



POWER SECTOR

Green Era



Power

Green Era

Long-term, fast growth in demand for electricity opens up a lot of opportunities for industries in the power system

In recent years, Vietnam has always been in the group of leading countries in terms of the growth rate of commercial electricity output. In the mid-long term, CAGR is expected to stay at a high level of 11.4% in the period 2023–25 and 7.9% in the period 2025–30. This premise opens up many opportunities for the growth of industries in the coming years: design consulting, construction, power generation, transmission, and distribution.

Gas turbine thermal and Wind power would take biggest slices from growth picture in the period of 2025-45

Regarding the power generation activity, especially, we highly evaluate the growth potential of the two sources of gas turbines and wind power in the mid- and long-term based on analyzing the two fundamental characteristics of the power system in terms of (1) stability and (2) economic efficiency. This is also consistent with the government's orientation in Power Development Plan 8 (PDP 8), given the CAGR of gas turbine and wind power capacities planned to be 18.3% and 21.1% in 2022-45, respectively. These numbers are much higher than hydropower's 1.2%, coal thermal power's 5.8%, or solar power's 8.3%.

Some policy restrictions need to be improved

However, to achieve the PDP 8's breakthrough goal, it's essential that the great government's support for price policies motivate private enterprises in developing power sources. In addition, to successfully boost the installed capacity of renewable energy sources, it is also necessary to take into account the ability to synchronize the transmission system.

Recommendation and Ratings: OVERWEIGHT

In terms of stock recommendations. Based on prospects, risks, and values, we rate **BUY** on **NT2** (TP: VND29,400, upside: +20%), **QTP** (VND23,400, upside: +54%), and **HOLD** on **GEG** (VND13,000). In addition, we positively value **POW**'s growth potential after 2024, when NT3 and NT4 plants begin commercial operation.

Overweight

Company	Rating	TP (VND)
Nhon Trach 2	BUY	29,400
Quang Ninh Power	BUY	23,400
Gia Lai Power	HOLD	13,000
Petro Vietnam Power	Non-ratings	N/A

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What is the report about?

- 2024 - Power sector Outlook
- Prospects & Risks in Power sector in the mid-long term
- Forecasts & recommendations on the sector and stocks

I. Executive summary

The hydrological situation began to improve in 3Q23, and a more favorable trend is predicted in 2024

Hydropower & wind power are expected to be positive in 2024

Electricity demand is forecasted to rise at a high rate of CAGR 2025-30: 7.9% per year

Gas turbine thermal power & Wind power are expected to get many opportunities and they are oriented, in addition to strong development by PDP 8

OUTPERFORM, QTP, NT2 & POW are our favorite stocks

In 2024, at the end of September 2023, the water level at the annual balancing lakes and the water flow in the main basins are progressing quite well, thanks to the appearance of small floods at the end of 2Q. Along with NOAA's forecast, the probability and level of impact of the El Nino phase will tend to gradually decrease from the end of 2023 and may shift to a neutral phase by the end of 2Q24. The above premises are expected to create a favorable environment for hydropower enterprises to operate more effectively in 2024. In addition, the mobilized output from wind power plants is forecast to increase significantly by promoting the mobilization capacity of transitional renewable energy plants in 2H23. In the opposite direction, we believe that gas turbine plants will likely be slightly negatively affected due to (1) disadvantages in competing on electricity generation prices, (2) saving limited domestic fuel resources, and (3) flexibility in power generation capacity.

In mid & long-term: As of now, Vietnam is still one of the countries whose electricity consumption is growing the fastest. From 2017 to 2022, the CAGR is 6.8% per year. In the meantime, Vietnam's GDP is expected to keep growing in a good way over the next few decades. This will make it easier to keep up with the fast rise in power use that is expected. The baseline case forecasts that the country's power output will rise by 7.9% from 2025 to 2030 and by 11.4% from 2023 to 2025. The strong growth helps fields operating in power systems, such as consulting and construction, generation, transmission, and distribution, to be benefited considerably.

According to PDP 8, wind power (CAGR 2022–25: 40.0%, 2025–30: 9.7%, 2030–35: 12.3%) and gas turbine steam (CAGR 2025–30: 27.4%, 2030–35: 9.5%) will be the power sources that grow the fastest in the whole system. These come from analyzing two key factors in the industry: (1) the reliability of the power system and (2) the efficiency of economic results. To make this progress, however, it's essential that the great government's support for price policies motivate private enterprises in developing power sources. In addition, to successfully boost the installed capacity of renewable energy sources, it is also necessary to take into account the ability to synchronize the transmission system.

In terms of stock recommendations. Based on prospects, risks, and values, we rate **BUY** on **NT2** (TP: VND29,400, upside: +20%), **QTP** (VND23,400, upside: +54%), and **HOLD** on **GEG** (VND13,000). In addition, we positively value **POW**'s growth potential after 2024, when NT3 and NT4 plants begin commercial operation.

II. Coverage projection and valuation

Table 1. Coverage valuation

Recommendation & TP			Earnings & Valuation											
Company			Sales	OP	NP	EPS	BPS	ROE	ROA	PE	PB	EV/EBITDA	DY	
			(VND bn)	(VND bn)	(VND bn)	(VND)	(VND)	(%)	(%)	(x)	(x)	(x)	(%)	
Nhon Trach 2 (NT2)	Recommendation	BUY	2021A	6,150	593	534	1,756	14,706	12.5	8.2	14.2	1.8	33.6	6.3
	TP (VND)	29,400	2022A	8,788	950	883	2,960	16,027	20.0	12.6	9.4	1.8	16.4	8.7
	Price (02 Oct, VND)	24,900	2023F	6,492	704	667	2,194	16,218	14.4	7.7	10.6	1.5	20.5	8.2
	Mkt cap. (VND bn)	7,168	2024F	6,226	650	612	2,014	16,291	13.1	6.6	11.5	1.5	21.3	7.9
			2025F	7,008	881	847	2,790	16,392	18.0	10.5	8.3	1.5	18.2	11.0
Quang Ninh Power (QTP)	Recommendation	BUY	2021A	8,571	734	578	1,168	13,712	9.4	6.0	6.4	1.2	5.6	7.9
	TP (VND)	29,400	2022A	10,417	968	764	1,405	13,694	12.4	9.0	11.1	1.3	3.2	11.5
	Price (02 Oct, VND)	15,300	2023F	12,536	686	609	1,232	13,730	9.9	7.7	11.3	1.1	4.4	7.8
	Mkt cap. (VND bn)	6,885	2024F	12,101	675	617	1,249	13,848	9.9	8.0	11.2	1.1	4.4	7.9
			2025F	12,941	731	686	1,391	14,086	10.9	8.8	10.0	1.1	4.2	7.5
Gia Lai Power (GEG)	Recommendation	HOLD	2021A	1,381	653	325	895	11,121	8.8	3.2	6.4	1.2	13.4	-
	TP (VND)	13,000	2022A	2,093	851	371	928	13,287	8.2	2.5	11.1	1.3	10.8	-
	Price (02 Oct, VND)	15,350	2023F	2,210	939	195	506	13,794	3.9	1.2	27.8	1.2	9.3	-
	Mkt cap. (VND bn)	4,942	2024F	2,431	1,035	316	791	14,585	5.8	1.9	17.2	1.2	8.9	-
			2025F	2,533	1,128	471	1,143	15,728	7.8	3.0	11.5	1.1	8.4	-
Petro Vietnam Power (POW)	Recommendation	Positive	2021A	24,561	2,400	2,052	746	12,229	6.3	3.9	20.0	1.4	8.3	-
	TP (VND)	Non-rating	2022A	28,224	2,859	2,553	824	13,031	12.4	9.0	9.8	0.8	4.7	-
	Price (02 Oct, VND)	11,600	2023F	28,509	1,382	1,096	359	13,390	9.9	7.7	24.8	0.9	6.8	-
	Mkt cap. (VND bn)	27,516	2024F	27,950	1,454	602	154	13,543	9.9	8.0	45.1	0.9	5.8	-

Source: Respective company data, KIS

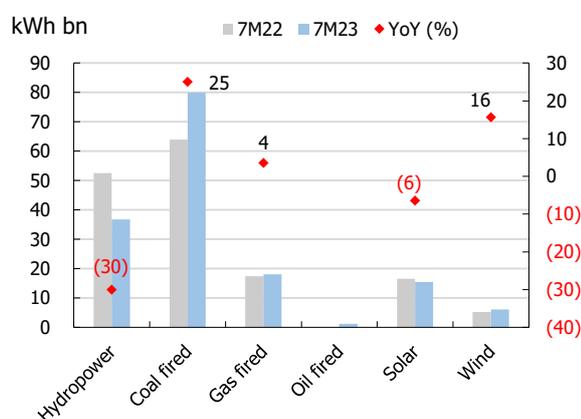
III. In 2H23-2024, bright spot for hydropower & wind power

1H23 - El Nino, thermal power takes over & wind power grows thanks to policy

Unfavorable hydrological situation in 1H23, partly influenced by El-nino

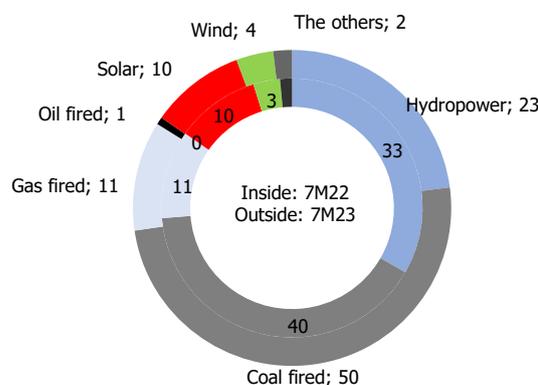
In 1H23, many parts of the country will continue to have hot weather, partly because of the strong El Nino. This also caused many obstacles in dispatching the national power system when the output from hydropower plants decreased significantly. Especially at the end of May and early June, average mobilized capacity of hydroelectric plants only reached less than 10% when the water level at the reservoir fell close to the dead water level.

Figure 1. Mobilization growth of coal thermal power and wind power offset hydropower in 7M2023



Source: EVN, KISVN

Figure 2. Structure of electricity output by source



Source: EVN, KISVN

EVN data shows that the output from hydropower plants was only 29.8 billion kWh (-28% year over year) in the first 7M23, making up only 22% of the system's total energy production. In the context of supply shortages from hydropower sources, coal-fired thermal and wind power plants are the plants that gain the most because they become the best alternative supply sources:

...thereby creating favorable conditions for thermal power plants

- **Coal-fired power** plants, as a controllable source that the best replacement for hydropower source thanks to low cost. According the data, the coal-fired power plants's capacity factor rose by 8% yoy to 58% in 7M23. Along with new capacity from plants: Thai Binh 2 (1,200MW), Nghi Son 2 (1,200MW), Song Hau 1 (1,200MW) and Van Phong 1 (1,432 MW), the production output of coal-fired power group reached 80 billion kWh, +25% yoy.
- The **wind power** group's output also went up in 7M23. This was because the Ministry of Industry and Trade (MOIT) put in place temporary price signing for "transitional" wind power projects.¹ Around 833 MW of wind power from transitional projects have been released as of the end of July 2023. This is 21% more than at the beginning of the year. Wind power production recorded 5.3 billion kWh in 7M 2023, up 13%yoy.

Wind power output soared rapidly after transitional renewable energy plants were signed "temporary price" contracts,.

¹ "Transitional" projects are not completed before October 31, 2021 to enjoy FIT price.

2. 2H23-2024 forecasts that hydropower and wind power will continue to change positively, while thermal power will reduce mobilized capacity

Figure 3. The proportion of hydropower output recovers from June 2023

	Hydro power	Coal fired	Gas fired	Oil fired	Solar	Wind	Biomass
Aug-23	46%	32%	5%	0%	11%	5%	0%
Jul-23	27%	52%	10%	0%	7%	3%	0%
Jun-23	21%	54%	11%	0%	10%	3%	0%
May-23	17%	50%	16%	3%	10%	3%	0%
Apr-23	22%	51%	12%	1%	10%	2%	0%
Mar-23	21%	50%	12%	0%	11%	5%	1%
Feb-23	25%	44%	12%	0%	11%	6%	1%
Jan-23	30%	41%	10%	0%	9%	7%	0%

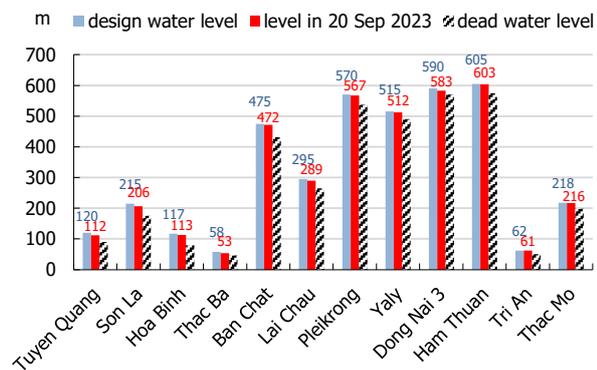
Source: EVN, KISVN

Figure 4. Positive hydropower output capacity in August 2023

	Hydro power	Coal fired	Gas fired	Oil fired	Solar	Wind	Biomass
Aug-23	63%	42%	22%	0%	42%	33%	35%
Jul-23	37%	67%	45%	5%	27%	19%	20%
Jun-23	28%	70%	48%	3%	35%	17%	29%
May-23	27%	70%	77%	80%	39%	20%	22%
Apr-23	32%	63%	53%	13%	38%	15%	35%
Mar-23	28%	60%	51%	0%	39%	28%	41%
Feb-23	33%	51%	49%	0%	36%	35%	41%
Jan-23	32%	39%	34%	0%	26%	32%	24%

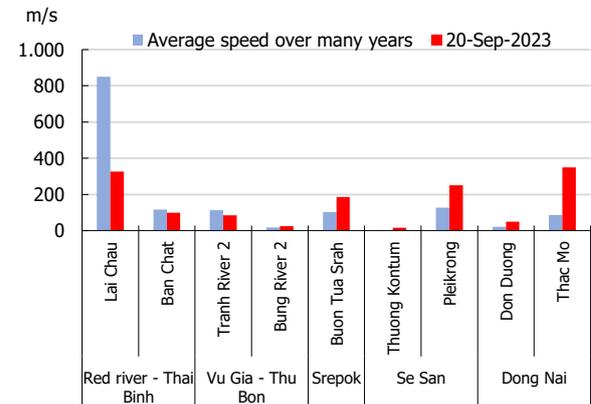
Source: KISVN

Figure 5. Water levels at large hydropower reservoirs are high



Source: EVN, KISVN

Figure 6. Water flow at upstream hydropower plants is at a high level



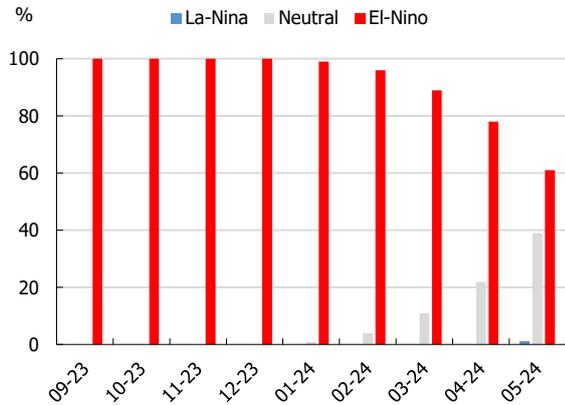
Source: EVN, KISVN

The hydrological situation began to improve in 3Q23 and is expected to improve further in 2024.

3Q23: Small floods in July enhanced the country's hydrology. This has greatly improved hydropower plant electricity generation. EVN data shows that hydropower groups' capacity factor rose quickly, up to 63% in August from 28% in June (Figure 3). Additionally, wind power capacity is continuously increasing through transitional projects (as of September 23, wind power capacity has increased by 3,341 MW compared to the beginning of 2023, which is an increase of 84% ytd from 62 transitional projects). Notably, the gas turbine power group's capacity factor dropped considerably to 22% in August from 77% in May.

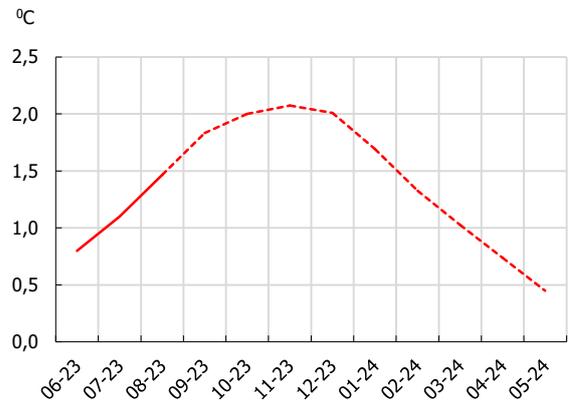
In 4Q23, as of the end of September, the water level at the annual balancing lakes and the water flow in the main basins are progressing well, as shown in figures 5–6. In addition, a significant amount of new capacity from transitional wind power projects was added to the system. These will create favorable opportunities for the National Load Dispatch Center (NLDC) to prioritize the use of cost-effective power sources—hydropower and wind power—in the remaining months of 2023.

Figure 7. El-nino probability decreases in 2024



Source: NOAA, KISVN

Figure 8. Temperature in zone 3.4 is forecast to peak in Nov 2023 and decrease to neutral levels by the end of 2024



Source: NOAA, KISVN

Figure 9. The proportion of hydropower and wind power output is forecast to increase in 2024



Source: NOAA, KISVN

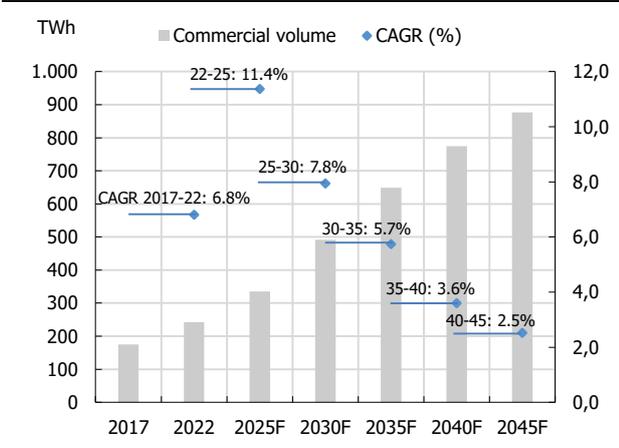
In 2024F: NOAA’s forecast indicates El-Nino phase will hit its strongest point in November 2023, then slowly weaken and probably enter the neutral phase in the second half of 2024F (Figure 7-8). In the end, it will enter the neutral phase from plate number 1, as shown in Figure 7-8. This premise is expected to help the operating environment of hydropower plants be more favorable than in 2023. Along with the prediction that electricity demand will rise by 7% in 2024F, we come up with these estimates:

In 2024, hydropower and wind power are expected to be positive. While thermal power plants' mobilization might be lower

- The hydropower group's overall effectiveness will be better in 2024, with a capacity factor of 45%, which is 4% higher than the average for 2023. The share of output is expected to reach 31% in 2024, up 1% year over year (Figure 9).
- At the same time, wind power output is projected to go up a lot because of adding significantly new capacity from transitional plants in 3Q23. We believe that by 2024, the share of output that comes from renewable power group and wind power will have grown by 1% yoy, reaching 5% and 14%, respectively.
- On the other hand, we think that gas turbine plants will probably have lower capacity factors: (1) disadvantages in competing on prices; (2) saving domestic fuel resources; and (3) flexibility in operation. Based on these analyses, we think that the share of production coming from gas turbine power plants might go down by 0.9% compared to 2023. In addition, the projected capacity factor of 36.4% could go down by 1.3% compared to the number in 2023.

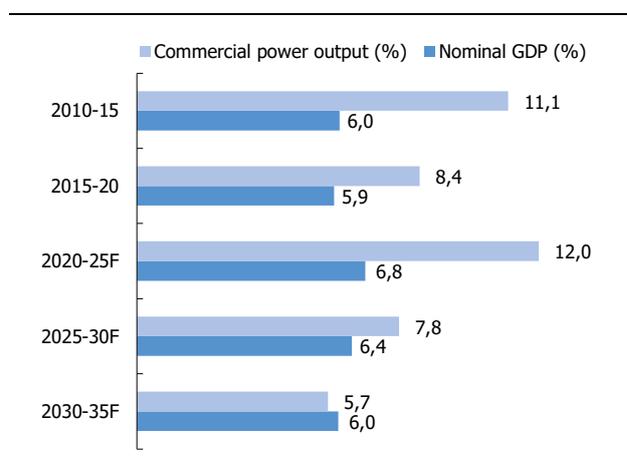
IV. Electricity demand continues to grow rapidly in the long term

Figure 10. In the period 2022-30, our country's electricity output growth is forecast to remain high



Source: PDP 8, KISVN

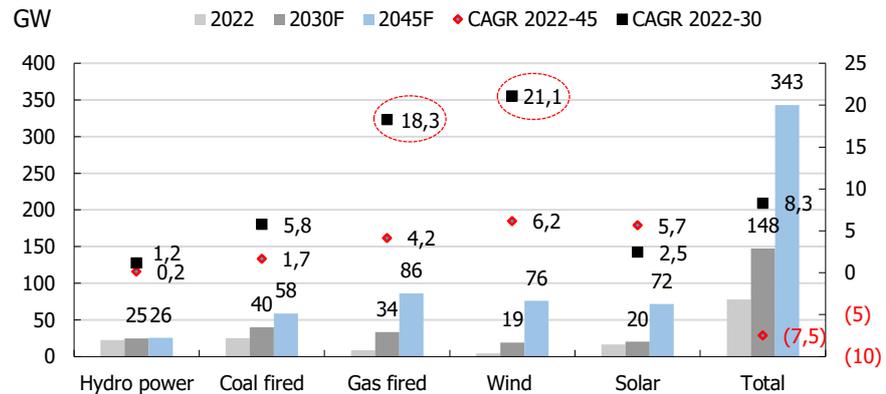
Figure 11. GDP & commercial electricity output growth



Source: PDP 8, KISVN

In recent years, Vietnam has always been in the group of leading countries in terms of growth in commercial electricity output. From 2017 to 2022, the CAGR was 6.8% per year. That being said, there is a good chance that Vietnam's GDP will continue to grow in the medium and long run. This will make a strong base for supporting the growth of power production in the coming years. In the base case, EVN predicts that Vietnam's electricity output will grow quickly, at 11.4% per year from 2023 to 25 and 7.9% per year from 2025 to 30.

Figure 12. Gas turbine thermal power & wind power are oriented for strong development according to PDP 8



Source: PDP 8, KISVN

In the mid-long term, electricity demand is forecasted to rise rapidly. This will create numerous chances for fields in power system.

The strong growth in mid and long-term will open up many opportunities for fields in the power system, including: design consulting, construction, generation, transmission, and distribution. Regarding the power generation activity, especially, we highly evaluate the growth potential of the two sources of gas turbines and wind power in the mid- and long-term based on analyzing the two fundamental characteristics of the power system in terms of (1) stability and (2) economic efficiency. This is also consistent with the government's orientation in Power Development Plan 8 (PDP 8), given the CAGR of gas turbine and wind power capacities planned to be 18.3% and 21.1% in 2022-45, respectively. These numbers are much higher than hydropower's 1.2%, coal thermal power's 5.8%, or solar power's 8.3%.

V. Power generation: Gas turbine thermal & wind power have great growth potential in the mid, long-term

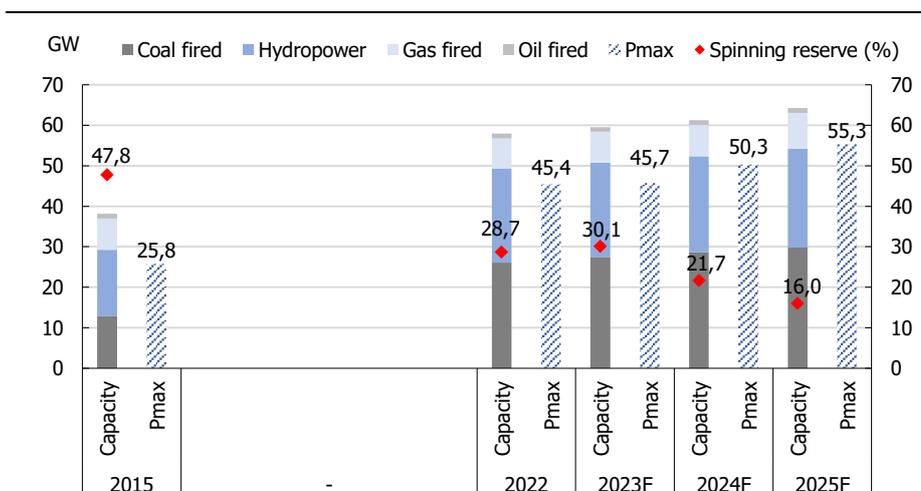
1. Gas turbine thermal power - growth prospects come from ensuring the system's stability

Getting benefit from the limit in the expansion of hydropower and coal-fired power sources

New gas turbine power plants will be critical in stabilizing the power system in the future years.

Maintaining the stability of the electricity system: In the medium and long run, the two most important things for the power sector are to reach its growth goals. Those are (1) the system's stability and (2) economic efficiency. In order to keep the power system stable and reliable, countries need to build up a base of controllable power sources that are large enough. Which operate as balancing sources when renewable power sources cannot generate electricity or as provision sources during hydrologically adverse times. Most of the time, a spinning reserve ratio of 25% will be enough to keep the power system running smoothly. This difference (25% higher than Pmax) is a savings amount for factory repair. Or during El Niño years, hydropower plants could not generate as much as normal, and thermal power plants's efficiency was also lower than usual because they had to run at full capacity for a long period of time.

Figure 13. Probability of crude provision ratio decline in 2024-25



Source: EVN, PDP 8, KISVN

Risk of electricity shortage could occur by 2025 and become more severe in the period of 2026-30

In 2023-2025: Vietnam's spinning reserve ratio is expected to be 30.1% at the end of 2023, which is still enough to keep the power system running smoothly. In the period 2024–25, the growth rate of Pmax is 10% per year, but with the new controllable capacity added to the system of only 4,696 MW (table 2), the growth rate is only 3.9% per year. This causes the spinning reserve ratio to decline to only 21.7% in 2024 and 16.0% in 2025 (Figure 13). Because of this, the risk of power shortages might occur more frequently in 2024–25 if El Niño's strong operation causes a sharp rise in fuel prices. However, compared to 1H23, the national electricity system is affected by both of the above factors. While there is still no additional capacity at the two Van Phong coal-fired power plants (1,320 MW) and Thai Binh 2 (1,200 MW), the risk of a power shortage in 2024–2025 is forecast to be lower.

Table 2. Active source plants capable of operating in 2022-2025 will greatly benefit from the supply shortage

Location	Capacity (MW)	Investor	starting time	2022	2023E	2024F	2025F
Hydro power				23,226	23,436	23,746	24,401
<i>An increase over 2022</i>					210	520	1,175
+ Pac Ma	Lai Chau	140	Privated company	07/2022			
+ Yen Son	Tuyen Quang	90	Privated company	12/2022	90	90	90
+ Nam Cum 3	Lai Chau	35	Privated company	04/2023	26	35	35
+ Phu Tan 2	Dong Nai	93	Privated company	06/2023	54	93	93
+ Song Lo 7	Ha Giang	36	Privated company	2Q/2023	21	36	36
+ Nam Cum 4	Lai Chau	54	Privated company	3Q/2023	18	54	54
+ Ban Mong	Nghe An	45	Privated company	2023		45	45
+ Hoi Xuan	Thanh Hoa	102	Privated company	1Q/2024		85	102
+ Tra Khuc 1	Quang Ngai	36	Privated company	2Q/2024		21	36
+ Dak Mi 1	Kon Tum	84	Privated company	09/2024		28	84
+ Duc Thanh	Binh Phuoc	40	Privated company	12/2024		3	40
+ Yaly *	Gia Lai	360	EVN	12/2024		30	360
+ Hoa Binh *	Hoa Binh	480	EVN	08/2025			200
Coal fired				26,087	27,327	28,607	29,807
<i>An increase over 2022</i>					1,240	2,520	3,720
+ Nam Sông Hậu	Hau Giang	1200	PVN	07/2022			
+ Nghi Sơn II	Thanh Hoa	1200	BOT	07/2022			
+ Thái Bình II	Thai Binh	1200	PVN	04/2023	800	1,200	1,200
+ Vân Phong	Khanh Hoa	1320	BOT	08/2023	440	1,320	1,320
+ Vũng Áng II	Ha Tinh	1200	BOT	2025			600
+ Quảng Trạch I	Quang Binh	1200	EVN	2025			600
Gas fired				8,764	8,764	8,889	10,014
<i>An increase over 2022</i>						125	1,250
+ Nhơn Trạch 3	Dong Nai	750	POW	11/2024		125	750
+ Nhơn Trạch 4	Dong Nai	750	POW	05/2025			500
+ Hiệp Phước	HCM	1200	Privated company	06/2022			

Source: PDP 8, KISVN

As a result, controllable power projects that can run between 2022-25 will gain greatly

Gas turbine thermal power get benefited greatly by the limit in hydropower and coal thermal power's development potential

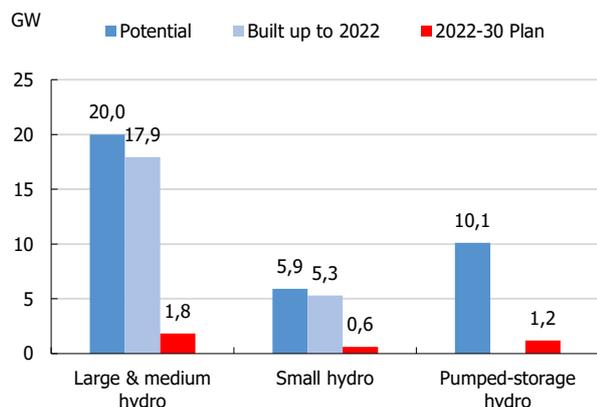
In the medium-long term (2026–2030), according to our analysis, this risk is likely to be greater when the amount of additional controllable capacity is very limited during this time. Because most other controllable power projects in PDP 8 are in the early stages of preparation, it will take 5-7 years for the plants to run commercials. On this basis, we appreciate the prospect of new controllable power plants, including hydropower, coal-fired power, and gas turbines, that could start operating in 2022–25 (table 2), thanks to the system's supply shortage.

After 2025, gas turbine thermal power will benefit from the limit on hydropower and coal thermal power's expansion.

At the present, hydropower in our country does not have much room for development. Meanwhile, the construction of new coal-fired power plants is facing considerable environmental pressure from public opinion. Therefore, gas turbine power plants are the most optimal choice for developing controllable power sources for the system. On this basis, it can be seen that gas turbine thermal power is one of the two power sources that can get the biggest slice from the prospects of electricity demand growth in the long term.

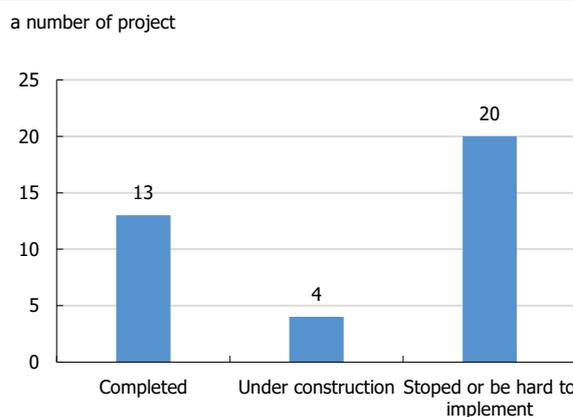
- **Hydropower:** According to the notes to the PDP8 report, large hydropower plants (>30 MW) in Vietnam no longer have room for development, and EVN data also shows that since 2019, the installed capacity of large hydropower plants has not changed and has kept constant at 17,930 MW. Meanwhile, Vietnam's small hydropower potential is at 5,900 MW, and at the end of 2022, 5,296 MW had been exploited. Therefore, it is estimated that only about 600 MW of capacity can be developed in the period up to 2045.

Figure 14. The remaining room for hydropower development is still very low



Source: EVN, PDP 8, KISVN

Figure 15. Current status of coal thermal power development according to Planning 7



Source: PDP 8, KISVN

In addition, the government has also started to build pumped storage hydropower plants to balance out demand during peak hours. The Bac Ai pumped storage hydropower plant started building in 2016 and is set to start running at the end of 2029. As of now, there are no plans to build any other pumped storage hydropower plants. The reason is that pumped storage hydropower projects require large investment capital along with low costs. Therefore, it is often only invested by state-owned enterprises with the main goal of stabilizing the power system rather than the economic efficiency of the project.

- In short-run, *coal-fired power* plants are still built but are facing many big challenges. Of the 37 projects included in the revised PDP 7 approved since 2016, only 13/37 coal-fired power plants have come into operation, 4/37 projects are in the implementation stage, and there are up to 20/37 projects have stopped implementation or are less feasible due to public opinion issues about the environment and difficulties in accessing investment capital.

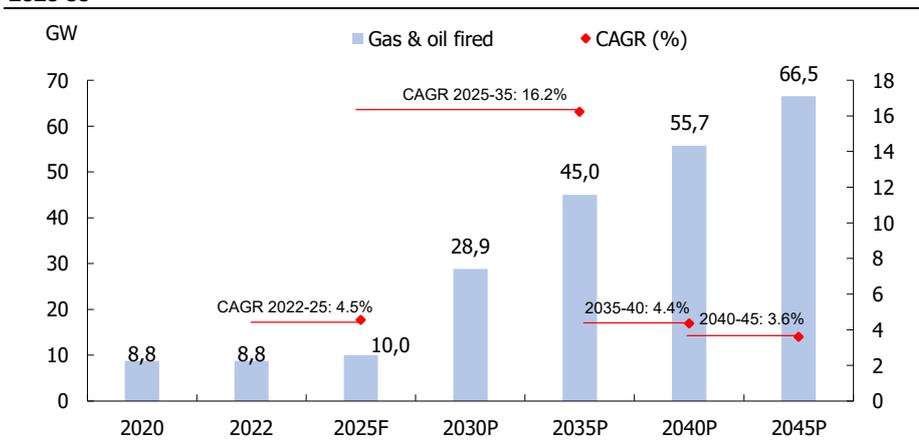
Concerning environmental issues, it is clear that 4 projects—Cam Pha 3, Quang Ninh 3, Hai Phong 3, and Vung Ang 3—do not have local approval. On the other hand, 5 projects have been proposed to switch to LNG fuel. These are Long An 1, Long An 2, Tan Phuoc 1, Tan Phuoc 2, and Bac Lieu 1. Also, most foreign lending institutions no longer fund the construction of factories that use coal power. Japan, Korea, and China were the three countries that most often put money into supporting coal-fired power plants in the past, especially in Vietnam. Japan and South Korea, on the other hand, have said they will no longer fund coal-fired power projects in recent years. Even Chinese investors are becoming less interested in thermal power projects. For example, ICBC, one of China's biggest commercial banks, has put off setting up cash for foreign investors in the An Khanh-Bac Giang thermal project.

Strong development according to the government's orientation

Gas turbine thermal power is expected to rapidly develop in 2025-35, CAGR is 16.2%

Based on an analysis of electricity demand, it is forecast to grow rapidly in the medium and long term. Besides benefiting from limited active hydropower and coal-fired power sources, We see positive growth potential for gas power projects in the coming stages. This is similar to the orientation of proactive power source development in PDP 8. Specifically, in the period 2023–2045, it is expected that 66.5 GW of gas power will be put into operation as background power and balancing renewable energy sources, with a CAGR of 9.2% per year. In particular, the periods 2025–35 are considered the fastest growth periods in gas turbine power capacity, with a CAGR of 16.2%, respectively.

Figure 16. Gas turbine thermal power capacity is expected to grow rapidly in the period 2025-35



Source: PDP 8, KISVN

However, in the short term, pricing policy and a number of other rules must be handled for explosive expansion

However, numerous obstacles remain in the near term.

Pricing policy is the biggest bottleneck. EVN's current retail electricity price mechanism is not truly market-based. Currently, TKV and PVN are providing great support in stabilizing input fuel prices for electricity generation, in addition to retail electricity prices being greatly regulated by the MOIT from the perspective of social balance. Therefore, in terms of economic efficiency, EVN will have to prioritize mobilizing cheap power sources first and will encounter many times when coal and gas fuel prices increase sharply. Therefore, it is very difficult for EVN to negotiate high-level long-term output off-take agreements at the current prices required by investors (which could transmit the risks of fuel price fluctuations into the price of electricity sold). Meanwhile, from the perspective of private investors, it is difficult to implement large-scale capital projects if they cannot find a guaranteed rate of return and reduce risks during operations. Recently, EVN proposed to the MOIT a mechanism to adjust the average retail electricity price every 3 months, taking into account cost fluctuations in all stages of electricity generation, transmission, distribution, and retail electricity. If this issue is approved, it will solve the most difficult problem of domestic power source development. However, in our opinion, this issue will be less likely to be approved in the short term when the government's policy always places top priority on the issue of stabilizing social security.

Table 3. Gas electrothermal sensitivity (LCOE)

LCOE UScent/kWh		LNG price - USD/mmBTU						
		6.00	7.00	8.00	9.00	10.00	11.00	12.00
C F	68%	6.00	6.75	7.50	8.25	9.00	9.75	10.50
	63%	6.11	6.86	7.61	8.36	9.11	9.86	10.61
	58%	6.25	7.00	7.75	8.50	9.25	10.00	10.75
	53%	6.42	7.17	7.92	8.67	9.42	10.17	10.92
	48%	6.61	7.36	8.11	8.86	9.61	10.36	11.11
	43%	6.86	7.61	8.36	9.11	9.86	10.61	11.36
	38%	7.17	7.92	8.67	9.42	10.17	10.92	11.67
	33%	7.57	8.32	9.07	9.82	10.57	11.32	12.07

Source: KISVN

There are other obstacles. The development of gas turbine power projects requires a large amount of capital, combined with low costs, to ensure the project's profit rate. Therefore, among the 18 gas turbine thermal power projects in PDP 8, up to 15 projects have capital contributions from foreign corporations with advantages in capital resources. In particular, in addition to the issue of the price mechanism analyzed above, foreign investors also require the government's guarantee of debt obligations to pay for projects. This provision is currently not consistent with current document laws in the country, and the requirements for foreign exchange conversion are high compared to the prescribed ceiling. These issues are beyond the authority of EVN and the Ministry of Industry and Trade and require special mechanism approval from the government.

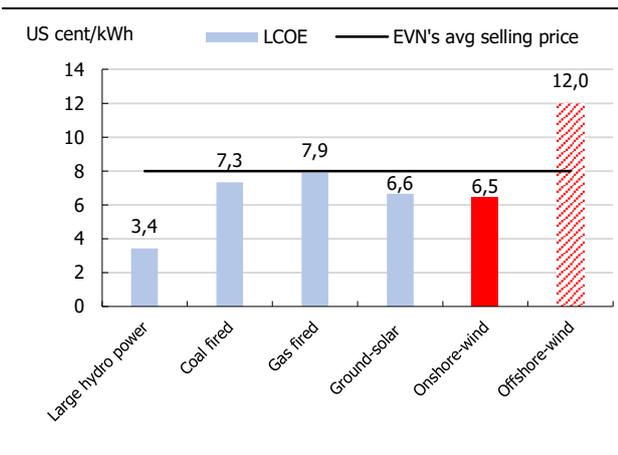
2. Wind power has positive prospects thanks to the advantage of low electricity generation cost

Electricity generation costs became more competitive

Wind power is the second lowest generating cost in the system, behind only solar power.

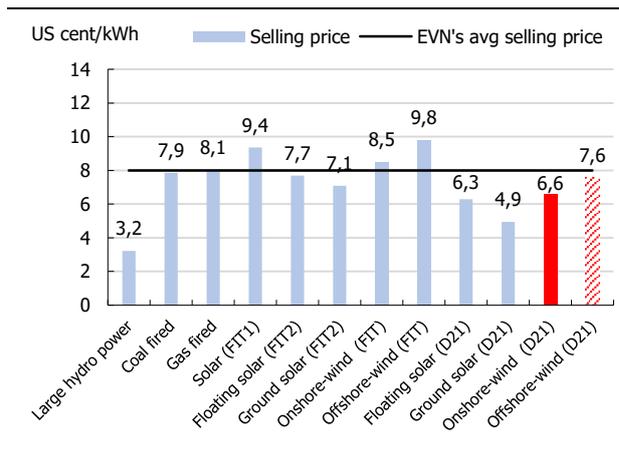
Thanks to significant reductions in equipment investment costs in recent years and access to low-cost capital, wind power is currently the energy source with the third-cheapest levelized cost of electricity (LCOE) after hydropower and solar power (Figure 17). Besides, the FIT price to buy wind power from EVN is still significantly low compared to EVN's average retail price (Figure 18). Therefore, from an efficiency perspective, EVN will prioritize mobilizing wind power sources before mobilizing thermal power sources if the technical elements of the power system are still ensured. At the same time, in the future, with continuous improvements in technology, it is predicted that the cost of producing renewable energy power in general and wind power in particular will continue to decrease. According to ETIP WIND estimates, the cost of onshore wind power production could decrease by 28% in 2030 compared to the present time and by 45% by 2050. Along with the estimated cost of offshore wind power production, it is estimated that there will be a significantly higher reduction of 44–65% by 2030 and a possible reduction of up to 57–78% in 2050.

Figure 17. LCOE of all types



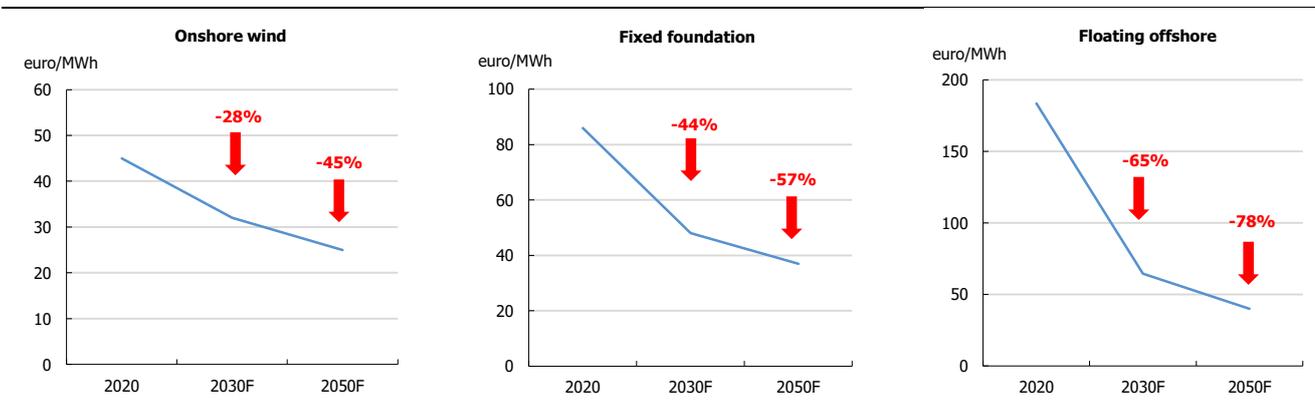
Source: KISVN

Figure 18. Selling prices of all types



Source: MOIT, KISVN
D21: Calling price in Decision No. 21/QĐ-BCT

Figure 19. Wind power production costs (LCOE) are forecast to decrease significantly in the future



Source: ETIP, KISVN

Each project has a short implementation period and requires little capital. Aside from lowering the risk of fuel price volatility, These is advantages of wind power compared to controllable sources

...more likely to get benefited by attracting foreign investment capital in Viet Nam

Benefit from the constraints of controllable sources

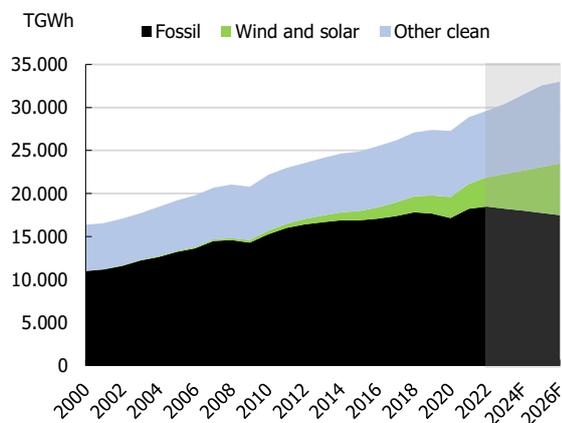
As analyzed above, in the medium-long term 2025–30, the system's risk of power shortage is high due to limitations on capacity expansion from controllable power sources due to policy, environmental issues, and natural conditions, while domestic consumption demand is forecast to continue to grow at a rapid rate of 7.8% per year during this period. With the advantages of low investment capital and quick construction time, expanding the development of renewable energy projects is the most reasonable option to keep up with the demand for electricity load growth. In addition, increasing the proportion of renewable energy sources helps EVN reduce the risk of coal and gas fuel price fluctuations. In fact, this risk has shown a significant impact on the dispatching of power systems in countries around the world, including Vietnam in 2022, when fuel prices increased sharply due to the influence of the Russia-Ukraine war.

Trends in green development

One of the four major goals at the COP 26 summit is to reduce emissions by 2030, aiming for net-zero emissions by 2050. One of the proposed solutions is to accelerate the process of transforming energy sources by narrowing the development of coal thermal power and increasing renewable energy sources. From a micro perspective, multinational corporations are increasingly focusing on production activities using renewable energy sources and environmentally friendly materials. In addition to carbon neutrality efforts in manufacturing operations through the purchase of carbon credits, a portion can be supplied from renewable energy plants.

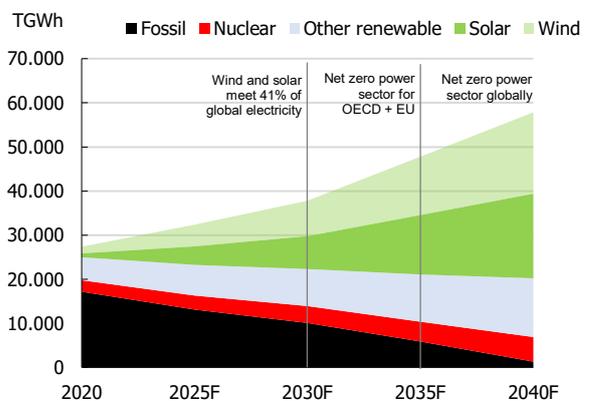
Vietnam is currently a country with a fairly rapid integration pace, facing many opportunities to receive FDI capital flows from developed countries thanks to advantages in production costs and supply chain reallocation, a large-scale production and consumption market, and high growth potential. Therefore, the demand for using electricity from renewable energy sources in production activities is forecast to expand in parallel with the development and integration processes of our country in the coming periods.

Figure 20. Wind and solar hit 12% of global power in 2022, an era of fossil decline is about to begin



Source: Ember, KISVN

Figure 21. Power sector transition to net zero by 2040



Source: Ember, KISVN

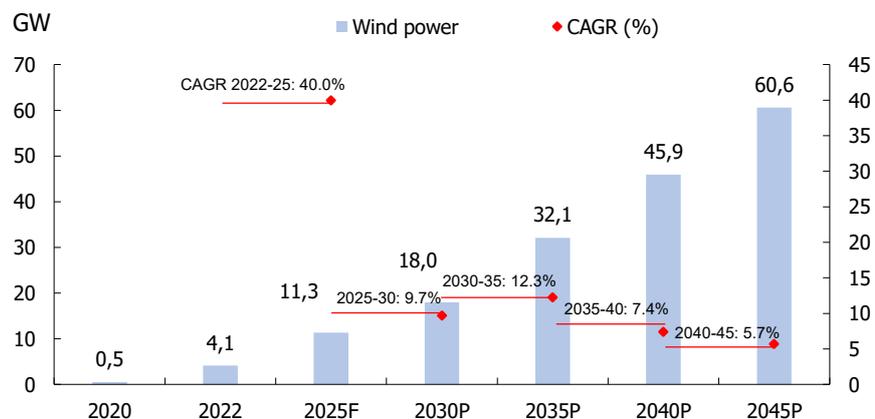
Strategic planning for explosive expansion between 2023 and 2045

In the short term 2024, we forecast that wind power output will be much higher. This is mostly because the MOIT passed a temporary price policy for transitional projects. From there, it can add up to 4,184 MW of wind power potential in 2023, which is twice as much as at the beginning of 2023. However, it's important to note that even though output could grow quickly after the temporary price policy is approved, this will help transitional wind power projects make revenue and have better running cash flow than they did in 2022–23. But until the MOIT officially declares an official price mechanism, it will still be hard for the projects to make positive profits (the temporary price is only equal to 70% of the cost of making energy).

Wind power is planned to be the fastest expanding source in the system between 2022- 2045, CAGR is 12.4%

In the mid and long-term, in addition to the huge advantage of low electricity generation costs, wind power projects are the most viable option for stabilizing Vietnam's power system in the period 2025–2030, amid the low implementation of controllable power sources. According to PDP8, wind power will be the fastest-growing power source in the system in 2022–45. Specifically, the installed capacity of wind power by 2045 will be up to 60.6 GW, 14.7 times higher than the figure at the end of 2022. The CAGR for 2022–45 will reach 12.4% per year. Especially in the 2023–35 period, the growth rate is very fast: 2022–25: 40.0%, 2025–30: 9.7%, and 2023–35: 12.3%.

Figure 22. Wind power capacity is oriented to grow rapidly in the period 2025-35



Source: PDP 8, KISVN

Although we are optimistic about wind power's potential for future expansion, To build a future on renewable energy as outlined in PDP 8, however, we must first address immediate issues on pricing policy, transmission capacity, and active power sources.

However, in the short term, improving the price mechanism, transmission capacity, and increasing active backup supply are required to create foundation for the expansion

Pricing policy: Up to now, the MOIT is now soliciting feedback on a proposed pricing policy for renewable energy projects. Therefore, before the MOIT officially issued this policy, it was difficult for investors to complete the procedures for the projects's construction and electricity grid connection. In addition, Decision 21/QD-BCT established the cap price for renewable energy transition projects in January 2023. Since the process for determining the cost range for these two types of projects is quite similar, the transitional renewable energy project ceiling price can be reduced by 20–30% compared to the FIT price. As a result, the new pricing system is more likely to narrow the pool of potential investors to those who can actually take part in the development of the project. We also believe that investors will greatly benefit from being able to

access lending and financing at a rate lower than 6%.

Transmission: According to PDP 8, wind power sources are focused on development in the Mekong Delta provinces and offshore locations, as stated in power planning 8. The load demand is minimal in all of these regions. For this reason, EVN must rapidly and synchronously create power grid infrastructure in these locations in the near time if it is to successfully release the capacity of projects.

Backup controllable power source: To effectively develop renewable energy sources, the power system must ensure sufficient capacity of flexible active power sources such as single cycle power plants or ICE or storage sources that act as a balancer for the power system. when renewable energy sources cannot generate electricity. However, as analyzed above, the current development of proactive power sources in our country is being implemented quite slowly. Therefore, this will be one of the major bottlenecks for the breakthrough of renewable energy sources in general and wind power in particular in the mid-term period 2025-28.

Backup controllable power source: To effectively develop renewable energy sources, the power system must ensure sufficient capacity from flexible controllable power sources such as single-cycle power plants, ICE, or storage sources that act as a balancer for the system when renewable energy sources cannot generate electricity. However, as analyzed above, at the moment, the new development of controllable power sources in Vietnam is being implemented quite slowly. Therefore, this will be one of the major bottlenecks for the breakthrough of renewable energy sources in general and wind power in particular in the mid-term period 2025–28.

VI. Risks to be considered

However, weather forecasting is always a difficult problem, even *in the short term*. Therefore, this will be the primary key risk that needs to be regularly monitored to more accurately update forecasts on the business activities of electricity enterprises. *In the medium and long term*, the growth prospects of gas turbine and wind power thermal power sources are forecast to be very large based on the analysis of the two most important core factors of the industry: system stability and economic efficiency. economy, along with the government's development orientation in PDP 8. However, the time for these two energy sources to achieve a breakthrough depends greatly on the perspective of the government and the Ministry of Industry and Trade in perfecting policies to support the development of power sources, especially policies on price mechanisms to encourage the participation of private economic organizations, in addition to implementing synchronously developed power transmission grid systems.

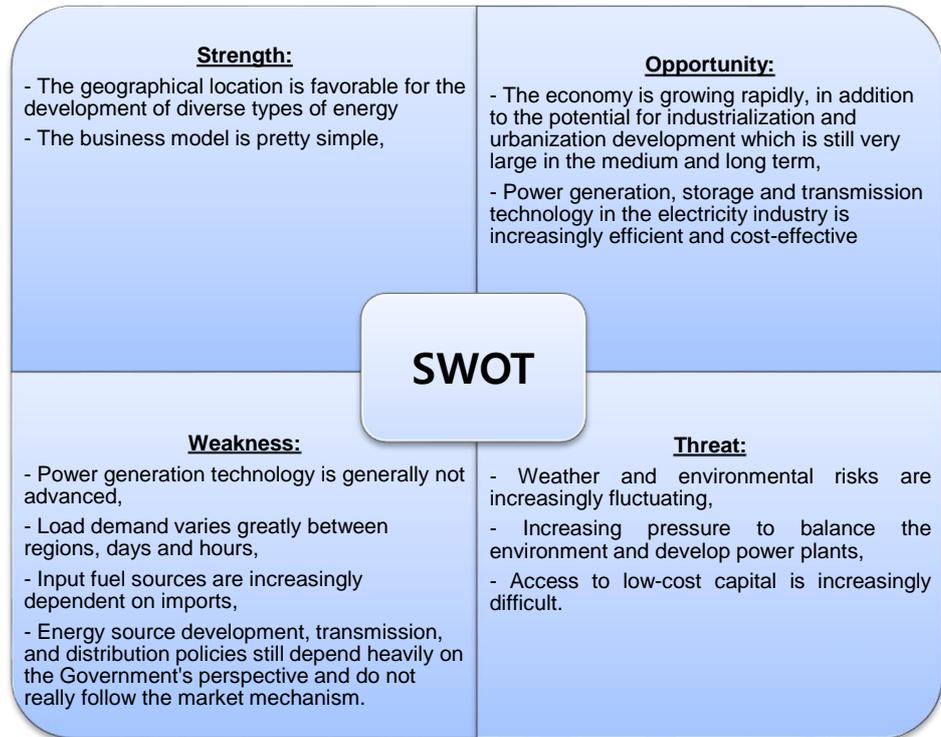
VII. Conclusion and Ratings

We recommend **POSITIVE** for the Power sector's prospect in the mid and long term.

- *In 2024*, at the end of September 2023, the water level at the annual balancing lakes and the water flow in the main basins are progressing quite well, thanks to the appearance of small floods at the end of Q2. Along with NOAA's forecast, the probability and level of impact of the El Nino phase will tend to gradually decrease from the end of 2023 and may shift to a neutral phase by the end of 2Q24. The above premises are expected to create a favorable environment for hydropower enterprises to operate more effectively in 2024. In addition, the mobilized output from wind power plants is forecast to increase significantly by promoting the mobilization capacity of transitional renewable energy plants in 2H23. In the opposite direction, we believe that gas turbine plants will likely be slightly negatively affected due to (1) disadvantages in competing on electricity generation prices, (2) saving limited domestic fuel resources, and (3) flexibility in power generation capacity.
- *In the medium and long term*, in general, all sectors related to the power system benefit from commercial electricity demand, which is forecast to maintain a rapid growth rate from the economic growth engine (GDP). In terms of power generation alone, gas turbine thermal power and wind power are forecast to be the two power generation sources with the fastest growth rate in the entire system based on an analysis of two core factors of the industry: (1) electricity system stability and (2) economic efficiency.
 - *Gas turbine thermal power* benefits from the limited space for expanding controllable sources of hydropower and coal power. From there, it becomes the best choice for ensuring stability and reliability for the electrical system. According to PDP8, by 2045, the country is expected to have 66.5 GW of gas power operating as background power and balancing renewable energy sources, with a CAGR of 9.2% for 2023–2045.
 - Meanwhile, *wind power* is likely to achieve rapid growth in the period 2022–2045 due to the following drivers: (a) competitive advantage in power generation costs; (b) benefiting from the limitations of proactive supply; and (c) the net-zero trend is taking place strongly around the world. According to PDP8, wind power is the power source with the fastest growth rate in the system in the period 2023–2045, with a CAGR of 12.4% per year and a capacity of up to 60.6 GW by 2045.

However, to achieve the PDP 8's breakthrough goal, it's essential that the great government's support for price policies motivate private enterprises in developing power sources. In addition, to successfully boost the installed capacity of renewable energy sources, it is also necessary to take into account the ability to synchronize the transmission system.

In terms of stock recommendations, based on prospects, risks, and values, we rate BUY on NT2 (TP: VND29,400, upside: +18%), QTP (VND23,400, upside: +54%), and HOLD on GEG (VND13,000). In addition, we positively value POW's growth potential after 2024, when NT3 and NT4 plants begin commercial operation.



Top picks

Nhon Trach 2 Power NT2

Quang Ninh Thermal Power QTP

Gia Lai Power GEG

Petro Vietnam Power POW

Nhon Trach 2 Power (NT2)

BUY, TP VND29,400

Stock price (02 Oct, VND)	24,900
Market cap (USD mn)	290
Shares outstanding (mn)	288
52W High/Low (VND)	31,892/19,525
6M avg. daily turnover (USD mn)	0.93
Free float (%)	32.3
Foreign ownership (%)	15.0
Major shareholders (%)	
PVN	59.37
CFTD	8.27

Yr to	Sales	OP	NP	EPS	BPS	ROE	ROA	PE	PB	EV/EBITDA	DY
Dec	(VND bn)	(VND bn)	(VND bn)	(VND)	(VND)	(%)	(%)	(x)	(x)	(x)	(%)
2021A	6,150	593	534	1,756	14,706	12.5	8.2	14.2	1.8	33.6	6.3
2022A	8,788	950	883	2,960	16,027	20.0	12.6	9.4	1.8	16.4	8.7
2023F	6,492	704	667	2,194	16,218	14.4	7.7	10.6	1.5	20.5	8.2
2024F	6,226	650	612	2,014	16,291	13.1	6.6	11.5	1.5	21.3	7.9
2025F	7,008	881	847	2,790	16,392	18.0	10.5	8.3	1.5	18.2	11.0

Performance

	1M	6M	12M
Absolute (%)	(7,3)	(6,2)	(10,3)
Relative to VNI (%p)	(23,3)	(2,1)	(19,8)

Stock price trend



Stable dividends for defensive strategy

BUY and TP of VND29,400, upside +18% compared to closing price 02 Oct 2023. Our rating is based on long-term prospects and the target price is valued by DCF method. In which, we use a cost of equity at 10.27% assuming: (1) a riskfree rate of 4.2%, (2) a beta of 0.86 and (3) an equity risk premium of 8.0% and liquidation value in 2035 is zero.

In 2H23 and 2024, business results are likely to decline

In 2H23, revenue and NPAT are forecasted at VND2,127bn (-48% yoy) and VND289bn (-20% yoy), respectively, due to the effects of (a) the factory overhaul from September 7 to October 17, (b) the low in the system marginal price (SMP) and output volume because of NLDC's priority in mobilizing hydropower and wind power. Actual data in 3Q23 shows that the mobilized output from NT2 is only 370 mn kWh, down 59% yoy or down 65% qoq.

In 2024, we project NT2's revenue and NPAT at VND6,226bn (-4% yoy) and VND612bn (-8% yoy), respectively.

Stable dividends for defensive strategy

Over the recent five years, from 2018 to 2022, NT2's average dividend was VND2,000 per share, or 8% of the market price at the moment. With fairly stable business operations and proactive supply shortage forecasts in the coming years, NT2 will likely still be able to maintain this dividend level throughout its entire operating period.

The risks of decline in short-term business results (2H23-1H24) could affect stock price fluctuations that are not as expected.

Company overview

Founded in 2007, Nhon Trach 2 Thermal Power (HSX: NT2) is a leading firm in power generation. NT2 owns the Nhon Trach 2 gas thermal power with total capacity of 750MW, which has used the advanced F-generation gas turbine combined cycle. On Jun 12, 2015, NT2 officially traded on Ho Chi Minh City Stock Exchange (HOSE).

Cost of equity assumption

%

Item	
Beta	0.86
Risk free rate	4.20%
Equity risk premium	8.00%
Cost of equity	11.38%

Source: KISVN

WACC assumption

%

Item	
Cost of debt	9.30%
Target debt to capital	0.00%
Tax rate	10.00%
WACC	11.38%

Source: KISVN

FCFE summary

VND bn

FCFE	FY2023F	FY2024F	FY2025F	FY2026F	FY2027F	FY2028-35F
EBIT(1-tax)	627	570	796	857	913	7,639
add: depreciation	695	697	698	698	43	190
less: capex	(100)	(30)	(9)	(9)	(10)	(85)
(increase) / decrease in NWC	(1,135)	639	375	(456)	43	1,638
less: bonus & welfare funds	(35)	(32)	(44)	(47)	(50)	(432)
add: net borrowing	345	(269)	(174)	(9)	4	(528)
FCFE	397	1,575	1,642	1,033	943	8,421
PV of FCFE	95	1,364	1,274	719	587	3,141
Cumulative sum PV of FCFE until 2035	7,182					
Liquidation value	-					
FCFE	29,600					

Source: KISVN

FCFF summary

VND bn

FCFF	FY2023F	FY2024F	FY2025F	FY2026F	FY2027F	FY2028-35F
EBIT(1-tax)	627	570	796	857	913	7,639
add: depreciation	695	697	698	698	43	190
less: capex	(100)	(30)	(9)	(9)	(10)	(85)
(increase) / decrease in NWC	(1,135)	639	375	(456)	43	1,638
less: bonus & welfare funds	(35)	(32)	(44)	(47)	(50)	(432)
add: Interest Expenses*(1-t)	38	39	29	25	25	212
FCFF	90	1,883	1,845	1,067	964	9,160
PV of FCFF	22	1,652	1,457	759	617	3,516
Cumulative sum PV of FCFF until 2035	8,021					
Liquidation value	0					
FCFF	29,100					

Source: KISVN

Balance sheet VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
Current assets (Adj.)	2,581	4,557	7,653	6,930	6,688
Cash & cash equivalent	1	384	414	1,471	2,381
Non-current assets (Adj.)	2,580	4,173	7,239	5,459	4,307
Fixed Asset	3,496	2,809	2,214	1,547	858
Investment assets	-	-	-	-	-
Others	547	79	58	56	72
Total assets	6,624	7,445	9,925	8,532	7,618
Advances from customers	-	-	-	-	-
Unearned revenue	-	-	-	-	-
Trade payables	1,034	770	3,200	2,100	1,200
Others	1,147	1,431	1,080	1,036	1,166
ST debt & bond	210	631	976	707	533
LT debt & bond	-	-	-	-	-
Total liabilities	2,390	2,831	5,256	3,843	2,899
Controlling interest	4,234	4,614	4,669	4,690	4,719
Capital stock	2,879	2,879	2,879	2,879	2,879
Capital surplus	(0)	(0)	(0)	(0)	(0)
Other Reserves	160	182	182	182	182
Retained earnings	1,196	1,554	1,609	1,629	1,659
Shareholders' equity	4,234	4,614	4,669	4,690	4,719

Cash flow VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
C/F from operations	1,074	1,383	144	1,871	1,821
Net profit	566	943	712	653	904
Depreciation	690	689	695	697	698
Net incr. in W/C	1,266	1,668	1,399	1,347	1,578
C/F from investing	9	(946)	117	15	46
Capex	(2)	(1)	(100)	(30)	(9)
Incr. in investment	11	(945)	217	45	54
C/F from financing	(1,143)	(54)	(231)	(828)	(948)
Incr. in equity	-	-	-	-	-
Incr. in debts	-	-	345	(269)	(174)
Dividends	(575)	(474)	(577)	(559)	(774)
C/F from others	-	-	-	-	-
Increase in cash	(61)	383	29	1,057	919

Income statement VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
Net sales	6.150	8.788	6.492	6.226	7.008
COGS	5.474	7.706	5.723	5.513	6.058
Gross profit	676	1.082	769	713	951
SG&A	83	131	65	62	70
Operating profit	593	950	704	650	881
Financial income	18	24	48	45	54
Interest income	11	21	43	45	54
Financial expenses	52	18	40	42	31
Interest expenses	20	15	40	42	31
Other non-operating profit	7	(14)	-	-	-
Gains (Losses) in associates, subsidiaries and JV	-	-	-	-	-
Earnings before tax	566	943	712	653	904
Income taxes	32	60	45	41	57
Net profit	534	883	667	612	847
Net profit of controlling interest	534	883	667	612	847
EBITDA	1.283	1.639	1.399	1.347	1.578

Key financial data

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
per share data (VND, adj.)					
EPS	1,756	2,960	2,194	2,014	2,790
BPS	14,706	16,027	16,218	16,291	16,392
DPS	1,650	2,500	2,003	5,000	5,000
Growth (%)					
Sales growth	1.1	42.9	(26.1)	(4.1)	12.6
OP growth	(26.8)	60.2	(25.9)	(7.6)	35.4
NP growth	(14.6)	65.5	(24.5)	(8.3)	38.5
EPS growth	(14.6)	65.5	(24.5)	(8.3)	38.5
EBITDA growth	(14.6)	27.7	(14.6)	(3.7)	17.1
Profitability (%)					
OP margin	9.6	10.8	10.8	10.4	12.6
NP margin	8.7	10.1	10.3	9.8	12.1
EBITDA margin	20.9	18.7	21.5	21.6	22.5
ROA	8.2	12.6	7.7	6.6	10.5
ROE (excl MI)	12.5	20.0	14.4	13.1	18.0
Dividend yield	6.3	8.7	8.2	7.9	11.0
Dividend payout ratio	89	81	87	91	91
Stability					
Net debt (VND bn)	209	246	562	(764)	(1,848)
Net debt/equity (%)	0	0	0	(0)	(0)
Valuation (X)					
PE	14.2	9.4	10.6	11.5	8.3
PB	1.8	1.8	1.5	1.5	1.5
EV/EBITDA	33.6	16.4	20.5	21.3	18.2

Quang Ninh Thermal Power

BUY, TP VND23,400

Stock price (02 Oct, VND)	15,300
Market cap (USD mn)	283
Shares outstanding (mn)	450
52W High/Low (VND)	16,978/9,829
6M avg. daily turnover (USD mn)	0.46
Free float (%)	88.4
Foreign ownership (%)	1.6
Major shareholders (%)	
GENCO 1	42.00
PPC	16.35
SCIC	11.42

Yr to	Sales	OP	NP	EPS	BPS	ROE	ROA	PE	PB	EV/EBITDA	DY
Dec	(VND bn)	(VND bn)	(VND bn)	(VND)	(VND)	(%)	(%)	(x)	(x)	(x)	(%)
2021A	8,571	734	578	1,168	13,712	9.4	6.0	6.4	1.2	5.6	7.9
2022A	10,417	968	764	1,405	13,694	12.4	9.0	11.1	1.3	3.2	11.5
2023F	12,536	686	609	1,232	13,730	9.9	7.7	11.3	1.1	4.4	7.8
2024F	12,101	675	617	1,249	13,848	9.9	8.0	11.2	1.1	4.4	7.9
2025F	12,941	731	686	1,391	14,086	10.9	8.8	10.0	1.1	4.2	7.5

Performance

	1M	6M	12M
Absolute (%)	33,8	(3,8)	16,8
Relative to VNI (%p)	17,9	0,0	7,3

Stock price trend



FCFE is expected to soar by 2024

BUY and TP of VND23,400, upside +54% compared to closing price 02 Oct 2023. Our rating is based on long-term prospects and the target price is valued by DCF method. In which, we use a cost of equity at 12.2% assuming: (1) a riskfree rate of 4.2%, (2) a beta of 1.0 and (3) an equity risk premium of 8.0% and liquidation value in 2039 is zero.

2H23 mobilization output is forecast to decrease compared to 1H23: In 2H23, we estimate QTP's mobilized output at 3.5 bn kWh, which decreased compared to 1H23 or the same period due to the maintenance of generator unit No. 2 and the priority of hydropower mobilization in the favorable hydrological situation. However, revenue and PAT reached VND5,833bn and VND217bn, respectively, still growing over the same period when in 2H22, mobilized output and gross margin were significantly low due to the increase in coal prices.

In 2024, we forecast a slight decrease in business results: we forecast that QTP's revenue to be VND11,989bn, only slightly down by 4% thanks to the growth in electricity demand, along with the background running nature. However, NPAT is estimated at VND512bn, -17% yoy, which is considered affected by high operating leverage and a decrease in the system marginal price (SMP).

FCFE will soar when there is only a little debt after 2H24. By the end of 2Q23, QTP's outstanding loan balance was recorded at VND704bn. Given net debt repayment operations of roughly VND700–800bn per year, the debt balance is only negligible by the middle of 2024. Accordingly, QTP's FCFE line could expand significantly to VND1,400–1,500bn per year after 2024, which would be 5.9–6.4 times more than VND236bn in 2020. At the same time, the capitalization ratio on FCFE is still at 4.7x. In addition, this is also a strong motivation for QTP to increase the payout ratio, as EVN (which holds 42% of the shares) is facing challenges in its financial situation.

Risks of material input: The supply of domestic coal by TKV is expected to gradually decline and become more dependent on imports. As a result, QTP will gradually lose its competitive advantage in the mid-long term and be more vulnerable to the risks related to fluctuations in fuel prices.

Company overview

QTP is one of EVN's member companies. Having Commercially operated by 2009, given the capacity of 1,200 MW, QTP is playing significant role in the Northern power system. Currently, the company has been traded on UPCOM.

Cost of equity assumption		%	WACC assumption		%
Item			Item		
Beta	1.00		Cost of debt	8.30%	
Risk free rate	4.20%		Target debt to capital	0.00%	
Equity risk premium	8.00%		Tax rate	10.00%	
Cost of equity	12.20%		WACC	12.20%	

Source: KISVN

Source: KISVN

FCFE summary							VND bn
FCFE	FY2023F	FY2024F	FY2025F	FY2026F	FY2027F	FY2028-39F	
EBIT(1-tax)	586	597	657	663	1,196	18,790	
add: depreciation	961	961	961	961	405	91	
less: capex	(7)	(7)	(7)	(7)	(13)	(201)	
(increase) / decrease in NWC	(533)	97	59	29	16	14	
less: bonus & welfare funds	(55)	(55)	(60)	(61)	(109)	(1,710)	
add: net borrowing	(475)	(76)	(63)	(66)	(65)	(1)	
FCFE	477	1,517	1,546	1,519	1,430	16,982	
PV of FCFE	421	1,190	1,077	941	789	4,752	
Cumulative sum PV of FCFE until 2039	9,169						
Liquidation value	-						
FCFE	23,100						

Source: KISVN

FCFE summary							VND bn
FCFF	FY2023F	FY2024F	FY2025F	FY2026F	FY2027F	FY2028-39F	
EBIT(1-tax)	586	597	657	663	1,196	18,790	
add: depreciation	961	961	961	961	405	91	
less: capex	(7)	(7)	(7)	(7)	(13)	(201)	
(increase) / decrease in NWC	(533)	97	59	29	16	14	
less: bonus & welfare funds	(55)	(55)	(60)	(61)	(109)	(1,710)	
add: Interest Expenses*(1-t)	63	44	38	32	26	282	
FCFF	1,015	1,636	1,647	1,617	1,521	17,265	
PV of FCFF	902	1,294	1,160	1,014	851	4,937	
Cumulative sum PV of FCFF until 2039	10,157						
Liquidation value	-						
FCFF	23,700						

Source: KISVN

Balance sheet

VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
Current assets (Adj.)	3,639	3,732	4,380	5,232	6,272
Cash & cash equivalent	206	24	530	1,536	2,577
Non-current assets (Adj.)	3,433	3,709	3,849	3,696	3,695
Fixed Asset	5,195	4,242	3,289	2,334	1,379
Investment assets	-	-	-	-	-
Others	75	76	90	86	92
Total assets	8,910	8,051	7,759	7,652	7,743
Advances from customers	0	-	-	-	-
Unearned revenue	-	-	-	-	-
Trade payables	437	607	730	698	747
Others	143	184	226	216	231
ST debt & bond	750	776	365	349	349
LT debt & bond	1,405	316	253	190	126
Total liabilities	1,329	1,567	1,321	1,264	1,328
Controlling interest	6,171	6,162	6,179	6,193	6,283
Capital stock	4,500	4,500	4,500	4,500	4,500
Capital surplus	231	231	231	231	231
Other Reserves	274	274	274	274	274
Retained earnings	1,166	1,158	1,174	1,188	1,278
Shareholders' equity	6,171	6,162	6,179	6,193	6,283

Cash flow

VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
C/F from operations	1,802	1,438	965	1,521	1,516
Net profit	617	805	642	539	608
Depreciation	972	960	961	960	961
Net incr. in W/C	1,877	1,896	1,647	1,524	1,577
C/F from investing	(407)	217	554	15	25
Capex	(5)	(4)	(10)	(6)	(6)
Incr. in investment	(403)	221	564	21	31
C/F from financing	(2,025)	(1,836)	(1,013)	(531)	(499)
Incr. in equity	-	-	-	-	-
Incr. in debts	-	-	(412)	(15)	0
Dividends	(449)	(719)	(538)	(452)	(436)
C/F from others	-	-	-	-	-
Increase in cash	(631)	(182)	506	1,005	1,042

Income statement

VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
Net sales	8,571	10,417	12,536	11,989	12,824
COGS	7,581	9,336	11,714	11,296	12,069
Gross profit	990	1,081	822	694	755
SG&A	256	113	136	130	139
Operating profit	734	968	686	564	616
Financial income	82	34	25	21	31
Interest income	52	33	25	21	31
Financial expenses	195	193	67	46	39
Interest expenses	195	133	67	46	39
Other non-operating profit	(4)	(4)	(3)	-	-
Gains (Losses) in associates, subsidiaries and JV	-	-	-	-	-
Earnings before tax	617	805	642	539	608
Income taxes	39	41	32	27	31
Net profit	578	764	609	512	577
Net profit of controlling interest	578	764	609	512	577
EBITDA	1,705	1,928	1,647	1,524	1,577

Key financial data

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
per share data (VND, adj.)					
EPS	1,168	1,405	1,232	1,036	1,170
BPS	13,712	13,694	13,730	13,762	13,963
DPS	1,500	1,500	1,200	1,000	1,000
Growth (%)					
Sales growth	(6.7)	21.5	20.3	(4.4)	7.0
OP growth	(57.6)	32.0	(29.1)	(17.8)	9.3
NP growth	(55.7)	32.2	(20.3)	(16.1)	12.8
EPS growth	(55.7)	32.2	(20.3)	(16.1)	12.8
EBITDA growth	(40.8)	13.1	(14.6)	(7.4)	3.5
Profitability (%)					
OP margin	8.6	9.3	5.5	4.7	4.8
NP margin	6.7	7.3	4.9	4.3	4.5
EBITDA margin	19.9	18.5	13.1	12.7	12.3
ROA	6.0	9.0	7.7	6.6	7.5
ROE (excl MI)	9.4	12.4	9.9	8.3	9.3
Dividend yield	7.9	11.5	7.8	6.6	6.3
Dividend payout ratio	117	88	88	88	76
Stability					
Net debt (VND bn)	1,949	1,069	87	(997)	(2,102)
Net debt/equity (%)	32	17	1	(16)	(33)
Valuation (X)					
PE	6.4	11.1	11.3	13.5	11.9
PB	1.2	1.3	1.1	1.1	1.1
EV/EBITDA	5.6	3.2	4.4	4.7	4.6

Gia Lai Power (GEG)

HOLD, TP VND13,000

Stock price (02 Oct, VND)	15,350
Market cap (USD mn)	233
Shares outstanding (mn)	341
52W High/Low (VND)	17,170/9,000
6M avg. daily turnover (USD mn)	1.02
Free float (%)	68.2
Foreign ownership (%)	22.7
Major shareholders (%)	54.5
AVH Pte. Ltd	21.36
TTC	42.19

Yr to	Sales	OP	NP	EPS	BPS	ROE	ROA	PE	PB	EV/EBITDA	DY
Dec	(VND bn)	(VND bn)	(VND bn)	(VND)	(VND)	(%)	(%)	(x)	(x)	(x)	(%)
2021A	1,381	653	325	895	11,121	8.8	3.2	6.4	1.2	13.4	-
2022A	2,093	851	371	928	13,287	8.2	2.5	11.1	1.3	10.8	-
2023F	2,210	939	195	506	13,794	3.9	1.2	27.8	1.2	9.3	-
2024F	2,431	1,035	316	791	14,585	5.8	1.9	17.2	1.2	8.9	-
2025F	2,533	1,128	471	1,143	15,728	7.8	3.0	11.5	1.1	8.4	-

Market price might be fair

Performance

	1M	6M	12M
Absolute (%)	5,3	13,6	20,0
Relative to VNIndex (%p)	(10,7)	17,6	10,5

Stock price trend



HOLD and TP of VND13,000. Our rating is based on long-term prospects and the target price is determined according to the SOTP method for each power manufacturing. In which, we use a cost of equity at 10.27% assuming: (1) a riskfree rate of 4.2%, (2) a beta of 1.08 and (3) an equity risk premium of 8.0% and liquidation value is zero for all power plants.

The project implementation progress of the Duc Hue 2 solar power project and the V.P.L. 2 wind power project is quite slow. The Duc Hue 2 solar power project has been supplemented with electricity planning since January 2019, with a total investment of about 947 billion VND. However, after more than four years of implementation, the total cost of unfinished construction only reached 287 billion VND, equivalent to 30% of the investment value. At the same time, the financial statements also show that the project construction progress has not made much progress since the end of 2020. Meanwhile, the V.P.L. 2 wind power project by the end of 2Q23 has not yet received significant investment when the value of unfinished construction was recorded at just over VND2bn.

The Tan Phu Dong wind power project has not contributed significantly in its first year of operation. The Tan Phu Dong wind power project was signed by EVN with a power generation contract at a temporary price of VND794 per kWh by May 2023. With a capacity of 100 MW, the project can contribute VND 250 billion in revenue in the next 12 months. However, during this period, with the electricity selling price (temporary price) estimated to be only about 70–80% of the electricity generation cost, we estimate that the project is likely to still suffer a loss of VND15bn in NPAT in 2023 (only operate for 7 months in 2023). At the same time, this risk may extend to 1H24, as up to now we have not seen more open moves from the MOIT in negotiating prices for transitional renewable energy projects.

Profit after tax is forecast to decrease in 2023 due to no more profit from divestment.

In 2H23, we forecast that the core business activities of the enterprise will improve significantly thanks to the stable operation of the renewable energy segment and the favorable operation of the hydropower segment thanks to the hydrological situation. Revenue for the period is forecast at VND1,182bn, +16% yoy. However, NPAT is forecast to only reach VND82bn, -47% yoy due to no more profit from divestment activities like in 4Q2022 (166 billion, divestment Ayun Ha).

In 2024, we forecast revenue and NPAT to reach VND2,431bn (+10% yoy) and VND316bn (+62% yoy), respectively. The improvement mainly comes from the trend of improving the operation of hydroelectric plants.

The risks of prolonging the time to negotiate the electricity price of the Tan Phu Dong project and slowing the progress of the two ongoing Duc Hue 2-solar power and V.P.L 2-wind power projects will significantly affect the improvement of the ROE ratio of the company when this index is at 8%, which is quite low compared to the industry average.

Company overview

Founded in 2007, Gia Lai Power (HSX: GEG) is a leading firm in renewable power. GEG owns 13 hydro power plants, 7 solar power plants and 4 wind power plants. The total capacity is up to nearly 500MW. On March 01, 2017, GEG officially traded on Ho Chi Minh City Stock Exchange (HOSE).

Cost of equity assumption	%
Item	
Beta	1.08
Risk free rate	4.20%
Equity risk premium	8.00%
Cost of equity	12.80%

Source: KISVN

WACC assumption	%
Item	
Cost of debt	8.10%
Target debt to capital	60.00%
Tax rate	10.00%
WACC	8.80%

Source: KISVN

SOTP valuation

Plant	Method	Stake (%)	Eff. NAV
Hydro power			1,902
la Drăng 2	DCF	100	30
la Drăng 1	DCF	100	17
la Drăng 3	DCF	100	41
la Meun 3	DCF	100	34
H'Chan	DCF	25	108
Đắk Pi Hao 2	DCF	100	274
la Púch 3	DCF	100	151
Đa Khai	DCF	100	386
H Mun	DCF	25	138
Ayun Thượng	DCF	100	421
Đắk Pi Hao 1	DCF	100	170
Thượng Lộ	DCF	63	95
Solar power			5,995
Phong Điền	DCF	100	853
Krông Pa	DCF	100	1,219
Hàm Phú 2	DCF	100	1,170
Đức Huệ 1	DCF	100	1,053
Trúc Sơn	DCF	100	808
Rooftop	DCF	100	607
Đức Huệ 2	BV	99	285
Wind power			5,803
la Bang 1	DCF	85	1,659
Tân Phú Đông 2	DCF	55	1,254
V.P.L 1	DCF	92	1,224
Tân Phú Đông 1	DCF	55	1,663
V.P.L 2	DCF	92	3
Others			17
Others	BV	100	17
Sum			13,679

Source: KISVN

Item	VND bn
Cash & cash equivalents	261
Short-term investment	236
Long-term investment	165
Revaluation assets	13,679
Debts	10,163
NAV	4,178
Number of Outstanding shares	322
Fair value per stock	VND13,000

Balance sheet

VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
Current assets (Adj.)	1,316	2,118	2,079	2,700	2,990
Cash & cash equivalent	250	334	502	1,015	1,265
Non-current assets (Adj.)	1,066	1,785	1,577	1,686	1,725
Fixed Asset	10,495	9,965	13,802	12,903	12,004
Investment assets	100	113	165	165	165
Others	562	4,921	419	425	450
Total assets	12,473	17,118	16,465	16,194	15,609
Advances from customers	3	2	2	3	3
Unearned revenue	0	0	-	-	-
Trade payables	315	1,225	111	122	127
Others	152	180	204	225	234
ST debt & bond	408	663	763	827	852
LT debt & bond	6,695	9,264	8,894	8,152	7,041
Total liabilities	878	2,071	1,080	1,176	1,216
Controlling interest	3,378	4,278	4,441	4,696	5,064
Capital stock	3,037	3,861	3,861	3,861	3,861
Capital surplus	38	26	26	26	26
Other Reserves	94	98	98	98	98
Retained earnings	208	292	455	710	1,078
Shareholders' equity	3,378	4,278	4,441	4,696	5,064

Cash flow

VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
C/F from operations	2,542	496	415	1,151	1,317
Net profit	369	407	214	347	517
Depreciation	414	652	899	899	899
Net incr. in W/C	1,075	1,480	1,851	1,947	2,040
C/F from investing	(5,883)	(4,405)	24	18	20
Capex	(5,807)	(4,531)	(221)	(21)	(23)
Incr. in investment	(77)	126	244	39	42
C/F from financing	3,456	3,993	(271)	(676)	(1,087)
Incr. in equity	313	1,232	-	-	-
Incr. in debts	-	-	100	65	25
Dividends	(140)	(57)	-	-	-
C/F from others	0	(0)	-	-	-
Increase in cash	115	84	168	493	251

Income statement

VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
Net sales	1,381	2,093	2,210	2,431	2,533
COGS	614	1,082	1,102	1,209	1,210
Gross profit	767	1,011	1,109	1,221	1,323
SG&A	114	161	170	187	194
Operating profit	653	851	939	1,035	1,128
Financial income	37	214	41	39	42
Interest income	26	31	21	18	22
Financial expenses	409	657	779	739	667
Interest expenses	384	592	779	739	667
Other non-operating profit	81	(14)	-	-	-
Gains (Losses) in associates, subsidiaries and JV	6	13	13	13	13
Earnings before tax	369	407	214	347	517
Income taxes	43	36	19	31	46
Net profit	325	371	195	316	471
Net profit of controlling interest	283	316	170	265	383
EBITDA	1,067	1,502	1,838	1,934	2,028

Key financial data

FY-ending Dec.	2021A	2022A	2023F	2024F	2025F
per share data (VND, adj.)					
EPS	895	928	506	791	1,143
BPS	11,121	13,287	13,794	14,585	15,728
DPS	-	-	-	-	-
Growth (%)					
Sales growth	(7.5)	51.6	5.6	10.0	4.2
OP growth	1.3	30.3	10.4	10.2	9.1
NP growth	10.3	13.9	(47.4)	62.3	48.9
EPS growth	9.9	11.6	(46.3)	56.2	44.4
EBITDA growth	6.9	40.8	22.4	5.2	4.8
Profitability (%)					
OP margin	47.3	40.6	42.5	42.6	44.5
NP margin	23.6	17.7	8.8	13.0	18.6
EBITDA margin	77.3	71.8	83.2	79.6	80.1
ROA	3.2	2.5	1.2	1.9	3.0
ROE (excl MI)	8.8	8.2	3.9	5.8	7.8
Dividend yield	-	-	-	-	-
Dividend payout ratio	-	-	-	-	-
Stability					
Net debt (VND bn)	6,853	9,593	9,154	7,965	6,628
Net debt/equity (%)	203	224	206	170	131
Valuation (X)					
PE	6.4	11.1	27.8	17.2	11.5
PB	1.2	1.3	1.2	1.2	1.1
EV/EBITDA	13.4	10.8	9.3	8.9	8.4

Petro Vietnam Power (POW)

Non-rating

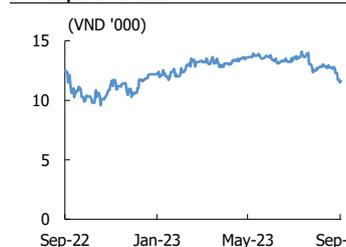
Stock price (01 June, VND)	11,600
Market cap (USD mn)	1,118
Shares outstanding (mn)	2,342
52W High/Low (VND)	14,100/9,580
6M avg. daily turnover (USD mn)	4.63
Free float (%)	20.0
Foreign ownership (%)	5.4
Major shareholders (%)	
PVN	79.74

Yr to	Sales	OP	NP	EPS	BPS	ROE	ROA	PE	PB	EV/EBITDA	DY
Dec	(VND bn)	(VND bn)	(VND bn)	(VND)	(VND)	(%)	(%)	(x)	(x)	(x)	(%)
2021A	24,561	2,400	2,052	746	12,229	6.3	3.9	20.0	1.4	8.3	-
2022A	28,224	2,859	2,553	824	13,031	12.4	9.0	9.8	0.8	4.7	-
2023F	28,509	1,382	1,096	359	13,390	9.9	7.7	24.8	0.9	6.8	-
2024F	27,950	1,454	602	154	13,543	9.9	8.0	45.1	0.9	5.8	-

Performance

	1M	6M	12M
Absolute (%)	8,9	(7,9)	(12,1)
Relative to VNI (%p)	(7,1)	(3,9)	(21,6)

Stock price trend



Growth motivation from NT3 & NT4 plants

2H2023 business results are forecast to decrease, in which: we forecast POW's revenue and NPAT at VND12,655 bn (-8% yoy) and VND265bn (-77% yoy), respectively. The main reason comes from the reduction in mobilized output from gas turbine thermal power plants (NT1, NT2 and Ca Mau). That is affected by (a) overhaul activities and (b) mobilization priority of hydropower and renewable energy plants. In 3Q23, electricity output from these plants was estimated at 1.0 billion kWh, down 30% yoy. Meanwhile, Vung Ang 1-coal fired power plant is expected to achieve output growth after unit 1 begins operating again from August 2023 after two years of overhaul. In addition to hydroelectric power plants (Dakdrinh & Hua Nua) are also operating more efficiency thanks to the favorable hydrological situation.

Long-term growth motivation from NT3 and NT4 factories. Currently, two plants are in the process of installation and construction. According to schedule, the NT3 factory can be commercially operated from the end of 4Q24 and the NT4 factory from the end of 2Q25. With a capacity of up to 1,500 MW (an increase of 36% compared to the current number), located in a favorable geographical area, and benefiting from the scarcity of controllable supply in the system in the coming years, it is expected to create strong growth after both factories go into operation. On this basis, we believe that 2024 will be a milestone marking the growth of the company's business activities.

Risks in negotiating power purchase contracts for NT3 and NT4 plants. At present, the price of imported LNG is 12–14 USD per mmBTU. LCOE is estimated at a level, so the electricity selling price of two plants, NT3 and NT4, is expected to be higher than the electricity selling price of turbine plants gas from natural gas by 25–30%. While the ceiling price is limited according to regulations by the MOIT every year, in addition to the financial pressure EVN is facing, Therefore, electricity purchase price and long-term offtake output are two major bottlenecks in the contract negotiation process for EVN and POW. Prolonging the negotiation time or maintaining low consumption and selling prices will greatly affect the performance of factories.

Company overview

POW is one of the members of PVN. Given a capacity of up to 4,205 MW from gas turbine power plants (NT1, NT2, NT4, and Ca Mau 1 and 2), coal-fired thermal power plants (Vung Ang 1), and hydropower plants (Dak Drinh and Hua Nua), POW is the 4th largest power generation enterprise in the country, just behind EVN's power generation enterprises (GENCO).

Balance sheet VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F
Current assets (Adj.)	18,420	24,925	30,658	30,045
Cash & cash equivalent	8,224	8,252	8,335	8,172
Non-current assets (Adj.)	10,196	16,673	22,323	21,873
Fixed Asset	31,869	29,155	26,437	39,939
Investment assets	828	878	933	933
Others	1,860	1,885	8,895	6,876
Total assets	52,977	56,843	66,923	77,793
Advances from customers	6	4	4	4
Unearned revenue	-	0	-	-
Trade payables	7,240	7,346	7,421	7,275
Others	4,797	5,340	5,185	5,083
ST debt & bond	4,769	5,635	15,383	26,622
LT debt & bond	3,689	3,382	2,705	2,029
Total liabilities	16,811	18,326	27,992	38,984
Controlling interest	28,638	30,516	31,357	31,717
Capital stock	23,419	23,419	23,419	23,419
Capital surplus	(0)	(0)	(0)	(0)
Other Reserves	2,209	3,678	3,678	3,678
Retained earnings	3,010	3,420	4,261	4,621
Shareholders' equity	28,638	30,516	31,357	31,717

Cash flow VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F
C/F from operations	5,147	3,156	(2,661)	4,071
Net profit	2,339	2,809	1,207	663
Depreciation	2,818	2,809	2,818	3,498
Net incr. in W/C	4,485	5,456	4,253	5,005
C/F from investing	563	(3,374)	(6,327)	(14,797)
Capex	(284)	(2,600)	(6,970)	(15,000)
Incr. in investment	846	(774)	643	203
C/F from financing	(4,555)	245	9,071	10,562
Incr. in equity	-	-	-	-
Incr. in debts	-	-	9,748	11,239
Dividends	(710)	(199)	-	-
C/F from others	(0)	(0)	-	-
Increase in cash	1,154	28	83	(163)

Income statement VND bn

FY-ending Dec.	2021A	2022A	2023F	2024F
Net sales	24,561	28,224	28,509	27,950
COGS	22,021	24,498	26,471	25,853
Gross profit	2,540	3,726	2,038	2,097
SG&A	140	868	656	643
Operating profit	2,400	2,859	1,382	1,454
Financial income	690	445	215	203
Interest income	319	319	146	135
Financial expenses	653	592	573	1,048
Interest expenses	510	438	573	1,048
Other non-operating profit	(120)	44	130	-
Gains (Losses) in associates, subsidiaries and JV	22	53	53	53
Earnings before tax	2,339	2,809	1,207	663
Income taxes	287	256	110	60
Net profit	2,052	2,553	1,096	602
Net profit of controlling interest	2,052	2,553	1,096	602
EBITDA	5,218	5,668	4,200	4,952

Key financial data

FY-ending Dec.	2021A	2022A	2023F	2024F
per share data (VND, adj.)				
EPS	746	824	359	154
BPS	12,229	13,031	13,390	13,543
DPS	-	-	-	-
Growth (%)				
Sales growth	(17.4)	14.9	1.0	(2.0)
OP growth	(28.8)	19.1	(51.7)	5.2
NP growth	(22.9)	24.4	(57.1)	(45.1)
EPS growth	(24.0)	14.6	(58.0)	(57.2)
EBITDA growth	(15.8)	8.6	(25.9)	17.9
Profitability (%)				
OP margin	9.8	10.1	4.8	5.2
NP margin	8.4	9.0	3.8	2.2
EBITDA margin	21.2	20.1	14.7	17.7
ROA	3.9	9.0	7.7	8.0
ROE (excl MI)	6.3	12.4	9.9	9.9
Dividend yield	-	-	-	-
Dividend payout ratio	-	-	-	-
Stability				
Net debt (VND bn)	234	765	9,754	20,479
Net debt/equity (%)	1	3	31	65
Valuation (X)				
PE	20.0	9.8	24.8	45.1
PB	1.4	0.8	0.9	0.9
EV/EBITDA	8.3	4.7	6.8	5.8

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