The 6th International Conference on Economic Management and Green Development (ICEMGD 2022)
DOI: 10.54254/2754-1169/3/2022796

Study of New Energy Car Market in China

Qianye Chen[1,a], Yuhao Wu[2,b,*], Xinyu Lin[3,c] and Yicheng Dong[4,d]

[1] *University College London, London, UK*
[2]*School of Information & Computer Science, University of California, Irvine, U.S, 92697*
[3]*Oregon state university, Corvallis*
[4]*Shenzhen College of International Education, Shenzhen, 518043, China*
a. 438076027@qq.com, b. 826158554@qq.com, c. 2412278325@qq.com, d. 2412278325@qq.com
**corresponding author*

Abstract: From 2016 to 2021, the new energy vehicles start to become unstoppable in its growth and development. This market has been a nonnegligible impact on the traditional market. In order to explore the potential of the new energy market, this paper focus on analyzing Chinese New Energy Car Market from 4 major perspectives: the macro market performance, the influence of the relevant policies, the infrastructure, and the comparison of traditional cars and new energy car. In this work, graphs and tables are made to show the increasing power and potential of the market. The policies and infrastructures are also beneficial for the new energy car. Based on the analysis, this work shows that the market is rapidly and will still be growing in the future. The potential of the new energy vehicles is worth more attention.

Keywords: Market, Policy, Infrastructure, Performance

1. Introduction

In years of development, China has become one of the biggest markets of automobiles and increasing demand. From 2014 to 2021, new energy vehicles have gradually turned to a bright star in the market. In terms of the macro market, the increasing demands of the new energy vehicles can be reflected in the sales and production. During these years, the overall sales & production of the new energy car never turned its head and tried to reach a higher peak.

The support of government is continuing, though there were regulations, which should be considered as a signal showing the completion of this market. The Chinese government has been making beneficial policies to help this market grow even more. While in terms of the environment, China's infrastructures, such as the charging station and charging pile, are also factors of the rapid growth of new energy car market. Compared to traditional vehicles, the new energy cars exhibit various advantages with respect to the cost and other perspectives. Generally, the market's potential is worth pinpointing with the support of policies and stable base of itself.

DOI: 10.54254/2754-1169/3/2022796

2. Macro Market

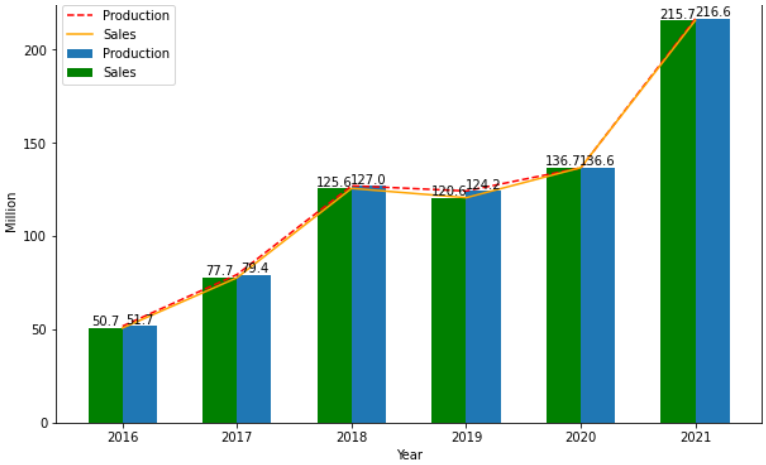

Figure 1: Sales & Production of New Energy Car Market[1].

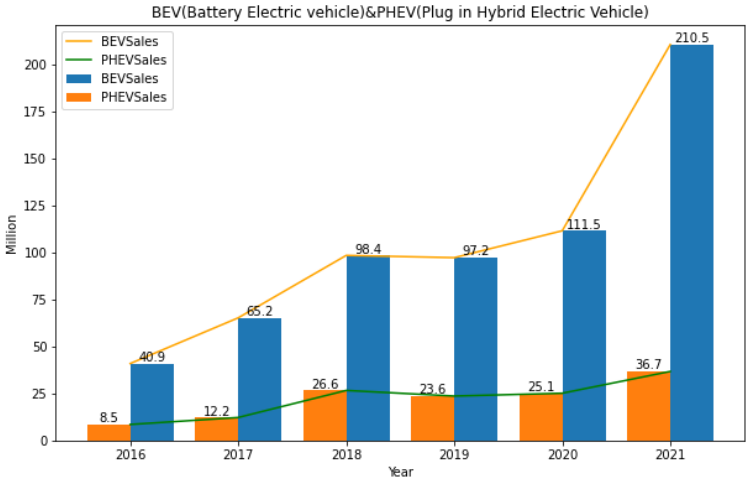

Figure 2: Comparation Between the Sales of BEV and the Sales of PHEV[2].

In the market, new energy car market performs well in terms of sales, production, and investments it received. Based on the information provided by Askci, Figure 1 shows that new energy car market exhibits steady overall increase from 2016 to 2021. In these 5 years, 99% of new energy cars were sold compared to the production. From 2018 to 2019, a slight decrease in both production and sales occurred. It's partially affected by the modification of subsidy policy in China. However, in 2021, the sales and production jumped up dramatically[1].

Take close look at the Figure 2, it shows that sales of PHEV (Plug in Hybrid Electric Vehicle) & BEV (Battery Electric Vehicle). On the other hand, the PHEV takes only 1/5 of the market and the rate of growth is not as active as the BEV[2].

DOI: 10.54254/2754-1169/3/2022796

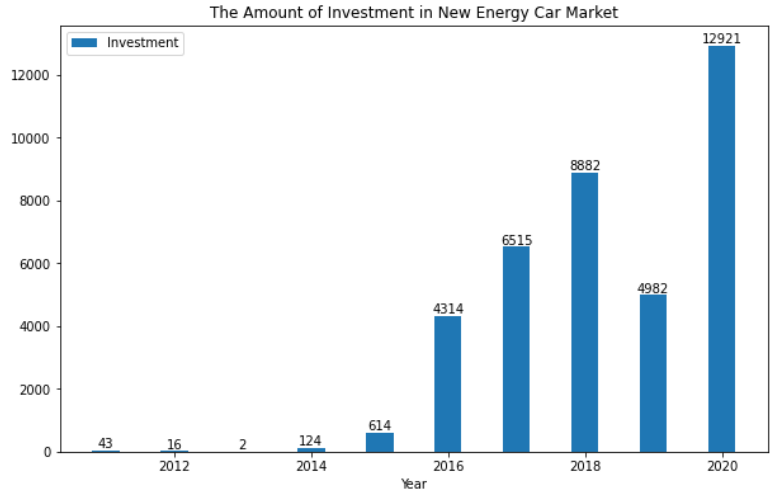

Figure 3: Investments on New Energy Car Market[3].

With respect to the investment received in the new energy market from 2011 to 2020, as it's shown in Figure 3, the first significant investment that markets received started in 2014, and in the following years, the investment increase in a rapid speed. It can be seen from the data that from 2018 to 2019, similar to the sales & production graph, a clear decline in investments is shown. It happens because of the regular of the government on new energy car, but still, in 2020, the investment grew back again [3].

3. Policies

The Chinese government aims to advocate NEV, which tremendously supports the market on the policy side. These policies primarily focus on technology and infrastructure development, subsidies and tax reductions, and the market's growth to achieve the leading goal towards market-oriented growth. Early in 2014, the vehicle purchase tax exemption was granted on the consumption of the new energy cars, and the subsidy was provided for the consumers. Rewards for the construction of charging stations facilitate the infrastructure improvement with many policies that loosen the barrier of entry for new domestic firms aid the market's growth. In the following years, more policies were implemented at both national and regional levels, but a few reductions in monetary subsidies were carried out. In fact, the monetary subsidies will slowly phase out, with the government announcing subsidy removal in 2022. The following table shows some significant regional policies in Beijing (first-tier city), Chongqing (new first-tier city), and Hefei (second-tier city) after a reduction in subsidy and tax exemption.

From Table 1, policies imposed in Beijing and Chongqing, unlike Hefei, focus on people's convenience rather than the cost of usage. Moreover, there was a survey in 2020 on NEV and the policies. It has shown consumers' following essential factors when purchasing NEV (from most important to less): price, safety, convenient charging and changing electricity, product performance, cost of usage, subsidy, and tax reduction.[8] All the above factors benefit from implementing government policies, and the market itself will slowly reach its maturity. The survey also showed people's attitudes toward the policies. In the first-tier cities, most people prefer and support 'no traffic restriction' while those below the first-tier prefer tax reduction and subsidy. Compared with the above table, these cities are implementing appropriate policies according to people's predilection to see a constant increase in sales volume. Overall, the market is transitioning toward market-based and will function well on its own after the removal of certain policies.

DOI: 10.54254/2754-1169/3/2022796

Table 1: Different Regional Policies in Beijing, Chongqing and Hefei[4-7].

Beijing	Chongqing	Hefei
Regional subsidy 50% of the national subsidy	Regional subsidy 50% of the national subsidy for pure electric vehicles with a range of more than 400 km 46% of the national subsidy otherwise	Regional subsidy 50% of the national subsidy
No restriction during peak hours	No restriction during peak hours	Full subsidy on the first compulsory insurance
60000 quota indicators	Free parking for 2 hours, half charge for more than 2 hours (Airport, train station, temporary parking spaces on roads…)	Free parking for 2 hours, half charge for more than 2 hours (temporary parking spaces on roads) Free parking twice, each time within 5 hours (public parking lots invested by the government)
Free of the license-plate lottery	Subsidy on charging fee	Subsidy on charging fee
Subsidy on charging facilities	Subsidy on charging facilities	Support enterprises to establish waste power battery recycling system

4. Infrastructure

The overall number of gas stations in China shows an upward trend, which is consistent with the trend of Road construction and motor vehicle ownership in China. According to the data, "The total number of gas stations in China reached 119,000 in 2020, up 11.6 percent from 2019."[9] However, according to statistics, "the number of data charging piles in the same year increased by 38% in 2020 compared to the previous year. In 2021, the number of charging piles in China was 1.962 million, up 16.7 percent year-on-year."[10] From January to September 2021, the national charging infrastructure will increase by 542,000 units."[11] From the data, we can see that the charging infrastructure of new energy vehicles is growing faster than the virtual gas stations of traditional fuel vehicles.

Despite the rapid growth of new energy facilities, "1,024,000 out of 1,947,000 charging points are private charging points, which are installed in residential communities for personal use at night, while only 923,000 public charging points provide external charging services,"[10] according to statistics.

In addition to the lack of public charging piles, the distribution of charging piles throughout the country is not even. According to statistics, "Statistics from The China Charging Alliance in June showed that the number of public charging piles built in the top 10 provinces and cities, including Guangdong, Shanghai and Beijing, accounting for 72 percent of the total public charging piles in China."[12]

"Guangdong is the province with the largest number of charging piles, with 161,000 public charging piles, followed by Shanghai with 97,000. Fujian province, the lowest, has 36,000 public charging piles, which is still a small but positive number. China has also introduced policies to address

DOI: 10.54254/2754-1169/3/2022796

the distribution of new energy infrastructure. The problem will be solved soon."[13] It can be seen that the number of public charging infrastructure is increasing, and the country is also controlling and solving the distribution problem of new energy infrastructure. With the continuous increase of these basic charging devices, more people will choose new energy vehicles.

5. Comparison

Table 2: Domestic Gasoline Price of Some cities in China[14].

Location	NO.92 gasoline	NO.95 gasoline	NO.98 gasoline	NO.0 diesel
Beijing	7.67	8.16	9.14	7.37
Shanghai	7.63	8.12	9.01	7.31
Tianjin	7.66	8.09	9.31	7.33
Chongqin	7.73	8.17	9.2	7.39
Fujian	7.63	8.15	8.92	7.32
Gansu	7.67	8.18	8.75	7.23
Guangdong	7.69	8.33	9.47	7.33
Guangxi	7.73	8.35	9.18	7.38
Guizhou	7.8	8.24	9.14	7.43
Hainan	8.78	9.33	10.56	7.41
Hebei	7.66	8.09	8.91	7.33
Henan	7.67	8.2	8.85	7.31
Xinjiang	7.58	8.14	9.06	7.21

Gasoline price and electricity price is always paid close attention. In case of China, the price of gasoline is not stable and is different in disparate provinces, which is due to many reasons, including transportation price etc. The Table 2 shows the top 10 cities in terms of 4 different types of gasoline prices. For example, Hainan Province, a city in the southern part of China and one of the remotest provinces in China, is a big island. Due to this special location, the gasoline price of Hainan is far higher than other provinces. Similarly, Xizang, located in the south-east of China with many steep mountains, has fairly inferior traffic. That makes the transportation extremely hard, thus resulting in higher cost and price. Population, development level, number of factories are other factors that could affect the gasoline price in China [14].

In Table 3, the domestic electricity price is shown from top to bottom. However, even with variable gasoline price, the new energy cars always win the game with lower price. For a normal vehicle, the total amount of the fuel tank is averagely 50 liters (60 for SUV). It takes about 400 RMB to fulfill the tank [14], and 1 liter of gasoline allows a vehicle to run for 10 to 15 km. This can vary due to different situations, but it won't vary too much.

When it comes to electricity price, the capacity of an electric car is averagely 30 degree (kWh) and 1 degree supports running for 10km approximately. The average gasoline price is about 7-8 RMB, while the average electricity price is around 1.5 RMB [15]. Compared to the gasoline price, electricity is cheaper even in the city with highest price, Jiangxi, with 2.36RMB per Kwh. Therefore, in total, it will be far cheaper with electricity. In general, the costs of electric cars are cheaper than that of traditional ones under the same circumstances.

DOI: 10.54254/2754-1169/3/2022796

Table 3: Domestic Electricity Price of Some cities in China[15].

province/city	Vehicles with 7 seats or less (RMB/kWh)	12m bus (RMB/kWh)
JiangXi	2.36	1.36
Nanchang	1.8	1.26
Hebei	1.6	0.6
Shanghai	1.47	1.19
Wuxi	1.44	1.23
Nanjiang	1.4	1.35
Jinan	1.32	1.32
Suzhou	1.32	1.32
Guangdong	1.2	0.8
Foshan	1.2	0.7
Xiamen	1.2	1.2

6. Conclusion

In summary, the NEV market has developed thoroughly in all aspects. The increase in sales volume in the macro market and the construction of infrastructures comes from government policies and advances in technology. The government policies can aid the growth of the firms that leads to its progress. With all these aspects, the market will grow unceasingly, but at different growth rates in different tier cities. The infrastructure is still developing in lower-tier cities; their market has not reached maturity and depends on specific policies to increase sales volume. Over time, these problems will be conquered as economic growth and people's ideas progress. As a result, a continuous increase in NEV sales volume is expected in the following years.

References

[1] *Zhongshang Network. (2022) Prediction and analysis of market scale and industry trend of China's new energy vehicle industry in 2022. https://baijiahao.baidu.com/s?id=1721314195708104318&wfr=spider&for=pc.*

[2] *Zhongshang Industrial Research Institute. (2021) Analysis on the upstream, middle and downstream markets of China's new energy vehicle industry chain in 2021. https://xw.qq.com/amphtml/20211015A05WLU00.*

[3] *Qcc Big Data Research Institute. (2021) Report on investment and financing data of new energy vehicles in recent ten years. https://m.thepaper.cn/baijiahao_17359730*

[4] *Qianzhan Industrial Research Institute. (2021) Summary and interpretation of new energy vehicle industry policies in China and 31 provinces and cities in 2021. https://m.sohu.com/a/482517136_473133.*

[5] *Xiang Lele. New policies and regulations of Beijing new energy vehicles. https://m.pcauto.com.cn/baike/99061/173773/.*

[6] *Q&A Jiaoshou. (2022) Chongqing introduced the subsidy policy for new energy vehicles in 2021. https://m.pcauto.com.cn/x/2809/28095157.html.*

[7] *GaokaoHelp. (2021) Preferential subsidy policies and subsidy • model catalogue for Hefei's purchase of new energy vehicles in 2021. http://m.creditsailing.com/HuiMinZhengCe/708259.html.*

[8] *Riders Headlines. (2020) Interpretation of the report: how much is the impact of policy changes on the new energy vehicle market. https://baijiahao.baidu.com/s?id=1668623632794511975&wfr=spider&for=pc&searchword.*

[9] *Eastmoney.c. (2021) Analysis on the market situation and development trend of China's gas station industry in 2021 China's gas stations will develop in the direction of diversified operation.*

DOI: 10.54254/2754-1169/3/2022796

https://mbd.baidu.com/newspage/data/landingsuper?rs=4070166480&ruk=DIX4MUwxsJ1phFI4hgxqYw&isBdboxFrom=1&pageType=1&urlext=%7B%22cuid%22%3A%22gu2RulaMHu_8uStqgiS6iluhSalIiv8iguHna_85280Z8v8RlaSfujteQur HkWau8_VmA%22%7D&context=%7B%22nid%22%3A%22news_9804086945605691322%22%7D.

[10] Industry Information Network. (2021) Analysis of China's new energy vehicle production and marketing, charging pile ownership and charging pile operators in 2021. https://www.chyxx.com/industry/202112/990423.html.

[11] Zhongxing Fast Charge. (2021) Latest data: the national charging infrastructure has accumulated 2223000 units. https://www.sohu.com/a/497777194_120981883.

[12] Industry Information Network. (2021) Analysis on the ownership, regional pattern and development of charging operators of public charging piles in China in 2020. https://www.chyxx.com/industry/202102/929958.html.

[13] Zhichepai News. (2021) The ranking of the number of charging piles in all provinces in China was released. He was the second and first in Shanghai. https://k.sina.cn/article_6854073802_19888ddca02001exvv.html?ab=qiche&_rewriteTime=1644042638991&http=fromhttp&wm=13500_0055&vt=4.

[14] Youjia.ChemCp. Today's oil price inquiry. http://youjia.chemcp.com/.

[15] tyncar. (2020) Charging price list of new energy vehicles in provinces and cities across the country. https://www.tyncar.com/vevaid-809047.html.