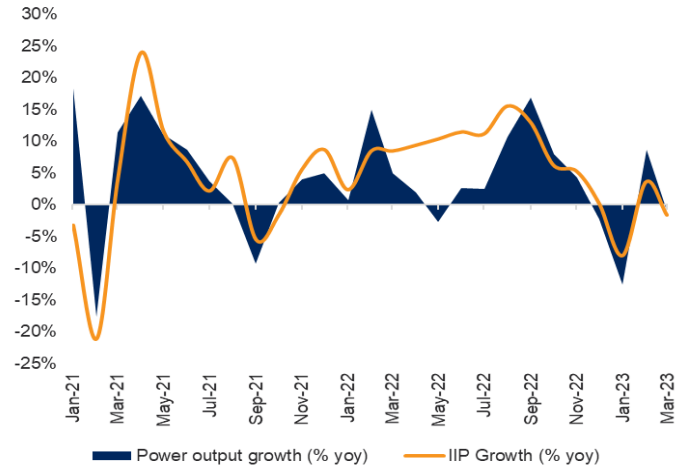
Source: VNDIRECT RESEARCH, Bloomberg

## Firing up thermal power

### Vietnam Power snapshot 1Q23: Power consumption recorded negative growth under weak industrial demand

**Figure 2: Power output dropped following lower industrial demand in 1Q23**

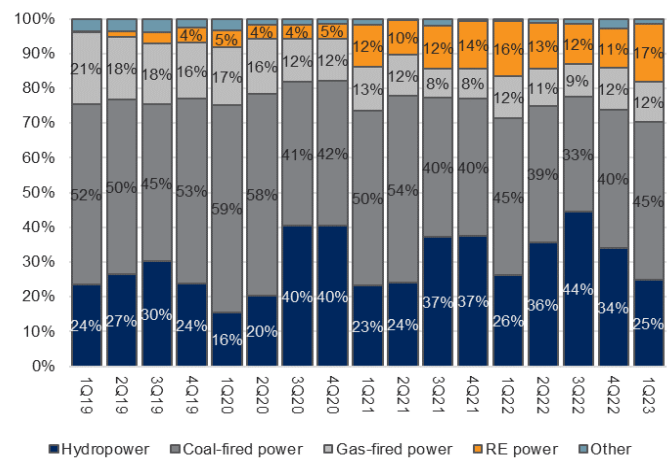
Vietnam total power consumption edged down 1.6% yoy to 61.83bn kWh in 1Q23, amid lower industrial demand. According to Vietnam General Statistics Office (GSO), the Index of Industrial Production (IIP) recorded negative growth, dropping 6.3% yoy, in which, some of the electricity intensive sectors such as steel (-2.4% yoy), and cement (-9.6% yoy) slowed down under the freezing condition of property market, as well as delay in public spending. Thus, lower power demand caused an overall decline among power sources.



Source: VNDIRECT RESEARCH, EVN, GSO

**Figure 3: 1Q23 output mobilization by power sources (Unit: %)**

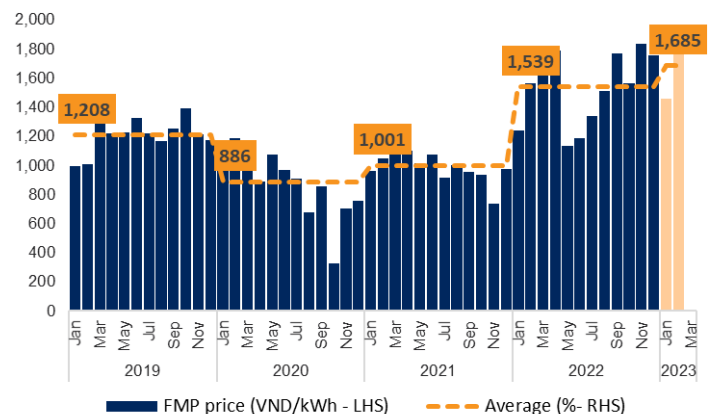
In terms of mobilization structure, coal-fired power mobilization portion improved from low level in 2H22, accounting for 45% total power output thanks to the global coal price downturn since Feb-23. Gas-fired power output weight remained stable, grabbing 12% total output generation. Hydropower output weight was also stable at 25%. Normally, the first quarter usually the water retention period to serve the upcoming hot weather. Solar power recorded stiff capacity cut down amid excessive situation in the South while power demand remained weak. In contrast, wind power generated solid output thanks to high wind season, making up for total RE output weight to edge up 5%pts to 17%.



Source: VNDIRECT RESEARCH, EVN

**Figure 4: FMP in the CGM remained at high level under higher mobilization from thermal power**

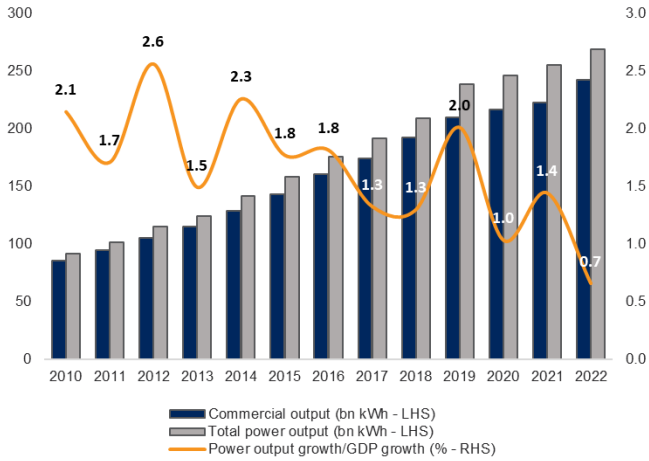
The Full market price (FMP) in the Competitive Generation Market (CGM) increased 20% yoy to VND1,685/kWh in 2M23, following higher mobilization from thermal power. At the moment, power plants are still bidding in the CGM under the 2022 Power market operation plan, issued by the Ministry of Industry and Trade (MOIT). Accordingly, the system marginal ceiling price (SMP cap) anchored at high level of VND1,602/kWh, favoring thermal power.



Source: VNDIRECT RESEARCH, GENCO3

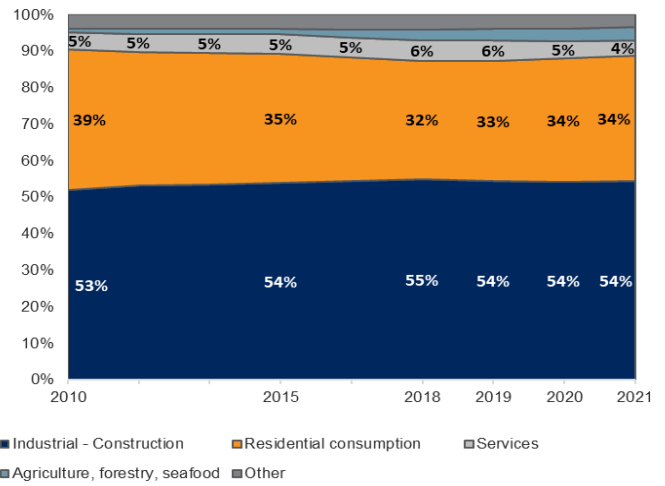
**We see power consumption growth will stay below the PDP8 forecasted level in 2023F**

**Figure 5: Energy elasticity ratio (Power output growth/GDP growth) recorded a downtrend in 2010-22 period**



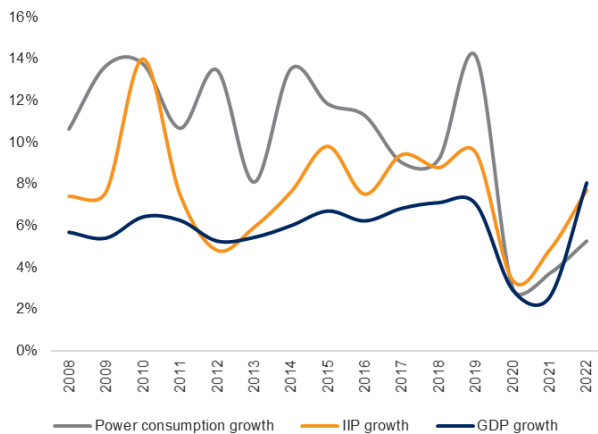
Source: VNDIRECT RESEARCH, PDP8 draft

**Figure 6: In 2021, Industrial – Construction accounted for 54% of total power consumption, followed by Residential group (Unit: %)**



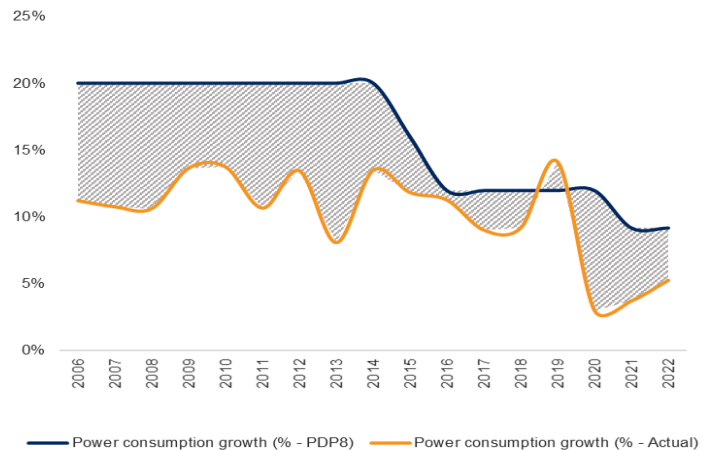
Source: VNDIRECT RESEARCH, EVN

**Figure 7: Power consumption growth went below GDP growth for the first time under low IIP growth (Unit: %)**



Source: VNDIRECT RESEARCH, EVN, GSO

**Figure 8: Previous PDP's power growth forecast stayed lower than actual in 2006-14 after bring out a more accurate number from 2015**



Source: VNDIRECT RESEARCH, PDP8 draft

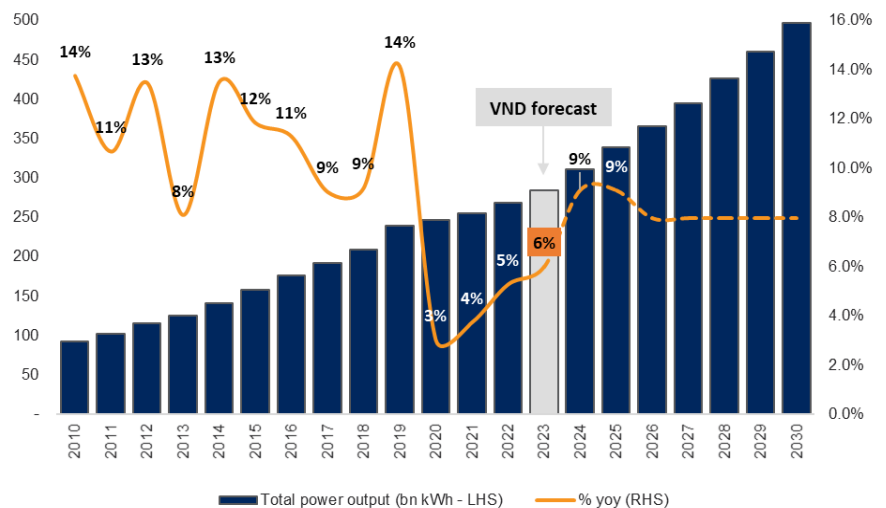
In 2021, Vietnam total power demand made up of average 53% from Industry – Construction sector, 39% from Residential consumption - Service sector, and the remained from Agriculture and other activities. The output/GDP growth ratio recorded a downtrend from averaging 1.9x in 2010-15 period to 1.4x in the 2015-20 period. We see this is understandable given that Vietnam’s energy consumption portion using for Industry – Construction grabbed the majority of more than a half, while the sector’s GDP contribution stayed around only 37% of total GDP. Notably, Vietnam consisted of several energy-intensive industry such as Cement, and Steel production with a tendency to increase its weight in the future.

Moving to 2022, Vietnam total power consumption growth reached 5.3% yoy, below GDP growth for the first time, and far lower than the PDP8’s low case forecast of 8.4% yoy. Accordingly, output growth/GDP growth ratio fell vastly to

0.7x. The humble growth caused by weak electricity demand among two major groups, in which:

- 1) Industrial - Construction power demand dropped as a result of lower production among intense power consumed sectors such as cement, steel, electronic while construction activities slumped following the freezing property market. Export activities also hampered in the context that the world economies faced difficulties, especially among Vietnam largest trading partners such as US, China and Europe. The multiple channel effect has drowned IIP growth and sector's GDP growth from 2H22, lingered through 1Q23, thus, brought down national power consumption. Industry – Construction power demand drive on the sector IIP, GDP growth, we see more severe effect during the absence period of power-intensive sectors, which can be seen in 2H22.
- 2) Power demand for the Residential sector growth lower than expected when 2022 hot season recorded lower temperature than average, dragged down abrupt demand in the summer. In 2010-20 period, Residential – Service power demand growth at 9.5% CAGR but total weight reduced from 44% to 39% with smaller portion from Residential group. We see the sector's growth fundamental relating to population expansion and more available access to electricity. Increasing demand for air conditioning and the transition fossil fuel to electrical cooking showed higher living standard among Vietnam residents. Accordingly, under the PDP8, experts noted that income per capita and urbanization rate will be primary factors influencing this group's consumption.

**Figure 9: We expect 2023F power output grow at 6% yoy, lower than PDP8 level of 9.1% yoy. For 2024-30F period, Vietnam power will grow in accordance with PDP8 base-scenario**



Source: VNDIRECT RESEARCH, PDP8 draft

For 2023F, we expect a more conservative power consumption growth of 6% yoy, equivalent to the 2023 market operation plan level, issued by MOIT. The growth is 38% lower than the high-case scenario, and 28% lower than the low-case scenario noted in the PDP8 draft as:

- We see the domestic construction sector will be greatly hit by weaker demand from property market, lingering through at least the rest of 2023. Thus, we expect steel and cement sectors to be hampered

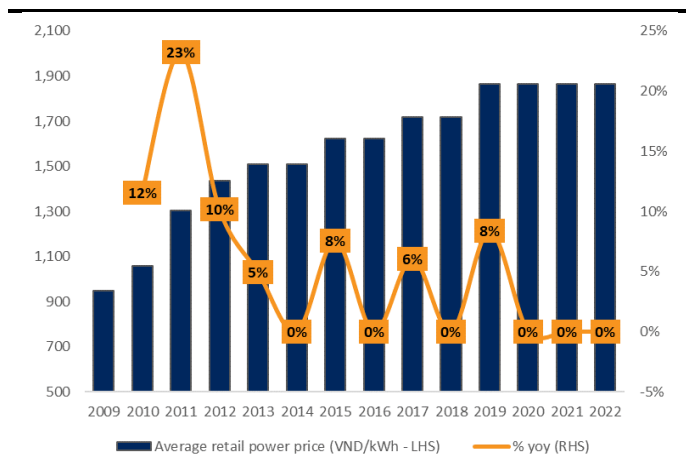
accordingly. However, we anticipate buzzing public investment activity this year, which somewhat lifts demand for these industries and offsets the output loss from the property market.

- On the other hand, we find expectations of a hotter summer will drive higher power consumption from Residential sector, somewhat offsetting the low industrial power demand in 2023F as the El Nino phase is expected to come back from May-23.

We compare actual power consumption growth versus Power Development Plan (PDP) forecast to see the efficiency as well as the implementation of Vietnam power system (Figure 8). The actual output growth was lower than the forecasted level in 2006 to 2014, under the PDP6. However, the gap narrows from 2015 (PDP 7) as forecasted output growth brought out a more accurate number, before deviating due to unexpected Covid-19 from 2020. Therefore, in 2024-30F period, we see Vietnam total power consumption will continue to grow in accordance with the base-case scenario of 8.4% CAGR in the PDP8 draft.

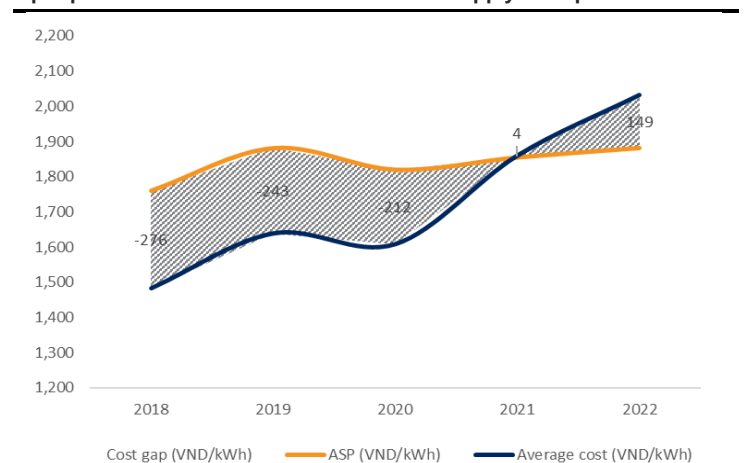
**We see the rising signal from retail power price will bring out settling consequences for the EVN's financial distress**

Figure 10: Retail price has not change for over 4 years from 2019...



Source: VNDIRECT RESEARCH, EVN

Figure 11: ...while production cost has surge sharply, regarding the input price hike from 2021 under the world supply disruption



Source: VNDIRECT RESEARCH, EVN

In Mar-23, the MOIT announced the result of EVN's electricity production and cost inspection for FY21-22. Accordingly, the cost of electricity production reach VND1,859/kWh (+1.84% yoy) in 2021, and VND2,032/kWh (+9.27% yoy), surpassing the average selling price (ASP) of VND1,855.6/kWh and VND1,882/kWh in FY21-22 respectively. Despite several efforts to reduce costs, the solutions fell short of covering mobilization price under the sharp rise of input price such as imported coal, gas price and oil price. According to the MOIT recent business review, EVN recorded a net loss of VND26,235bn in FY22, and the situation does not seem to be improving in 1Q23.

We see the input and output price mismatch to be the major cause for EVN's severe loss. Input price hike pulled thermal power ASP to go up sharply, along with RE capacity increased vastly from 2020. Thus, the average EVN's mobilization price swelled up while retail price remained unchanged for over four years from 2019. At the moment, there is only hydropower price still stay below retail price level, despite the fact that this power sources accounts for only 33%

of total system capacity. The remaining 67% come from high price power sources including thermal and RE power. As a result, we see some of the worrisome consequences if the situation will not soon be improved in near future:

- If retail prices are kept static, EVN will run out of cash by the end of May-23, with an expected loss of VND64,941bn in FY23F. At the moment, several power plants recorded higher receivable from EVN's electric bill, thus, the financial distress will cause further damage for power plants business and its operational cash flow.
- EVN is a state-owned enterprise, and its capital funding is not guaranteed by the government. Therefore, poor business performance will greatly affect the development process of new power capacity amid harder funding. We see the issues will threat assurance of power system and, and further, the economic and social development of Vietnam.

However, there have been positive signs in terms of relieving the financial pressure for EVN. Accordingly, on Feb-23, the MOIT issued a new retail price bracket, which will serve as the base for determining future retail prices. In particular, the new price range will be VND1,826-2,444/kWh increasing VND220-528/kWh from the previous range. We see a high potential that EVN's retail price will increase this year, but whether the increase is significant, or minor should carefully consider basing on Vietnam inflation situation. We see the new retail price, if officially rise, will greatly support EVN financial position in term of fullness cash flow to make payment for power plants as well as larger space to mobilize from higher price power sources.

### Thermal power will enjoy solid output mobilization thanks to the weakening of hydropower in 2023F

In terms of power capacity, in 2023F, we expect coal-fired power capacity to grab a wider portion of 34% total weight, thanks to additional 2,632MW on board, followed by hydropower with 29% total capacity with additional 1,636MW new capacity. Other power sources' capacity will remain unchanged. In terms of output mobilization, we see a sharp drop in hydropower output due to unfavored weather conditions before a soft rebound in 2024F. Coal-fired power continues to suffer a low output weight, mainly due to lower mobilization among imported coal-fired power plants. Gas-fired power will enjoy higher mobilization of 12% total weight thanks to lower hydropower output and input price ease. RE power output will rise thanks to the additional capacity of around 2,000MW from transitional projects.

Figure 12: Power capacity growth by power sources in 2023F

MW	2022			2023F		
	Capacity	% yoy	%weight	Capacity	% yoy	%weight
Hydropower	22,345	1%	28%	23,981	7%	28%
Coal-fired power	25,820	7%	33%	28,452	10%	33%
Oil-fired power	1,579	0%	2%	1,579	0%	2%
Gas-fired power	7,398	3%	9%	7,398	0%	9%
Solar power	16,567	1%	21%	17,019	3%	20%
Wind power	4,667	17%	6%	6,305	35%	7%
Biomass	356	0%	0%	386	8%	0%
Other	619	0%	1%	619	0%	1%
<b>Total</b>	<b>79,351</b>	<b>4%</b>		<b>85,739</b>	<b>8%</b>	

Source: VNDIRECT RESEARCH, EVN

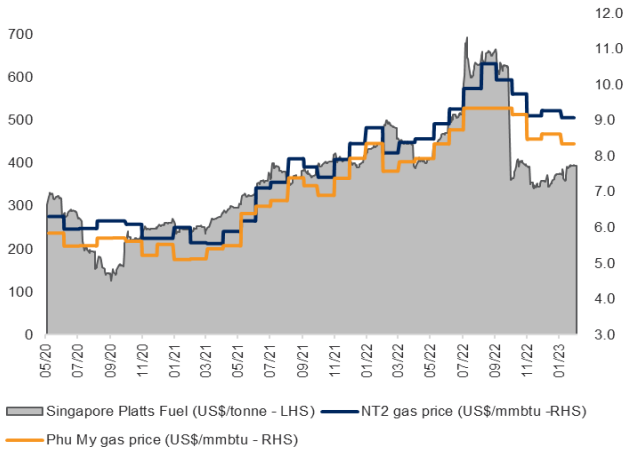
Figure 13: Output growth by power sources in 2022-24F

billion kWh	2022			2023F			2024F		
	Output	%yoy	%weight	Output	%yoy	%weight	Output	%yoy	%weight
Hydropower	95	21%	35%	85	-10%	30%	96	13%	31%
Coal-fired power	105	-11%	39%	114	8%	40%	127	12%	41%
Gas-fired power	30	12%	11%	34	15%	12%	37	9%	12%
RE power	35	10%	13%	46	31%	16%	43	-5%	14%
Others	4	193%	2%	6	37%	2%	6	9%	2%
<b>Total</b>	<b>268</b>	<b>5%</b>		<b>285</b>	<b>6%</b>		<b>310</b>	<b>9%</b>	

Source: VNDIRECT RESEARCH, EVN

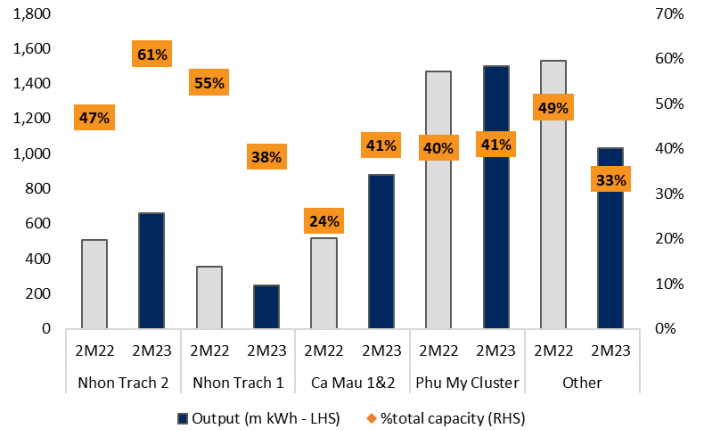
**We see the input price ease to be the primary factor supporting higher mobilization for gas-fired power in 2023F**

**Figure 14: Domestic gas price showed a downtrend from 2022 peak, anchoring on the decline of Singapore FO price**



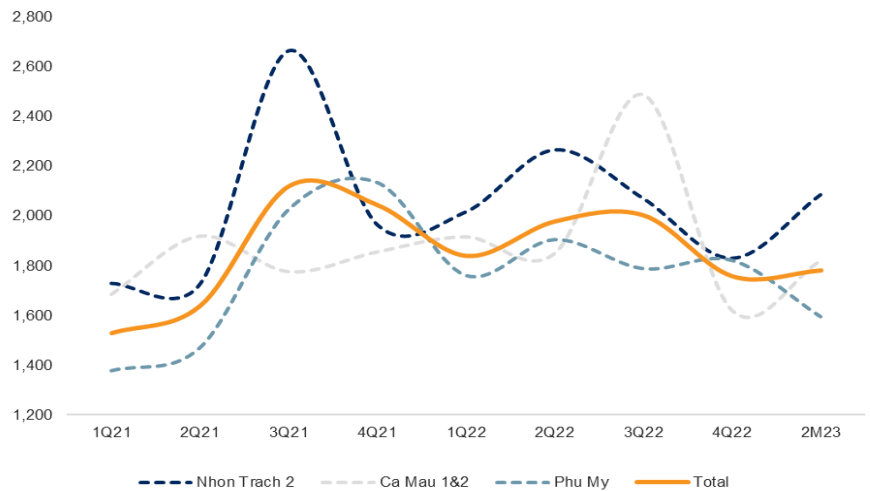
Source: VNDIRECT RESEARCH, GENCO3, Bloomberg

**Figure 15: Some of the high efficiency gas-fired power plants still recorded a solid output mobilization amid overall sector decline**



Source: VNDIRECT RESEARCH, Company reports

**Figure 16: Gas-fired ASP showed a slight retreat in 2023F from high level in 2022, supported by the recent price drop in gas input (Unit: VND/kWh)**



Source: VNDIRECT RESEARCH, Company reports

In 2M23, some of the gas-fired power plants recorded positive output mobilization including Nhon Trach 2, and Ca Mau 2 thanks to the plant’s high efficiency, but overall, total gas-fired power output still suffered a modest reduction due to weaker power demand, particularly among industrial zone in the South. Notably, gas price recorded a solid decline, anchoring on the downtrend of the Singapore FO. Its price cut down from 2022 peak of at most US\$700/tonne to below US\$400/tonne level in Mar-23. Accordingly, although the price is still far beyond the 5-years average, we consider this as a sign of optimism, enhancing the competitiveness of the energy source.

For 2023F, we find some of the risk threatening lower output generation of gas-fired power plants, given that EVN is facing severe financial distress. As gas-fired power outcome is heavily reliant on the electricity consumption of the

South, we see power demand will be hampered under the weak construction and industrial activities in this region. However, we see gas-fired power contains its own advantages amid the weakening of hydropower in 2023F. Furthermore, the price gap between gas-fired and coal-fired power has gradually shrunk due to the anchored high coal price. For 2023-24F, we see the Brent oil price to locate at a lower level of US\$85-80/barrel, supporting lower gas price. Thus, we see gas-fired power ASP is getting more competitive and vastly cheaper than new imported coal-fired power plants. We see gas-fired power still plays an essential role as reliable background source, securing the system safety and also benefited from remained high CGM price, thus, we estimate gas-fired power output to increase 15% yoy and 9% yoy over 2023-24F period. We see POW, NT2 will enjoy this trend.

**Domestic coal-fired power in the North will be benefited thanks to lower input cost and the region's high electric load growth in 2023F**

In 2M23, coal-fired power output recorded a slight drop of 4.6% yoy to 16.47bn kWh, continuing to prolong the dismal mobilizing situation that has taken place from 2022. Imported coal prices hike persisted as the major reason, especially given that Vietnam's electricity demand grew slowly from 2H22, while hydropower - the cheapest power source, was experiencing favorable weather. According to figure 9, Newcastle coal futures - the benchmark for the top consuming region of Asia, has surge up to almost US\$450/tonne in 4Q22, lingered through the first month of 2023F, before shrink to the 14-month low of US\$173/tonne since mid-March regarding the China's allowance of its three largest utility companies and steelmakers to continue importing coal from Australia, the first such action since Beijing imposed an unofficial ban on coal imports from this country by the end of 2020. At the same time, warmer weather than usual causes the US and European countries to reduce heating pressure in winter, helping to alleviate some worries about fuel shortages. However, we see the recent price is still far beyond its normal level before 2020 and Vietnam coal-fired power plants might still face a lot of pressure in term of price competition.

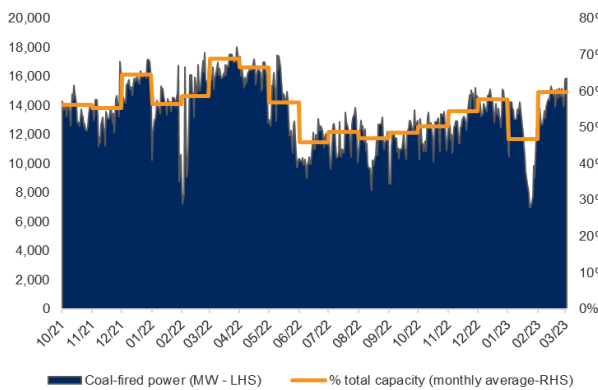
For 2023-24F, we expect total coal-fired power output to slightly improve 8-12% yoy, respectively from 2022 low-base. We see the power source outlook will differ depending on region and type of input fuel. We expect high-anchored global coal prices to persist regarding higher demand when China is fully reopens its economy, while on the supply side, the new legislation passed by Australia to cap greenhouse gas emissions required national coal mines to cut output by 5% per year, pressuring supply from the key exporter. As a results, we believe that new coal-fired power plants that use entirely imported coal such as Song Hau 1, Duyen Hai 2, Nghi Son 2, as well as the upcoming project Thai Binh 2 and Van Phong II will face serious difficulties in mobilization when the price of this power source is vastly higher than other power sources. In oppose, we see domestic coal-fired power plants, especially in the North such as QTP, HND, PPC will has brighter outlook in 2023F thanks to:

- We see that the North constantly recorded the highest electric-load growth because it is the hub of several large and rapidly developing industrial centers. Furthermore, the Vietnam Meteorological and Hydrological Administration forecasted a spike in power demand during the upcoming hot weather following 0.5°C higher temperature than multiple-year average in the North region, supporting higher power demand.



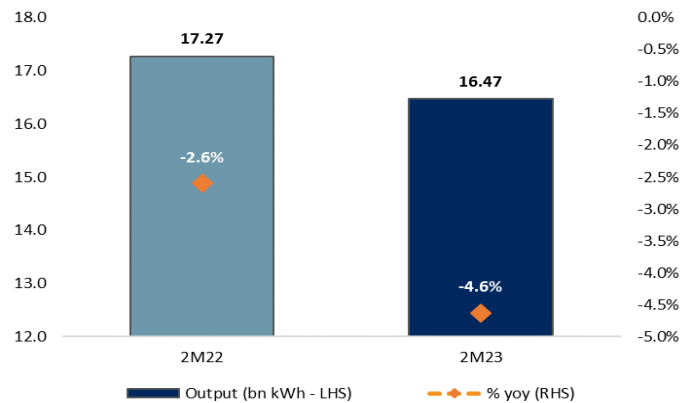
- We see the humble 2023F capacity growth as an opportunity for operated power plants to absorb higher output mobilization, especially in the potential power shortage areas such as the Northern region.
- We see the stable price level of domestic coal price of VND1.054m/tonne to be the major advantages for domestic coal-fired power plants in the context of global input price hike. Moreover, we see the power sources in the North usually benefited from lower transportation cost as well as guaranteed input sources by locating near the coal mine.

**Figure 17: Coal-fired power capacity mobilized at humble rate due to input price surge, leading to higher ASP**



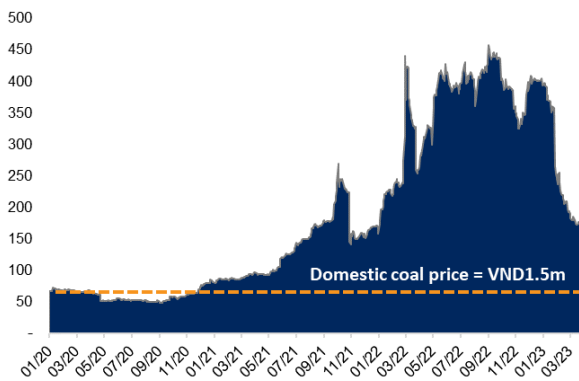
Source: VNDIRECT RESEARCH, NLDC

**Figure 18: Coal-fired power output continue to drop 4.6% yoy in 2M23**



Source: VNDIRECT RESEARCH, EVN

**Figure 19: Global coal price shrunk from 2022 peak, but still far above 5-years average level (Unit: USD/tonne)**



Source: VNDIRECT RESEARCH, Bloomberg, TKV

**Figure 20: Coal-fired power sources in the North enjoyed cheaper transportation cost by located near coal mine, providing lower ASP**

Power plant	Location	FY22		Output		ASP (VND/kWh)
		Revenue (VNDbn)	%yoy	(m kWh)	%yoy	
QTP	Quang Ninh	10,453	9.1%	6,425	7.7%	1,627
HND	Hai Phong	10,511	0.1%	6,718	-8.3%	1,565
PPC	Hai Duong	5,116	31.7%	2,979	11.1%	1,717
Mong Duong	Quang Ninh	11,167	33.7%	7,020	5.8%	1,591
Vinh Tan	Binh Thuan	11,033	18.8%	6,711	1.2%	1,644
Vung Ang 1	Ha Tinh	6,264	-36.1%	3,318	-21.0%	1,888
Song Hau	Hau Giang	6,257		2,620		2,388

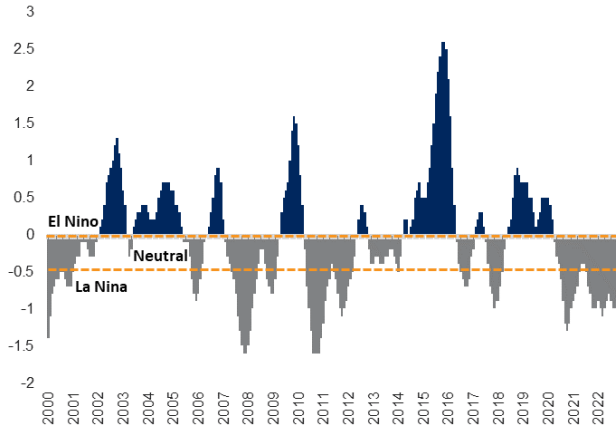
Source: VNDIRECT RESEARCH, Company reports

### Hydropower has officially exited its favorable weather phase from Mar-23, leaving room for other power sources

In our perspective, the La Nina phase has lasted for a longer-than-expected period from mid-20 to early-23 (around 28 months), thus, we see minimal possibility for La Nina phase to keep occurring in 2023F. According to the International Research Institute (IRI), the ENSO weather index officially switched to the Neutral phase from Mar-23 with highest possibility of 97%. Notably, the institution also expected a higher possibility of El Nino to take place from May-23. The El Nino phase will bring out hotter weather and more intense drought,

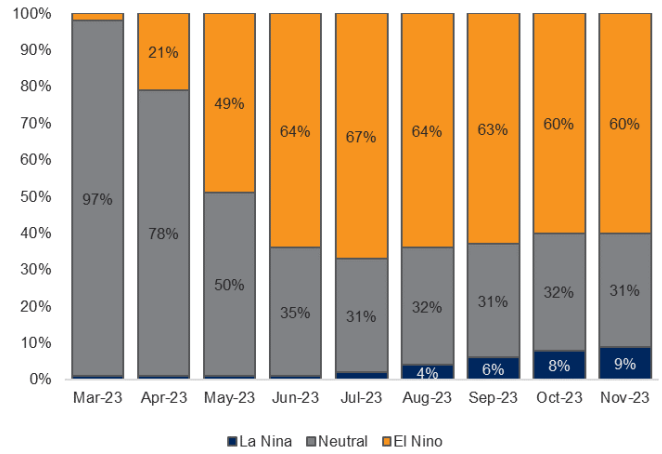
thus, we expect hydropower output to normalize from high-base 2022, hindering business results of hydropower plants. Overall, we estimate 2023-24F hydropower output to drop 13% yoy and rebound 17% yoy, respectively.

**Figure 21: La Nina has last for longer than expected, we see minimal chance for La Nina to comeback in FY23-24F (Unit: °C)**



Source: VNDIRECT RESEARCH, NOAA

**Figure 22: La Nina phase ended from Jan 23, while El Niño might occur from mid-23F with gradual high possibility (Unit: %)**

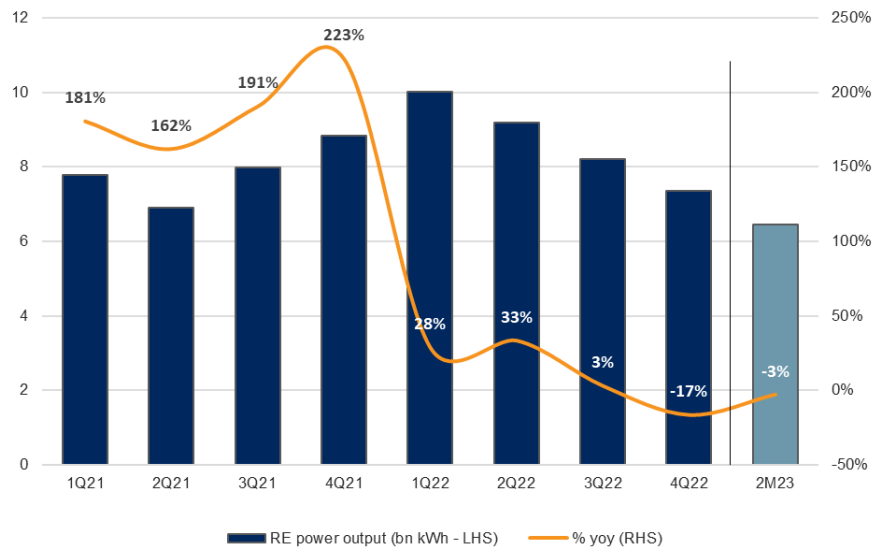


Source: VNDIRECT RESEARCH, IRI

### Renewable energy: Unresolved policy bottleneck

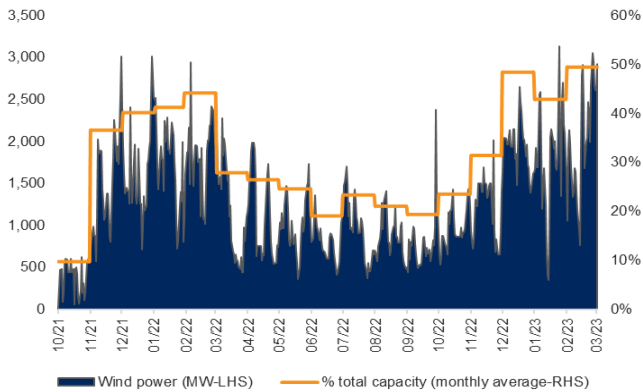
In 2M23, RE power output slightly dropped to 6.45bn kWh, due to strong capacity cut down among solar power plants. Wind power, on the other hand recorded a solid output rise of 9% yoy thanks to higher wind speed season, occurred from Nov-22. According to the daily capacity mobilized data from the National Load Dispatch Centre (NLDC), we see the energy sources have an annual cycle, while wind power usually records solid output mobilization during 1Q and 4Q period, solar power recorded a stable output throughout the years and slightly drop in 4Q to leave room for wind power mobilization.

**Figure 23: RE power 2M23 output dropped following lower capacity mobilized from solar power under weak industrial demand in the South.**



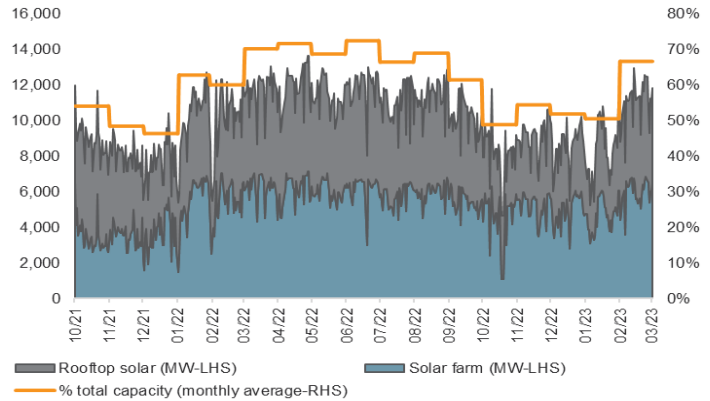
Source: VNDIRECT RESEARCH, EVN

**Figure 24: Wind power recorded high-capacity mobilization in 4Q22 and 1Q23 thanks to higher wind speed season**



Source: VNDIRECT RESEARCH, NLDC

**Figure 25: Solar power capacity dropped from 4Q22 following lower power demand in the South**



Source: VNDIRECT RESEARCH, NLDC

After the capacity upsurge during FIT price period, raising total RE proportion from only 9% in 2019 to grab 27% total capacity in 2022, the next development stage is encountering numerous challenges. In particular, as the FIT price policy expired from Nov-21, investor have been waiting for more than a year, and still unable to develop new RE power sources, regarding the delay of the PDP8 as well as official RE price mechanism showing no sign of release date.

In the context of congestion in multiple aspects, on Jan 07, 2023, the Ministry of Industry and Trade issued a price framework for transitional solar and wind power plants. The decisions basing on the result of previous calculation submitted by EVN. Accordingly, the new price for solar farm project is VND1,184.9/kWh, 29.5% lower than the FIT price. On the other hand, onshore and offshore wind power price decrease around 21% to VND1,587/kWh and VND1,816/kWh, respectively.

**Figure 26: EVN calculate four price options and suggest the final prices framework to MOIT on November 20, 2022**

	Option 1	Option 2	Option 3	Option 4	EVN suggesting option
Solar farm	1,482.7	1,508.4	1,508.8	<b>1,188.0</b>	<b>1,188.0</b>
Floating solar	1,740.8	<b>1,569.8</b>	NA	NA	<b>1,569.8</b>
Onshore wind	<b>1,590.9</b>	1,597.6	1,630.2	NA	<b>1,590.9</b>
Offshore wind	1,971.1	<b>1,944.9</b>	1,974.0	NA	<b>1,944.9</b>

\*Input assumptions: (1) Investment cost assumed lower than 90% actual number provided from investors; (2) Foreign/domestic loans' interest rate of 4.62%/9.87%; (3) Tax rate: averaging 8.25%/20 years

Source: VNDIRECT RESEARCH, EVN, MOIT

**Figure 27: MOIT issued the final transitional price framework from Jan 07, 2023, effective right at the decision date (Unit: VND/kWh)**

	Official price	EVN suggested price	FIT price (convert to VND)	% change vs FIT price
Solar farm	<b>1,184.9</b>	1,188.0	1,680.0	-29.5%
Floating solar	<b>1,508.3</b>	1,569.8	1,823.0	-17.3%
Onshore wind	<b>1,587.1</b>	1,590.9	2,015.0	-21.2%
Offshore wind	<b>1,816.0</b>	1,944.9	2,323.0	-21.8%

Source: VNDIRECT RESEARCH, EVN, MOIT

Although, we see the new price to be the first rescue signal for transitional RE developers, as their projects have been stalled for a long time since the FIT expiration. However, with this price bracket, we believe not every project will enjoy optimal profitability. We conducted an internal rate of return (IRR) test, using assumptions for standard RE power plant and carried out a result that: The new price will significantly reduce the IRR of these projects. Particularly, solar farm IRR locates at 5.1%, while onshore and nearshore IRR decreases to 8.0% and 7.9% from around 12.0% in previous FIT. In order to enhance the profitability under the new price framework, RE developers need to put hard effort to cut investment cost, operating costs and loan interest. At the moment,

it seems that transitional RE developers are not interested in such low prices, so by the end of Mar-23, only 4 applications over 84 transitional prices have been sent. There are still several disagreements about the PPA, related to ASP currency, contract terms and price level, between buyers (EVN) and sellers (RE developers). Therefore, despite the publishing of official transitional RE price framework, the possibility date for these projects to start operating is still unknown.

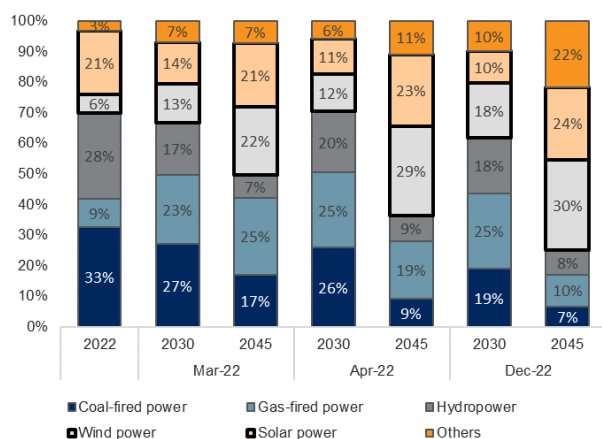
**Figure 28: We run a valuation model to estimate the profitability efficiency of a standard RE projects. IRR expected to drop sharply under the new price**

	Solar farm	Onshore wind	Nearshore wind
<b>Input parameter</b>			
Debt to capital ratio (%)	70%	70%	70%
Domestic loan interest rate (%)	11%	11%	11%
Operation hour (hour/year)	1,800	3,000	3,500
Tax rate (average 20 years)	8.25%	8.25%	8.25%
Investment cost (US\$/m/MW)	0.9	1.6	1.9
Depreciation (years)	20	20	20
<b>Output parameter</b>			
FIT price (VND/kWh)	1,680	2,015	2,323
<b>Estimated IRR - FIT (%)</b>	<b>11.7%</b>	<b>12.7%</b>	<b>12.9%</b>
Transitional price (VND/kWh)	1,185	1,587	1,815
<b>Estimated IRR - Transitional (%)</b>	<b>5.1%</b>	<b>8.0%</b>	<b>7.9%</b>

Sources: VNDIRECT RESEARCH

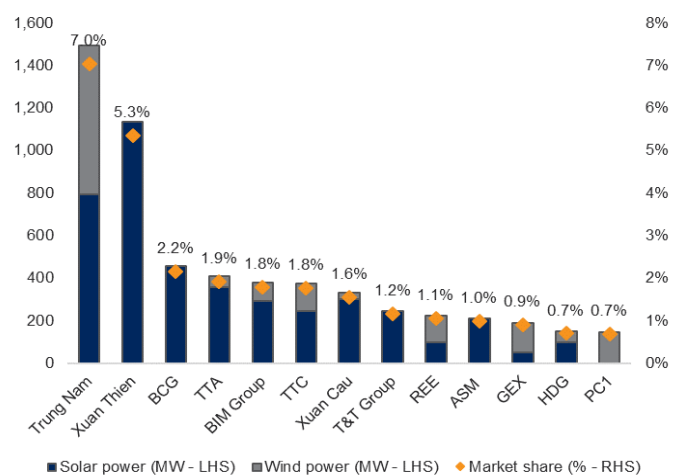
We believe that the transitional RE price will serve as the foundation for the MOIT to continue carrying out further guidance, especially for the official price mechanism of newly developed RE projects. Notably, Vietnam is piloting a direct power purchase (DPPA) scheme and is planning to encourage its application. While implementation progress is still unclear, and it is currently difficult for investors to judge when policies will be enacted, we see the government's vision being formed in a more clarity manner about the next development phase of renewable energy. Hence, with the Vietnam's strong commitment in COP26, along with ambitious adjustment in the latest PDP8 draft – favouring toward RE power, we still expect an attractive yet competitive price mechanism to continue encouraging qualified investors to participate in this field. In term of mobilization outlook, we see additional 2,000MW transitional RE project will push total sector output to rise 30% yoy in 2023F, before normalizing in 2024F.

**Figure 29: The newest draft continued to enhance a larger portion of RE power in 2022-45F (Unit: MW)**



Source: VNDIRECT RESEARCH, PDP8 draft



**Figure 30: Enterprises with advantages of scale, prices negotiation and capital raising ability will stay ahead in upcoming period**



Source: VNDIRECT RESEARCH, Company reports

## Our top picks including PC1, POW

Figure 31: Investment ideas

No	Ticker	1-year TP (VND/share)	Rating	Investment thesis
1	PC1	36,400	ADD	 <p>(1) FY23–24F will be a profitable break period for PC1 following a series of new business expansions in multiple industries within the company's ecosystem, including, Nickel mineral mining hydropower, residential property, and industrial park (IP). We expect a sharp EPS growth of 74% CAGR over FY23-24F.</p> <p>(2) We see the official announcement of PDP8 and RE mechanism will trigger PC1 M&amp;E segment soonest in term of wind power EPC and transmission grid contracting activities.</p> <p>(3) We see PC1 will continue to expand its RE portfolio, including 81MW small hydropower in sight. Besides, the company is also conducting surveys of more than 1,000MW of wind power and finding opportunities to reach the 350MW additional RE power ambition in 2025F.</p> <p>(4) PC1 wind power is one of the outstanding plants, fully ensuring ESG standard and financed by a green loan with very attractive interest rates of around 5-6%, much lower than than average domestic loan of around 10-11%. We see this to be the advantage for PC1 to achieve cheaper capital for its future projects.</p>
2	POW	18,400	ADD	 <p>(1) We see POW – top gas-fired power enterprise will enjoy the sharp gas-fired capacity developing trend under the clear orientation in the PDP8 draft. The company owns a pipeline of two projects including 100% ownership in LNG Nhon Trach 3&amp;4 (1,600MW), and 33% share of the LNG Quang Ninh (1,500MW). While Nhon Trach 3&amp;4 is expected to operate from 4Q24 and 2Q25F, LNG Quang Ninh will run from 2025-30F period.</p> <p>(2) For FY23-24F, we see a more intense mobilization rate for the company's gas-fired power segment thanks to 1) Power consumption expected to rise at 8.4% CAGR while the development of new power sources in the North is slow down; 2) Lower input price following lower Brent oil assumption of US\$85/80 per barrel, releasing competitive pressure for gas-fired plants especially in the context of remained high coal price; 3) We see lower output mobilization for hydropower will create large space for thermal output to enjoy a more intense mobilization rate.</p> <p>(3) We forecast a strong recovery from coal-fired power segment thanks to the comeback of Vung Ang 1 unit 1 (600MW) from 2Q23F after going through the repair from 4Q21.</p>
3	NT2	33,000	ADD	<p>(1) In FY23F, NT2 will go through a large overhaul schedule, usually around 45 days, we see output lost will result in lower revenue and gross profit of 16% yoy and 23% yoy, respectively, after recover 13% yoy and 28% yoy respectively.</p> <p>(2) We see the main outlook for NT2 is not about growth ability but a healthy financial performance and strong dividend policy. NT2 has paid entirely its long-term debt from 2021, and at the moment, the company record a very strong cash flow and healthy financial situation. We are looking forward a more intense cash dividend payment from NT2 of at least 15%/year.</p> <p>(3) (3) We see NT2 has remained its defensive element and will be a suitable choice under the macro uncertainty situation.</p>
4	QTP	NA	NA	<p>(1) We see QTP will set the same trend as NT2, including a gradual drop in debt and healthy dividend payments.</p> <p>(2) We expect thermal power in the North such as QTP will record higher mobilization in the FY23-24F, thanks to 1) Power demand in the North will rise sharply in the following years while additional power sources stay at low growth rate, 2) QTP benefited from ideal location, near coal mine and record low transportation cost, besides, the plants has ensured a long-term domestic coal price contract from TKV – the company major shareholder.</p>

Source: VNDIRECT RESEARCH

**Figure 32: Peer comparison**

Company name	Ticker	Price	Target price	Recom.	Mkt Cap	P/E(x)		P/BV(x)		EV/EBITDA (x)		ROE (%)	
		Bloomberg	LC\$			LC\$	US\$m	TTM	FY23F	Current	FY23F	TTM	FY23F
<b>Gas-fired power peer</b>													
PVPower	POW VN Equity	13,750	18,400	ADD	1,373.2	15.1	12.0	1.0	0.9	5.3	2.9	6.9	7.8
GENCO 3	PGV VN Equity	18,600	NA	NR	910.3	8.5	8.4	1.2	1.1	6.1	5.2	14.7	13.4
PetroVietnam Nhon Trach 2 JSC	NT2 VN Equity	30,250	33,000	ADD	371.4	10.1	10.6	1.9	1.8	4.9	NA	19.5	18.1
Ba Ria Thermal Power JSC	BTP VN Equity	13,000	NA	NR	33.4	11.1	NA	0.6	NA	13.3	NA	5.6	NA
<i>Average</i>						11.2	10.3	1.2	1.3	7.4	4.0	11.7	13.1
<i>Median</i>						10.6	10.6	1.1	1.1	5.7	4.0	10.8	13.4
<b>Coal-fired power peer</b>													
Vinacomin - Power Holding Corp	DTK VN Equity	10,500	NA	NR	305.7	9.2	NA	0.9	NA	4.2	NA	9.8	NA
HAI Phong Thermal Power JSC	HND VN Equity	14,800	NA	NR	315.6	13.5	9.5	1.2	1.1	4.9	NA	8.7	13.3
Quang Ninh Thermal Power JSC	QTP VN Equity	15,600	NA	NR	299.4	9.2	7.1	1.1	1.0	3.8	3.2	12.4	16.2
Pha Lai Thermal Power JSC	PPC VN Equity	15,500	NA	NR	211.9	10.0	6.3	1.0	NA	14.7	NA	9.9	14.5
<i>Average</i>						10.5	7.6	1.0	NA	6.9	NA	10.2	14.7
<i>Median</i>						9.6	7.1	1.1	1.1	4.5	3.2	9.9	14.5
<b>Hydropower peer</b>													
Vinh Son - Song Hinh Hydropower	VSH VN Equity	40,750	NA	NR	410.5	7.6	NA	1.9	NA	5.3	NA	28.0	NA
Hua Na Hydropower JSC	HNA VN Equity	18,400	NA	NR	184.6	7.4	NA	1.3	NA	4.6	NA	19.0	NA
Thac Ba HydroPower JSC	TBC VN Equity	34,900	NA	NR	94.5	6.8	NA	2.0	NA	4.4	NA	31.4	NA
<i>Average</i>						7.3	14.5	1.7	NA	NA	NA	26.1	NA
<i>Median</i>						7.4	NA	1.9	NA	NA	NA	28.0	NA
<b>RE power peer</b>													
Gia Lai Electricity JSC	GEG VN Equity	15,600	NA	NR	214.2	13.1	17.5	1.4	1.1	10.7	8.3	8.1	7.1
<b>Multi-segment peer</b>													
REE Corp	REE VN Equity	70,000	77,000	HOLD	1,060.9	9.2	9.1	1.6	1.2	7.6	7.7	18.7	14.3
Ha Do Group JSC	HDG VN Equity	32,800	43,800	ADD	342.1	7.3	5.8	1.5	NA	5.7	NA	22.7	21.0
PC1 Group JSC	PC1 VN Equity	29,250	36,400	ADD	337.3	17.2	9.1	1.5	1.1	9.4	8.9	9.4	13.7
Bamboo Capital Group JSC	BCG VN Equity	8,420	NA	NR	191.6	10.9	NA	0.7	NA	21.3	NA	6.8	NA
<i>Average</i>						11.2	8.0	1.3	1.2	11.0	8.3	14.4	16.3
<i>Median</i>						11.6	7.7	1.3	1.1	11.8	8.6	13.3	17.0

Source: VNDIRECT RESEARCH, BLOOMBERG (Data as of April 12, 2023)

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### Stock Ratings

Definition:

- Add The stock's total return is expected to reach 15% or higher over the next 12 months.
- Hold The stock's total return is expected to be between negative 10% and positive 15% over the next 12 months.
- Reduce The stock's total return is expected to fall below negative 10% over the next 12 months.

*The total expected return of a stock is defined as the sum of the: (i) percentage difference between the target price and the current price and (ii) the forward net dividend yields of the stock. Stock price targets have an investment horizon of 12 months.*

### Sector Ratings

Definition:

- Overweight An Overweight rating means stocks in the sector have, on a market cap-weighted basis, a positive absolute recommendation.
- Neutral A Neutral rating means stocks in the sector have, on a market cap-weighted basis, a neutral absolute recommendation.
- Underweight An Underweight rating means stocks in the sector have, on a market cap-weighted basis, a negative absolute recommendation.

### Hien Tran Khanh – Head of Research

Email: [hien.trankhanh@vndirect.com.vn](mailto:hien.trankhanh@vndirect.com.vn)

### Dzung Nguyen – Manager

Email: [dung.nguyentien5@vndirect.com.vn](mailto:dung.nguyentien5@vndirect.com.vn)

### Tung Nguyen – Analyst

Email: [tung.nguyenduc@vndirect.com.vn](mailto:tung.nguyenduc@vndirect.com.vn)

### VNDIRECT Securities Corporation

1 Nguyen Thuong Hien Str – Hai Ba Trung Dist – Ha Noi

Tel: +84 2439724568

Email: [research@vndirect.com.vn](mailto:research@vndirect.com.vn)

Website: <https://vndirect.com.vn>