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# Research on Residents' Cognition and Purchase Decision of New Energy Vehicles under the "Dual Carbon" Goal——Based on the survey in Anhui Province

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## Abstract

With the official proposal of the "dual carbon" target at the 75th United Nations General Assembly in China, the electric vehicle industry has become an emerging industry that cannot be ignored in the context of "dual carbon". The development of electric vehicles, especially under the "dual carbon" target, has significant theoretical significance and practical value for the research and analysis of the penetration status of new energy vehicles in small and medium-sized cities and rural areas. This issue has received high attention and importance from scholars in various fields and professions internationally, and has achieved certain research results.

## Keywords

Dual Carbon Target; New Energy Vehicles; Promotion Strategy; Green Development

## 1. Introduction

In October 2021, the State Council issued a notice on the "Action Plan for Carbon Peak before 2030" (Guofa [2021] No. 23), which proposed to "incorporate carbon peak and carbon neutrality into the overall economic and social development" [[1]], and made requirements for the "14th Five Year Plan" period, requiring new progress in the research, development, promotion and application of green low-carbon technologies, vigorously promoting green production and lifestyle, so as to further improve the policy system of green, low-carbon and circular development. New energy vehicles, due to their use of clean energy and the advantage of renewable energy sources, can greatly reduce carbon emissions in the transportation sector and are an important way to achieve the dual carbon goals. The country strongly sup-

ports the development of new energy vehicles in order to achieve carbon neutrality, and now the development of new energy vehicles is advancing rapidly. In the future, the Chinese automobile market will gradually shift from developed regions to underdeveloped regions and cities. It is an important market for promoting and disseminating new energy vehicles, with a vast geographical location and diverse energy supply. General Secretary Xi Jinping pointed out in the report of the 20th National Congress of the Communist Party of China that "the most arduous and heavy task of comprehensively building a socialist modernized country still exists." A series of problems that exist in this will affect China's economic development.

Therefore, how to utilize the new energy vehicle industry to support construction has become an urgent problem to be solved. Based on this, this article will analyze the current situation and many problems encountered in the promotion of new energy vehicles, and propose a series of targeted promotion strategies for new energy vehicles to contribute to achieving the dual carbon goal.

## 2.Current situation of brand communication

### 2.1 Development Status of New Energy Vehicles

The definition of new energy vehicles refers to vehicles that adopt new power systems and rely entirely or mainly on new energy sources for propulsion, including plug-in hybrid (including range extender) vehicles, pure electric vehicles, and fuel cell vehicles. With the active promotion of government policies and the transformation of consumers' shopping concepts, the development of new energy vehicles in China has become an inevitable trend. The production and sales of new energy vehicles in China have always been in a leading position globally, with sales of new energy vehicles ranking first in the world for eight consecutive years, making it the fastest-growing country in the world's new energy vehicle market.

### 2.2Current situation of promoting new energy vehicles

With the rapid development of new energy vehicle technology, the sales of new energy vehicles have significantly decreased compared to big cities. However, with the government's strong support for new energy vehicles to go to the countryside, the National Development and Reform Commission has also issued a document to encourage qualified local residents to buy new energy vehicles in the county where their registered residence registration is located, and give support such as consumer coupons to ease the pressure on new energy vehicle sales.

Although the development focus of the new energy vehicle industry is on big cities, the promotion of new energy vehicles by the government has also been highly valued in recent years. In the future, with the continuous promotion of the rural revitalization strategy and the further deepening of urban-rural integration, the dividends of economic development will continue to be obtained, and the travel and transportation needs of residents will be further released, which will also generate a

huge demand for new energy vehicles in the market. With appropriate policy guidance and sufficient supply of products that meet residents' needs, it will have broad development prospects.

## 3.Literature Review

In terms of the layout of urban and rural areas in China, Peng Hua pointed out in his article "Research on the Development and Spatial Layout of China's New Energy Vehicle Industry" that the main influencing factors of the spatial distribution of new energy vehicles require sufficient funds to invest in public facilities such as roads and charging stations from the perspective of consumer market proximity. From the perspective of the development direction of new energy vehicles, this article discusses the development of China's new energy vehicle industry from the aspects of market size, policy direction, and technological trends. In addition, the local climate and terrain are also influencing factors. Based on data such as the "China New Energy Vehicle City Liuzhou Model Big Data Report" compiled by the China Association of Automobile Manufacturers, Zhang Changling used statistical analysis methods to find that the penetration rate of third tier cities is higher than that of first tier cities. The potential of the new energy vehicle market in China's small and medium-sized cities and rural areas is enormous, and it is the focus of the future development of the new energy vehicle market.

In terms of new energy vehicle power infrastructure, Zhang Junhong pointed out the specific reasons for the slow development of the new energy vehicle industry in rural areas, and based on the current situation of rural new energy vehicle infrastructure construction, proposed that the country needs to provide policy and financial support to strengthen infrastructure construction. In addition, Li Dacheng, Yuan Fujia, Shen Tao, and Sun Wei selected Xinbao Village in Huailai County as representatives of rural areas in the north. Through literature collection, field investigations, face-to-face interviews, and other methods, they conducted in-depth research on the current situation of the use and charging of new energy electric vehicles in the rural front line, fully understanding the practical difficulties encountered by rural new energy electric vehicle users in the charging process.

In terms of consumer preferences, Li Danqing and Guo Yan adopted a questionnaire survey method to study the purchasing decisions of new energy vehicles using three binary Logit models: consumer awareness of new energy vehicles, purchase time, and factors affecting purchase price. Moreover, after comparing and analyzing the consumption of traditional and new energy vehicles in rural areas of Shandong, Zhang Yuqing and Xu Jing found that residents' consumption concepts and external interference have a significant impact on new energy vehicles. However, by establishing a game analysis model, it was concluded that a single traditional fuel vehicle is no longer sufficient to meet the needs of rural market development, and rural residents are more likely to choose new energy vehicles.

In terms of local government support, Zhao Yanyi also conducted research on the sustainable development of the new energy vehicle industry through literature analysis, questionnaire surveys, and semi-structured interviews. The policies for the new energy vehicle industry have gradually declined. This study believes that from fiscal subsidies to de subsidization, under the background of carbon neutrality, this industry should receive strong policy support. Local governments have constructed localized policies based on local conditions. Alan Jenn et al. [8] evaluated the impact of these incentive measures on the adoption of electric vehicles. It was found that for every $1000 tax refund or credit provided, the average sales of electric vehicles increased by 2.6%.

## 4.Advantages and Challenges of Promoting New Energy Vehicles

### 4.1 Advantages of Promotion

#### 4.1.1. National policies support new energy vehicles

In recent years, the State Council and ministries have repeatedly proposed the implementation of new energy vehicles in rural areas to guide residents to upgrade their travel modes, improve the quality of life of the people, and provide strong support for the construction of beautiful rural areas and rural revitalization. In order to implement the requirements of national support for new energy vehicles going to rural areas and comprehensively promoting rural revitalization, eleven specific measures have been proposed from three aspects: construction, operation and maintenance of charging infrastructure, support for the purchase and use of new energy vehicles, and strengthening the management of new energy vehicle publicity services. These measures ensure that charging infrastructure is "built, managed, and sustainable", promote consumers to "be able to consume, willing to consume, and dare to consume", and create a good environment for the promotion and use of new energy vehicles. This opinion is of great significance in promoting the promotion of new energy vehicles, guiding residents' green travel, and promoting the comprehensive revitalization of rural areas.

#### 4.1.2. Complete construction of charging infrastructure

In June 2023, the General Office of the State Council issued guidance on further building a high-quality charging infrastructure system. By 2030, we aim to establish a high-quality charging infrastructure system that covers a wide range of areas, has a moderate scale, reasonable structure, and complete functions. This will provide strong support for the development of the new energy vehicle industry and effectively meet the charging needs of the people for travel. Construct a charging network with a layout of urban areas, highway lines, and rural points. The proportion of parking spaces with standardized charging conditions in commercial parking lots in large and medium-sized cities will strive to exceed the proportion of registered electric vehicles in the city, and the coverage of charging services will steadily in-

crease. According to professional analysis, there are basically no purchase restrictions, and the area of homestead land is relatively large. Charging facilities are installed in one's own small courtyard, which is very convenient to use. Farmers use vehicles with short single driving range, and the problems of "range anxiety" and "charging anxiety" are not obvious. New energy vehicles that can be charged at home have comparative advantages in usage scenarios.

## 4.2 The dilemma of promotion

### 4.2.1. Residents have low awareness of new energy vehicle brands

One important reason for the dominance of gasoline powered cars is brand awareness. In China, the perception of BBA as a good car has always been deeply rooted, especially in the market where BMW and Mercedes Benz are hard currency. During the Spring Festival, there will be many low-end entry-level BMW and Mercedes Benz models appearing. Therefore, in the new energy vehicle camp, BYD may have a greater advantage in entering the market. BYD's brand image in the automotive industry is somewhat similar to Huawei, and in the market, BYD's brand awareness and image are relatively higher. However, the brand awareness of Weixiaoli Nezha Extreme Krypton in the market is still very low. Among the older generation, especially middle-aged and above, most of them are familiar with Japanese and German car brands, but they are very unfamiliar with new energy vehicle brands such as NIO, Ideal, and Xiaopeng. The market competition is relatively weak, and car brands do not attach enough importance to the market. In the fiercely competitive urban market, car brands often focus more on city marketing and promotion, while neglecting the importance of the market. This leads to limited channels for residents to understand new energy vehicles and low brand awareness. Many consumers not only focus on handling and experience when using a car, but also care about being able to use it anytime. At the same time, considerations are given to brand, cost-effectiveness, long-distance vehicle needs, maintenance and after-sales, second-hand car buying and selling, and adaptability to complex road conditions. And how to make the brand deeply rooted in people's hearts and break the fixed brand recognition of BBA as representing "luxury cars and good cars" may still have a long way to go.

### 4.2.2. Lack of market sales service system

Manufacturers of new energy vehicles usually layout their sales networks in urban centers and pay less attention to their services. This has led to significant difficulties for consumers when purchasing new energy vehicles, as well as difficulty in enjoying high-quality after-sales service. Secondly, the consumption concept is relatively conservative, and the acceptance of new energy vehicles is relatively low. Many residents still tend to choose traditional fuel vehicles, believing that new energy vehicles have problems such as insufficient range and inconvenient maintenance. Therefore, even if there is a certain market demand for new energy vehicles, they

are difficult to be widely promoted due to limitations in consumer attitudes.

#### 4.2.3. Consumers have limited price budgets

Although the per capita disposable income of residents continues to grow, the living standards of residents steadily improve, and residents have the consumption ability to purchase new energy vehicles, the current price of new energy vehicles in the automobile market is generally 50% -100% higher than traditional cars of the same type. The subsidies and related preferential policies provided by the government for purchasing new energy vehicles are not enough to offset this price difference. The price of new energy vehicles is generally higher compared to traditional cars, especially for consumers who may not have sufficient economic strength to purchase higher priced new energy vehicles. Residents are highly sensitive to prices, and a considerable number of people tend to purchase new energy vehicles priced below 70000 yuan. Every year, small and micro cars are mainly used in rural areas. Some residents prefer to choose affordable elderly transportation vehicles rather than new energy vehicles.

## 5.Research on the Promotion Strategy of New Energy Vehicles

### 5.1 Strengthen brand promotion and education to enhance brand awareness

If new energy vehicles want to achieve long-term development, they must first achieve localization of automobiles. To enter the new energy vehicle market, it is necessary to implement a brand localization development strategy. Automobile manufacturers should personalize their brands through product development, market-oriented sales, media communication, and after-sales service, which can bring them closer to consumers, create pleasant and easy communication, integrate into the lives of target customers, engage in interactive marketing with consumers, bring more profits to the brand, better establish brand image and reputation, and lay the foundation for further occupying market share. At the same time, it is also possible to promote the advantages and characteristics of new energy vehicles, let residents understand new energy vehicles, and carry out some promotional activities, such as new energy vehicle test drives, discount promotions, etc., to stimulate residents' willingness to purchase.

### 5.2 Improve the market sales service system

#### 5.2.1. Enrich the supply of new energy vehicle products

Support economically applicable enterprises to increase production capacity, optimize production, and strengthen leading enterprises in new energy vehicles. Give full play to the role of local automobile associations and other industry associations, deepen cooperation between energy vehicle manufacturers and upstream and downstream companies, implement innovation and technological breakthrough cooperation, promote the development of more economical and practical vehicle mod-

els suitable for production and life, especially micro trucks, light trucks, etc., to meet regional and consumer needs, deepen the technological transformation of the new energy vehicle industry, strengthen basic technology research in battery systems, new chassis design, intelligent vehicle systems and other fields, and reduce the prices of key components.

#### 5.2.2. Accelerate the layout of sales and service outlets

Encourage new energy vehicle companies to expand their sales and service points and radiate to surrounding villages. Establish a service alliance with new energy vehicle manufacturers, retailers, and service companies to explore a service intensive "joint diving" service model. Build a batch of service intensive and diversified new energy vehicle shared service centers, integrate automobile brand sales, new car testing, automobile maintenance, and structure, including new energy vehicles, transmissions, and other service functions to create various joint service centers. Each region formulates standards based on actual conditions and provides certain benefits.

### 5.3 Reduce the sales price of new energy vehicles

At present, the country and regions should provide certain financial subsidies to consumers of new energy vehicles. For example, the government has implemented policies such as tax reduction, exemption, and subsidies for new energy vehicles to increase consumers' willingness to purchase. At the same time, policies should be formulated to reduce the prices of new energy vehicles, provide consumers with more cost-effective products, and meet their needs. Flexibly utilize market tools such as discounts and subsidies, actively create conditions, and guide and stimulate consumers towards the path of energy conservation, low-carbon, green and environmental protection. But to achieve this goal, it still requires the concerted efforts of multiple parties. Manufacturers can further lower their sales prices by actively seeking subsidies from the government. Enterprises need to improve production efficiency and reduce production costs through technological innovation and lean management. New energy vehicle manufacturers should strive to expand production scale and further reduce costs through economies of scale. In addition, supply chain management also needs improvement. Good supply chain management can effectively control the reduction of raw material costs and production costs.

## 6.Summary

Firstly, strengthening the construction of supporting infrastructure is the fundamental guarantee for promoting the popularization of new energy vehicles in rural areas. It is necessary to organize power companies, charging pile construction and operation enterprises, and local governments to form a joint force and collaborate in carrying out the charging facility rural project, ensuring that the layout of charging piles is reasonable and widely covered, especially in key locations such as counties

and townships, transportation hubs, tourist attractions, and commercial centers, where high-quality public charging networks should be prioritized, and encouraging the use of idle resources for the renovation and upgrading of charging facilities.

Secondly, optimize the car usage environment in rural areas, including improving road traffic conditions, providing convenient and efficient maintenance services, improving after-sales service networks, and promoting the application of intelligent networking and digital services in rural areas to enhance the overall experience and satisfaction of new energy vehicle users.

Furthermore, the government, automobile manufacturing enterprises, and financial institutions should work together to increase support. They should not only provide substantial support to rural residents in terms of fiscal subsidies and car purchase discounts, but also innovate products and services in financial credit, such as reducing down payment ratios and providing flexible low interest loan schemes, effectively reducing the burden of car purchases on rural consumers and enhancing their motivation to purchase new energy vehicles.

In addition, based on the characteristics of the rural market, automobile manufacturers should be guided and supported to increase their research and development investment in new energy vehicles suitable for rural use, especially focusing on the research and improvement of cargo type microvans, microcars, light trucks and other models. At the same time, combined with the consumption needs and usage habits of rural residents, a group of reliable, well reputed and cost-effective new energy vehicle models should be selected and promoted to the rural market to meet the diversified and practical needs of rural consumers. By organizing various rural promotion activities, strengthening publicity and education, cultivating the rural new energy vehicle consumption market, and accelerating the penetration process of new energy vehicles in rural areas.

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