

The Impact and Effect Assessment of Public Policy on the Development of the New Energy Industry

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Abstract: As the global energy transition accelerates, governments worldwide have introduced policies to support clean energy to meet low-carbon and sustainable development targets. This paper analyzes the significance of public policies in the growth of the new energy industry, focusing on analyzing key policy tools such as fiscal subsidy policies, tax incentives, R&D support policies, market access policies, and regulatory policies. These policies not only directly promote the market expansion and sales growth of new energy products by reducing consumer acquisition costs and corporate operating costs, but also encourage companies to optimize technological innovation and product quality continuously. At the same time, R&D support policies provide funds and resources for enterprises to encourage technological innovation and industrial upgrading. Market access policies and regulatory policies maintain market order and encourage the healthy growth of new energy projects by optimizing the entry environment and ensuring product quality. In summary, public policies have played a key role in fostering the growth of the new energy industry and laid the foundation for achieving sustainable development goals.

1 INTRODUCTION

Energy transformation refers to the shift from fossil energy systems such as oil, coal and natural gas to renewable energy systems such as solar energy, wind energy, biofuels and hydrogen energy. The global energy transformation is advancing at an unprecedented speed around the world, aiming to achieve low-carbon and sustainable development goals. First, the International Energy Agency (IEA) predicts that the worldwide installed capacity of renewable energy will expand by 50% year on year in 2023. By 2025, renewable energy is predicted to be the primary source of power worldwide, with wind and solar energy accounting for 95% of new renewable energy output. (Liu, 2024). Secondly, hydrogen energy, as one of the important clean energy sources in the future, is receiving more and more attention. Despite the cost and technical challenges, it has great potential in energy storage and renewable energy consumption. To this end, governments have introduced policies to support clean energy. For example, the United States established the Inflation Reduction Act, while the European Union fostered renewable energy

development with the Green Deal Industrial Plan. At the 28th Conference of the Parties to the United Nations Framework Convention on Climate Change in November-December 2023, 118 countries announced the "Global Renewable Energy and Energy Efficiency Commitment" initiative, demonstrating the international community's commitment to energy transformation.

In the context of global economic transition, the new energy industry is likewise fast growing. In China, the new energy industry's market size has progressively grown. In general, wind power and solar technologies are at the forefront of global development. The hydropower engineering construction capacity and the design and manufacturing capacity of million-kilowatt hydropower units are the world's leading, and the transmission technology is fully independent and controllable. For example, China possesses separate intellectual property rights for million-kilowatt third-generation nuclear energy technology, and the independently developed fourth-generation nuclear power technology has been commercialized and demonstrated (Yuan, 2023). Technological innovation is the primary driving force behind the

growth of the new energy sector. According to Yuan (2023), the Chinese government's support policies for the new energy industry also provide a good environment for technology research and development. For example, in the fields of electric vehicles, hydrogen energy storage and photovoltaic materials, China has achieved many technologies that are ahead of the international level. The new energy industry chain covers multiple links from raw materials to final applications, including upstream resource development and acquisition of raw materials, midstream production of key components such as power batteries and photovoltaic modules, and downstream final applications of related products. These factors have contributed to the worldwide shift to a low-carbon economy. The new energy business is predicted to provide more growth prospects as regulatory support and scientific and technical advancements improve.

Public policies are critical to fostering the growth of the new energy industry. On the one hand, the government establishes a defined growth direction and aims for the new energy sector by creating a detailed industrial development plan. Meanwhile, government departments encourage the development of infrastructure to satisfy the rising demand for use. For example, local energy bureaus and power departments have widely increased charging piles, hydrogen stations, etc. to ensure the coordinated development of charging and swapping facilities and new energy vehicles and improve user convenience and user experience. On the other hand, government agencies have adopted rules to increase market oversight, promote the integration of new energy projects with conventional energy, and encourage new energy to engage in electricity market transactions. The Ministry of Finance has implemented incentive measures to decrease the operating expenses of new energy firms through tax breaks, financial subsidies, and other ways, as well as to encourage enterprises to innovate and expand into new markets. The Shenzhen Municipal Government, for example, offers specific incentives for the research and development of new energy firms to promote technical innovation and worldwide standards.

Based on the preceding material, this article will concentrate on China and the United States, study the public policies taken by the two countries in the field of new energy, and assess the impact and effect of various public policies on the growth of the new energy sector.

2 THE DIRECT IMPACT OF PUBLIC POLICIES ON THE DEVELOPMENT OF THE NEW ENERGY SECTOR

2.1 Fiscal Subsidy Policy

In recent years, the Chinese government has enacted several fiscal subsidies to encourage the rapid growth of the new energy industry. For example, the 2022 policy specifies that the purchase subsidy standard for new energy cars would be cut by 30% from the 2021 level., but the subsidy reduction for vehicles in the public transportation sector is relatively small, aiming to support the green transformation of public transportation (General Office of the State Council, 2022). In 2024, the Ministry of Finance of China issued 22.933 billion yuan in new energy vehicle subsidy funds, mainly for liquidation and pre-allocation of funds to further promote market development. To encourage people to acquire electric cars, the federal government in the United States offers a tax credit of up to \$7,500 under the Inflation Reduction Act. Through various fiscal subsidy policies, consumer costs are reduced, and funds are directed to high-tech, high-quality products, which directly stimulates the sales of new energy vehicles and encourages companies to optimize technology and product quality.

These fiscal policies have directly stimulated the sales of new energy vehicles by reducing consumer vehicle purchase costs and effectively guiding funds to high-tech, high-quality new energy vehicle products. At the same time, these policies have also prompted companies to continuously optimize technology and product quality to meet market demand. With the progressive collapse of subsidy programs, corporations face increased market rivalry pressure, forcing them to invest more in research and development of key technologies in order to improve product competitiveness and therefore maintain a competitive position in the market.

2.2 Tax Incentives

According to the Chinese Ministry of Finance policy, enterprises engaged in new energy power generation projects (such as wind and solar energy) are exempt from corporate income tax for the first three years from the tax year in which the project generates its first production and operation income, and the tax is reduced by half from the fourth to the sixth year. For the sale of self-produced wind power products, a 50%

VAT refund policy is implemented to reduce the burden on enterprises (Ministry of Finance, State Administration of Taxation, 2015). In contrast, the federal tax credit in the United States is based on the Inflation Reduction Act, and consumers who purchase electric vehicles assembled in the United States can enjoy a tax credit of up to US\$7,500. For vehicles with a certain proportion of battery materials from the United States or free trade partners, the credit amount can be increased to US\$10,000. The tax incentive policy directly reduces the operating costs of new energy enterprises by reducing corporate income tax, value-added tax, and other related taxes and fees, reduces the financial burden of enterprises and encourages them to increase R&D investment and technological innovation. Tax relief for purchasing new energy cars, such as the exemption of vehicle purchase tax, has promoted the growth of market demand. Since its implementation, this policy has greatly promoted the sales of new energy vehicles, and as anticipated, continued implementation will have a positive impact on sales. And by reducing the tax burden, companies can invest more resources in research and development, thereby improving product performance and competitiveness.

2.3 R&D Support Policies

To promote technological innovation and industrial upgrading, countries have formulated different R&D support policies for the emergence of new energy industries. The establishment of national new energy laboratories and research and development platforms by the Chinese government aims to foster the merger of industry, academia, and research while assisting in the development and implementation of advanced technologies. The National Development and Reform Commission and the National Energy Administration of China jointly released the "Implementation Plan for Promoting High-Quality Development of New Energy in the New Era" in 2022. It included several policy recommendations, such as enhancing service quality, guaranteeing the security of the supply chain for the new energy industry, and streamlining project approval procedures. In addition, the policy encourages enterprises to cooperate with universities and scientific research institutions to increase investment in basic theoretical research. The U.S. Department of Energy (DOE) also announced on November 21 that the Advanced Research Projects Agency-Energy (ARPA-E) announced a grant of \$42 million to 15 projects to develop next-generation semiconductor technologies to improve grid reliability, resilience, and flexibility, to absorb more

renewable energy such as wind and light and help achieve decarbonization goals (U.S. Department of Energy, 2023). These R&D support policies directly encourage companies to increase R&D investment by providing funds and resources.

In summary, R&D support policies help the new energy industry achieve sustainable development goals. By conducting research, developing, and implementing innovative technologies, the government may direct the industry's transition to a low-carbon and green economy. These rules provide a growth environment for the sector as a whole in addition to giving businesses the assistance they need.

3 THE INDIRECT IMPACT OF PUBLIC POLICIES ON THE DEVELOPMENT OF THE NEW ENERGY SECTOR

3.1 Market Access Policy

According to the Opinions of the General Office of the CPC Central Committee and the General Office of the State Council on Improving the Market Access System, to maximize the market access environment for new formats and new fields in China, it is imperative to encourage the development of a more adaptable and robust access management mechanism through standard guidance and scenario opening. This will increase the efficiency of market access in the new energy sector. Furthermore, the Chinese government encourages local governments to implement preferential policies, like parking and charging for new energy vehicles, as well as to dismantle local protectionism and create a single, open market system to support the growth and popularity of new energy vehicles, according to the New Energy Vehicle Industry Development Plan (2021-2035). In the United States, in addition to tax credits and industrial chain reconstruction, access policies that restrict the participation of foreign companies are also adopted. On January 1, 2024, the interpretation document of "Sensitive Foreign Entities (FEOC)" in the Bipartisan Infrastructure Construction Act officially came into effect. According to its content, starting from 2024, American clean energy vehicles using battery components produced in China will not be able to obtain consumer purchase subsidies; starting from 2025, American clean energy vehicles using key minerals such as lithium, nickel, cobalt, and graphite imported from China will not be able to obtain the

above subsidies. In May of the same year, the Biden administration announced a 100% tariff on electric vehicles imported from China and guided the European Union to impose additional tariffs on Chinese electric vehicles in June.

3.2 Regulatory Policies

In terms of regulatory policies, the implementation of project approval and compliance supervision, the strengthening of information disclosure requirements, and the strengthening of supervision of implementation are particularly important. First, governments ensure the legality and safety of new energy projects by setting strict project approval processes and compliance requirements. For example, China's National Energy Administration has issued a series of policies on the construction and operation management of photovoltaic power stations to regulate the order of project development and prevent improper behaviors such as "reselling road permits" (National Energy Administration, 2024). This regulatory mechanism helps maintain market order and reduce resource waste. Secondly, the government requires new energy companies to regularly disclose information such as operating data, financial status and environmental impact to the public to improve transparency and public trust. More importantly, regulatory agencies need to regularly supervise and inspect the implementation of new energy policies to ensure that various policies are implemented. For example, in China, the National Energy Administration emphasizes the supervision of major development tasks such as the stable supply of power coal and the grid connection and consumption of new energy.

3.3 Green Finance Policy

Green finance policy refers to policy measures that support environmental protection and sustainable development through financial means, aiming to guide funds to green projects. Its important tools include green credit and green bonds. The core of green finance policy is to establish a systematic policy framework to support environmental protection, address climate change, and efficient resource utilization. China's 2016 "Guiding Opinions on Building a Green Finance System" defined green finance and outlined its objectives, stressing that the financial sector should offer investment, financing, operation, and risk management services for clean energy, energy conservation, environmental protection, and other areas. Green finance provides

financial support for energy transformation financing, and guides financial resources to low-carbon and transformation enterprises by controlling the degree of financing constraints on different enterprises and mandatory information disclosure, thereby improving the allocation efficiency of financial resources (Chen, Xu, & Wang, 2024). For example, the low-interest loans obtained by the new energy vehicle industry through green credit make enterprises more competitive in expansion and technology research and development. In conclusion, green financing regulations have significantly influenced the growth of the new energy sector indirectly, which not only makes the sector more competitive but also establishes the groundwork for accomplishing sustainable development objectives.

4 POLICY EVALUATION

On the one hand, public policies effectively influence the growth of new energy sectors. The relevant government departments take the lead in promoting technological innovation and creating a good industrial development environment by formulating clear development plans, and providing various financial support and access policies. For example, around 2000, the growth of the green energy sector attracted the attention of the Chinese government. The central government issued a series of support policies to help the development of the solar energy and photovoltaic industries, covering both the supply and demand sides, involving different industrial links, and providing a variety of policy tools, such as the formulation of a national unified solar photovoltaic power generation benchmark on-grid electricity price in 2011; from October 1, 2013 to January 31, 2015, the taxpayers sold self-produced electricity products produced by solar energy and implemented a 50% VAT refund (Geng, 2019). The above-mentioned local government's active support policies have opened up the process of rapid growth of China's solar energy and photovoltaic industries, achieved large-scale production in the field of photovoltaic cell and component manufacturing, and created price advantages in the international market.

On the other hand, there are phases to how public policies affect the growth of new energy sectors. According to the analysis of the new energy industry chain, in the initial stage of resource development and acquisition of raw materials, fiscal subsidy policies, and R&D support policies play an irreplaceable and important role, which can directly provide financial support for enterprises, reduce the high cost of new

energy enterprises in technology research and development, and not only alleviate the financial pressure of enterprises, but also enable enterprises to focus more on innovation and technological breakthroughs (Xu, 2023). The production of key components in the middle and downstream and the application of downstream products are inseparable from the cooperation of market access policies and regulatory policies, which are usually accompanied by the setting of technical standards. These standards not only regulate product quality but also force enterprises to carry out technological innovation to meet the ever-increasing market requirements (Liu, et al., 2023).

5 CONCLUSION

The new energy sector is growing quickly, and public policy is essential to fostering technical innovation, encouraging market competition, and upholding industrial order. This study thoroughly examines the various ways that public policy has influenced the growth of the new energy sector and comes to the following findings.

First, the fiscal subsidy policy effectively reduced the cost of car purchases for consumers and directly stimulated the market demand for new energy vehicles. In addition, with the gradual decline of subsidy policies, companies are facing greater market competition pressure, which forces them to boost investment in the research and development of core technologies to enhance product competitiveness and thus occupy a favorable position in the increasingly fierce market. Secondly, the R&D support policy provides companies with the necessary funds and resources by setting up national laboratories and R&D platforms. These measures not only encourage companies to cooperate with universities and research institutions but also encourage the development and use of cutting-edge technology.

In addition, market access policies, regulatory policies, and green finance policies, as indirect means of influence, provide a clear direction for the development of the new energy industry by lowering entry barriers, optimizing resource allocation, setting strict project approval processes and compliance requirements, and guiding funds to green projects. These indirect influences not only reduce corporate financing costs, but also promote technology research and development and market expansion.

In summary, the impact of public policies on the growth of the new energy sector is multifaceted and far-reaching. Through the comprehensive use of

financial subsidies, R&D support, market access and supervision, and other means, governments can effectively promote The growth of the new energy sector and achieve the goals of economic transformation and sustainable development. In the future, nations should keep refining pertinent policies to adjust to the quickly shifting global energy scene and boost international collaboration to address the issues posed by climate change together.

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