



Research on the Promotion and Application Strategies of New Energy Vehicles under the Background of Green Development

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Abstract. Sustainable advancement is a pivotal notion for achieving a balanced relationship between humanity and the natural world, as well as for the enduring growth of both the economy and the environment. As the energy landscape shifts, vehicles powered by clean energy, notably new energy cars, have emerged as a crucial strategy for fostering eco-friendly transportation. This piece initially delineates the essence of sustainable progress, dissecting the attributes of new energy vehicles and their pivotal impact on safeguarding the environment and conserving energy. From the years 2019 to 2022, there was a notable surge in the sales of new energy vehicles, climbing from 1206 thousand to 6887 thousand, with their market share escalating from 4.7% to 23.9%. Nonetheless, challenges persist in the dissemination of new energy vehicles, including a lack of public awareness about policies, inadequate charging infrastructure, and the immaturity of the technology. To address these issues, the article suggests several strategies, encompassing enhanced policy promotion, technological advancement, and the development of supporting infrastructure, all aimed at propelling the sustainable evolution of the new energy vehicle sector.

Keywords: Promotion Strategies, Application Strategies, New Energy Vehicles, Green Development

1 Introduction

Green development is an approach that aligns with the natural order, fostering a symbiotic relationship between humans and the environment. It is a form of development that seeks to maximize economic and social benefits while minimizing the resource and environmental costs, aiming for high-quality and enduring progress. The transition to a low-carbon economy, prioritizing energy, is moving forward with determination. Presently, in China, the share of coal in energy consumption has decreased to 55.3%, while the share of non-fossil energy has risen to 17.7%. Renewable energy's installed capacity now makes up 52.9% of the total power generation capacity in the country, surpassing that of thermal power. Additionally,

China leads the world in the installed capacity of hydro, wind, solar, and biomass power, contributing to a significant reduction in carbon emission intensity [1]. The previously sharp rise in carbon dioxide emissions has been effectively curbed. New energy vehicles, which substitute traditional fuels with clean energy sources for propulsion, offer the benefits of being cost-effective, energy-efficient, and environmentally friendly, without causing pollution. They are a vital instrument in advancing green transportation. In the context of green development, it is highly pertinent to examine the challenges and propose solutions regarding the promotion and utilization of new energy vehicles.

2 Green Development and New Energy Vehicles

2.1 Concept of Green Development

Green represents the essence of life and the canvas of the natural world. Embracing green development as a keystone concept integral to the comprehensive progress of our nation will steer us towards an enlightened developmental trajectory characterized by thriving production, prosperous living, and a healthy ecosystem. This paradigm of green development entails a comprehensive transformation across production methods, daily living habits, cognitive frameworks, and value systems. It transcends conventional developmental paradigms, offering a profound understanding of the natural laws and the overarching principles of sustainable economic and social progress. It represents an indispensable decision for economic restructuring, development model innovation, and the realization of enduring development. A good ecological environment is not only the most equitable public product, but also the most inclusive people's well-being [2]. In the process of building a beautiful China, the concept of green development must be penetrated into ecological protection, environmental construction, production and manufacturing, urban development, people's lives and other fields. In the process of promoting the construction of ecological civilization, China has always been committed to promoting the construction of ecological civilization and sustainable development to complement each other and advance together, and to contribute China's plan and wisdom to global sustainable development with the rule of China. Practice has fully proved that only by fully implementing the concept of green development can we help improve the ecological environment, effectively reverse the loss of biodiversity, and protect the beautiful homeland on which we live. Green development provides a scientific and reasonable value orientation for the development of our civilization. We should persist in protecting and developing in development, take green transformation as the driving force, and lead the innovation of economic development mode. According to the "Opinions on Implementing the New Development Concept Completely, Accurately and Comprehensively to Do a Good Job in Carbon Peak and Carbon Neutralization" published in 2021, the important objectives of green development are shown in Figure 1.

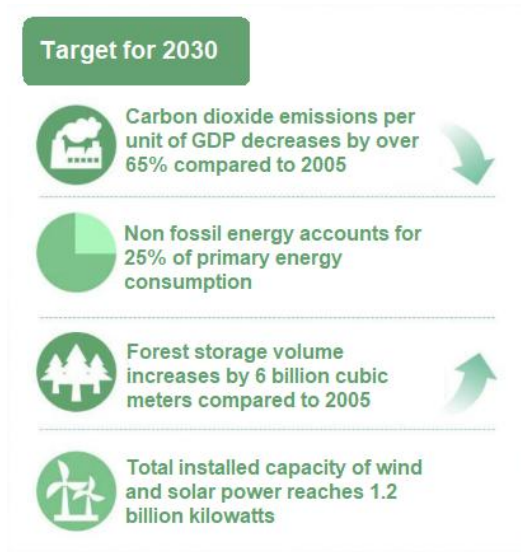


Fig. 1. Important goals of green development (figure credit: original)

2.2 New Energy Vehicles

New energy vehicles are defined as those that either rely on non-traditional fuels for propulsion or utilize conventional fuels but are equipped with innovative power systems onboard. They incorporate state-of-the-art technology in the areas of power control and driving mechanisms, embodying cutting-edge technological principles and novel structural designs [3]. These vehicles excel in their environmental and energy conservation capabilities, significantly diminishing the emission of exhaust gases, which is crucial for enhancing air quality and mitigating the impact of the greenhouse effect. Additionally, they boast superior energy efficiency, thereby lessening reliance on conventional fossil fuels. In terms of energy cost, the cost of new energy such as electricity is relatively low, and long-term use can save a lot of energy expenditure. In terms of intelligence, they are equipped with advanced electronic equipment and intelligent driving assistant system, which greatly improves the driving experience and driving safety. As new energy vehicles conform to the concept of sustainable development, governments have introduced subsidies and preferential policies to encourage consumers to buy and use them. In addition, the noise of new energy vehicles is smaller, and the interior environment is more comfortable. Moreover, the technology in this field is updated very fast, and new battery technology and drive technology are constantly emerging, which strongly promotes the rapid development of the whole industry. New energy vehicles represent the future development trend of the automotive industry, with the continuous progress of technology and the gradual improvement of infrastructure, its share in the market is expected to further expand.

2.3 Significance of New Energy Vehicles to Green Development

New energy vehicles are capable of markedly diminishing the release of greenhouse gases and pollutants. Emissions from traditional combustion-engine vehicles are laden with numerous harmful substances, including carbon dioxide, nitrogen oxides, and particulate matter, which adversely affect air quality and contribute to climate change. In contrast, new energy vehicles, particularly those that are fully electric, operate with near-zero emissions, aiding in the reduction of air pollution, the enhancement of the ecological environment, and the creation of a purer, healthier living space for humans [4]. As the global economy expands, the demand for conventional energy sources like oil keeps rising, yet these resources are finite. New energy vehicles predominantly depend on renewable energy sources such as electricity and hydrogen, thereby decreasing reliance on non-renewable energy sources like oil and encouraging the diversification and sustainability of the energy sector. The advancement of new energy vehicles also fosters technological innovation and the upgrading of associated industries. In order to improve the performance and safety of new energy vehicles, continuous research and development and innovation are needed in battery technology, charging facilities, intelligent driving and other fields. This not only promotes the upgrading of the automobile industry chain, but also promotes the development of energy storage, electronic information technology and other related fields, and injects new impetus into economic growth. With the continuous promotion of the national green development policy, the field of new energy vehicles is gradually transforming and upgrading towards the direction of electrification, networking and intellectualization, and a new industrial ecology is slowly taking shape, which greatly enhances the competitiveness of China's automotive industry.

3 Current Situation and Problems of Promotion and Application of New Energy Vehicles

3.1 Current Situations

Bolstered by governmental initiatives aimed at safeguarding the industrial supply chain, policies that stimulate automobile consumption, incentives and protective measures, the ongoing enhancement of new energy vehicles' performance, and the ongoing development of their usage infrastructure, the adoption and promotion of new energy vehicles within the transportation sector have opened up fresh opportunities. These efforts have unearthed and unleashed the sector's consumption potential, hastening the spread and application of such vehicles. The promotion of new energy vehicle consumption in transportation is expanding, encompassing areas such as bus leasing, urban logistics, and waste management.

Figure 2 shows the (forecast) sales of new energy vehicles and their (forecast) penetration in 2019-2025. Sales of new energy vehicles increased from 1.206 million in 2019 to 15.241 million in 2025, showing a significant growth trend. Total vehicle sales increased from 25.769 million in 2019 to 32.126 million in 2025, and the overall automobile market is also growing. The proportion of new energy vehicles in total

automobile sales increased from 4.68% in 2019 to 47.44% in 2025, reflecting a significant increase in market acceptance and penetration of new energy vehicles. Generally speaking, the new energy automobile market is expanding rapidly, and its share in the overall automobile market is increasing year by year, which indicates that the new energy automobile will occupy a more important position in the future automobile market.

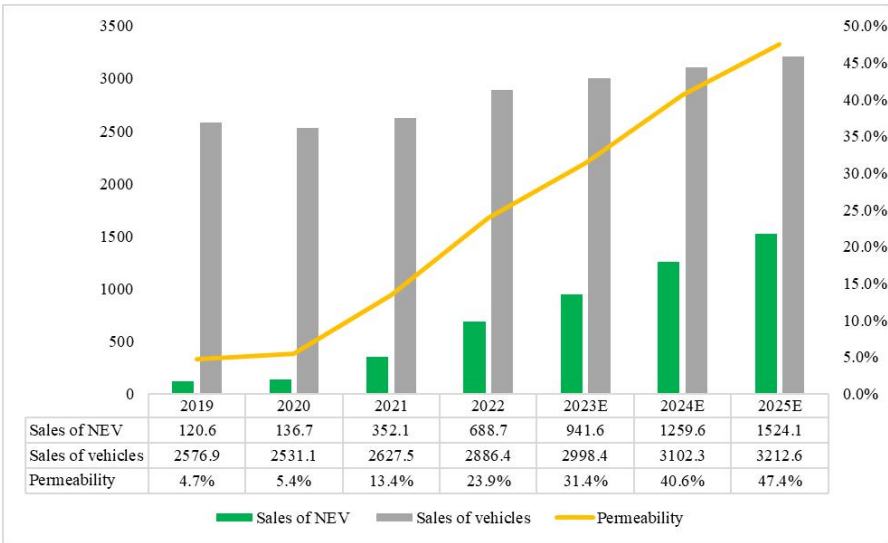


Fig. 2. Sales volume and penetration rate of new energy vehicles (unit: 10000) (figure credit: original)

The first-tier and second-tier cities are the earliest to promote the application of new energy vehicles in the transportation industry. The number of new energy vehicles is large, and the promotion and application foundation is good. With the help of the incentive and safeguard measures issued by the government, the number of new energy vehicles in the transportation industry will continue to grow. Third-tier and fourth-tier cities are relatively late in popularization and application, and have good market development potential. With the support of policies, the improvement and construction of charging networks, and the reduction and exemption of tolls, the continuous expansion of new energy vehicles in the transportation industry has been realized. The presence of new energy vehicles in the transportation sectors of both urban and rural areas is currently limited, indicating ample room for market expansion. However, the development of the necessary supporting infrastructure and systems is not keeping pace. By enhancing policy direction and bolstering the development of a service network, the reach of new energy vehicles is continually expanding. Their deployment in transportation offers clear advantages and is progressively extending into various sectors, including ride-hailing, logistics, car sharing, and vehicles for environmental protection and tourism [5]. As public

environmental consciousness grows and oil price volatility takes effect, an increasing number of consumers are turning to new energy vehicles. Concurrently, advancements in new energy vehicle technology have led to improvements in the brand image and service quality of manufacturers. The ongoing enhancement of fast charging technology and the charging infrastructure has further broadened the scope of new energy vehicle promotion and application.

3.2 Problems

Insufficient policy propaganda. In the early stages of promoting new energy vehicles, consumer awareness remains relatively low. The disparity in market information and the presence of consumers' limited rationality make it challenging for them to fully grasp details such as the performance, supporting infrastructure, operational expenses, and maintenance costs associated with new energy vehicles. This poses a significant challenge to the widespread adoption of these vehicles. Moreover, during the promotion of new energy vehicles, some regions have inadequate comprehensive promotion and a lack of a strong social atmosphere, resulting in low public awareness and recognition of new energy vehicles. Consequently, it is imperative to consistently enhance the dissemination of information and policies related to new energy vehicles through the use of internet platforms, radio broadcasts, newspapers, and other media outlets.

Immature technology innovation. At present, new energy vehicles are still in the stage of development, and their key technologies are steadily improving. However, compared with traditional fuel vehicles, the technology of new energy vehicles is not mature, the failure rate is high, and the driving stability and safety need to be enhanced. A large number of technical and safety problems have arisen in some new energy vehicles, which have brought various obstacles to their popularization and application [6]. Hence, enhancing the development and innovation of key technologies is imperative to facilitate the extensive adoption of new energy vehicles. Furthermore, the absence of maintenance facilities for new energy vehicles in certain areas, coupled with the lack of a robust after-sales service network among some new energy vehicle companies, leads to increased maintenance service expenses for these vehicles.

Inadequate charging facilities. Pure electric vehicles hold a significant role within the new energy vehicle sector. To accommodate the evolving requirements of pure electric vehicles, a comprehensive and efficient charging infrastructure is essential. Nevertheless, certain regions in China still face challenges in establishing charging facilities for new energy vehicles, including a scarcity of charging stations and suboptimal charging speeds, particularly in third- and fourth-tier cities. The extended charging times required for some larger new energy vehicles can severely impact both the operational efficiency and the driving experience, thereby impeding, to some extent, the market penetration and adoption of new energy vehicles.

4 Promotion and Application Strategies of New Energy Vehicles

4.1 Policy Publicity Strategy

very important. Policy advocacy strategies play a key role in this. The primary task of the policy propaganda strategy is to improve the public's awareness of new energy vehicles. Through various channels, such as television, newspapers and the Internet, the advantages and characteristics of new energy vehicles are widely disseminated. It emphasizes its significance to environmental protection, energy conservation and sustainable development, so that the public can deeply understand the key position of new energy vehicles in green development. It is also important to strengthen the interpretation and publicity of relevant policies. It explains in detail a series of incentive policies issued by the state and local governments, such as car purchase subsidies, tax incentives and free parking, so that consumers can clearly realize the actual benefits of purchasing new energy vehicles. This will not only stimulate consumers' willingness to buy, but also help promote the development of the new energy vehicle market. It is indispensable to organize various publicity activities [7]. It can organize exhibitions and test-driving activities of new energy vehicles, so that consumers can personally experience the performance and advantages of new energy vehicles. In the activities, professionals are arranged to explain and answer questions to eliminate consumer's concerns and misunderstandings. The use of social media platforms for interactive communication is also an effective tool. By publishing interesting and vivid content, we can attract public attention and participation. Encourage users to share their experience and opinions, and form a good word-of-mouth communication effect. Targeted policy publicity should be carried out for specific groups, such as enterprises, organs and units [8]. To guide them to actively purchase new energy vehicles and play a leading role in demonstration, so as to drive a wider range of social groups to follow up. Cooperate with educational institutions to incorporate knowledge related to new energy vehicles into the education system, and cultivate public awareness of environmental protection and awareness of new energy vehicles from an early age. At the same time, we should strengthen the application of new energy vehicles in public areas, so that public transport, taxis, logistics, sanitation and other industries can become the propaganda carrier of new energy vehicles.

4.2 Technology Innovation Strategy

Amidst the backdrop of sustainable development, the strategy of technological innovation is crucial for the advancement and implementation of new energy vehicles. Primarily, achieving a breakthrough in battery technology is essential. It is imperative to persistently bolster investment in the research and development of batteries, with the goal of enhancing their energy density. This advancement can directly extend the range of new energy vehicles, thereby alleviating the range anxiety experienced by consumers. At the same time, the safety and stability of batteries should be improved to ensure safe and reliable operation in various complex environments. Through in-

depth research and innovation of battery materials, such as exploring more efficient cathode materials, and electrolytes to promote the overall improvement of battery performance. Secondly, the development of intelligent driving technology is indispensable. With the help of advanced sensors and artificial intelligence algorithms, new energy vehicles have more powerful automatic driving capabilities. It can not only improve the safety and comfort of driving, but also further enhance the overall intelligent level of vehicles and attract more consumers. Through continuous optimization of algorithms and systems, more accurate perception and decision-making can be achieved, bringing users a new driving experience. Thirdly, the innovation of charging technology is extremely important. Speed up the research and development of fast charging technology, reduce the waiting time for users to charge, and improve the charging efficiency [9]. In addition, we should actively explore new technologies such as wireless charging to make the charging process more convenient and intelligent. At the same time, optimize the layout and management of charging facilities to ensure the convenience and reliability of charging. Through in-depth technological innovation in key areas such as battery technology, intelligent driving technology and charging technology, the core competitiveness of new energy vehicles can be continuously enhanced, which can effectively promote their wide promotion and application under the background of green development, and lay a solid foundation for achieving the goal of sustainable transportation and environmental protection.

4.3 Infrastructure Construction Strategy

Accelerating the extensive layout of charging facilities is the top priority. Charging piles and charging stations should be built on a large scale in various areas of the city, including commercial areas, residential areas and public places [10]. We should not only meet the demand in quantity, but also pay attention to the rationality of the layout to ensure that users of new energy vehicles can find charging facilities conveniently and quickly. Increase the proportion of fast charging piles to shorten the charging time and improve the user's experience. At the same time, we should actively expand the construction of charging facilities along expressways, solve the charging problems of long-distance travel, and eliminate consumer's worries about the mileage. For some specific scenarios and user needs, the power exchange mode has unique advantages. Increase the investment and construction of power exchange stations to improve the efficiency and service quality of power exchange. Through standardized battery specifications and power exchange process, it can provide users with efficient and convenient power exchange services, and further enhance the convenience and competitiveness of new energy vehicles.

An intelligent management system should be established. Using Internet of Things, big data and other technologies, real-time monitoring of the operation status of charging facilities, timely detection and solution of fault problems. Through the intelligent scheduling system, the charging resources are reasonably allocated to avoid the long waiting time in the queue. At the same time, it provides users with real-time information of charging facilities, which is convenient for users to plan their journey

and select charging sites. Strengthen the maintenance and management of infrastructure. Strict maintenance standards and procedures are formulated, and charging facilities are regularly inspected and maintained to ensure their safe and reliable operation. Strengthen cooperation with relevant departments and enterprises, jointly do a good job in infrastructure management, and improve the overall operational efficiency. At the same time, we should establish a user feedback mechanism, collect user's opinions and suggestions in time, and constantly optimize the service quality of infrastructure.

5 Conclusion

As a crucial element of sustainable development, the dissemination and utilization of new energy vehicles play a pivotal role in establishing a resilient transportation framework, mitigating environmental contamination, and fostering a shift in energy sources. This paper delves into the market dynamics, challenges, and strategies for promoting new energy vehicles, underscoring the significance of policy advocacy, technological advancement, and infrastructure development in their growth. With ongoing technological refinements and policy enhancements, the widespread adoption of new energy vehicles will offer substantial momentum towards attaining the objectives of sustainable development. Looking ahead, we anticipate the expansion of new energy vehicles into an array of sectors, aiding in the creation of a picturesque China and propelling forward global sustainable progress.

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