

Research on the Sustainable Development of Green Finance in Hainan Free Trade Port under the Dual Carbon Goals

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Abstract: Against the backdrop of global climate change, the Chinese government has proposed the ambitious goals of "carbon peak" and "carbon neutrality" (dual carbon goals). As an important part of the national strategy, Hainan Free Trade Port plays a key role in its sustainable development through green finance. This study aims to explore the connotation, current status, and challenges of green finance in Hainan Free Trade Port under the dual carbon goals, and propose strategies and paths to promote its sustainable development. The study finds that a sound policy environment, innovative financial products and services, specialized talent cultivation, and effective evaluation and risk management mechanisms are key factors for achieving the sustainable development of green finance in Hainan Free Trade Port.

Keywords: Dual Carbon Goals; Green Finance; Hainan Free Trade Port; Sustainable Development; Policy System

Introduction

In the context of increasing global climate change and environmental pollution, green finance, as an important means to promote the green transformation of the economy, has received widespread attention. The Chinese government's "carbon peak" and "carbon neutrality" goals require all regions to actively explore low-carbon development paths. As an important part of the national strategy, the development of green finance in Hainan Free Trade Port is of great significance for achieving the dual carbon goals. This study systematically analyzes the theoretical basis of green finance under the dual carbon goals and the current status and challenges of green finance development in Hainan Free Trade Port, providing theoretical support and practical guidance for promoting the sustainable development of green finance in the region.

1. Theoretical Basis of Dual Carbon Goals and Green Finance

The dual carbon goals and green finance are important strategies for China to address global climate change and achieve sustainable development. The dual carbon goals aim to control and balance carbon dioxide emissions through carbon peak and carbon neutrality, promoting coordinated economic and environmental development. Green finance supports environmental protection and resource conservation through financial instruments and policies, promoting the green transformation of the economy.

1.1 Connotation and Pathways to Achieve the Dual Carbon Goals

The dual carbon goals, namely "carbon peak" and "carbon neutrality," are important measures for China to address global climate change and fulfill international commitments. Carbon peak refers to the point at which carbon dioxide emissions reach their highest level within a certain period and then gradually decline. Carbon neutrality means offsetting all human-generated carbon dioxide emissions through measures such as afforestation, energy conservation, and technological innovation, achieving net-zero emissions. The pathways to achieve the dual carbon goals include energy structure adjustment, industrial structure optimization, technological innovation promotion, and ecological environmental protection. These pathways require strong national policy support and the joint efforts of the whole society.

Energy structure adjustment is a key step in achieving the dual carbon goals. Specific measures include accelerating the development of renewable energy, improving energy efficiency, and reducing dependence on fossil fuels. Meanwhile, industrial structure optimization requires the elimination of outdated, high-energy-consuming, and high-pollution capacities, promoting the green transformation of traditional industries and the development of high-tech industries. Technological innovation is a crucial support for achieving the dual carbon goals. By developing green technologies, low-carbon technologies, and carbon capture and storage technologies, carbon dioxide emissions can be significantly reduced. Additionally, ecological environmental protection is an important guarantee for achieving the dual carbon goals. By increasing forest areas and improving the ecological environment, carbon absorption and sequestration can be effectively enhanced, promoting the realization of carbon neutrality ^[1].

1.2 Definition and Development History of Green Finance

Green finance refers to a financial model that supports environmental protection, climate change response, and resource conservation through financial instruments and policies. Green finance includes traditional financial products such as green credit and green bonds, as well as green investment, carbon trading markets, and environmental risk management. The core of green finance is to incorporate environmental and social risks into financial decision-making processes, promoting the flow of funds to green industries, thereby driving the green transformation of the economy and sustainable development.

The development history of green finance can be traced back to the 1970s when environmental awareness began to increase, and the financial sector started to pay attention to environmental issues. Entering the 21st century, the exacerbation of climate change and the popularization of sustainable development concepts further promoted the development of green finance. In 2007, the United Nations Environment Programme Finance Initiative released the "Principles for Responsible Investment," marking the further promotion of green finance internationally. In recent years, with the advancement of the global climate change agenda, countries have introduced green finance policies and measures to promote the innovation and development of green financial products and services. In China, the development of green finance has also made significant progress, especially since the Chinese government released the "Guidelines for Green Finance Development" in 2016, with the market size and influence of green finance continuously expanding.

1.3 The Role Mechanism of Green Finance in Achieving the Dual Carbon Goals

Green finance plays a crucial role in achieving the dual carbon goals, mainly reflected in resource allocation, risk management, and market incentives. Firstly, green finance can effectively promote the development of green technologies and projects by directing funds to low-carbon, energy-saving, and environmentally friendly industries, thus driving energy structure adjustment and industrial structure optimization. For example, financial instruments such as green credit and green bonds can provide funding support for renewable energy, green buildings, and green transportation, reducing corporate financing costs and promoting the growth of green industries.

Secondly, green finance has unique advantages in risk management. Through environmental and social risk assessment, it can effectively prevent and resolve environmental risks faced by financial institutions. For example, banks can use environmental risk assessments to screen out companies and projects that meet environmental standards when issuing loans, thereby reducing credit risks caused by environmental issues. The carbon trading market provides a market-based mechanism for companies to reduce emissions costs and benefits, encouraging companies to actively reduce emissions and improve energy efficiency ^[2].

Finally, green finance promotes societal participation in carbon reduction and environmental protection through market incentive mechanisms. Green financial products and services, such as green bonds and green funds, can attract more investors to focus on the environmental field, enhancing corporate and public environmental awareness and fostering green consumption and investment habits. Government support for green finance policies, such as tax incentives and subsidy policies, further enhances the enthusiasm of market participants, promoting the rapid development and popularization of green finance. Through these mechanisms, green finance plays an important role in achieving the dual carbon goals, providing strong support for the coordinated development of the economy, society, and the environment.

2.The Current Status and Challenges of Green Finance Development in Hainan Free Trade Port

2.1 Policy Environment and Market Conditions of Green Finance in Hainan Free Trade Port

The development of green finance in Hainan Free Trade Port benefits from strong support from both national and local governments, creating a favorable policy environment. At the national level, policy documents such as the "Guidelines for Green Finance Development" provide directional guidance for the development of green finance, emphasizing its important role in achieving the dual carbon goals. Local governments have also introduced a series of supporting policies and measures to encourage financial institutions to innovate green finance products and services and promote the development of green industries. For example, the Hainan Provincial Government issued the "Hainan Province Green Finance Action Plan," which clarifies the development goals, key areas, and implementation paths of green finance, aiming to accelerate the establishment of a green finance system to support the development of the green economy in the Free Trade Port.

In terms of market conditions, the green finance market in Hainan Free Trade Port is taking shape but is still in its early stages. In recent years, with increased policy support and market demand, green financial products such as green credit, green bonds, and green funds have gradually emerged, significantly boosting market participants' enthusiasm. For instance, some banks have introduced loan products specifically targeting green projects, and some enterprises have successfully issued green bonds for financing environmental projects. Additionally, the establishment and development of the carbon trading market have provided enterprises with essential financial tools for carbon reduction, further promoting the development of the green finance market. However, compared to mature international markets, Hainan Free Trade Port's green finance market still has considerable room for growth in terms of scale and depth ^[3].

2.2 Analysis of the Current Status of Green Finance Products and Services in Hainan Free Trade Port

Green finance products and services in Hainan Free Trade Port are becoming increasingly diverse, gradually forming a multifaceted green finance system. In terms of green credit, many banks and financial institutions have introduced green loan products targeting fields such as renewable energy, energy conservation, environmental protection, and green buildings. These loans not only offer preferential interest rates but also simplify approval processes, significantly supporting the financing needs of green projects. The green bond market is also becoming more active, with enterprises issuing green bonds to raise funds for building environmental facilities and developing green technologies, thus promoting their green transformation and sustainable development.

Moreover, new green finance products such as green funds and green insurance are being actively explored in Hainan Free Trade Port. Green funds mainly invest in green industries and projects, supporting the development of renewable energy, ecological protection, and pollution control, providing long-term funding for green industries. Green insurance encourages enterprises to adopt environmental measures by providing protection against environmental risks, reducing the risk and losses from environmental incidents. These products and services not only enrich the forms and content of green finance but also offer enterprises and investors more ways to participate in the development of the green economy.

2.3 Major Challenges in the Development of Green Finance in Hainan Free Trade Port

Despite the progress made in the development of green finance in Hainan Free Trade Port, several challenges remain. First, the coordination of policy implementation and market mechanisms needs strengthening. Although the government has introduced several policies supporting green finance, their enforcement and effectiveness in practice are not yet satisfactory. Financial institutions and enterprises still face issues such as inconsistent policy understanding and unclear implementation standards when conducting green finance business. Additionally, the green finance market mechanism is not yet perfect, with a need for establishing and standardizing the recognition and evaluation systems for green projects to enhance the trust and participation of market players.

Secondly, the shortage of professional talent and technical support is a significant constraint on the development of green finance. Green finance involves complex environmental risk assessment and management, requiring financial institutions to possess specialized knowledge and skills. However, the

current reserve of green finance talent in Hainan Free Trade Port is relatively insufficient, and financial institutions lack professional guidance and support when conducting green finance business. Furthermore, the application of green finance technology is not widespread enough, and the potential of financial technology in green finance has not been fully realized^[4]. The lack of technical means limits the innovation and promotion of green finance products and services, affecting the vitality and competitiveness of the green finance market.

In summary, while Hainan Free Trade Port has made progress in the policy environment and market conditions for green finance development, challenges related to policy implementation, market mechanisms, professional talent, and technical support still need to be addressed. By continuously improving the policy system, optimizing market mechanisms, enhancing talent cultivation, and promoting technological innovation, the sustainable development of green finance in Hainan Free Trade Port can be achieved, providing strong support for achieving the dual carbon goals and green economic transformation.

3.Strategies and Pathways to Promote the Sustainable Development of Green Finance in Hainan Free Trade Port

To achieve the dual carbon goals, Hainan Free Trade Port needs to actively promote the development of green finance and establish a comprehensive policy and operational system. As an essential means of promoting sustainable development, green finance can effectively support the development of green projects and industries through the rational allocation of resources, risk management, and market incentives.

3.1 Building a Comprehensive Green Finance Policy System

Building a comprehensive green finance policy system is key to promoting the sustainable development of green finance in Hainan Free Trade Port. Firstly, the government should introduce more specific and operational policy measures to ensure the effective implementation of green finance policies at the local level. For example, tax incentives, interest rate concessions, and financial subsidies for green finance products can be formulated to encourage financial institutions and enterprises to actively participate in green finance. Simultaneously, a sound legal and regulatory system for green finance should be established, clarifying the definition, standards, and regulatory requirements of green finance to provide clear legal basis and operational guidelines for market participants.

Additionally, the government should strengthen policy coordination and cooperation to build a multi-level, multi-field green finance policy support system. Communication and collaboration between local and central governments and among various departments should be enhanced to ensure policy consistency and coordination. A coordination mechanism for green finance development can be established, with regular cross-departmental and cross-industry green finance meetings to discuss and address challenges in green finance development. Through the improvement and coordination of the policy system, a solid policy foundation and guarantee can be provided for the healthy development of green finance in Hainan Free Trade Port.

3.2 Innovating Green Finance Products and Service Models

Innovating green finance products and service models is an important pathway for promoting green finance development in Hainan Free Trade Port. Firstly, financial institutions should actively explore and develop diversified green finance products to meet the financing needs of different types of green projects. For example, green credit for renewable energy projects, green bonds for environmental infrastructure construction, and green funds for green technology research and development can be introduced. Through a variety of green finance products, financial institutions can better support the development of green industries and promote economic green transformation^[5].

Secondly, financial institutions should innovate service models to improve the quality and efficiency of green finance services. Financial technology can be utilized to optimize green finance service processes, enhancing convenience and transparency. For instance, big data and artificial intelligence can be used for more accurate environmental risk assessment and customer credit analysis, improving loan approval efficiency and risk control capabilities. Additionally, combining green finance with inclusive finance can be explored, expanding the coverage of green finance services through digital platforms and mobile financial services, enabling more small and medium-sized enterprises and

individuals to benefit from green finance support.

3.3 Strengthening Green Finance Talent Cultivation and Technological Support

Strengthening green finance talent cultivation and technological support is the foundation for promoting the sustainable development of green finance in Hainan Free Trade Port. Firstly, efforts should be increased to cultivate green finance professionals and establish a comprehensive talent cultivation system. Cooperation between universities and financial institutions can be promoted to set up green finance-related courses and training programs, nurturing professionals with green finance knowledge and skills. Financial institutions should also encourage internal green finance training to enhance employees' professional literacy and practical capabilities. By building a multi-level talent cultivation system, the overall quality and professional capabilities of green finance practitioners can be improved.

Secondly, technological support should be emphasized to promote innovation and application of green finance technology. Financial technology has great potential in green finance, significantly improving its efficiency and effectiveness. For example, blockchain technology can be used to achieve transparency and traceability of green finance products, enhancing market trust and participation. Big data analysis can provide precise environmental benefit assessments and risk predictions for green projects, offering scientific decision-making support. Both government and financial institutions should increase investment in green finance technology, supporting collaborative innovation between tech companies and financial institutions to drive the development and application of green finance technology.

3.4 Establishing Effective Green Finance Evaluation and Risk Management Mechanisms

Establishing effective green finance evaluation and risk management mechanisms is crucial for ensuring the healthy development of green finance in Hainan Free Trade Port. Firstly, a scientific and reasonable green finance evaluation system should be established, clarifying the evaluation standards and methods for green finance projects. A unified green finance standard and certification system can be developed to classify and rate green projects, ensuring effective allocation of green finance resources. For example, international experiences can be leveraged to develop evaluation standards for green bonds and green credit that fit China's national conditions, enhancing the standardization and credibility of green finance products.

Secondly, a comprehensive green finance risk management mechanism should be established to effectively prevent and mitigate financial risks. Green finance projects typically have long investment cycles and high environmental risks, necessitating a robust risk assessment and control system for financial institutions. Environmental risk assessment models can be utilized to comprehensively evaluate the environmental benefits and risks of green projects and develop scientific risk control measures. Additionally, a green finance risk mitigation mechanism can be established, such as setting up risk reserves or purchasing environmental liability insurance to disperse and transfer financial risks. Through a comprehensive evaluation and risk management mechanism, the safety and sustainability of green finance can be improved, promoting the steady development of green finance in Hainan Free Trade Port [6].

By building a comprehensive green finance policy system, innovating green finance products and service models, strengthening talent cultivation and technological support, and establishing effective evaluation and risk management mechanisms, the sustainable development of green finance in Hainan Free Trade Port will be strongly supported and promoted. These measures will not only help achieve the dual carbon goals but also provide valuable references and experiences for other regions.

Conclusion

Through the study of the sustainable development of green finance in Hainan Free Trade Port under the dual carbon goals, this paper proposes several strategies: building a comprehensive green finance policy system, innovating green finance products and service models, strengthening green finance talent cultivation and technological support, and establishing effective green finance evaluation and risk management mechanisms. These measures not only help to enhance the development level of green finance in Hainan Free Trade Port but also provide valuable references for other regions.

Future research directions can focus on the following aspects:

Further exploring the coordinated development of green finance policies and market mechanisms,
Studying the application of green financial technology innovation in promoting a low-carbon economy,

Evaluating the long-term impact of green finance on regional economies and the environment to achieve the coordinated development of the economy, society, and environment.

Through continuous research and practice, we aim to contribute to achieving China's dual carbon goals and global sustainable development.

Project Name

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