# The impact of green finance on the sustainable development of new energy enterprises

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**Abstract.** For new energy enterprises, in order to occupy a favourable position in future market competition, making full use of green financial resources will be a key factor for their success. This paper concentrates on the impact of green finance on two aspects of new energy enterprises, namely their R&D innovation capabilities and enterprise operation and environmental performance, and provides a summary. In summary, green finance, as a financial services model, centers on supporting green industries and sustainable development projects. This model provides financial support to enterprises through financial instruments such as green credit, green bonds and green funds, which can enhance targeted innovation, provide financial support for research and development projects and improve the ESG ratings of enterprises. Nevertheless, certain issues persist in the practical implementation of green finance, such as exorbitant implementation costs and suboptimal efficacy in promoting the quality of innovative products by enterprises. In this respect, it is indispensable to vigorously facilitate the execution of green financial subsidy policies for the purpose of effectively curbing costs. Simultaneously, the supervision and management of technological innovation in new energy enterprises should be strengthened to guarantee the precise flow of funds, thereby augmenting the driving force and efficiency of technological innovation and R&D quality.

**Keywords:** Green finance; New energy enterprise; Technological innovation; Enterprise performance.

## 1. Introduction

In recent decades, China's economy has experienced significant growth driven by both population increase and the reforms associated with opening up. However, this swift economic expansion has led to serious environmental pollution issues, making these challenges more pronounced. As a result, sustainable development strategies have gained global recognition. In response, our government has established key policy targets such as achieving 'carbon peak' and 'carbon neutrality.' Additionally, renewable energy sectors like wind power, solar energy, and hydropower have garnered substantial attention and support from policies. Consequently, numerous enterprises related to new energy have started to emerge in this environment. Green Finance, also known as Environmental Finance or Sustainable Finance, refers to economic activities that support environmental improvement, climate change response and efficient use of resources, which incorporates environmental factors into the financial decision-making process and aims to achieve synergy between economic development and environmental protection. It aims to achieve synergy between economic development and environmental protection [1]. Green finance, as an emerging financial service model, can provide liquidity support and environmental benefits for new energy enterprises, and will be the direction of future business development.

In 2006, the Chinese Government promulgated its Eleventh Five-Year Plan, which is intended to guide the country towards sustainable development. To accomplish this objective, the Government has put forward a series of specific measures, encompassing promoting the advancement of clean energy, enhancing energy efficiency, and reinforcing ecological protection and restoration. On the eve of the Copenhagen Climate Conference in November 2009, the Chinese Government pledged to reduce carbon dioxide emissions per unit of GDP by 40-45 per cent in 2020 compared to 2005 levels. Since June 2017, China has launched a series of pilot projects for green financial reform and innovation nationwide. This initiative aims to develop a green development path that is consistent

with the central government's policy orientation while giving full play to local creativity through practical exploration in a number of provinces [2]. At present, China's green financial system mainly includes green loans and green bonds, as well as a variety of other green financial instruments, which as well as forming a multi-level green financial market system. By the end of the first quarter of 2023, the balance of local and foreign currency green loans in China exceeded 25 trillion yuan, and the balance of green bonds exceeded 1.5 trillion yuan, both of which ranked among the top in the world.

In 2015, through the signing of the Paris Agreement, the United Nations Climate Change Conference set a goal to limit the global temperature increase to 2°. In order to achieve this goal, the international financial markets will be a great help, and in order to gain support from the financial markets, the green financial system is beginning to emerge. Green finance combines resource recycling and utilization, environmental friendliness and other factors to direct economic resources to environmentally friendly industries in order to achieve the results of pollution control and climate change control.

At present, the environmental pollution problem has received increasing attention, new energy enterprises also take this booming development, new energy enterprises how to green finance through these new financial services and products to more rapid development is the current need to study the main issues. For enterprises, green finance affects project investment and financing, project management, risk management and other aspects, which is closely related to the sustainable development of enterprises. Green finance not only enhances economic growth potential and creates economic growth points, but also promotes the speed of green development and the greening of economic structure transformation [3].

## 2. Development History and Current Situation of New Energy Industry

As a key area for China's economic transformation and sustainable development, the new energy industry has become an important part of the national strategic layout. Over the past decades, the development history of China's new energy industry has experienced a shift from being dominated by the domestic market to the international market. In the initial stage of the new energy industry, the government played a leading role in promoting the research and development of new energy technologies and the initial formation of the industry through a series of policy support measures, such as subsidies and tax incentives. With the passage of time, China's new energy market has gradually matured and the process of marketisation has accelerated. Under such circumstances, the new energy industry has gradually formed from policy-driven to market-driven transformation. In terms of the development process of China's new energy industry, it can be roughly divided into the following three stages: the initial stage, the growth stage and the maturity stage.

The initial stage (2006 and before) is the stage in which China has just begun to build new energy sources. In 2006, China promulgated the Renewable Energy Law, which is the symbol of the beginning of new energy in China. In this period, wind, solar and other renewable energy is still in the beginning of the exploration period, the number of enterprises in the industry is relatively small, the overall technical level is relatively low.

Growth stage (2006-2010): With the support of national policies, the new energy industry has entered a fast track of development, and the use of new energy has gradually extended from rural areas to cities and towns, while new energy projects such as wind energy and geothermal energy have begun to be promoted in cities. And from the initial stage of research and development, new energy has gradually entered the process of marketisation and industrialisation.

Maturity stage (2010-present): During this period, China has gradually come to understand the environmental pressure brought about by the traditional resource-based economy and the importance of sustainable development, and has therefore begun to actively promote the development of green and low-carbon technologies, a shift that is reflected not only in the optimisation and upgrading of the economic structure, but also in the strategic adjustment of the energy sector. During the 13th Five-Year Plan, China has proposed a series of key initiatives aimed at promoting sustainable development.

Among them, plans to ‘promote the economical and intensive use of resources’ and ‘vigorously develop and promote energy-saving technologies and products, and carry out major technology demonstrations’ are highlighted, and these measures have laid a solid foundation for the vigorous development of China's new energy industry [4]. Under the guidance of the policy and market demand, China's new energy industry in the field of new energy equipment manufacturing has made remarkable achievements, China's new energy equipment manufacturing capacity also ranks among the world's leading. This trend not only promotes the innovation and application of new energy technology, but also brings unprecedented development opportunities for many new energy enterprises. Taking new energy vehicle enterprises as an example, Figure 1 presents the monthly production and sales of new energy vehicles. As can be seen from the figure, the sales volume of new energy vehicles of domestic enterprises has been rising sharply since March 2013, and there is still much room for increase in the future.

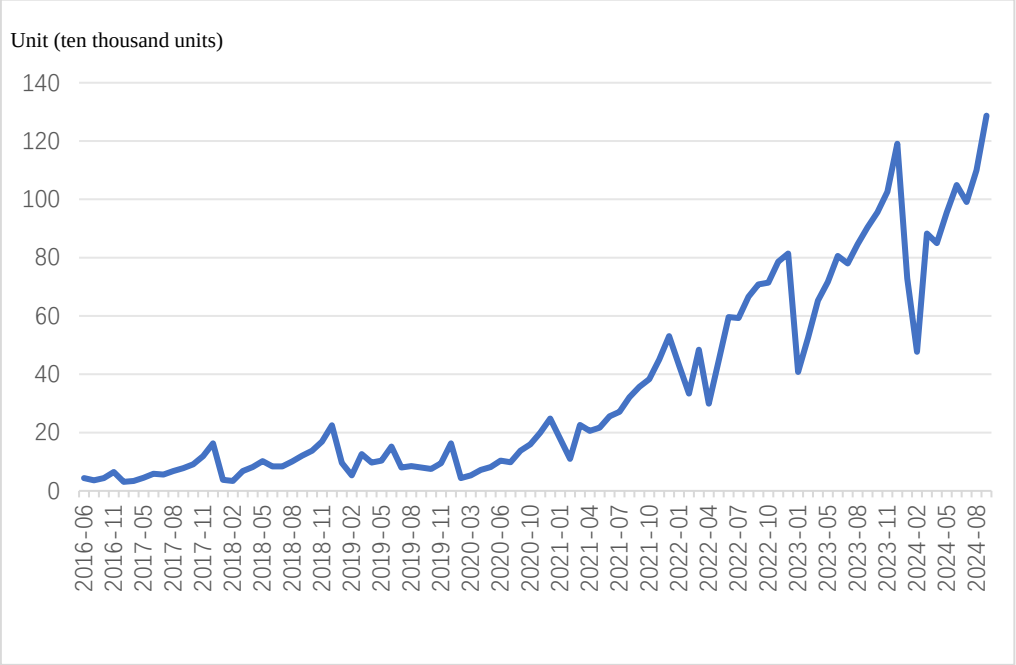



**Fig. 1** Production and sales of new energy vehicles (month) (Source: CSMAR database)

## 3. The Impact of Green Finance on New Energy Enterprises

Green finance offers a considerable amount of financial support for enterprises' environmental protection projects via a series of novel financial instruments. This not only contributes to guiding capital towards projects and enterprises that are sustainable and environmentally friendly but also holds great significance for establishing a positive incentive mechanism for green projects in the market. The core of green finance lies in its innovative financial tools. These tools, including green bonds, green loans, and green funds, provide diversified financing channels for environmental protection projects. Secondly, green finance provides the necessary financial guarantee for these projects by offering financial support. This paper summarises a number of related research papers and finds that most of them mention the impact on corporate technological innovation and corporate performance, and it can be said that technological innovation and performance are two parts that are greatly affected by green finance. In this paper, we will focus on the overview and analysis of these two parts.

### 3.1. The Impact of Green Finance on the Technological Innovation of New Energy Enterprises

Currently, in the academic context, scholars hold different conclusions about the impact of green finance on technological innovation. Acemoglu argues that, based on the theory of endogenous growth, the ability of technological innovation can be enhanced by increasing the deployment of

scientific researchers and the scale of investment in research and development funds [5]. Accordingly, a number of scholars contend that green finance is capable of effectively augmenting the scale of enterprise innovation in the domain of green technology by furnishing the requisite financial infusion. However, some other scholars have come to the opposite conclusion, and with the help of the Poisson distribution test, they found that although green finance, as an emerging financing model and investment concept, should theoretically be able to promote the innovation of environmentally friendly technologies by enterprises, the actual data show that it is not effective in promoting the green invention patents of enterprises [6].

In 2017, China introduced the Green Finance Pilot Zone (GFPZ) policy, which some scholars have found improves the quality of green innovation by easing financial constraints, lowering transaction costs, and increasing peer-to-peer competition for R&D investments, and that this impact is more pronounced for highly polluting industries, non-state-owned enterprises, and micro, small, and medium-sized enterprises (MSMEs) [7]. In the process of new energy technology innovation, the lack of funds will often hinder the development of technology, green finance can provide financial security for enterprises, green finance can be through a variety of financial instruments to the new energy enterprise's technological innovation impact. Green credit policy in green finance promotes green technological innovation among polluting firms by stimulating liquid debt financing and rising corporate profits. In addition, the implementation of green credit policies, while enabling polluting firms to engage in strategic green innovation, has only been quantitative, not qualitative [8]. This suggests that the implementation of green credit policies requires not only an increase in the quantity of technological innovation by enterprises, but also an increase in quality. Green financial policies promote both practical and strategic technological innovation, but the promotion effect on green strategic technological innovation is more obvious [9]. Technological innovation by financial firms has likewise played a positive role in promoting the development of green finance. With the advancement of financial technology, such as the application of big data and blockchain, green credit and green investment have been further improved, promoting green economic growth [10].

### 3.2. The Impact of Green Finance on the Performance of New Energy Enterprises

Business performance is the result of business operations over a certain period of time. Business performance can reflect a company's business situation, operational capability, financial condition and development potential. With the increasing concern for sustainable development and environmental protection, the ESG (Environmental, Social, Governance) performance of enterprises has gradually become an important indicator of their comprehensive competitiveness and long-term investment value, and more and more investor groups are taking the ESG performance of enterprises into consideration in their investment decision-making process. Green finance, as a financial service, also has the function of environmental protection, it also has economic and environmental benefits, and has a driving effect on the economic performance and environmental performance of enterprises. New energy companies can use green credits to positively impact the value of their companies, and this impact can be sustained over a long time span [11]. Green finance can bring a large amount of investment for enterprises and has a driving effect on enterprise technological innovation. Green finance can provide new energy enterprises and others with additional sources of funding through financing channels dedicated to green projects, thereby effectively easing financing constraints and having a positive impact on environmental protection and pollution control [6]. In addition, the improved level of regional green finance development can effectively improve targeted innovation and reduce the cost pressure on enterprises, which in turn significantly improves their environmental performance and innovation performance [12]. The significant impact of green finance on the environmental performance of banking institutions cannot be ignored. Green finance has provided banking institutions with a new business growth point through financial products and services specifically designed for environmental projects; it has facilitated the implementation of environmental projects by providing financial resources for them; and it has had a positive impact on

environmental performance by supporting environmentally friendly technologies and encouraging environmental management practices [13].

## 4. Conclusion

The purpose of this paper is to discuss the role of green finance on new energy enterprises by summarising and analysing several related papers. At present, the view that green finance has a positive impact on the new energy industry is widely recognised. Green finance can not only provide financial support for new energy enterprises, boost technological innovation and R&D investment, but also alleviate the financing constraints of enterprises and thus contribute to technological innovation. It also has an impact on the ESG ratings of enterprises, and promotes the performance of enterprises in many ways, including environmentally and economically. But green finance has also revealed some shortcomings in its development process: 1. Limited role in promoting the quality of innovation. Although green finance promotes the technological innovation of enterprises, its role in enhancing the quality of innovation still needs to be strengthened.2 The development mode is single and the number of products is insufficient. The current development mode of green finance is relatively single, with limited product types and quantities, making it difficult to meet the diversified financial needs of new energy enterprises.3. Higher service costs, affecting implementation efficiency. The cost of green financial services is high, which may affect its implementation efficiency, especially among small and medium-sized enterprises (SMEs), and the high cost may become an obstacle to the participation of enterprises in green finance.

For the above problems, this paper puts forward the following suggestions: Firstly, China also needs to promote the improvement of green finance related policies, strengthen the supervision of the quality of enterprise innovation and the implementation of related policies, and establish a perfect regulatory body, so as to make the flow of green finance to enterprises more accurate and specific, and to ensure that the quality of enterprise innovation and research and development is guaranteed. Secondly, strengthen the innovation and development of green financial products, launch more green financial products and diversify the green financial market. The third is to popularise green finance-related financial products, so that their service costs can be reduced through large-scale application.

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