

Technology Roadmap of Electric Vehicle Industrialization

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Abstract. Through the understanding of the development of the domestic and foreign electric vehicle dynamic and trend, we can know the state new energy vehicles encouraging policies and development strategies, combine with the auto industry distribution in the city, to make electric vehicle industry as a breakthrough, and Look for the city of the electric car development road; To grasp new energy development and Strategic opportunities for the development of new industries, we can make of the electric car industry and the solar energy industry together, to be Perfect the electric car infrastructure construction, strengthen the construction of the electric car local standards, and Make the encouragement and support policies, Eventually develop baoding characteristics of the electric car industry layout, the technology roadmap, industrial supporting model and policy measures, etc.

Keywords: electric Vehicle, new energy, solar energy, development strategy, Technology Roadmap.

1 Introduction

The electric car is in power since battery for, rely on the powerful motor powered new traffic tools. Electric cars have the pollution, the power supply diversification, clean energy conversion efficiency high, simple structure and convenient maintaining, called by "the 21 st century green car". The wide application of the electric car, not only reduce the pollution of the environment, and relieve the energy pressure, but also gives China the auto industry to catch up behind the world advanced level of opportunities [1].

2. The Electric Car the Classification and Development Situation

At present, the new energy automobile generally include a battery-powered electric vehicles (BEV), hybrid electric vehicle (HEV) and fuel cell vehicles (FCV) three mainstream technology [2].

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2.1 Battery Electric Vehicles(BEV)

Battery electric vehicles in vehicle battery powered can really realize zero exhaust, completely solve the problem of energy and pollution, the trip range mileage can meet the urban traffic has basic requirements, technology has gradually mature and began to commercialization, but battery performance restrict battery electric car industrialization process. Electric cars can't reach the traditional power, power requirements; Limited storage can't meet the needs of the long-distance driving, battery life is short,charging time is so long,Lack of social supporting charging infrastructure, etc.

2.2 Hybrid Electric Vehicle (HEV)

Perfect integration of driving system is a hybrid car to the practical application, to need to have high aspect ratio of energy and power energy storage device, low cost and high efficiency of the power electronic equipment and fuel economy high emissions low of the engine. Need to solve the key technology includes three aspects: One is engine and electric motor optimal coupling power allocation of control and realize, and power allocation and transmission device and its integration of design [3].

2.3 Fuel Cell Vehicles (FCV)

Fuel cell vehicles to hydrogen and oxygen from the burning of energy as a motor power, is recognized as the car is energy structure adjustment of the final solution, now the automobile companies invest in power, committed to the development of the fuel cell vehicles and test run, and has made many technical breakthrough [4].

3 The Development of Domestic and Foreign Electric Vehicles and Popularization of Strategy and Policy Measures

Many countries and regions have formulated incentive policy, promote the industrialization of the electric vehicles. In the early 1990 s, Japan MITI through the establishment of "the third electric cars popular plan" and so on the electric vehicles development strategy, and encourage the development of the industrialization of the electric vehicles [6]. Barack Obama came to power in 2009 after made it clear that, by 2015, the United States will have 1 million cars charging type hybrid cars on the road. Europe in 1990, established the "city of electric vehicles" association, there were 60 in the European Union organization in cities, the feasibility of the electric vehicle research and guide the operation of the electric vehicle.

Beginning in the 1990 s in China to study the electric vehicle, in April 2001, ministry of science & technology convened the electric vehicle development strategy first national experts seminar, discuss and make through the 863 electric vehicle major projects of the project research content and the project's guidelines, give the electric vehicle industry policy and financial support.

The electric car industrialization has gradually formed. By 2000, Europe already has 16255 electric vehicles [6]. Japan's Toyota prius, lexus EX cars, etc by the end of January 2009 has total sales of 1.7 million vehicles. China also accelerate the electric car industrialization, in three to five years China or become the world's largest electric vehicle quantities country, China will most likely be electric vehicle kingdom.

4 The Feasibility of the Industrialization of the Electric Vehicle on BaoDing City Research

In 2011, the national development and reform commission announced the drafts fo car and new energy auto industry development planning, sure to plug-in hybrid vehicles, pure electric cars and fuel cell cars for the direction of development, set up to 2020 new energy vehicles industrialization and the size of the market to the global the first, new energy auto possession to 5 million cars goal.

At present, the country had been Beijing, Shanghai, more than 40 local electric vehicle for city development planning, and submit to the relevant departments of the state build electric vehicle production base of the report.

There are nine automobile mabufactors in Baoding city such as The Great Wall, HeBei changan, zhongxing automobile etc, have production capacity of 900000 cars annually. It has auto parts enterprise many 300 including Fengfan Stock Limited Company, Lingyun Stock Limited Company etc. So it has unique advantage and the industrialization of the electric vehicle hardware conditions in development the electric vehicle of Baoding.

5 Electric Vehicle Industrialization Technology Roadmap of Baoding City

Through making the city the electric car technology roadmap for the industrialization of Baoding, guide the electric car industrialization process, promote the unoin of the electric car industry and photovoltaic industry, walk a way of with local characteristics of new energy vehicle development road. We can do it like Fig.1.

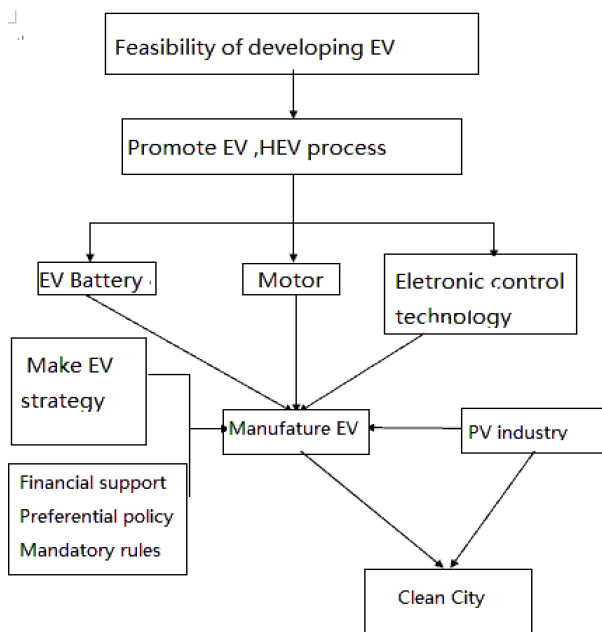


Fig. 1. Electric vehicle industrialization technology roadmap

5.1 Promote the Fuel Cell Vehicle Research and Development

Through making electric vehicle development strategy for local conditions, it is a breakthrough with hybrid cars for the industrialization of the breach and speed up the pure electric vehicle industrialization.

From the existing features selective and orderly development of the electric vehicle industry, considering the advantage and practical factors of hybrid vehicles, it can be in hybrid electric vehicles and pure electric vehicle field to take the lead to achieve the breakthrough, and then to a higher fuel cell vehicles field.

5.2 Make a Base for the Electric Vehicle of the Industrialization Process

Through the government guidance, integrated software and hardware resources, establish the electric vehicle technology research committee to enterprise to rely on, to focus their efforts on the electric vehicle the technical challenges [7].

The Great Wall motor company cooperates with many famous international professional parts company, succeeds development of seven electric vehicles, including Oula BEV, Spirit EV, Hafe HEV, Xuanli car, Deer car, Tengyi C20EV, Tengyi V80 Plug-in hybrids. Some new vehicles is arrivalling including Tengyi C20R BEV, Tengyi C30 etc. The Great Wall of pure electric car system platform, hybrid system platform, will be made and speed up the \$1 billion into electric car research and development and industrialization in the near future. Fengfan Stock Limited Company is one of the leading enterprises battery industry, through enhancing the ability of independent innovation, by technical innovation optimization product layout, the company has rich scientific research ability in the electric vehicle batteries and sets up a 30 million cylindrical lithium battery capacity.

Through the resources integration, Baoding city focus on scientific research strength, solves power battery, motor and electronic control system of technology electric vehicles which need to break through the three core technology direction, promotes the electric vehicle industrialization process.

5.3 Combine Electric Vehicles with Photovoltaic Industry of Baoding, and Develop the Way Which Has Characteristic of Baoding

There are two mainstay industry in Baoding City which are Solar energy, automobile manufacturing. Automobile products include small-engine cars and pickup trucks and SUV, subminiature truck, economical special vehicle and so on many kinds of models. There is 60.5 billion yuan in automotive manufacturing sales income and the vehicle sales of 731500 automobiles in 2010.

There is 45.66 billion yuan income in the solar energy industry in 2010, more than 2005 years increased 6.6 times. Through transforming solar energy into electrical energy, then storing in the community into electric charge equipment and charging electric vehicle, so we can combine the new energy industry with automobile manufacturing industry together, develop the way which has characteristic of baoding city.

5.4 To Speed up the Local Electric Vehicle Industrialization Process

Through measures of economic support, compulsory preferential policy and regulations, take demonstration operation, favorable lease, strengthen the construction of infrastructure, and other means to promote the development of electric vehicle industry [8].

Financial support: in the research and development period of the electric vehicle, the government gives a higher intensity funding to support the research of enterprise, develops economical practical electric vehicle as soon as possible. Offering more funds, make good economic basis for the development of the electric vehicle.

Preferential policy: the users can get more preferential policy and benefit, and are willing to use an electric vehicles. The preferential policy of the electric vehicles vigorously promote, it is power for producers and users provides development and buying.

Mandatory regulations: there are two aspects in mandatory regulations. One is making restrictive regulations for manufactures, sales, uses, and exhaust of fuel vehicles; the other is planning application for electric vehicles. Among them about the strict limit fuel automobile emission regulations, it is a direct role in promoting in the development of electric vehicles.

6 Conclusions

As a production base of pickups, Miniature truck, economical suvs and special function of vehicles, it has a unique prerequisite for Baoding city in the progress of electric car research and industrialization; Through the research and promotion of residential solar charging device, we can realize Baoding city of solar energy and motor industry in the concept of strategic seamless connection; As a way of the government the appropriate policy guide and strongly support, promote China's electric vehicles industrialization process, at the same time, develop low carbon industry as the leading city economy, carry forward to low carbon for the concept of life concept, make with low carbon for guidance of government construction blueprint, advocate low energy consumption and low emission, low pollution economic model, make Baoding city be a clear water blue sky, ecological livable charm city.

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