

# Current Situation and Development Trend of the New Energy Vehicle Industry in China

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**Abstract.** In recent years, people have paid more and more attention to the importance of environmental protection and energy conservation, and new energy vehicles are favored by more and more people, and the car is gradually becoming one of the key products in the global automotive sector. At present, the sales volume of new energy vehicles is growing continuously, and the trend of overall development is good. However, the industry is still facing many challenges, and there are still some deficiencies that need to be adjusted as soon as possible. This paper uses PEST analysis to conduct a comprehensive analysis of the internal and external current situation of the industry, and from the cost control, improve the follow-up infrastructure construction and strengthen the export of new energy vehicles in three directions, put forward specific and realistic suggestions on existing issues. Hope to provide a certain reference for the development of China's new energy vehicle industry.

## 1 Introduction

Nowadays, the topics of environmental protection and energy security are becoming more and more important in the international context. Among them, the development of the new energy vehicle industry has become the focus of attention in the world. Starting in 2016, the annual sales volume and ownership of new energy vehicles in China continue to rank first in the world. Until 2023, China's new energy vehicles showed explosive growth, and sales volume accounted for 66% of the total global sales volume [1]. However, China's new energy vehicle industry is still facing many challenges such as how to improve its market competitiveness, how to keep its market position, how to make technological innovation and so on.

Previous studies have discussed some situations and development trends of the new energy vehicle industry in China. Some people believe that the development of China's new energy vehicle industry is currently in good condition, occupying a certain share of the market. Hong et al thought the new energy vehicle industry in China has occupied a large market share in the world [2]. Ning et al. once mentioned that the new energy vehicles have changed from the electric technology competition to the integrated development of electric, networked and intelligent competition. Intelligent electric vehicles meet the market demand and are expected to usher in a stage of rapid growth [3]. Zhang mentioned that until 2022,

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China's annual sales of new energy vehicles reached 6.887 million, up 93.4% year on year, accounting for more than 60% of the global sales of new energy vehicles. The retail penetration rate of new energy vehicles increased to 25.6%, and the development of the industry is ushering in the Market-oriented golden period [4].

However, many people believe that although China's new energy vehicle industry has occupied a certain market scale, but there are still many problems. Peng found that there are still many problems in China's new energy vehicle industry, such as the lack of key technologies, insufficient innovation ability, and lagging supporting services [5]. Liu thought although the new energy vehicle industry has made significant progress, it still has some deficiencies such as the charging infrastructure construction [6]. Fu et al. concluded that the charging pile for new energy vehicles plays an important role in promoting the development of the overall new energy industry as one of the seven core industries of new infrastructure. At present, China has a large number of charging piles, but it still does not meet the needs of the growing users [7].

Some people have put forward relevant suggestions regarding the existing situation of new energy vehicles. Wang has made some development proposals. For example, reducing the cost of buying and using cars to improve the cost performance, and improving the range of new energy vehicles through continuous technological innovation[8]. Wang said the talent security system should be improved, because of the highly professional in the development of new energy vehicles technology. This is especially reflected in the optimization of talent incentive policy and strengthening the training of technical personnel, etc [9]. Unlike others, Xu has proposed that China must speed up the construction of a carbon emission trading market, improving the formulation and distribution of total carbon emission quotas to create an environmentally friendly, green and sustainable environment for the development of new energy vehicles [10]. Hu and Zhu mentioned that the government should strengthen the guidance and encouragement of manufacturers. At the same time, the government also needs to mobilize the enthusiasm of consumers to buy new energy vehicles and strengthen their environmental awareness. At the same time, it should organize in-depth cooperation with manufacturers to let consumers deeply understand the new energy knowledge and the advantages of new energy vehicles in diversified ways and ways [11].

By consulting relevant literature, the new energy automotive industry situation is on the rise, increasing sales, but there are still some problems, such as infrastructure service lag, key technology weak, etc., then will be a specific analysis of the new energy automobile industry, understand the existing new energy vehicle types, and the industry status quo and related Suggestions.

## **2 Classification of new energy vehicles**

### **2.1 Natural gas car**

A natural gas vehicle is a vehicle that uses natural gas as fuel. After purified natural gas, compared with ordinary liquid fuel, natural gas contains fewer harmful substances, so the fuel system evaporation emissions are less. With less oil reserves and a growing energy crisis, people have been looking for alternative fuels. Natural gas is one of them. In the past 20 years, environmental pollution in major cities around the world has become more and more serious, and automobile emissions are the main source of pollution, and natural gas as a "clean fuel" has been well developed. Many countries have invested huge financial and material resources in the development of natural gas as vehicles and carried out a lot of scientific research and demonstration work, some of which have relatively mature

technologies. However, the natural gas vehicles in most countries are still in the stage of development and promotion. The development of natural gas vehicles in China started relatively early. After 1986, the world's oil energy shortage, China began to develop natural gas vehicles.

## **2.2 Electric vehicle**

There are three forms of electric vehicles, namely pure electric vehicles, hybrid vehicles fuel cell vehicles.

The principle of pure electric vehicles is to use electric energy to drive the electric motor, and then the electric motor to drive the car. Electric cars no longer use a traditional internal combustion engine, so its electric motor is equivalent to the engine on a traditional car, and the battery replaces the fuel tank on a traditional car. Electric cars rely on the battery in their car as the source of electricity. There are many advantages of pure electric vehicles, the most important is that they completely replace oil and have no pollution. In addition, because there is no engine, the vehicle structure is greatly simplified, the fault is correspondingly reduced, the use and maintenance are convenient, and the energy conversion rate is high. The reason why it is not widespread is that there are still some bottlenecks, such as power storage technology for batteries.

Hybrid car has many advantages of engine drive and electric drive system, solve the real electric car power is not strong, the battery service life is short and short range, the power of the hybrid car is better, basic with the traditional engine, at the same time the hybrid car fuel economy was greatly improved, harmful material emissions greatly reduced, even close to zero emissions. Hybrid cars have two different power sources. These two power sources can work together when the car is working, separately or together, and minimize the fuel consumption and exhaust emissions, so as to achieve the purpose of fuel saving and environmental protection. Because its energy utilization rate has increased from 60%~70% to more than 95%, it can save nearly half of the fuel, and make great progress in reducing engine noise and exhaust pollution. The hybrid electric vehicle uses the control system to combine the two power sources together. Through the good coordination between the two, it has not only the advantages of the power driving range of traditional cars but also has the advantages of energy saving and environmental protection of electric vehicles, making up for their own shortcomings. In terms of environmental protection, hybrid vehicles just reduce the emissions of pollutants, and do not really achieve "zero" emissions, but the dynamics of hybrid vehicles, and economy are better, in terms of reducing pollution conform to the requirements of new energy vehicles, can alleviate the huge demand of the car market and environmental pollution and resource consumption, so the development of hybrid vehicles in today's society has practical significance.

Fuel cell vehicles are mainly driven by electric motors, which are powered by the electric current obtained from the complex chemical reactions of fuels such as methanol and hydrogen. The chemical reaction of this fuel cell does not burn in the process and does not produce harmful substances, so the vehicle with a fuel cell as energy is a pollution-free car. In addition, the biggest advantage of fuel cells is that the energy conversion rate is high, which is about 2 to 3 times higher than the ordinary internal combustion engine. Therefore, whether for the effective use of energy or environmental protection, the fuel cell as energy is an ideal vehicle.

Using hydrogen fuel cells as energy vehicles is the most ideal solution for new energy vehicles. Hydrogen fuel cell vehicles have many advantages, including high efficiency, no pollution, low noise and many advantages that traditional energy vehicles do not have. Because hydrogen can be easily extracted from a variety of substances and can be regenerated, it is the most likely ultimate alternative energy source. Of course, production

technology and industrial promotion are also very difficult, and the biggest problem is the storage of hydrogen technology, which requires deeper research and development.

### **3 Current situation and influence factor of the new energy vehicle industry**

#### **3.1 Current status of the industry**

In recent years, due to the continuous improvement of global awareness of environmental protection, new energy vehicles are becoming more and more popular in the market, the production and sales of the new energy vehicle industry are on the rise, and the market scale is expanding, and the overall development trend is good. By June 2024, the production and sales of new energy vehicles had completed 1.025 million and 1.049 million units, respectively, with a year-on-year growth of 37% and 30.1%.

#### **3.2 PEST Analysis**

In the field of new energy vehicles, there are more and more emerging automobile brands, and some traditional automobile brands are also involved in it. The competition in the new energy vehicle industry is becoming more and more fierce. This section will analyze the external factors of the industry through the PEST model.

##### *3.2.1 Political environment analysis*

The support from the state. In 2020, the General Office of the State Council issued the new energy automobile industry development planning (2021-2035), this paper puts forward new energy vehicles should insist on three development directions, which are electric, networked and intelligent, and focusing on the fusion innovation, improve industry strength, break through the key core technology, optimize the environment of the industry development, so as to promote the high quality and sustainable development of the new energy automobile industry in China [12].

Beneficial policies for customers. Since 2014 countries have been for new energy vehicles shall be exempted from the vehicle purchase tax policy, in June 2023 countries introduced again on continuation and optimization of new energy vehicles vehicle purchase tax reduction policy, putting forward the purchase date on January 1, 2024, to December 31, 2025, of new energy vehicles shall be exempted from vehicle purchase tax, and the purchase date on January 1, 2026 solstice during December 31, 2027 of new energy vehicles halved vehicle purchase tax and other preferential policies [13].

Practical measures. On May 20, 2024, Xinhua News Agency launched the "China Economic Roundtable", which proposed that the National Development and Reform Committee will continue to take concrete measures to effectively promote the quality of the new energy vehicle industry, cost reduction, expand, consolidate and expand the advantages of industrial development. In addition, it will continue to introduce policies such as sending new energy vehicles to the countryside and exchanging old ones for new ones and actively promote technological innovation and development in this field [14].

### *3.2.2 Economic environment analysis*

Benefits from increasing economics in China. Since the reform and opening up, China's economy has been in a state of steady growth. According to the National Bureau of Statistics released on January 17, 2023, according to information released in 2022 China's GDP exceeds 120 trillion yuan, the annual GDP growth of 3%, ranks second in the world, and China's per capita GDP also presents a rising trend, people's income level and quality of life are constantly improving, most of them would prefer to try new things, such as choose a new energy vehicle as their commuted tool, which can promote the growth of new energy vehicle sales and the development of this whole field.

However, due to the outbreak of the domestic epidemic situation, complex and severe international environmental factors make the high prices of oil, increase the cost burden on the auto industry which has a high demand for oil. Besides, China constantly promotes the transformation and upgrading of the industrial structure, gradually eliminated energy-intensive, highly polluting traditional industries, vigorously supports the development of a green economy, brought a good opportunity for the development in the field of new energy vehicles, which is the most suitable chance for new energy vehicles industry to show itself.

### *3.2.3 Social environment analysis*

From the perspective of society, in recent years, China has advocated green, low-carbon and environmental protection development, and put forward the "two-carbon" development strategy to promote the realization of carbon peak and carbon integration. Economic growth has promoted the development of population education. More and more people understand the importance of environmental protection, and support and recognize the concept of "green travel, low-carbon life". Therefore, new energy vehicles are also favored by more and more people. In addition, compared with traditional fuel cars, new energy vehicles with the support of various preferential policies such as purchase and tax and the relatively lower cost of subsequent use of cars have higher cost performance, which is a good choice for some families with weak economic ability and some people who are just beginning to work and without too much deposit.

### *3.2.4 Technical environment analysis*

For new energy vehicles, the key technology lies in the "three power" system, which is the battery, motor and electric control system. Among them, the core and most difficult part is the battery. How to achieve high endurance and low cost is a difficult problem, and the battery's endurance is vulnerable to extreme weather like cold and extreme heat, which will bring inconvenience to the users of new energy vehicles, and will also restrict the development of the new energy vehicle industry to a certain extent.

At present, China has issued relevant policies to vigorously support the innovation and development of technology in this field. After the cancellation of the financial subsidy policy for new energy vehicles in 2022, the double integral policy will serve as the main policy drive dynamic factors, cooperate with the relevant supporting policies to continue in the industry research and development, production, sales, use, infrastructure construction and other aspects to give support, to help the industry smoothly into the "subsidy policy exit, market-led" a new stage of industrial development [15].

## **4 Development suggestions for the new energy vehicle industry**

### **4.1 Cost control**

For new energy vehicles, the most important is the three electric technologies, including battery, motor and electric control, in which the battery technology research and development is the most difficult, needs a lot of manpower, capital, and the cycle of research and development is longer than traditional cars. So far, the battery models and types used by various brands of new energy vehicles are not unified, so the related battery technology does not circulate in the new energy vehicle market, which requires each brand to research and develop their own battery technology or spend a lot of cost to introduce them from abroad.

The following suggestions are put forward: (1) The new energy vehicle market should unify the battery model as far as possible, using the same specifications of products, in order to reduce the overall research and development cost and shorten the research and development time. (2) Strengthen the interconnection and sharing of relevant non-core technologies among brands, reduce the overall research and development time and development costs, and use a unified and single charging interface as far as possible, avoid unnecessary production input, and improve the utilization efficiency of charging piles in the market. (3) Unified recycling management of used batteries, strengthen the recycling of waste batteries, so as to reduce the production cost of enterprises in batteries and truly realize the sustainable development of the green economy.

### **4.2 Strengthen infrastructure construction**

For new energy vehicles, the use time of electricity is one of the factors affecting most people's choice, which is specifically reflected in the short actual endurance and vulnerability to extreme weather and the insufficient distribution of charging piles.

Improve the construction of charging infrastructure can solve some related problems: (1) Consider the place of charge pile carefully, except the crowded center campus, public parking lot, etc., the highway and resorts also need to be considered, which can reassure consumers for driving new energy vehicles in a long journey. (2) Adhere to the regular maintenance and overhaul of each charging pile, to avoid the situation of charging pile failure and long-term failure. In this way, we can cooperate with big data to realize online real-time monitoring of the use and operation of various charging stations, sort out the recent flow data, and constantly adjust the reasonable layout of charging piles, so as to realize the efficient utilization of charging piles. (3) Strengthen the compatibility of charging piles, provide corresponding charging interfaces according to the existing product types in the market, and avoid the problem of waste of resources or low resource utilization[16]. (4) The government and enterprises should jointly maintain the charging stations, charging piles and other facilities for new energy vehicles. Relevant punishment policies should be formulated for the behavior of intentionally destroying and occupying the facility, and the supervision and management of such infrastructure should be strengthened to realize the long-term and effectiveness of its use.

### **4.3 To increase export development**

At present, China strongly supports the export of new energy vehicles, in 2023, the Ministry of Commerce and other nine departments jointly issued the " about the support of the healthy development of new energy automobile trade cooperation on the development

of new energy automobile export development in China, the policy spending to provide comprehensive, all levels of security in the field, such as: provide financial support, promote trade exchanges, strengthen the construction of international logistics system, etc., adhere to encourage and promote the foreign trade cooperation of new energy vehicles in China [17].

As far as this field itself is concerned, there are still many areas to be improved: (1) Strengthen the breakthrough of core technologies, reduce the dependence on foreign technologies, and constantly improve battery research and development to achieve high safety and long life use, and enhance their comprehensive strength. (2) Increase the publicity in related fields, enhance brand awareness, and increase the market competitiveness in the domestic and foreign markets while guaranteeing its own technology. (3) Strengthen logistics and transportation support, realize the indiscriminate use of domestic and foreign products, and reduce the impact of high tariffs on automobile exports. (4) Strengthen overseas after-sales service, increase the layout of after-sales outlets in overseas markets, realize efficient cost-raising overseas after-sales service, and increase users' trust in products[18].

## 5 Conclusion

This paper analyzes the present situation of the new energy automobile industry, found that the industry existing in the core technology is weak and too dependent on imports, battery life is short and charging infrastructure distribution is not widely enough, and the battery performance is vulnerable to extreme weather, therefore, this paper from the cost control, improve the infrastructure construction and increase the volume of three general directions, put forward relevant Suggestions and improvement measures.

Continuous investment in the use of new energy vehicles is conducive to China's better implementation of the green and sustainable development strategy, in line with the concept of developing a green economy. Therefore, on the whole, the overall trend of the new energy vehicle industry is good, the market continues to expand, and it still has great development potential in the future.

## References

1. F. Kaidong, C. Junting. New machines that will change the world?— The prospect of global competition for new energy vehicles. *Cultural Horizontal*. **02**,75 (2024)
2. H. Jichao, L. Fengwei, Y. Jingsong, et al. Development status and prospect of new energy vehicle industry and its technology. *Science and Technology Herald*. **41**, 49 (2023)
3. N. Taiyu, H.W. Ouyang, C. Jiayi, et al. Development status and problems of new energy vehicle industry. *Modern Transportation and Metallurgy Materials*. **3**, 47 (2023)
4. Z. Yeji. "Excellent" and "worry" of China's new energy vehicles — Development status and suggestions of China's new energy vehicle industry. *Intelligent and Connected Vehicles*. **05**, 64 (2023)
5. P. Zhiran. Analysis of the competitiveness of China's new energy vehicle industry. Ph.D. thesis. Party School of the CPC Central Committee. (2019)
6. L. Kaidi. Development status and strategy of the new energy vehicle industry. *Research on Industrial Innovation*. **21**, 42 (2023)
7. F. Ruoqi, X. Jingyi, G. Yuqi, et al. Development status and suggestions of charging pile facilities for New energy vehicles in China. *Time Automobile*. **08**,130-132 (2024)

8. W. pin. Development status and countermeasures of New energy vehicles in China. *Automotive Practical Technology*. **49**, 187 (2024)
9. W. Kewen. Research on the development of new energy vehicle technology under the background of new era integration. *Time Motors*. **21**, 92 (2023)
10. X. Miaoyao. Research on the sales forecast and development path of new energy vehicles in China. PhD's thesis. Shandong Industrial and Business College. (2023)
11. H. Zhenhua, Z. Yali. Evolutionary game analysis of the development strategies of new energy vehicles under the background of sustainable development. *Industrial technology and Economy*. **41**, 11 (2022)
12. Notice of The General Office of the State Council on Issuing the New Energy Vehicle Industry Development Plan (2021-2035). *Bulletin of The State Council of the People's Republic of China*. **31**,16 (2020)
13. The Central People's Government of the People's Republic of China. Announcement on the continuation and optimization of the new energy vehicle purchase tax reduction policy.(2023) [https://www.gov.cn/zhengce/zhengceku/202306/content\\_6887734.htm](https://www.gov.cn/zhengce/zhengceku/202306/content_6887734.htm).
14. H. Fupeng: Consolidate and expand the advantages of the new energy vehicle industry. *Contemporary county economy*. **07**,5 (2024)
15. W. Minghe. China's new energy vehicle industry policy research. PhD's thesis. Jilin University. (2023)
16. Z. Jiatian. Analysis of the development status and prospects of new energy vehicles. *Automotive Practical Technology*. **48**, 193 (2023)
17. L. Zongxian, H. Jiabin, Y.Xiaoman, et al. Analysis on the study of sustainable operation of new energy vehicle industry-Case analysis based on the triple bottom line. *National circulation economy*. **08**,73 (2024)
18. T.Faxin, L. Mingkun, G.Yuning. Opportunities and challenges of China's new energy vehicle export. *Business Watch*. **10**, 53 (2024)