

Comparison and Optimization Strategies of New Energy Vehicle Industry Policies in China and the United States

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Abstract. It carries out a comparative analysis of the new energy vehicle industry policy in China and the United States. The focus is on new energy vehicle policy differences between China and the United States and their optimization strategy. With each passing day, global energy and environmental problems worsen. And countries are actively seeking energy transformation to achieve low-carbon and sustainable development. New energy vehicles are essential to achieving energy transformation and are significant to sustainable economic growth. The comparison of policies between China and the United States in this area helps analyze their impact on the economic development of the two countries. Therefore, this comparative analysis of policy in China and the United States comes in handy to help diagnose the influence the policies have had on the two countries' economic development. Policymaking in both countries has rested on government-led subsidies and infrastructure expansion in China and market incentives and private enterprise cooperation in the US. Because of this, the paper will propose some optimization suggestions based on comparative policy analysis in terms of relative advantages and disadvantages to emphasize how balance can be sought in promoting government intervention and market forces to accelerate the popularity of new energy vehicles and seek sustainable traffic. Comparison and optimization strategies of new energy vehicle industry policies in China and the United States.

Keywords: New energy vehicle policy; energy transition; sustainable development.

1. Introduction

In recent years, global environmental pollution has become increasingly serious, and countries have gradually felt a sense of crisis regarding environmental protection and energy use. As the preferred means of transportation, cars face pollution from automobile exhaust emissions and petroleum energy use. Therefore, countries are looking for energy transformation strategies to protect the environment, which can achieve low-carbon and sustainable development while also protecting the environment. The emergence of new energy vehicles is an important way to transform energy. As the world's second-largest economy, China, while committed to global energy transformation and environmental protection, also attaches great importance to and vigorously develops the new energy vehicle industry. Therefore, China has also placed the strategic goal of economic development on the development of new energy vehicles. China officially launched new energy vehicles starting with the "Ten Cities and Thousand Vehicles" project. The "Notice on Promoting and Applying New Energy Automobiles" was then promulgated by the Chinese government in 2013. The Chinese government promulgated another policy, "Notice on Financial Support Policy for the Promoting and Applying of New Energy Automobiles from 2016 to 2020", in 2016. In early November 2020, the State Council published its latest "New Energy Vehicle Industry Development Plan 2021-2035". The Chinese government has introduced these relevant policies to lay the foundation for the development of new energy vehicles [1].

For the United States, the world's largest economy, China undoubtedly poses a robust competitive situation in the field of new energy vehicles because China is not only the world's largest new energy vehicle producer but also occupies a leading position in export sales. China's new energy vehicle industry is also developing rapidly. Although China's new energy vehicle development prospects are good, the technology is still immature. The main reasons include the following points: First, China's new energy vehicle development focuses on output. The production scale is large, but the car's value is low. Second, the core of the three-electric system of new energy has yet to make a breakthrough,

which has restricted the overall development of production. Third, new energy vehicle companies in various countries are developing in the Chinese market, which has led to the continuous squeezing of the living space of Chinese companies. Fourth, the overall competitiveness of China's new energy vehicle products in the international market could be more substantial. The average market value of exports is low, and the recognition needs to be higher. The export regions are primarily distributed in Southeast Asia.

In contrast, the European and American markets have expanded in recent years but are still unstable [2]. As the leader of the world's automotive industry, the United States has a leading advantage in its development level and the automotive industry's progress in many developed countries compared with other developing countries such as China. These R&D technicians' research areas are mainly in technology R&D and innovation, and the new energy vehicles of the United States have naturally become the focus of the world [3]. The status and influence of China and the United States in the field of new energy vehicles are enormous for the world. This paper will also explore the similarities and differences between the new energy vehicle industry policies of China and the United States and analyze the impact of policy differences on the economic development of China and the United States. Research objectives: This paper aims to analyze and compare the new energy vehicle industry policies of China and the United States and explore the impact of the development of the new energy vehicle industry on economic transformation. In addition, this paper will optimize the strategy of the new energy vehicle industry policy.

2. US New Energy Vehicle Industry Policy

New energy vehicles produced in the United States are divided into hybrid, pure electric, and fuel cell-powered. However, the U.S. market mainly centers on hybrid cars, and synthetic power and fuel ethanol have the upper hand [4]. In terms of policy, since 2005, the United States has enacted the Energy Policy Act, the Energy Independence and Security Act, and the American Clean Energy and Security Act. The United States has continuously improved its new energy policy and overall continuity and integrity, thus establishing a complete legal system in the new energy field. Therefore, it has the capital to enter the carbon trading market early and occupy a leading position in the world's new energy. As for carbon tariffs, the U.S. has adopted several related bills to new energy taxation since 1975 initiated a tax reform process in 2005, including tax increases on traditional energy and tax support for new energy. By comparison, it is pointed out that the tax incentive system needs to be improved, and the investment in new energy and the intensity of value-added tax incentives be strengthened. In addition, the tax burden of traditional energy is increased, and the introduction of environmental tax and carbon emission tax is considered to achieve coordinated and sustainable development of taxation and industry in the development process. Alan V. Nice (2010) analyzed the relationship between economics and energy in the argument about the importance of carbon tariffs. He proposed that air, water, or idle land are not renewable energy, pointed out the functional argumentation method of the optimal utilization of exhaustible energy and the functional relationship between energy, environment, and economic growth, and proposed the necessity of a carbon tax system under the new energy-environment relationship system. The United States promotes the development of the new energy vehicle industry from two aspects: administrative means, such as laws and regulations, parameter standards, and economic means, such as taxation, loans, and fund support. Formulate a new energy development strategy from a national perspective to enhance the public's awareness of the importance of new energy development. The formulation of laws and regulations should enhance operability, formulate a complete policy system for developing new energy, increase the intensity of early government investment, promote industry technology and talent construction, and thus create a good market environment [5]. The U.S. new energy vehicle industry support policy aims to reduce dependence on fossil energy and protect energy security. In 2017, the total domestic oil production in the United States was 571 million tons, while the total consumption was as high as 913.3 million tons, accounting for 19.8% of the global total consumption. After

experiencing the second oil crisis in 1973 and 1979, which triggered economic turmoil in Western countries, the United States gradually realized the urgency of energy conservation, emission reduction and development of new energy. If it wants to reduce its dependence on fossil energy, it must focus on developing new energy and improving energy-saving technologies. The emergence of the new energy vehicle industry has made it a product of transformation and change in the contemporary environment. The second is to respond to climate change and achieve energy conservation and emission reduction. Data shows that the United States is currently the second largest energy consumer in the world, second only to China. At the same time, it also shoulders the critical responsibility of reducing carbon emissions and energy conservation and emission reduction. Reducing carbon dioxide emissions and dependence on traditional fossil energy can also effectively promote the development of the new energy vehicle industry. Finally, it will develop emerging manufacturing industries and promote domestic economic development. As an emerging industry, the new energy vehicle industry is not only the focus of future industrial development in the United States and even the world but also a new economic growth point. Therefore, the new energy vehicle industry is used as a breakthrough point to achieve "re-industrialization." In the long run, traditional cars can use high-tech technology in the automotive industry while also making the United States a leader in the new energy vehicle industry in the international market. In the short term, it will help offset the impact of the financial crisis, expand domestic demand, and stimulate consumption, thereby boosting the growth of US GDP. It will also encourage related upstream and downstream companies to develop the new energy vehicle industry, and the industrial cluster developed around the new energy vehicle industry will revitalize the U.S. economy. Therefore, if people want to effectively promote the process of "re-industrialization" in the United States, people need to pay attention to the development of the new energy vehicle industry in the United States [6].

3. Comparative Analysis of New Energy Vehicle Industry Policies in China and the United States

3.1. Market Mechanism

The development of China's new energy vehicle industry relies on a comprehensive model of government leadership, market pull, and policy support. Since the launch of the "Ten Cities, Thousand Vehicles" project, the government has played an important role in both supply and demand through a series of fiscal subsidies, tax incentives, and precise industrial planning. Guided by a series of policies, China's new energy vehicle industry chain has rapidly expanded and promoted sustained market growth. The government directly supports the production and sales of new energy vehicles through subsidies. It invests in constructing charging infrastructure to provide convenient conditions for using new energy vehicles [7]. Such policies have enabled China's new energy vehicle market to have a place, improving infrastructure while ensuring the industry's long-term development internationally.

In contrast, the development of the new energy vehicle industry in the United States relies more on market forces. Although the federal and state governments also provide tax incentives and subsidy policies to encourage the production and sales of new energy vehicles, the United States generally adopts a market-oriented operation model. Enterprises play a leading role in independent innovation and market competition, and the government mainly creates a favorable policy environment for the new energy vehicle market by setting strict emission standards and carbon emission regulations [8]. In addition, there are large differences in policies between different states. Thus, each state has created different support measures according to its own market demand and resource conditions, which has brought diverse impetus to the development of the new energy vehicle industry in the United States [9].

3.2. Incentives

The purchase tax exemptions and corporate income tax incentives reflect China's tax incentive policies. Consumers who purchase new energy vehicles enjoy tax exemptions, effectively reducing the cost of buying a car and promoting the growth of new energy vehicles in the personal consumer market. At the same time, manufacturers can also reduce cost pressure through tax incentives and promote the improvement of technology research and development and production efficiency [4]. This dual incentive mechanism not only arouses the desire to buy among consumers but also encourages enterprises to make further technological and production capacity upgrades.

Contrary to this, the United States has a tax credit policy at both federal and state levels. The federal government provides consumers who purchase new energy vehicles with a tax credit of up to \$7,500, and each state also offers additional incentives based on specific policies [5]. This policy effectively reduces the purchase cost of new energy vehicles, especially in the private car purchase market, and dramatically promotes the sales growth of electric vehicles [5]. While such a tax credit policy reduces the economic burden of consumers, it enhances the market demand of enterprises and, therefore, can promote the marketization of new energy vehicles.

3.3. Fiscal Subsidy

The Fiscal subsidy policy includes investment in production and consumption in China. China's fiscal subsidy policy involves both production and consumption aspects. For manufacturers, the government reduces production costs through direct subsidies, which promotes the expansion of new energy vehicle production. At the same time, consumers can also receive subsidies of different amounts based on the vehicle's performance (such as driving range) when purchasing new energy vehicles [6]. These subsidy policies were influential in promoting the new energy vehicle market in the early stages. Still, as the subsidy costs increase, the government gradually reduces the subsidy intensity and turns to other means to guide the market to achieve independent development [6].

In contrast, the US fiscal subsidy policy focuses more on technology research and development. The federal government provides financial support for technological innovation of new energy vehicles, helping companies to make breakthroughs in battery technology, intelligent networking, and other fields [7]. In addition, some state governments also provide purchase subsidies to promote new energy vehicles. Although the amount is not as high as that of China, it has played a positive role in stimulating independent innovation of enterprises [7]. Through these subsidies, US new energy vehicle companies are better able to cope with technological and market challenges.

3.4. Financial Support

In terms of financial support, China has introduced a series of measures, including providing low-interest loans, special funds, and venture capital support [8]. The National Development Bank and other financial institutions help solve the financing problems of new energy vehicle companies by providing them with sufficient financial support. This financial support allows companies to conduct technological research and development and provides financial guarantees for upgrading the entire industrial chain [8]. The support of this long-term financial tool enables new energy vehicle companies to gain an advantage in the fierce international competition.

The United States mainly provides financial support for new energy vehicle companies through market-based financing mechanisms. Venture capital and private equity funds have played an essential role in promoting technological innovation and market promotion of start-ups [9]. In addition, the federal government helps reduce the financing risks of new energy vehicle companies and supports their market expansion through policies such as loan guarantees [9]. This market-based financing method has brought sufficient financial support to new energy vehicle companies and encouraged them to continue to innovate and expand in the global market.

4. New Energy Automobile Industry Policy Optimization Strategy in China and America

4.1. Suggestions for Perfection in the New Energy Vehicle Industry of China

The financial subsidy policy for new energy vehicle industry development in China should be decreased step by step, and the track of development shall be transformed from "policy-driven" to "market-driven".

While fiscal subsidies played a positive role at the very beginning of the market expansion, excessive dependence suppresses the motivation of independent innovation within an enterprise and weakens the market's competitiveness. To achieve market-oriented development, the government can gradually reduce direct subsidies and use tax incentives and financial support to encourage enterprises to gain market advantages through technological breakthroughs and independent innovation [1]. Technological innovation is the key to enhancing the global competitiveness of China's new energy vehicle industry. Although China has made some progress in battery technology, there is still a gap compared with the international leading level. Enterprises face significant technical challenges regarding battery energy density and endurance [2]. The government should continue to increase financial support for the research and development of critical technologies, promote new energy vehicle enterprises to achieve technological breakthroughs in batteries, intelligent networking, etc., and maintain their competitiveness in the global market [2]. Charging infrastructure construction is also a key focus of China's new energy vehicle development. Although charging pile facilities in first-tier cities are relatively complete, the coverage of charging networks in third-tier cities and rural areas is still low, which seriously limits the popularity of new energy vehicles in these areas [3]. The government can promote the expansion of charging pile layout by attracting social capital to participate in infrastructure construction, especially in areas with weak charging networks, to improve the user experience of new energy vehicles and promote further growth in market demand [3]. In addition, China should actively participate in formulating international standards and enhance its voice in global new energy vehicle technical standards. Although China has certain advantages in electric vehicle battery standards, it still needs to strengthen international cooperation in areas such as autonomous driving and intelligent networking [1].

4.2. Reference and inspiration from the US New Energy Vehicle Industry Policy

The market-driven model of the US new energy vehicle industry provides an essential reference for China. First, the US government has created an environment conducive to market competition through environmental regulations and tax incentives, while enterprises have won the market through independent innovation [4]. This market-oriented model has helped companies such as Tesla rise globally, indicating that market competition effectively stimulates technological innovation. China can learn from this experience, gradually reduce its dependence on fiscal subsidies, and promote enterprises to develop through market competition and technological innovation [4]. The financing mechanism of the United States also inspires China. The United States provides sufficient financial support for new energy vehicle companies, especially start-ups, through market-based means such as private equity funds and venture capital [5]. This financing method helps companies obtain the required funds in the early stages and improves their innovation capabilities and market adaptability through market competition [5]. China can further open up its capital market to attract more social capital into the new energy vehicle field, primarily to support start-ups and technologically innovative companies to help them increase and achieve technological breakthroughs [5]. In terms of charging infrastructure construction, the United States' experience is also worth learning from. Although the construction of charging facilities in the United States is relatively slow, the service quality has been improved through a market-based operation model [6]. China can encourage private enterprises to participate in the operation of infrastructure by promoting public charging networks and improving the coverage and service level of charging facilities through competition [6]. Finally, this makes it possible to compare policy flexibility among different states in the United States for reference by

China. According to the different economic conditions, resource distribution, and market demand, different states in the United States have come up with different policy support measures, and therefore, the new energy automobile industry is developing differently among the different states [7]. China can also refer to this model and allow local governments to formulate flexible policies based on local market demand and resource conditions to promote the balanced development of the new energy vehicle industry across the country [7]. By learning from the experience of the United States in market mechanisms, financing models, infrastructure construction, etc., China can promote the new energy vehicle industry to realize market-oriented operation gradually, reduce dependence on government subsidies, enhance the independent innovation capabilities of enterprises, and ultimately achieve sustainable development of the industry [8].

5. Conclusion

On the basis of the comparative study on the Chinese-American new energy auto industry policy, a development of this industry has been concluded whereby it has taken different ways in both countries. While the Chinese government attaches great importance to market stimulation, the United States mainly depends on market drive and technological innovation. The government encourages enterprises to develop and consumers to purchase new energy vehicles through policy means such as subsidies, tax exemptions, and carbon emission regulations. At the same time, the United States also focuses on promoting infrastructure construction and technological breakthroughs to enhance the competitiveness of new energy vehicles in the international market. Compared to the traditional fuel automobile, it is supported with explicit industrial development targets in China, offering massive fiscal subsidy support and tax incentives for the new energy automobile, and it introduces purchase restrictions in large-scale charging facility promotion to ensure that new energy automobiles will be widely promoted. In addition, the Chinese government has continuously adjusted its industrial policies to respond to changes in market demand and technological development while promoting the coordinated development of the industrial chain. By comparing the policies of the two countries, the US policy emphasizes market competition. It relies on the independent innovation of enterprises to promote industrial development, but the continuity and strength of its policy implementation are affected by the political environment. China's policy is more systematic and long-term. The government is very much the main leading role in promoting industrial technological upgrading and market expansion, but it also has had some problems, such as over dependence on subsidies and under-marketization. In the process, it could gradually reduce subsidy dependence, further promote market mechanism perfection with enhanced corporate innovation capability, and therefore should contribute to the sustainable development of the global new energy vehicle industry and bring positive results in the fight against global climate change.

In the future development of the new energy industry, China and the United States should strengthen cooperation in new energy vehicle technology research and development, standard setting, and market access. The United States can learn from China's rapid experience in infrastructure construction. Meanwhile, by gradually reducing subsidies, China can also help improve the market mechanism and enhance the corporate innovative ability in the way to promote the global sustainable development of new energy vehicles and make an active contribution to the solution of world climatic changes.

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