Research on Exploration of New Branches of Carbon Management Based on Double Carbon Goals

Liuyuan Yang

Utah State University, Logan, Utah, 84322, USA

2313369908@qq.com

Keywords: Carbon management; Double carbon target; Carbon trading; Carbon finance

Abstract: With the increasing focus on carbon management and dual-carbon goals, this paper discusses new developments in the field of carbon management. Firstly, the importance of achieving carbon management and dual carbon goals is emphasized by analyzing the strategic changes in carbon management content and the relationship between carbon trading, carbon markets, and carbon finance. Secondly, this paper points out the challenges and opportunities brought by carbon management, including the chaos of carbon trading, the dilemma of carbon finance, and the birth of derivative risks. In response to the above challenges, the paper proposes response strategies, including carbon management, carbon sharing, and carbon governance, to get rid of financial challenges. Lastly, this paper emphasizes the importance of correcting carbon management and reducing carbon targets, and presents potential developments for the future.

1. Introduction

Carbon management is one of the main responsibilities of social development and is also the collective name for carbon emission reduction, which can be divided into basic carbon regulation and non-basic carbon trading, which are composed of government and market, respectively. The government has also entrusted financial institutions with the responsibility of operating carbon finance to reach the goal of carbon neutrality. Carbon management has become increasingly important for the protection of the environment since the industrial revolution, and carbon trading has become a criterion for environmental protection. It is important to note that carbon management differs from traditional environmental governance in that it emphasizes market mechanisms, financial means, and technological innovation. As a result, carbon management is proposed based on dual carbon goals, and carbon finance provides a new method for managing carbon emissions.

The concept of carbon management is derived from the reduction of carbon emissions with carbon neutrality as its foundation. It is a form of governance that incorporates carbon marketization and is also a tool for managing carbon emissions. Through a combination of market mechanisms and financial measures, carbon management seeks to reduce carbon emission efficiency and modernize carbon management. In spite of this, this is only a theoretical discussion. Globalization has played a significant role in the development of carbon management today. The comprehensive advancement of carbon management will not only revolutionize the carbon governance landscape and embody the concept of carbon sharing but also revolutionize the global governance landscape and pose an important challenge to climate change. Therefore, the discussion of carbon management based on dual carbon objectives must have a global perspective and pattern. Therefore, the dual carbon target proposition is put forward in the new era. As a result, carbon management represents the key condition and guarantee for achieving carbon neutrality. Carbon management has progressed globally, but there are also shortcomings. Although carbon management has not yet fully adapted to global governance, it continues to make great efforts in this regard. As a result, carbon management needs to be shared on a global scale, which is both a challenge and an opportunity.

Based on the above background analysis, this paper proposes a new branch of exploration which aims to solve the challenge of carbon management, which solves the problem of carbon management through theory and method and its main content is strategy change, carbon finance operation and

  DOI: 10.25236/semihs.2024.015

response to carbon management technology challenges, effectively responds to carbon management risks and has global significance.

2. Collaborative Realization of Carbon Management and Dual Carbon Goals

2.1 Strategic Change of Carbon Management Content

Carbon management is a concept developed in paralled with the dual-carbon goal. Its own "immerse" the concept of carbon emission reduction, highlights the strategic orientation of carbon neutrality and reflects the leading strategy of environmental protection in recent years. However, it is still difficult to get consistency when we try to construct the definition of carbon management and its essence with some unified standards. Carbon management not only involves the regulation and supervision of government departments but also includes the voluntary emission reduction behavior of enterprises and market-oriented carbon trading activities [1]. Therefore, the strategic change of carbon management needs to comprehensively consider various factors such as policy, market, and technology so as to promote the realization of carbon emission reduction targets and the development of carbon trading and the carbon market.

2.2 Carbon Trading, Carbon Market and Carbon Finance

Carbon trading is an important standard for the carbon market and a market-oriented expression of carbon emission rights. The government and academia have discussed the different definitions of carbon trading from the perspectives of marketization and environmental economy. Some scholars also believe that carbon trading is a method of reducing emissions, or a way of addressing climate change. Due to carbon trading is more market-oriented to a certain extent and belongs to the science of environmental protection for the purpose of market mechanisms. The history of carbon trading can even be traced back to the 1990s, and its main activities include the buying and selling of carbon emission quotas [2]. Carbon markets and carbon finance are closely related to carbon emission regulation. Enterprises have become an important subject of responsibility for carbon emission reduction through carbon trading. The main contribution of the carbon trading theory in the early 21st century was to promote carbon emission reduction. Consequently, the carbon trading concept initially focused on the measurement of carbon emission rights based on market-based standards.

3. Challenges and Opportunities Brought by Carbon Management

3.1 Chaos of Carbon Trading: Excessive Trading of Carbon Finance Causes Imbalance of Carbon Market System

Carbon management based on dual carbon targets emphasizes the interrelationship between carbon emissions control and economic and social development and is comprehensive and long-term in nature [3]. Even though some scholars believe that carbon emission control may not directly relate to economic and social development, most scholars believe that carbon management can provide a rational basis for evaluating economic and social development. It has been around for some time that Zhang San, among others, proposed a classic carbon management model, which includes elements related to carbon emission intensity. Since then, this model has become a standard tool for carbon management, and the concept of carbon management has gained popularity. These scholars believe that carbon management is strategic and the key to realizing the " double carbon goal. " Only when carbon emissions are effectively controlled can the economy and society develop sustainably. Therefore, carbon management is the result of achieving the dual carbon goal. Researchers also summarize carbon management into carbon management models, namely a carbon management model based on carbon emission control and a carbon management model based on carbon emission rights trading. Among the two, the former focuses on the reduction of carbon emissions, while the latter focuses on the trading of carbon emissions [4]. While carbon management has experienced some practical failures, from the viewpoint of achieving dual carbon goals, it can promote the transformation of economic and social development models, and the concept of carbon management

has gradually become a consensus.

3.2 Chaos of Carbon Finance: Carbonization Operation under Financial Bullying

The chaos of carbon finance focuses primarily on the issue of carbon emissions. Carbon finance is the application of green thinking in the financial field. In order to overcome the shortcomings of the traditional financial model, the carbon finance framework has entered the research field as a new alternative model. Based on this framework, carbon finance should ensure that carbon emissions are effectively realized, set professional standards for carbon emission reduction output, capture carbon emissions through technologies such as carbon trading, and measure carbon emission benefits through green finance methods. The carbon finance framework reconstructs financial operations, emphasizing the need to enhance green awareness and build supervision, transparency, sustainability and social responsibility for carbon emissions.

3.3 The Birth of Derivative Risks under the Domination of Carbon Finance

The emergence of derivative risks under the dominance of carbon finance is the main challenge of carbon management, which highlights the risk nature of carbon finance operations and directly reflects the economic status of carbon emissions and carbon emission reductions through the carbon market. Various components of carbon finance development are gradually taking shape, and carbon finance and various evaluation systems are gradually receiving attention. However, from a practical point of view, the practice of some carbon finance still stays in the theoretical stage, which is contrary to the logical framework and generation mechanism of carbon management, thus deriving the derivative risk problem under the domination of carbon finance.

4. The Coping Strategies of the Industrial Development Process under the Challenge of Carbon Management Technology

4.1 Two-way Promotion: Carbon Management to Get Rid of Financial Challenges

In terms of industrial development, carbon management is a crucial component of achieving dual carbon objectives and represents the core of carbon trading and carbon markets. As a result, carbon management is based primarily on two-way promotion [5]. Carbon management is the main means of carbon emission reduction and the main body of carbon trading. At this stage, carbon management strengthens carbon emission control from the perspective of technical challenges. There are three main forms: First, carbon capture and storage (CCS). It is clear that carbon capture achieves a carbon balance between carbon emissions and carbon emission reductions. The second is the formulation of carbon emission standards. Standardized control of carbon emissions is realized through formulating carbon emission standards and emission reduction standards and disclosing carbon emission standards to enterprises. Third is the enterprise's internal process reengineering. In recent years, companies and others have used technological innovation to improve carbon emission control and improve carbon emission reduction efficiency. However, compared with achieving the dual carbon goals, the effectiveness of current carbon management needs to be further improved.

4.2 Carbon Sharing: Carbon Management Response System Optimization and Carbon Governance

4.2.1 Carbon Regulation and Carbon Governance

The fundamental difference between carbon regulation and carbon governance lies in its target attributes. A major objective of carbon regulation and carbon governance guidelines is to achieve carbon neutrality, and carbon management mainly focuses on reducing and controlling carbon emissions. As described in the carbon governance framework for carbon management, accurately measuring carbon emissions, controlling carbon emissions effectively, promoting carbon emission reductions, and achieving carbon balance are the core values and principles that guide the development of carbon management. The current diversity of carbon emission types and differences in carbon emissions have led to a complex situation in carbon management. Although carbon

management has achieved certain results, carbon regulation is still not perfect, and carbon governance itself lacks an effective mechanism. This results in a "short board" in carbon management, which adversely affects its effectiveness. Figure 1 illustrates the optimization of the carbon management response system and carbon governance.

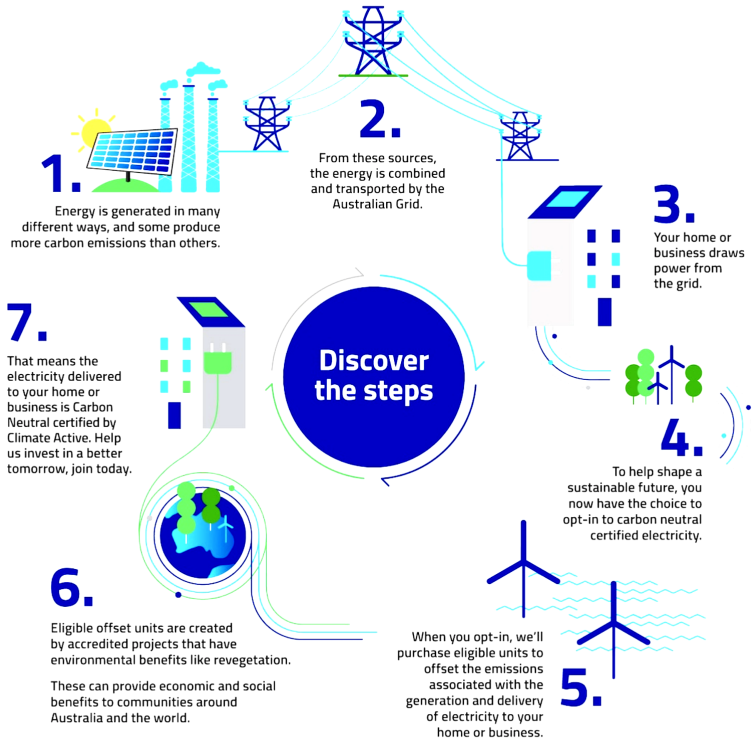

Figure 1 Optimization of carbon management response system and carbon governance

4.2.2 Carbon Decision-making and Carbon Cultivation

A traditional decision-making tool cannot effectively provide the comprehensive information required for carbon management from a decision-making perspective. A primary objective of carbon decision-making is to control carbon emissions by measuring satisfaction. However, traditional decision-making tools lack relevant information and mechanisms for assessing risk [6]. The limitations of decision-making tools may contribute to this issue. In carbon management, carbon emissions are often described as "externalities", and its impact on economic and social development directly reflects the control effect of carbon emissions. However, carbon emissions are mostly related to corporate emissions and other information, and macro-level carbon emissions data are relatively scarce. Usually, carbon emissions are difficult to obtain or measure. Information asymmetry and imperfect decision-making tools directly lead to obstacles in carbon emission control decisions.

4.2.3 Carbon Sharing and Carbon Co-governance

In terms of industrial development, carbon emission issues have long restricted the industry's capabilities in sustainable development. The low-carbon development strategy integrating environmental protection and economic development through the carbon trading market has reshaped the industrial development model. However, the shortcomings of the traditional industrial development model still limit the deepening of low-carbon transformations. Not only due to the limitations of carbon emission control technology, but also due to the impact of market mechanisms and policy support, the carbon emission trading market has yet to be improved. Under the premise of carbon sharing, carbon co-governance is regarded as a direct way to achieve low-carbon development of the industry. However, the actual role that carbon management technology will play in the industry, primarily carbon capture, remains to be determined. At the same time, due to the difficulties in collecting and monitoring carbon emission data, the carbon emissions trading market lacks effective

supervision. As a result, carbon management does not always seem to meet expectations, which shows that carbon management is not only a technical problem, but also faces problems with policy implementation and market mechanisms.

4.3 Carbon Recovery: Correcting Carbon Management and Reducing Carbon Targets

In terms of reducing carbon emissions, carbon management cannot avoid the "carbon constraints" that are "bottlenecks" of industrial development. In the carbon regulation mechanism, carbon emission rights are a standard and effective market tool that plays an important role in the carbon market. As a result, carbon emissions are not only a technical concept but also an economic one. Consequently, carbon management focusing on "carbon sharing" has become the core mechanism of carbon governance. A practical interpretation of carbon management involves gradually reducing carbon emissions through carbon emission control, although this path may include attempts at carbon capture and storage (CCS). From carbon regulation to carbon governance, carbon emissions are closely related to realizing carbon targets from beginning to end. The carbon management process should be committed to developing and applying carbon emission reduction technologies to meet carbon neutrality requirements. However, it is important to note that when carbon emissions are amplified, a dilemma arises, namely that the carbon emissions trading market is flawed [7]. In general, there is room for improvement in the management of carbon emissions, and the technology of carbon capture and storage also needs to be further improved, which is also an important task in managing carbon emissions [8].

5. Conclusion

As a result of climate change, the global environment and social economy have been profoundly affected, which poses a number of new challenges and requirements for carbon management. Carbon management is not only a symbol of the "functionality" of carbon emission control, but also an important means of attaining carbon neutrality and maintaining sustainable development, which represents humankind's commitment to the social and ecological ideals inherent in ecological civilization. Carbon management is to build a theoretical analysis framework and practical mechanism of the carbon cycle under the guidance of dual carbon goals. Modern information technologies, such as big data and artificial intelligence, have contributed to the innovative development of carbon management. Data enables carbon management, making carbon emissions more accurate and scientific. Therefore, its value matches the inherent logic of carbon management. Therefore, carbon management based on modern information technology also provides a new path for the industry's sustainable development. To summarize, sustainable improvements and developments in carbon management will enable the dual carbon goals to be better achieved and enable ecological civilization to be constructed.

References

[1] Amin M N, Hossain M S, de Bruyn L L, et al. A systematic review of soil carbon management in Australia and the need for a social-ecological systems framework[J]. Science of the total environment, 2020, 719: 135182.

[2] Tayebi M, Bemani A, Fetanat A, et al. A decision support system for sustainability prioritization of air pollution control technologies in energy and carbon management: Oil & gas industry of Iran[J]. Journal of Natural Gas Science and Engineering, 2022, 99: 104416.

[3] Falciani J E, Grigoratou M, Pershing A J. Optimizing fisheries for blue carbon management: Why size matters[J]. Limnology and Oceanography, 2022, 67: S171-S179.

[4] Zhang Y, Chen Z, Chen H, et al. Exploring the impact of "double carbon target" on environmental efficiency of coal cities in China[J]. Frontiers in Environmental Science, 2023, 11: 248.

[5] Li X, Li H. Ideological and political reform of chemical courses based on the "double carbon"

target[J]. Curriculum & Innovation, 2023, 1(1): 1-4.

[6] Mu Y, Duan C, Li X, et al. A Monitoring Method for Corporate Environmental Performance Based on Data Fusion in China under the Double Carbon Target[J]. Sustainability, 2023, 15(12): 9391.

[7] Song P, Mao X, Li Z, et al. Study on the optimal policy options for improving energy efficiency and Co-controlling carbon emission and local air pollutants in China[J]. Renewable and Sustainable Energy Reviews, 2023, 175: 113167.

[8] Wang B, Liu Q, Wang L, et al. A review of the port carbon emission sources and related emission reduction technical measures[J]. Environmental Pollution, 2023: 121000.