

Development of Wind Power in the Context of Development Green Energy in Vietnam

Le Thi Thanh

Hanoi University of Home Affairs, Vietnam

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ABSTRACT: Vietnam's energy system undergoes a profound transition from being largely fossil fuel-based to increasing efficiency, relying on renewables and implementing extensive electrification while increasing flexibility of the system. The focus of the transformation is on: clean electricity as the main source of energy, combined with digital technology to make the most of the increasing amount of low-cost renewable electricity; Rapidly increase electricity use and electricity production from renewables by coordinating their deployment and use in important sectors: Electricity, transport, industry and buildings. Finalize the policy framework for renewable energy development. The contribution of wind power to economic development, creation of new jobs, diversification of supply, energy security, will have a practical role in the period to 2030 and vision to 2045 in Vietnam. Male. The scale of wind power by 2030 should reach about 10GW. With this scale, it will help shape the domestic supporting industry, reducing investment costs. However, the exploitation of wind power still has many challenges and needs strong attention and support from State and Government agencies. Therefore, the article analyzes the potential, identifies challenges and policies for wind power in Vietnam in the context of green energy development, thereby proposing some solutions to promote wind energy development in Vietnam. Male.

Keywords: Wind power; Green energy; Recycled energy; Vietnam.

I. INTRODUCTION

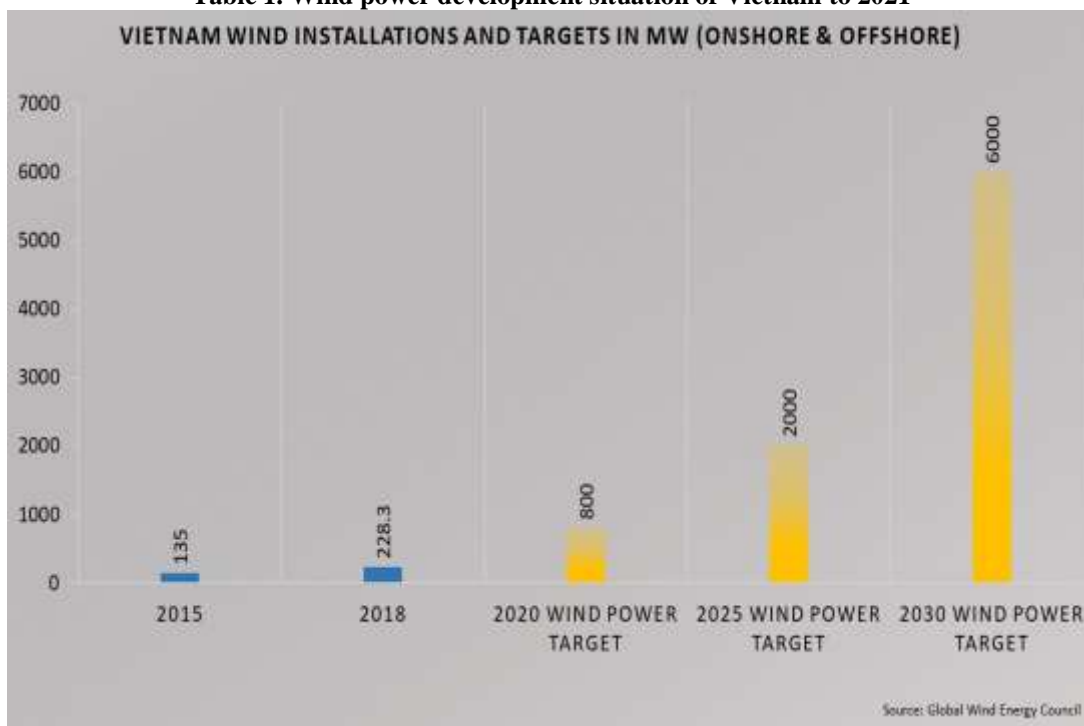
Vietnam is facing an energy shortage, especially in the South, where the demand for energy is high and the growth rate is high, while the large hydroelectric resources have been fully exploited, the hydroelectric small does not guarantee benefits

compared to the environmental damage it causes. Besides, in the face of fluctuations in world oil prices and the depletion of fossil fuels, wind power is considered an abundant resource in the South with many advantages and can be deployed quickly. As one of the countries severely affected by climate change, Vietnam has been interested in investing in wind power production to meet the soaring domestic energy demand and reduce greenhouse gas emissions. . The study of potentials and challenges, in order to make some suitable proposals to promote the development of wind power in Vietnam, in order to ensure energy security, protect the environment and be in line with the trend of energy development in the world now and in the future.

Current status of wind power development in Vietnam from 2010 to present

According to the World Bank's assessment, Vietnam has the largest wind energy potential of the four countries in the region, with more than 39% of Vietnam's total area estimated to have a high average annual wind speed. more than 6m/s at an altitude of 65m, equivalent to a capacity of 512 GW. In particular, nearly 8% of Vietnam's area is ranked as having very good wind potential, with wind speed at an altitude of 65m of 7 - 8 m/s. According to the 2018 World Air Quality Report, 95.5% of the population of Southeast Asia lives in areas where air quality exceeds the safe limits of the World Health Organization. Most of Vietnam's coal-fired power plants are concentrated in the North. In October 2019, Hanoi's air quality index put the capital in the list of cities with the highest air pollution in the world. Liming Qiao, Asia director of the Global Wind Energy Council, said that there are many causes of air pollution in Vietnam, however, coal slag from thermal power plants is the most prominent factor. and using wind energy is the ideal solution to this situation.

Table 1. Wind power development situation of Vietnam to 2021



(Source: Global Wind Energy Council, 2021)

Incentives on investment in plant construction and electricity selling prices for Vietnam's electricity industry have attracted the attention of both domestic and foreign investors [3]. Therefore, although starting to build wind power plants in 2012 (Tuy Phong Wind Power Plant - now known as Binh Thanh Wind Power), by mid-2019, Vietnam had several dozen projects with installation capacity from 20 to 250 MW has been or is about to be completed.

Since the Prime Minister issued Decision No. 39/QĐ - TTg amending and supplementing a number of articles of Decision No. 37/2011/QĐ - TTg on the mechanism to support the development of wind power projects in Vietnam. Nam, at present, there have been many projects proposed and under construction. In which, the largest project is Bac Lieu Wind Power Farm with 99 MW, the smallest project is the 6 MW Phu Quy Wind Power Plant with independent grid connection (not connected to the national grid) on Phu Quy island (Binh Thuan). , the remaining wind power plants have a small capacity of less than 50 MW. Other wind power projects are being implemented slowly, in many cases are still in the process of applying for permits or facing difficulties in finding investors [11].

Another factor promoting the development of this energy industry is the tendency to reduce costs in production, leading to the price of wind

turbines becoming more and more competitive in the market.

According to the latest data, the price of wind power in 2018 from inland plants sold to the national grid is 8.5 US cents/kWh, and from offshore facilities is 9.8 US cents/kWh. This price will expire in 2021.

Up to now, the total installed capacity of the whole system is about 69,000 MW. To meet the growing energy demand, Vietnam will need about 137.2GW of electricity by 2030, with an estimated investment capital of 128.3 billion USD.

Total wind power capacity by 2020 is 327 MW. Vietnam is also the only country in the Association of Southeast Asian Nations (ASEAN) to develop offshore wind power with installed projects currently reaching 99 MW. Not only that, in the current National Power Development Plan, Vietnam also aims to increase the total wind power capacity to 6,000 MW by 2030.

In July 2020, the Vietnamese Government granted a survey permit to build the world's largest offshore wind power plant, with a capacity of 3,400 MW at Ke Ga cape, Binh Thuan province. Once completed, the capacity of this project will outstrip coal and gas-fired thermal power plants and even the nation's largest hydroelectric power plant [14-15].

Despite the great potential of wind power, in reality, wind power projects have not been

effective, due to too many barriers and difficulties in terms of legal, technical, financial, human resources and investors. project.

Wind power development potential in green energy development trend in Vietnam

The wind power industry started to flourish in 2019 in Vietnam, although not as spectacularly as solar. By the end of May 31, 2019, seven wind power plants (with a total capacity of 331 MW) had been put into operation. For example, the Trung Nam renewable energy complex project in Ninh Thuan province, inaugurated in April 2019, with a wind power capacity of 40 MW (will be expanded to 112 MW in phase 2) and solar power. sky is 204 MW.

The revised PDP7 Power Development Master Plan, announced in 2016, aims to achieve 0.8 GW of wind power capacity by 2020, 2 GW by 2025 and 6 GW by 2030. It is estimated (see see Fig. Table 2 below and Table 5 Supplementary Project Inventory), the number of construction projects that are gradually reaching the target of 2020. Total capacity of projects in the "starting up" or "approved" stage approved" is twice the capacity needed to meet the 2025 target. If the capacity of "announced" and "planned" wind power projects is added, the current total capacity is sufficient. to reach the 2030 target .

Research by IFS (Teske, Morris, and Nagrath in 2019), evaluates three scenarios for the development of the electricity sector in Vietnam. This study estimates trends in future power demand as well as examines power generation structures that meet requirements. Among these scenarios, the role of wind power is identified as follows:

The first scenario corresponds to PDP7, the target of installed wind power capacity of 6 GW in 2030, accounting for 2.1% of electricity production. The remaining two scenarios achieve a total installed wind capacity of 26 GW and 42 GW in 2030, respectively. In the most ambitious scenario, the annual new installed capacity would be around 2 GW for both wind power. onshore and offshore for the next 10 years. While year-on-year market growth looks ambitious, Vietnam's energy demand forecast is markedly elevated in the revised PDP7, which is expected to install 70 GW of additional generation capacity during 2020- 2030 - mainly power plants running in the background (baseload). The rapid growth in power supply infrastructure is crucial to meet the needs needed to move a country of one hundred (100) million people from the lower middle income level. to the upper middle income level within the next ten (10) years. Advances in technology are helping to

reduce costs rapidly, leading to a dramatic shift in investment models. For example, the target for solar power in PDP7 by 2025 is 4 GW, but reality shows that installed capacity is forecast to be more than 5 GW by the end of 2019. Based on public concern At present, the same trend is expected for wind power.

The following section presents three scenarios to account for the different developments: In the "Old plan" scenario, a wave of new wind power plants is put into operation in time to enjoy the FIT rates. before November 2021. After that, the government's failure to renew the FIT price and legal issues make it possible for the first pilot auction to be delayed to 2022. By that time, an auction The global economic crisis affects Vietnam, reducing economic growth and domestic electricity demand. World fossil fuel prices hit historic lows as not only was global demand depressed, but producing countries were also trying to sell off their remaining reserves before they became useless. Vietnam's policy will prioritize GDP growth over climate protection. This gives natural gas a priority role in the 2020-2030 decade. The rapid catching up in energy efficiency and the strong growth of solar energy, including grid-connected solar power plants and rooftop solar PV, leaves little room for wind energy to open up. far beyond the goals set out in the revised PDP7. In the "New normal" scenario, after the wave of new wind power projects in 2021, there will be no more FIT prices as policymakers worry there will be over-inflation. The market is driven by direct power purchase agreements with multinationals in Vietnam to meet their environmental responsibility goals. These companies purchase electricity directly from wind project developers and through government tenders. Successful bidding pilot in 2020. The government is committed to implementing a bidding mechanism for 1 GW of offshore wind power per year, the market size is expected to cause many industries to choose Vietnam as a base in Southeast Asia for equipment production and maintenance. maintenance and operation of wind power projects. The offshore wind industry is organized around two hubs: the Vung Tau port area serving wind power plants in the area facing the coasts of Binh Thuan and Ca Mau; and Hai Phong port serving the areas facing the Quang Ninh coast. In the "Factor three" scenario, the national oil company PVN reasserts its position as a supplier of sustainable energy, by exploiting its offshore capacity and synergistic cooperation. between fossil energy and renewable energy. Thang Long wind power project, with the proposed large-scale offshore wind power

development near Ke Ga area, Binh Thuan province will meet the set target. The project will start operating phase 1 of 600 MW by the end of 2022. This convinces the government to shape the strategy of Vietnam to become a leading country in the region in the field of wind energy. The Ke Ga offshore wind power project continues to expand its capacity up to 3,400 MW, with a total investment of nearly 12 billion USD. A national-scale offshore high-voltage submarine cable system infrastructure system for offshore transmission submarine cables is started in this area. After 2025, the main strategy to meet electricity demand in Vietnam is to auction two wind power plants with a capacity of 600 MW every six months, along the transmission grid, to the North.

Challenges in wind power development

Firstly, the challenge of policy mechanism: Although Vietnam is a country with great potential for wind energy, so far, the number of projects implemented is still very small due to the lack of strong enough policies. synchronously, including from investigation, potential assessment to exploitation and use.

Second, technological and technical challenges: Lack of necessary and reliable data on wind speed for research and development of wind power sources in different regions; Wind power plant equipment is all super-long and super-weight equipment while road and port infrastructure is still rudimentary, leading to high risks and unsafety; Lack of capacity to manage, operate, maintain and repair wind power projects; Lack of assessment information on offshore wind power potential, as well as the ability to connect to the grid of projects after completion; Wind power projects in coastal alluvial areas have relatively complex topography and geology and are affected by severe weather such as rain, storms, high waves, high winds, combined with an unstable tidal regime. stability will lead to many challenges during the construction and installation of equipment; With new technology and complicated techniques, domestic contractors do not have much experience in the construction and installation of wind turbines at sea.

Third, economic and financial challenges: The biggest challenge for wind power development lies in the investment capital and the investor's ability to arrange capital. One of the main risk factors is the fact that Electricity of Vietnam (EVN) - the only facility that purchases all electricity from manufacturers, is the exclusive unit in payment activities and contract negotiations. electricity purchase and sale agreement. In the view

of many investors, this leads to the possibility of a lack of transparency in transactions with EVN and unprofitable in the long run.

Fourth, wind power is electricity that is only generated when there is wind and the output power changes with the wind level. Favorable areas for factories are often far from consumption areas, causing great difficulties in system operation and stability; difficulties in importing equipment, lack of foreign experts for technical coordination.

Fifth, in addition to the challenges mentioned above, offshore wind power is also a big challenge for Vietnam's energy industry, when countries around the world are racing to install it with many preeminent features and benefits. In Vietnam, offshore wind power is still considered a new technology, when deployed, it will certainly face many problems in technology, as well as development costs. In addition, there are difficulties in site clearance, construction of foundation for turbine piers, transmission line poles, and line corridors when the land demand for onshore wind power projects needs about 28,000 ha. loss of arable land and people's livelihood, ensuring social security. Developers also face the possibility of a shortage of high-quality labor, as well as the underdevelopment of supporting industries [2, 4-5, 7-8, 15].

Legal basis for wind power development towards green energy development in Vietnam

With the orientation of developing a sustainable green economy, in line with international commitments, over the past time, the Government has also issued many mechanisms and policies to encourage the development of renewable energy sources, including: having wind energy, such as: Decision No. 2068/QĐ - TTg dated November 25, 2015 approving Vietnam's Renewable Energy Development Strategy to 2030, with a vision to 2050; Decision No. 39/2018/QĐ-TTg of the Prime Minister dated September 10, 2018 on the mechanism to support the development of wind power projects in Vietnam; The National Electricity Development Plan for the period 2021 - 2030, with a vision to 2045 (Power Master Plan VIII) has been approved by the Prime Minister in Decision No. 1264/QĐ-TTg dated October 1, 2019. ; The national energy master plan for the period of 2021 - 2030, with a vision to 2050, has been approved by the Prime Minister in Decision No. 1743/QĐ-TTg dated December 3, 2019; Resolution No. 55 - NQ/TW dated February 11, 2020 of the Politburo on orientations of Vietnam's national energy development strategy to 2030, with a vision to 2045 [1, 9-12].

Over the past two decades, a system of mechanisms and policies for the development of renewable energy, including wind energy, has been built and gradually completed with price incentives for renewable energy sources. Investors, manufacturers, creating a driving force for the development of the renewable energy market in Vietnam in general and wind power in particular. The potential for wind power development in Vietnam is still very large, diverse and rich, so it is necessary to continue researching, amending, supplementing and perfecting mechanisms and policies to encourage the strong development of wind power in Vietnam. Vietnam to serve the country's socio-economic life.

Proposals to improve investment efficiency in wind power development in the period of 2021 - 2030

Firstly, Vietnam's next national electricity development plan will be an important opportunity to increase the target of low-cost wind power development.

Second, in order to realize the great potential of offshore wind energy, it is necessary to clearly define the role of wind energy in infrastructure planning as soon as possible.

Third, to ensure stable operation of the system if the wind energy source has a large integration rate in the system, it is necessary to invest in more power sources with flexible operation characteristics to increase the level of redundancy for the system. Besides, the transmission grid also needs to be invested more so as not to create bottlenecks on the grid.

Fourth, to solve the problem of investment capital for wind power enterprises, it is necessary to improve production and business efficiency in order to improve the ability to raise capital of enterprises operating in the energy sector, especially state-owned corporations like EVN. Encourage many economic sectors to invest in the wind field; In particular, it is necessary to strengthen the attraction of capital sources from abroad, including: concessional official development aid, non-preferential official development aid, foreign commercial loans, and priority in the allocation of credit capital. preferential use of ODA capital and loans under bilateral agreements for investment in projects such as exploration and development of wind energy.

Fifth, the right direction of renewable energy policy also contributes to promoting sustainable green growth, institutionalizing legal regulations through the development of the Law on Renewable Energy to effectively mobilize

resources. develop this energy source; develop effective support mechanisms for wind energy and ensure efficient operation.

Sixth, it is necessary to supplement financial policy solutions for mobilizing capital to develop the energy industry, using taxes and fees to encourage economic sectors to invest in green energy development, and prioritize green spending policies. buying and using clean energy and green credit policy for the renewable energy industry in general and wind power in particular.

II. CONCLUSION

Despite being a country with great potential for wind energy, the development of wind energy sources in recent years continues to face a number of inadequacies and challenges, such as high investment costs, high number of low power source operating hours, large land use requirements. The biggest challenge to develop this power source is to have a stable mechanism and policy, and to select an investor with financial capacity, as well as experience in investment and effective implementation. In order to exploit this energy source in Vietnam effectively, it is necessary to make a methodical, specific and strong investment at the national level and to place it in an important position in order to create the premise. for planning specific development strategies, policies, plans and roadmaps. In addition, there should be a series of incentive mechanisms for wind power, other preferential policies for investors, such as: priority in credit provision, corporate income tax exemption and reduction, land rent, etc. using a model power purchase agreement, etc. It is hoped that, with the attention and direction of the State through a system of policies, there is a unified program and appropriate funding from the budget, as well as other policies. International assistance in engineering, technology, finance and wind power in Vietnam will achieve results commensurate with its potential.

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