Opportunities and Challenges of New Energy Vehicles in Carbon Neutrality and Financial Investment Banking

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Abstract. One of the biggest problems the world is currently experiencing is global climate change, requiring all industries to work together to mitigate its adverse effects on the environment and society. In this context, carbon neutrality has become a topic of widespread concern and discussion. This article focuses on the role that financial investment banks play in initiatives for carbon neutrality and their function in the area of alternative fuel vehicles. This study will go into the history and difficulties of creating new energy vehicles, highlighting the critical function of market-based carbon pricing in achieving emissions reduction targets. The research results show that the new energy vehicle field has good development prospects, but there are also development challenges. Financial investment banks play a crucial role in advancing the carbon neutrality strategy and provide important support for enterprises to achieve sustainable development by providing services such as financial support, risk management and market analysis. Finally, the research significance of this article lies in an in-depth discussion of the role of financial investment banks in carbon neutrality strategies, which provides useful reference and guidance for achieving sustainable development goals.

Keywords: Carbon neutrality; financial investment banking; new energy vehicles.

1. Introduction

China's high-quality economic development is currently at a standstill due to the issue of energy development and utilization. How to break this bottleneck and achieve high-quality economic development is one of the current issues that need to be solved [1]. Currently, global climate change and related sustainable development issues have become important issues of concern to the international community [2]. Carbon neutrality refers to achieving net-zero emissions by reducing the amount of greenhouse gases it emits, or by making its own carbon emissions equal to the amount it removes from the environment through compensation measures. Carbon neutrality is an important strategy to combat climate change, aiming to reduce the accumulation of greenhouse gases in the atmosphere to curb rising global temperatures. Through market exchanges, polluting industries or organizations can buy and sell greenhouse gas emission quotas. This is known as carbon trading. Emissions allowances are typically expressed in units of carbon emissions (e.g., tonnes of CO_2) and can be freely traded by participants within the total allowed emissions allowances, creating economic incentives to reduce emissions.

Through market exchanges, polluting industries or organizations can buy and sell greenhouse gas emission quotas. This is known as carbon trading. Carbon trading is proposed as a flexible means that allows countries to purchase and sell emission quotas through trading according to their own circumstances to achieve overall emission reduction goals. Subsequently, the carbon market gradually developed, including the European Emissions Trading System (EU ETS). Carbon neutrality and carbon trading play an important role in combating climate change. In this context, financial investment banks can provide support to carbon trading participants and help companies trade carbon quotas, avoid risks, and implement sustainable investment strategies. Driven by the two-wheel drive of carbon neutrality and carbon trading, financial investment banks can lead companies to take a critical step in sustainability. The School of Economics and Management at Jiangsu University of Science and Technology's Wu and Yu previously made the argument that "achieving carbon neutrality is an extensive and profound economic and social systemic change, and as the core of the modern economy, finance is playing a vital role in promoting carbon neutrality [3]. The importance

of achieving the neutralization goal is self-evident. "New energy vehicle technology represented by electric power in the automotive field is showing rapid growth driven by both market and policy. Hydrogen energy technology is also accelerating innovation, which has a great impact on the gasoline and diesel market. The degree of influence is beginning to appear [4]. Qi and Duan also said that the implementation of carbon trading policy has significantly improved the level of corporate financialization [5].

Facing the challenge of global climate change, carbon neutrality and carbon trading have become the focus of the financial community. In light of this, this research will concentrate on the new energy vehicle industry and examine its position within the corporate governance framework of the carbon neutrality strategy. Finally, this study will delve into how financial investment banks can advance the carbon neutrality agenda through innovative financial products and strategic support.

2. Development of New Energy Vehicles

The "National Comprehensive Three-Dimensional Transportation Network Planning Outline" published by China's State Council in February 2021 made a clear proposal to hasten the peak of carbon dioxide emissions in the transportation sector. Therefore, the new energy vehicle industry has received widespread attention, and it is of great significance to achieve the "double carbon" goal [6]. Seen from Fig. 1, one can find that the new energy vehicle industry is showing a rapid growth trend [7]. Consumer demand for environmental protection has increased as more nations have established emission reduction objectives [8], and ongoing technology advancement and government assistance have produced favorable conditions for the development of alternative energy vehicles. The cruising range of batteries is gradually increasing, and the infrastructure for charging them is also improving. These elements support the new energy vehicle sector's ongoing expansion. The growth of the new energy vehicle market will encourage the development of related industries, such as batteries, motors, charging facilities, and intelligent driving technology, creating employment and economic growth. This is important from the perspective of the economic and environmental potential of investing in new energy vehicles. Second, encouraging the use of alternative fuel cars helps to reduce reliance on oil, enhance energy security, lower carbon emissions, mitigate climate change, and has beneficial effects on environmental preservation and sustainable development.

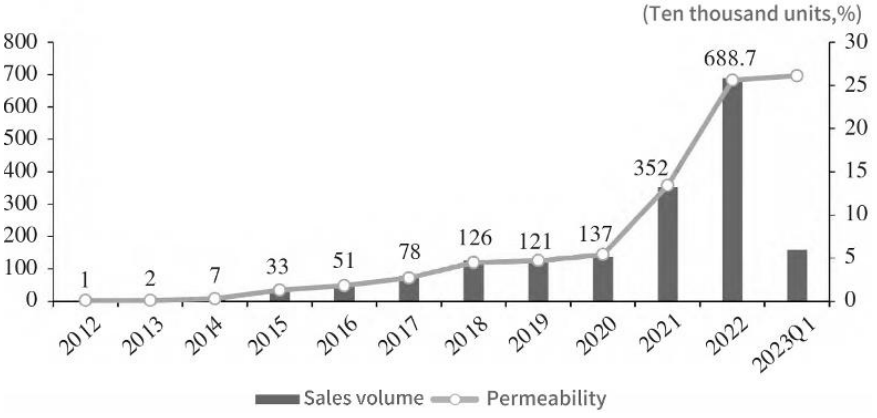


Fig 1. 2012-2023Q1 Domestic New Energy Vehicle Sales and Market Penetration Rate.

3. Analysis of BYD Co., Ltd.

A complete high-tech company with its headquarters in Shenzhen, China, BYD Co., Ltd. (BYD) was established in 1995. BYD has significant operations in the areas of electric vehicles, the new energy industry, IT, electronic communications, and rail transportation. It is one of the world's top suppliers of battery technology [9, 10]. The ability of a company or individual to generate money from their commercial activity within a predetermined time frame is referred to as profitability. It is a crucial metric for assessing the economic success and financial stability of businesses. Profitability

reflects the net income a business has left after selling products or providing services, which can be used to cover costs, offset losses and provide a return on investment. As shown in the figure below, in terms of profitability, the company's bicycle profit in 2022 reached about 8,000 yuan, and is expected to be maintained in 2023. BYD sold 1.8 million vehicles in 2022, a year over year rise of 150%, including 1.788 million new energy vehicles, a year over year increase of 218%, and its domestic market share reached 27%, an increase of over 10%. The company's manufacturing and sales report states that BYD sold 683,000 new energy vehicles in Q4 2022, setting a record high and increasing 156.7% year over year and 26.9% month over month. BYD's profitability analysis and forecast are shown in the Table 1.

Table 1. Earnings forecasting and valuation. Source: EWSoochow Securities.

Earnings forecast and valuation	2022A	2023E	2024E	2025E
Total Revenue (million Yuan)	*424,061*	575,141	684,077	810,425
On a year-on-year basis	*96%*	36%	19%	18%
Net profit attributable to parent company (million yuan)	*16,622*	25,743	33,694	44,478
On a year-on-year basis	*446%*	55%	31%	32%
Earnings per Share-Latest diluted share Capital ($/Share)	*5.71*	8.84	11.57	15.28
P/E (current price & latest diluted share capital)	*42.91*	27.71	21.17	16.04

Debt solvency refers to the ability of a business or individual to repay debts within a specific period of time. It is one of the important indicators to evaluate an entity's ability to pay its debts on time and assume liabilities. The quality of debt solvency is directly related to the financial stability and sustainability of an enterprise or individual. The ability of a corporation to pay off debts in the near future is determined by a number of financial indicators, including the current ratio, quick ratio, interest coverage ratio, and asset-liability ratio. They are important tools in solvency analysis. BYD's solvency financial data is shown in the Table 2.

Table 2. Financial data related to solvency.

Year	Liquidity Ratio	Quick Ratio	Interest Coverage Ratio	Asset-liability Ratio
2019	0.99	0.67	1.81	68.00
2020	1.05	0.67	2.83	67.94
2021	0.97	0.65	3.53	64.76

According to the information in the aforementioned figure, analysis reveals that the current ratio is approximately 1, and that it will be higher than 1 in 2020, signifying that the company's current assets surpass its current liabilities and that it has enough cash on hand to pay off debts. In addition, the rising interest coverage ratio means that the company has enough profits to pay the interest on its debt, reducing the risk of default. BYD's asset-liability ratio has gradually declined, indicating that the company's solvency is continuously improving. Therefore, financial investment banks can give full play to their professional advantages in the field of new energy vehicles and provide multi-level support to enterprises by analyzing various financial contents. Through the design and execution of financing plans, financial investment banks can assist companies in raising the funds they need to develop new technologies, expand production scale, and market promotion. Through in-depth understanding of the market, financial investment banks can provide enterprises with targeted strategic advice, help formulate precise market promotion strategies, and achieve market share growth.

4. Carbon Trading and New Energy Vehicles

The Ministry of Ecology and Environment and the Shaanxi Provincial Government conducted the "National Low Carbon Day" home event in Xi'an on July 12, 2023, the 11th "National Low Carbon Day." Vice Minister of Ecology and Environment Guo Fang stated at the event that my nation has developed the largest carbon market for greenhouse gas emissions in the entire globe. The cumulative transaction volume of carbon emission quotas reached 237 million tons and 10.912 billion yuan as of

June 30, 2023, greatly reducing the intensity of carbon emissions. In the carbon trading market, companies can buy and sell greenhouse gas emission quotas. This mechanism forms the price of emission quotas through market supply and demand. Combining carbon trading with the new energy vehicle industry has multiple potentials. First, new energy vehicle manufacturers can obtain excess carbon quotas by reducing emissions and sell them to industries with higher emissions, thereby providing additional sources of income for automakers. Carbon quota trading is the name of this trading strategy. Tesla, which manufactures electric vehicles in Shanghai, received the most loan lines from the 2020 manufacturers, according to statistics recently disclosed by China's Ministry of Industry. The American manufacturer was awarded 890,000 points, which included credit for its Beijing import and distribution hub. According to Nikkei Asia, Chinese electric vehicle manufacturer BYD was placed second with 750,000 points, and Tesla was expecting to collect about US$390 million from China's automotive emission quotas this year. The points will be worth nearly $350 million, or more than half of the net earnings from the previous year. The colossus of domestic new energy vehicles, BYD, presented its annual report. According to the annual report, BYD will sell 1.8024 million cars in 2022, up over 1.5 times from the previous year. Of these, 1.7878 million will be new energy cars, up more than 2 times.

According to other statistics, BYD car owners will travel a total of 19.4 billion kilometers on pure electric vehicles in 2022, reducing fuel use by approximately 940,000 tons. Carbon emissions were reduced by 2.38 million tons throughout the year, which is equivalent to planting 130 million trees. In order to encourage new energy vehicle manufacturers to speed up the development and sales of these vehicles as well as to further the sustainable growth of the automotive industry, the government can also allocate a portion of the carbon quota to them in the form of free allocation or paid allocation. 4.1039 million tons of carbon emission quotas were exchanged on the national carbon market's first day of trading on July 16, 2021, with a transaction value of 210 million yuan and a closing price of 51.23 yuan/ton, up 6.73% from the opening price of 48 yuan/ton. The highest CEA transaction price in the first half of this year was merely 60 yuan/ton. However, starting from July 17, the transaction price of CEA began to rise sharply. The highest transaction price that week was 65 yuan/ton, a record high. As of August 23, the latest closing price of the CEA listing agreement was 74.76 yuan/ton. These data reflect the dynamics of the carbon market. From a macroeconomic perspective, rising prices mean that demand exceeds supply, showing the activity of carbon emission allowance trading and enthusiasm for market participation. Price increases may also further encourage companies to increase their efforts to reduce carbon emissions and promote the development of a low-carbon economy. The development of the carbon market will continue to receive attention as it is of great significance to achieving the goal of carbon neutrality and promoting the transition to a low-carbon economy.

5. Challenges Encountered by the New Energy Automobile Industry

The field of new energy vehicles faces a series of technical challenges, including battery technology and cruising range, charging infrastructure, and materials and lightweighting. Battery technology and cruising range directly affect user experience and market acceptance. However, developing high-performance, long-life, and low-cost battery technology is still a challenge to be solved. In addition, the construction of charging infrastructure requires large-scale investment and needs to solve the problems of different charging standards and speeds. At the same time, ensuring the stability of charging piles and reasonable charging time is also a technical problem. In terms of materials and lightweighting, in order to improve the energy density of batteries and vehicle performance, the application of new materials must be continuously explored.

A number of cost and price-related economic issues are faced by the new energy vehicle industry. New energy vehicles now have higher selling prices than conventional internal combustion engine automobiles since their production costs are still quite high. Reducing production costs and improving cost performance is an urgent challenge that needs to be solved. Although new energy vehicles may

have a lower total cost of ownership due to reduced energy costs in the long run, adverse price differences in the short term may affect consumers' purchasing decisions. Another economic challenge is market cultivation. The development of the new energy vehicle industry necessitates a sizable investment in infrastructure development, R&D innovation, as well as publicity and advertising. However, in the early stages of market cultivation, you may face the problem of insufficient demand. Governments, businesses and investors need to develop strategies during the market cultivation process to ensure the sustainability and effectiveness of investments. When solving these economic challenges, collaboration and innovation from all parties in the industry are needed to promote sustainable development in the area of alternative fuel vehicles.

6. Suggestions & Implications

Through services like risk management, financial support, and market strategies, financial investment banks can play a significant role in the new-energy vehicle sector, fostering industrial development and fostering sustainable economic growth. For risk management and investment analysis, financial investment banks can provide risk management and investment analysis services to help investors understand the risks and opportunities of the market for new energy vehicles. For investors, understanding the industry's technical challenges, policy impacts and market prospects can help them make more informed investment decisions. Regarding to financial support and financing solutions, financial investment banks can assist new energy vehicle manufacturers in financing and provide financial support. Designing financing solutions suitable for industry characteristics, including equity financing, debt financing and green finance, can help companies raise funds for research and development, production and marketing. As for sustainable finance and green investment, financial investment banks can promote sustainable finance and green investment and encourage investors to pay attention to environmental protection and social responsibility. Offer green financing, bonds for sustainable development, and other financial solutions to aid in the growth of the new-energy vehicle sector and the attainment of carbon neutrality objectives.

7. Conclusion

Environmental concerns like carbon neutrality and carbon trading have progressively taken center stage in the new energy vehicle sector, driving change and growth. Through a thorough examination of the intimate connections between the new energy vehicle industry, carbon neutrality, and carbon trading, this article highlights the significance of this sector in addressing climate change and attaining sustainable development. This paper takes new energy vehicles as an entry point to explore the application of carbon neutrality strategies in reducing greenhouse gas emissions. Taking BYD Co., Ltd. as an example, it studies the investment value of new energy vehicle companies.

In order to more comprehensively measure the environmental impact of cars, the industry has proposed the concept of "emission factors", which measures the entire life cycle emissions produced by a car per kilometer driven. Emission factors cover multiple dimensions such as carbon emissions, carbon dioxide emissions, and harmful substance emissions, and are considered at all stages from vehicle production, use to scrapping. This method can more accurately assess the emission reduction effects of different types of vehicles, as well as the emissions of electric vehicles in the power production process and throughout their life cycles. Therefore, when discussing emission factors, this article does not introduce influencing factors such as carbon factor emissions for discussion, which has limitations. The calculation of emission factors may be affected by multiple factors, such as energy structure, electricity generation method, battery production process, etc.

Looking to the future, the new energy vehicle industry will continue to grow and develop and carbon neutrality and carbon trading will become the key driving forces for industrial upgrading. Governments, businesses, and financial institutions need to work together to actively promote the goals of environmentally sustainable development. Financial investment banks should fully utilize

their professional advantages to promote the new energy automotive industry's sustainable growth and contribute to the synchronized growth of the economy, society, and environment. The new energy vehicle market is anticipated to positively contribute to the reduction of global carbon emissions and establish a strong foundation for a more environmentally friendly, low-carbon future through multiparty cooperation.

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