

# ***Analysis of the Dynamic Influence of New Energy Automobile Market Expansion on Fuel Vehicle Market Share***

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**Abstract:** Global environmental issues, countries all focus on green and low-carbon development, industrial structure transformation (industrial transformation). The industry's awareness of low-carbon production has gradually increased. With the encouragement of the Chinese administration, new energy automobile have been introduced into the Chinese auto market on a large scale, and financial subsidies have been given to the research, production and promotion of new energy automobile, which promoted the development of new energy automobile and the fuel vehicles's transformation. The government's support has improved the technology of new energy automobile, which is more cost-effective than fuel vehicles and improves driving safety and comfort. In the data from 2017 to 2023, the share of new energy automobile in the automotive industry continues to rise. The expansion of the new energy vehicle market will reduce the market share of fuel vehicles. The data on the share of Chinese cars shows that new energy automobile have strong competitiveness in the automotive industry.

**Keywords:** Green economy, low-carbon plan, expansion of new energy automobile.

## **1. Introduction**

Since 2020, global environmental challenges have become increasingly severe. The dual pressures of population growth and economic expansion have significantly aggravated environmental problems. With the times's progress and the excessive consumption of material resources, Brundtland first proposed "sustainable development". The "harmonious coexistence" of enterprises and the environment has gradually become a research topic for scholars from various countries. Green innovation is to reduce the harm to the environment under the same benefits while bringing profits to enterprises [1]. With the expansion of human activities, especially in offshore areas, nitrogen, phosphorus and other nutrients have surged by 50% to 200% due to agricultural and industrial activities. This has not only destroyed the ecological balance of the ocean, but also posed a serious threat to marine biodiversity, further impacting the fishery industry that relies on marine resources. On the other hand, the problem of resource scarcity has become increasingly prominent, which is mainly attributed to the intensified contradiction between the continuous growth of population and the uneven distribution of resources. The limited resources of the earth force us to re-examine the economic development model and achieve sustainable development by rationally regulating the

economic growth rate and optimizing resource allocation. According to statistics, 60% of the bottom-level atmospheric pollutants, come from automobile exhaust. China has successively formulated and revised laws and regulations such as the "Measures for Public Participation in Environmental Impact Assessment". In the next few years, the gas car industry's proportion in China's carbon emissions will continue to increase, so the automobile industry must change its development model [2].

In response to a series of current environmental problems, many countries have planned measures to deal with the difficulties. At the G20 Hangzhou Summit held in August 2016, China proposed the concept of leading the development of the new era with green finance. This initiative aims to improve economic efficiency and promote sustainable development by integrating green financial mechanisms into the market and construction, while effectively protecting the environment, maintaining market stability and ecological security. However, this plan also requires the government to provide correct incentives and support to better introduce funds into the market in combination with green finance.

With the comprehensive advocacy of the national green development and low-carbon life concepts, the industry's awareness of low-carbon production has gradually increased. Industrial green and low-carbon development has become the core of the national strategic planning. The use of advanced technology and intelligent manufacturing is the top priority for promoting industrial green and low-carbon development. China began to explore and formulate the "Green Automobile Guidelines" as early as 2004. After continuous efforts, China has obtained the experience of energy saving and new technology from developed countries. In 2008, China introduced new energy automobile into the automotive industry market on a large scale, and issued the "Opinions on the Demonstration, Promotion and Application of Energy-Saving and New Energy Vehicles" in 2009, providing financial subsidies for the research and development, production and promotion of new energy vehicles, encouraging everyone to live a low-carbon and environmentally friendly life when traveling by car.

The research objective of factors of the expansion of the new energy vehicle market and its dynamic impact on the market share of fuel vehicles. Specifically, this paper will analyze the impact of new energy vehicles on the market share of fuel vehicles from multiple perspectives, including the driving factors, the administration's incentive policies for the new energy vehicles's transformation, and changes in consumer demand.

## **2. Analysis of Driving Factors for the Expansion of the New Energy Vehicle Market**

With China launching a series of new energy vehicles, the new energy vehicle market has become one of the key topics that people continue to pay attention to. The green travel advocated by the country is also being slowly implemented in the automobile market. According to CleanTechnica statistics, the compound global's growth rate new energy vehicle sales from 2012 to 2022 was as high as 55.1%. The global share of new energy passenger vehicles increased by 56.4% to reach 10.091 million units in 2020, and the penetration rate increased by 5 percentage points year-on-year to 14%. Both sales and penetration rates hit record highs. There are many driving factors that make new energy vehicle consumption increasingly hot.

### **2.1. Government Subsidies and Tax Incentives**

The core purpose of the government's support and subsidy policies for new energy vehicles is to reduce consumers' car purchase costs. Specifically, the government not only provides car purchase subsidies to car buyers, but also implements preferential policies for exemption from vehicle purchase tax. These measures have significantly reduced the economic burden on consumers and accelerated. In addition, the government has also actively invested in the construction of charging infrastructure, such as the extensive layout of charging piles, to ensure the endurance of new energy automobile and provide car owners with a more convenient and worry-free car experience. The government and

enterprises see huge development potential in the market of charging supporting facilities and are investing on a large scale, with the largest investment in electricity. For other competitors, the government supports "one-stop service", which makes consumers worry-free and naturally choose new energy vehicles. However, for the international automobile market, there are still many competitors for Chinese new energy vehicles. In order to increase the competitiveness of new energy vehicles in the market, it is not enough to focus on scale, but also on technological improvement. The state will naturally increase support for technological improvement, which has created a good environment for the development of new energy vehicles [3].

## **2.2. Technological Progress**

The technological progress of new energy vehicles has profoundly changed the driving experience of consumers. It not only provides a higher cost-effectiveness, but also ensures a more comfortable and safe driving environment. The battery is the core of new energy vehicles, which mainly includes lithium polymer batteries. Among them, lithium ion batteries are the most widely used battery type at present. They characteristics of high energy density, increased vehicle endurance, making new energy vehicles more practical when compared with fuel automobile [4]. A charging technology of new energy is also very user-friendly. It is mainly divided into fast charging, wireless charging, solar charging, etc. Among them, The vehicle control system of new energy vehicles can achieve precise control of the acceleration, braking, steering and other behaviors of the vehicle, improving driving safety and comfort.

## **2.3. Changes in Consumer Demand**

Consumers' demand for new energy automobile has changed importantly. At present, the sales of new energy automobile become the mainstream of the market. According to research, users who prefer new energy vehicles are young people aged 24-40. However, there are still many uncertainties in the changes in consumer demand, such as fluctuations in oil prices. When the oil price remains unchanged, new energy vehicles rely on government subsidies and support. Compared with fuel on the market, the cost is relatively low, so it is more advantageous. And it leads to more serious environmental pollution, so the country should increase more subsidies for new energy vehicles and expand the popularization and publicity of new energy vehicles. The new energy vehicles's cost will sustain to decline, so there is also a great market advantage in competition. The rise in oil prices will increase, which will make new energy vehicles more cost-effective. Driven by government support, emerging technologies and market demand, my country's new energy automobile have successfully "overtaken on the curve" in the international automobile industry. The China Association of Automobile Manufacturers announced that the annual saleroom and production of vehicles in 2023 will both exceed 30 million for the first time, ranking first in the world for the first time.

## **3. The Impact of the Expansion of the New Energy Vehicle Market on the Market Share of Fuel Vehicles**

### **3.1. Changes in Market Share**

In the wave of green transformation in successfully achieved rapid growth in market share with their significant preponderance in emission reduction and energy conservation, with the dual support of strong government promotion and widespread social recognition. According to the production information of new energy vehicles and fuel vehicles from 2017 to 2023 (June) provided by the China Association of Automobile Manufacturers and Guotai An Database, as the share of its in the automobile increases, the share of fuel vehicles continues to decline. The market share of fuel vehicles

will be affected by the expansion of the new energy vehicle market. From 2017, the production of new energy vehicles was only 720,000 vehicles, and it increased to 3.611 million vehicles in 2023. The production of fuel vehicles has continued to decline from 29.22 million to 9.489 million, compared with the production of new energy vehicles. Indicating that have largely covered the entire automotive industry and established a good foundation for the transformation of the industry.

### **3.2. Government-driven Technological Progress**

The technological progress of new energy vehicles has also affected the increase in market demand and market share. China strongly supports the development of new energy vehicles and will certainly strongly support the technological development of new energy vehicles. According to data, within 10 years, as the power system cost and life cycle cost of fuel cell vehicles continue to decline [5]. For large vehicles such as trucks and commercial vehicles, charging with public charging piles and other methods occupies a large amount of public space resources, has low charging power utilization, and has caused great difficulties and high costs for the planning and construction of charging stations [6]. Therefore, China has introduced a government procurement system. Through government procurement, the short-term failure of the initial market mechanism can be compensated. Automobile manufacturers can only make profits by selling the new energy vehicles they produce, and then improve technology and expand production scale. The initial cost was borne by the government, which required buses, taxis and other public transportation to purchase a certain number of new energy products. This acted as a "sedative" for the production and technological research of automobile companies. The government's procurement system not only maintained the initial operation of new energy automobile companies, but also helped to improve the enthusiasm of enterprises [7]. The government promoted the initial development of new energy vehicles, allowing new energy vehicles to "gain a foothold" in the initial entry into the automobile industry and lay a stable industrial foundation.

### **3.3. Market Competition Pattern**

The competitiveness of the automobile market has intensified, and new energy vehicles are China's latest strategy in "low-carbon driving". The half of 2020, BYD successfully surpassed Tesla's 564,000 vehicles with a sales volume of 641,400 vehicles, regaining the sales champion. BYD's achievement is largely due to the ultra-high cost-effectiveness of its products, that is, the perfect combination of excellent quality and affordable prices, which accurately meets the core needs of consumers. According to the data showing the comparison of BYD's new energy vehicles and fuel vehicles from 2020Q1 to 2021Q3, the sales of new energy vehicles continued to rise compared with BYD's fuel vehicles. The new energy vehicles of China are relatively more competitive in terms of environment and development potential, because China has introduced a large number of policies to support the development of new energy vehicles, providing a good macro environment [8].

## **4. Conclusion**

In the in-depth study of the dynamic impact of the share of fuel vehicles, a series of important conclusions were obtained. First, this study clarified the necessity of in the current development trend by analyzing the many environmental problems faced today, such as the increasing scope of human activities and the increasingly serious industrial pollution. Through the many effective measures taken by the Chinese government, such as the "Green Guidelines", China's positive attitude towards the industry can be seen. This result is of great significance for the scientific the future development trend of new energy vehicles. Subsequently, this paper found that government subsidies, tax incentives, scientific and technological progress, and changes in consumer demand are important factors driving

the vigorous development of new energy vehicles. The government not only provides car purchase subsidies to car buyers, but also implements preferential policies to exempt vehicle purchase tax. This finding is conducive to solving the long-standing problem of consumers not knowing where new energy vehicles come from, where they are used, and where they are going. Finally, supported by a lot of data, it can be seen that new energy vehicles have largely covered the entire automotive industry and established a good foundation for transformation industries. The development of new energy vehicles still has a good macro environment. In the competition with traditional fuel vehicles, new energy vehicles have considerable development potential.

Combined with the findings of this study, we put forward the following suggestions. On the one hand, the government formulates more perfect policies and regulations to guide the development of new energy vehicles in a healthy and sustainable direction. On the other hand, enterprises increase the publicity of their own products, increase market share, and at the same time increase investment in talent training to enhance their core competitiveness.

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