



Impact Mechanisms of Green Finance on High-Quality Development under the Background of Carbon Peaking and Carbon Neutrality

Pengfei Guo*

School of Continuing Education, Huzhou College, Huzhou, China

*guopengfei@zjhzu.edu.cn

Abstract. The study first takes Zhejiang Province as an example to investigate the current status of carbon emissions in the production and consumption fields. Then, focusing on the theoretical system and policy framework of green finance, the study identifies the intrinsic mechanism of the impact of green finance on high-quality development through industrial economics and collaborative development theory. By referring to externality-related theories, the study explores and designs a long-term mechanism for financial support of high-quality development. Finally, drawing on international experience and combining the pioneering advantages of green financial reform in Zhejiang Province, the study proposes policy recommendations and effective measures for green finance to support carbon peaking and carbon neutrality. This study looks at carbon emissions in Zhejiang Province and shows how green finance helps improve development. It explores key mechanisms using industrial economics and collaborative development theory, leading to a plan for long-term financial support for sustainable growth. By learning from international experiences and the benefits of green financial reforms in Zhejiang, the study suggests specific policies to support carbon peaking and carbon neutrality goals.

Keywords: Green Finance, Carbon Peaking, Carbon Neutrality, High-Quality Development.

1 Introduction

As the world shifts towards sustainable development, green finance has become a crucial factor in promoting high-quality development, especially in reaching carbon peaking and neutrality. This study investigates how green finance influences high-quality development in Zhejiang Province, addressing both immediate impacts and long-term mechanisms. The research aims to provide an understanding of green finance's role in supporting carbon neutrality goals, thus emphasizing the importance of economic and environmental harmony.

© The Author(s) 2025

H. M. Briel (ed.), *Proceedings of the 3rd International Conference on Social Sciences, Economics, Management and Education-workshop on Social Sciences and Education (SSEME-SSE 2025)*, Advances in Social Science, Education and Humanities Research 951,

https://doi.org/10.2991/978-2-38476-454-9_7

2 Literature Review

Domestic and foreign scholars have conducted a large number of studies on the impact of environmental regulations on carbon emissions, mainly focusing on two viewpoints. One is the "green paradox effect" proposed by Sinn [1]. That is, environmental regulation policies to limit carbon emissions can hardly truly suppress carbon emissions; on the contrary, they will increase carbon dioxide emissions. From the perspective of the supply side, suppliers believe that environmental regulation policies will become stricter and expect a reduction in their future earnings. As a result, they accelerate the extraction and consumption of energy in the current period and accelerate the emissions of carbon dioxide [1]. The other viewpoint is the "reverse-forcing emission reduction effect" [2]. It is believed that environmental regulation policies such as subsidies for clean energy, high taxes on fossil fuels, and sewage charges will promote the use of clean energy, thereby reducing carbon dioxide emissions and achieving the goal of emission reduction [3]. So, what exactly is the role of environmental regulations on carbon emissions? Domestic scholars have conducted relevant research. Zhang Xianfeng and Han Xue [4] used China's provincial-level panel data from 2000 to 2010. The research shows that the reverse-forcing effect is not significant, and overly strong environmental regulations will have a certain inhibitory effect on economic growth [4]. Zhang Hua and Wei Xiaoping [5] used the two-step GMM method to empirically prove that China's current environmental regulation policies effectively curb carbon emissions and achieve the expected results [5]. The concept of pollution haven was also proposed later [6]. Initially, it was mainly aimed at the North American Free Trade Area. Mexican enterprises with lower environmental regulations will obtain obvious cost advantages, and the "dirty industries" in the United States and Canada will shift to Mexico [7]. Some studies mainly use econometric regression to verify the existence of the pollution haven effect, while others focus on emphasizing the importance of the pollution haven hypothesis by calculating virtual carbon in import and export trade [8].

Regarding research on financial instrument arrangements and green policy incentives, especially on how to solve problems such as climate change and the difficulty and high cost of financing for green enterprises, many scholars have put forward valuable ideas [9,10]. At the same time, the domestic academic community has carried out a series of studies on issues such as green finance and industrial structure transformation [11,12], and the relationship between green finance and economic growth [13,14,15]. However, very few studies have systematically sorted out the relationship among the three, and in the empirical research methods, the quantitative processing of green finance indicators is mostly based on the balance of green credit or its proportion. There are disadvantages such as a small number of observable indicators, poor spatial comparability, and inconsistent statistical calibers, failing to comprehensively reflect the comprehensive effects of green finance policies [11,12].

This project intends to start with the research on the relationship among green finance, carbon peaking, carbon neutrality, and sustainable development. Using industrial economics and coordinated development theory to find out the internal mechanism of the impact of green finance on carbon peaking, carbon neutrality, and sustainable

economic development, and drawing on relevant externality theories to explore and design a long-term mechanism for financial support for green development [16].

3 Survey and Comparative Analysis of the Current Carbon Footprint in Zhejiang Province

This study primarily uses three indicators for calculating the carbon footprint: Carbon Emissions Intensity (CEI), Total Carbon Emissions (CE), and Per Capita Carbon Emissions (PCE) [17]. Among these, CEI is an indicator of carbon emissions per unit of GDP, reflecting the rate of carbon emissions from the energy consumed to produce a unit of output. For this study, the carbon emissions intensity is the amount of carbon emissions produced to create one million yuan of GDP. The calculation formulas for these three indicators are as follows:

$$CEI = \text{Energy Consumption per Ten Thousand Yuan of GDP} * \text{Carbon Emission Coefficient of Energy} \tag{1}$$

$$CE = \text{Comprehensive Energy Consumption (Standard Coal)} * \text{Carbon Emission Coefficient of Energy} \tag{2}$$

$$PCE = \text{Carbon Emissions} / \text{Population (Resident)} \tag{3}$$

The carbon emission coefficient of energy is taken as 2.684 [18].

3.1 Changes in Carbon Emissions in Zhejiang Province from 2015 to 2021

After collecting and calculating the data, the changes in Zhejiang Province's carbon footprint from 2015 to 2021 are as shown in Table 1:

Table 1. Overview of Zhejiang Province's carbon footprint from 2015 to 2021.

| Year | GDP (Billion Yuan) | Energy Consumption per Ten Thousand Yuan of GDP | Carbon Emissions Intensity CEI (Tons/Ten Thousand Yuan) | Total Carbon Emissions CE (Ten Thousand Tons) | Per Capita Carbon Emissions (Tons) |
|-------------|--------------------|---|---|---|------------------------------------|
| 2015 | 43507.72 | 0.45 | 1.21 | 52633.24 | 10.80 |
| 2016 | 47254.04 | 0.43 | 1.15 | 54419.71 | 11.08 |
| 2017 | 52403.13 | 0.40 | 1.08 | 56444.55 | 11.39 |
| 2018 | 58002.84 | 0.37 | 1.00 | 58174.52 | 11.64 |
| 2019 | 62462.00 | 0.36 | 0.96 | 60102.81 | 11.93 |
| 2020 | 64689.06 | 0.38 | 1.02 | 66187.44 | 13.06 |
| 2021 | 73515.76 | 0.36 | 0.97 | 71458.01 | 14.02 |

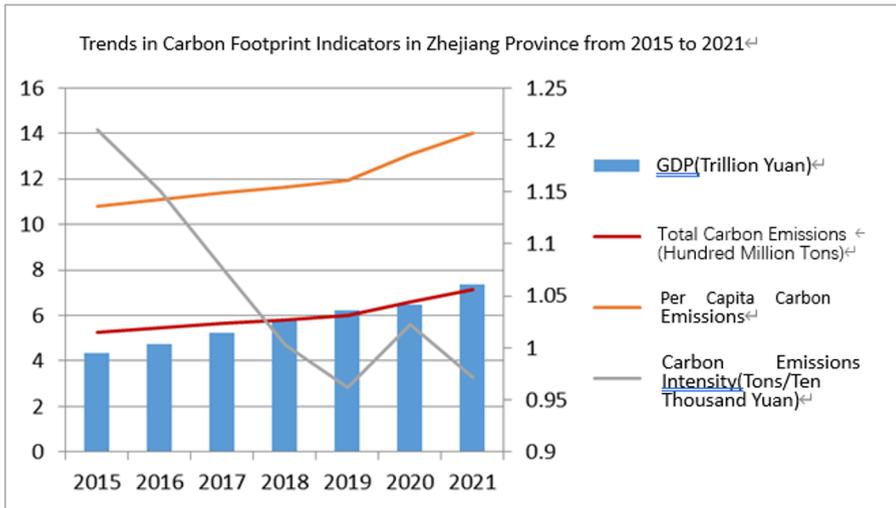


Fig. 1. Trends in carbon footprint indicators in Zhejiang Province from 2015 to 2021.

As can be seen from Table 1 and Fig. 1, Zhejiang Province's GDP has increased steadily year by year, while the carbon emission intensity has continuously decreased from 1.21 tons per ten thousand yuan in 2015 to 0.97 tons per ten thousand yuan in 2021. This indicates that the work on energy conservation and emission reduction in Zhejiang Province has been steadily advanced and has achieved certain results.

3.2 Comparison of Carbon Emissions Between Zhejiang Province and Other Provinces and Cities in 2021

This study selected Guangdong Province, which ranked first in GDP in 2021 and was also among the first batch of low-carbon pilot provinces, as well as Shandong and Henan Provinces, which are adjacent to Zhejiang in GDP ranking, and Liaoning Province, another member of the first batch of low-carbon pilot provinces, as comparison objects. After data collection and calculation, the carbon emission data and comparison charts for these five provinces are as shown in Table 2 and Fig. 2:

Table 2. Overview of carbon footprint by province in 2021.

| Province | GDP (Trillion Yuan) | Carbon Emissions Intensity CEI (Tons/Ten Thousand Yuan) | Total Carbon Emissions CE (Hundred Million Tons) | Per Capita Carbon Emissions (Tons) |
|-----------|---------------------|---|--|------------------------------------|
| Zhejiang | 7.351576 | 0.972009414 | 7.14580108 | 14.02297799 |
| Guangdong | 12.436967 | 0.794636597 | 9.882869128 | 7.791602908 |
| Shandong | 8.30959 | 1.440939835 | 11.97361924 | 11.77347025 |
| Henan | 5.888741 | 1.071140402 | 6.3076684 | 6.382341799 |
| Liaoning | 2.75841 | 2.425827459 | 6.69142672 | 16.11576484 |

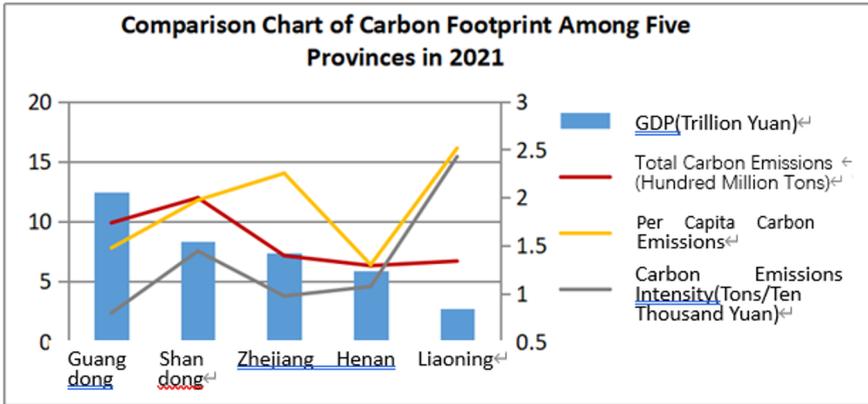


Fig. 2. Comparison of carbon footprint among five provinces in 2021.

From the chart, it can be observed that among the two provinces with a higher GDP than Zhejiang, Guangdong Province has a lower carbon emission intensity than Zhejiang. Among the two provinces with a lower GDP than Zhejiang, Zhejiang has the lowest carbon emission intensity. Zhejiang's total carbon emissions rank third among the five provinces, but its per capita carbon emissions rank first, which is related to the relatively small permanent population of Zhejiang. Overall, the comparison shows that Zhejiang's work on energy conservation and emission reduction is good, but there is still room for improvement.

3.3 Comparison of Carbon Emissions Among Cities in Zhejiang Province in 2021

Table 3. Overview of carbon footprint by city in Zhejiang Province in 2021.

| City | GDP (Billion Yuan) | Carbon Emissions Intensity CEI (Tons/Ten Thousand Yuan) | Total Carbon Emissions CE (Ten Thousand Tons) | Per Capita Carbon Emissions (Tons) |
|----------|--------------------|---|---|------------------------------------|
| Hangzhou | 18109 | 0.68 | 12394.16 | 10.16 |
| Ningbo | 14595 | 1.07 | 15543.84 | 16.29 |
| Wenzhou | 7585 | 0.78 | 5903.86 | 6.12 |
| Jiaxing | 6355 | 1.15 | 7334.43 | 13.3 |
| Huzhou | 3645 | 0.72 | 2637.81 | 7.74 |
| Shaoxing | 6795 | 0.39 | 2679.13 | 5.02 |
| Jinhua | 5355 | 1.05 | 5605.40 | 7.87 |
| Quzhou | 1876 | 1.16 | 2176.04 | 9.51 |
| Zhoushan | 1704 | 2.70 | 4614.70 | 39.61 |
| Taizhou | 5786 | 0.84 | 4845.24 | 7.27 |
| Lishui | 1710 | 0.86 | 1473.46 | 5.86 |

Zhejiang Province governs the cities of Hangzhou, Ningbo, Wenzhou, Jiaxing, Huzhou, Shaoxing, Jinhua, Quzhou, Zhoushan, Taizhou, and Lishui. After collecting and calculating the data, the carbon emission data and comparison charts for each city are as Table 3.

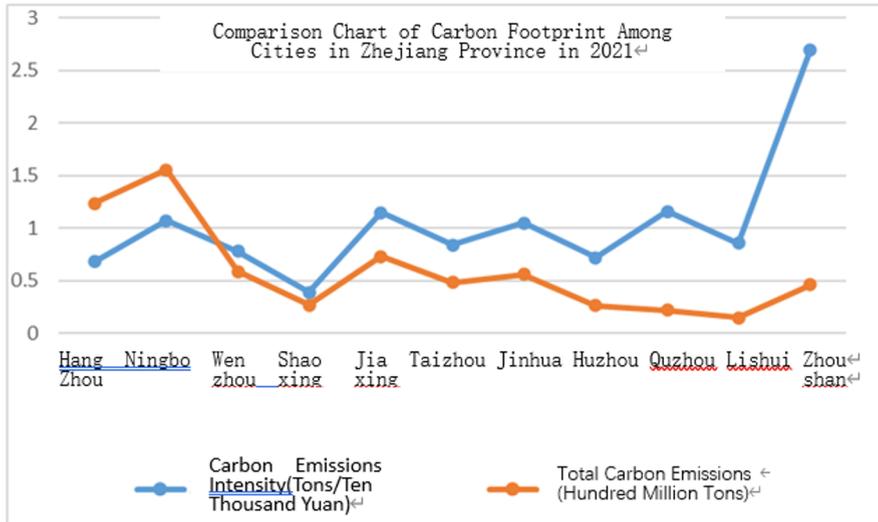


Fig. 3. Comparison of carbon footprint among cities in Zhejiang Province in 2021.

In the Fig. 3, the cities are arranged from left to right in order of their GDP, from high to low. In terms of carbon emission intensity, Zhoushan City has the lowest GDP but the highest carbon emission intensity; Hangzhou City has the highest GDP, but its carbon emission intensity is the second lowest, indicating that Hangzhou is a leader in energy conservation and emission reduction within the province. Ningbo City has a GDP closest to Hangzhou, but its carbon emission intensity is much higher, suggesting that Ningbo needs to strengthen its efforts in energy conservation and emission reduction. Ningbo, Jiaxing, Jinhua, Quzhou, and Zhoushan all have carbon emission intensities that exceed the average level of Zhejiang Province and should be the focus of future carbon reduction efforts.

4 The Intrinsic Mechanism and Long-term Mechanism of Green Finance's Impact on High-quality Development

The construction of the theoretical system and policy framework of green finance requires the comprehensive application of various theoretical tools, such as industrial economics, collaborative development theory, and externality-related theories, to achieve a win-win situation for both economic and environmental benefits. On this basis, it is also necessary to formulate corresponding long-term mechanisms and policy measures to guide and promote financial institutions in increasing their investment and

financing support for green and low-carbon industries, thereby promoting the development of green and low-carbon industries and achieving the goal of addressing climate change.

Green finance in Zhejiang helps promote high-quality development by cutting industrial emissions and encouraging green technology. By implementing policies and investing in green projects, Zhejiang offers financial rewards that steer businesses towards low-carbon activities, connecting economic growth with sustainable practices. This study looks at how these strategies work together to ensure that Zhejiang’s development is both economically effective and environmentally friendly.

4.1 The Theoretical System of Green Finance

Green finance refers to the integration of environmental protection, social responsibility, and sustainable development into financial decision-making and investment to promote low-carbon, environmentally friendly, and sustainable financial activities. The theoretical system of green finance includes the following three aspects (as shown in Fig. 4):

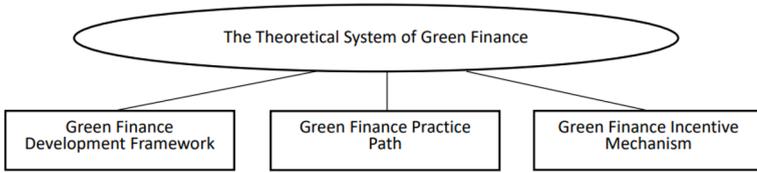


Fig. 4. Theoretical system of green finance.

4.1.1 Establishing the Green Finance Development Framework. The green finance development framework refers to the system established to promote the development of green finance [19], which mainly includes policies, regulations, standards, service systems, markets, innovation, and talent, among other aspects (as shown in Fig. 5). Firstly, policies and regulations are important guarantees for promoting the development of green finance. By formulating green finance policies and regulations, financial institutions and investors can be guided to increase their support for green investments. Secondly, the establishment of standards is crucial for the development of green finance. Only with unified and scientific standards can the rights and interests of investors be effectively protected and the issuance of green financial products be promoted. In addition, it is necessary to establish a market-oriented, professional, and diversified green financial service system to provide more complete infrastructure for green financial products and services. At the same time, it is also essential to deepen the integration of green finance with the real economy, establish green financial markets and investment and financing platforms, promote the combination of green finance and technology, and enhance the level of protection for green finance talent and intellectual property rights.

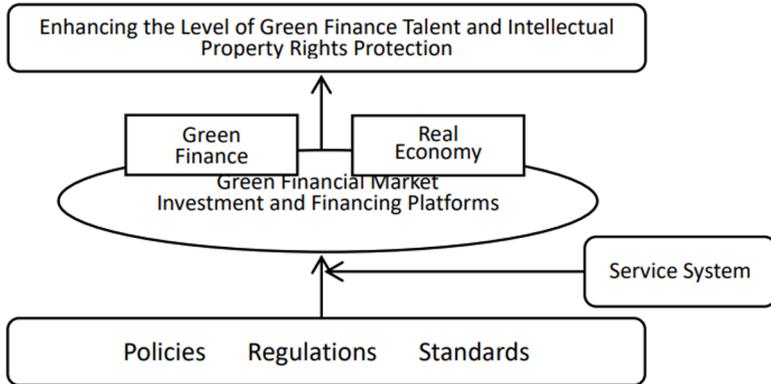


Fig. 5. Green finance development framework.

4.1.2 Exploring Green Finance Practice Pathways. Green finance practice pathways mainly include: green credit and bonds, green investment, energy transition, carbon markets and ecological compensation, green insurance and risk management, green evaluation and disclosure mechanisms, green consumption and investment concepts, as well as green finance cooperation and dialogue. Among these, green credit and bonds are the most basic forms of green finance, providing low-cost, long-term financing support for environmental protection enterprises. Green investment supports the development of the environmental protection industry through capital market methods, offering diverse financing channels such as equity financing and mergers and acquisitions for environmental protection enterprises. Energy transition, carbon markets, and ecological compensation are policy measures taken to support a low-carbon economy and ecological protection. Green insurance and risk management aim to reduce environmental risks and protect the interests of investors. Green evaluation and disclosure mechanisms are designed to enhance the transparency and credibility of green financial products. Green consumption and investment concepts promote the support and recognition of the environmental protection industry by consumers and investors through the promotion of green consumption and investment ideas. Finally, green finance cooperation and dialogue are meant to strengthen international cooperation and jointly promote the development of global green finance.

4.1.3 Designing Green Finance Incentive Mechanisms. Establishing green finance funds and incentive mechanisms, strengthening preferential policies for green credit and bonds, promoting deep integration of green finance with the green industry, enhancing the status and influence of green finance in the financial system, improving the marketization degree of green finance innovation and technology application, and cultivating the competitiveness and influence of green financial markets and investment and financing platforms.

Green finance incentive mechanisms mainly include policy incentives and market incentives (as shown in Fig. 6). Policy incentives involve government policies such as green finance tax incentives, subsidies, and fiscal assistance to attract more financial institutions and investors to participate in green investment. Market incentives involve establishing market mechanisms for green investment to improve the investment return and risk management level of green financial products, thereby attracting more capital to participate in green investment. Market incentives also include enhancing the rating and creditworthiness of green financial products to provide a more reliable investment channel for green finance products.

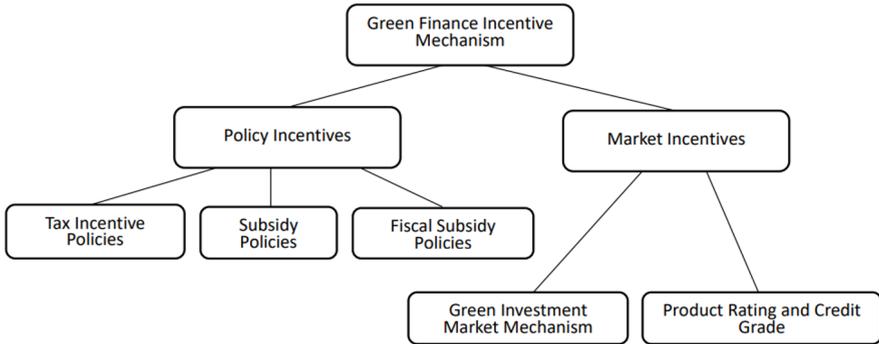


Fig. 6. Green finance incentive mechanism.

4.2 Constructing the Green Finance Policy Framework

4.2.1 Establishing a Green Finance Standard System. The green finance standard system is a crucial means to ensure the quality of green financial products and the stability of the market. The government can standardize the issuance and operation of green financial products, and enhance the transparency and stability of the green finance market by formulating, releasing, and promoting green finance standards [20]. The green finance standard system includes standards for green bonds, green insurance, green funds, and green loans [21].

Green bonds are bonds issued to finance environmental protection and sustainable development projects. To regulate the green bond market, a series of international green bond standards have been introduced, such as the Green Bond Principles and Green Bond Standards. These standards outline how bond issuers should determine the green nature of projects, develop and implement environmentally friendly projects, and disclose and monitor project progress.

Green insurance refers to insurance products and services oriented towards environmental protection and sustainable development. Green insurance standards are the standard systems that regulate green insurance products and services. The aim is to enhance the transparency and credibility of green insurance products and services, promote the development of a green economy, regulate the investment behavior of insurance institutions, and prevent environmental risks.

Green funds are funds specifically invested in environmentally friendly and sustainable development projects. Green fund standards are the standard systems that regulate green fund products. These standards primarily include provisions on investment strategies, investment scope, project evaluation, information disclosure, and supervision.

Green loans are loan products specifically provided for environmentally friendly and sustainable development projects. Green loan standards are the standard systems that regulate green loan products. These standards mainly include provisions on the loan process, loan conditions, loan purposes, interest rates, and loan risk management.

Additionally, there are other green finance standards, such as green rating standards and green securities standards. The introduction of these standards benefits not only financial institutions and investors but also the environment and society, promoting the transformation and upgrading of the global economy and achieving sustainable development.

4.2.2 Strengthening the Development of Green Finance Laws and Regulations.

Laws and regulations are essential for guiding the healthy development of the green finance industry. The government can strengthen the formulation and improvement of green finance-related laws and regulations, particularly detailed provisions on the issuance, investment, evaluation, and disclosure of green financial products, to ensure the standardization, legalization, and sustainability of the green finance market. Moreover, it is necessary to establish a green financial market supervision system to enhance the supervision of green financial institutions and products and ensure the stability and healthy development of the green finance market.

4.2.3 Accelerating the Construction of Green Financial Markets.

Green financial markets are important carriers for promoting the development of a green economy. The government can introduce relevant policies to encourage financial institutions to increase the issuance and investment of green financial products, expanding the scale and scope of the green financial market. Additionally, establishing green financial market trading platforms, information service platforms, etc., can enhance the liquidity and transparency of green financial products, providing investors with more convenient investment channels.

4.2.4 Exploring the Marketization of Ecological Product Values.

The marketization of ecological product values is a significant means to promote green finance practices [22]. The government can establish green ecological compensation mechanisms, ecological protection trusts, and other means to explore the marketization of ecological product values, enhancing the market value and economic benefits of ecological products, and providing more reliable support for the investment in green financial products. Furthermore, actively promoting the international development of green finance, strengthening cooperation and exchanges with international green finance standards, institutions, and markets, will promote the healthy development of the green finance industry globally.

Constructing the green finance policy framework requires the joint efforts of the government, financial institutions, and society. The government should strengthen regulation and policy-making, financial institutions should innovate products and services, and society should enhance publicity and promotion to jointly advance the development of the green finance industry, achieving the dual goals of sustainable economic development and environmental protection.

4.3 The Intrinsic Mechanism and Long-term Mechanism of Green Finance's Impact on High-quality Development

Industrial economics posits that the production and operation of enterprises are subject to various factors such as market competition, technological progress, and policy environment. Therefore, it is necessary to establish synergistic relationships among industrial chains, value chains, and ecological chains to achieve economic scale effects and reduce costs. During the development of green and low-carbon industries, green finance can promote the coordinated development of all links in the industrial chain, thus achieving a win-win situation for economic and environmental benefits [19].

The theory of collaborative development emphasizes the interactive cooperation among various departments, enterprises, and organizations to achieve common development. In the field of green finance, governments at all levels, financial institutions, green and low-carbon industries, social organizations, etc., should strengthen collaborative cooperation to form linkage effects in policies, funds, and technology, and jointly promote the development of green and low-carbon industries and the realization of goals to address climate change.

The theory of externality suggests that market mechanisms may fail, necessitating government intervention and regulation. In the context of green finance, the green and low-carbon industries exhibit external effects, which is a positive impact on the environment and society. However, due to the inability of market mechanisms to fully reflect this positive impact, it is necessary for governments and financial institutions to formulate corresponding policies and measures to guide and support the development of green and low-carbon industries.

Based on the above theories, the intrinsic mechanism of green finance can be summarized as: through financial means, green finance guides and supports the development of green and low-carbon industries, forming synergistic effects in policies, funds, and technology to achieve a win-win situation for economic and environmental benefits. At the same time, it is necessary to establish corresponding long-term mechanisms to make up for market failures, promote the development of green and low-carbon industries, and achieve the goals of addressing climate change. For example, green finance standards and certification systems can be established, green finance incentive mechanisms can be strengthened, and the green finance product and service system can be improved to guide and drive financial institutions to increase their investment and financing support for green and low-carbon industries (as shown in Fig. 7).

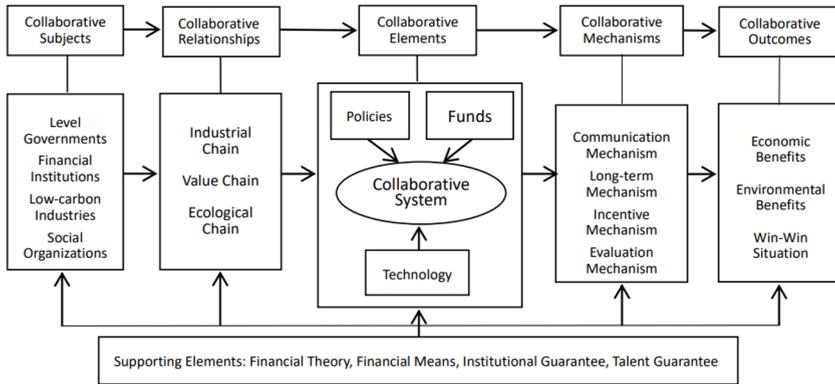


Fig. 7. The intrinsic mechanism and long-term mechanism of green finance's impact on high-quality development.

5 International Experiences in Green Finance Supporting Carbon Peaking and Carbon Neutrality

Carbon peaking and carbon neutrality refer to the goal of achieving a balance between emissions and reductions at a specific point in time (carbon peaking) and then moving towards net-zero emissions. To achieve this goal, countries have implemented various policy measures with the support of financial institutions. Here are some international developments and financial support experiences:

EU Carbon Neutrality Plan: The EU announced in late 2019 that it will achieve carbon neutrality by 2050, with the target of reducing greenhouse gas emissions by 55% between 2020 and 2030. The EU has implemented a series of policy measures, such as establishing a carbon trading market, implementing carbon taxes, and encouraging the development of clean energy. Financial institutions are also actively involved, with the European Investment Bank (EIB) announcing in 2021 that it will invest 1 trillion euros in sustainable projects over the next decade.

US Carbon Neutrality Plan: The Biden administration announced in 2021 that the US will achieve carbon neutrality by 2050, with the target of reducing greenhouse gas emissions by 50%-52% by 2030. To achieve this goal, the US government has proposed a range of policy measures, such as promoting the development of renewable energy and increasing the popularity of electric vehicles. Financial institutions are also actively involved, with Citibank announcing that it will invest 1.5 trillion US dollars in sustainable projects by 2030.

These international experiences demonstrate that policies and financial support are crucial for achieving the goals of carbon peaking and carbon neutrality. Governments should formulate appropriate policy measures to encourage businesses and financial institutions to increase investment, while financial institutions should actively introduce green financial products and services to support sustainable development projects and work together to achieve carbon peaking and carbon neutrality goals.

6 Policy Recommendations for Zhejiang Province to Support High-Quality Development with Green Finance

6.1 Implementing Multiple Measures to Attract Social Capital Investment in Green Industries and Projects

6.1.1 Establish a Green Bond Market. Establish a green bond market to provide financing support for green industries and projects. The government can use fiscal, tax, and bond issuance policies to encourage companies to issue green bonds, thereby attracting social capital investment in green industries and projects. At the same time, the government can establish a green bond rating and regulatory system to regulate the order of the green bond market.

6.1.2 Support the Issuance of Green Securities. Support the issuance of green securities to provide financing support for green industries and projects. The government can use fiscal, tax, and securities issuance policies to encourage companies to issue green securities. Additionally, the government can establish a green securities rating and regulatory system to regulate the order of the green securities market.

6.1.3 Establish an Incentive Mechanism. Establish an incentive mechanism to encourage companies and institutions to increase their investment in carbon emission reduction and carbon neutrality. The government can provide rewards, subsidies, and tax exemptions to incentivize companies and institutions to actively participate in carbon emission reduction and carbon neutrality efforts, thereby promoting the development of a low-carbon economy.

6.1.4 Establish a Carbon Finance Fund. Establish a carbon finance fund to provide financial support for carbon emission reduction and carbon neutrality projects in Zhejiang Province. The fund can provide financial support, credit guarantees, and risk compensation services to companies and institutions, encouraging more participation in carbon emission reduction and carbon neutrality.

6.1.5 Promote Green Insurance Products. Encourage insurance companies to develop green insurance products to provide risk protection for carbon emission reduction and carbon neutrality projects. This will help reduce the risk cost of carbon emission reduction and carbon neutrality projects and encourage more companies and institutions to participate in these projects.

6.2 Issuing Policies and Institutional Guarantees

6.2.1 Issue Policies to Encourage and Support the Development of Renewable Energy. The government can provide tax and fiscal incentives to reduce the investment

cost of renewable energy projects and provide green financial support for renewable energy companies, accelerating the development of renewable energy.

6.2.2 Issue Policies to Encourage Financial Institutions to Engage in Green Finance. Encourage banks, securities companies, insurance companies, and other financial institutions to engage in green finance and promote green finance innovation. Encourage the issuance and trading of green bonds, green credit, carbon trading, and other green financial products, strengthening the construction and development of the green finance market and improving the supply and use efficiency of green finance [23].

6.2.3 Issue Policies to Strengthen Technological Innovation and Application. Encourage companies and institutions to increase investment in low-carbon technology research and development, promoting the progress and application of low-carbon technology, reducing carbon emission reduction costs, and improving carbon emission reduction benefits.

6.2.4 Improve the Legal and Regulatory System. Improve the legal and regulatory system to provide legal guarantees for the development of green finance. The government can formulate relevant laws and regulations to regulate the order and development of the green finance market and ensure the stable development of green finance.

6.2.5 Strengthen Environmental Governance and Regulation. Strengthen environmental governance and regulation, establish a sound environmental protection system. The government can establish carbon emission standards and carbon reduction targets, force companies and institutions to reduce carbon emissions during their production and operation. At the same time, the government should strengthen supervision over companies and institutions to ensure they comply with environmental laws and regulations and carbon emission restrictions.

6.2.6 Establish an Environmental and Social Risk Assessment System. Establish an environmental and social risk assessment system to strengthen environmental and social risk management and promote the healthy development of green finance. Conduct risk assessments and supervision of green finance projects to prevent environmental and social risks. The government can also strengthen the supervision and enforcement of green financial institutions and regulate the order of the green finance market.

6.3 Establish a Long-term Mechanism for Green Development

6.3.1 Establish a Green Credit Mechanism. The government can cooperate with commercial banks to establish a green credit mechanism, encouraging banks to provide

preferential loans and credit support to companies and projects that meet carbon emission reduction and carbon neutrality standards. This will promote Zhejiang's low-carbon transformation and provide more flexible funding support for companies.

6.3.2 Establish an Information Disclosure Mechanism. The government can establish an information disclosure mechanism, requiring companies and institutions to disclose their carbon emissions, carbon reduction, and carbon neutrality plans. Strengthen data support and provide data and information support for green finance development. Establish carbon reduction and carbon neutrality data management and exchange platforms to provide data and information support for green financial institutions and companies.

6.3.3 Establish a Cross-departmental Collaboration Mechanism. Establish a cross-departmental collaboration mechanism to promote inter-departmental cooperation in carbon emission reduction and carbon neutrality. The government can strengthen cooperation with relevant departments such as energy, environmental protection, and climate change to facilitate cross-departmental collaboration in carbon emission reduction and carbon neutrality, and to promote the coordinated implementation of policies.

6.3.4 Establish an International Cooperation Mechanism. Strengthen international cooperation and actively participate in global carbon emission reduction and carbon neutrality efforts. The government can enhance cooperation with international institutions, governments, and enterprises to share experiences and technologies, fostering global cooperation in carbon emission reduction and carbon neutrality. Moreover, strengthen cooperation with countries along the Belt and Road Initiative to promote the development of green finance and low-carbon technologies, jointly addressing climate change challenges.

6.3.5 Establish a Green Finance Innovation Incentive Mechanism. Support green finance innovation and promote the application of new technologies, new forms, and new models. The government can increase investment in green finance technology, encouraging financial technology companies to engage in green finance innovation. At the same time, establish a green finance innovation support platform to provide technical, financial, and policy support for green finance innovation.

To encourage green finance in Zhejiang, the main steps are to make green credit systems better, help green technology companies, and create clear evaluation standards. By focusing on these actions, funds can be used effectively, leading to innovations that support quality development and carbon neutrality. Providing tax breaks and eco-compensation can also help build a useful and expandable model for green finance.

7 Conclusion

This paper starts from the relationship between green finance and high-quality development, using industrial economics, collaborative development theory to identify the intrinsic mechanism of green finance's impact on high-quality development. By referring to the theory of externalities, it explores the design of a long-term mechanism for financial support of green development, which has high theoretical and practical value. In practice, it has played a key role in the construction of Zhejiang Province's "Green Finance Reform Pilot Demonstration Zone" and provided strategic thinking and plans for the national carbon peaking and carbon neutrality "14th Five-Year Plan". It is of great significance for promoting the high-quality transformation of low-carbon economy development.

In conclusion, green finance has been effective in supporting quality development by connecting environmental and economic goals. This study found that by promoting investment in low-carbon industries and green innovations, Zhejiang has successfully gathered financial resources to meet sustainability goals. Future research could look into how these methods can work in other areas or examine how Zhejiang's approach can help achieve carbon neutrality across the country.

Funding Project. General Scientific Research Project of Zhejiang Provincial Education Department (Project Number Y202145853)

Abbreviations. (1) CEI: Carbon Emissions Intensity (2) CE: Carbon Emissions (3) PCE: Per Capita Carbon Emissions

Data Source Declaration. The data used in this article are all from the public data of relevant government departments.

Conflict of Interest Statement. The authors declare that they have no conflicts of interest related to this study. Additionally, all authors have confirmed that they have no financial or personal relationships with other people or organizations that could inappropriately influence (bias) their work. Furthermore, all authors have adhered to the ethical guidelines set forth by the journal and have ensured the integrity of the research presented in this article.

References

1. Sinn, H.-W.: Public Policies Against Global Warming: A Supply Side Approach. *International Tax and Public Finance* 15(4), 360–394 (2008).
2. Wang, Y., Zhang, Q.: Environmental Regulation and Reverse-Forcing Emission Reduction. *Environmental Policy Journal* 21(1), 45–59 (2012).
3. Stern, N.: *The Economics of Climate Change: The Stern Review*. Cambridge University Press, Cambridge (2007).

4. Zhang, X., Han, X.: An Empirical Study on the Reverse-Forcing Emission Reduction Effect in China. *China Environmental Policy* 14(3), 56–68 (2015).
5. Zhang, H., Wei, X.: The Effectiveness of Environmental Regulations on Carbon Emission Reduction. *Journal of Environmental Economics* 35(2), 76–89 (2016).
6. Copeland, B. R., Taylor, M. S.: Trade, Growth, and the Environment. *Journal of Economic Literature* 42(1), 7–71 (2004).
7. Cole, M. A.: Trade, the Pollution Haven Hypothesis and the Environmental Kuznets Curve: Examining the Linkages. *Ecological Economics* 48(1), 71–81 (2004).
8. Grether, J.-M., Mathys, N. A.: Is the World Trade Center a Pollution Haven? *Environmental and Resource Economics* 45(1), 103–122 (2010).
9. Ma, J.: Developing Green Finance in China. *China Finance* 8(1), 45–50 (2015).
10. Rao, S., Chen, Y.: Financial Incentives for Green Enterprises. In: 22nd Annual Conference on Financial Studies, pp. 33–45. Financial Studies Publishing, Beijing (2020).
11. Xu, S., Li, Y., Chen, Z.: Green Finance, Industrial Structure, and Carbon Emission Reduction. *Environmental Science and Policy* 10(1), 12–23 (2018).
12. Li, Y., Zhang, W., Sun, T.: Green Finance and Industrial Structure Transformation. *Journal of Green Finance* 12(2), 45–60 (2020).
13. Ning, W., She, J.: Green Finance and Economic Growth. *Economic Research Journal* 10(4), 112–121 (2014).
14. Wang, Y., Liu, X., Zhang, Q.: Green Finance and Economic Sustainability. *China Economic Review* 30(3), 54–61 (2016).
15. Fang, J., Lin, F.: The Impact of Green Finance on Economic Growth. *Sustainability* 11(4), 978 (2019).
16. Elkington, J.: *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*, 2nd edn. Capstone, Oxford (1997).
17. Guo, P., Tao, C.: Research on Accelerating the Construction of 'Ecology + Low Carbon Circulation' Cities in Zhangzhou. *Urban Architecture* 16(31), 32–35 (2019).
18. Tao, C.: Study on Institutional Innovation in Building Low-carbon Cities in Jiaying. Jiangxi University of Technology (2012).
19. Han, J., Li, R.: Spatio-temporal Variation and Correlation Network of Coupling Coordination between Green Finance and High-quality Economic Development. *Financial Theory Exploration* 1, 50–60 (2023).
20. Li, M.: Analysis of the Current Situation and Problems of Green Finance Development in Gansu Province. *Small and Medium-sized Enterprise Management and Technology* 2, 105–107 (2022).
21. China Banking and Insurance Regulatory Commission Policy Research Bureau Research Group, Hong, W.: Research on Green Finance Theory and Practice. *Financial Supervision and Research* 3, 1–15 (2021).
22. Cheng, R., Nie, X., Li, C.: Research on Precise Poverty Prevention and Alleviation Strategies for 'Agricultural Products + Live Streaming' in Heilongjiang Province from a Green Finance Perspective. *China Market* 3, 1–5 (2023).
23. Gao, Z., Gou, H.: Impact of Trade Openness on Green Total Factor Productivity under the Threshold of Technological Innovation: An Empirical Analysis Based on 14 Prefecture-level Cities in Xinjiang. *Resource Development and Market* 38(6), 688–698 (2022).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

