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Sustainable Development Of Renewable Energy: A Case Study In Vietnam

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Summary:
The depletion of fossil fuels, coupled with the growing awareness of the impact of fossil fuel consumption on the global environment, has spurred research activities focused on alternative (or recycled energy). Besides, the demand for energy and related services to meet people's economic and social development, welfare and health is also increasing daily. Therefore, renewable energy is an excellent approach to mitigate climate change and meet the sustainable energy needs of present and future generations future.

Keywords: Sustainable development, energy, renewable energy.

Preamble:

For a country, energy always plays a significant role. Sustainable energy development is one of the criteria to measure the prosperity of each country. However, maintaining this sustainable development is a complex problem. The article will analyze the situation of sustainable development in Vietnam's renewable energy industry and simultaneously propose a group of solutions to solve the remaining difficulties.

1. Concept of Sustainable Development

The term "sustainable development" first appeared in 1980 in the publication of the World Conservation Strategy (published by the International Union for Conservation of Nature (IUCN) with the content "The development of mankind cannot only focus on economic development but also respect the inevitable needs of society and the impact on the ecological environment." This concept was widely disseminated in 1987. Sustainable development simultaneously operates three dimensions: sustainable economic growth, prosperous society, equity, stability, cultural diversity, and a healthy environment resources are maintained sustainably.

Criteria, roles and content of sustainable development

First, the criterion of sustainable economic development The aspect of sustainable economic growth consists of several essential contents: Firstly, gradually reducing energy consumption and other resources. Second, changing consumer needs without harming biodiversity and the environment. Third, equality in access to resources, river levels, health services, and education. Fourth, eradicating hunger and reducing absolute poverty. Fifth is clean technology and industrial ecology (recycling, reusing, reducing waste, recreating used energy, and developing a circular economy). To be sustainable, the economy needs to meet the following requirements: high GDP growth and high efficiency; GDP per capita reached a high level; Reasonable GDP structure. Secondly, the criteria of socially sustainable development are assessed by measures, such as HDI, income equality coefficient, gender equality, indicators on education, health, etc., social welfare, cultural enjoyment, and protection of cultural diversity. In addition, social sustainability

guarantees a harmonious social life; there is equality between the stages of social classes and gender equality; it minimizes the gap between rich and poor and the difference in river life between regions. Third, the criterion of environmentally sustainable development is to ensure the purity of air, water, and land geospatial landscape, control and reduce greenhouse gas emissions, reduce emissions, overcome pollution, develop a circular economy, protect biodiversity, and protect the ozone layer. Ensure a balance between preserving the natural environment and exploiting natural resources.

2. P sings about sustainable development in the renewable energy industry in Vietnam

New types of renewable energy

Solar energy has grown by leaps and bounds over most of the time, both in terms of the number of plants, capacity, and total investment. Wind energy started the earliest, still maintaining a reasonably high development rate. Meanwhile, biomass energy, due to various reasons, both subjective and objective, is still only at a potential level

Traditional power plants and power plants using use renewable energy

Hydroelectric power plants and clusters with large capacity have been built all or almost all. They may not be considered in the future when they want to increase their large hydroelectricity capacity. Up to now, large hydropower projects with a total of over 100MW have almost been fully exploited. Projects with favorable locations and low investment costs have also been implemented.

Capacity increases due to renewable energy and coal-fired power, So the first assumption is the future capacity increase, mainly the story between renewable new energy (solar power, wind power) and thermal power coal (plants that use fossil fuels). With some assumptions, an increase in the percentage of plants using renewable energy will positively or negatively affect the existing system. a. Investment rate Assume that the increase in the source is only accounted for by one of two types of plants, either coal-fired power plants or power plants using renewable energy

Vietnam is a country with vibrant solar energy potential, especially in the central and southern regions, with sunshine almost all year round. In the North (including Bac Ninh province), during the winter, the efficiency of solar energy use is lower due to cloudy weather and drizzling rain (about 3-4 months). However, there is still a lot of potential for efficient solar energy from May to October. Bac Ninh has many industrial parks and industrial clusters with large factory roofs and roofs of offices, schools, and offices. The population is relatively high, so it is suitable for installing rooftop solar power systems.

Promoting this potential, over the past time, the province has directed units, localities, businesses, and people to install the solar PV system to create a significant source of clean energy, bringing high efficiency to both economy, environment, and society. Up to now, the province's electricity sector is signing power purchase and sale contracts with 491 investors with solar PV projects, with a total generating capacity of 20,230.715 kWp. Of these, there are 24 projects with their own dedicated substations and 21 with a generating capacity of over 100 kWp. The projects are mainly in industry, civil, technical infrastructure, and agriculture.

3. Actual situation of energy use in Vietnam

According to data from the Electricity of Vietnam (EVN), by the end of 2021, the total installed capacity of renewable energy sources in Vietnam is estimated at 22,300 MW, accounting for about 28% of the installed capacity of the system national electricity system.

However, the problem for the development of renewable energy is not only focusing on building factories but also optimizing this energy source in the power system is also a big challenge.

By the end of 2021, the total installed renewable energy capacity will reach 22,300 MW.

Many experts agree that developing renewable energy is a trend and will gradually replace fossil fuels in the future. This energy source brings many benefits, such as reducing carbon emissions and other types of pollution. Still, it also comes with many challenges, especially in operating the electricity system, increasing costs, and the user's ability to pay.

In this case, the power system must mobilize a lot of wind and solar power sources, and the amount of capacity that needs to be invested in construction is very high. In fact, dispatching the power system shows that operating with a high proportion of renewable energy is not easy.

Despite many difficulties and challenges, energy experts agree that fighting climate change and developing a "green economy" are top priorities for many countries worldwide. In the world, renewable energy is receiving more and more attention. Vietnam needs to develop faster, creating a competitive position in the "green economy" period and a pivotal point to achieving the country's sustainable development goals.

4. Renewable energy is the determining factor in Vietnam's economic future

The use of fossil fuels such as coal, oil, and gas... is one of the leading causes of environmental pollution, climate change, and the greenhouse effect. These fuel sources are supplying about 80% of global energy demand. The development of renewable energy sources is an inevitable trend, contributing to slowing climate change increase.

Vietnam has many opportunities to become a global leader in renewable energy. According to calculations of the Institute of Energy, the total potential scale of wind power onshore and near shore in Vietnam is 217GW, of which the offshore wind power technical potential is about 160GW; The unlimited development potential of solar energy is 386GW.

From 2015 to now, Vietnam has changed from an energy exporter to an energy importer. Therefore, developing renewable energy is crucial in ensuring the country's energy security. However, there are still some difficulties and policy problems that are barriers to the sustainable development of this energy source.

The Institute of Energy Economics and Financial Analysis (IEEFA) latest report estimates that multinational corporations contribute about 150 billion USD to Vietnam's annual export revenue. They also commit to being carbon neutral or reducing carbon emissions in different scopes and roadmaps. Therefore, the journey towards sustainable development of these global brands is an opportunity that Vietnam cannot ignore.

Vietnam currently has the most considerable export value of goods among the developing economies in Southeast Asia. With nearly 60% of export revenue coming from products outsourced to major international brands, Vietnam's increasingly important position in the global supply chain comes with the need for flexible adaptation to the interests and priorities of these corporations.

In addition, wind power and solar power are no longer merely a solution for the additional power supply but also act as a policy to ensure jobs for millions of workers in terms of foreign currency revenue and economic growth economy will be the key to unlocking investment capital for sustainable development. Unlike the past decade, the cash flow of the next decade will depend heavily on the ability to supply clean electricity to manufacturing plants and industrial parks. An assertive and clear renewable energy development plan will have a macro spillover effect on the entire economy.

Large corporations such as Nike and Apple have strongly advocated for a bold clean energy development plan in Vietnam. Specifically, these businesses have petitioned the government to allow factories in their supply chains to have access to clean electricity sources. For these corporations, consuming clean electricity is not just about immediate cost savings. Still, it is part of an overall and urgent effort to reduce carbon emissions that, if delayed, could negatively impact their profitability, access to low-cost capital, and reputation.

5. Renewable energy sources for sustainable development and mitigation of climate change Queen

In the current context, the world's energy demand is increasing along with population growth, leading to more and more use of fossil fuel-based energy sources (coal, oil, and gas). That has created challenges such as depletion of fossil fuel reserves, greenhouse gas emissions, environmental pollution, geographical and military conflicts, and associated fuel price fluctuations customary. These problems will create unsustainable situations, eventually leading to an urgent and potentially irreversible threat to human society and the planet (Smith, 2019). Renewable energy sources are the only solution to these growing challenges (GN Tiwari, 2011).

In addition, in terms of new relationships, renewable energy has a direct relationship with sustainable development through its impact on human development and economic productivity (Asumadu-Sarkodie & Owusu, 2016a). Renewable energy provides opportunities for energy security, economic and social development, energy access, mitigation of climate change, and environmental and health impacts (Asumadu-Sarkodie & Owusu), 2016b).

Climate change has become one of the biggest challenges of the 21st century (Khuc, 2022; QH Vuong, 2021). The severe effects of climate change can still be avoided if efforts are made to transform the current energy system. Renewable energy source holds the significant potential to displace greenhouse gases from fossil fuel-based manufacturing and thus reduce gas change, Queen.

Towards a safe and sustainable energy source

The vigorous development of the renewable energy industry to gradually replace fossil energy is taking place in the leading countries of the world economy, further showing the importance of economic growth must be associated with sustainable and safe energy development.

The Institute of Energy (Ministry of Industry and Trade) said that according to research data from the International Energy Agency (IEA), Europe is the leading region in promoting the structural transformation of the energy industry toward building infrastructure development of clean energy sources.

With a solid determination to transform the energy sector, Europe aims to increase the share of renewable and bioenergy sources to 60% by 2030 and increase offshore wind capacity by 25 times by 2050 to achieve the goal of being carbon neutral by 2050.

In the United States, in the study "Renewable Energy Prospects" conducted by the National Renewable Energy Laboratory (NREL) under the US Department of Energy, it was found that most coal-fired power plants and Nuclear power plants will be decommissioned in 2030, and the remaining plants will operate until 2050.

According to this study, the United States can generate 80% of its electricity from renewable energy using existing technologies, including wind turbines, photovoltaic, wind energy, bioenergy, geothermal, and hydroelectricity.

According to the summary of the United Nations Environment Program on renewable energy in China, in 2004, China's investment in this field was only 3 billion USD. Still, by 2015 it had increased to 103 billion USD, surpassing the whole United States is 44.1 billion USD and accounts for about 36% of the investment of countries worldwide. In the summary of the 5-year plan from 2016 to 2020, the total Chinese investment in this industry has reached more than 360 billion USD.

China's National Energy Administration (NEA), expects that by 2021, the total electricity output from solar and wind power plants will reach 11% of the country's total electricity consumption, higher than last year. 2020 (9.7%), the target will reach 16.5% by 2025. The Chinese government claims to increase the share of renewable fuels in primary energy consumption to about 25% by 2030.

This is considered a key goal of China's commitment to cut carbon emissions by 2030

and is part of a comprehensive national energy reform program to cut down on fuel-using plants gradually fossils pollute the environment.

From a very early age, Vietnam's renewable energy development roadmap recognized the supreme importance of renewable energy; the Party and State have shown their interest in renewable energy development since the Resolution of the Ninth Party Congress in 2001.

The Prime Minister issued Decision No. 2068/TTg dated November 25, 2015 approving Vietnam's renewable energy development strategy to 2030, with a vision to 2050 and Decision No. 428/TTg dated March 18. 2016 approved the adjustment of the National Power Development Plan for the period 2011 - 2020, with a vision to 2030 (Power Master Plan 7); Resolution 55-NQ/TW of the Politburo on the orientation of the National Energy Development Strategy to 2030, with a vision to 2045, which clearly states the proportion of renewable energy sources in the total primary energy supply. level will reach about 15-20% by 2030; 25 - 30% by 2045.

6. Challenges and recommendations to renewable energy sources create

Although renewable energy sources have no net emissions, this will help limit future global greenhouse gas emissions. However, costs, prices, political environment, and market conditions have become barriers preventing developing and underdeveloped countries from using their full potential. Thus, creating global opportunities through international cooperation helps underdeveloped and developing countries to move forward. Next ability power next near power quantity recreating, history use power quantity brand. As a result, energy technologies will reduce the cost of renewable energy and provide more accessible and efficient access to climate change mitigation.

In addition, some challenges tend to hinder renewable energy sources. These challenges are market failure, lack of information, and, most importantly, inefficient human use of energy. This clearly reflects the human perception of life's approaches, needs, and errors. Therefore, it is necessary to improve educational capacity, raise people's awareness about impact reduction and adaptation to climate change, and at the same time develop information exchange programs, and invest in science and education and training to help get closer to renewable energy (Q. Vuong, 2018). Knowledge of renewable energy technologies should be increased by establishing education and training programs. Energy research and development projects should be encouraged to improve information and raise public awareness. The technology transfer and development process needs to be institutionalized through international exchange, cooperation, and connectivity (Vuong et al., 2022).

Conclusion

Energy plays a significant role in the development of each country and is one of the essential needs for human life. Exploiting new power affects not only the energy structure but also the economic structure and economic development model of a city, a region, a country, and even society. Exploiting new energy can reduce the consumption of ore mines' fuels such as coal, and oil..., reduce greenhouse gas emissions, and make the economy of a region and a country come into the world. The sustainable and environmentally friendly development path

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