November, 2022

POWER INDUSTRY

Green tranformation



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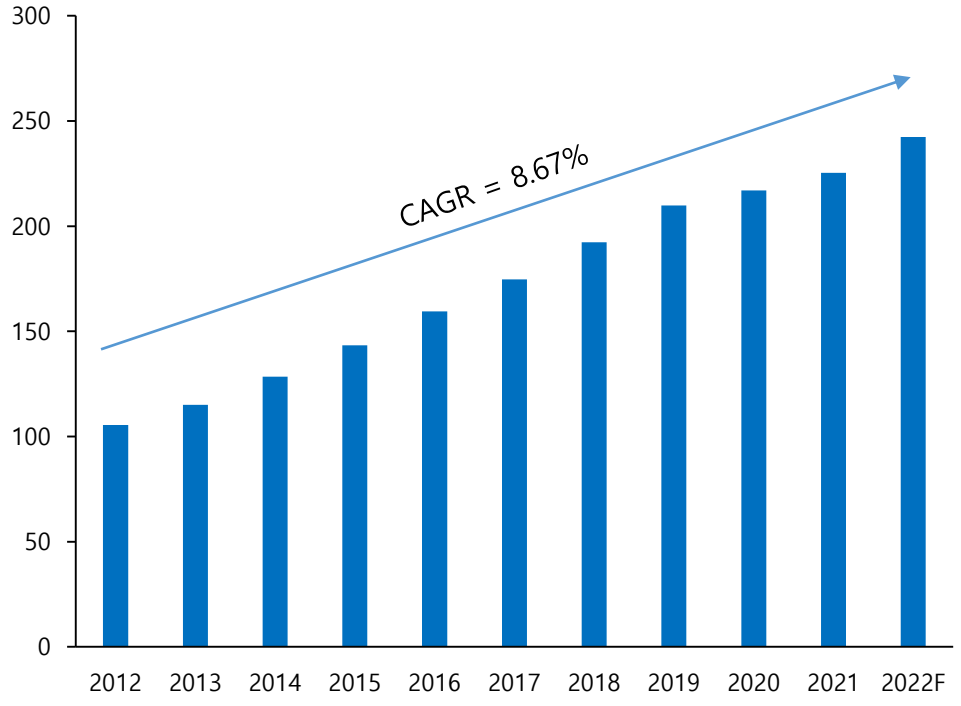
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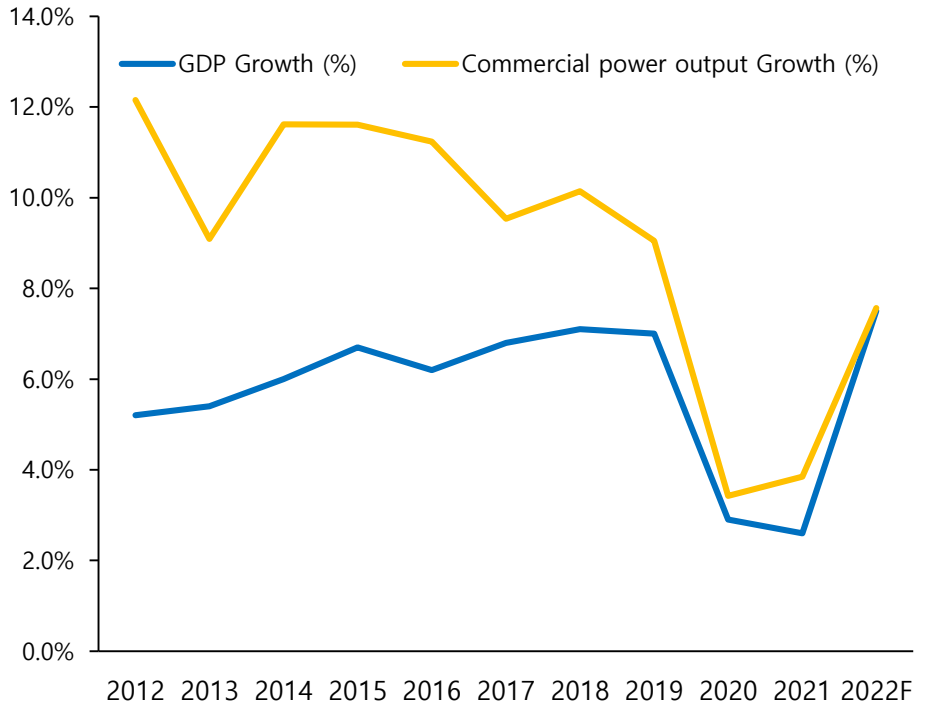
Growth rate of commercial power output in Vietnam

Commercial power output (billion Kwh)



Source: EVN, Shinhan Securities Vietnam

The growth rate of electricity consumption and GDP growth (%)

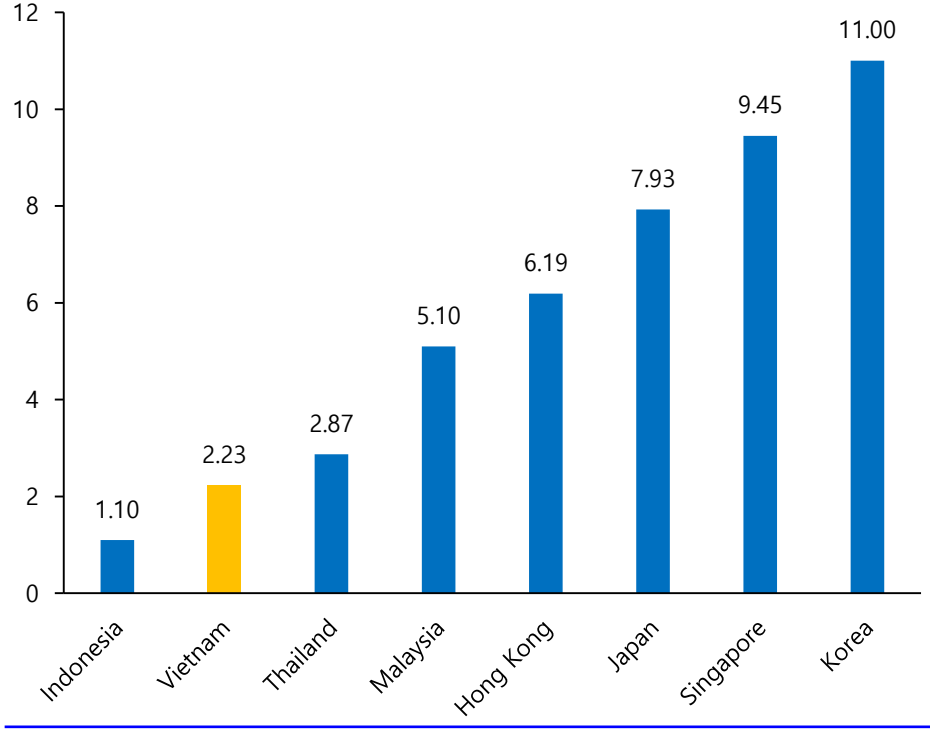


Source: EVN, GSO, Shinhan Securities Vietnam

- In the period 2012-2022F, the electricity consumption of Vietnam has a compound annual growth rate (CAGR) of 8.67%, indicating a sustainable and long-term growth trend when Vietnam is still a developing country with a bright future.
- In 2022, the electricity consumption of Vietnam will jump strongly thank the low level of 2021. In 2023, we forecast commercial electricity output will increase stably when the economy returns to normal.

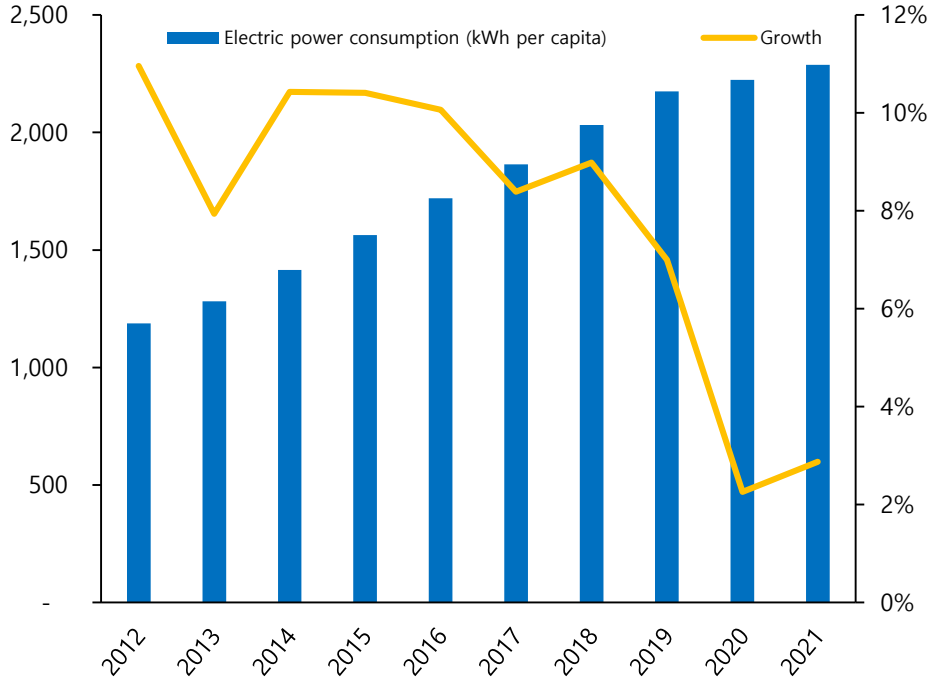
Electric power consumption per capita

Electric power consumption in 2020 (MWh per capita)



Source: EIA, Shinhan Securities Vietnam

Electric power consumption of Vietnam (kWh per capita)

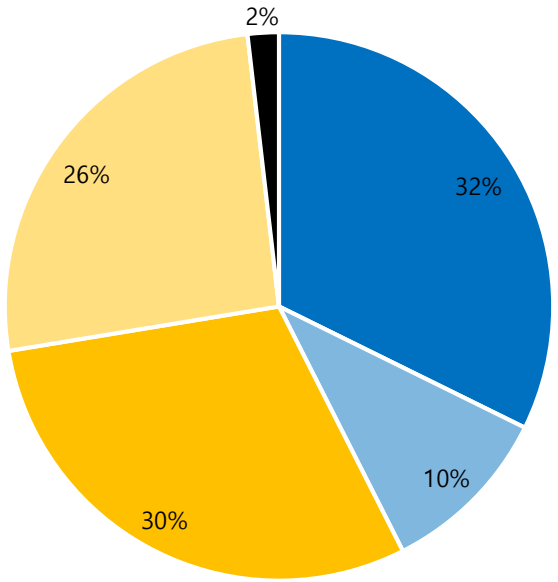


Source: EVN, GSO, Shinhan Securities Vietnam

- Electricity consumption per capita of Vietnam (2.23 MWh/person) is still low when compared to other countries in the Asia region. It can be seen that with the growing population and economy, the demand for electricity from each individual is increasing day by day. Thereby creating room for growth in the energy sector.
- The growth rate of electricity consumption per individual cools down in 2020 and 2021 due to the impact of the Covid-19 pandemic.

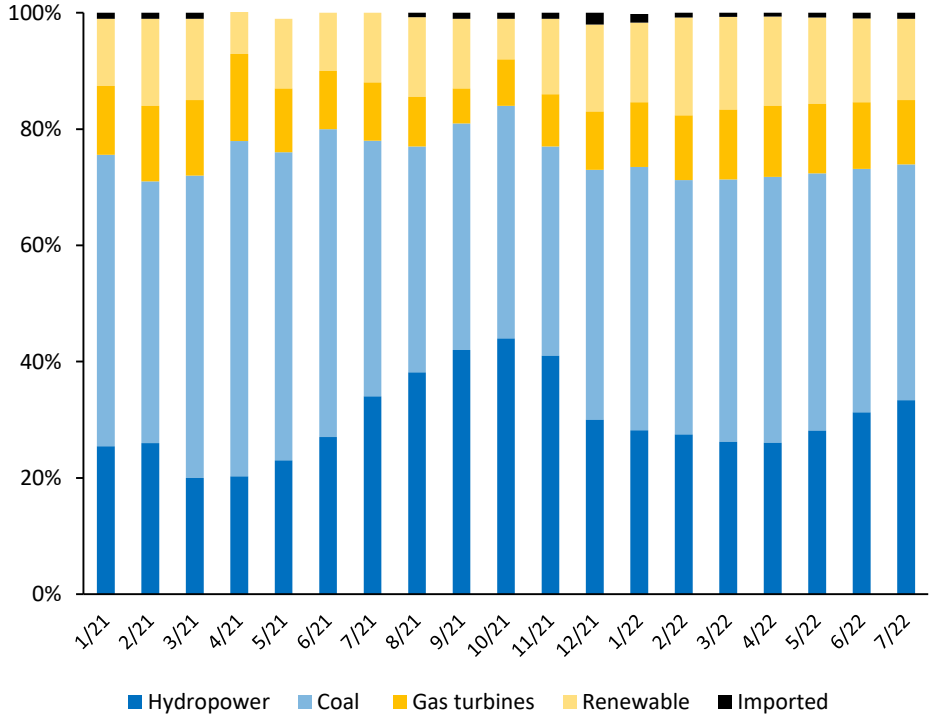
Installed capacity and mobilization rate of power sources

The capacity of all types of power sources in 2020 (%)



Source: EVN, Shinhan Securities Vietnam

The proportion of electricity mobilization from sources 1/2021 - 7/2022

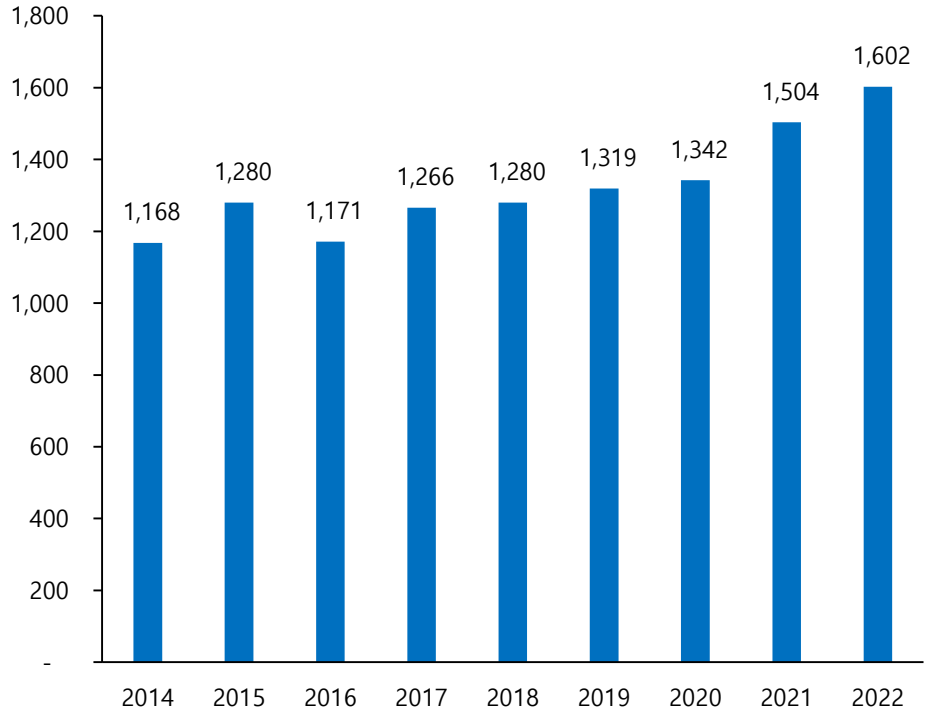


Source: EVN, Shinhan Securities Vietnam

- Based on the installed capacity of electricity in 2020, the capacity of power depends mainly on hydroelectricity, thermal power (Coal-fired and gas-fired), and renewable energy. In 2021 and 2022, due to the favorable hydrological situation, hydropower is prioritized for mobilization.
- In addition, the renewable energy group has been installed a lot, but its contribution to the overall system is still not commensurate. Especially, the performance of wind power projects still needs time to be tested.

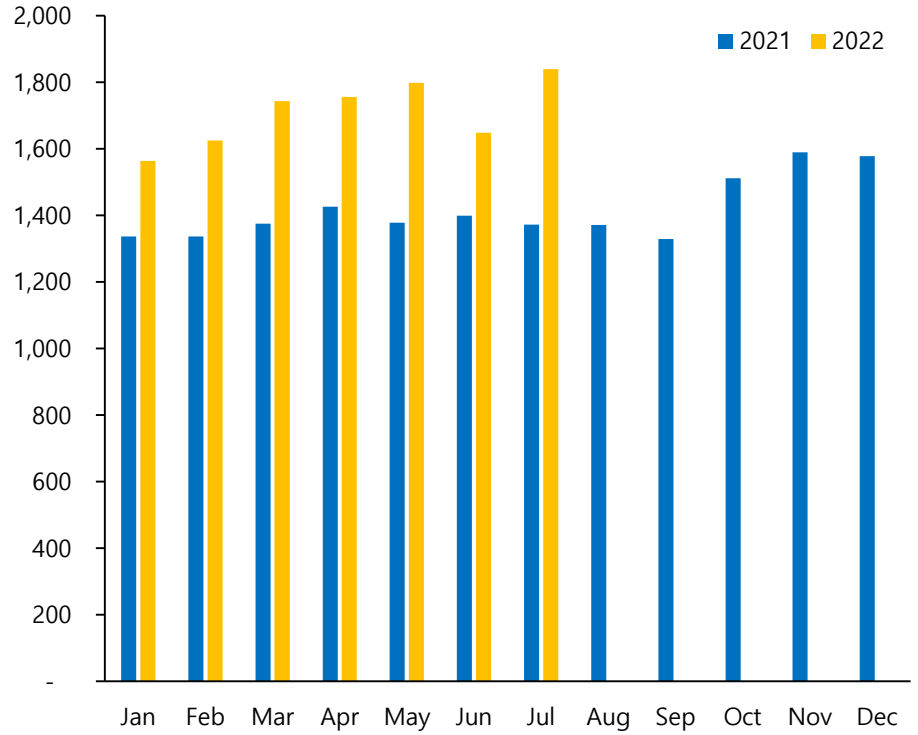
Electricity price in the market

The ceiling price of SMP[1] price in CGM[2] market (VND/Kwh)



Source: MOIT, Shinhan Securities Vietnam

Average selling price of electricity in CGM market (VND/Kwh)



Source: EVN, Shinhan Securities Vietnam

- The ceiling price of SMP from 2016 to 2022 has been increased stably by MOIT (CAGR = 5.3%) to match market economic conditions.
- In 2022, due to the high price of input materials of coal and gas power groups, the selling price in the competitive power generation market skyrocketed by about 30% YoY, contributing to helping the hydropower group of 1H2022 business results are extremely impressive.

[1] : System Marginal Price; [2] : Competitive Generation Market

Risks of the electricity industry

Risks:

- Power consumption recovers more slowly than anticipated.
- Input material prices (gas, coal...) continue to rise.
- Severe weather changes.
- Projects operating below capacity.
- Shortage of input materials.
- Hiking interest rates make interest expenses higher than expected.





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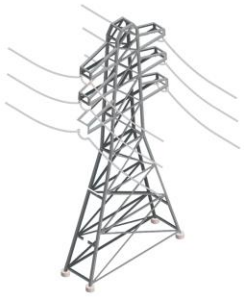




II. Value chain

Value chain of power industry in Vietnam






Material	Power Generation	Transmission	Distribution	End-user
• Coal: domestic (75%): NBC,TVD, TC6, THT, TDN, imported (25%)… • Natural gas: GAS (100% dry gas)	• Coal-fired: EVN, EVNGENCO, PPC, QTP, HND… • Gas-fired: EVNGENCO, EVN, POW, NT2 • Hydropower & Renewable: EVN, REE, HDG, PC1, GEG	• EVN monopoly	• EVN monopoly	• Residential • Industry

II. Value chain

Key players in power industry

Upstream — Power Generation

Power plants owners

- EVN: 17.15%
- Genco 1, Genco 2, Genco 3 (PGV): 25.44%
- Others: 57.41%:

Construction & Service

- **Plant construction:** SongDa Group (SJG), Lilama, Vinaconex, PC1 (renewable), TV2
- **Equipment suppliers:** imported equipment: Simen (Ger), General Electric (US)…
- **Transmission contruction:** Domestic players: PC1, VNE

Midstream — Transmission

Transmission network owners

EVN 100%

- NLDC — Load Dispatch Center
- NPT — Owning Transmission Network
- EPTC — Operating Electric Trading market

Construction & Service

- **Transmission construction:** PC1, VNE
- **Equipment suppliers:** Gelex transformer, Dong Anh Electrical Equipment,…

Downstream — Distribution

Distri bution network owners

EVN 100%

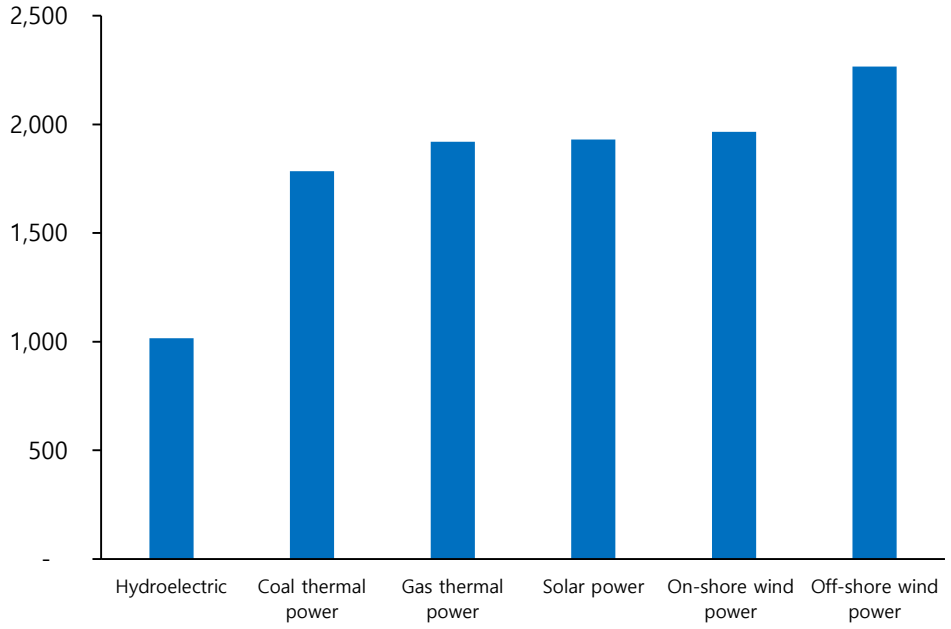
- Nothern Power Corp
- Central Power Corp
- Southern Power Corp
- HCM Power Corp
- Hanoi Power Corp

Construction & Service

- **Transmission network & transformer station construction:** PC1, VNE
- **Equipment suppliers:** Gelex Equibment Corp, Dong Anh Electrical Equipment

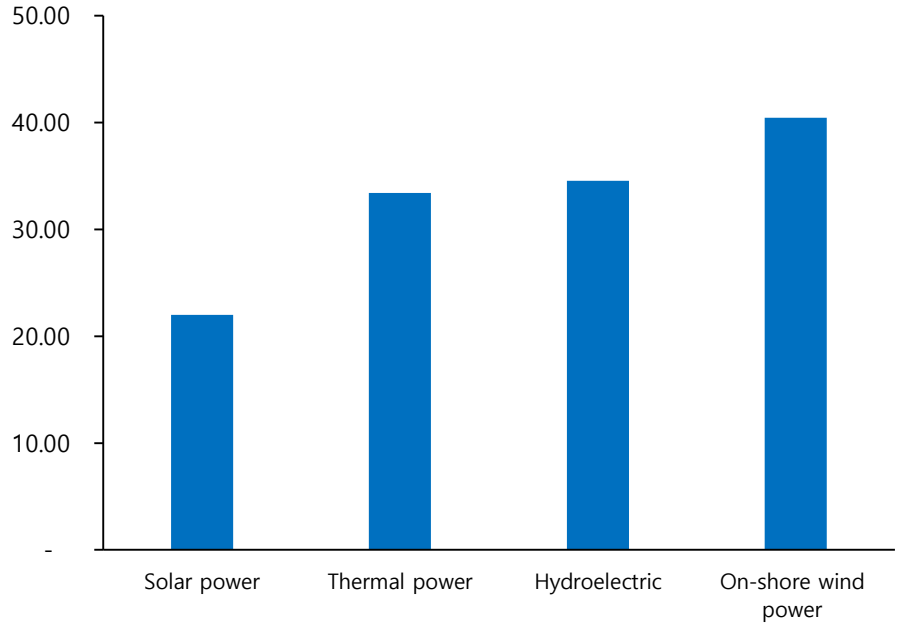
Revenues and characteristic of power plants

Average selling price of all types of electricity (VND/Kwh)



Source: Shinhan Securities Vietnam

Estimated total investment/MW of types of electricity (bn VND/MW)



Source: Shinhan Securities Vietnam

- Revenue of power plant = Qc*Pc + Qm*Pm
  - Qc: Volume of electricity sold according to PPA[3] price.
  - Pc: Selling price according to PPA, PPA based on Fixed Costs (including depreciation, interest expense, etc) adjusted IRR (from 10% to 12%), and Variable Costs of materials and transportation.
  - Pm: Selling price on CGM market (FMP[4] price), FMP price equals SMP price plus CAN[5] price
    - ❑ SMP price is affected by electricity supply and demand;
    - ❑ CAN price is calculated based on four thermal power plants operating nearby
  - Qm: Volume of electricity sold in the CGM.

[3] : Power Puchase Agreement; [4] : Full Market Price; [5] : Capital-add-on

Pros & Cons of different types of electricity in Vietnam

Thermal power — Gas-fired: POW, NT2; Coal-fired: QTP, NBP, BTP, PPC

- Pros: Stable operation, independent of the weather.
- Cons: High initial investment cost, higher carbon emissions than other types of electricity (especially coal), depending on the price of input materials.
- Characteristics: Priority is given to mobilization in the dry season (from November to April), especially in years affected by El Nino; small maintenance (about once every 3 years) and periodic factory overhaul (about once every 5 years) in the rainy months (September-October).
- According to draft power VIII, gas thermal power is prioritized by the government for development in the period 2022-2030 because carbon emissions are only half that of coal power and can be switched to using hybrid materials.

Hydropower — VSH, REE, SBH, TBC

- Pros: Stable operation, low COGS, environmentally friendly.
- Cons: Low PPA price, High initial investment cost, dependent on weather conditions, no potential for expansion in Vietnam, possible earthquake-related geological impact
- Characteristics: Priority is to be mobilized when in the rainy season (from April to November), especially in the years affected by La Nina; responsible for hydrological regulation of downstream areas.

Renewable power — HDG, GEG, PC1

- Pros: Environmentally friendly, great development potential, favorable selling price.
- Cons: The operation is not as stable as thermal and hydroelectricity, much depends on the weather.
- Characteristics: Prioritize mobilization in favorable weather season (high number of sunny hours or strong wind season), performance needs time to verify.

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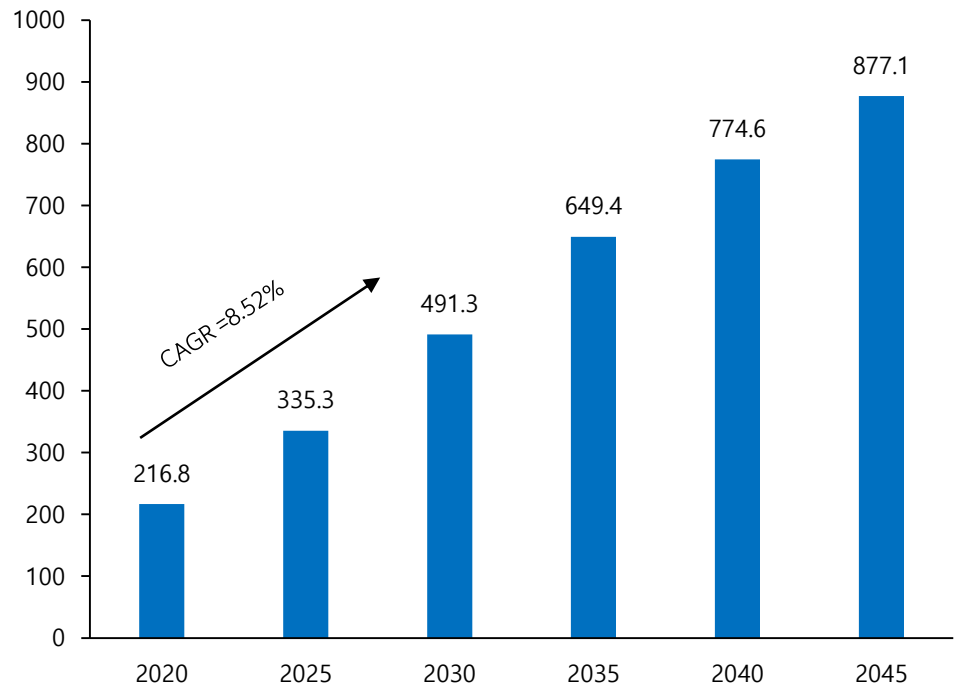
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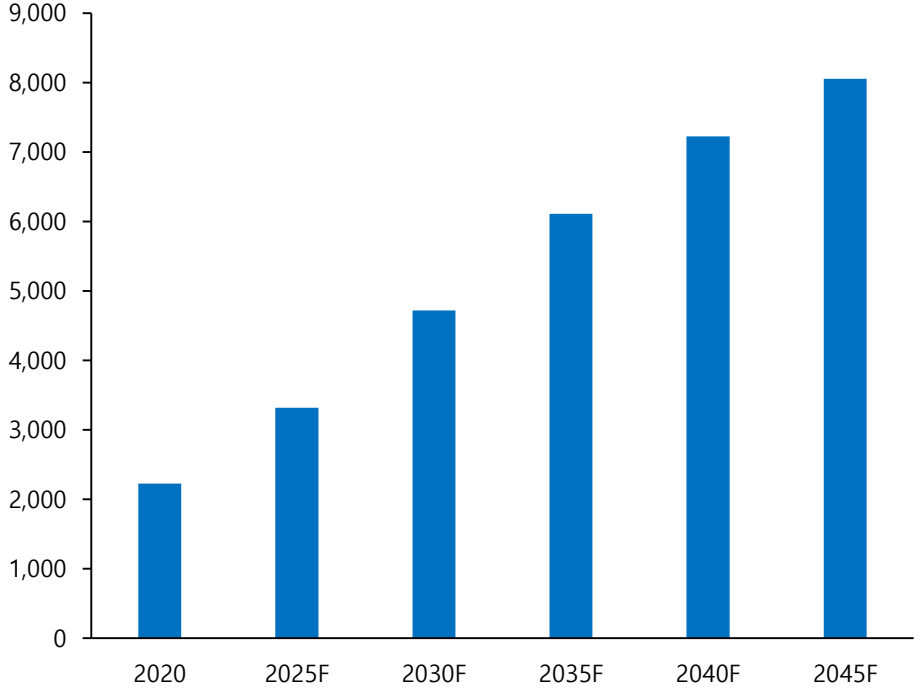
Forecast electricity consumption of Vietnam

Total national electricity consumption (billion Twh)



Source: Draft power VIII, Shinhan Securities Vietnam

Forecast of electricity consumption per capita of Vietnam (Kwh/person)

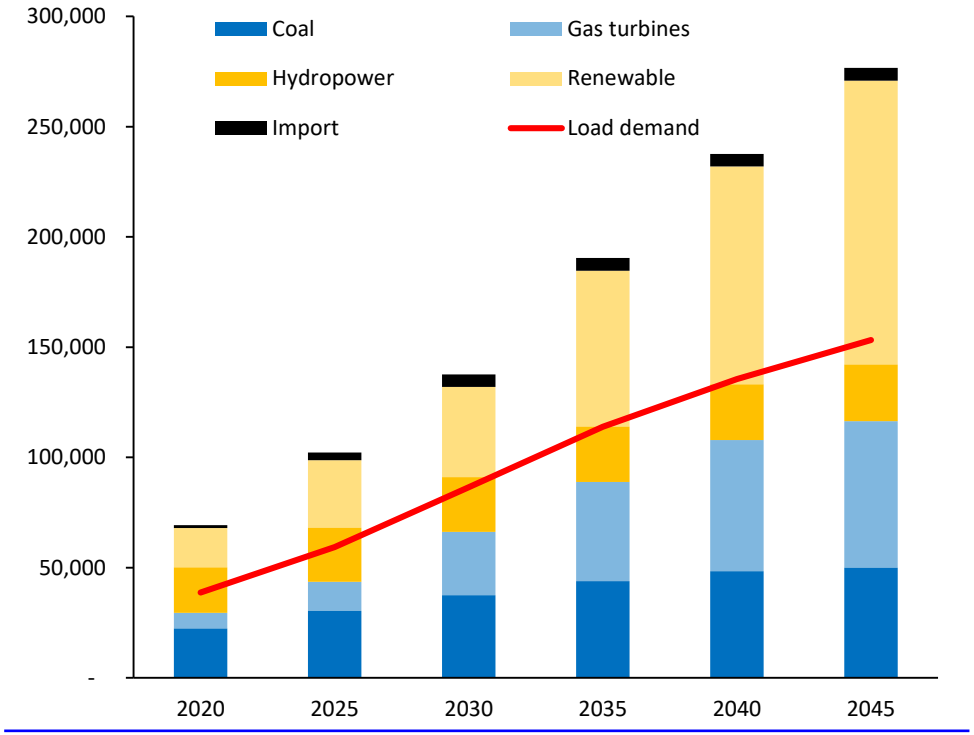


Source: Draft power VIII, Shinhan Securities Vietnam

- According to the electricity draft VIII, Vietnam's electricity demand is expected to grow at a CARG of 8.52% in the period 2020 – 2030. By 2045, the total national electricity consumption will be at 877.1 billion Kwh.
- Along with that, Vietnam's per capita consumption will increase to over 8,000 Kwh/person in 2045, approximately the same as Japan's in the current period.

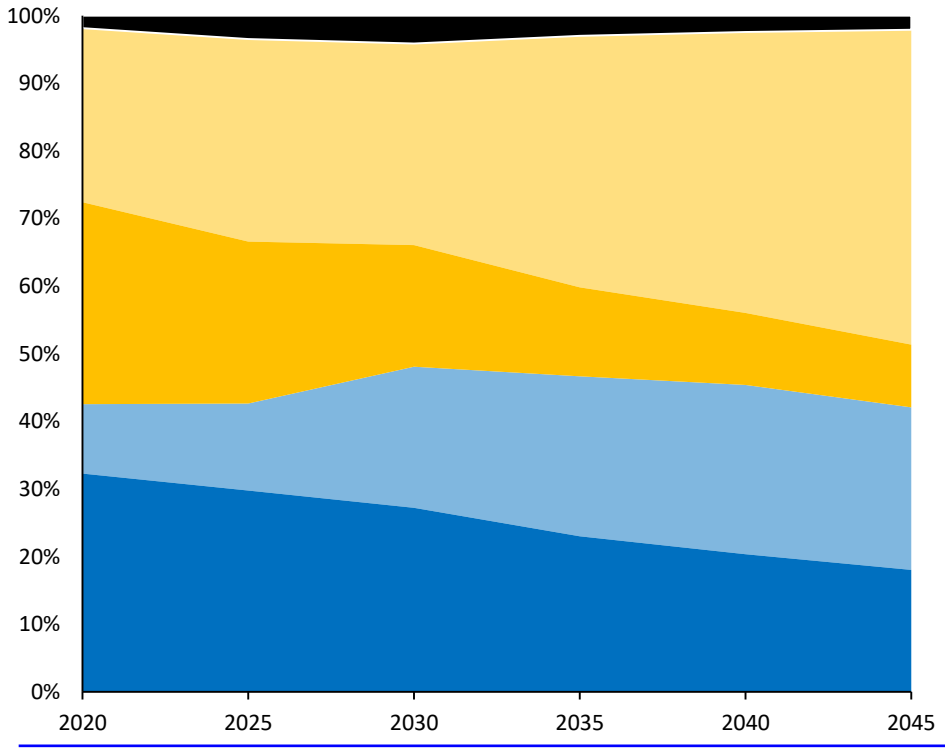
Plan to develop power sources in Vietnam

Capacity of power sources according to draft power VIII (MW)



Source: Draft power VIII, Shinhan Securities Vietnam

The capacity of power sources according to draft power VIII (%)



Source: Draft power VIII, Shinhan Securities Vietnam

- At COP26, Vietnam committed to net zero emissions by 2050. To gain that achievement, Draft power VIII promotes the capacity of more environmentally friendly power sources such as gas turbines and renewable energy. Specifically, in the period of 2020-2030, electricity from onshore and near-shore wind power and gas power using LNG will be promoted. After 2030, electricity from solar power will be prioritized for development.
- For hydropower and coal power, these two sources will not be prioritized for further development because 90% of the hydropower potential (over 30MW) has been exploited and coal power has a large carbon footprint, which is not in line with the orientation of government.

Promiment companies in the power industry

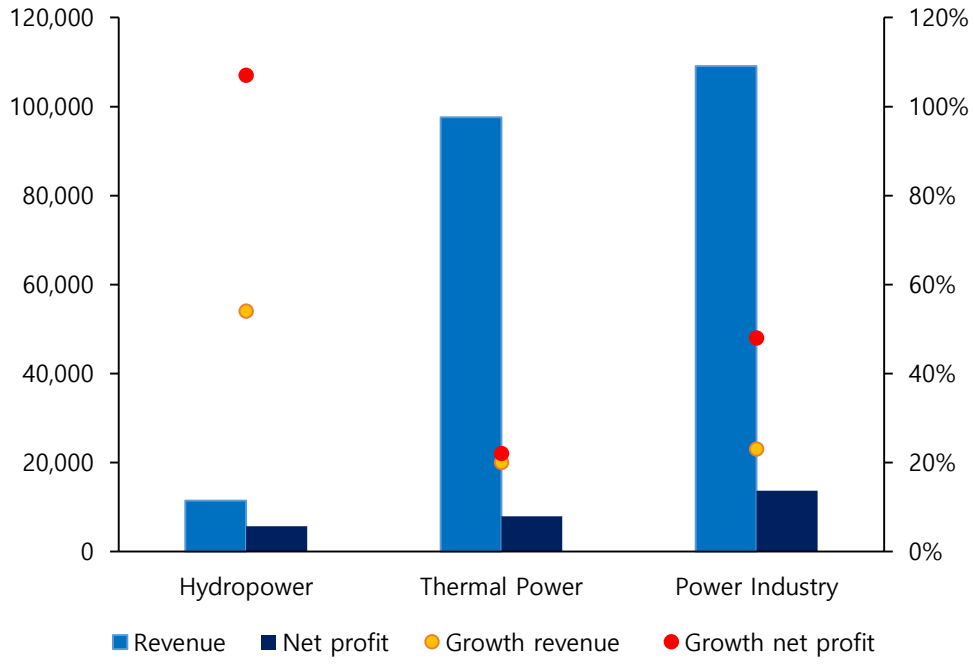
General info					Share price			Key financials**				Growth 3Q2022		Valuation 23F	
No	Ticker	Sub-sector	Capacity (MW)	Mkt Cap (VND bn)	CP (VND)	TP* (VND)	Upside (%)	GPM (%)	D/E (x)	ROA (%)	ROE (%)	Revenue (% YoY)	EPS (% YoY)	P/B (x)	P/E (x)
1	VSH	Hydropower	356	7,536	31,900	47,500	48.9	64.7	0.9	12.1	25.3	117.2	345.9	1.7	9.3
2	REE	Diversified	978	24,914	70,100	90,303	28.8	23.0	0.6	10.3	18.6	61	85.4	1.7	9.0
3	HDG	Renewable	444	7,081	28,950	65,600	126.6	64.7	1.0	10.8	21.4	2.1	14.6	1.3	5.0
4	POW	Gas-fired thermal	4,208	22,950	9,800	17,660	80.2	14.0	0.3	3.8	6.5	-1.9	-34.2	0.8	19.7
5	NT2	Gas-fired thermal	750	6,909	24,000	26,306	9.6	14.8	0.1	13.1	21.6	52.0	80.6	1.6	8.4
6	PC1	Renewable	343	5,030	18,600	38,163	105.2	18.2	1.7	1.6	5.1	-21.8	-56	1.0	12.3
7	GEG	Renewable	471	3,895	12,100	26,283	117.2	34.3	1.6	2.9	9.5	70.1	48.5	1.1	10.4
8	PPC	Coal-fired thermal	1,040	4,473	13,950	20,667	48.1	4.1	0.0	6.6	8.1	5.8	32.3	0.9	15.1
9	PGV	Diversified	6,559	21,402	19,050	40,800	114.2	12.0	2.4	3.3	13.3	23.0	-32.4	1.3	9.2
10	QTP	Coal-fired thermal	1,200	6,300	14,000	19,000	35.7	12.2	0.3	11.2	16.1	30.7	89.0	1.0	10.9

* Target price (fair value) for the next 12 months
** Data for 12 months up to Q3/2022

Source: SSV Research, Bloomberg
Data as of Nov 7, 2022

Business results in 3Q2022 of the power industry

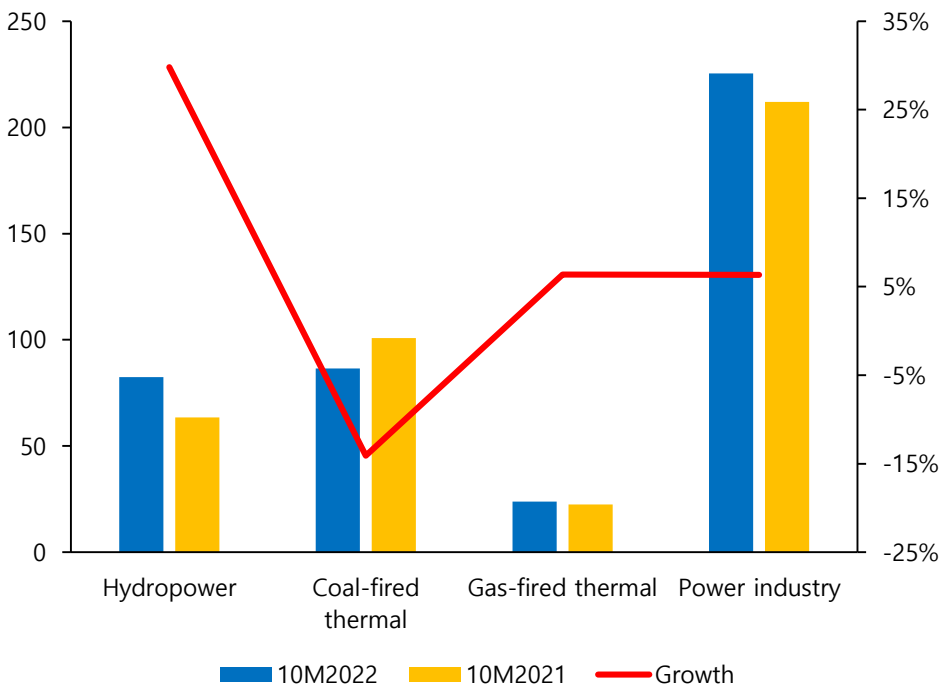
Revenue and profit of the electricity industry 9M2022 (VND billion)



Statistics of 38 companies listed on HSX, HNX, UPCOM (26 hydropower companies, 12 thermal power companies)

Source: fiinpro, Shinhan Securities Vietnam

Power output from power sources (kWh billion)

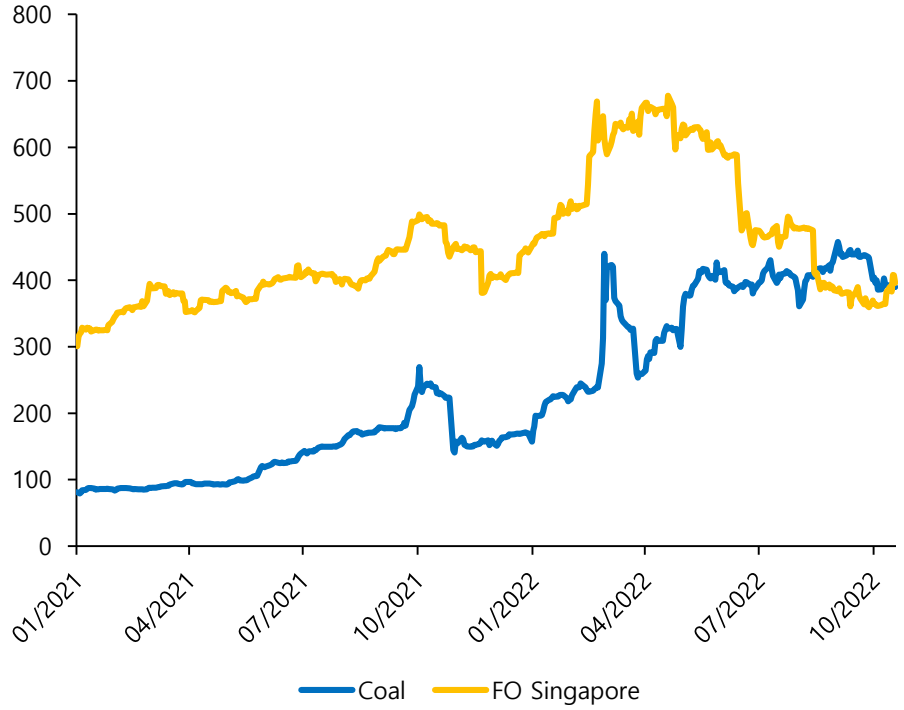


Source: EVN, Shinhan Securities Vietnam

- In 9M2022, the revenue and profit of the power industry grew by 23% YoY and 48% YoY, respectively. The hydropower segment recorded significant growth when profit increased by over 100% thanks to the high selling price and favorable weather, which led to a 30% YoY soared in output. Meanwhile, electricity output slumped by 14% due to the sharp increase in the cost of goods sold but the average price increase so the net income of the thermal power segment soared by 22%.
- In 2023, when the La Nina phenomenon is over, we expect that the thermal power segment will be mobilized back to the average level and the gas-fired thermal power segment will be given priority when it has less carbon footprint than coal power.

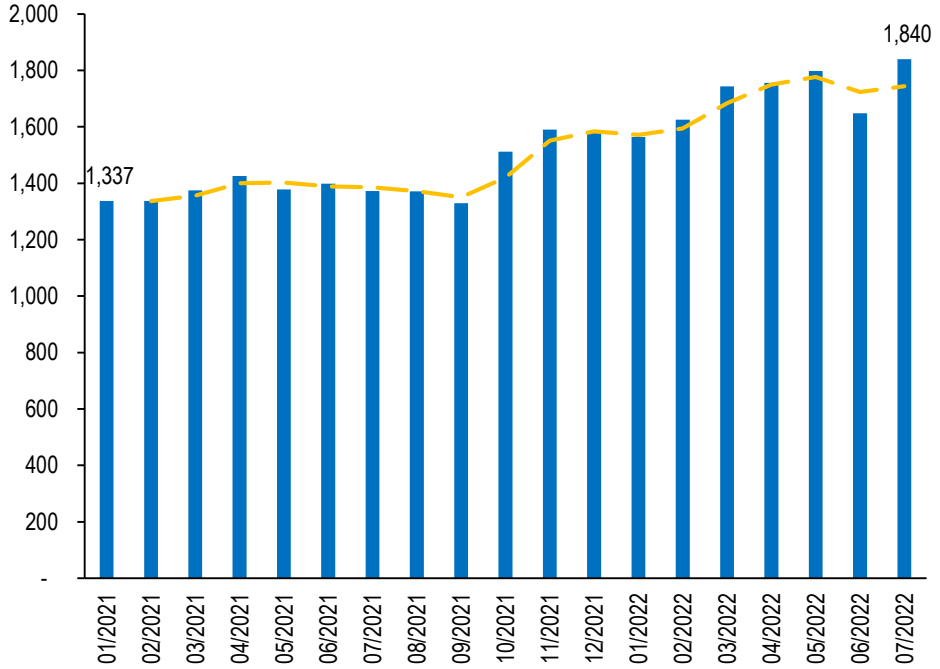
Performance of electricity prices and input materials prices

Newcastle coal price and Singapore FO oil price (USD)



Source: Bloomberg, Shinhan Securities Vietnam

Electricity selling price on CGM market (VND)



Source: EVN, Shinhan Securities Vietnam

- The price of coal and FO oil (used as a reference to calculate gas prices) has skyrocketed in the past two years. From 1/2021 to 10/2022, coal and FO oil prices have been 380% abd32% higher, respectively. This pulls up the cost of thermal power enterprises, causing the electricity selling price in the CGM market to soared by more than 37% in the period from 1/2021 to 7/2022.
- In 2023, EIA forecasts Brent oil price will be at USD 95/barrel, Fitch Solutions forecasts coal price will fluctuate in the range of USD 280-320/ton in 2022-2023. Therefore, we expect electricity prices in the CGM market to stay anchored in this price range.

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9M2022 – Stock pitch



Overview of NT2

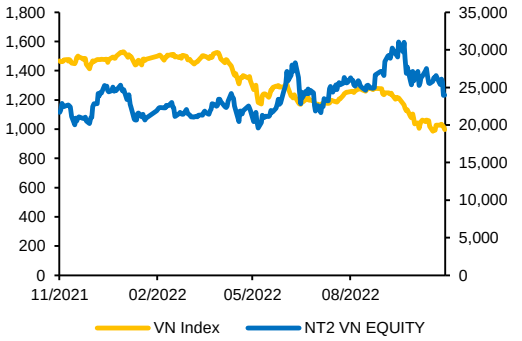
BUY

(Initiation Coverage)

Target price (12 months)	**VND 32,950**
Curren price (07/11/22)	VND 24,000
Return (%)	37.3%
VNINDEX	997
Market P/E (x)	9.6
Market Cap (bn VND)	6,909
Outstanding shares (mn)	288
Free-Floating (mn)	93
52-Wk High/Low (VND)	32,600/20,000
90-day avg. trading volume (mn)	1.7
90-day avg. turnover (bn VND)	46
Foreign ownership (%)	26.43

Shareholders (%)		
POW	59.37	
Others	40.73	

Performance	3M	6M	12M
Absolute (%)	-8.7	6.9	3.9
Relative to VNIndex(%)	11.7	31.9	35.4



PetroVietnam Power Nhon Trach 2 JSC (NT2 VN)

Investment thesis & Catalyst

- NT2 is one of the companies operating in gas-fired thermal power on a large scale and applying the latest efficient technologies in Vietnam. The power plant of NT2 is located in Nhon Trach, Dong Nai directly supplies energy to the southern key economic region with stable demand and growing solidly.

- One of the most prominent features of NT2 is its healthy financial health with an attractive dividend payout that the company maintains for many years. Besides, in 2021, NT2 has completed its obligations for long-term loans from the second quarter. As a result, the business results of NT2 are improved significantly when the interest burden is taken off. In the coming years, when the pressure of long-term debt is no longer, NT2 will actively pay cash dividends to support the parent company - POW to finance two big projects NT3 & NT4.

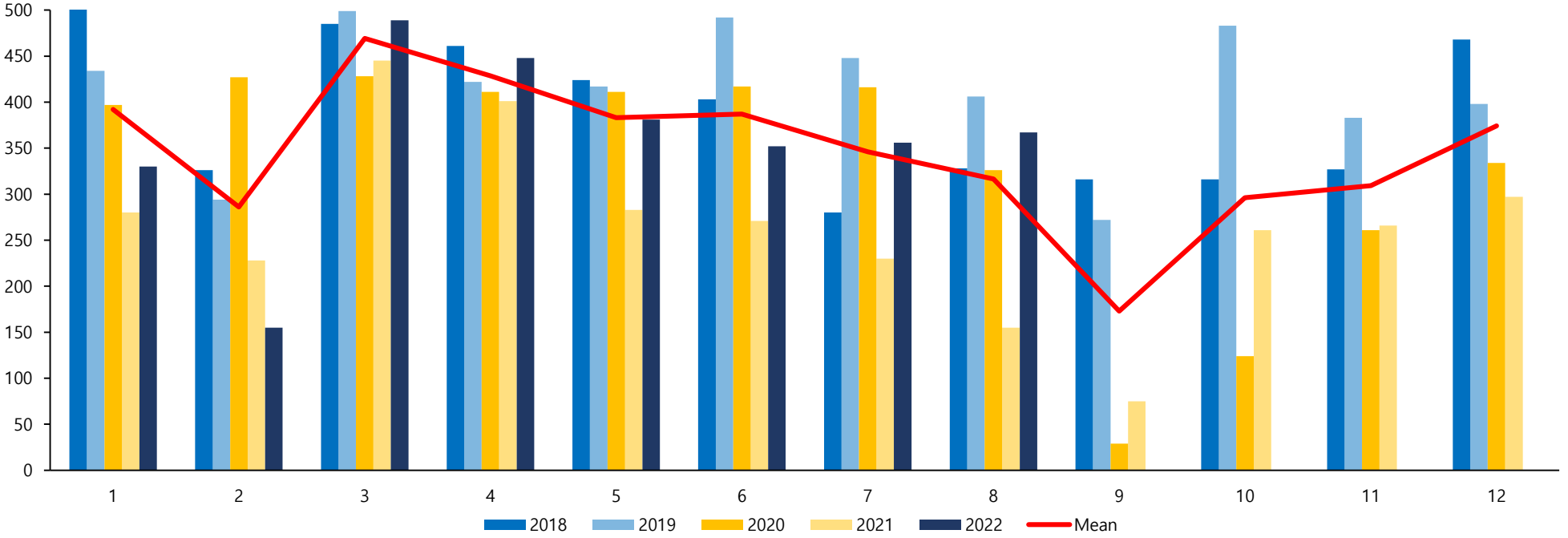
- In addition, NT2 is likely to be compensated by EVN for an exchange rate of about VND 200 billion shortly. It is expected that NT2 will account for this compensation at the end of 2022.

- Risks: (1) Risk of high anchor natural gas price; (2) Risk of prolonged La Nina phenomenon; (3) Output is fiercely competed by other forms of energy.

Year	2020	2021	2022F	2023F	2024F
Revenue (bnVND)	6,082	6,150	8,775	8,590	8,761
Operating profit (bnVND)	667	559	993	977	1,019
Net profit (bnVND)	625	534	933	918	958
EPS (VND)	2,095	1,778	3,241	3,189	3,328
BPS (VND)	14,928	14,707	14,630	16,061	16,725
OPM (%)	11%	9%	11%	11%	12%
NPM (%)	10%	9%	11%	11%	11%
ROE (%)	22%	19%	32%	32%	33%
PER (x)	11.7	14.8	7.1	7.2	6.9
PBR (x)	1.7	1.8	1.6	1.4	1.4
EV/EBITDA (x)	5.2	6.0	6.6	6.4	5.5

Invesment thesis & Catalysts

Electricity output by month of NT2 in the period of 2018-2022 (million Kwh)



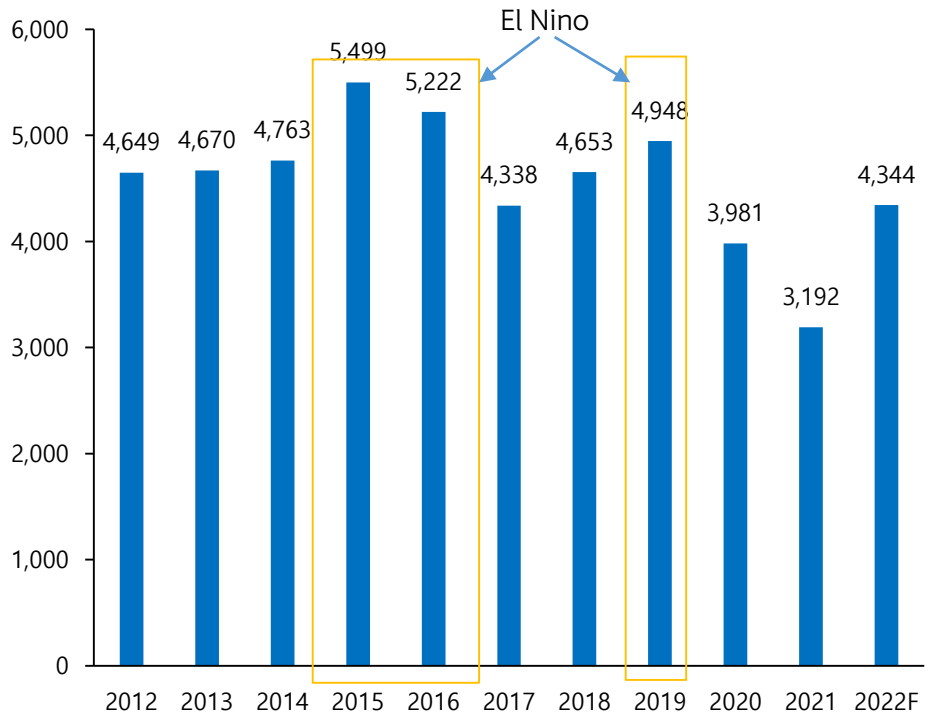
Source: Company data, Shinhan Securities Vietnam

Core business with strong growth potential

- Nhon Trach 2 is located in the Dong Nai area, about 20km from Ho Chi Minh City, closer than power plants in Vinh Tan and Duyen Hai, so NT2 directly supplies power to the Southeast region which has been severely affected in 3Q2021 when social distancing measures must be implemented to combat the Covid-19 pandemic. In 2H2022, NT2 is expected to grow on the low base of the previous year.
- However, the rainy season lasts from April to November when the mobilization rate of hydropower is highest, so NT2's business results in the second half of 2022 will not be as impressive as at the beginning of the year. However, with a vision to 2023 when La Nina is over and neutrality takes the lead, NT2 is expected to be mobilized with the highest possible output.

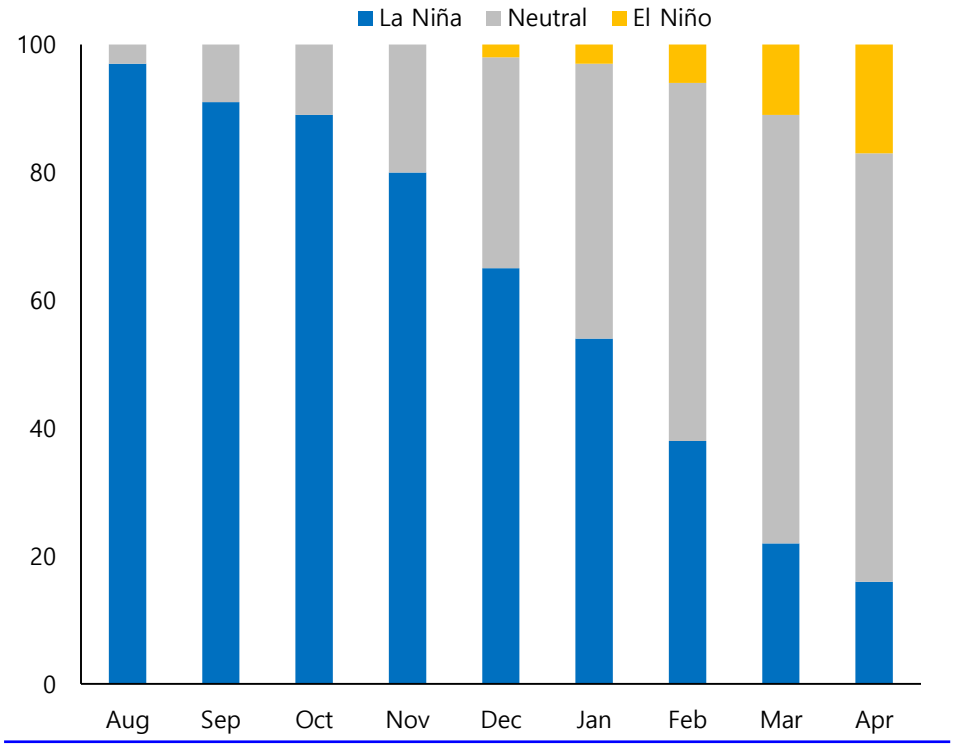
Invesment thesis & Catalysts

Commercial power output of NT2 (million Kwh)



Source: Company data, Shinhan Securities Vietnam

Probability of La Nina and El Nino from 8/2021 to 4/2022



Source: IRI, Shinhan Securities Vietnam

La Nina gradually passed

For gas-fired thermal enterprises, the years when El Nino become the master of the game, it has positively affected the business results. Because the water source at the reservoirs is low, the proportion of mobilization from hydropower enterprises goes down. Even so, in 2022 when La Nina is strong, NT2 still has positive business results thanks to the strong recovery of electricity demand. Thanks to that, Qc contract value in the second quarter increased sharply, equivalent to 2019 when El Nino took place.

Invesment thesis & Catalysts

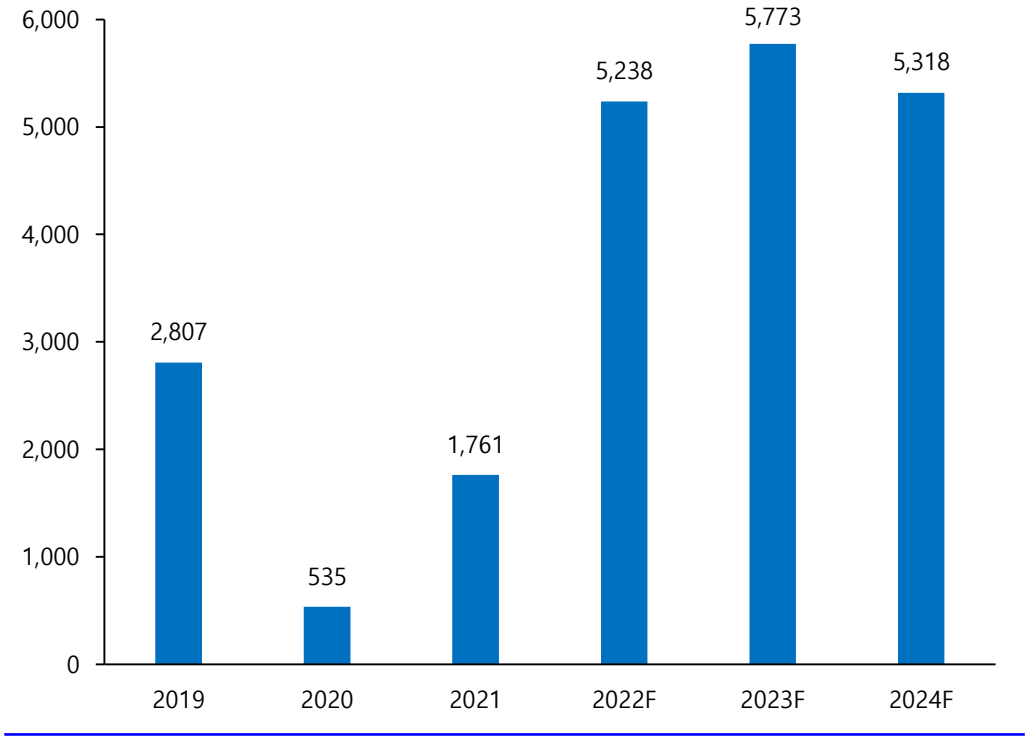
Cash dividend potential

After completing debt obligations, the abundant cash flow of NT2 is expected to be spent on cash dividend payments as the parent company – POW is currently in need of huge capital to conduct NT3 & NT4. We expect that the EPS of NT2 will soar to VND3,279 in 2022 and maintain this level in the following years.

Exchange rate compensation helps boost the profit of NT2

According to the Board of Directors of NT2, this company is expected to be compensated by EVN at the exchange rate of VND 200 billion in 2022 and VND 200 billion for the two years of 2023 and 2024.

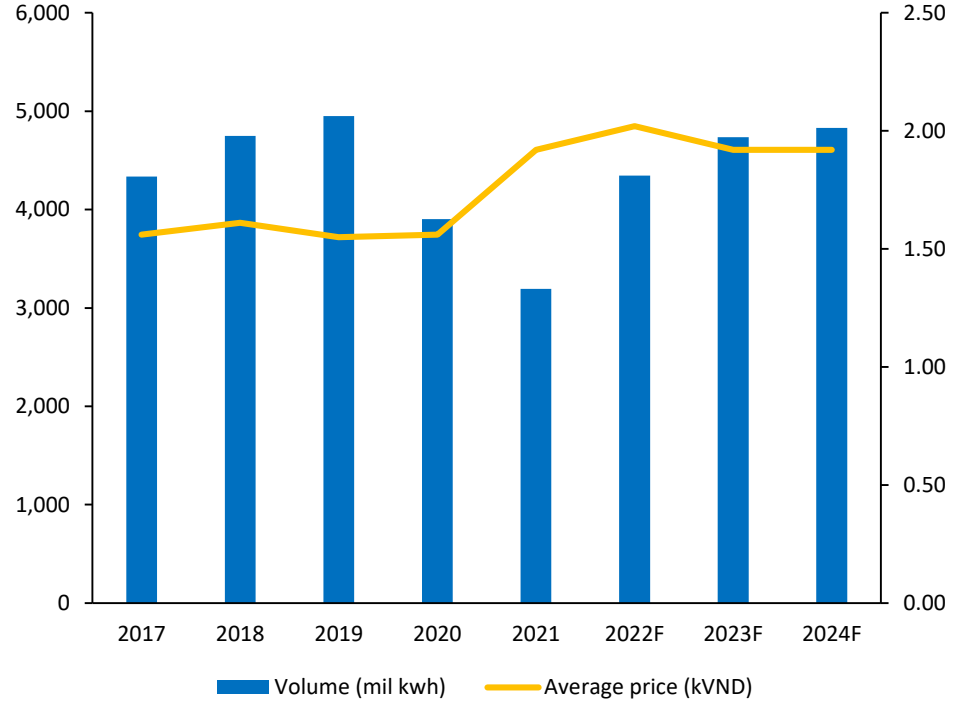
Forecast FCFE per share of NT2 (VND/share)



Source: Company data, Shinhan Securities Vietnam

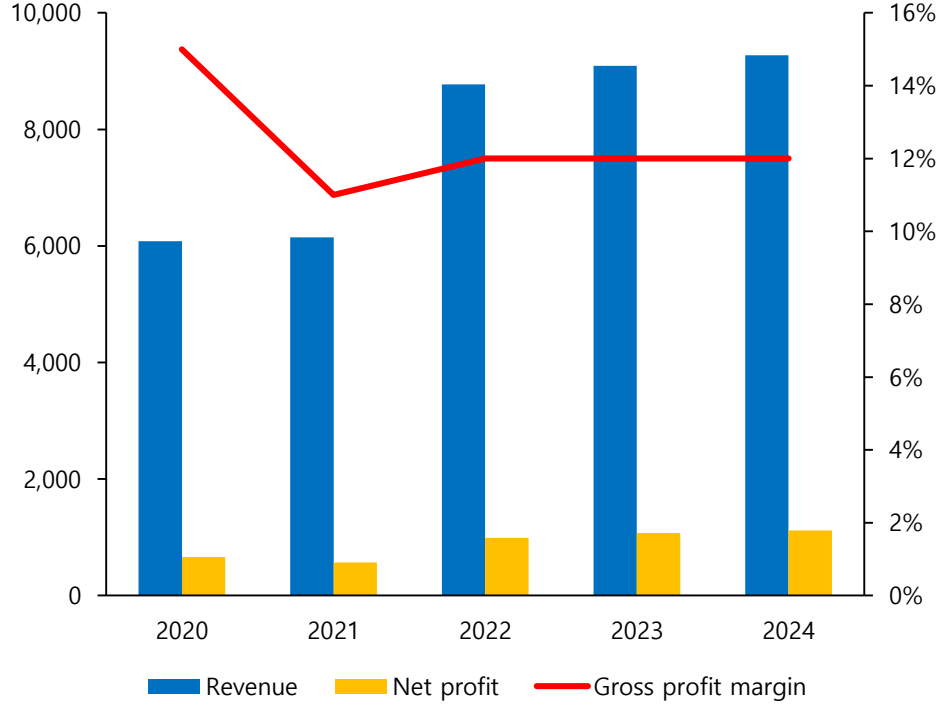
Forecast revenue & volume of NT2

Forecast volume and average selling price of NT2



Source: Company data, Shinhan Securities Vietnam

Forecast revenue & net profit and NPM of NT2



Source: Company data, Shinhan Securities Vietnam

- In 2022, the southern provinces will begin to return to normal production activities, pulling up electricity demand. We forecast NT2's power output will reach 4,344 million Kwh (+36% YoY). Along with that, with the sharp increase in the cost of electricity (coal, gas) in recent years, FMP prices have increased significantly, so we forecast the average selling price of NT2 to increase by 5% compared to 2021.
- Based on the above assumption, we forecast the revenue and net profit of NT2 in 2022 to reach VND 8,775 billion (+42% YoY) and 933 billion (+95% YoY), respectively, with EPS at VND 3,279 (+84% YoY), in 2023, revenue will drop slightly to VND 8,590 billion (-2% YoY) and EPS at VND 3,189 (-2% YoY).

Valuation

Combine valuation of NT2

Methods	Weight	Target Price (VND)
P/E	50%	30,109
FCFF	50%	35,807
Total	100%	**32,958**

Forecast FCF of NT2

Unit: bn VND	2022F	2023F	2024F	2025F	2026F
Net profit	933	1,008	1,050	1,603	1,668
Plus: After-tax interest expense	14	14	14	14	14
Plus: Depreciation & Amortization	712	733	755	217	224
Minus: Change in working capital	46	78	-6	-6	188
Minus: CapEx	140	155	155	0	45
Free Cash Flow (FCF)	1,326	1,233	1,219	1,214	987
Discount rate	0.90	0.81	0.73	0.66	0.59
PV of FCF	1,311	1,218	1,186	1,178	954
Growth rate	0%				
Present value of long-term value	4,532				
Enterprise value	10,379				
Debt	200				
Cash and cash equivalents	205				
Implied Equity Value	10,384				
Number of shares outstanding (billion units)	0.29				
Target price (VND)	**35,807**				

Source: Company data, Shinhan Securities Vietnam

Weighted Average Cost of Capital (WACC)

WACC (%)	**12.22%**
Risk-free rate (%)	5.00%
Equity risk premium (%)	7.80%
Beta	0.94
Debt cost (%)	7.00%
The cost of equity(%)	12.33%
Debt-to-equity ratio	0.02
Total debt (bn VND)	210

Source: Company data, Shinhan Securities Vietnam

Peer valuation

Ticker	PE	EV (mil USD)	Mkt Cap(mil USD)
NT2 VN EQUITY	8.38	314.42	314.63
POW VN EQUITY	15.76	1,220.66	1,044.38
PGV VM EQUITY	8.95	2,670.53	1,091.43
SPCG TB Equity	6.72	533.74	409.42
SUPER TB Equity	11.74	1,969.78	504.67
SSP TB Equity	9.12	565.32	347.37
579 HK Equity	4.36	8,141.33	1,627.92
Mean	9.29		
EPS forward	3241		
Target price	**30,109**		

Source: Company data, Shinhan Securities Vietnam

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