

GENERAL OVERVIEW

Vietnam, with over 93.67 million¹ inhabitants in 2017, is the third largest ASEAN member state by population. The majority of Vietnam's population works in the agricultural sector. According to General Statistics Office of Vietnam, the industrial sector contributes around 40% to Vietnam's GDP with the total GDP of USD 223.8 billion¹. Since the late 1980s, the economy of Vietnam has been undergoing a reform – modernization and integration into the global economy. Hanoi is the capital and political centre of the country.

ENERGY SECTOR

ENERGY POLICIES

In the past two decades, Vietnam has experienced one of the world's most rapid economic growth. The GDP per capita has increased nearly 20 times, from USD 94.88 in 1990 to USD 2,343 in 2017. Therefore, energy economy of Vietnam has changed rapidly in the past few decades with the transformation from an agricultural based on traditional fuels, to a modern mixed energy economy. With the increasing energy demand and recent fluctuations in energy import and export, in order to fulfill their domestic demand, Vietnam has become a net energy importer since 2015.

The energy sector plays a significant role in promoting the economy development. Economic growth requires secure and affordable supply of energy to all of the society participants and economic sectors. At the same time, in order to be sustainable, the energy sector must be able to attract the capital required to expand infrastructure,

¹ ASEAN Secretariat. ASEAN Statistical Leaflet 2018

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securing the needed supply of energy sources in the long term, and reducing negative environmental impacts as well as controlling green-house gas emissions.

According to National energy development strategy within 2020-2050, that is developed by Ministry of Industry and Trade (MOIT) in 2007, the specific objectives are striving to ensure adequate energy supply to meet the demand for socio-economic, developing generation sources and power grid, developing oil refinery plants, ensuring the national strategic reserve of oil at 45 days of average consumption, completing the rural and mountainous electrification program, developing long-term environmental objectives and standards and strengthening international cooperation in the energy sector.

ENERGY MIX

Vietnam's energy demand is mainly covered by conventional fossil fuel (**Figure 1**). Nevertheless, the renewable energy contributes significant share of 23.73% with Biofuels & Waste as the main renewable source. Large population is residing in rural areas and majority of the workforce is working in the agricultural sector. Therefore, the utilization of biomass, especially by households, is very high. However, the use of biomass is merely limited to the generation of thermal energy for household purpose (e.g. cooking, heating, etc).

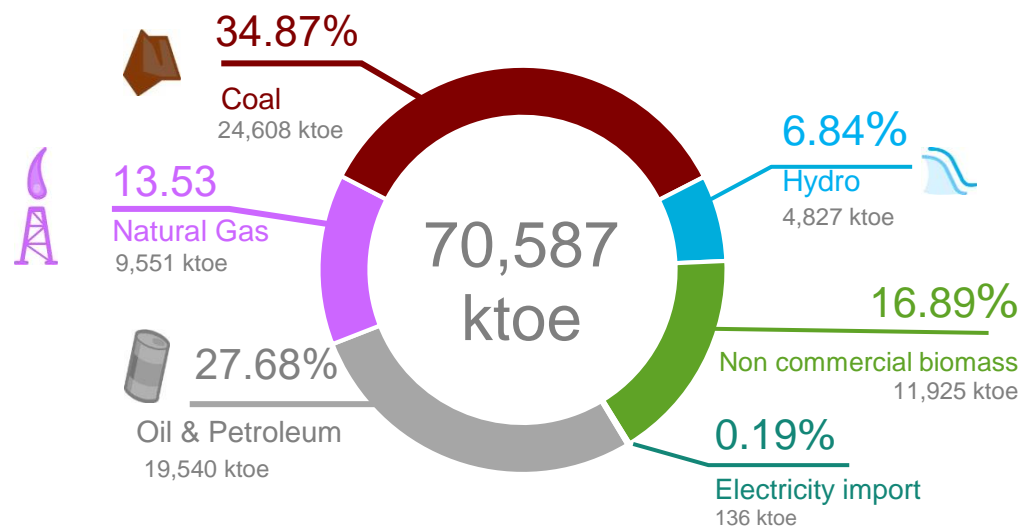


Figure 1: Vietnam Primary Energy Supply (2015)

Source: Institute of Energy. Vietnam Energy Statistics

The electricity generation in Vietnam is shown in **Figure 2**. Total electricity generated in 2016 was amounted to 176,990 GWh. Hydropower and coal with 36% share were the dominant source in electricity generation, with natural gas being the third largest (25%). Renewable sources (i.e. Biofuels and Wind) only contribute to an almost negligible share (0.10%) although it was mentioned in 2016 that Vietnam has 135 MW of wind energy capacity.

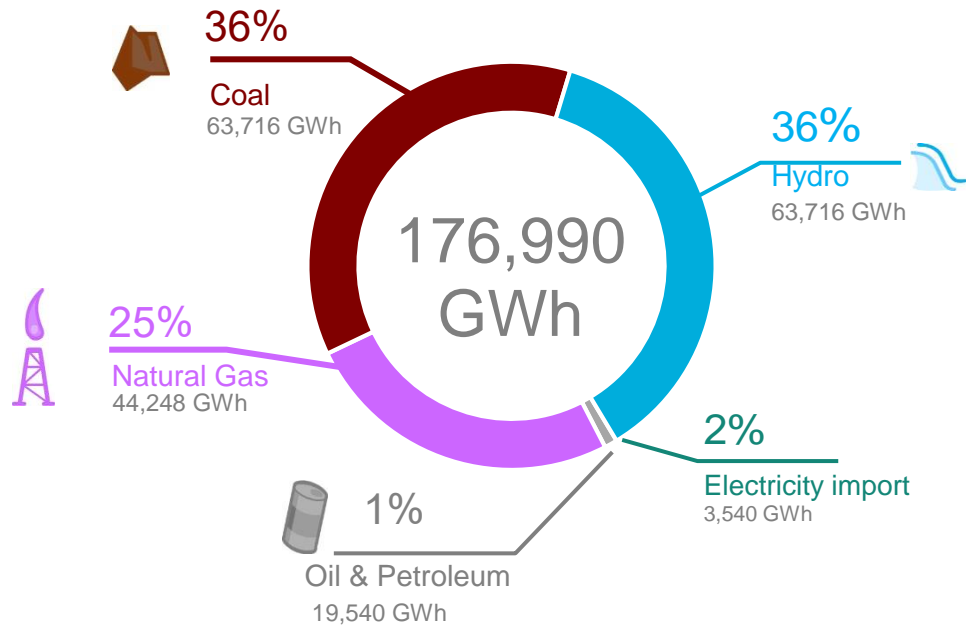


Figure 2: Vietnam Power Generation Share by Source (2016)

Source: Vietnam Electricity Annual Report 2017

ELECTRICITY TARIFF & ELECTRIFICATION RATE

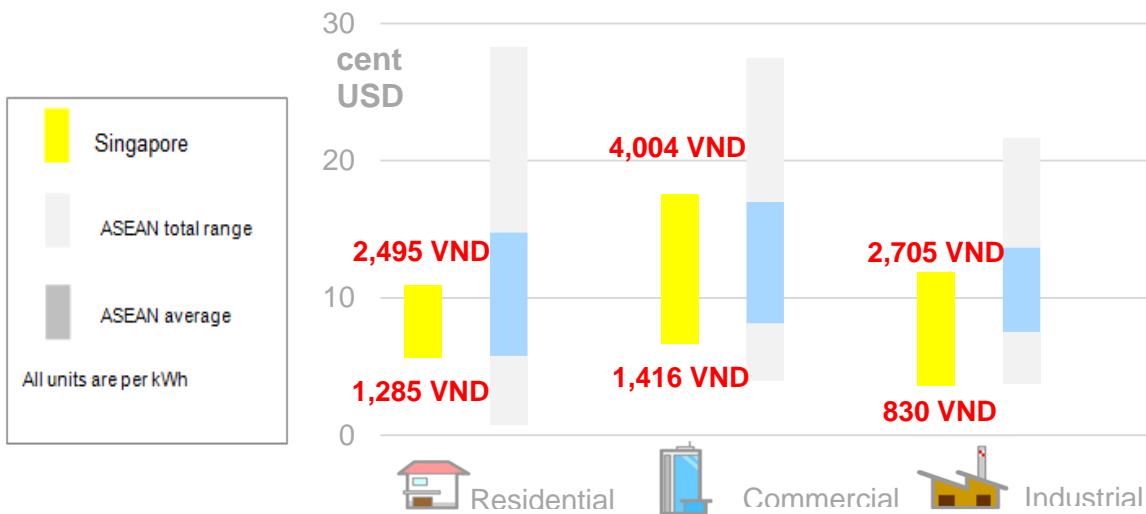


Figure 3: Electricity Tariff in Vietnam per 2017

Source: EVN website [Accessed: September 2018]

Note: Conversion rate from USD (US-Dollar) to VND (Vietnam-Dollar) is 23,232 (as of December 2018).

Vietnam applies a differentiated tariff system which denotes that the commercial sector pays the highest price for electricity. Across all sectors, the electricity tariffs in Vietnam are lower than the ASEAN average. However, the prices are expected to rise in the upcoming years. According to Vietnam Electricity in Annual Report 2017, the access to electricity in Vietnam is almost covered. Vietnam has already achieved the electrification rate of 99%

RENEWABLE ENERGY SECTOR

RENEWABLE ENERGY TARGETS

In 2000, Renewable Energy including biomass and hydro together contributed around 53% of the total primary energy supply (TPES). However, this share dropped to 24% in 2015. In the same period, the coal share grew from 15% to 35% of total supply. This trend is expected to continue far into the future as the domestic supply of hydro and biomass do not seem to be able to meet the increasing demand.

Vietnam has relatively ambitious targets for the development of renewable energy. These targets are described in the National Master plan for Power Development 2011-2020 or Power Master Plan VII, which includes the vision until 2030. The share of renewable energy in electricity generation is expected to grow from 3.5% in 2010 to 4.5% by 2020 and 6.0% by 2030 (see **Table 1**).

Table 1: Vietnam RE Targets for 2020 and Vision for 2030

	2020	2030	2050
RE use in production (MTOE)	37	62	138
%RE in TPES	31	32.3	44
%RE in Electricity generation	38 (101 TWh)	32 (186 TWh)	43 (452 TWh)
Hydro power (TWh)	90	96	
Pump Storage (MW)		2,400	8,000
Biomass for power (TOE)	1.8 (3%)	9 (6.3%)	20 (8.1%)
Biomass for heat (TOE)	13.6	16.8	23
Biomass for bio energy (TOE)	0.8	6.4	19.5
Wind power (TWh)	2.5 (1%)	16 (2.7%)	53 (5%)
Solar power (TWh)	1.4 (0.5%)	35.4 (6%)	210 (20%)

Source: National Master Plan for Power Development for 2011 – 2020 with the vision to 2050

Note: The target for 2020 consists of two parts: normal hydropower (17,400 MW) and energy storage hydropower (1,800 MW). In 2030, the target for hydropower storage is 5,700 MW and there is no specific target for normal hydropower. It is assumed that normal hydropower capacity remains the same as of 2020.

In Vietnam, large hydropower with installed capacity more than 30 MW is not considered a renewable energy source.

INSTALLED CAPACITY OF RENEWABLE ENERGY

At present, the total renewable energy installed capacity is around 2,418 MW in 2016. Hydropower is the dominant source which contributes to 94.42% of total installed capacity of renewable sources (see **Figure 4**). Wind power make up the remaining share. Only small hydropower plants with capacity of less than 30 MW are considered to be renewable energy source in Vietnam.

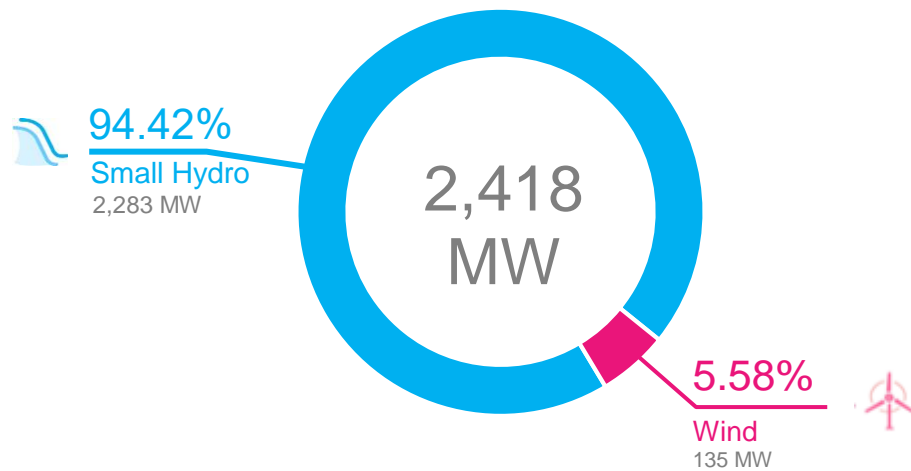


Figure 4: RE Installed Capacity (2016)

Source: Vietnam Electricity Annual Report 2017

RENEWABLE ENERGY GENERATION

The total renewable energy generation is nearly 66 TWh in 2016. Hydropower is the only dependable renewable source in Vietnam. The potential of hydropower is estimated at 64 TWh per annum. In case this resource was almost fully utilised, the total electricity consumption in the country could be covered. Vietnam is also rich in biomass resources such as rice husks, paddy straw, etc., which could also be used for electricity generation.

At the moment, the electricity generated by renewable energy sources comes almost exclusively from hydropower. Wind power and biomass also generate some electricity, but the numbers are almost negligible compared to hydropower (see **Figure 5**).

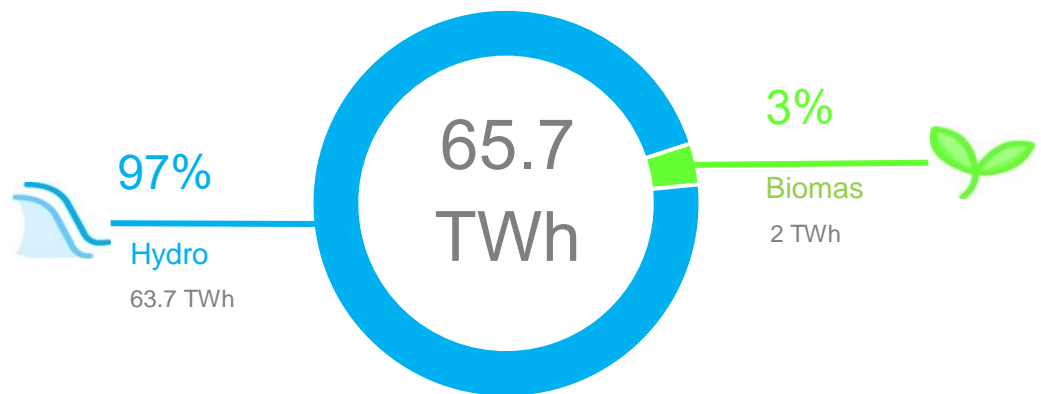


Figure 5: RE Generation (2016)

Source: Institute of Energy. Vietnam Energy Statistics

Note: Hydropower indicated in Figure 6 represents the small hydropower (less than 30MW) as well as large hydropower (with capacity equal to or more than 30MW). Although the Ministry of Industry and Trade Vietnam does not consider large hydropower (specifically for installed capacity above 30 MW) as a renewable energy source, the available energy generation data does not distinguish between small and large hydropower.

RENEWABLE ENERGY MARKET

According to the Vietnam energy outlook 2017 published by Ministry of Industry and Trade, the summary of existing supporting mechanisms for renewable energies or renewable energy feed in tariff is shown as in **Table 2** below:

Table 2: Vietnam RE Feed in Tariff in 2017

Source: Vietnam Energy Outlook 2017

Generation Source	Technology	Tariff	Electricity Sale Price
Small Hydro Power	Electricity Production	Avoided Cost tariff published annually	598-663 VND/kWh (by time, region, season) 302-320 VND/kWh (surplus energy vs contracted) 2,158 VND/kWh (capacity price)
Wind Power	Electricity Production	FiT for 20 years	8.5 USc/kWh (on land) 9.8 USc/kWh (off-shore)
Biomass	Co-generation	FiT for 20 years	5.8 USc/kWh
	Electricity Production	FiT for 20 years	7.5551 USc/kWh (North) 7.3458 USc/kWh (Central) 7.4846 USc/kWh (South)

Municipal Solid Waste (MSW)	Incineration	FiT for 20 years	10.5 USc/kWh
	Landfill for gas production	FiT for 20 years	7.28 USc/kWh
Solar Power	Grid-connected generation (Solar farm and rooftop)	FiT for 20 years	9.35 USc/kWh

The wind energy sector is expected to develop progressively in the coming years. There is an on-going 6 MW wind farm project on Phu Quy Island in Binh Thuan province. In 2012, the installation of 10 wind turbines with a total capacity of 16 MW was completed in Bac Lieu province. The process of grid connection is under way. In total, 62 wind turbines are going to be installed in the first phase of this project with total installed capacity of 99.2 MW. Another 52 turbines are planned for the second phase.

The government has launched a roadmap for electricity market liberalization. This will offer opportunities for individuals or businesses to establish energy retailing enterprises. However, this roadmap is a long-term process and a fully competitive retail market cannot be expected in the near future.

The subsidy for renewable energy development is necessary to attract investments. However, since the subsidy price for electricity (excluding small hydro) is higher than the average price offered by the EVN on the electricity market, it is necessary to consider the option for setting up a fund to support renewable energy development.

The National Energy Development Strategies for Vietnam up to 2020 with an outlook until 2050 states that the Government of Vietnam considers to establish an Energy Development Fund to support the development of renewable energy project. Under this fund, the developers of renewable energy-based power project have access to investment credits from the state which provides loans at favourable interest rate.

The Vietnam Renewable Energy Development Strategy up to 2030 with an outlook to 2050 states that the Sustainable Energy Promotion Fund shall be established to support renewable energy development. The fund will be provided by the state budget, revenue from the environmental fees levied on fossil fuels, various source of funds, and contributions from domestic and foreign organisations. This fund will provide the financial support to compensate the costs incurred by the power utilities on the investment and construction cost for power system using renewable energy power sources. This fund also supports the studies as well as the R&D of renewable energy project and construction of renewable energy projects in rural areas.

ENERGY EFFICIENCY AND CONSERVATION (EE&C) SECTOR

EE&C TARGET

The Vietnam National Target Program on EE&C in the period 2012 to 2015 (VNEEP 2) was approved by the Government under the Decision No.1427/QĐ-TTg dated 2 October 2012. Vietnam's energy efficiency and conservation target is to:

- reduce total final energy consumption (TFEC) by 8% as compared to BAU and to reduce Energy Intensity of Energy Intensive Industries by 10% by the year 2020.
- reduce GHG emissions by 8% by 2030 compared to BAU; and up to 25% with international support.
- reduce GHG intensity per GDP unit by 20% by 2030 from 2010 levels.
- increase commercial electricity savings to more than 10% of total power consumption by 2020 relative to BAU.

Vietnam is one of the most energy intensive countries in ASEAN in which Industrial growth has been one of the key drivers of Vietnam's increasing energy intensity, accounting for 48% or almost half of the final energy use. Subsequently, Vietnam Government has its best efforts on energy efficiency such as Vietnam Energy Efficiency for Industrial Enterprises Project, issued a series of decrees such as Decision No. 79/QĐ/2006/QĐ-TTg (dated April 14, 2006) and Decision No. 1427/QĐ-TTg (dated October 02, 2012) in order to promote energy efficiency and conservation.

EE&C POLICY

The Ministry of Industry and Trade in 2005 has released the Vietnam National Energy Efficiency Programme (VNEEP) for the period 2006–2015. This Programme institute measures for improving energy efficiency and conservation in Vietnam, involving a wide range of stakeholders across all sectors of the Vietnamese economy. VNEEP aims to was to encourage, promote and disseminate energy efficiency and conservation management in the public sector, and to include energy efficiency and conservation measures in science and technology research activities. There are four projects initiated under VNEEP, one of which is specifically on energy efficiency and conservation in Buildings. The new phase of the programme that will run from 2019 until 2030 targeting reduction in 10 % of Energy Consumption is being revised, the programme is due to be approved in the year 2019.

The Law on Economical and Efficient Use of Energy (No. 50/2010/QH12) covers all areas of the economy, specifically on the industrial sector, the transportation sector, the agricultural sector, the service and domestic sectors, and all state-funded investment projects and agencies.

The National Targeted Program on Energy Efficiency and Conservation 2012-2015 focus on the area of industrial manufacturing, large energy consuming buildings, household, high performance equipment among others. The program has projects on creating energy efficiency and conservation awareness, extensive use of high-performance energy-saving equipment and implementation of mandatory management in compliance with Vietnamese Construction Standard.

The Vietnam Power Development Plan VII sets realistic targets for EE savings “above 10% of total electricity consumption” relative to Business-As-Usual (BAU) conditions, by 2020. The Plan, together with the Vietnam National EE Program, identifies significant savings in the industrial, residential and commercial sectors, as well as significant improvements in EE indicators (energy intensity and energy elasticity), resulting from advances in technical standards and high-performance equipment in energy-intensive industries.

EE&C ACTIVITIES AND INVESTMENTS

Integrated fund projects designed by the government in order to boost investments in industrial energy efficiency projects, this including two components such as:

1. Component 1: Energy Efficiency Investment Lending (USD 312 million, of which USD 200 million from International Bank for Reconstruction and Development, USD 50 million from Participating Financial Institutions, and USD 62 million from Industrial Enterprises);
2. Component 2 – Technical Assistance and Capacity Building for Improving Energy Efficiency (USD 3 million financed through International Development Association).

Vietnam has developed EE&C financing instruments as follow: financing schemes from the Vietnam Environment Protection Fund (VEPF), the National Technology Innovation Fund (NATIF), and the Vietnam Development Bank.

According to the Resettlement Policy Framework (RPF) by the Ministry of Industry and Trade, the types of energy efficiency sub-projects will include:

- a) Adoption of energy saving industrial technologies such as more efficient industrial boilers, kilns, and heat exchanger
- b) Recovery and utilization of by-product gas, waste heat and pressure;
- c) Installation of highly efficient mechanical and electrical equipment, including motors, pumps,
- d) Industrial system optimization to reduce energy use. Most of these subprojects will be located within the existing premises of industrial facilities and will not require additional land acquisition.

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