

VIETNAM ELECTRICITY INDUSTRY REPORT Q3/2018



Content

<i>Executive Summary</i>	4	2.2.4 Electricity consumption	43
1. Business environment	6	2.2.5 Electricity price	49
1.1 Macroeconomic situation	7	2.3 Issues in energy industries development	54
1.2 Legal framework	10	2.3.1 Existing	55
2. Industry overview	18	2.3.2 Challenges	56
2.1 Situation of global electricity industry	19	2.4 Planning	60
2.1.1 Demand and supply for electricity	19	3. Business analysis	64
2.2 Situation of Vietnam electricity industry	26	3.1 Typical companies of electricity industry	65
2.2.1 History of Vietnam electricity industry	27	3.2 Business performance indicators	78
2.2.2 Value chain of the industry	31	3.3 Financial indicators	83
2.2.3 Electricity generation	32	3.4 Payment indicators	88

Abbreviations

ERAV Electricity Regulatory Authority of Vietnam

EVFTA Vietnam-EU Free Trade Agreement

EVN Vietnam Electricity Corporation

FDI Foreign Direct Investment

FTA Free Trade Agreement

GSO General Statistics Office

MAIFI Momentary Average Interruption Frequency Index

MOIT Ministry of Industry and Trade

NLDC National Load Dispatch Center

PVN Vietnam Oil and Gas Group

SAIDI System Average Interruption Duration Index

SAIFI System Average Interruption Frequency Index

TPP Trans-Pacific Partnership Agreement

VCGM Vietnam Competitive Generation Market

Vinacomin Vietnam National Coal - Mineral Industries Group

VIRAC VIRAC Joint Stock Company

VWEM Vietnam Wholesale Electricity Market

WTO World Trade Organization

World's electricity volume was constantly increasing over a period of time from 2009 to 2017 with compounded annual growth rate at x.xx%

Three main resources of generation electricity are hydroelectricity, thermoelectricity by coal and thermoelectricity by gas which account for xx.xx% of total capacity of national installed electricity system

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Currently, EVN still has a monopoly on the segments of regulation, electricity wholesaling, transmission and distribution or retailing..

Electricity price is quite low compared to other countries in the Asia-Pacific region.

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Vietnam power demand increased rapidly from 2001 to 2017 with average growth rate about xx.xx%/year and is forecasted to still increase in the next 15 years.

Generation electricity is exclusive sector which has other investors beside EVN because of a specific huge capital requirement.

1. Business environment

1.1 Macroeconomic situation

1.2 Legal framework

1. Business environment

1.1 Macroeconomic situation

GDP growth rate by quarter, 2015 - Q2/2018

%

The Government's 2018 GDP growth target of

Sources: VIRAC, GSO

Consumer price index (CPI) in the first 6 months of 2018 has a lot of changes

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Monthly CPI fluctuations, 2015-6/2018

Sources: VIRAC, GSO

Many new projects in the field of electricity production and distribution are licensed in 2018:

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Sources: VIRAC, FIA

VND/USD exchange rates, 2013-6/2018

The stable exchange rate will help the electricity producers to be more active in calculating input costs due to their dependence on imported coal.

1. Business environment

1.1 Macroeconomic situation

The electricity industry plays an important role in supporting the development of all sectors of the economy.

**Contribution to electricity production and distribution in GDP,
2012 – 6M/2018e**

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Sources: VIRAC collected

The electricity sector is estimated to have a relatively high and stable growth rate in industrial production.

1. Business environment

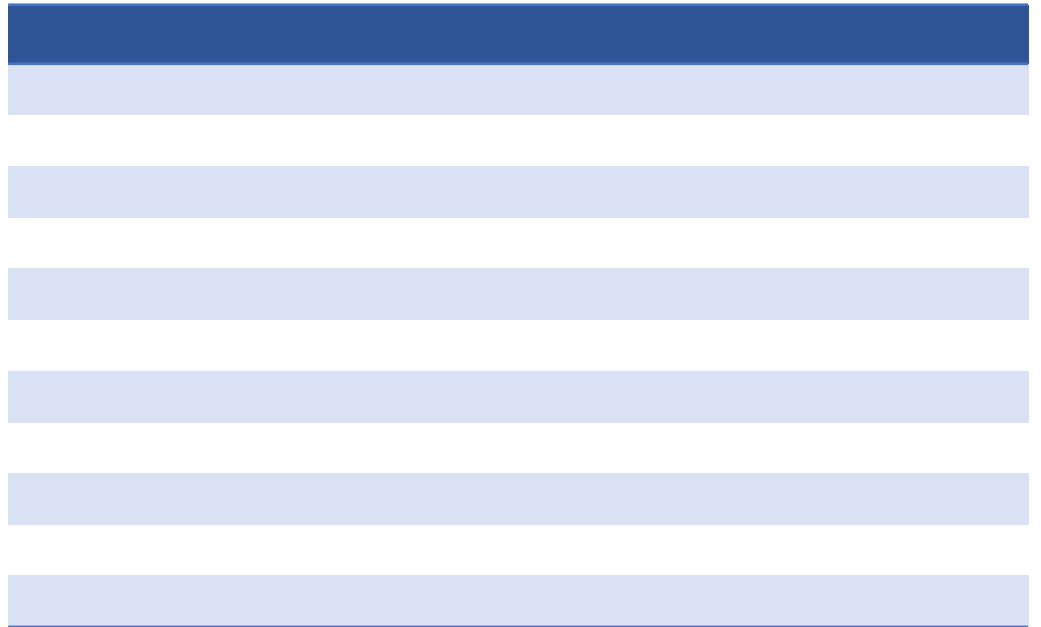
1.1 Macroeconomic situation

1.2 Legal framework

Electricity Law 2004

Amended Electricity Law 2012:

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1. Business environment

1.2 Legal framework

Decree No. 137/2013 / ND-CP guided the Electricity Law and the amended Electricity Law.

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The application of advanced technologies, digitization-based technology and the linkage to create high-tech agricultural models, and smart agriculture are few.

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Decree No. 24/2017 guided average electricity price regulation.

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1. Business environment

1.2 Legal framework

On 30 November 2017, the Ministry of Industry and Commerce issued Decision No . 4495 / QD-BCT regulating the electricity price.

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1. Business environment

1.2 Legal framework

There are also some circulars about the electricity sector:

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2. Industry overview

2.1 Situation of global electricity industry

2.2 Situation of Vietnam electricity industry

2.3 Issues in energy industries development

2.4 Planning and forecasting

2. Industry overview

2.1 Situation of global electricity industry – 2.1.1 Demand and supply for electricity

Global electricity volume increases consistently over a period of time from 2009 to 2017 with compounded annual growth rate at x.xx%

World electricity production volume , 2009-2017

TWh

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Sources: VIRAC, Statsreview.bp.com

Structure of world electricity production, 2017e

2. Industry overview

2.1 Situation of global electricity industry – 2.1.1 Demand and supply for electricity

Structure of electricity supply according to resource, 2016 - 2017

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Sources: VIRAC, Statsreview.bp.com

According to Exxon Mobil enterprise, electricity consumption demand is going to increase in 2014 because of population development and the result is an increase in power and vehicles demand.

2. Industry overview

2.1 Situation of global electricity industry – 2.1.1 Demand and supply for electricity

World's top largest electricity producing countries, 2016 - 2017

TWh

Contribution structure of world electricity production, 2017

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Source: VIRAC, Statsreview.bp.com

Source: VIRAC, Statsreview.bp.com

China is the leading country in electricity production.

2. Industry overview

2.1 Situation of global electricity industry – 2.1.1 Demand and supply for electricity

Electricity production volume in some countries, 2012 - 2017

Unit: TWh

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2. Industry overview

2.1 Situation of global electricity industry – 2.1.1 Demand and supply for electricity

Global electricity consumption, 2008-2017

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Source: VIRAC, Statsreview.bp.com

World's electricity consumption was constantly increasing in the period of 2008-2017 with a CAGR of x.xx%

2. Industry overview

2.1 Situation of global electricity industry – 2.1.1 Demand and supply for electricity

Top 10 most electricity consuming countries, 2017

TWh

China and the United States continued to be the two largest electricity consuming countries in the world in 2017

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2. Industry overview

2.1 Situation of global electricity industry – 2.1.1 Demand and supply for electricity

Billion USD

World electricity exports, 2010-2017e

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Top largest electricity exporters, 2017

Sources: VIRAC, Worldstopexports

2. Industry overview

2.1 Situation of global electricity industry

2.2 Situation of Vietnam electricity industry

2.3 Issues in energy industries development

2.4 Planning and forecasting

2. Industry overview

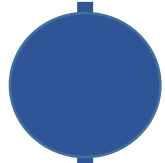
2.2 Situation of Vietnam electricity industry - 2.2.1 History of Vietnam electricity industry

Overview of Vietnam Electricity Industry

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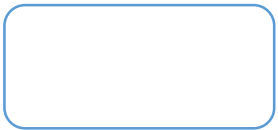
2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.2 Value chain of the industry

Electricity is a special commodity,

Electricity industry of Vietnam also has a similar value chain with other countries in the world

Production



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2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation

Compounded annual growth rate (2010-2017e) reach xx.x%

Total supply of electricity, 2010 – 6M/2018e

Million kWh

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Sources: VIRAC, EVN, GSO, MOIT

Structure of electricity, 2017

Million kWh

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation

Electricity generation is the only segment with the participation of units outside EVN due to the specific requirements of capital investment.

Proportion of electricity generation by supplier, 2016

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Sources: VIRAC, EVN

Power projects operation in 2018

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Sources: VIRAC, EVN

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation

The main sources of electricity are Hydroelectricity, Coal Thermoelectricity and Gas Thermoelectricity, accounting for xx.x% of total electricity generation capacity in the 3 first years in 2018

Structure of electricity production by source of materials, 2012 – 3M/2018

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Sources: VIRAC, EVN, MOIT

Renewable energy has not been widely used for electric development,

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation – Characteristics of electricity generation sources

Most of the machinery and equipment of Vietnam's hydropower plants are imported from overseas.

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Characteristics of power plants by source of fuel

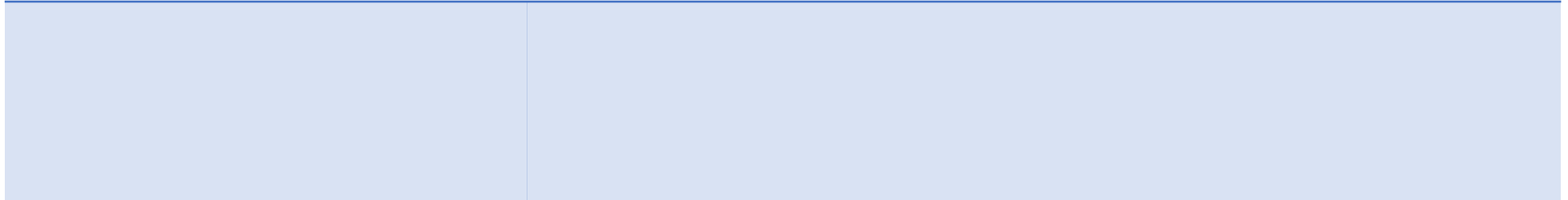
Compare the advantages and disadvantages of hydroelectricity and thermal electricity

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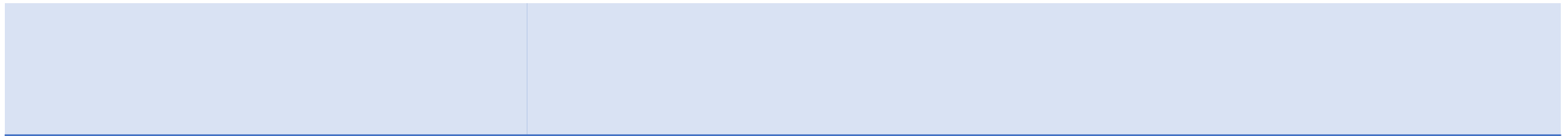
2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation – Characteristics of electricity generation sources

Electricity generating technology from coal (Thermal power)



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2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation – Characteristics of electricity generation sources

Wind power

Nuclear power

Electricity produced from renewable energy

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2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation – Characteristics of electricity generation sources

At present, the installation location of power plants is heavily dependent on the distribution of natural resources, so there is a clear distinction between regions.

Distribution of main power plants

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2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation – Characteristics of electricity generation sources

Import of electricity, 2010 – 2018f

Billion kWh

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Source: VIRAC, EVN

Vietnam imports electricity mainly from China and Laos

Import of electricity from China, 2010 - 2017e

Billion
kWh

Cent/kWh

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.3 Electricity generation – Characteristics of electricity generation sources

Current situation of selling electricity to Laos:

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Situation of electricity import from Laos:

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.4 Electricity consumption

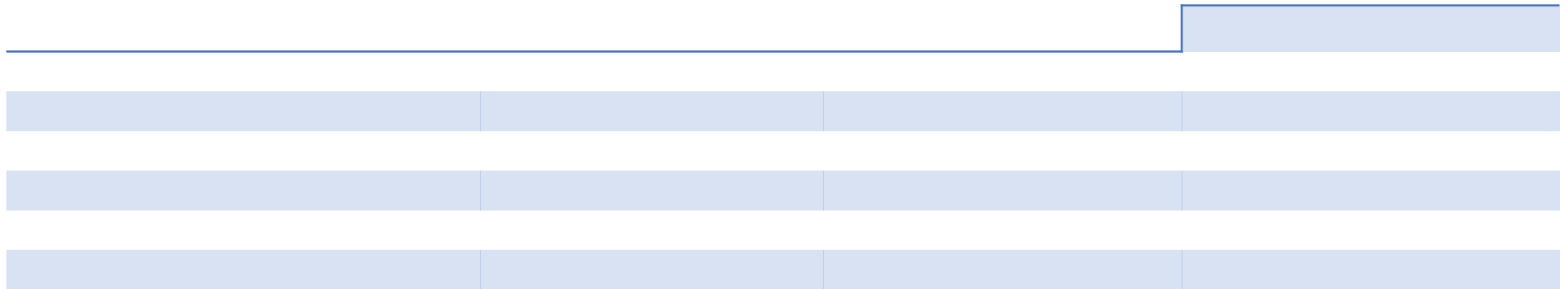
Commercial electricity, 2012 – 6M/2018e

Million kWh

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Source: VIRAC, EVN, MOIT

Commercial electricity according to the distribution companies (Million kWh), 2016 – 2018



2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.4 Electricity consumption

Vietnam is one of the most inefficiently electricity using countries in the world.

Electricity intensity by region in the world (kwh/USD)

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Electricity consumption per capita of Vietnam, 2000-2017e

Source: VIRAC

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Commercial electricity, 2012-6M/2018e

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.4 Electricity consumption

Electrical efficiency in Vietnam from the perspective of coefficient of electricity elasticity/GDP.

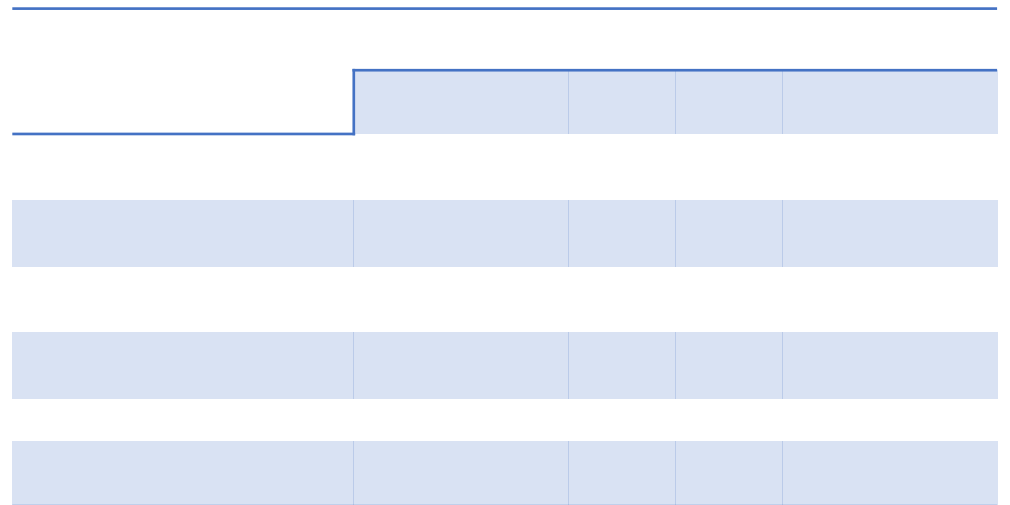
Elastic electricity factor/GDP, 2010 – 6M/2018

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Source: VIRAC, GSO, EVN

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Electricity supply reliability criteria, 2017-2018 Source: VIRAC, NLDC



Source: VIRAC, EVN

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.4 Electricity consumption

Vietnam's getting electricity indicator, 2012 - 2016

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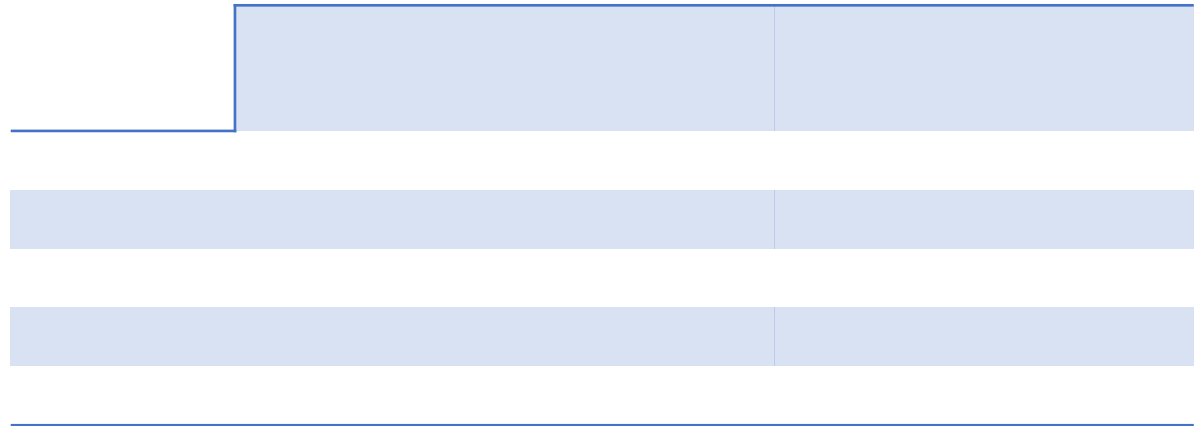
Source: VIRAC, World Bank, EVN

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.5 Electricity price

Electricity generating price

Avoided cost tariff applied to small and medium-sized hydroelectric plants in 2018



Content is intentionally removed for demo purpose Source: VIRAC, Decision No 5106/QĐ-BCT

Average electricity purchase price of EVN, 1/2015 – 5/2018

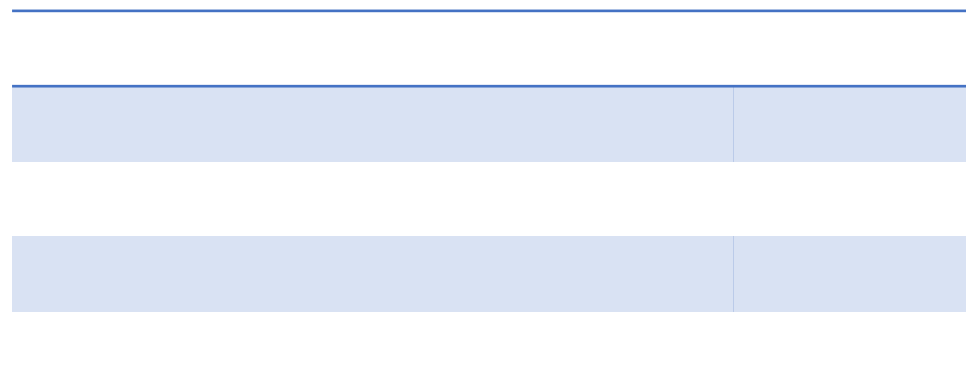
VND/kWh

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.5 Electricity price

Wholesale price of electricity

Average electricity wholesale price of EVN for other electricity corporations in 2018



Content is intentionally removed for demo purpose Source: VIRAC, Decision No 2712/QĐ-BCT

Retail price of electricity

Content is intentionally removed for demo purpose Source: VIRAC, Decision No 2712/QĐ-BCT

Electricity price in 6 degree

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.5 Electricity price

Electricity price in Vietnam is quite low compared to other countries in the Asia-Pacific region.

VND/ kWh

Average electricity price, 7/2007 – 6/2018

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Sources: VIRAC, MOIT

Price of input material, 1/2014 – 4/2018

Sources: VIRAC, MOIT

2. Industry overview

2.2 Situation of Vietnam electricity industry - 2.2.5 Electricity price

1. Price frame for coal thermoelectricity factories

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2. Price frame for hydroelectricity factories

2. Industry overview

2.1 Situation of global electricity industry

2.2 Situation of Vietnam electricity industry

2.3 Issues in energy industries development

2.4 Planning and forecasting

2. Industry overview

2.3 Issues in energy industries development – 2.3.1 Existing

Existing problems affecting the development of Vietnam's energy industry

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Structure of electricity production by primary energy source

Sources: VIRAC, ERAV

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Vietnam currently ranks 20th in the world among the countries with the most coal thermal power plants in the world.

Sources: VIRAC, GreenID

The development of coal electricity in Vietnam is against the world trend.

Levelized Cost of Electricity of techs per 1kWh, 2017-2025

Million USD/MW

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Import of electrical wires and cables, 2011 - 2017e

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Source: VIRAC

Energy using efficiency and awareness are low.

2. Industry overview

2.1 Situation of global electricity industry

2.2 Situation of Vietnam electricity industry

2.3 Issues in energy industries development

2.4 Planning and forecasting

Decision No. 428 / QD-Nog approving the adjustment of zoning for national electricity development in 2011-2020, with a vision to 2030

1. National electric power development planning:

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2. Industry overview

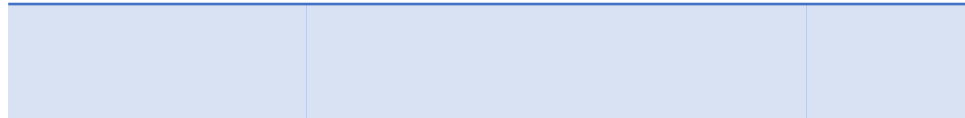
2.4 Planning and forecasting -2.4.1 Planning

2. Electricity grid development planning:

3. Solutions to industry zoning

Volume of transmission grids shall be elaborated in stages, as follows:

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Solution to electricity price

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3. Business analysis

3.1 Typical companies of electricity industry

3.2 Business performance indicators

3.3 Financial indicators

3.4 Payment indicators

3. Enterprise analysis

3.1 Typical companies of electricity industry

Enterprises in electricity industry are divided into three groups:

Electricity distribution and retail companies.

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3. Enterprise analysis

3.1 Typical companies of electricity industry

Electricity regulation and transmission companies.

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Source: VIRAC

Electricity generating enterprises

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.1. *Electricity distribution and retail companies.*

Southern Power Corporation - EVNNPC

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.1. *Electricity distribution and retail companies.*

Northern Power Corporation - EVNNPC

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.1. *Electricity distribution and retail companies.*

HCM city Power Corporation - EVNHCMC

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.1. *Electricity distribution and retail companies.*

Hanoi city Power Corporation - HNPC

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.1. *Electricity distribution and retail companies.*

Central VN Power Corporation - EVNCPC

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.2. *Electricity regulation and transmission companies.*

Electricity regulation and transmission corporations:

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.3. Electricity generating enterprises.

Power Generation Corporation 3 – EVNGENCO3

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.3. Electricity generating enterprises.

Power Generation Corporation 1 – EVNGENCO1

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.3. Electricity generating enterprises.

Hai Phong Thermal Power Joint Stock Company

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.3. Electricity generating enterprises.

Quang Ninh Thermal Power Joint Stock Company

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3. Enterprise analysis

3.1 Typical companies of electricity industry– 3.1.3. Electricity generating enterprises.

Pha Lai Thermal Power Joint Stock Company

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3. Business analysis

3.1 Typical companies of electricity industry

3.2 Business performance indicators

3.3 Financial indicators

3.4 Payment indicators

3. Enterprise analysis

3.2 Business performance indicators

Net revenue, 2016-2017

Billion VND

Content is intentionally removed for demo purpose

Source: VIRAC

Net revenue of electricity distribution and retail businesses is much higher than that of electricity generation enterprises.

3. Enterprise analysis

3.2 Business performance indicators

Billion VND

Profit indicator, 2016-2017

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Source: VIRAC

While the net revenue of the 5 electricity distribution and retail businesses is much higher than that of some companies in the electricity generation business group, the gross profit is not clear.

Self-financing rate, 2016 - 2017

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Source: VIRAC

Financial cost, 2016-2017

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Source: VIRAC

3. Business analysis

3.1 Typical companies of electricity industry

3.2 Business performance indicators

3.3 Financial indicators

3.4 Payment indicators

Total asset, 2016-2017

Billion VND

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Source: VIRAC

Average days of receivables, 2017

Days

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Sources: VIRAC

Profit indicators, 2017

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Source: VIRAC

Days

Days in inventory, 2017

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Source: VIRAC

3. Business analysis

3.1 Typical companies of electricity industry

3.2 Business performance indicators

3.3 Financial indicators

3.4 Payment indicators

Solvency, 2016-2017

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Source: VIRAC

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Thank you !