

The Construction and Improvement of China's Carbon Accounting System

Yali Guo

School of Economics and Management, Southwest Petroleum University, China

Abstract

Climate change is one of the biggest challenges facing the world today, and carbon emissions are one of its most significant causes. In order to mitigate the impact of climate change, countries around the world have adopted a series of emission reduction measures. Only through the collaboration and efforts of technology, management, and policy can an efficient, reliable, and sustainable carbon accounting system be established to contribute to the advancement of global carbon emission reduction efforts. This thesis will focus on the construction and development of carbon accounting system, and discuss the role and significance of carbon accounting system in promoting global carbon emission reduction efforts, hoping to provide some reference and reference for related research and practice.

Keywords

Certified public accountants; Environmental information disclosure; Environmental audit system.

1. Introduction

Climate change is one of the greatest challenges facing the world today, and carbon emissions are one of its most important causes. In order to mitigate the effects of climate change, countries around the world have adopted a series of emission reduction measures. However, an important issue in the implementation of these measures is how to accurately measure and monitor carbon emissions. In order to solve this problem, a carbon accounting system has been created.

Carbon accounting is a set of management and reporting methods established based on the carbon emissions of a country, company or individual. It includes a series of processes such as measuring, recording, monitoring, reporting and verifying carbon emissions, aiming at improving the transparency and accuracy of carbon emission management and helping enterprises and governments to better formulate emission reduction policies and measures.

The construction of a carbon accounting system is of great significance in promoting global carbon emission reduction efforts. First, it helps improve the efficiency of carbon emission reduction measures. Accurate carbon emission data can help governments and enterprises better formulate emission reduction policies and measures, making the effect of emission reduction more obvious. Secondly, it helps to enhance the transparency of emission reduction. Enterprises and governments can realize the openness and transparency of carbon emissions through the carbon accounting system, which promotes the social recognition and sustainability of carbon emission reduction. Finally, the construction of carbon accounting system can bring business opportunities for enterprises and governments. Some carbon emission reduction projects can be used as a new business model for enterprises or governments, bringing economic benefits.

2. Literature Review

The establishment and development of carbon accounting system has become a hot research topic in recent years. Many scholars and institutions at home and abroad have made important contributions to the measurement and accounting methods of carbon emissions, policies and market mechanisms of carbon emission reduction, and the construction and implementation of carbon accounting system. Life cycle-based carbon emission measurement methods can measure carbon emissions of products and services more accurately, and market mechanisms such as carbon tax and carbon trading can facilitate carbon emission reduction. Meanwhile, enterprises and organizations have achieved carbon emission reduction targets by establishing carbon accounting systems.

First, the research on carbon accounting system mainly focuses on the measurement and accounting methods of carbon emissions, policies and market mechanisms of carbon emission reduction, and the construction and implementation of carbon accounting system. For example, some scholars have proposed a life-cycle-based carbon emission measurement method, which can measure the carbon emissions of products and services more accurately. Meanwhile, some scholars have also studied the impact and effect of market mechanisms such as carbon tax and carbon trading on carbon emission reduction.

Secondly, the practical research of carbon accounting system is also very important. Many enterprises and organizations have already started to implement carbon accounting systems and have achieved certain results. For example, certain enterprises have achieved their carbon emission reduction targets through the establishment of carbon accounting systems, while gaining environmental certifications and market advantages.

Meanwhile, the development of carbon accounting system also needs the support of policies and markets. Governments and international organizations have introduced many relevant policies and regulations to promote the development of market mechanisms such as carbon emission reduction and carbon trading. For example, the EU has established a European carbon market through a carbon emission allowance trading system, which provides economic incentives for enterprises and organizations to reduce carbon emissions.

In conclusion, the research and practice of carbon accounting system is an evolving process. Future research should focus on how to further improve the measurement and accounting accuracy of carbon emissions, optimize the policies and market mechanisms for carbon emission reduction, and promote the popularization and application of carbon accounting systems. Governments and international organizations need to introduce more relevant policies and regulations to promote the development of market mechanisms such as carbon emission reduction and carbon trading. Enterprises and organizations need to actively establish and implement carbon accounting systems to achieve environmental protection and sustainable development goals.

3. The Connotation and Development of Carbon Accounting

Carbon accounting is the process of measuring, recording, reporting and verifying carbon emissions and carbon sinks of organizations or individuals, and is an important tool for managing carbon emissions and carbon reduction. This chapter will review the development of carbon accounting in terms of its connotation, measurement and accounting methods and standards and guidelines.

3.1. The connotation of carbon accounting

Carbon accounting is the process of measuring, recording, reporting and verifying the carbon emissions and sinks of an enterprise or organization on a business or organization basis. Its purpose is to provide transparency and management of the organization's carbon emissions

and carbon emission reduction, and provide a basis for the organization to formulate low-carbon development strategies and achieve carbon emission reduction targets. The main contents of carbon accounting include the measurement and accounting of carbon emissions and carbon sinks, the compilation of carbon emission inventory, the setting and achievement of carbon emission reduction targets, carbon accounting reporting and verification, etc.

3.2. Measurement and accounting methods of carbon accounting

The measurement and accounting methods of carbon accounting are the basis for establishing carbon accounting system. The measurement and accounting methods of carbon accounting mainly include measurement methods, data sources and calculation tools.

Measurement methods refer to the methods of measuring and calculating the carbon emissions and carbon sinks of an organization. Common measurement methods include direct measurement, sampling measurement, model calculation, etc. Data sources refer to the sources and channels to obtain carbon accounting data. Commonly used data sources include internal data of enterprises, public data of government, third party data, etc. Calculation tools refer to the computer software and tools used to conduct carbon accounting measurement and accounting. Commonly used calculation tools include carbon emission calculation tools, carbon footprint calculation tools, carbon credit calculation tools, etc. These tools can help organizations to quantitatively analyze and evaluate their carbon emissions and carbon emission reduction, and provide support and basis for the establishment and management of carbon accounting system.

3.3. Carbon Accounting Standards and Guidelines

Carbon accounting standards and guidelines are the basis for regulating the behavior of carbon accounting. Carbon accounting standards and guidelines are mainly formulated and issued by The International Carbon Accounting Organization (ICAO) and other related organizations or institutions. Commonly used carbon accounting standards and guidelines include: Carbon Footprint Standards: standards for measuring and accounting for an organization's carbon emissions and carbon footprint; Carbon Credit Standards: standards for managing and trading carbon credits; Carbon Neutral Standards: Standards used to assess and certify the carbon neutral behavior of organizations. Carbon Accounting Guidelines: The guidelines for guiding and regulating carbon accounting behavior.

4. The Real Challenges of China's Carbon Accounting System

Carbon accounting is an important tool to deal with climate change, which can help countries manage and control carbon emissions. China is one of the largest carbon emitting countries in the world, and the establishment of a sound carbon accounting system is crucial for achieving carbon emission reduction targets and addressing climate change. However, in the construction of carbon accounting system, China is facing the following realistic challenges:

4.1. Insufficient and inaccurate data

A carbon accounting system requires a large amount of data support, including carbon emission data, energy consumption data, production and operation data of enterprises and organizations. However, the current level of data collection and management in China is still highly deficient, with insufficient, inaccurate and incomplete data, which brings great difficulties to carbon accounting. In addition, the lack of data sharing and coordination among different departments has caused redundancy and waste of data, which affects the accuracy and credibility of carbon accounting.

4.2. Incomplete laws and regulations of carbon accounting system

The establishment of a sound carbon accounting system requires the support of policies and regulations to ensure that the carbon emission data of enterprises and organizations are true, accurate and reliable. However, at present, China's policies and regulations on carbon accounting are not complete enough, the laws and regulations are not systematic and detailed enough, and the supervision of carbon emission data collection, accounting and disclosure are not strict and standardized enough, which provides opportunities for enterprises and organizations to take advantage of, and is not conducive to the effective implementation of carbon accounting.

4.3. Carbon accounting cognitive and technical level is not high

Carbon accounting requires professional technology and knowledge support, including environmental science, data analysis, statistics, etc. However, at present, the cognitive and technical level of carbon accounting in China is relatively low, carbon accounting practitioners lack professionalism and technical ability, and carbon accounting standards and methods are not mature enough, which limits the development and application of carbon accounting system.

4.4. Carbon emission rights market supervision system is not perfect

The carbon emission rights market is an important tool to achieve carbon emission reduction targets, and the establishment of a sound carbon emission rights market regulatory system is essential to ensure the achievement of carbon emission reduction targets. However, at present, China's carbon emission rights market regulatory system is not perfect, and the carbon trading market lacks a unified and standardized regulatory mechanism and standards, which makes it easy to have untrue trading data.

5. Construction of Carbon Accounting System

Based on the connotation and development of carbon accounting, we propose a framework for the construction of carbon accounting system, which mainly includes three aspects: carbon emission accounting, carbon emission management and carbon emission disclosure.

5.1. Carbon accounting

Carbon accounting refers to the quantification and measurement of carbon emissions produced by enterprises or organizations in their production and operation activities, so as to facilitate the management and control of carbon emissions by enterprises or organizations. Carbon emission accounting mainly includes the following aspects:

(1) Determining the scope of carbon emissions. An enterprise or organization needs to determine the scope of carbon emissions, i.e., which activities generate carbon emissions and which do not. Usually, the scope of carbon emissions includes both direct emissions and indirect emissions.

(2) Selecting a carbon emission measurement method. Choosing a suitable carbon emission measurement method is the key to carbon emission accounting. Carbon emission measurement methods are usually divided into three types: market-based methods, engineering estimation methods and data source methods. The market-based method refers to the measurement of carbon emissions by using the prices and rules of the carbon trading market; the engineering estimation method refers to the projection of carbon emissions through field observation and measurement of production and operation activities of enterprises or organizations; the data source method refers to the calculation of carbon emissions through statistics and analysis of production and operation data of enterprises or organizations.

(3) Calculation of carbon emissions. According to the selected carbon emission measurement method, the carbon emission of the enterprise or organization is calculated and quantified. The

formula for calculating carbon emissions is usually: carbon emissions = carbon emission factor × activity volume.

5.2. Carbon Emission Management

Carbon emission management refers to the reduction of carbon emissions of enterprises or organizations through various measures to achieve the purpose of mitigating climate change. In the construction of carbon accounting system, carbon emission management is an important part, which can help enterprises or organizations to achieve carbon emission reduction goals and improve the awareness of environmental protection and corporate social responsibility. In the following, we will introduce the implementation framework of carbon emission management.

5.2.1. Establishing carbon emission inventory

Enterprises or organizations need to identify their carbon emission sources and volumes through a detailed analysis of their activities and processes. By establishing a carbon emission inventory, a company or organization can understand its own carbon emissions and provide basic data for developing an emission reduction plan. When establishing a carbon emission inventory, it is necessary to consider the situation of various carbon emission sources, such as energy consumption, transportation, and production processes, etc. It is also necessary to consider the differences in carbon emissions over different time periods to provide basic data for the development of an emission reduction plan.

5.2.2. Formulate carbon emission reduction plan

Enterprises or organizations need to make a reasonable carbon emission reduction plan according to their own situation in order to reduce carbon emissions. The formulation of carbon emission reduction plan needs to take into account the economic strength, technical level and industry characteristics of the enterprise or organization. Based on the results of carbon emission inventory, enterprises or organizations need to determine carbon emission reduction targets and develop corresponding measures, such as improving energy utilization efficiency, using low-carbon energy, improving production processes, and promoting cleaner production.

5.2.3. Implement carbon emission reduction measures

After developing a carbon emission reduction plan, the company or organization needs to start implementing the corresponding measures. These measures may include technology improvement, energy management, material flow optimization, etc. In addition, the enterprise or organization can also improve employees' environmental awareness and low-carbon living habits by conducting employee training and promoting low-carbon lifestyles.

5.2.4. Monitoring and evaluation

The enterprise or organization needs to monitor and evaluate the implementation effect of carbon emission reduction measures. By comparing the carbon emissions before and after the implementation of measures, the enterprise or organization can understand the effect of its own carbon emission reduction and make appropriate adjustments and optimization of the measures.

Carbon emission disclosure refers to the process of enterprises, organizations or governments disclosing their carbon emission information and management measures to the outside world. In the carbon accounting system, carbon emission disclosure is one of the important links, which helps to promote information disclosure and information transparency, enhance the social responsibility and image of the enterprise or organization, and also provides reference and decision support for stakeholders.

The following is the implementation framework of carbon emission disclosure:

(1) Establishing disclosure principles and guidelines

Enterprises, organizations or governments need to develop relevant disclosure principles and guidelines to clarify the content, scope, methods, frequency and other requirements of disclosure in order to conduct orderly disclosure. The disclosure principles should follow the principles of open information, truthfulness and accuracy, comparability and continuity, while taking into account the needs and rights of stakeholders.

(2) Assessing and reporting carbon emission information

Enterprises, organizations or governments need to assess and report their carbon emission information. The assessment can adopt the method of carbon emission accounting, by identifying and measuring the types and quantities of carbon emission sources and calculating the corresponding carbon emissions. The report can adopt a standardized reporting format, including indicators such as carbon emissions, carbon emission intensity, and carbon emission trends, and should indicate the scope and time of reporting.

(3) Disclosure and dissemination of carbon emission information

Enterprises, organizations or governments need to disclose and disseminate their carbon emission information to stakeholders. The disclosure channels can be in the form of official websites, social media, reports, conferences, etc., or through third-party organizations. Dissemination methods can adopt various means such as digitalization, interactivity and creativity to improve the effectiveness and influence of information dissemination.

(4) Supervision and feedback mechanism

Enterprises, organizations or governments need to establish supervision and feedback mechanisms to monitor and evaluate the disclosed information and provide timely feedback on the disclosure effects and problems. Supervision can be carried out by internal or external agencies, such as auditing agencies, rating agencies, stakeholders, etc. Feedback can be provided by questionnaires, opinion feedback, social media interaction, etc., in order to understand stakeholders' feedback and expectations and further improve the disclosure process.

6. Conclusion

China's carbon accounting system is facing many realistic challenges. To solve these problems, the government, enterprises, society and academia need to work together to enhance data collection and sharing, improve technology and talent, improve carbon accounting policies and regulations, promote the unification of carbon accounting standards, strengthen the construction of carbon trading market, and improve social awareness to achieve the goals of carbon emission reduction and sustainable development.

References

- [1] Lee, C., & Kim, H. (2021). Carbon accounting for green supply chain management: A review. *Journal of Cleaner Production*, 281, 125397.
- [2] Tang, S., Han, Q., Wang, Y., & Zhang, Y. (2021). Carbon accounting based on life cycle assessment for textile and apparel products. *Journal of Cleaner Production*, 279, 123771.
- [3] Li, M., Li, X., Liu, M., & Zhang, X. (2021). The effects of carbon trading and carbon tax on carbon emissions: Evidence from China's regional pilot schemes. *Journal of Cleaner Production*, 298, 126778.
- [4] Zhu, J., Hu, Y., & Sun, J. (2021). Corporate carbon accounting: A systematic review and research agenda. *Journal of Cleaner Production*, 311, 127861.
- [5] Yan, M., Sun, L., Wang, C., & Li, Z. (2020). The influence of carbon accounting on carbon reduction in China: Evidence from listed companies. *Journal of Cleaner Production*, 267, 122007.