

Power Industry

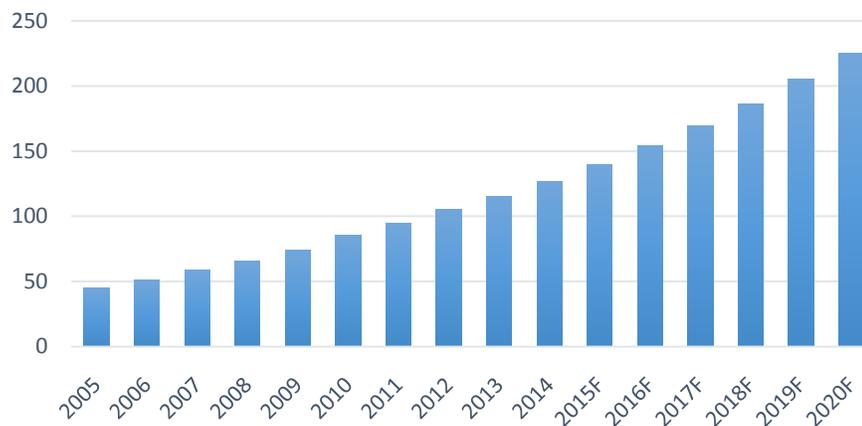
Industry updates



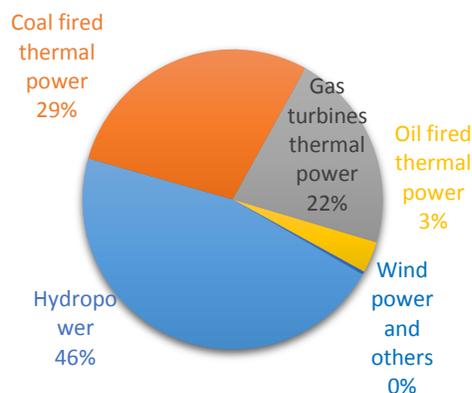
Energy demand:

With GDP annual growth over 5% and in the process of expanding global cooperation and trade so Vietnamese demand for energy is becoming urgent and the supply always overworks to satisfy growing demand day by day. The growth of Vietnamese electricity consumption is always over 9% and after 10 years from 2005 until now electricity consumption increased from 51.4bn KWh to nearly 140bn KWh. With the average growth rate in the recent years about 9% - 10% we can forecast the demand will reach 220bn KWh. In previous years the energy consumption of the South was always the highest among other regions but this year the energy consumption of the North dominated due to hot weather during several months as well as more heavy industrial zones were built in the North so the electricity demand of the North exceeded the Central and The South.

Electricity consumption (billion KWh)



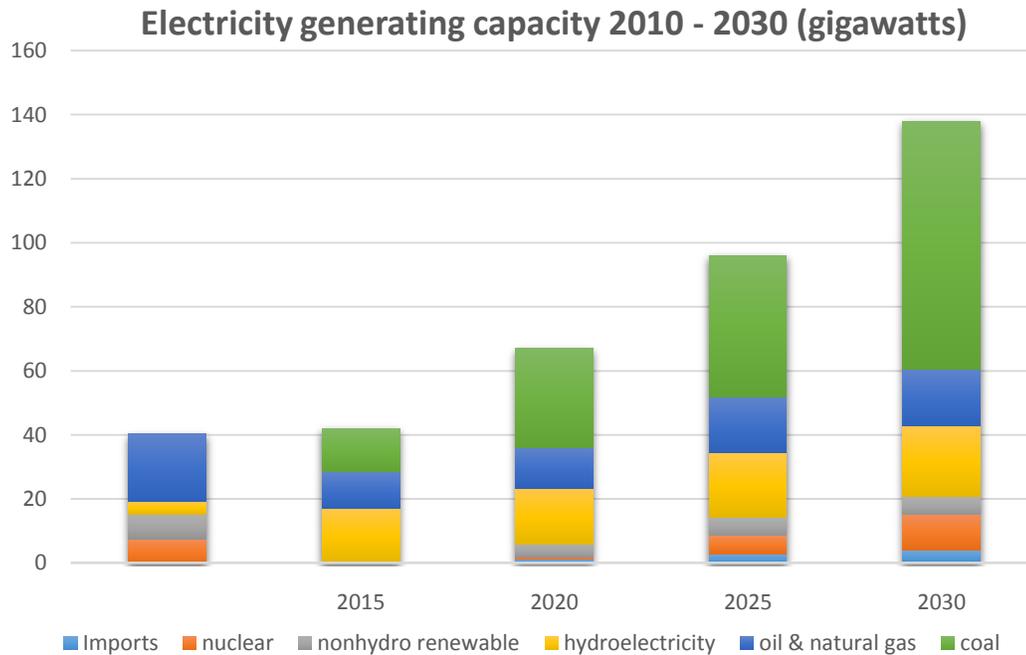
Structure of energy supply 2015



| Type of energy | Capacity (MW) | Ratio (%) |
|----------------------------|---------------|------------|
| Hydropower | 15,702 | 46.07 |
| Coal fired thermal power | 9,759 | 28.64 |
| Gas turbines thermal power | 7,354 | 21.58 |
| Oil fired thermal power | 1,154 | 3.39 |
| Wind power and others | 109 | 0.32 |
| Total | 34,078 | 100 |

Energy supply in the end of 2014, according to the designed capacity, is 34,058 MW. Vietnamese Energy Systems is ranked 3rd in Southeast Asia and 31st in the world. The power plants concentrate in the North with hydropower plants such as Hoa Binh, Son La with capacity 1,910 MW and 2,400MW respectively. In the Southern most energy plants are Gas power plants and others are small hydropower plants with capacity about 400 - 500MW. EVN is holding approximately 59.5% of total capacity and other companies are holding the rest 40%. Only a small amount of energy about 250 MW is purchased from China. Beside domestic demand, Vietnam also satisfies about 40% of Cambodia's demand (about 170 MW). Therefore, with the current supply of energy, Vietnam can ourselves satisfy almost domestic energy demand. The self-satisfaction of energy is very important for economic development and national security. With gas resources, coal availability, long coastline and location in lower section of Mekong river, Vietnam have good conditions to develop different types of energy generation including hydropower, thermal power, wind power ...

Main energy resources and future energy resources:



Hydropower: Vietnam is one among 14 countries in the world which have high potential to develop hydropower thanks to more than 2,300 small and big rivers spreading the whole length of our country. As this potential, Vietnam can generate about 26,000MW equivalent to 100bn kWh/year. Until 2014 Vietnamese hydropower has generated 13,689MW and provided about 40% of total domestic demand. The large hydropower plants such as Hoa Binh and Son La focus in the North while smaller plants located in the Central such as Sesan (360MW), Yaly (720MW) and Vinh Son Song Hinh (70MW). With large contribution to total energy supply, hydropower became the most important part of energy supply network and national energy security. However hydropower also brings negative impacts to environment such as blocking river flows and leading to the changes of natural ecosystems which can affect negatively on agricultural lands, forest land and create large greenhouse effects. The development of hydropower projects in the future will slow down and will reach the highest capacity about 17,000 MW in 2018 after most hydropower potential is used up. Therefore the leading role of hydropower will be limited and contribute only 15% - 20% in the future.

Coal fired thermal power: coal fired thermal power is the second largest contributor to energy supply with total capacity approximately 9,759 MW and if this segment cooperate with hydropower, they will supply nearly 90% of total domestic energy demand. With coal is main input, the coal fired thermal power have to associate with coal mining operation. Vietnam coal reserves concentrated in the North with the second largest reserves in Southeast Asia. Coal consumption is 19.1m tons in 2014 and in 2015 coal consumption is estimated about 23m-24m tons, increases 20% annually. The

demand for coal will continue rising this year and next year after the supply from hydropower is limited and affected by weather. Each year coal fired thermal power needs more about 5m-6m tons of coals so beside the supply from Vinacomin, Vietnam must import more coals from Indonesia and we expect until 2020 the demand for coal imports could reach 20m tons of coal annually.

At the moment the largest coal fired thermal power plants placed in Quang Ninh, where is near the source of main material. According to energy development strategy from now until 2030, coal fired thermal power will get the strongest growth and provide more than 55% of domestic energy demand from 36% of demand now with current capacity increases from 10,000 MW to nearly 80,000 MW. Some big coal fired thermal power plants now are Quang Ninh 1 and 2 (1,200 MW), Pha Lai 1 + 2 (1,040 MW), Hai Phong 1 and 2 (1,200 MW) and other plants have been being built in Vinh Tan 4 (1,200 MW), Duyen Hai 3 (1,200) ... Now the world coal prices is falling deeply because the world economy growth is slowing and enter the transition period from fossil energy to renewable energy. China is the leading country in coal imports but now also reduced import value to protect the environment. Vietnam decided to develop coal fired thermal power because the cost to generate energy is higher than only hydropower. The new coal fired thermal power plants which run lately usually cooperated with China and most of their equipments and machines are imported from China because Chinese equipments and machines are cheaper than the ones from European countries but their technology is out of date and not long lasting. However, the energy plants which run by equipments and machines from China may cause potential risk of serious environmental pollution in the future which many regions in China is facing but still can't find the best solution for this issue.

Gas turbine thermal power: Gas turbine thermal power is the second contributor in thermal power segment and it provides 7,337 MW in capacity, accounts for 21% of total energy supply. With advantages of a country which owns the fourth largest gas reserves in East Asia, follows China, Indonesia and Malaysia, the source of gas can satisfies domestic demand. The gas turbine power plants focus primarily on the South coastline where oil gas projects are exploited such as Phu My 2, 3 (1,400 MW), Ca Mau 1 and 2 (1,500 MW), Nhon Trach 1, 2 (1,200 MW). According to national plan, these plants will not develop as quickly as coal fired thermal power plants because high input costs and the disadvantages from gas exploitation activities based on cooperation with foreign organizations, especially large corporations such as Exxon Mobil and the companies from Russia.

Nuclear power: Vietnam has started the first steps to approach this technology many years ago and planned to build two nuclear power plants in Ninh Thuan by the cooperation with Russia and Japan in the future. Two nuclear power plants Ninh Thuan 1 and 2 have eight units with capacity of one unit from 1,000 to 1,200MW. The first plan is sponsored VND8bn by preferential loan from Russia and will be build in 2017 and operated in 2020. The development of nuclear power takes a lot of cost for construction, operation and personnel training so nuclear power aimed to contribute about 8% to total energy supply in 2030.

Wind power: This is one of green powers but its investment cost is nearly 80% higher than the

investment cost of hydropower if we calculate on per unit of capacity. The network of wind power has low capacity and the power supply area is quite small. The first network of wind power is being built offshore in Bac Lieu with the highest capacity about 80MW and expected to be completed in 2016. Beside wind power, another green power is solar energy. Some countries such as Korea want to invest and build a solar energy plant in Hue with capacity from 100MW -200MW and investment costs about USD200m and another solar energy plant in Ha Tinh with capacity 300W and investment cost about USD650m. The solar energy development plan requires a large area about 300ha - 500ha and high initial investment costs but this is considered as the cleanest and safest energy source.

Current electricity price in Vietnam:

Vietnam electricity prices have doubled from VND781/KWh in 2005 to VND1,622/KWh in March 2015. Compared with other countries in Southeast Asia and Asia, Vietnam electricity price is still so cheap with 7.2cents/KWh compared with 10-11cents/KWh in Thailand or India and even 16cents/KWh in Cambodia because some countries have to import electricity. However, comparing electricity price to average income per individual, electricity price in Vietnam is higher than most countries in Asia. Exchanged to USD, the average electricity price in 2005 is only 4.9cents/KWh but now it has increased more than 45%. High inflation during the last 10 years depreciated value of VND against USD (over 42%) so we can say that Vietnamese people have to suffer high electricity cost is due to high inflation. As government's plan, electricity prices could increase from 18% - 20% until 2020 to attract new investors. The sizable drain of electricity also impacts on electricity prices. Since 2010 until now, electricity drain decreased only slightly from 10% to 8.5% in 2014 and target for next year is lower to 7.7%. The increase of electricity prices in Vietnam are often faced many protests because the income of most Vietnamese people is still relatively low and the increase of electricity prices will affect many economic sectors. Especially FDI companies don't concern about electricity price but appreciate stable electricity transmission. Many FDI companies are willing to pay more 15% - 20% of electricity cost annually for stable electricity transmission. The industrial zones in the South are still suffering high risk from shortage of electricity because power plants in this region are still small and transmitting through the line 500KV. Several power projects in the Southern region are gas turbines thermal power and oil fired thermal power but they have been delayed for long time and will put pressure on power shortage in the next few years if they are not run soon.

| Electricity price | USD (cent)/KWh | Average GDP |
|-------------------|----------------|-------------|
| Myanmar | 3.6 | 1,200 |
| Laos | 7 | 1,660 |
| Viet Nam | 7.2 | 2,200 |
| Indonesia | 8.75 | 3,475 |
| China | 9.3 | 6,807 |
| Thailand | 10 | 5,779 |
| India | 10.5 | 1,500 |
| Malaysia | 11 | 10,538 |

| | | |
|-------------|------|--------|
| Cambodia | 16 | 1,007 |
| Japan | 22 | 38,633 |
| Philippines | 30.4 | 2,765 |

| | 2005 | 2015 |
|-----------------------|--------|--------|
| Energy price (VND) | 781 | 1,662 |
| Price in USD (cent) | 4.94 | 7.2 |
| GDP per person | 715 | 2,200 |
| USD/VND exchange rate | 15,800 | 22,500 |

To set up a competitive electricity market, the government has adjusted the project with 3 phases:

Phase 1: competitive electricity market, with experimental period from 2012 to 2015.

Phase 2: competitive electricity wholesale market - with experimental period from 2016 to 2021.

Phase 3: competitive electricity retail market - with experimental period from 2022.

After 3 years of experiment, competitive electricity market has got some significant strides despite EVN's monopoly policy has not changed much. The electricity purchase contract is usually signed at negotiated official bid price.

In 2016 phase 2- competitive electricity wholesale market- will be tested with many important changes so the monopoly of important purchaser-EVN- will be limited. The objects involved in electricity trading market will include:

- The companies who buy electricity at competitive prices - the companies who don't belong to EVN can participate and purchase electricity directly on the market then resale.
- EVN electricity trading company.
- The big electricity consumers who satisfy requirements and 5 parent power companies in the North, Central, South, Hanoi and HCM City belong to EVN.

According to this project, the electricity retail companies will buy directly on competitive electricity market then sell to customers instead of buying from EVN. The purchasers can also choose sellers who offer the best price instead of buying from EVN. Most purchasers are big customers from industrial zone, steel or cement factories...

The experiment steps will begin since 2016 and it can take three years to complete the necessary steps for companies and large customers to participate. Basically in the next few years the procedure to purchase electricity will not have major changes but the process of trading will be initially changed and more companies will be called for the involvement.

Performance of listing companies:

There are about 20 listing companies belongs to power industry, in which there are 13 electricity generation companies, the others are consultant, design or construction companies. The listing

companies only account for about 10% of total generating capacity of the whole industry with a total capacity over 3,000 MW as the summary table below.

| Code | Plant name | Type | Capacity (KW) | Exchange | Market price | Current outstanding shares | PE |
|------|----------------------------------|--------------|---------------|----------|--------------|----------------------------|-------|
| PPC | Pha Lai 1,2 | Coal fired | 1040 | HOSE | 18,300 | 318,154,614 | 5.85 |
| NT2 | Nhon Trach 2 | Gas turbines | 750 | HOSE | 27,300 | 273,919,843 | 7.02 |
| BTP | Ba Ria | Gas turbines | 389 | HOSE | 10,900 | 60,485,600 | 12.69 |
| CHP | A Luoi | Hydropower | 170 | HNX | 20,800 | 125,999,511 | 7.32 |
| TMP | Thac Mo | Hydropower | 150 | HOSE | 28,100 | 70,000,000 | 7.36 |
| VSH | Vinh Son, Song Hinh | Hydropower | 140 | HOSE | 17,100 | 206,241,246 | 6.89 |
| TBC | Thac Ba | Hydropower | 120 | HOSE | 25,500 | 63,500,000 | 12.66 |
| SHP | Da M'Bri, Da Dang 2, Da Siat | Hydropower | 114 | HOSE | 19,300 | 93,710,200 | 10.73 |
| SJD | Can Don, Ry Ninh, Na Loi, Ha Tay | Hydropower | 104 | HOSE | 25,700 | 45,999,150 | 6 |
| NBP | Ninh Binh | Coal fired | 100 | HNX | 15,000 | 12,865,500 | 6.81 |
| SBA | Krong Hnang, Khe Dien | Hydropower | 73 | HOSE | 9,400 | 60,288,331 | 16.42 |
| SEB | Eakrong | Hydropower | 28 | HNX | 49,000 | 20,000,000 | 10.98 |
| DRL | Dray Hlinh 2 | Hydropower | 16 | HOSE | 39,500 | 9,500,000 | 10.42 |

There are only 4 thermal power companies listing on the stock market but all of them are large cap companies which can attract the attention of investors. Daily trading activities also focus on some stocks such as PPC, NT2 and VSH with liquidity is over 100,000 shares per day.

According to business results of 9 months 2015, 13 listing electricity companies reached 4.3% in revenue growth while profit growth was 10%. There are 7 enterprises which got profit growth this year over the same period last year while other companies such as BTP, NBP and SBA suffered serious drop, over 65% in profit. BTP recorded profit VND77.8bn in 2Q2015 and VND48.1bn in 3Q2015 but the total profit in 2Q and 3Q still can't compensate for the loss VND122.8 billion in 1Q due to exchange rate losses. This year BTP profit target is quite modest with VND57.8bn but it is still difficult for NTP to complete this target in the last quarter because the profit after 9 months was only VND3.1bn. Another company, NBP only earned profit VND8.6bn after 9 months because produce costs increased due to the lack of high quality coal after serious disaster in Quang Ninh.

PPC reached VND6,045bn in revenue after 9 months, rose 7% while earned only VND441.5bn in profit, declined 11% (y-o-y). PPC's borrowings valued JPY23.2bn. Because exchange rate JPY/VND increased about 5%, PPC suffered an exchange rate loss about VND200bn. PPC associated with Hai Phong Thermal Power and Quang Ninh Thermal Power and both these 2 companies have loans in

USD so PPC will have to extract provision for exchange rate losses from loans of these associated companies.

NT2 electricity output reached 5,376m KWh after 9 months, equal to 90.36% yearly target. NT2 will pay cost of gas material in September 2015 as market price – equal to USD4,014/mBTU - 31.4% lower than previous gas price. NT2's estimated business results after in 9 months of 2015 is relatively positive with revenue reached VND5,021bn, increased 8.5% (y-o-y). Profit after tax reached VND691bn, increased 20% over 9M2014.

| Code | Revenue | | Revenue growth % | Net profit | | Profit growth % | EPS VND | P/E x | P/BV x |
|------|--------------|--------------|------------------|--------------|--------------|-----------------|---------|-------|--------|
| | 9M2014 VNDbn | 9M2015 VNDbn | | 9M2014 VNDbn | 9M2015 VNDbn | | | | |
| NBP | 747.88 | 525.37 | -29.8% | 25.25 | 8.66 | -65.7% | 2,216 | 6.8 | 0.85 |
| PPC | 5,642.33 | 6,045.57 | 7.1% | 495.96 | 441.54 | -11.0% | 3,113 | 5.9 | 1.02 |
| DRL | 44.26 | 41.99 | -5.1% | 23.91 | 25.44 | 6.4% | 3,742 | 10.4 | 3.09 |
| SEB | 68.38 | 140.87 | 106.0% | 26.71 | 46.44 | 73.9% | 4,462 | 11.0 | 3.95 |
| SJD | 316.23 | 305.53 | -3.4% | 146.33 | 155.65 | 6.4% | 4,265 | 6.0 | 1.15 |
| SBA | 139.48 | 99.02 | -29.0% | 41.94 | 10.69 | -74.5% | 566 | 16.4 | 0.88 |
| TBC | 233.98 | 192.37 | -17.8% | 109.03 | 92.89 | -14.8% | 2,014 | 12.7 | 1.83 |
| TMP | 489.36 | 492.00 | 0.5% | 146.42 | 183.80 | 25.5% | 3,942 | 7.4 | 1.97 |
| SHP | 419.73 | 417.43 | -0.5% | 162.32 | 115.21 | -29.0% | 1,789 | 10.7 | 1.51 |
| CHP | 280.20 | 432.08 | 54.2% | (2.71) | 149.00 | 5598.2% | 2,895 | 7.3 | 1.83 |
| VSH | 210.14 | 363.09 | 72.8% | 94.54 | 216.34 | 128.8% | 2,453 | 6.9 | 1.22 |
| BTP | 1,550.06 | 1,320.79 | -14.8% | 101.18 | 3.11 | -96.9% | 827 | 12.7 | 0.66 |
| NT2 | 4,625.75 | 5,021.14 | 8.5% | 575.25 | 691.52 | 20.2% | 3,831 | 7.0 | 1.61 |

Investment and Construction plan (2015 - 2020):

| No | Project | Location | Capacity (MW) | Operation Time |
|---|--------------------------|------------|---------------|----------------|
| I Power plant projects | | | | |
| 1 | Vinh Tan 2 TPP | Binh thuan | 2x622 | 2014 |
| 2 | Hai Phong 2 – unit 2 TPP | Hai Phong | 1x300 | 2014 |
| 3 | Song Bung 4 HPP | Quang nam | 2x78 | 2014 |
| II Under construction power plant projects | | | | |
| 1 | Lai chau HPP | Lai Chau | 3x400 | 2015 |
| 2 | Duyen hai 1 TPP | Tra Vinh | 2x622 | 2015 |
| 3 | O Mon 1 – unit 2 TPP | Can Tho | 1x330 | 2015 |
| 4 | Mong duong 1 TPP | Quang Ninh | 2x540 | 2015 |
| 5 | Huoi Quang HPP | Son La | 2x260 | 2015 |
| 6 | Duyen Hai 3 TPP | Tra Vinh | 2x622 | 2016 |
| 7 | Song Bung 2 HPP | Quang Nam | 2x50 | 2016 |

| | | | | |
|---------------------------------|---------------------------|------------|---------|-----------|
| 8 | Trung Son HPP | Thanh Hoa | 4x65 | 2016 |
| 9 | Thac Mo extension HPP | Binh Phuoc | 1x75 | 2017 |
| 10 | Thai Binh TPP | Thai Binh | 2x300 | 2017 |
| 11 | Duyen Hai 3 extension TPP | Tra Vinh | 1x660 | 2018 |
| 12 | Vinh Tan 4 TPP | Binh Thuan | 2x600 | 2018 |
| III New investment plans | | | | |
| 1 | Da Nhim extension HPP | Lam Dong | 2x 80 | 2018 |
| 2 | Vinh tan 4 tPP extension | Binh Thuan | 1x600 | 2019 |
| 3 | laly HPP extension | Gia Lai | 2x180 | 2020 |
| 4 | Omon 3 CCPP | Can Tho | 750 | 2020 |
| 5 | Omon 4 CCPP | Can Tho | 750 | 2020 |
| 6 | Bac Lieu TPP | Tra Vinh | 2x600 | 2026 |
| 7 | Bac Ai PSPP | Ninh Thuan | 4x300 | 2026 |
| 8 | Don Duong PSPP | Lam Dong | 4x300 | 2030 |
| 9 | Ninh Thuan 1 NPP | Ninh Thuan | 2x1.000 | 2020-2030 |
| 10 | Ninh Thuan 2 NPP | Ninh Thuan | 2x1.000 | 2020-2030 |

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Sacombank Securities Company - Head office

278 Nam Ky Khoi Nghia Street, District 3 Ho Chi Minh City Vietnam

Tel: +84 (8) 6268 6868 Fax: +84 (8) 6255 5957

www.sbsc.com.vn

RESEARCH CENTER

Tel: +84 (8) 6268 6868 (Ext: 8769)

Email: sbs.research@sbsc.com.vn

Ha Noi Branch

6th-7th Floor, 88 Ly Thuong Kiet Street

Hoan Kiem District

Hanoi

Vietnam

Tel: +84 (4) 3942 8076

Fax: +84 (8) 3942 8075

Email: hanoi@sbsc.com.vn

Sai Gon Branch

6th floor - 177-179-181 Nguyen Thai

Hoc, Pham Ngu Lao Ward, District 1,

Hochiminh city, Vietnam

Tel: (+848) 38 38 65 65

Fax: (+848) 38 38 64 16