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Vietnam Power Development Plan for the period 2011 – 2020

Highlights of the PDP 7 revised

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On 18 March and by Decision No. 428/QD-TTg, the Prime Minister has approved the adjustment of National Power Development Plan VII (hereinafter referred to as PDP 7 rev) for the period of 2016 – 2030 with the vision to 2030.

Compared to the PDP 7 of July 2011, the most obvious changes in the PDP 7 rev is a stronger emphasis on **Renewable Energy** development and on power market liberalization.

This short paper summarizes the highlights of PDP 7 rev. It is not intended to be a scientific paper, but meant for information purposes only. It does not claim to have covered all issues extensively, but – despite our attempts to be as objective as possible – has been prepared from the perspective of our Energy Support Programme.

Contents

Prepared by: GIZ Energy Support Programme in Viet Nam

Specific Objectives

The specific objectives of the PDP 7 rev are described as follows (*direct translation*):

- *Provide adequate electricity for the domestic demand, satisfy socio-economic development objectives with average GDP growth rates of 7% during 2016-2030:*
    - *Commercial electricity: 235 – 245 billion kWh in 2020; 352 – 379 billion kWh in 2025; 506 – 559 billion kWh in 2030*
    - *Electricity production and import: 265 – 278 billion kWh in 2020; 400 – 431 billion kWh in 2025; 572 – 632 billion kWh in 2030*
- *Prioritize the development of renewable energy sources for electricity production; increase the proportion of electricity generated from renewable energy sources (excluding large-scale, medium-scale and pumped storage hydro power) up to around 7% in 2020 and above 10% in 2030.*
- *Construct the power transmission grid with flexible operation and high automation capabilities from electricity transmission to distribution; develop unmanned substations and substations with 50% of human participation to increase the capacity of the electricity industry.*
- *Accelerate the program of electrification in rural and mountainous areas to ensure that in 2020 most of the rural households have access to electricity.*

Structure of power sources

To specify, PDP 7 rev distinguishes between electricity production & import on the one hand, and commercial electricity on the other hand; PDP 7 as of July 2011 by contrast only mentioned the former.

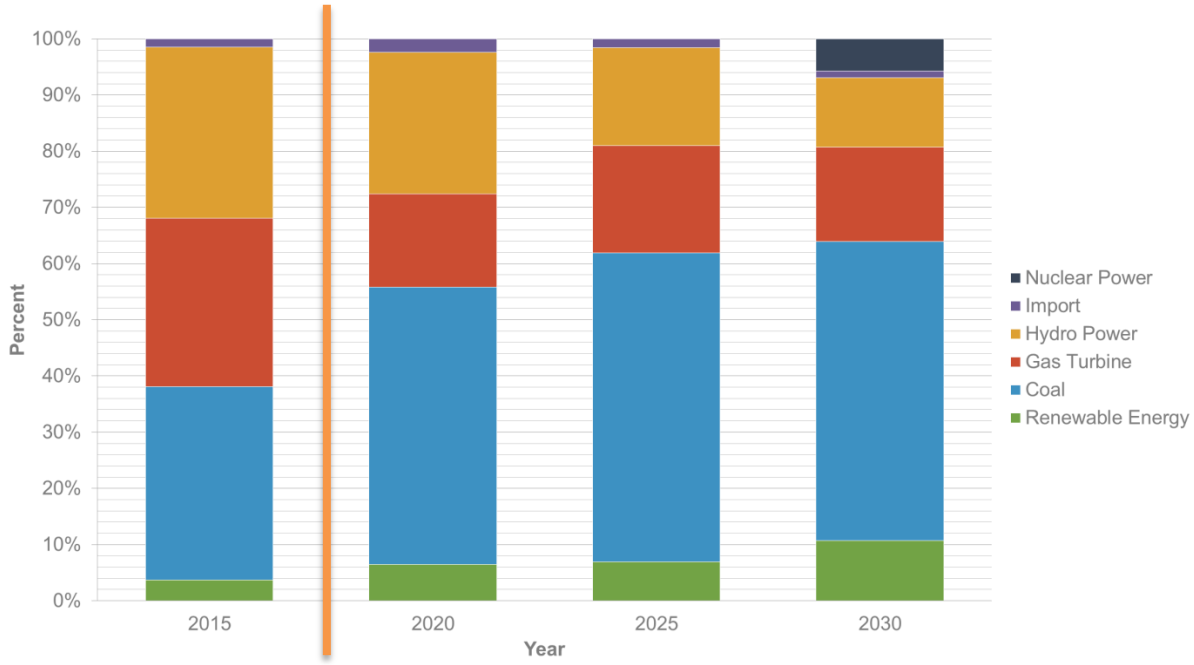
The following tables and graphs below compare the proportion of power sources as outlined in both PDP 7 as of July 2011 and the PDP 7 rev as of March 2016 over the period of 10 years from 2020 to 2030. As per the PDP 7 rev structure, the data is presented on the basis of (1) percentage share of total electricity production; and (2) percentage share of total installed generation capacity.

Table 1: Structure of power sources in percent of total electricity production*

Power Sources	2015[1]	2020		2025		2030	
	IE	PDP 7	PDP 7 rev	PDP 7	PDP 7 rev	PDP 7	PDP 7 rev
Renewable Energy	3.7%	4.5%	6.5%	---	6.9%	6%	10.7%
Coal	34.4%	46.8%	49.3%	---	55%	56.4%	53.2%
Gas Turbine	30%	24%	16.6%	---	19.1%	14.4%	16.8%
Hydro	30.4%	19.6%	25.2%	---	17.4%	9.3%	12.4%
Import	1.5%	3.0%	2.4%	---	1.6%	3.8%	1.2%
Nuclear	---	2.1%	---	---	---	10.1%	5.7%

** Note: These numbers have been taken from the Decision No. 1028/QĐ-TTG and 428/QĐ-TTG respectively.*

Figure 1: the structure of power sources of total electricity production (PDP 7 rev)



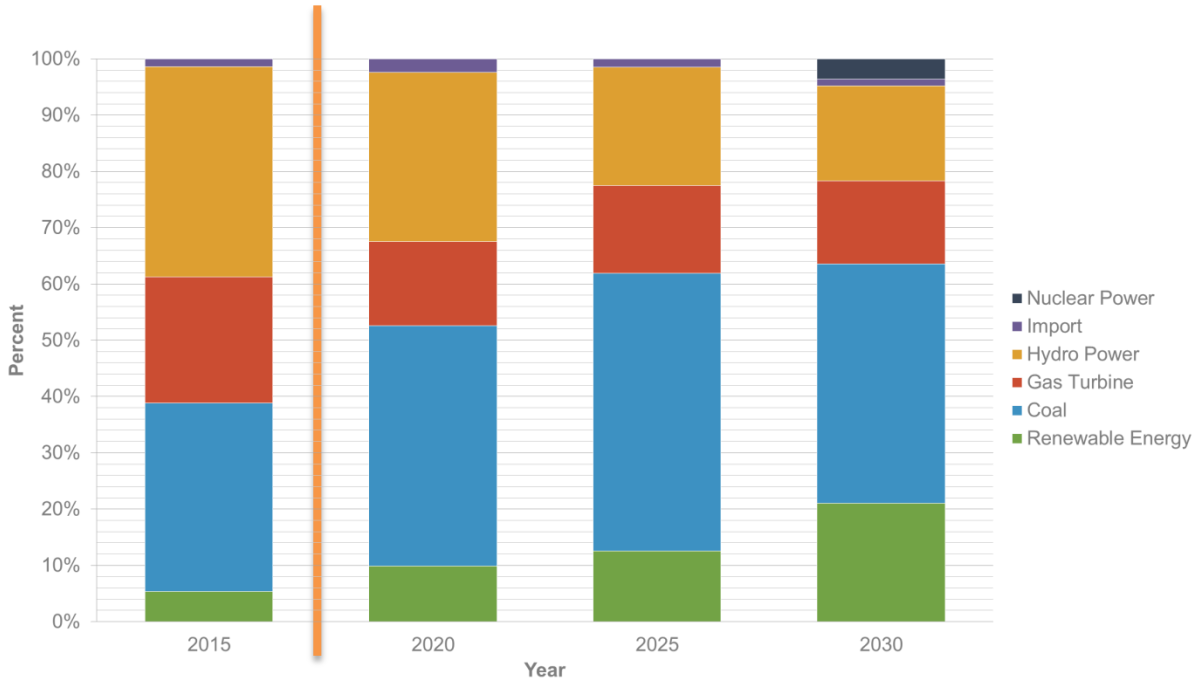
[1] This column on 2015 figures has been added for illustration purposes only; they do not form part of any of the PDP 7 versions. Source: IE, 2015

Table 2: Structure of power sources in percent of total installed capacity*

Power Sources	2015[2]	2020		2025		2030	
	IE	PDP 7	PDP 7 rev	PDP 7	PDP 7 rev	PDP 7	PDP 7 rev
Renewable Energy	5.37%	5.6%	9.9%	---	12.5%	9.4%	21%
Coal	33.45%	48%	42.7%	---	49.3%	51.6%	42.6%
Gas Turbine	22.45%	16.5%	14.9%	---	15.6%	11.8%	14.7%
Hydro	37.31%	25.5%	30.1%	---	21.1%	15.7%	16.9%
Import	1.42%[3]	3.1%	2.4%	---	1.5%	4.9%	1.2%
Nuclear	---	1.3%	---	---	---	6.6%	3.6%

** Note: These numbers have been taken from the Decision No. 1028/QĐ-TTG and 428/QĐ-TTG respectively.*

Figure 2: the structure of power sources of total installed capacity (PDP 7 rev)



As indicated in aforementioned Table 1, Coal is projected to be the main source for electricity production while Renewable Energy is showing an upward trend.

The proportion of coal only changes slightly between 2020 and 2030, and is projected to provide ca. half of total electricity production. Besides, the projections for the share of electricity produced from gas have undergone a significant change for 2020.

Similarly, and somewhat surprisingly, the figures for large-scale hydro power have seen a significant upward adjustment.

[2] This column on 2015 figures has been added for illustration purposes only; they do not form part of any of the PDP 7 versions. Source: IE, 2015

[3] The proportion of import is calculated based on the capacity factor for coal of 0.49 (Author)

Renewable Energy

PDP 7 rev outlines a master plan for power source development, in which renewable energy (wind energy, solar energy, bio energy) will be prioritized, so as to gradually increase the proportion of electricity generated from RE sources. As shown in Table 3 below, PDP 7 rev sets out new targets on Biomass and Solar Power, the latter of which was not specifically mentioned in the PDP 7 of 2011.

Moreover, and again in contrast to PDP 7, the Annex to the PDP 7 rev first the first time specifically mentions RE generation facilities (please see Annex 1 of this document for a respective extract from the PDP 7 rev). The sub-targets for RE are described in the below table.

Table 3: Sub-targets for Renewable Energy (share of elec. prod. and inst. capacity)

		2020		2025		2030	
		Old	New	Old	New	Old	New
Wind	Total Capacity (MW)	1,000	800	---	2,000	6,200	6,000
	Electricity prod. (%)	0.7%	0.8%	---	1%	2.4%	2.1%
Hydro power	Total Capacity (MW)	17,400	21,600	---	24,600	---	27,800
	Electricity prod. (%)	---	29.5%	---	20.5%	---	15.5%
Biomass	Electricity prod. (%)	0.6%	1%	---	1.2%	1.1%	2.1%
Solar	Total Capacity (MW)	---	850	---	4,000	---	12,000
	Electricity prod. (%)	---	0.5%	---	1.6%	---	3.3%

Energy Efficiency

PDP 7 rev slightly redefines the target for electricity savings from the previous range of savings ("…to save 8% to 10% [total electricity consumption] in 2020") to an "above 10%" by 2020 goal. However, there is no target for 2030. The following provisions on Energy Efficiency are taken from PDP 7 rev:

- *Enhance communication, dissemination and implementation of the Law on energy saving and efficiency to improve energy use efficiency in general and electricity consumption in production, business and households in particular.*

- *Widely deploy and enhance the efficiency of the National Target Program on electricity savings and efficiency with the target to save above 10% total electricity consumption during the period from 2016 to 2020. (Article 1, 4.i).*

Electricity Pricing

There are almost no changes in this section except that the provision on "…long-term marginal cost of electricity system in 2020 equivalent to 8 – 9 US cents / kWh…" has been taken out of PDP 7 rev. Since the section of electricity pricing is quite similar to the 2011 version, there is no mentioning of specific feed-in or avoided cost tariffs.

Development of Power Transmission Grid

The Government will make further investments in the national Power Transmission grids to bring the development in line with the national and local power development plans, increase the reliability of power supply, reduce power losses during transmission and ensure favorable mobilization of power sources in the rainy season and dry season. The following provisions on Energy Efficiency are taken from PDP 7 rev:

- *Gradually develop and upgrade power grids to meet the technical standards of the transmission network; by 2020, transmission grid meets reliability standard of N-1 for main equipment.*
- *Develop 500 kV transmission network to transmit power from the higher voltages stations to substations, connecting power systems among regions and neighboring countries.*
- *Develop 220 kV transmission grids with ring typology.*
- *Research and build GIS substation, 220/22 kV substations, underground substations, unmanned substations. Apply* ***smart grid*** *technologies in transmission network.*

Development of Investments

To implement the PDP 7 rev, the Government estimates that total investment (without BOT projects) for the period from 2016 to 2030 shall be approximately 3,206,652 billion VND (equivalent to ~148 billion US dollars). This number is much higher than the number of 75 billion USD mentioned in the 2011 version.

For the period from 2016 to 2020, around USD 40 billion are required, of which 75% will be used for power generation development and 25% for power network development. The amount of USD 108 billion is required for period from 2021 to 2030 with a similar distribution for power generation and network development respectively.

Regarding solutions to mobilize investment capital for the development of the electricity sector, PDP 7 rev intends to "…equitize the corporation and power generation companies of EVN, PVN and Vinacomin…".

Annex 1: List and schedule of the projects on power generation investment

The Annex of PDP 7 of 2011 only mentioned renewable energy sources in a very general manner, neither making provisions for specific MW targets, nor mentioning concrete operators or locations.

In contrast to this previous practice, PDP 7 rev mentions quite a few specific projects of CHP and Wind power – at least for the period up to 2021. Thereafter, the Plan only foresees aggregated estimates.

The following RE projects have been extracted from the Annex of PDP 7 rev:

No.	Project Title	Installed Capacity (in MW)	Project Owner
Starting from 2016			
1	(CHP Sugar) KCP Biomass Power #1	30	IPP (Phu Yen)
2	Renewable Energy (SHP, Wind, Solar, Biomass energy)	260	
Starting from 2017			
1	An Khe Biomass Power #1	55	Quang Ngai Sugar Co.
2	Renewable Energy (SHP, Wind, Solar, Biomass energy)	360	
Starting from 2018			
1	(CHP Sugar) KCP Biomass Power #2	30	IPP (Phu Yen)
2	An Khe Biomass Power #2	55	Quang Ngai Sugar Co.
3	Lee&Man Biomass Power	125	Lee&Man Paper Co. (CHP)
4	Khai Long Wind Power (Ca Mau)	100	Cong Ly Limited Co.
5	Bac Lieu Wind Power phrase III	142	Cong Ly Limited Co.
6	Renewable Energy (SHP, Wind, Solar, Biomass energy)	520	
Starting from 2019			
1	Nam Cum SHP 1, 4 ,5	65	IPP
2	Trung – Nam Wind Power	90	IPP (Ninh Thuan)
3	Soc Trang Wind Power	99	Cong Ly Limited Co.
4	Thien Tan Solar Power #1	300	IPP (Ninh Thuan)
5	Renewable Energy (SHP, Wind, Solar, Biomass energy)	450	
Starting from 2020			
1	Nam Cum SHP 2,3,6	54	IPP
2	Hanbaram Wind Power	117	IPP
3	Thien Tan Solar Power #2	300	IPP (Ninh Thuan)
4	Renewable Energy (SHP, Wind, Solar, Biomass energy)	260	
Starting from 2021			
1	Thien Tan Solar Power #3	300	IPP (Ninh Thuan)

2	Renewable Energy (SHP, Wind, Solar, Biomass energy)	790
Starting from 2022		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	1,200
Starting from 2023		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	1,000
Starting from 2024		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	1,200
Starting from 2025		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	1,800
Starting from 2026		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	2,160
Starting from 2027		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	2,910
Starting from 2028		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	3,240
Starting from 2029		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	3,350
Starting from 2030		
1	Renewable Energy (SHP, Wind, Solar, Biomass energy)	3,530