

Highlights of Power Planning VIII

On May 15, 2023, the Prime Minister issued Decision No. 500/QĐ-TTg approving the National Electricity Development Master Plan for the period of 2021 – 2030, with an orientation to 2050 (“**Power Master Plan VIII**”).

Accordingly, Power Master Plan VIII focuses on development of power sources and transmission grids at voltages of 220 kV or higher, industry and services in renewable energy and new energy in the Vietnamese territory in the period of 2021 – 2030, with an orientation to 2050. This Master Plan also includes building works to link power grids with neighboring countries. Below are some notable contents of Power Master Plan VIII:

1. Development objectives

- National energy security assurance:
- Supplying enough electricity in the country, meeting socio-economic development goals with an average GDP growth rate of about 7%/year in the period of 2021 – 2030, about 6.5 – 7.5 %/year in the period of 2031 – 2050:

	2025	2030	2050
Commercial power	335.0 billion kWh	505.2 billion kWh	1,114.1 – 1,254.6 billion kWh
Electricity production and import	378.3 billion kWh	567.0 billion kWh	1,224.3 – 1,378.7 billion kWh
Maximum capacity	59,318 MW	90,512 MW	185,187 – 208,555 MW

- Ensuring safe and reliable power supply, meeting criteria N-1 for important load areas and N-2 for particularly important load areas. By 2030, the reliability of electricity supply will be in the group of 4 leading countries in the Association of Southeast Asian Nations (ASEAN), and the electricity access index will be in the group of 3 leading countries in ASEAN.
- Striving to have 50% of office buildings and 50% of residential houses using self-sufficient and self-exploiting rooftop solar power (for on-site consumption, not selling electricity into the national electricity system) by 2030.
- Just energy transition:
- Strongly developing renewable energy sources for electricity production and restricting greenhouse gas emissions from power generation:

	2030		2050
	Normal	Commitments under JETP(*) with Vietnam	
Renewable energy sources for electricity production	30.9 – 39.2%	47%	67.5 – 71.5%
Restriction to greenhouse gas emissions from power generation	204 – 254 million tons	170 million tons	27 – 31 million tons

Remark: () the Political Declaration establishing a Just Energy Transition Partnership.*

- Constructing a smart grid system, capable of safely integrating and effectively operating large-scale renewable energy sources.
- Development of renewable energy services and industrial ecosystems:
- It is expected that to form two inter-regional renewable energy industry and service centers, including electricity production, transmission and consumption; renewable energy equipment manufacturing industry, construction, installation, related services, building renewable energy industry ecosystem in areas with great potential such as the North, South Central, and South regions when there are favourable conditions by 2030.
- Developing power sources from renewable energy and producing new energy for export. The scale of electricity export capacity aims to reach about 5,000 – 10,000 MW by 2030.

2. Development plan

- Power from renewable energy sources:
- Onshore and offshore wind power:

Promoting the development of onshore and offshore wind power to satisfy demands for electricity and to produce new energy (hydrogen, green ammonia, etc.). Prioritizing and encouraging the development of self-generated and self-consumed wind power.

	Total technical potential	Capacity	
		2030	2050

Onshore wind power (satisfying demand for electricity)	221,000 MW	21,880 MW	
Offshore wind power (satisfying demand for electricity)		6,000 MW	70,000 – 91,500 MW
Offshore wind power (for new energy production (hydrogen, green ammonia, etc.))	600,000 MW	15,000 MW(*)	240,000 MW

Remark: (*) As of 2035.

▪ Solar power:

Promoting the development of solar power combined with storage battery when the price is suitable. Prioritizing and encouraging the development of self-generated and self-consumed wind power solar power (including solar power on people's roofs and building works' roofs; solar power at production, business, and consumption establishments) on site, without connecting or selling electricity to the national grid). Giving priority and formulating breakthrough policies to promote the development of rooftop solar power of people and building works, especially areas at risk of power shortage such as the North region and self-generated and self-consumed solar power.

	Total potential		Capacity	
	Each type	Total	2030	2050
Ground	837,400 MW	963,000 MW	Increasing by 4,100 MW	168,594 – 189,294 MW
Water surface	77,400 MW			
Rooftop	48,200 MW			

- Electricity from biomass, electricity generated from garbage:

Prioritizing and encouraging the development of various types of electricity from biomass, electricity generated from garbage and solid waste in order to utilize agricultural, forestry and wood processing by-products, promotion of afforestation, and environmental remediation in Vietnam.

	Total potential		Capacity	
	Each type	Total	2030	2050
Electricity from biomass	7,000 MW	8,800 MW	2,270 MW	6,015 MW
Electricity generated from garbage	1,800 MW			

- Hydropower:

Maximizing the potential of hydropower sources on the basis of ensuring the environment, forest protection, and water source security. Studying and selectively expanding existing hydropower plants to reserve capacity; exploiting hydroelectricity on irrigation lakes and reservoirs to take advantage of hydroelectricity sources.

	Total potential	Capacity	
		2030	2050
Large-scale hydroelectricity	40,000 MW	29,346 MW	36,016 MW
Small-scale hydroelectricity			

▪ Storage power source:

Developing storage hydropower plants to regulate the load, reserve capacity and support the integration of large-scale renewable energy sources. And at the same time, storage batteries are developed when they are reasonably priced, distributed in close proximity to wind power, solar power sources or load centers.

	Capacity	
	2030	2050
Storage hydroelectric power plants (to regulate the load, reserve capacity and support the integration of large-scale renewable energy sources)	2,400 MW	30,650 – 45,550 MW
Storage batteries (distributed in close proximity to wind power and solar power sources, etc.)	300 MW	

▪ Cogeneration power:

Prioritizing and encouraging the development of cogeneration power plants, power plants using residual heat, blast furnace gas, and by-products of technological chains in industrial

establishments.

	Capacity	
	2030	2050
Cogeneration power plants	2,700 MW	4,500 MW
Power plants using residual heat, blast furnace gas, and by-products of technological chains in industrial establishments		

▪ Coal-fired power:

Only continuing to implement projects already in the adjusted Power Master Plan VII and under construction until 2030; being oriented to convert fuel to biomass and ammonia with plants has been running for 20 years when the price is right. Stopping operating plants with a lifespan of more than 40 years if fuel conversion is not possible.

	Capacity	
	2030	2050
Coal-fired power plants	30,127 MW	0 MW
Thermal power plants using biomass or ammonia as fuel (converted from those using coal as fuel)	0 MW	25,632 – 32,432 MW

▪ Gas-fired thermal power:

Prioritizing the maximum use of domestic gas for power generation. In case the domestic gas production decreases, the

import will be supplemented with natural gas or LNG. Developing projects that use LNG and synchronous LNG import infrastructure with appropriate scale and modern technology. Implementing a fuel-to-hydrogen conversion roadmap when the technology is commercialized and the cost is affordable.

	Capacity	
	2030	2050
Domestic gas-fired thermal power	14,930 MW	14,930 MW
LNG thermal power	22,400 MW	20,900 – 29,900 MW

- Flexible power source (quick start-up):

Investment in developing flexible power sources to regulate loads, maintain power system stability to absorb large-scale renewable energy.

	Capacity	
	2030	2050
Flexible power source	300 MW	30,900 – 46,200 MW

- Import and export of electricity:

Effectively connecting to and exchanging electricity with countries in the region, ensuring the interests of the parties, and enhancing the safety of the power system; stepping up the import of electricity from Southeast Asian countries, i.e. those in ASEAN and the Greater Mekong Sub-region (GMS) with hydropower potential. Being interested in investing and exploiting power sources in foreign countries to supply electricity to Vietnam. In 2030, importing about 5,000 MW from Laos under the Agreement between the two Governments, producing 18.8 billion kWh; it could increase to 8,000 MW. By 2050, importing about 11,000 MW, producing 37 billion kWh on a

balanced basis with exports to ensure overall optimal efficiency.

Prioritizing the unlimited capacity development of renewable energy sources for export and new energy production (hydrogen, green ammonia, etc.) on the basis of ensuring energy security and bringing efficiency high economic returns. The scale of electricity export capacity strives to reach about 5,000 – 10,000 MW by 2030.

3. Power source structure

	2030		2050	
	Capacity	Proportion	Capacity	Proportion
Onshore wind power	21,880 MW	14.5%	60,050 – 77,050 MW	12.2 – 13.4%
Offshore wind power	6,000 MW	4.0%	70,000 – 91,500 MW	14.3 – 16.0%
Solar power	12,836 MW	8.5%	168,594 – 189,294 MW	33.0 – 34.4%
Power from biomass, electricity generated from garbage	2,270 MW	1.5%	6,015 MW	1.0 – 1.2%
Hydropower	29,346 MW	19.5%	36,016 MW	6.3 – 7.3%
Storage hydropower	2,400 MW	1.6%	30,650 – 45,550 MW	6.2 – 7.9%
Storage batteries	300MW	0.2%		

Cogeneration power, etc.	2,700 MW	1.8%	4,500 MW	0.8 – 0.9%
Coal-fired thermal power (*)	30,127 MW	20.9%	0 MW	0%
Thermal power using biomass and ammonia	0 MW	0%	25,632 – 32,432 MW	4.5 – 6.6%
Domestic gas-fired thermal power	14,930 MW	9.9%	14,930 MW	9.9%
LNG thermal power	22,400 MW	14.9%	20,900 – 29,900 MW	4.2 – 5.4%
Flexible power source	300 MW	0.2%	30,900 – 46,200 MW	6.3 – 8.1%
Electricity imports (**)	5,000 MW	3.3%	11,042 MW	1.9 – 2.3%
TOTAL (***)	150,489 MW	100%	490,529 – 573,129 MW	100%

Remark: () Excluding some projects. With coal power sources facing difficulties in deployment, the treatment process will be updated to replace them with LNG or renewable energy sources.*

*(**) Possibly increasing up to 8,000 MW.*

*(***) Excluding export, existent rooftop solar power, renewable energy to produce new energy. Due to working in numbers, cumulative weights can be > 100%.*

4. Power grid and other technical infrastructure

- Development of the power grid.
- Connection of the electricity grid to countries in the region.
- Rural electricity development.
- Development of industrial ecology and renewable energy services.

5. Demand for investment capital

	2021-2030 period		2031-2050 period	
	Investment capital	Year average	Investment capital	Year average
Power sources	119.8 billion USD	12 billion USD	364.4 – 511.2 billion USD	18.2 – 24.2 billion USD
Power transmission grid	14.9 billion USD	1.5 billion USD	34.8 – 38.6 billion USD	1.7 – 1.9 billion USD
TOTAL	134.7 billion USD	13.5 billion USD	399.2 – 523.1 billion USD	19.9 – 26.1 billion USD

6. Solutions to create capital sources and mobilize investment capital

- Studying and improving financial mechanisms and capital mobilization for investment in and development of the power sector.
- Diversifying capital sources, forms of capital mobilization, effectively attracting domestic and foreign capital sources into electricity development, ensuring national defense and security and competition in the electricity market. Strengthening calling for and effective use of international support commitments (JETP, AZEC, etc.), green credit sources, climate

credit, green bonds, etc.

- Diversifying investment forms (public, private, public-private partnership, etc.) in power projects. Promoting the role of state-owned enterprises, strongly attracting domestic and foreign private sectors to participate in electricity development investment. Continuing to negotiate, effectively using funding sources, supporting capital arrangement of international partners in the process of energy transition and towards “zero” net emissions of Vietnam.
- Encouraging people and businesses to invest in the development of rooftop solar power, self-generated and self-consumed electricity.
- Creating a favourable, transparent, attractive and encouraging environment for the private sector to participate in investment and development of power projects.
- Gradually increasing the financial mobilization capacity of enterprises in the electricity sector at the request of domestic and international financial institutions.
- Implementing flexible and effective credit policies, creating favorable conditions for enterprises to access capital sources for the development of power projects.

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