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Monopolistic Business Strategy of EVN in Vietnam's Electric Energy Market

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Abstract
In a business plan in sequence, including a series of methods and ways of doing business throughout a certain period of time. To be able to draw up a *business strategy*, the leadership team and the consulting team must fully and in detail study the issues surrounding the internal environment as well as external factors affecting the business. From there, it is possible to analyze and forecast the market in the medium and long term and develop strategies based on those factors. Many people confuse business strategy and tactics. The strategy is overall, across a long period of time (from at least 1 year to 5-7 years depending on the size and vision of the business). Meanwhile, tactics are measures and methods of operation that are specifically built for each short-term business period (6 months to less than 1 year). With monopoly business is characterized by a single seller, selling a single product in the market and having many buyers and sellers do not face competition as they are the only sellers, thus selling a single product with no substitutes and no competition is therefore a monopoly. Currently, the parties involved in the electricity generation market in Vietnam are state-owned companies such as Electricity of Vietnam (EVN), Vietnam Oil and Gas Group (PVN), Vietnam National Coal and Mineral Group. (Vinacomin) and independent power producers (IPPs) and foreign BOT projects. State-owned companies hold a very large market share in electricity production. EVN currently owns most of the capacity of power sources, holds the entire stage of electricity transmission, distribution and retail business. EVN also plays the role of the sole power purchaser, the Electricity Trading Corporation under EVN buys power from power plants other than EVN such as PVN, TKV to distribute and retail electricity to electricity consumers. It can be said, "So far, EVN is still a monopoly organization in electricity trading in the country, there is no competition in any activities in all stages of the electricity industry".

Keywords: Business Strategy, Monopoly Business, Monopoly Market, Monopoly Electricity Market of EVN

1. Introduction

1.1 Overview of the research problem

In the context of industrialization and modernization of the country, the electricity sector is an industry with a very important strategic role and is the driving force of the economy.

However, in Vietnam today, the production and distribution of electricity is still owned by the State, but directly by the Vietnamese electricity corporation. This monopoly situation is one of the causes leading to insufficient production for consumption, and constant electricity shortages.

Vietnam's electricity industry is mainly supplied by EVN. EVN's output accounts for 74% of electricity production, 100% of transmission and 94% of electricity distribution across the country. Therefore, EVN is a prime example of a natural monopoly. EVN participates in all three stages including electricity generation, transmission and distribution. In Vietnam, there is no competitor, other power generation companies have to sell electricity to EVN at a set price, which has created a monopoly situation, causing significant impacts on production and consumption.

1.2 The urgency of the research problem.

The stable and sustainable development of the economy and the enhancement of the well-being of people's lives requires electricity services that are provided efficiently and reliably. Electricity is an input for most production, business and consumption activities. The electricity sector is also a key infrastructure industry in most of the world's economies.

In the past, the electricity industry across countries operated under the model of "natural monopoly". With this model, the production of electricity on an industrial scale is carried out according to the supply chain by "monopoly" suppliers, with the state's regulation on prices and accession conditions. market, investment management and service quality control. The process of electricity production - supply is vertically integrated, focusing on one or several exclusive suppliers under the regulation of

the State. This model is also suitable when the electricity production capacity (generating capacity) is not enough to meet the electricity consumption demand. In other words, when production is not enough to meet demand, the priority issue of the power industry is to increase output and ensure the security of electricity supply.

When the electricity industry enters the stage of having a higher production capacity to meet the consumption capacity of customers, the priority of the industry will be more economic and efficient production, coupled with the business model, organization more advanced market. At this time, customers' demand for electricity services with more reasonable prices, higher quality and reliability, and initially formed the basis for competition. From here the process of natural selection begins. Factories with outdated technology and inefficient production will gradually be replaced by new factories with modern technology and lower costs. Areas and activities in the electricity industry that are inherently inefficient will gradually transform and form more optimal and cost-effective models and ways of operating. As a result, the most economically efficient factors of production exist in the industry. This selection process takes place when the electricity sector is liberalized and a competitive electricity market is built. International experience from the late 1980s to the early 2000s shows that many countries have succeeded in developing the power market towards liberalizing and improving the competition mechanism, transforming the power industry. to a new level of efficiency, higher quality and improved customer satisfaction.

In our country, the electricity industry has a long history of development and has contributed significantly to socio-economic development. The Government soon had a roadmap to perfect the organization, liberalization and improvement of the market competition mechanism in the electricity generation (in 2014), electricity wholesale (in 2021) and electricity retail (after 2021). passed Decision No. 26/QD-TTg 2006. This decision shows the appropriate long-term strategy and vision for the power industry. The basic goals set for the development of the market, the orientation towards liberalization and improvement of the competition mechanism are: First, to gradually develop the competitive market in a stable manner, eliminating subsidies in the industry. electricity, increasing the right to choose electricity suppliers for electricity users; *Secondly*, attracting investment capital from all economic sectors at home and abroad participating in electricity activities, gradually reducing the State's investment in the electricity industry; *Third*, enhance the efficiency of production and business activities of the electricity industry, reduce the pressure to increase electricity prices; ensure stable, reliable and increasingly high-quality power supply; and ensure sustainable power sector development. Up to now, the fully competitive electricity generation market (level 1) has been officially operated since July 1, 2012, marking a new development step for Vietnam's electricity industry. The competitive wholesale electricity market belongs to level 2 in the Roadmap for the formation and development of power grids in Vietnam, implemented from 2015 to 2021 in two phases, undergoing pilot operation (to 2019) and fully operational after 2019. The development of the power market in general has obtained positive results such as improving the operating capacity and reliability of the system, basically providing enough electricity for socio-economic development. In addition, the operation of the competitive electricity generation market has increased transparency and fairness in mobilizing power sources. Power generation plants participating in the market also initially improved their production and business efficiency. However, the electricity market still has some limitations as follows: Firstly, the electricity price mechanism is not reasonable, does not properly reflect the nature of market prices and the supply-demand relationship, subject to strong regulation by the Government. while the subsidy status in the electricity sector has not been completely eliminated. The current electricity tariff 3 is maintained at a low level while production costs are increasing day by day. Not only low-income consumers but also energy-intensive industrial sectors are being indirectly subsidized through low electricity prices. This is a burden not only for the electricity industry but also for the national budget when economic relations are distorted and the state has to implement price subsidies. Second, the electricity market is still dominated by companies affiliated or owned by Vietnam Electricity - which is a monopoly company in the industry. Attracting investment capital from domestic and foreign economic sectors, especially the private sector involved in electricity activities, faces many difficulties. As a result, the production and supply of electricity has not been stable, especially during the dry season every year, there is an overload on the transmission grid due to the imbalance of power sources between regions. Third, electricity customers still do not have the right to choose a service provider, and therefore have not been fully guaranteed of their benefits. This creates a paradox in the purchasing relationship when the relationship between the customer and the service provider is relatively asymmetric. When customers have no other choice, it means that service providers have little incentive to improve business performance. Improvements in the efficiency of production and business activities of the power sector are unclear and unsustainable, putting pressure on electricity prices to increase. Then the customer's interests will be affected. Stemming from the limitations in the reality of power market development in Vietnam today, the PhD student has chosen the issue "Development of the electricity market in Vietnam" as a research topic for his PhD thesis in Economics. Development Economics. This is necessary research to contribute to the formation of a number of solutions to complete and develop the electricity market, aiming for an efficient market, providing electricity to customers safely, reliably and with quality service. higher service levels, contributing to ensuring national energy security.

1.3 Research significance for management practice

The experience of some countries that have successfully implemented the market at a high-level show that the liberalization and establishment of competition in the electricity business have brought greater benefits to customers and achieved high economic efficiency. than. In the long term, electricity production costs tend to decrease or remain stable at both wholesale and retail levels. This helps to avoid economic losses caused by electricity price increases, benefits customers and creates an effective competitive environment that benefits the economy as a whole. However, the transformation of an important economic sector, which is an essential infrastructure field for sustainable socio-economic development, requires many

factors and fundamental principles for the construction and development process. The market does not deviate from the purpose of establishing competition, increasing transparency and bringing more benefits to consumers.

The transformation process requires many conditions and implementation methods in which the power market regulation and management mechanism is an indispensable factor, having a great influence on the roadmap and destination of the electricity sector reform and development. market development. Accordingly, it is necessary to build an independent market regulatory agency and institution capable of controlling information on costs, service quality and operational efficiency of power grid enterprises. The regulatory body has the power to regulate transmission/distribution charges and the conditions and terms of access to and use of the grid for power generation and trading units.

- The process of completing state policies and regulations for the management of the power sector and restructuring the power sector requires an objective assessment, on the basis of respecting and inheriting existing policies and regulations in order to promote and enhance the feasibility and sustainability of the institutional environment;
- The improvement and consolidation of the system of agencies and organizations related to the formulation and implementation of energy policies in general and the electricity sector in particular should follow the general orientations of the Party and the State on administrative reform. Government, building a constructive and serving government. The institutional structure must be completed according to the general direction and not disrupt the existing structures.

The power market construction must go hand in hand with the reform of the power sector in the direction of deregulation of the electricity generation and retailing areas, maintaining functional regulation and economic regulation of the grid service stage in order to ensure that non-state entities have conditions to access the power grid as a shared infrastructure, aiming to better serve the interests of consumers.

2. Theoretical basis

After more than twenty years of implementing the renovation policy, our country has achieved important achievements, laying the foundation for the development phase: the country's economy has a high and continuous growth rate with an average GDP of about approx. 7%/year in the period 2001-2007; stable socio-political situation; people's living standards are enhanced; international cooperation in all aspects has been improved.

The 10th Party Congress continued to affirm the renewal path in the direction of accelerating industrialization and modernization to make our country basically become an industrial country by 2020; actively integrate into the international economy, commit to implementing agreements within the framework of AFTA, the Vietnam-US Trade Agreement and the World Trade Organization (WTO); strengthen the renewal of the state economic sector, develop the collective economy, encourage the military sector, strongly support the small and medium enterprises sector; promote administrative reform.

The 2001-2010 socio-economic development strategy has determined that the development goal is to bring our country out of underdevelopment, significantly improve the people's material and spiritual life, and create a foundation for by 2020 Vietnam will basically become an industrial step towards modernity; human resources, scientific and technological capacity, infrastructure, economic potential, national defense and security are enhanced; socialist-oriented market economic institutions are basically formed; Our country's position in the international arena is enhanced.

In that context, our Party and State affirm that the development of science and technology is the top national policy, the foundation and driving force for industrialization and modernization of the country. The ideology of our country's science and technology development strategy to 2020 is to focus on building our country's science and technology in the direction of modernity and integration, striving to reach the average advanced level in the region, bringing science and technology to truly become the foundation and driving force for the country's industrialization and modernization.

Vietnam Electricity (hereinafter referred to as the Group - EVN) is one of the most useful facilities in Vietnam's spearhead industries, contributing to the creation of infrastructure and development motivation for many economic sectors. other, improving social life, contributing to ensuring national security and defense. Among the enterprises in our country, Electricity of Vietnam is currently managing the largest amount of assets, the highest average total construction investment capital per anwm. In 2007, EVN's total assets were VND 185,180 billion. Over the history of development, up to now, Electricity of Vietnam has been developing strongly in investing and using new technological equipment in parallel with the equipment and technology of the previous generation existing in Vietnam. electricity production, transmission, distribution and trading; the growth of electricity consumption to meet the increasing demand and to serve the socio-economic development goals of the country.

The strength of Vietnam's electricity industry, represented by the Vietnam Electricity Group, will largely depend on the Group's technological capabilities. To adapt to the above context and implement development strategies and policies in the energy field in particular and socio-economic development in general, the development of electricity technology for Vietnam Electricity requirement is becoming more and more urgent.

Regarding organization, Electricity of Vietnam is a state-owned company, invested and established by the state, organized and operated in accordance with the provisions of law for state-owned companies and the charter of EVN.

3. Research Methods

3.1 Data sources and methods of collection

3.1.1 Data sources

After nearly 1 year of implementing the project, the implementation of digital transformation tasks has been strongly promoted in all stages of power generation, transmission, distribution, and customer service.

EVN has completed the database of the Technical Management Software System (PMIS): 100% digitization of 220kV transmission grid equipment; 100% of power corporations have completed digitizing 80% of 110 kV grid equipment; IT application in CBM repair for substations from 110 kV in which power corporations have achieved 90% of assigned tasks.

Notably, EVN assigned EVNNPT and EVNCPC to test the application of AI in image processing and recognition technology in inspecting and monitoring the line corridor with photographic equipment and intelligent flying devices. EVNNPT is testing the application of AI image analysis 500kV Da Nang - Thanh My, 220kV Da Nang - Hoa Khanh transmission line at the stage of image collection and AI training. EVNCPC has organized to collect images of existing power grids, built an AI module to analyze snapshot data, and integrated PMIS.

3.1.2 Collection method of Electricity of Vietnam (EVN)

The Electricity Corporation of Vietnam (EVN) has been effectively applying advanced technologies in collecting and exploiting distance meter data and a remote metering data collection system. This is also a component of EVNHCMC's smart grid construction platform.

Application of advanced technology in data collection

As of July 31, 2021, EVNHCMC has installed more than 2.3 million telemetry meters, accounting for ***86.87%*** of the total number of meters on the grid. It is expected that in 2021, the corporation will complete the installation of 100% of distance meters for customers.

In order to efficiently exploit data from rangefinders, EVNHCMC has built an IoT Gateway System with advanced technology for data collection.

IoT Gateway system is designed in the direction of load balancing, two-way interaction. After collecting the modem/DCU device, the data will be transferred to the server through a single Gateway. Gateway will receive information and transfer data to the connection channels (sockets) of the JMS server. The socket channels of the JMS server will be expanded as the current system increases the modem/DCU connection load. Users will exploit data through the provided IoT Gateway website or interact with the modem/DCU through integrated connection protocols.

The system with the main functions to help employees of the Electricity industry handle operations remotely such as: reading meter data remotely, monthly closing index; warn of measuring points with fluctuations in transmission on the power grid; locate the measuring point, modem, DCU integrated on the electronic map for users to quickly localize and analyze the location if an error occurs; monitoring signal wave of sim, backup battery mounted in 3G/GPRS modem.

The system also supports instant warning for the unit when the measuring point is disconnected, the measuring point is connected but does not collect information; control declaration of measuring points with other information systems such as CMIS, PMIS.

In addition, the system also built a utility function for users to manipulate multiple devices at the same time, without having to check and order each device; integrated indicators to warn of measuring point operation (non/full/overload; collapse/overvoltage; over/undercompensation, phase difference); sharing collected data for related exploitation systems such as load research, load reduction, billing/loss data on CMIS...; applying AI and Big Data algorithms in data analysis.

3.2 Research Methods

- There are many countries in the world that have electricity markets and they have succeeded in choosing and offering a method to calculate a reasonable transmission price for their electricity market. As for anti-clogging solutions in market conditions, there are 5 main solutions currently being applied. However, each solution has advantages and disadvantages that have not been analyzed and generalized for different market conditions.
- Researched the problems of optimal grid structure, electromagnetic fields of high and super high voltage lines, the possibility of occurrence and application of super high power transmission > 500kV on the Vietnamese power system, reliability trees and stability of the power system; develop principles for selecting TDK insulators for industrial contaminated areas; polarization and depolarization current analysis methods for the determination of moisture in transformer insulation; research and design of lightning protection; Study on properties of composite materials used in high voltage electrical equipment...
- Researching and applying artificial neural networks in short-term electricity load forecasting, studying, calculating and determining electricity price brackets of various types of power generation technologies in the competitive electricity generation market; the influence of the power sector on economic development; calculate the price support level in the development strategy of independent renewable energy sources.
- Assess the factors affecting energy consumption of industries, research and propose energy usage norms for industries; research on methods of determining electricity transmission prices and anti-congestion methods... Research results of these topics have been referenced for strategic tasks of the industry.
- In the field of industry economic research, the Institute has carried out economic studies including research on electricity prices, energy prices and electricity markets.

4. Research results and discussion

As learned, Resolution No. 55-NQ/TW of the Politburo on strategic orientations for Vietnam's national energy development to 2030, with a vision to 2045 (February 11, 2020) affirms that: National energy development must be consistent with the socialist-oriented market economic institution and the trend of international integration; quickly build a synchronous, competitive, transparent energy market, diversify forms of ownership and business methods; apply market prices to all types of energy. To encourage and create all favorable conditions for all economic sectors, especially the private sector, to participate in energy development; resolutely eliminate all manifestations of subsidies, monopolies, unfair competition and lack of transparency in the energy industry.

The Politburo issued such a regulation because the most prominent feature of the energy regime in Vietnam is that the State holds a monopoly in (1) transmission activities, (2) regulation of the national power system, and (3) regulation of the national electricity system) construction and operation of large power plants. This exclusivity provision is perhaps the biggest barrier to innovation in Vietnam's energy sector.

In Vietnam today, in addition to a few small suppliers, there are at least three major agencies in the energy sector, namely: Electricity of Vietnam, PV Power (PetroVietnam Electricity Corporation), and TKV (Vietnam Coal and Mineral Industries Group, also known as VINACOMIN). Let's assume that there is no monopoly in electricity

production (although all three companies are state-owned and there is no evidence of competition among them).

In addition, technically, it is completely reasonable for the State to regulate the national electricity system. We are assuming that, traditionally, each system needs one party to govern the entire system, and that it is reasonable that the government should be the regulator of the national system. However, if the technology advances to the point where all power producers – public and private – can participate in a common coordination system, then our current story of monopoly electricity transmission will be different, meaning that system regulation can be applied equally to all parties – public and private.

Let's try to simplify the problem by focusing only on the monopoly mechanism in power transmission.

The only basis for this monopoly is national security. The national power transmission system is the backbone and lifeblood of the national power system, playing a particularly important role in ensuring energy security and national security.

However, no one can explain why the government should keep a monopoly in the operation of the national grid and large power plants just because they are important to national security.

Conventional wisdom and reliable studies both show us that a centralized system like the national grid is extremely vulnerable. If the backbone is cracked, it is likely that an entire country or a large part of the country will be paralyzed. The safety measures will require the system to be decentralized into many smaller elements – multiple power plants and local grids distributed across the country – and interconnected into a smart grid and harmony. National security requires the national power grid (and power generation plants) to be distributed throughout the country, not centralized into a single giant system.

A monopoly protected by law is the worst thing that can happen to an economy. Even without legal protection, EVN (Electricity of Vietnam) inherently holds the role of a natural monopoly, this comes from the traditional development of the energy industry around the world. Using legislation to further protect this natural monopoly is not only unnecessary, but also harmful to the economy – because it eliminates all opportunities for private investment and therefore, competition in the energy sector, where new economic conditions or new technologies permit competition. Without competition, the energy industry simply cannot thrive.

Allowing competition also means that the government will spend more time on regulation and regulation, thus leaving business to private enterprises. Until now, almost every investment plan in the energy sector has faced plans, regulations, permits, approvals from the state and most require the signature of the Prime Minister, therefore A lot of time is spent, but not much progress has been achieved. This is extremely inefficient for the government. Nor is it an attractive environment for private investors. The legal structure should allow private enterprises to trade and compete, the market self-regulates and the government to act as the arbiter of competition regulation, with very little regulation as long as market conditions may allow.

When a private investor is allowed to build a solar or wind power plant, sell electricity directly to consumers, and build a local transmission network to serve customers, it can be it is only a very small grid at the regional level, but it will also bring about a small competition – within that local grid – between the private investor and EVN. Even if EVN has no operations in this locality, the existence of EVN inherently creates potential competition for any company that wants to raise prices to economically unreasonable levels.

In fact, a private investor may want to have a small independent local grid, and at the same time transmit some of his electricity through the national grid of the National Power Transmission Corporation (EVNNPT). to serve remote customers. Whether operating independently, connected to the national grid, or both, these local grids will help increase the country's energy capacity, ensure greater security for the national energy grid, and bring more competition to the electricity market. Competition often increases the quality and reduces the price of products and services.

Allowing private investors to generate and transmit electricity on their own lines does not present any significant danger. Many of these private investors will continue to rely on EVNNPT for power transmission, because it is the best way to supply electricity over a very long distance or a very large area. However, allowing the government to allow businesses to build their own production plants and power transmission systems would be the first big step in bringing competition into the energy industry to a manageable level.

- Another obvious structural change to create competition in the energy sector is to separate EVNNPT (the power transmission unit) completely from EVN, and just let EVN operate as a power generating company. Separating transmission from power generation allows for competition. First, this split ends all cross-subsidization between EVN and EVNNPT, so that each unit will operate in line with more market principles. Second, when EVNNPT operates independently and separately, it will not discriminate against all power producers, including EVN and all other companies. That will help all companies compete on an equal footing.

  As long as the production and transmission of electricity remains in the hands of a single monopolist, then competition cannot develop.
- Another structural change that can be made if the government wishes is to separate the other 10 subsidiaries of EVN from this unit, and allow these subsidiaries to act as producers and transmitters independent electricity.

  After the separation, it is clear that EVN is still the most dominant power producer and EVNNPT is the most dominant power transmission company. However, competition still has the opportunity to grow steadily.

  Competition will not remove regulations. but the economy simply requires a different, more sophisticated and efficient way of regulating the market. And the government will have enough time to monitor new market conditions to design regulations accordingly.

For example, the Committee for the Management of State Capital at Enterprises recently announced that it may sell some power plants that EVN builds after these plants enter the operational phase, to ensure a high level of security. cover public debt and collect capital for new projects. This is a very encouraging sign for the government to move out of business and instead become more involved in competition management.

5. Conclusions and Recommendations

5.1 Conclude

Sharing more about the difficulties and impacts on the power system when there are many renewable energy sources, Mr. Nguyen Van Ninh said that there has been a situation of oversupply and overload of intra-regional lines and 500kV link lines; The load difference between peak and low peak is large; Forecasting the generating capacity of renewable energy is difficult due to large errors; Vietnam's electricity system operates independently (unlike the linked grid in the European region), while technical factors as well as ensuring the operation of a competitive electricity market and other regulations are still required. maintain the traditional power source.

To ensure the safety of the power system as well as economic efficiency, according to Mr. Nguyen Duc Ninh, the reduction of renewable energy sources is necessary. In the first 4 months of 2021, the amount of rooftop solar power will be cut by 447.5 million kWh, accounting for 13.3%. It is expected that the whole year of 2021 will cut 1.25 billion kWh, accounting for 9% of total renewable energy output.

According to statistics of the National Load Dispatch Center, in the first 4 months of 2021, due to the priority of mobilizing renewable energy sources, thermal power plants had to start the unit more than 334 times. This number in 2020 is 192 times. With a coal, gas and oil power project, each shutdown and restart costs tens of billions of dong, not to mention the risk of damage and reduced machine life. In fact, there was a breakdown of the unit at Phu My 2.2 factory; Ba Ria factory...

From the actual operation, EVN has also developed solutions and reported to the authorities in which it is recommended to review, update and adjust circulars and processes to suit the operating conditions of the power system. a high proportion of renewable energy, especially with a large penetration rate of rooftop solar power in the distribution grid, soon promulgate a mechanism for rooftop solar power, which encourages the increase of self-consumption capacity as well as ensures technical requirements.

EVN also reported to the Ministry of Industry and Trade/Prime Minister to approve the auction/bidding mechanism for wind and solar power projects – supplementing the master plan according to the 3-5 year implementation plan with an appropriate scale at each location. time, each area in the future, avoiding grid overload and excess power. At the same time, it is proposed to propose a mechanism to invest in building a battery storage system (BESS); ancillary service mechanism in the power system to encourage power generation units to participate. It is recommended to soon approve the additional planning of urgent power grid works to serve the release of renewable energy. Overall consideration of the need for an avoidable cost mechanism and readjusting the avoidable cost calculation method in the context of renewable energy penetration with an increasing rate.

5.2 Recommendations and suggestions

5.2.1 Recommendations

The period from 2016 to 2025

Deploying technologies and services with the goal by 2025 to complete the task of making the retail market competitive, as a premise for the development of a border retail market to operate by 2030:

- Deploying smart metering technology on the basis of inheriting the previous stage
- Complete and upgrade the integrated customer service center.
- Improve and develop inspection and testing centers.
- Implement monitoring and analysis of electricity demand. By the time the electricity market was formed: Managing transactions in the market.
- Research and implement projects related to remote index reading and database storage.

5.2.2 Suggestions

Organizational and mechanism solutions

- EVN's leaders collectively direct the implementation of the Group's strategy on development of electricity technology, consider and approve projects and projects serving the implementation of technology innovation and development.
- The Electricity of Vietnam (EVN) promulgates mechanisms and policies, prioritizing the balance of investment capital in technology development in order to soon implement the process of technological innovation according to the approved strategy in accordance with the authority as prescribed.
- The Department of Science, Technology and Environment is the focal point to advise and lead EVN to implement the Strategy for development of electricity technology.
- The functional departments and units of EVN according to their assigned functions and tasks are responsible for coordinating with the Department of Science, Technology and Environment to implement the Strategy for development of electricity technology.
- Boards and member units of EVN coordinate to develop a specific roadmap for technological innovation in power industry sub-sectors according to the proposed Strategy.
- The Institute of Energy is the unit that consults or participates as a collaborator in formulating projects in the implementation of the Strategy when assigned by the Group or in coordination with other units in the Group by economic contracts.

Solutions for development investment and finance

- Electricity of Vietnam plays a key role in ensuring investment in technology development to meet development needs and in line with the Group's financial capacity.
- Implementing mechanisms and policies to diversify investment methods in order to effectively promote resources and meet EVN's technology development needs.
- Continue to implement the equitization of power projects and issue bonds and stocks to the stock market.
- Performing joint ventures, linkages and technology transfer in the technology development investment of EVN.
- Continue to recommend the implementation of electricity price reform according to the approved roadmap.

Necessary projects and projects to be implemented during the implementation of the Strategy

- Research on exploitation and efficient use of domestic primary energy (coal fuel, gas...) for power plants.
- Research on efficient exploitation of hydroelectric reservoirs, especially for hydropower plants on a river.
- Researching solutions to improve the reliability of the power system (in electricity production, transmission and distribution).
- Research to improve capacity of power transmission and distribution networks; Research solutions to reduce power loss.
- Research solutions to improve the capacity of electricity business and services - customers.
- Researching solutions to reduce electromagnetic fields of ultra-high- and high-voltage lines;
- Research to improve competitiveness in the electricity market.
- Research topics and projects on telecommunications and information technology for electricity production and business

5.3 Limitations and directions for further research

5.3.1 Limitations of EVN

1. High cost
2. Unstable
3. High cost of energy storage
4. Still polluting the environment, even if very little
5. Low energy density

5.3.2 Orientation of EVN

Based on the development perspective of the Draft Power Master Plan VIII, EVN has identified a number of focuses to develop strategic orientations for energy transition.

Specifically, about the power source, EVN will optimize and choose the appropriate ratio for different types of power sources; developing thermal power plants using liquefied natural gas and renewable energy sources; focus on researching and updating technologies to apply new fuel sources with low greenhouse gas emissions. EVN also determined a roadmap to upgrade and apply technological solutions to store and treat greenhouse gas emissions for traditional thermal power plants; lays out a roadmap to phase out old plants that no longer meet age and emission standards.

With the power grid, EVN focuses on developing the transmission grid system to release capacity synchronously with the electricity investment roadmap to 2045; study and apply technological solutions, modernize and improve the capacity of the transmission system, reduce the loss rate on the transmission and distribution grid; developing smart grid, combined with building ancillary service market for power sources and loads, in order to improve the flexibility of grid operation.

At the same time, EVN will promote the mobilization of preferential capital sources at home and abroad to invest in the development of renewable energy sources, new energy and encourage energy transition.

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