Research on Green Transition Development of China's Electric Vehicle Industry in the New Era Guided by Low Carbon Economic Theory

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Abstract. The shortage of petroleum resources and the aggravation of environmental pollution at present. There is no doubt that China's automotive industry has put forward higher requirements for energy conservation and environmental protection. How should China base itself on its own situation? To formulate a reasonable technological development route and industrialization strategy to stimulate the development of electric vehicle industry. It is an urgent problem to be solved at present.

1. Introduction
This paper is based on the theory of low-carbon economy, technological innovation and sustainable development. First, this paper introduces the essence and development of low-carbon economy theory. Through the analysis of the technical characteristics and low carbon characteristics of electric vehicles, it is pointed out that the development of electric vehicles is the only way to achieve sustainable environmental development. Then qualitative and quantitative analysis methods are used.

This paper makes a comparative analysis of the development status of electric vehicle industry in developed countries, represented by the United States, and the development status of domestic electric vehicle industry. Points out the problems existing in China's electric vehicle industry. Finally, the development strategy and policy suggestions of electric vehicle industry in China are given.

2. Summary of Low Carbon Economic Ideas
With the progress of science and technology, the rapid development of world industrial economy, Automobile has become the most important means of transportation for human beings. However, the associated worldwide environmental pollution and ecological destruction are becoming more and more serious. In order to protect the environment on which human beings depend, in the process of industrialization, the traditional concept of human development centered on economic growth has gradually changed into a scientific concept of development with emphasis on the concept of sustainable development. In the innovative development of the concept of human sustainability, a "low carbon" economic concept characterized by low energy consumption, low pollution and low emissions has gradually been recognized and accepted by people. [1]

The so-called low-carbon economic model, it refers to an economic model based on low energy consumption, low pollution and low emissions. It is another significant progress of human society
after agricultural civilization and industrial civilization. It is a global revolution involving production patterns, lifestyles, values and national rights and interests. Low-carbon energy is the basic guarantee of low-carbon economy. Clean production and green consumption are the key links of low-carbon economy. Recycling is an effective way of low-carbon economy. Sustainable development is the basic direction of low-carbon economy. Its essence is high energy efficiency and clean energy structure. The core is the fundamental transformation of energy technology innovation, system innovation and human survival and development concept.

3. Low Carbon Characteristic Analysis of Electric Vehicle Industry

Electric vehicles (BEVs) are not new things. It has a history of nearly 200 years. It refers to a motor-driven vehicle with all or part of its power. Electric vehicles can be divided into pure electric vehicles (BEV), hybrid electric vehicles (HEV) and fuel cell vehicles (FCEV) according to their technical routes. Unlike traditional cars, Because of its technical characteristics, it can bypass the depleted oil resources. To a certain extent, "zero emission" will be achieved. Really realize the sustainable development of human society. [2]

Electric vehicle industry is a new high-tech industry to cope with energy crisis and environmental pollution in the new situation. It is an important achievement of low carbon technology. At the same time, electric vehicle is an integration of machinery, metallurgy, electronics, energy, new materials and computer products. It is also the integration of information technology, biotechnology, digital technology, energy technology and other high-tech [3]. Its development will inevitably promote its related industries. Drive the development of its related fields. The low-carbon effect and the pulling effect of science and technology productivity produced by its development will also greatly exceed the traditional automobile industry. As shown in Figure 1.

![Figure 1. Total Energy Consumption and Fossil Energy Consumption of Traditional Internal Combustion Engine Vehicle and Electric Vehicle in Their Whole Life Cycle Company Kj/Km.](image)

4. Current Development of Electric Vehicle Industry in the United States

The United States has been involved in the research of electric vehicles earlier. Technologically, it has also been in the leading position in the world. In terms of the quantity, price level, battery technical index, supporting infrastructure and technical reserve of electric vehicles, etc. They have formulated more detailed and comprehensive goals and achieved a higher degree. [4] According to the sales data of electric vehicles in the United States published by EV Sales website, in 2018, 35,8645 electric vehicles were sold in the United States. It surged 80% from 2017. Sales of models are shown in Table 1.
Table 1. U.S. Electric Vehicle Sales TOP5 in 2018.

| ranking | Vehicle type | December 2018 | 201801-12 | Market share |
|---------|--------------|---------------|-----------|--------------|
| 1       | Model 3      | 24963         | 139513    | 39%          |
| 2       | Prime        | 2759          | 27595     | 8%           |
| 3       | Model X      | 4100          | 24900     | 7%           |
| 4       | Model S      | 3250          | 24781     | 5%           |
| 5       | Volt         | 1058          | 18306     | 5%           |

5. Current Development of Electric Vehicle Industry in China
Pure electric vehicles are the largest branch of new energy vehicles. Production and sales account for nearly 80% of the total volume of new energy vehicles. According to statistics, in November 2018, China's production and sales of pure electric vehicles completed 135,000 and 138,000 respectively, an increase of 23.6% and 30.3% over the same period last year. [4] In cumulative terms, from January to November 2018, the production and sales of pure electric vehicles in China reached 806,600 and 799,900 respectively. It increased by 50.30% and 55.66% year on year. Production and sales accounted for 76.6% and 76.8% of the total new energy vehicles. As shown in Figure 2.

![Figure 2. Sales of Pure Electric Vehicles in China (10000).](image)

6. Problems of China's Electric Vehicle Industry
(1) There are still some shortcomings in the standard of short plate manufacturing. For electric vehicles, the problem of power battery is one of the main technical shortcomings of pure electric vehicles. In order to realize the industrialization of electric vehicles, the key is that the performance of power batteries should meet the needs of electric vehicles. These performances mainly include charging time, endurance, safety and service life. [5]

(2) In the whole life cycle of electric vehicle manufacturing (such as steel, glass, rubber and other raw materials processing, tires, bearings, electronics and other parts manufacturing, decoration, maintenance, logistics and other ancillary services), most of them still follow the traditional automobile industry and still cause high carbon dioxide emissions.

(3) Policy support is insufficient and supporting facilities are not perfect.

In terms of organization and coordination of the vehicle manufacturing industry, the lack of effective guidance and management of the state has led to a chaotic phenomenon of "a hundred schools of thought contending". Enterprises and research institutes stand on their own feet. As a result, the technical standards of core components such as batteries, motors and electronic control are different.

7. Development Strategy and Policy Suggestions of Electric Vehicle Industry
(1) Strengthen cooperation between international and regional whole industry chains to break through technological bottlenecks. The research and development of automotive core technology involves a wide range of technical fields. For example, machinery, chemistry, energy, materials and so on, it is impossible to break through the bottleneck of technology by relying solely on the strength of an
enterprise itself. Mutual cooperation of the whole industry chain is needed to inject funds and talents for R&D.

(2) Theoretical Guidance to Promote the Real Green Transformation and Upgrading of Electric Vehicle Industry Automobile enterprises themselves should aim at "green transformation and upgrading of industry". Taking green design, green manufacturing, green purchasing, green products and recycling standards as the starting point, through the whole process of the automobile manufacturing industry, we will promote the comprehensive development of green materials, green products, green factories, green parks and green supply chains. Make the automobile industry a model of green transformation and upgrading of China's industry and upgrading the level of green development. [6]

(3) Improving the National Policy Support Policy and Perfecting the Construction of Supporting Facilities

1. In terms of technical support
   Establish and increase special state funds to support related enterprises and institutes of higher learning in electric vehicle research and development. Promote scientific research institutions, core component manufacturers and vehicle manufacturers to build a common R&D platform. Accelerate the speed of technology research and development.

2. In terms of technical support
   Establish and increase special state funds to support related enterprises and institutes of higher learning in electric vehicle research and development. Promote scientific research institutions, core component manufacturers and vehicle manufacturers to build a common R&D platform. Accelerate the speed of technology research and development, and establish and improve the management of related patents.

Acknowledgments
This paper refers to the Southern Agricultural Machinery and the era of automobiles and other related content. Thank you in the meantime.

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