

# Analysis of China's New Energy Vehicle Industry

Chenyi Lu

<sup>1</sup>International School, Huaqiao University, Quanzhou, China, 362000

\*Corresponding author. Email: 1824131056@stu.hqu.edu.cn

## ABSTRACT

Along with Chinese economic and technological development and the upgrading of people's living standards, motor vehicles are becoming increasingly important and common among Chinese households. However, at the same time, the continuously consumed resources and more and more serious environmental pollution caused by the population of automobiles have aroused public concern. The new energy vehicle, which is much more environmentally friendly, has become a new choice for consumers and is worthy of attention. This report focuses on the new energy vehicle industry in China and analyzes the industry by studying some Chinese academics' relevant papers, some analysis reports offered by the Chinese local security companies and data from native institutes. This report analyzes China's new energy vehicle industry through the current status of China's new energy vehicle market, competitive environment, upstream, midstream and downstream conditions of the industry chain, and suggestions about the industry's future development. Accordingly, it is found out that China's new energy automobile industry has considerable investment value with the growing market, generally reasonable and ordered competitive environment, an industrial chain with great development potential. Also, technical improvement, broader sales channels, government support and cooperation between the industrial chain might benefit the whole industry.

**Keywords:** *New Energy Vehicle; Industry Analysis; Competitive Environment; Industrial Chain Analysis; China*

## 1. INTRODUCTION

In the context of global carbon neutrality, the new energy industry is developing rapidly. According to the difficulty of decreasing the carbon emission and the fact that the global energy supply structure dominated by fossil energy is a critical cause of high carbon emissions, the new energy vehicle industry has aroused wide public concern[1]. There already have been a little research about some technology of the new energy vehicles, momentum of the industry development, current condition of Chinese public companies in this industry and so on. Based on them, this research is conducted to

generalize the situation of China's new energy vehicle industry and try to provide some investment references and improvement advice.

This research can help people who would like to invest in financial assets related to China's new energy vehicle industry to make their investment decisions. Moreover, it may be useful for some companies that have entered or are preparing to enter this industry since this report can help them know more about the current situation of it and help them identify their directions of development. Furthermore, this report may be beneficial to the improvement of the entire industry since some useful information and suggestions are provided.

## 2. CURRENT STATUS OF CHINA'S NEW ENERGY VEHICLE MARKET

### 2.1. Holding Quantity

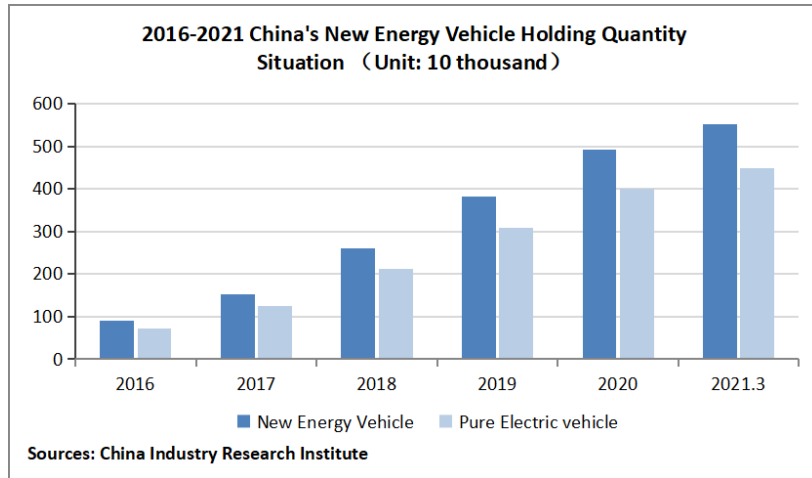


Figure1 2016-2021 China's New Energy Vehicle Holding Quantity Situation

China's new energy automobile industry is growing rapidly, and its ownership has increased by more than 9 times in five years. As of March 2021, the number of new energy vehicles in China has reached 5.51

million[1], of which 4.49 million are pure electric vehicles, accounting for 81.53% of the total.

### 2.2. Production and Sales Growth Rate

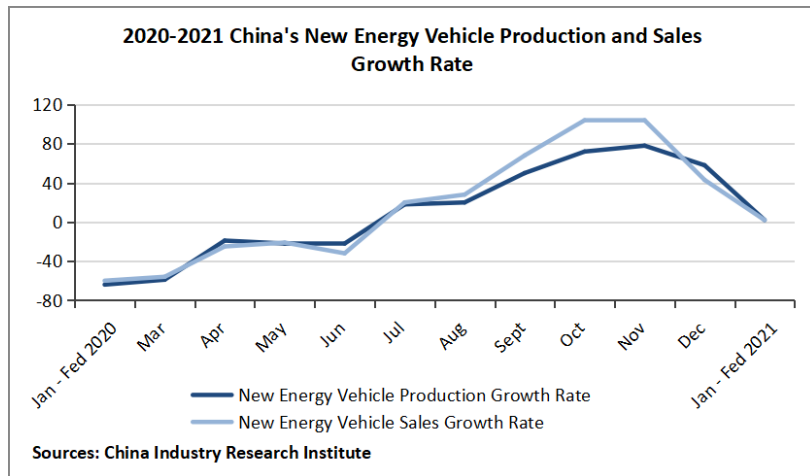


Figure2 2020-2021 China's New Energy Vehicle Production and Sales Growth Rate

Under the influence of the COVID-19, in early 2020, the production and sales of new energy vehicles dropped significantly. After the epidemic eased, China's economy began to turn around, there was a substantial increase in growth of the industry.

## 3. COMPETITIVE ENVIRONMENT ANALYSIS

### 3.1. Porter's Five Forces Analysis

#### 3.1.1. Bargaining Power of Suppliers

The suppliers of the industry is ought to be divided

into two parts: those have already existed in the traditional automobile industry and those emerge with the development of new energy vehicles[2].

Since the new energy vehicles have not been accepted widely and their market scale is much more smaller than traditional vehicles', the traditional auto parts suppliers still mainly focus on traditional vehicle industry. Moreover, in the long-term development, the traditional vehicle industry have been mature and competitive, which makes their suppliers' bargaining power limited and relatively weak.

Suppliers specializing in new energy automobile industry, like factories of Lithium battery and electric

motor control, usually provide scarce natural materials or high-tech products. Due to their specialty and the growing demand of the new energy automobiles, suppliers specializing in new energy automobile industry, like Lithium battery and electric motor control, have strong bargaining power till this moment. Nevertheless, with the entry of more and more companies and the overcoming of technical problems, they may gradually lose their pricing power[3].

### *3.1.2. Bargaining Power of Buyers*

The main buyers of the industry can be divided into two parts: government demand and market demand[4]. With the aim of benefiting the nature of public welfare, government guides the development of consumer demand in the direction of new energy, and it is not cost-oriented[2]. Therefore, its bargaining power is weak. Also, this kind of government procurement may continue for many years for environmental protection and sustainable development of society

In terms of market demand, supply of China's new energy vehicle industry itself is small[5], and the high core technology requirements make the price remain high. Moreover, consumers may have doubts about the convenience of daily use of new energy vehicles. Therefore, many consumers may not accept new energy vehicles, giving them high bargaining power.

### *3.1.3. Threat of New Entrants*

First and foremost, the release of the "New Energy Automobile Industry Development Plan (2021-2035)" specifically describes the Chinese government's future support measures and protection measures for the new energy automobile industry[6]. With the support of this policy, potential entrants may gradually increase. Nevertheless, in the short term, these potential entrants will not be able to pose a greater threat to existing competitors because this industry requires long-term preparation. Secondly, the government control limits the possibility for non-traditional automakers to enter the new energy auto industry[2] and sets production access conditions for traditional automobile classification. This move greatly limits the scope and number of potential entrants. Thirdly, the unresolved technical issues, strict production capacity requirements and high cost together create a high entrance barrier, giving little chance to potential entrants.

### *3.1.4. Threat of Substitutes*

New energy vehicles themselves are substitutes for traditional vehicles. However, compared with traditional cars, its advantages are not obvious. To begin with, new energy vehicles have no advantages in terms of operating costs and supporting facilities[7]. Moreover, in terms of selling price, traditional cars have formed a stable price in the long-term development, while new energy cars have higher prices due to technical requirements. Therefore, the threat of traditional vehicles will always exist with their high market share.

### *3.1.5. Existing Industry Rivalry*

The domestic new energy automobile industry is highly concentrated, but it has not formed a monopoly, and the overall competition is fierce[3]. Furthermore, if China's new energy vehicle companies would like to participate in the global competition, they will also be threatened by overseas new energy vehicle companies. Since many developed countries, such as the United States and Japan, started earlier in new energy vehicles and have more mature technologies[5], China's new energy vehicle companies face great challenges both at home and abroad.

### *3.1.6. Conclusion of Competitive Environment*

The construction of new energy vehicle industry competitiveness is still in its infancy stage, while:

Suppliers have strong bargaining power.

Customers have strong bargaining power.

Potential entrants pose little threat.

Long-existing threats of substitutes.

Fierce competition at home and abroad.

## ***3.2. 2021Q1 Brand Competition Pattern in China***

In the first quarter of 2021, the market ranking generally continued the pattern of 2020. Tesla still maintains its lead in the high-end market. SGW and BYD also performed very well.

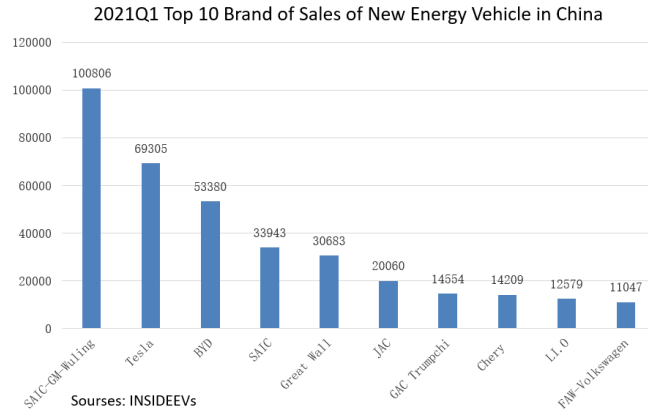


Figure3 2021Q1 Top 10 Brand of Sales of New Energy Vehicle in China

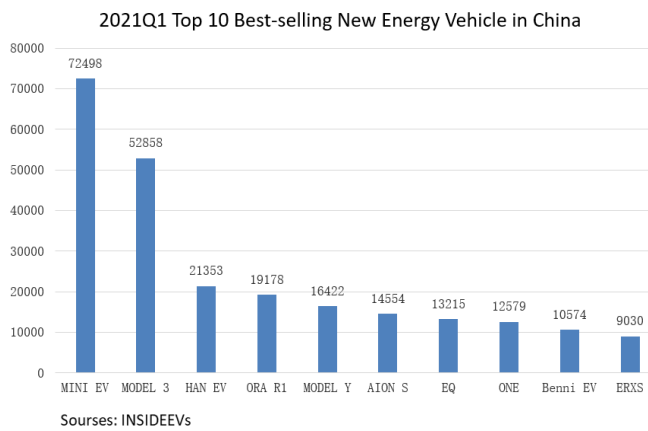


Figure4 Table 2021Q1 Top 10 Best-selling New Energy Vehicles in China

#### 4. THE NEW ENERGY VEHICLE INDUSTRY CHAIN SITUATION

This report divides the new energy vehicle industry chain into three parts: the upstream, mainly including raw materials and mineral resources; the midstream, mainly including motor, electric control, and battery ; and the downstream, mainly including vehicle manufacturing, charging services and post-market services.

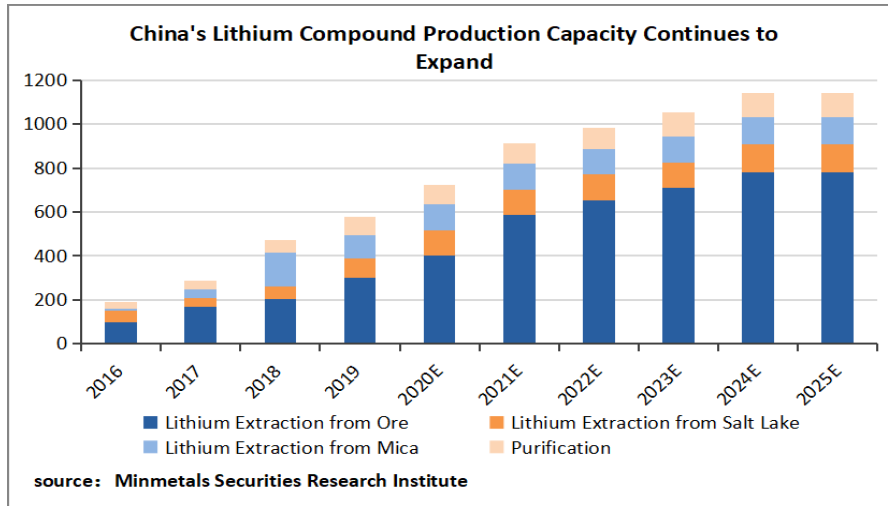
##### 4.1. Upstream of the Industry Chain

The raw materials of the industry include mineral resources such as lithium, cobalt, iron, and rare earth,

etc. The upstream of the industrial chain is generally more stable than the other two parts since changes in natural resources are less dramatic than technology.

##### 4.1.1. Supply Side

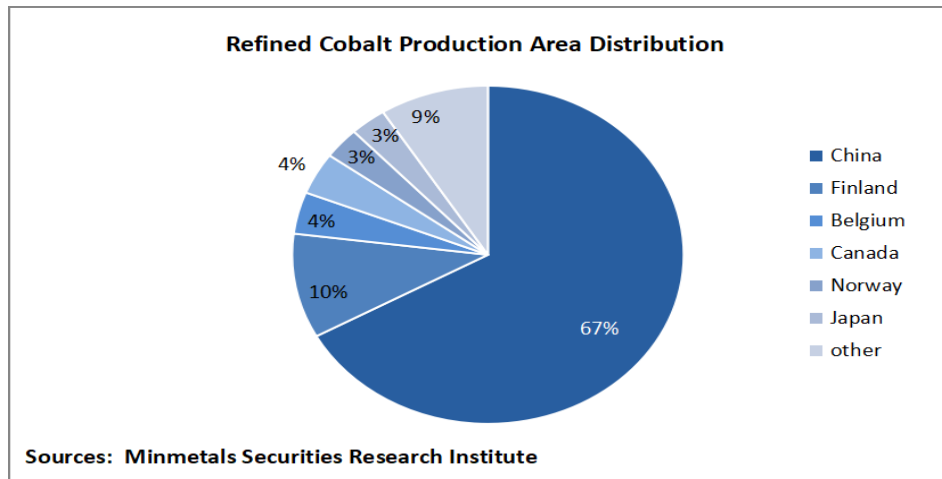
China is relatively rich in lithium and nickel resources. China’s metal lithium reserves account for 10% of the world, and its reserves rank third in the world[8]. Also, China's lithium compound production capacity and the inventory is continuing to expand. Moreover, China’s nickel reserves are the ninth in the world.



**Figure5** China's Lithium Compound Production Capacity Continues to Expand

China's cobalt reserves account for only 1.11% of the world and the main production of these raw

materials is in Africa. However, the refining of it is concentrated in China



**Figure6** Refined Cobalt Production Area Distribution

However, affected by the COVID-19 in the short term, new capacity may be limited in the short term.

*4.1.2. Demand Side*

From the demand perspective, the increasing popularity of new energy vehicles, electric bicycles and other miniaturized applications brings demand

supplementation. Furthermore, in other fields, there is a possibility that the demand in the energy storage field will exceed expectations in the future. Also, batteries have a strong demand for these mineral raw materials and they will not be replaced for the time being.

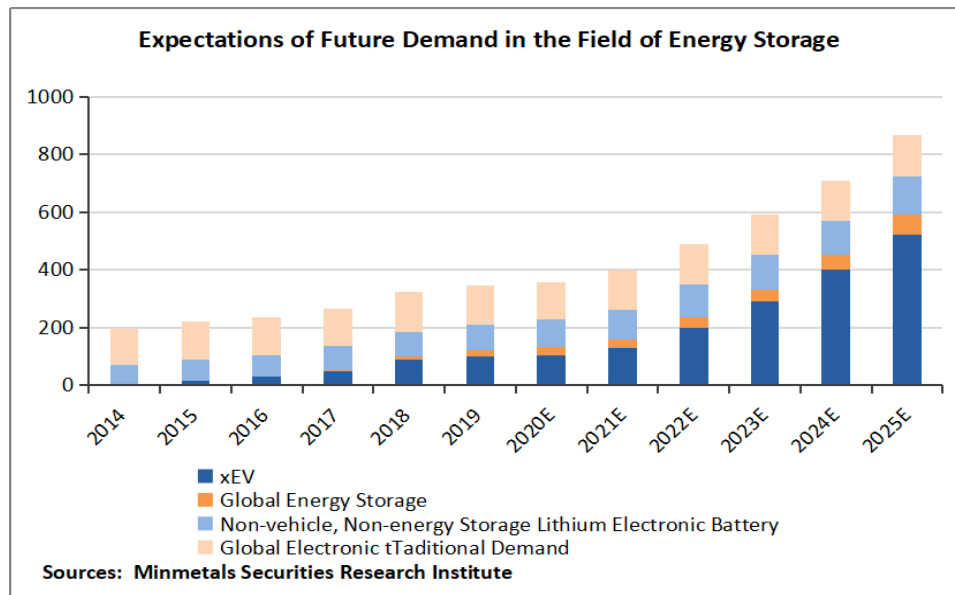


Figure7 Expectations of Future Demand in the Field of Energy Storage

#### 4.2. Mid-stream of the Industrial Chain

The midstream chiefly includes motors, electric controls, and batteries. Among them, the battery industry chain is complex, mainly composed of positive electrodes, negative electrodes, separators and electrolytes.

##### 4.2.1. Supply Side

The impact of the epidemic is gradually eliminated, and the output has grown steadily. In 2020, the domestic output of cathode materials, anode materials, separators and electrolyte was increased by 15%, 37%, 10% and 34% year-on-year respectively. On a quarterly basis, from the first quarter to the fourth quarter of 2020, the output of the four major raw materials also increased quarter by quarter[9].

##### 4.2.2. Demand Side

In the first quarter of 2021, the average price of cathode materials, anode materials, separators and electrolyte was increased by 26.9%, 1%, 0% and 24.3% respectively from the previous month, mainly due to better industry demand conditions[9]. If the market of new energy industry keeps expanding, the demand of these battery materials will also increase, meaning that the price of them will remain high.

#### 4.3. Downstream of the Industry Chain

The downstream is vehicle manufacturing, charging service and aftermarket service. Among them, vehicle manufacturing is about assembling upstream raw materials and parts to form a complete vehicle.

Charging services include charging equipment, battery replacement equipment and battery recycling. And aftermarket services include car insurance, car leasing, car repair, car maintenance, and second-hand car trading.

##### 4.3.1. Complete Vehicle Manufacturing

On the supply side, in 2020, new energy passenger vehicles increased by 10%, and new energy commercial vehicles decreased by 23% compared with 2019. Moreover, in 2021Q1, new energy passenger vehicles increased by 54% compared to the same period last year, while new energy commercial vehicles decreased by 36% during the same period[9]. Therefore, it suggests that passenger cars are still the main focus and are expected to be the growth driver.

On the demand side, since the domestic epidemic has been effectively controlled in China, the sale of the vehicles has gradually recovered.

Compared with traditional automobiles, new energy automobile manufacturing has stricter technical requirements. With the improvement of technology and the perfection of supervision, China's new energy vehicle manufacturing companies are likely to take advantage of China's own manufacturing superiority to compete in the international market.

##### 4.3.2. Charging Pile

As of the end of the first quarter of 2021, China has 851,000 public charging piles and 937,000 individual stakes[10]. The lack of downstream charging piles has been an important fact that restricts the development of new energy vehicles. The market is huge with the large

demand and the need of technological progress. With the inclusion of charging piles in new infrastructure projects and the support of various policies, the current situation of more vehicles and fewer piles is expected to be changed.

#### **4.4. China's Overall Situation**

In general, China is rich in raw materials reserves and has a great advantage in the production of new energy vehicles. Though the technological gap with other countries has been narrowed, China still lacks relevant technologies compared with the world's top level. China's factories will further penetrate the global auto supply chains by virtue of their production efficiency advantages, raw material cost advantages and industrial cluster advantages. Furthermore, the downstream supporting facilities and services of new energy vehicles are receiving more attention.

### **5. SUGGESTIONS OF INDUSTRY'S FUTURE DEVELOPMENT**

#### **5.1. Technical Aspects**

Although many Chinese new energy vehicle companies have paid great attention to technology development and innovation, in general, there is still a gap between them and world's top level.

For the new energy automobile industry, increasing R&D investment, breaking through core technologies, reducing production costs, and building industry entry barriers are the keys to improving industry competitiveness. Issues such as improving the temperature control part of new energy vehicles, strengthening the heat dissipation management system, and optimizing motor manufacturing are all worthy of attention.

#### **5.2. Innovation Based on Industrial Chain Cooperation**

The upstream and downstream of the industrial chain of new energy vehicles are closely connected, and innovative research and development require overall and orderly cooperation. If the upstream, middle and downstream parties cooperate to share R&D pressure and costs[8], it can greatly reduce the difficulty of innovation and increase innovation efficiency.

#### **5.3. Broaden Sales Channels**

China's new energy vehicle companies might be able to appropriately explore foreign markets and participate in international competition with their advantages in manufacturing and cost.

#### **5.4. Government Support**

In the development of industries with high technical requirements and high manufacturing costs, and are environmentally friendly, such as new energy vehicles, the government has the responsibility to continue to support the development of enterprises.

The government is capable of providing support for the development of the industry in terms of policies, technology, financial subsidies, and stimulating consumer demand.

### **6. CONCLUSION**

Generally speaking, it has been found that the China's new energy vehicle market is expanding with rapidly growing holding quantity and relatively high production and sales growth rate. Also, the construction of new energy vehicle industry competitiveness is still in its infancy stage with strong bargaining power of suppliers, strong bargaining power of customers, little threat of potential entrants, long-existing threats of substitutes and intensive competition at home and abroad. Moreover, it suggests that though having some disadvantages, the new energy vehicle industry chain in China generally works well and has great potential for development. Furthermore, the future development of the industry requires more technical development, more cooperation among the whole industry chain, broader sales channels and more government support. In conclusion, China's new energy vehicle industry works quite well and it is highly recommended to invest in financial assets related to this industry. Further research is needed to explore more about specific shortages of the technology of China's new energy vehicle industry compared with other countries and how to improve them. Moreover, the cooperation between industrial chains is worth investigating. Furthermore, they are expected to pay more attention to China's advantages in the world competition of new energy vehicles.

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