Chapter 2

Literature Review

2.1 Research and Current Situation of other countries electric vehicles

In Japan hybrid vehicle technology and industrialization research and development and implementation of the situation, focusing on rechargeable hybrid electric vehicles, electric vehicles in the research and development and industrialization of the national policy system and the overall development strategy and other content, he stressed that the whole society Jointly participate in the formulation and promotion of the research and development of electric vehicles.

In May 1998, Japan released a green tax system aimed at alleviating green car taxes and increasing the burden on traditional environmentally-conscious fuel-efficient cars, and encouraged the development of electric vehicles with a sound tax policy. In August 2005, the Japanese government enacted a Green Procurement Act that included hybrid vehicles, fuel cell vehicles and pure electric vehicles into the government's priority procurement scope and promoted by the government a government-led strategy to promote the industrialization of electric vehicles.

John R Wilson and Griffin Burgh (2003) released a research report on hydrogen energy, the report on the preparation of hydrogen energy methods, mode of transport, access to such content, the study concluded that although the oxygen energy is a pure clean energy, the combustion process will not produce any harmful Gas and greenhouse gas have great potential to replace existing petroleum fuels. However, due to the current large-scale application of hydrogen energy, there are still many problems in terms of technology, thermal power loss and safety. At present, the supporting infrastructure of gas energy, serious development lags behind, so the United States to develop oxygen
energy will face many economic and technical difficulties.

Joseph Romm (2004) assesses the Freedom CAR project and expects to see an explosion of oxygen and fuel cell vehicles by the end of the year.

Fuel cell vehicles are the focus of the long-term development of Japan's electric car industry. In 2003, the Ministry of Land, Infrastructure and Transport set up a special research institute to explore various issues involved in research and development with promotion of fuel cell vehicles and make various preparations for the smooth progress of such electric vehicles.

Hasishi Ishitan (2007) in the article named 【Overview of Japan’s Efforts On Plug-Hybrid Vehicle】 Analyzed Japan's hybrid, pure electric vehicles and their policies and regulations, development strategies, main objectives, etc., and strive to build a nationwide participation of all walks of life to support pure electric vehicle research and development system.

Yoichi Kaya (2005) in the article 【Research Intitule of Innovative Technology for the Earth】 mentioned that Proposed that ammonia can have a place in the development of new energy vehicles in the future, and that fuel cells, as the main driving energy for pure electric vehicles, will become the development direction in the future and meanwhile put forward suggestions on matching with related facilities.
Currently, Japan is at the forefront of hybrid electric vehicle technology in the world. Toyota Motor Corporation of Japan is walking in the forefront of hybrid vehicle research and development of automotive companies, hybrid technology, Toyota has mastered more than 200 hybrid patents. Toyota has been exploring hybrid technology since 1993, and after three years, started mass production. In January 1998, Toyota first launched the world's first mass-produced hybrid Prius in the Japanese market. It started exporting to North America in February 2001 and began exporting to Europe in the same year. Since its listing in the first half of the year, Toyota has been in full operation in many countries in the world go on the market and the global cumulative sales volume has exceeded 420,000. In March 2002, Toyota introduced "ESTIMA" hybrid cars and "Crown" sedans equipped with soft hybrid systems. Toyota has been at the forefront of the world in terms of reducing fuel consumption, reducing emissions and improving drivability of hybrid systems.

In the U.S. the brand “TESLA” still the best electric vehicle producer in the world, the reason why TESLA become success there is an inseparable relationship between the U.S. government's strong support of technology and capital. The U.S. government attaches great importance to the cultivation of talents, and its personnel training has a clear structure and hierarchy. The cultivation of graduate scientific research personnel is supported by the federal government, while the training of skilled personnel in community colleges is undertaken by the district government. For example, the University of Michigan training of automotive researchers is carried out in the master's degree stage, with the United States General Motors, the United States Ford, Chrysler and other three major companies, the course by the "Automotive Research Center (Automotive Research Center, ARC) to bear.
BEV Market Share in U.S. vs. Left – PHEVs Market Share in U.S.

(Tesla) is the representative brand of American electric vehicle. In this study author will use Porter's Five Forces and the growth–share matrix on Tesla.

The growth–share matrix on Tesla

(Iinsideevs.com)

(waitbutwhy.com)
Porter's Five Forces on Tesla

The main conclusions are as follows:

(1) Low market share of electric vehicles and huge market capacity, which provides Tesla with a good external environment.

(2) Tesla Motors is widely known in China's automobile industry due to its strong research and development capabilities and marketing capabilities. In the future, as the maturity of automobiles increases, the future development will be favorable.

(3) According to the analysis of market positioning and consumer behavior, Tesla's market positioning is more accurate and succeeded in capturing the characteristics of a minority of rich people who are more concerned about the public image. In this niche market, won a good reputation.

(4) From the marketing model point of view, Tesla in the sales model, relying
on the Internet to sell the brand, build experience store and cooperate with e-commerce.

China's research on new energy vehicles is also mainly concentrated in the theory of research and development and industrialization. Cui Xin Cun (2007) introduced the definition of new energy vehicles and their development routes, and explained the importance of developing new energy vehicles. Huang Zhenbang and Wu Sen (2007) summarized the characteristics of different types of HEVs, studied their development status, and prospected their development prospects. Luo Shao-wen (2008) studied the development strategies of new energy vehicles in various countries and proposed strategic proposals for the development of China's new energy vehicles on the basis of this. Li Hongzhi (1997) summarized the strategy of promoting electric vehicles in foreign countries and put forward some suggestions on the development of electric vehicles in China. White Wood and Zhou Jie (2003) analyzed the development of the industrialization of electric vehicles in our country, and put forward specific policy suggestions. Inizaka (2007) analyzed Japan's new energy industry development model, explained in detail the development of Japan's new energy industry motivation, the relevant policy system and its research and development application pattern.

New energy vehicle technology belongs to a kind of emerging technology, and its technology is more difficult. Therefore, research on new energy vehicles in foreign countries is mainly conducted in developed countries such as the United States, Japan, the United Kingdom and France, and is mainly concentrated in technology research and
development and industry.

2.2 Electric Vehicle Subsidies

Electric vehicle subsidies implemented in various countries in the world are generally subsidized vehicles for consumers, car purchase there are many forms of subsidies, it can be a certain amount of compensation, and it can be a certain degree of allowances. In 2006, United States implemented provides that the government provides consumers up to the maximum amount to buy hybrid vehicles $3400 tax credit (Energy Policy Act, 2005)

The "Green vehicle purchasing promotion measure" adopted by Japan's parliament in the year stipulates that the government will provide pecuniary subsidies of up to 100,000 JPY and tax breaks for consumers who purchase Environmentally Friendly Vehicles. (JAMA, 2010)

1. BYD New Energy Electric Vehicle Business Development Overview

BYD Co Ltd is a Chinese manufacturer of automobiles, buses, forklifts, rechargeable batteries, trucks, etc. with its corporate headquarters in Shenzhen. It has two major subsidiaries, BYD Automobile and BYD Electronic. (www.byd.com)

On BYD company research, Liu Zhiwei (2010) in Japan, the United States, the EU's new energy vehicles Industrial government support measures were analyzed in detail. Wang Xiaojie (2010) analyzed BYD's industry the profitability of the value chain and its new energy automotive business. Wang Quanxiu, Li Zhen (2010) to BYD business management model conducted a detailed analysis and analysis of its competitiveness.

In terms of new-energy electric vehicle manufacturers, the traditional car manufacturers in the United States, Japan, Germany and France dominate the global
new energy automotive market. Among them, Ford, Nissan, Chevrolet, Volkswagen, Renault, Mitsubishi and Toyota of the major developing countries have a good performance and a high market share; emerging car manufacturers, Tesla become the only one not involved in the traditional car manufacturing world's leading new energy vehicle manufacturers. BYD, on the other hand, benefited from the promotion policy of new energy vehicles in China. In the short term, the technology reserve of new energy vehicle was commercialized and enjoyed rapid growth. While leading the domestic new energy vehicle market, BYD was also among the world leading new energy vehicles Manufacturers of the ranks.

BYD overall development overview

BYD as the current domestic market, the largest production scale, the largest sales, new energy technology leader in new energy electric car manufacturers, vendors, has been to actively explore the field of new energy electric vehicles, pure electric vehicles as its' three green Dream "(that is, pure electric vehicles, storage power plants,
solar power plants), BYD has been focused on the development of strategic areas.

Tesla is BYD's main competitor in the global electric vehicle market and in China's domestic market. In the year 2018, TESLA will establish a new manufactory in Shanghai, China.

2014, 2015 List of Sales of Major New Energy Vehicle Manufacturers in the World

<table>
<thead>
<tr>
<th>RANK</th>
<th>BRAND</th>
<th>SALES (2015)</th>
<th>SALES (2014)</th>
<th>Growing Rate (%)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BYD</td>
<td>61726</td>
<td>18358</td>
<td>236%</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>TESLA</td>
<td>51598</td>
<td>31623</td>
<td>63%</td>
<td>9</td>
</tr>
</tbody>
</table>

(Blomberg)

BYD through the integration of automotive technology and battery technology platforms to solve the energy shortage, excessive emissions of carbon dioxide and air pollution Global solution to the problem. BYD new energy electric vehicle development rooted in the market, based on customers, adhere to the core technology innovation as the core, firmly grasp the people-oriented development concept, through the vertical integration, cost-effective and high-end innovation strategy to create effective Of the product competition; the use of kangaroo model, make full use of internal resources to achieve cross-border development of the advantages of the field, the formation of the polymerization effect of resources in order to achieve the diversification of the entire industrial chain development; through overseas market strategy, build with international influence and competitiveness The internationalization of new energy automotive companies.

New energy vehicles, according to our country on July 1, 2009 the "new energy vehicles manufacturing enterprises and product access management rules" is defined as
the use of unconventional vehicle fuel as a source of power (or the use of conventional cars Fuel, new vehicle-mounted power plant), advanced technologies for integrated power control and drive of vehicles, advanced vehicles with new technologies and structures. Its classification includes pure electric vehicles, extended range electric vehicles, bubble hybrid vehicles, fuel cell electric vehicles, ammonia engine vehicles, other new energy vehicles. Among them, the new energy electric vehicles as the current market mainstream new energy vehicles, including pure electric vehicles, plug-in hybrid vehicles. At present, BYD new energy vehicles adhere to the concept of safety, efficiency and low cost to abandon normal battery, fuel cell and ammonia battery technology development direction, established the phosphoric acid iron button batteries as the main direction of development of new energy vehicle technology line

2. SWTO Analysis on BYD

SWOT analysis was first proposed by management professors at the University of San Francisco in the early 1980s in the United States. It is an accurate and objective method for analyzing the actual situation of enterprises. The SWOT analysis method combines the Opportunities, Weakness, Strength and Threat formed by the internal and external environment in which the enterprise is located, and is specifically used for market positioning, strategic analysis and measures formulation. SWOT analysis method in the use of more intuitive, convenient and easy to operate. Even in the absence of accurate and detailed data, it is possible to infer more convincing conclusions.
Conclusion of SWOT

BYD new energy electric vehicles to enter the Chinese market, the competitive advantage comes mainly from the internal advantages, and external factors on the one hand for the Chinese market demand for new energy vehicles and development opportunities for good policy, on the one hand for the industry competition and local protection of the threat of competition. Therefore, in my opinion, BYD should make full use of its policy advantages in the development of new energy vehicles in China from the two aspects of internal advantages and external opportunities by taking full advantage of its own advantages, including scientific research, nuclear technology, financing and overseas operating experience. Blowout needs to make up for the brand, the vehicle manufacturing process, etc., to avoid the threat of local protection and local competition in order to achieve BYD new energy vehicles to fully enter the Chinese market to seize the strategic goal of new energy vehicles share.
3. **PEST Analysis on BYD**

This method is commonly used in the external macro environment analysis. The macro environment is also known as the general environment, including Political, Economic, Sociological and Technological fact.

![PEST Analysis Diagram]

**PEST Conclusion**

1. Start early. BYD is one of the first batch of enterprises to enter the new energy industry. After so many years of development, BYD has formed a science and technology accumulation with its own advantages.

2. High technology content. BYD new energy industry involves many areas: cloud rails, pure electric cars, cars, solar cells and many of BYD's technology is leading in the world.

3. Their own accumulation of science and technology. Battery is the key to new energy vehicles, BYD first involved in the battery industry, but also because of BYD
battery quality, not only occupy most of the domestic battery market, but also in the world, there are a lot of share

4. New energy vehicles classification

According to the different energy sources and working principles, new energy vehicles can be divided into hybrid vehicles (including HEV and PHEV), pure electric vehicles (FCEV), alternative fuels (gas, bioethanol, Dimethyl ether) cars and other new energy sources (such as high-energy storage) cars and other products. According to the different forms of charging, hybrid vehicles can be divided into ordinary hybrid vehicles and plug-in hybrid vehicles.

Hybrid vehicle (HEV) do not need to charge at all, relying on the traditional power to achieve the effect of hybrid. The plug-in hybrid vehicles usually use large-capacity battery 10 Kwh or so, you can only use the battery for longer distances, the need for a separate battery charge.

Electric vehicles (EV) refer to new energy vehicles that rely solely on electric motors to drive and are fully powered by rechargeable vehicle power sources. The biggest difference with hybrid vehicles is that they do not use internal combustion engines, so they do not use traditional renewable energy sources such as diesel and gasoline. Pure electric vehicles rely solely on rechargeable car power supply for driving,
the vehicle's internal structure is relatively simple, and the technical difficulties mainly lies in the car battery.

G.R Grove in 1893 put forward the concept of fuel cells (FCEV). A fuel cell is a type of power plant that directly converts the chemical energy of fuel and oxidizer into electricity without any combustion. Fuel cell vehicles (FCVs) are new energy vehicles driven by motor-driven vehicles powered by on-board fuel cells.