Technical Route and Application Data Analysis of New Energy Vehicle

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Abstract. With the gradual depletion of fossil fuels and the increasingly severe form of environmental protection, data analysis shows that the new energy vehicle industry has become the future industry competing for development all over the world. China has also established the development strategy and goal of the new energy vehicle in the future. This paper analyzes the technical route and application data of new energy vehicle and puts forward the development strategy of new energy vehicle industry in view of the current situation and existing problems of the development of new energy vehicle in China. It is necessary to strengthen the formulation of national standards for energy vehicle industry, pay attention to core technology breakthroughs and parts research, improve infrastructure construction, constantly improve the business promotion mode, so as to promote the rapid development of new energy vehicle industry in China.

Keywords: New energy vehicle; Technical route; Development strategy.

1. Introduction
Since the 21st century, with the gradual introduction of the policy of "energy conservation and emission reduction, sustainable development", new energy vehicle has become the new darling of the automobile market. In order to accelerate the strategic transformation of transportation energy, countries have upgraded the development of new energy vehicle industry to national strategy. The development of new energy automobile industry can not only cultivate new economic growth points to promote energy conservation and emission reduction, but also promote the transformation and upgrading of China's automobile industry, laying a good technical and market foundation for the follow-up development of China's automobile industry[1].

2. Technical Route Analysis of New Energy Vehicle
New energy vehicle is a kind of vehicle which can solve the shortage of oil resources and reduce environmental pollution on a certain basis. At present, there are mainly the following technical routes for new energy vehicle.

2.1. Pure Electric Vehicle
Pure electric vehicle is a kind of vehicle which uses battery as power and drives wheels by electric motor. It will not produce any pollutants in the process of driving, at the same time can reduce the pressure of oil resources shortage. The structure of pure electric vehicle is simpler than that of traditional vehicle, while the maintenance cost is relatively low. The endurance of pure electric vehicle depends on the capacity of battery pack, so the promotion of pure electric vehicle depends on the progress of battery technology. Because the battery composition of pure electric vehicle is relatively
high and its service life is relatively long, it needs to be replaced every 2-3 years, the replacement cost of which is relatively large. But the most important problem is the charging of pure electric vehicle, because there is no special charging service station in the distance of driving, which seriously limits the wide application of pure electric vehicle [2].

2.2. Hybrid Vehicle
Hybrid vehicle is a kind of vehicle which uses many kinds of energy to drive in the driving process, the most widely used driving mode of which is gasoline and electricity driving together at present [3]. Although electric drive can reduce the pollution to the environment, but sometimes there will be lack of power, so the use of electricity and fuel can not only reduce greenhouse gas emissions, but also solve the problem of insufficient battery power. When the capacity of battery is sufficient, electric energy can be used to drive the car. When the electric energy of battery is lower than a certain level, it can be converted to fuel driving. However, the manufacturing cost of hybrid electric vehicle is high. When driving for a long distance, the fuel economy is reduced, while the maintenance cost of hybrid electric vehicle is high.

2.3. Fuel Cell Vehicle
Fuel cell vehicle uses fuel cells, which mainly relys on fuel cell system, drive motor, power battery and hydrogen storage system in the process of operation [4]. In the working process of the battery, there will be chemical reactions, which will convert the chemical energy of substances into electrical energy, so as to drive the car. At present, the widely used fuel cell is the hydrogen oxygen fuel cell, in which hydrogen and oxygen will react to generate water and a lot of heat that can be collected to form electrical energy in order to drive the car. This kind of car is the most environmentally friendly, because its reactant is water without pollution. However, the hydrogen cost of this kind of vehicle is high, so it can not be widely used at present.

2.4. Natural Gas and Liquefied Gas Vehicle
The fuel of natural gas and liquefied gas vehicle is mainly octane, which has better antiknock performance, full combustion, cheaper price and low noise compared with oil [5]. Although there are a small amount of harmful gas emissions, there is basically no black smoke and particulate matter. The car is widely used in the market at present, especially in the west of China where is rich in natural gas resources, so it is more important to produce this kind of car.

2.5. Alcohol Fuel Vehicle
Alcohol fuel vehicle refers to the vehicle that uses alcohol fuel as energy to drive, the fuel of which mainly includes methanol and ethanol currently [6]. Alcohol fuel can be blended with gasoline or diesel oil in a certain proportion, while it can also be directly used as engine fuel. Compared with gasoline, alcohol fuel has higher output efficiency and lower energy consumption, which belongs to clean energy because of sufficient combustion and less harmful gas emissions. However, methanol is toxic and harmful to human body. In addition, methanol can also corrode metal and rubber products. The high price of ethanol fuel also limits its wide application.

2.6. Solar Vehicle
Solar vehicle can convert solar energy into electric energy, which produces the driving power of the car. In fact, this kind of car also belongs to the category of electric vehicle [7]. The core part of the solar vehicle is the solar cell, which has large energy storage and good sunlight absorption, but relatively high manufacturing cost. The advantages of solar vehicle are that they can be used continuously, have less environmental pollution, high energy utilization rate and low noise. The main disadvantage is slow energy absorption, which is greatly affected by weather.

2.7. Biofuel Vehicle
Biofuel is renewable fuel derived from crops or animal fats. It mainly reacts vegetable oil or animal fat with alcohol to obtain methyl ester or ethyl fat, which is put into diesel engine for combustion, which
is called biodiesel. But this kind of material is easy to corrode the metal of the fuel injection system of the engine, so the application of which is limited.

3. Development Status of New Energy Vehicle in China

3.1. Gradual Expansion of Industrial Scale
Since the release of made in China 2025 in 2015, new energy vehicle has been one of the key research and development fields in the future, the historical position and strategic development direction of which is also established [8]. The breakthrough of key core technologies of new energy vehicle and the preferential policies of governments at all levels towards the new energy vehicle industry has led to an unprecedented upsurge of domestic consumers' purchase enthusiasm. According to the statistics of China Automobile Association, the sales volume of new energy vehicle in the market is 1.206 million, accounting for 4.68% of the total sales volume until 2019, while the industrial scale of new energy vehicle is gradually expanding.

3.2. The Layout of New Energy Vehicle by Enterprises Increased
Throughout the development of new energy vehicle enterprises in the world, the United States is committed to the research and development of biofuel vehicle, the fuel cell and hybrid technology of which have reached the world's top level, while hybrid vehicle in Japan lead the rest of the Asia Pacific region and pure electric passenger vehicle are mainly developed in Europe. The upscale core technology of developed countries is ahead of domestic enterprises, the industrial scale of which is mature. China's new energy vehicle enterprises should adhere to independent innovation and build a world brand. With the continuous support of the state for the new energy automobile industry, the automobile enterprises have also increased their layout in new energy technology, new energy automobile development and other fields. GAC Group signed a contract with CATL to establish two joint ventures to develop power batteries in July 2019, while BYD and Daimler AG established a joint venture to focus on electric vehicle products in March 2012.

3.3. New Energy Vehicle Industry Chain Gradually Completing
China is gradually exploring the development of new energy vehicle, and the development of new energy vehicle has been raised to the national strategic level, which also provides strong support policies for the development of new energy. After years of research and demonstration operation, the new energy vehicle industry has made great progress, with a complete industrial chain, from the supply of raw materials, batteries, vehicle controllers and other key parts of R & D and production, to the design and manufacturing of the whole vehicle, as well as the supporting construction of charging infrastructure, which all have the basis of industrialization.

4. Problems in the Development of New Energy Vehicle
Due to the late start of new energy vehicle in China, the technology is not mature enough, there are still a series of problems in the development process.

4.1. Standard System of New Energy Vehicle is not Perfect
In order to improve the international competitiveness, China's new energy automobile industry needs a set of effective standards. At present, the issuance of standards has a long cycle, lack of continuity and timeliness, so it has a certain impact on the technology research and development of enterprises. Although the standard formulation process is gradually accelerated, the standards related to the marketization of new energy vehicle in China still need to be further improved, such as battery size standards, battery replacement standards, charging pile standards, vehicle charger standards, which still need to be further implemented, especially the implementation and unification of charging pile standards is of great significance for promoting the national infrastructure construction as soon as possible.
4.2. Key Technologies Still need to be Tackled
In recent years, China's new energy vehicle industry has achieved some development, but the technology is backward and the reserve of technical personnel is insufficient, which greatly hinders the development of the industry. The core technologies of new energy vehicle are battery, electric control and motor. These core technologies are still not mastered in China, as well as key materials and parts are mainly imported. At present, the key components such as batteries and motors are in the period of industrial transformation. The reliability and durability in the research and development process need to be further improved. It is necessary to increase efforts to train talents and support technology research and development.

4.3. Imperfect Infrastructure Construction
The infrastructure construction of new energy vehicle has a direct impact on the number of new energy vehicle, so improving the system infrastructure can greatly promote consumers' enthusiasm for new energy vehicle. Currently, there is no general policy for the construction of charging infrastructure in China, while there is no overall planning plan and guidance based on long-term development and scientific system. The utilization rate of the completed charging and exchange facilities is at a very low level leading to the equipment idle and slow progress of charging piles for parking spaces for private consumers.

4.4. Lack of New Energy Vehicle Business Promotion Mode
At present, new energy vehicle is mainly public vehicle, such as pure electric vehicle, which are mainly involved in public transport, rental, school bus and other government public areas, accounting for a small proportion of private consumption. The key to the development of new energy vehicle industry lies in the innovative business promotion mode under various unfavorable circumstances, such as imperfect charging facilities, short endurance and high overall cost. Only by fully realizing the social and economic effects can the new energy vehicle industry develop sustainably.

4.5. Insufficient Policy Support for Consumer Groups
The development of new energy vehicle depends on market demand, the main body of which is consumer groups. At present, China has some policy support for the new energy vehicle industry, which are generally aimed at the source production enterprises. For the vast new energy vehicle consumer groups, perfect policies and timely subsidies has not formulated. As the price of new energy vehicle is generally 1-2 times higher than that of traditional vehicle, if the subsidies are absent, market demand cannot rise in this case.

5. Development Strategy of New Energy Automobile Industry

5.1. Strengthening the Formulation of National Standards for Energy Automobile Industry
China needs to learn from the experience of advanced countries and strengthen the revision of new energy vehicle standards, so as to improve the national standards of new energy vehicle as soon as possible. We must strive to achieve the supporting and standardization of new energy vehicle and infrastructure nationwide, and support the introduction of relevant infrastructure technology and acceptance standards, using strong standards and regulations to promote the development of new energy vehicle. Based on the existing standards, the definition and classification standards of pure electric vehicle and plug-in hybrid vehicle, as well as charging interface, vehicle safety, energy filling infrastructure and other standards are mainly studied and formulated.

5.2. Focusing on Core Technology Breakthrough and Parts R & D
In the future, China's new energy vehicle should strengthen R & D and innovation around core technologies and components. Enterprises should adhere to the market-oriented principle, increase R & D investment in key technologies, improve the production technology level of new energy vehicle, and strive to master key core technologies such as batteries, motors and electric controls. Enterprises must adhere to the path of open innovation and integrated innovation, as well as actively introduce
advanced technology at home and abroad. We will complete the strategic technology reserve as soon as possible, realize technology upgrading and transformation, and tackle key core technologies. We should improve the energy density of lithium-ion power battery, strengthen the research of power battery and module safety technology, strengthen the research and development of driving motor, power system and other technologies, and focus on the research and application of new battery materials. We must support the improvement of industrial manufacturing, quality and management level, improve the reliability and consistency of products, reduce costs, and improve the comprehensive quality and market competitiveness of products.

5.3. Improving Infrastructure Construction
The national and local corresponding infrastructure construction master plan and construction policy should be issued as soon as possible, clearing infrastructure construction scheme, basic path, operation mode, electricity price operation mode and other relevant details. The urban planning and relevant engineering construction standards should be improved, clarifying the requirements and proportion of the construction conditions of the reserved charging facilities for the building equipped parking lot and the urban public parking lot. Charging facilities shall be built for new, reconstructed and expanded parking lots, which shall be constructed orderly around existing parking lots, passenger and freight transport hubs, and toll collection nodes of expressways. Policy subsidies shall be provided for the charging and exchanging infrastructure with large investment scale and high capital demand to develop the infrastructure construction of new energy vehicle industry on the basis of market, government and social capital.

5.4. Constantly Improving the Business Promotion Mode
The network platform must be fully utilized to broaden the marketing and promotion channels of new energy vehicle. Nowadays, with the rapid development of the Internet, the network marketing has surpassed the traditional marketing methods. Therefore, it is necessary to give full play to the advantages of the Internet, such as low operating cost, strong interaction and easy access, in order to improve the business promotion of automobile enterprises, which should actively promote the integration of marketing channels. Compared with traditional vehicle, new energy vehicle still have a price disadvantage, which is a key constraint hindering the sales of new energy vehicle. To solve the problem of high price, new energy vehicle enterprises should integrate marketing channels, strive to reduce the level of new energy vehicle middlemen, and effectively reduce marketing operation costs.

5.5. Regionalization of Policy Support and Encouragement by the Government
In the development process of new energy vehicle, there are two main stakeholders, one is the production enterprise, the other is the consumer group. At present, the state's support for new energy vehicle mainly lies in the source production enterprises, while the consumer group in the downstream has little funding and subsidies due to the dispersion of individuals and other reasons. However, in terms of stable market demand, people's desire to buy is fundamental. Therefore, the government's support and encouragement should be divided into two areas, one for enterprises and one for consumers. In order to form a stable market enthusiasm for consumption and production to promote the sound development of the industry, subsidies and subsidies should be given to the two regions respectively.

6. Conclusion
Due to the advantages of energy conservation and environmental protection, new energy vehicle are in line with the current concept of sustainable development and the concept of building a resource intensive and environment-friendly society. The development of new energy vehicle is an important path for China to fulfill the responsibility of the world powers and jointly resist climate change. China's new energy automobile industry started late, but it has huge potential and conforms to the concept of sustainable development. With the increase of policy support, scientific and technological innovation, the improvement of independent production capacity of core components and the
expansion of international and domestic markets, China's new energy automobile industry will develop better and better.

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