Analysis on the Development of New Energy Vehicle Industry in China under the Double Carbon Targets

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Abstract

With the increasingly serious problem of global climate change, countries are transitioning to a low-carbon economy. As the world's largest emitter, China has proposed the "dual carbon" goals of carbon peaking by 2030 and carbon neutrality by 2060. In this context, the transformation and upgrading of fuel vehicles is imperative. The new energy vehicle industry has gained unprecedented momentums, but at the same time, it is also facing many challenges. This article aims to systematize the development history, current situation, challenges and potential opportunities of China's new energy automobile industry under the background of "double carbon". The study will first discuss the core role of new energy vehicles in promoting the transformation of a low-carbon economy, and the impact of politics, market demand and technological innovation on the industry. Based on this, this article will continue to discuss a series of challenges faced by the former industry, such as technological bottlenecks, insufficient infrastructure, and international competition. Finally, this paper will combine the trend of China's new energy vehicle industry and put forward target policy recommendations to provide theoretical support for promoting the industry. Through comprehensive, this paper seeks to provide valuable insights for policymakers and industry participants to drive greater progress in China's NEV industry in achieving the "dual carbon" goals.

Keywords: double carbon goals, new energy vehicles, development status, challenges, opportunities
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To address global climamte challlenges, the UN adopted the 2030 Agenda for Sustainable Development, wherein the Sustainable Development Goals (SDGs) explicitly mandate that all nations implement proactive strategues to reduce greenhouse gas emissions and accelerate the transtion to a green economy. As the world's largest greenhouse gas emitter, China has proposed the "dual carbon" goals, which serves as a catalyst for industrial restructing and technological innovation. With this policy framework, the new energy vehicle (NEV) sector, a pivotal component of the low-carbon economics systems, has emerged as a strategic priority in China's national green development agendasu.

1 Dual-carbon targets and the development context of China's new energy vehicle industry

1.1 Introduction and meaning of the dual-carbon goal

Since the reform and opening up, China's economic volume has been steadily increasing, alongside the continuous advancement of urbanization and industrialization. However, this industrialization process has come at a cost, leading to an increasingly serious with environmental pollution issues. In response to the current state of domestic development and the context of addressing global climate issues, President Xi announced at the 75th United Nations General Debate in September 2020 that China will aims to peak its carbon dioxide emissions by 2030, and achieve carbon neutrality by 2060 - this is referred to as a "dual-carbon" commitment. The "dual-carbon" goals represent a major strategic objective of the Chinese Government, To achieve it, China needs to vigorously develop green industries, promote the transformation of its energy structure and adopt a series of stringent measures to reduce emissions.

1.2 Development background of China's new energy vehicle industry

As a key component of China's advanced manufacturing industry, the automobile industry plays a central role in the transition from high-speed development economic growth to high-quality development, but in the process of industrial

development, However, this sector faces challenges such as high energy consumption and industry overcapacity, As a result, transitioning to low-carbon and decarburization decarbonized solution is an effective strategy to actively promote energy conservation and emission reduction, thereby assisting in the achievement of the "dual carbon" goals.[1] New energy vehicles embody a fusion of innovative energy sources,, new materials, Internet, big data, artificial intelligence and other trans-formative technologies. They are facilitating the evolution of automobiles from pure transportation to mobile intelligent terminals, energy storage units and digital spaces. This transformation is driving the upgrading of energy, transportation and information and communication infrastructures. Promoting the popularization and development of new energy vehicles has become an important way for China to achieve the "dual-carbon" goal. Promoting the development and widespread adoption of new energy vehicles is crucial for building of a clean and beautiful world and fostering a coummunity with a future for mankind. Achieving the "dual carbon" goals has emerged as a significant pathway for China through the advancement of NEV.

In recent years, new energy vehicles have emerged as a key focus of global industrial transformation and development and an important engine to promote the sustainable growth of the world economy, the world's major automotive powers have strengthened planning and policy support, and multinational automotive enterprises have increased R & D investment and improved industrial layout.[2] Although China's new energy vehicle industry started late, its development has been remarkably swift. Following the initiation of new energy vehicle pilot in 2009, both national and local governments have implementedvarious subsidy policies to facilitate the widespread adoption of NEVs. These measures include subsidies for vehicle purchases, tax incentives, free licenses, charging facilities, etc., in order to remove obstacles to the full-scale promotion of new energy vehicles. In recent years, under the unremitting efforts of the government, new energy vehicles, like newborn babies, have gradually learned to walk and stepped into the fast lane, realizing the transformation and upgrading from traditional fuel vehicles to new energy vehicles.[3]

2 Analysis of the development history and current situation of China's new energy vehicle industry

2.1 Development history of China's new energy vehicle industry

The development of China's new energy vehicles can be traced back to the 1990s. After years of technical accumulation and policy support, China's new energy vehicle industry has gradually matured from scratch, from small to large.

In 1991, China initiated the "863 Program", designating electric vehicles as a key area for research and development. Since then, prestigious institutions like Tsinghua University, Shanghai Jiao Tong University and other institutions of higher learning and research institutions began to carry out research and development of electric vehicle technology. In 2001, the "Tenth Five-Year Plan" formally identified new energy vehicles as an important national development direction, with increasing financial and policy support. In 2009, the government launched the "Ten Cities, One Thousand Vehicles" program, aiming to vigorously promote new energy vehicles in ten cities, including Beijing and Shanghai. This program has greatly stimulated market demand and promoted the popularity of new energy vehicles. In 2012, the State issued the "Energy Saving and New Energy Vehicle Industry Development Plan (2012-2020)", which set an ambitious goal of reaching a cumulative production and sales target of 5 million new energy vehicles by 2020. To achieve this goal, the government has further increased its support for new energy vehicles, including measures such as providing subsidies for vehicle purchases, reducing or waiving the purchase tax, and accelerating the construction of charging infrastructure.

China's new energy vehicle industry has entered a new phase of development with the introduction of the 2020 "dual-carbon" target vision in 2020. In 2021, NEVs' sales in China reached a record high of 3.52 million units, capturing 53% of the global market share. The global NEVs market continued to e xpand rapidly in 2022 , with total sales reaching 10.55 million units - an increase of 3.8 million units from the previous year. China's new energy vehicle market sales maintained its climbing momentum, with sales climbing to 6.887 million units, representing 65.3% of the global market share and ranking first globally for the eighth consecutive year.[4] 2023 was marked the

[1] Yang Yanfeng,Ge Xinqi." Research on innovation and development of China's new energy automobile industry under the background of "double carbon"[J]. Energy Storage Science and Technology,2022,11(7):2406-2407.
[2] Ministry of Industry and Information Technology of the People's Republic of China. Development Plan for the New Energy Vehicle Industry (2021-2035)
[3] Yin Biao,Duan Pengfei." Countermeasures for the development of new energy automobile industry in China under the background of "double carbon"[J]. Shanghai Energy Conservation, 2023,(08):1048-1052.
[4] Beijing Institute of Technology. China New Energy Vehicle Big Data Research Report (2023), English version

first year that China's new energy vehicle industry operated without national subsidies for electric vehicle purchases. By this time, China's new energy vehicle ownership has exceeded 5 million units. The industry has now become a cornerstone of the global automotive electrification transition. A comprehensive industry chain has emerged in China, encompassing everthing from the upstream supply of battery materials to the downstream vehicle manufacturing. Each link has a large number of enterprises involved, and has shown strong competitiveness in the international market.

2.2 Analysis of the Current Situation of China's New Energy Vehicle Industry

2.2.1 Market size and development trends

In recent years, China's new energy vehicle market share has been steadily rising. In 2023, China's overall automobile sales exceeded 30 million units, and the growth momentum of new energy vehicles continued, gradually stepping into the era of ten million units. China's local new energy automobile enterprises are rapidly rising, BYD reported annual sales of 3.02 million units, in 2023, making it the world's top-selling company in the new energy passenger car sector. Among the top ten Chinese automobile enterprises, five positions are occupied by NEV manufactures accounting for a total of 43%. According to China Association of Automobile Manufacturers (CAAM), the global sales of new energy vehicles in 2023 were 14.653 million, with 9.495 million, 1.468 million and 2.948 million in China, the U.S. and Europe, respectively, and China's new energy vehicle exports increased by 37.9% year-on-year, with a market share of 31.6%, ranking first globally for the ninth consecutive year.In the first three quarters of 2024, the production and sales of new energy vehicles were completed respectively at 8,316,000 and 8,320,000, up 31.7% and 32.5% year-on-year.[5] the International Energy Agency released the "2024 Global Electric Vehicle Outlook" report is also expected to 2024 global new energy vehicle sales will reach 17 million, which than the 2023 increase of 3 million electric vehicle sales, most of them from China. Meanwhile, electric vehicle sales could account for about 45% of China's total vehicle sales in 2024.[6]

2.2.2 Technological Innovation and Industry Chain Construction

In addition to the rising market position of new energy automobile enterprises, the market position of China's new energy industry chain has also been further enhanced, positioning the country as an accelerating supply chain center for the global automobile industry. China has developedthe world's most comprehensive industrial chain, encompassing materials research and development, battery production, recycling to equipment support. The technological innovation of China's new energy vehicle industry primarliy focuses on breakthroughs in core technologies such as batteries, motors and electronic control systems. Notably, advancements in lithium battery technology have been crucial, the four major raw materials of positive electrode, negative electrode, electrolyte and diaphragm are basically dependent on imports. The localization rate of lithium battery equipment has reached more than 90%, and the localization rate of key process equipment has reached more than 80%, this provides an important support for the large-scale popularization of electric vehicles and renewable energy storage. With the continuous progress of technology, the energy density and safety of new energy batteries have been greatly improved, and the cost has gradually decreased.

2.2.3 Key players and market landscape

China's new energy vehicle market is showing a trend of diversification, intelligence and internationalization. China's major new energy vehicle companies not only occupy an important position in the domestic market, but also gradually emerge in the international market. Mainstream companies such as BYD, Weilai, Xiaopeng, etc. have formed a competitive landscape in different market segments.

BYD (BYD) is one of the leading companies in China's new energy vehicle market not only producing pure electric vehicles (EVs) but also occupying an important market share in the field of plug-in hybrid electric vehicles (PHEVs). Its battery technology and core component production capacity give it a competitive advantage in the market. Weilai Automobile focuses on high-end smart electric vehicles. It not only innovates in hardware, but also continues to increase in software, intelligence and autonomous driving technology. It has launched innovative services including "battery replacement" technology, focusing on the mid-to-high-end market. Xiaopeng Motors is an innovative company focusing on smart electric vehicles, especially in the fields of autonomous driving and smart cockpits, with strong

[5] Data source: China Association of Automobile Manufacturers (CAAM) .
[6] International Energy Agency. Global Electric Vehicle Outlook 2024

technology foundation, its flagship models, such as Xiaopeng P7 and G3, have gained a certain market share by virtue of intelligent driving systems, autonomous driving technology and designs that meet consumer needs. Cars mainly launch plug-in hybrid (PHEV) models, such as ONE, L9, etc. These models are favored by consumers for their large space, high performance and long cruising range, showing strong market competitiveness.

2.2.4 Policy support and market mechanisms

Since its initial pilot program in 2009, China has been actively promoting new energy vehicles. The relevant subsidy policy is also changing with the development of the industry, from the pilot demonstration and promotion stage to promote the application of the stage, and then to the stage of market-oriented adjustments. The geographic scope of the pilot cities has expanded from a national focus, and the subsidized models have evolved from being limited public vehicles to encompassing various types of new energy models. In October 2020, the State Council Standing Committee meeting adopted the "new energy automobile industry development plan (2021-2035)", "the new energy automobile industry development plan (2021-2035)". Development Plan (2021-2035)", the "plan" for the development of China's new energy automobile industry in the next few years for the deployment, put forward to 2025, China's new energy automobile market competitiveness increased significantly, power battery, drive motor, vehicle operating system and other key technologies to achieve a major breakthrough, the level of safety comprehensively improved. The average power consumption of new pure electric passenger cars has dropped to 12.0 kWh/100km, the sales volume of new energy vehicles has reached about 20% of the total sales volume of new automobiles, highly self-driving cars have realized the commercial application of limited areas and specific scenarios, and the convenience of the charging and switching services has been significantly improved.

Local policies have also encouraged the consumption of new energy vehicles. For example, in the "Shanghai Municipal Implementation Plan for Accelerating the New Energy Vehicle Industry (2021-2025)" in February 2021. This plan aims to position Shanghai as a national leader in the NEVs industry by 2025, focusing on achieving major breakthroughs in core technology research. The R&D and manufacturing of key components such as power batteries and management systems, fuel cells, drive motors and power electronics have reached the international leading level. In September 2021, Tianjin pointed out in the "14th Five-Year Plan for Tianjin's New Energy Industry" that it will focus on supporting new application projects for intelligent manufacturing of new energy vehicle power batteries. Heilongjiang Province's 2022 "Heilongjiang New Energy Vehicle Planning (2022-2025)" clearly stated that the province will build a new energy vehicle and parts industry, centered around Harbin and Daqing. Aiming to create a group of high-profile and prestigious new energy vehicles and parts brands.

3 Challenges and development opportunities for China's new energy vehicle industry

3.1 Challenges facing China's new energy vehicle industry

3.1.1 Technical bottlenecks and core competitiveness to be broken through

Battery technology is fundamental to the new energy vehicle industry, as keys aspects like the battery life and charging speed of power batteries directly affect the market acceptance of electric vehicles. Although China has made great progress in battery manufacturing, especially companies such as BYD and Ningde Times have certain advantages in the battery industry chain, they still face some bottlenecks. For example, although the energy density of the battery has been significantly improved, the battery life performance is still unstable in the case of long-distance driving, extreme cold or extreme hot weather, etc., and it is difficult for users to travel for long distances. main concern. The safety of batteries is still a potential hidden danger of electric vehicles, especially in extreme cases such as collisions, overcharging or overdischarging, safety issues such as spontaneous combustion may occur. Meanwhile, China's new energy automobile industry chain part of the link into the contraction period, mainly manifested in the battery enterprise into the production capacity release period and the chip investment into the contraction period, the tail end of the enterprise facing financing pressure. Compared with foreign countries, China's new energy vehicle chip development is relatively backward, the domestic chip self-sufficiency rate is only maintained at 10%.[7] According to the data from the Battery Alliance, China's power automobile production capacity of 1260GWh, by the end of 2022 and increased to 1,860GWh by the end of June 2023. However, the capacity utilization rate for batteries in China was 51.6% in 2022, which dropped to approximately 41% in 2023. There are more than 300 domestic automotive chip companies, the market share is rapidly to the

[7] Yin Biao, Duan Pengfei." Countermeasures for the development of new energy automobile industry in China under the background of "double carbon"[J]. Shanghai Energy Conservation, 2023, (08):1048-1052.

head of the enterprise concentration, in the investment and financing and mass production under the double pressure, the automotive chip industry will usher in the "elimination race".

In terms of autonomous driving technology for new energy vehicles, Chinese companies also face some challenges. While they have established a competitive edge in vehicle manufacturing, they still rely heavily on external suppliers for core components (such as battery management systems, electric drive systems, smart chips, etc.) still rely on external suppliers. Therefore, how to break the dependence on core technologies and achieve self-sufficiency has become an important challenge for Chinese new energy vehicle companies. Moreover, China's autonomous driving laws and regulations have not yet been perfected. How to promote the application of technology under the premise of ensuring safety has also become an important issue faced by enterprises.

3.1.2 Lagging infrastructure development

Although China has increased investment in charging infrastructure construction in recent years, overall, the charging piles for new energy vehicles are insufficient and unevenly distributed, showing the characteristics of dense coastal areas and relatively sparse northwest regions. The construction of new energy vehicles is still unable to grow rapidly. There are significant gaps between urban and rural areas, developed areas and underdeveloped areas. The number and charging speed of charging piles in first-tier cities and developed areas are relatively high, but in some second-and third-tier cities and rural areas, there is still a serious shortage of charging facilities, and the charging convenience and experience of users are poor. This restricts consumers' willingness to buy electric vehicles to a certain extent. Moreover, most charging piles still use relatively slow charging, and there are still bottlenecks in the construction of fast charging networks.

3.1.3 Impact of international competition and globalization strategies

The domestic market share of Chinese new energy vehicle companies is increasing year by year, but they still face strong competition from European, American and Japanese automakers. These multinational auto companies still occupy an important position in the high-end market by virtue of their strong brand influence, mature production technology and supply chain management capabilities. When Chinese new energy vehicle companies enter these overseas markets, they may face the following problems: First, the problems of brand recognition and trust. Second, the legal and policy barriers of different countries, especially the stricter safety and environmental protection of the European Union and the United States, put forward higher requirements for the product adaptability of Chinese enterprises. Third, the uncertainty of international trade policies, especially the trade between China and the United States, may also affect the internationalization process of Chinese new energy vehicle companies.

3.2 Future Development Opportunities for China's New Energy Vehicle Industry

3.2.1 Dual Carbon Targets and National Policy Facilitation

The future prospects of China's new energy automobile industry are exceptionally promising. As domestic and international trends evolve, the opportunities within the industry are becoming increasingly abundant and diverse. China's "double carbon" goal vision provides robust policy support for the new energy vehicle industry. To facilitate the achievement of this goal, a series of supportive policies such as car purchase subsidies, exemption from purchase tax, exemption from vehicle and ship tax, and construction of charging facilities have been implemented. Especially in terms of car purchase subsidies and tax incentives, it was pointed out that we should adhere to the main tone of "consolidating and expanding advantages", consolidate and further expand the advantages of new energy vehicles, and at the same time extend the vehicle purchase tax reduction and exemption policy for new energy vehicles until the end of 2027, which not only alleviates The burden on consumers to purchase cars has also greatly promoted the market penetration and popularization of new energy vehicles.

3.2.2 Growing Market Demand and Increasing Consumer Awareness

With the continuous improvement of public awareness of environmental protection, consumers' demand for low-carbon and green travel is increasing, and new energy vehicles have become the first choice of more and more consumers. Especially young people, they have higher requirements for environmental protection, intelligence and sense of technology. New energy vehicles are enthusiastically sought after by them because of their characteristics of environmental protection, low noise, and intelligence. At the same time, with the continuous improvement of the cruising range of electric vehicles and the improvement of charging convenience, consumers are gradually accepting new energy vehicles. These technological advances have significantly enhanced the comprehensive competitiveness of new energy vehicles and further promoted the growth of market demand.

3.2.3 Technological Innovation and Industrial Integration

With the urgency of global climate action, new energy is becoming an important bridge for communication and cooperation in the fields of economy, trade, technology and supply chain. New energy vehicles integrate green energy, artificial intelligence, the Internet, big data and other transformative technologies, positioning themselves as important platforms for the application of new technologies. In particular, breakthroughs in the field of solid-state batteries predict that future batteries will be safer, more durable and efficient. And with the low price of lithium carbonate, the decline in the cost of power batteries, the improvement in the cost of new energy vehicles, as well as geopolitical risks to international energy trade, rising oil prices accelerating the contraction of the fuel market, the sales of new energy vehicles in China to further enhance. Not only that, with the gradual development of China's new energy vehicle industry, the integration and optimization of the industrial chain has gradually become an important driving force for the industry. The cooperation among battery producers, vehicle manufacturers, charging facility enterprises, as well as the government and the capital market has formed a strong industrial synergy, which promotes the effective allocation of resources such as technology, capital and policies.

3.2.4 Internationalization and Global Market Expansion

As China's new energy vehicle market matures, many domestic companies have not only made remarkable achievements in the domestic market, but have also begun to actively layout the international market. Chinese new energy vehicle brands, such as BYD, Azure, and Xiaopeng, have gradually penetrated into developed markets such as Europe and North America by virtue of their lower production costs, mature supply chain systems, and excellent R&D capabilities. The internationalization process of Chinese companies serves not only to expand their market share, but also to further enhance their innovation capability and brand influence through technical collaboration with leading global automakers and technology firms. The rise of these Chinese brands not only boosts the global competitiveness of China's new energy vehicles, but also contibutes significantly to the electrification of the global automotive industry.

4 Policy recommendations for the future development of new energy vehicles in China

China's new energy vehicle industry is at a critical stage of booming development. With increasingly stringent environmental policies and growing market demand, new energy vehicles have become an important direction for future transportation development. In order to ensure that China's new energy vehicle industry can maintain its competitiveness and promote its sustainable development, it is necessary to carry out a comprehensive layout from the dimensions of technological innovation, market demand, policy support, industry chain synergy, etc., to promote the comprehensive upgrading and leapfrog development of the new energy vehicle industry.

4.1 Accelerate technological innovation and enhance industrial core competitiveness

Currently, the main technical bottlenecks faced by the new energy vehicle industry include power battery technology, charging facilities, autonomous driving technology, and hydrogen energy technology. Achieving breakthroughs in these areas can enhance product performance while also significantly reducing production costs, thereby facilitating the overall upgrade of the industry. On the one hand, it is necessary to strengthen the research and development of battery technology and the breakthrough and application of hydrogen energy technology. Enterprises and scientific research institutions can be encouraged to carry out R&D and innovation in battery materials, manufacturing processes and recycling technologies through special funds, tax exemptions, technology formulation and other means. At the same time, enterprises are encouraged to strengthen the R&D and demonstration application of hydrogen fuel cell technology. Supporting policies should facilitate the construction of hydrogen energy infrastructure and promote the gradual implementation of hydrogen energy vehicles in specific fields (such as logistics and public transportation). On the other hand, it is vital to continue to promoting intelligent network connection and autonomous driving technology. Enterprises should increase investment in intelligent network technology, autonomous driving algorithms, vehicle operating systems, etc., promote road testing and standardized management of smart vehicles, and gradually promote the commercialization of autonomous driving technology.

4.2 Improve infrastructure development and promote market penetration

The rapid development of new energy vehicles cannot be separated from perfect infrastructure support, especially the

construction of charging facilities is crucial. At present, the number and distribution of charging piles have not yet fully met the growing market demand. In order to break through this problem, first of all, the government should strengthen the planning and construction of charging infrastructure and enrich the application scenarios of charging piles. Through rational layout and technological progress, promote the use of family charging piles by individuals, and focus on the reasonable planning and layout of public charging piles in the community according to the new energy vehicle ownership in the region.[8] At the same time, promote the intelligent construction of charging piles to realize interconnection and enhance user experience. Second, it is necessary to promote the integration of charging facilities with the smart grid. The large-scale popularization of new energy vehicles will significantly increase electricity demand, which poses a challenge to the load and scheduling of the power grid. The government should encourage the integration of charging piles with smart grids to promote the upgrading of grid infrastructure. Through the scheduling function of the smart grid, charging and intelligent control of charging time and power during periods of lighter power loads can avoid excessive pressure on the power grid from large-scale charging, while also realizing the energy storage function of charging piles, releasing the reserve power when the power is tight and further improving the efficiency of power usage.

4.3 Optimize policy support to stimulate market demand

In recent years, policies and measures such as car purchase subsidies and tax incentives have provided consumers and manufacturers with relatively generous incentives. However, as the market gradually matures, policies need to be further optimized and upgraded to promote the industry to become more independent and healthier. direction. Under the framework of the current new energy vehicle subsidy policy, we should gradually reduce reliance on purchase subsidies and shift to policies that pay more attention to technological innovation and market-oriented incentives, the "Technology Innovation Award" can be set up to reward the development of high-performance and high-safety new energy vehicles. By introducing low-carbon travel tax incentives, consumers are encouraged to buy green and environmentally friendly new energy implemented. To better balance the presence of new energy vehicles and fuel vehicles, implementing differentiated tax policies would be beneficial. For example, higher emission taxes or fuel surcharges are imposed on fuel vehicles, and the funds obtained are used for the new energy vehicle industry. This measure can not only effectively promote consumers' green travel choices, but also encourage car companies to accelerate the transformation of new energy vehicles through market mechanisms.

4.4 Promote internationalization strategy to enhance global competitiveness

With increasingly stringent global environmental regulations and increased demand for new energy products in the international market, the international market for new energy vehicles has become a new blue ocean for Chinese enterprises to expand. The technological advances, cost advantages and market scale of Chinese enterprises in the field of new energy vehicles have given them strong international competitiveness, and in order to further assist enterprises to go global, it is necessary for enterprises and the government to work together.

China's new energy automobile industry is a complex system engineering, involving technology, market, policy, internationalization and other aspects. Comprehensive policies should be implemented to create a complete industrial ecological chain, not only to encourage technological innovation and infrastructure construction, but also to promote the health of the industry by optimizing policy support and expanding the international market. The "dual-carbon" goals also put forward introduce richer and more diversified requirements for the production of China's new energy automobile enterprises. While traditional production methods still persist, it is essential for new energy automobile manufactures to adopt a green and low-carbon approach. This is not only in line with the requirements of China's "double carbon" goal, but also in line with the needs of the international market for low-carbon economy.[9] Enterprises should continue to strengthen the research and development of batteries, electric drive systems and intelligent technologies (such as autonomous driving and Telematics) to improve product performance and safety, and strive to occupy the right to speak in the global technical standards. Meanwhile, through precise market positioning and differentiation strategies, combined with localized operations and differentiated marketing, they should establish the image of a globally renowned brand and increase brand exposure through channels such as social media and automotive exhibitions. Enterprises also need to pay close attention to the policies and regulations of different countries and regions to ensure compliance and seek policy support, especially

[8] Zhao Zheng. Research on the status quo and challenges of new energy vehicle development in China under the dual-carbon goal[J]. Business Economy,2022, (08):46-47+52.

[9] Liu Zhuo." Analysis of the international competitiveness situation of new energy vehicles in China under the background of 'double carbon' target[J]. Modern Industrial Economy and Informatization,2024,14(06):34-37.

when it comes to environmental protection and certification requirements in markets such as Europe and the United States, where companies need to improve their level of compliance. In the process of internationalization, international cultivation of talents and cross-cultural management are equally important.

5 Conclusion

Under the guidance of the "dual carbon" goals, China's new energy vehicle industry is experiencing rapid development and has become an important driving force for the transformation of the global low-carbon economy. Despite challenges such as technical bottlenecks, insufficient infrastructure and international competition, the growth of market demand and policy support provides a solid foundation for the future of the industry. By accelerating technological innovation, improving infrastructure construction, and optimizing policy incentives, the new energy vehicle industry is expected to break through the current bottlenecks and achieve success.

References

Yang Yanfeng, Ge Xinqi." Research on innovation and development of China's new energy automobile industry under the background of "double carbon"[J]. Energy Storage Science and Technology,2022,11(7):2406-2407.

Yin Biao, Duan Pengfei." Countermeasures for the development of new energy automobile industry in China under the background of "double carbon"[J]. Shanghai Energy Conservation, 2023, (08):1048-1052.

Beijing Institute of Technology. China New Energy Vehicle Big Data Research Report (2023), English version

Zhang Yuxin, Tang Hsuhuan." Development status, problems and countermeasures of China's new energy automobile industry under the goal of "double carbon"[J]. China Resources Comprehensive Utilization,2024,42(06):148-153.

Han Yue. Opportunities, Challenges and Countermeasures of China's Green and Low-Carbon Transition under the Target of "Double Carbon"[J]. China High-Tech, 2022, (21):93-95.

International Energy Agency. Global Electric Vehicle Outlook 2024

Ministry of Industry and Information Technology of the People's Republic of China. New Energy Vehicle Industry Development Plan (2021-2035).

Wang Huixin. New Energy Vehicles Accelerate Toward Scale and Globalization[N]. China Transportation News, 2024-09-19(008).

Deng Peng. The development of new energy vehicles reflects the pace of China's overall green transformation[J]. Sustainable Development Economics, 2024, (08):2.

Zhao Zheng. Research on the status quo and challenges of new energy vehicle development in China under the dual-carbon goal[J]. Business Economy,2022, (08):46-47+52.

Tang Shijian, Luo Yantuo, Zhang Xueliang, et al. Problems and development path of China's new energy vehicle charging market[J]. Oil and Gas and New Energy,2024,36(05):10-16+27.

Liu Zhuo." Analysis of the international competitiveness situation of new energy vehicles in China under the background of 'double carbon' target[J]. Modern Industrial Economy and Informatization,2024,14(06):34-37.