

# The Design of China's Carbon Audit Framework and The Construction of The Implementation Path under the "Double Carbon" Goal

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**Abstract:** Under the goal of "double carbon", carbon peaking and carbon neutral work has become the key task specified in the central economic conference. Based on this, this paper analyzes the current situation and obstacles of carbon audit development in China, constructs a carbon audit framework for the current situation and proposes the implementation path of carbon audit: firstly, a three-dimensional evaluation index system is constructed according to the current obstacles of carbon audit, in order to make carbon information flow smoothly, secondly, a coordination chain is constructed consisting of social, governmental and national audit institutions to link up and supervise the carbon emission of enterprises, and finally, the government gradually improves the carbon audit standard according to the problems in practice. Carbon audit standards, new standards can in turn stimulate the generation of new evaluation systems, until the entire carbon audit framework becomes scientifically unified; the implementation path is built around the carbon audit framework, divided into pre-audit stage, implementation stage, assurance stage, and follow-up audit stage.

**Keywords:** Carbon emissions, Carbon audit, Framework design, Implementation path.

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## 1. Introduction

Since China actively promoted the Paris Agreement at the 21st UN Climate Conference, China has taken a historic step forward in addressing global climate change, and in December 2020, General Secretary Xi Jinping solemnly announced at the Climate Conference that China would achieve "carbon peaking" by 2030 and "carbon neutrality" by 2060. With the major strategic deployment of "carbon neutrality", China is gradually moving into a "low-carbon" development pattern, while "decarbonization" is the requirement for economic development. In response to environmental changes, China has launched carbon emissions trading pilot projects since 2013, and has launched carbon emissions trading pilot projects in 7+1 cities, and officially launched the national carbon emissions trading market in July this year using the "two-city" model, ending a seven-year pilot project. Therefore, the corresponding monitoring system should be enhanced as China fulfills its climate responsibility.

The "carbon audit" in environmental audit is a special audit model, which is based on the "Environmental Protection Law", "Regulations on Carbon Emission Trading" and "Certified Public Accountants Law" to authenticate and evaluate the carbon emission status and carbon emissions of audited units. However, a unified carbon audit theoretical framework and efficient implementation path have not yet been formed in China, and there are defects such as imperfect laws and regulations, incomplete grasp of carbon information by professionals, unreasonable application of audit results and low enthusiasm for disclosure. Therefore, in the context of energy conservation and emission reduction, green and low-carbon and "double carbon", the design and implementation of carbon audit framework and pathway are particularly important.

## 2. Literature Review

For the design of carbon audit framework and the

construction of implementation path, the theory of developed countries is extremely mature and more practical. Therefore, in the process of crossing the river by feeling the stones, China should learn from the mature carbon audit system of such developed countries such as the United States, the United Kingdom and Denmark, and develop a carbon audit framework and implementation path suitable for China's national conditions.

First, in terms of carbon audit content and framework design, the International Organization of Supreme Audit Institutions[1] (INTOSAI) believes that carbon audits are extremely broad and thematic, and should be a comprehensive audit, including traditional financial audits, performance audits and risk control audits; meanwhile International Organization for Standardization[2] points out that the carbon audit index evaluation system mainly includes efficiency management, operational index system and expected response to environmental changes. In terms of framework design, the UK monitors carbon emissions by closing the audit loop for high-emission enterprises and designing low-carbon communities to collect carbon emissions data in each period for quantitative analysis, so as to monitor and forecast carbon emissions. The scholars in China have studied the carbon audit index system and framework more profoundly. Jianhui Gao[3] used hierarchical analysis AHP method and KPI method to assign weights to nearly 20 indicators, such as low carbon transformation rate of traditional industries, greenhouse gas emission growth of functional management departments, greenhouse gas emission brought by new vegetation, etc., to initially construct a carbon audit evaluation system.

In terms of implementation path, Zheng Shiqiao[4] argued that there are differences in evidence collection ideas and audit procedures for different topics of carbon audits, so the implementation path is not the same, and risk assessment and audit programs should be prepared according to different audit topics, and audit procedures should be streamlined

between closely related topics. Hao Yugui and Chen Xiaomin[5] et al. believe that the content of carbon audit path should include low-carbon policy implementation audit, low-carbon funds destination audit, audit certification of low-carbon economic projects and products and carbon economic responsibility audit, while carbon audit objectives, carbon audit path and carbon audit information transfer should form a closed-loop system, so that the objectives are clear, the path is smooth and the information is fluid.

### **3. The Current Situation and Obstacles of Carbon Audit Development in China**

#### **3.1. Carbon Audit Laws and Regulations and Regulatory System Are Not Comprehensive**

First of all, although China has successively issued the Interim Provisions on Accounting Treatment Related to Carbon Emission Trading Pilot and the Requirements and Guidelines for Disclosure of Information on Enterprise Carbon Emission Management (Draft for Public Comments) and other regulations, most of these regulations are theoretical explanations and simple operational guidelines on carbon emission rights and carbon trading, and there is no systematic framework for the system and guidelines on carbon audit implementation, and the policies on carbon emission reduction are also very This has posed a higher challenge to carbon auditing. Secondly, China adopts voluntary disclosure of carbon accounting information, and the content of the disclosure is not standardized, which leads to most of the companies describing carbon accounting information in general terms, lacking objective data support, which also leads to the inability of auditors to effectively identify carbon accounting information, thus reducing the accuracy of audit results. Finally, the government has not made clear regulations on the content and form of carbon accounting information disclosure, and has not been able to monitor the truthfulness and objectivity of the disclosure in a timely manner, so the bill policy is just a formality and has no real binding effect on enterprises.

#### **3.2. Difficult to Account for Carbon Audit Data, Low Technical Input and High Cost of Work**

The content of carbon emission data forensic collection in China is mostly based on the subjective judgment of auditors, the process and method are very irregular, and there is an extreme lack of equipment and instruments that can accurately monitor carbon emissions, resulting in high audit costs. First, China's carbon audits are mainly carbon special fund audits and carbon emission reduction audits, but the accuracy of the methods and audit results are not optimistic, mainly because without a clear implementation plan and accurate data forensics, auditors can only produce third-party reports with a fixed format based on incomplete carbon audit knowledge, and most of them are mainly qualitative descriptions. Secondly, due to the lack of funding for carbon audit R&D in China, there are very few scholars researching and developing high-tech digital detection instruments for carbon audit, which makes it much more difficult and costly for third parties to carry out carbon audit, and is very unfavorable to the development of carbon audit.

### **3.3. Carbon Audit Talent Is Scarce**

Carbon audits are different from traditional audits in that they include many different topics, each of which is interconnected and independent of the other, and carbon auditing methods and evidence collection vary from field to field. This requires carbon auditors to not only have the professional skills of traditional auditing, but also know the industry knowledge of various fields such as petroleum, chemical and energy, proficient in professional laws and regulations, and understand the carbon footprint process rating system of each industry. In China, carbon auditors are well versed in accounting knowledge but lack knowledge of environmental engineering and ecosystems, and are unable to effectively combine the dual knowledge systems, making carbon audits difficult to implement.

### **4. The Construction of China's Carbon Audit Framework**

#### **4.1. Building A Carbon Audit Evaluation Index System**

The carbon audit evaluation index system is a three-dimensional evaluation system consisting of driving force factor (D), state factor (S) and response factor (R), which is finally formed by classifying and deciphering the many obstacles encountered by auditors in the audit process as the starting point, finding the factor indicators related to the obstacles, and evaluating the indicators.

The driving force indicator (D) is also linked to the pressure indicator, and the economic, environmental and social impacts should be considered. The government side should actively introduce incentives for carbon emission reduction, increase government support, automatically tilt resources to enterprises that meet carbon emission reduction standards, and set the total amount of low-carbon special funds and the utilization rate of low-carbon special funds[6]. The public side can set a public satisfaction questionnaire to give feedback from the public's point of view whether the enterprises highly fulfill the responsibility of environmental protection.

Status factor (S) should consider reducing the use of high carbon emission energy and increasing the use of clean energy, so status indicators can be set for SO<sub>2</sub> emissions, greenhouse gas emissions, nitrogen oxide emissions, clean production applications, and major solid pollutant emissions.

Response index (R) refers to the enterprises' response to the government's relevant measures and degree of carbon emission reduction, and the main indicators include greenhouse gas emission reduction, carbon emission reduction R&D expenditure, low-carbon project yield, necessary utilization rate of clean energy, etc.

#### **4.2. Building A Coordination Link Between the Audit Departments of All Parties**

Although China has run a carbon trading platform containing trading account management, quotas, certifications, voluntary emission reductions and other functions this year, aiming to bring into play the aggregation effect of carbon trading, gathering carbon assets, carbon management and other enterprises, forming industrial clusters, thus facilitating the collection and supervision of carbon information of high carbon emission enterprises, making various carbon information more transparent, and promoting

the fair development of the carbon market and enterprise competition for emission reduction. However, since the carbon trading platform has just run, the relevant regulatory measures and reward and punishment system must be put into practice to stop enterprises from escaping from the extra-legal territory by taking advantage of the system defects of incomplete development, so the government, under the premise of allocating carbon quotas according to regional and industrial differences, establishes a coordination chain with local government audit departments, social audit institutions and national audit departments as the supervision system, and each local government coordinates legislation and joint enforcement. Local governments will coordinate legislation and joint law enforcement to build a "double barrier" of social and governmental supervision, and then the national audit department will link governmental audit departments across the country into a complete chain to prevent enterprises from transferring high carbon products to unregulated border areas.

### 4.3. Improve Carbon Audit Standards and Clarify The Responsibilities of Carbon Auditors

The audit content, audit mode and audit process of carbon

audit in China are very vague, and most of them adopt the traditional audit model, but carbon audit is a systematic audit work of integrated environment, society and ecology. Therefore, China can learn from the provisions of the international audit assurance standard ISAE3000, which requires that the non-accounting audit process should include non-traditional accounting processes such as ethical constraints, quality control and accessibility of evidence, and two types of audit results should be issued: reasonable assurance and limited assurance [5]. At the same time, during the audit process, the equity and cost expense accounts generated by enterprises conducting carbon transactions should be reviewed and included in the carbon audit evaluation system. In addition, China should clarify the responsibilities of carbon auditors in the CPA, such as understanding the carbon emissions of the industry in general and verifying the carbon emission products of enterprises and accounting for carbon emissions; proficiently grasping the laws and regulations on carbon emission reduction, suggesting carbon emission reduction measures to the management of enterprises, and guiding enterprises to fulfill their responsibility for environmental protection. Audit institutions should also make more efforts to train auditors' carbon audit knowledge for the society.

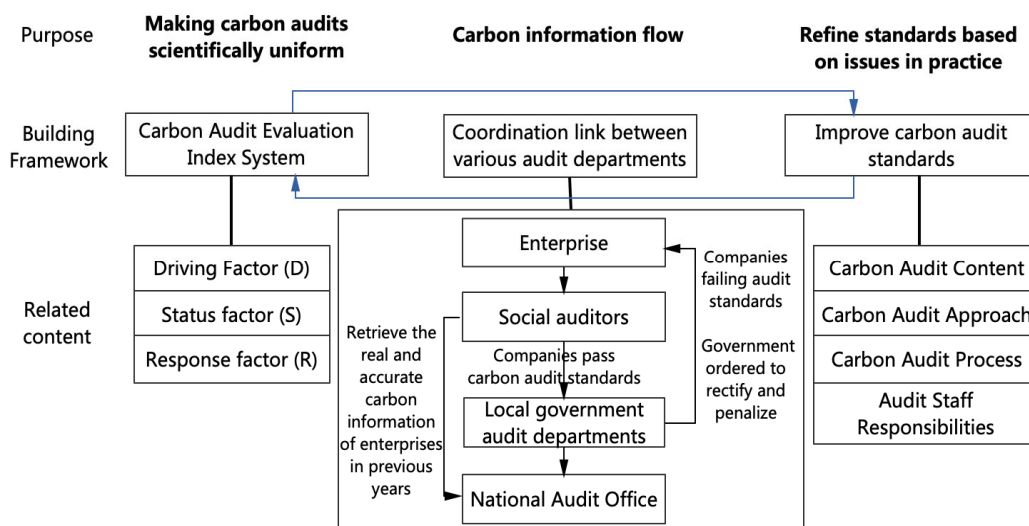


Figure 1. The construction of China's carbon audit framework

## 5. Suggestions for the Implementation Path of Carbon Audit in China

### 5.1. Pre-trial Investigation and pre-trial Planning

Pre-audit investigation and pre-audit plan should be done before the auditor carries out the audit work. Firstly, according to the audit standards in the carbon audit framework, the auditor should clarify the scope of audit implementation, specific ways and audit focus, understand the basic information of carbon emission in the industry, collect the carbon emission information of the audited unit and make basic judgment. The overall plan is based on the carbon audit evaluation system to evaluate the carbon emission reduction status of enterprises, while the specific plan is based on the production and processing process of carbon emission products of enterprises to verify the objectivity of carbon emission data and check whether

enterprises have exceeded the standard or stolen emission behavior.

### 5.2. Carbon Accounting and Audit Evaluation

For the accounting of carbon emissions, that is, the accounting of greenhouse gases, China has issued greenhouse gas accounting methods for various industries in response to the requirements of the "Twelfth Five-Year Plan" (Guo Fa [2011] No. 41), such as the "Greenhouse Gas Emission Accounting Methods and Reporting Guidelines for China's Oil and Natural Gas Producers ( The accounting of carbon emissions also requires auditors to randomly select samples for review and calculate the carbon footprint based on the product life cycle. The carbon audit framework then uses a combination of qualitative and quantitative methods to evaluate the carbon emissions of the audit subject based on the evaluation index system in the carbon audit framework. In the evaluation, appropriate statistical methods and performance evaluation are adopted to select some evaluation

indicators of driving factors, state factors and response factors, and set up a carbon audit evaluation system that matches the enterprise, such as the impact indicators of enterprise business status, the impact indicators of direct greenhouse gas emissions (energy product consumption, product carbon sequestration rate, industrial process processing and manufacturing) and the impact indicators of technological innovation (processing and conversion rate, national carbon emission market, carbon sink and carbon emission trading market).

### 5.3. Carbon Audit Assurance and Reporting

Carbon audit assurance is based on carbon accounting and evaluation to audit the implementation of low carbon policies, low carbon funds, low carbon economic projects and carbon

economic responsibilities. The auditor can then issue both a reasonable assurance and a limited assurance.

### 5.4. Follow-up Audit of Carbon Audits

After the accounting firm issues the audit assurance and proposes the rectification opinion, the enterprise should implement the rectification opinion to each project and activate the risk control mechanism. In turn, the accounting firm should continue to follow up on the implementation of the enterprise and the effect of rectification, assess the reasonableness, extent and effectiveness of the rectification, and at the same time express an assurance opinion on the function, effectiveness and practicality of the risk control mechanism of the carbon audit, and issue an audit report according to the subsequent actual situation.

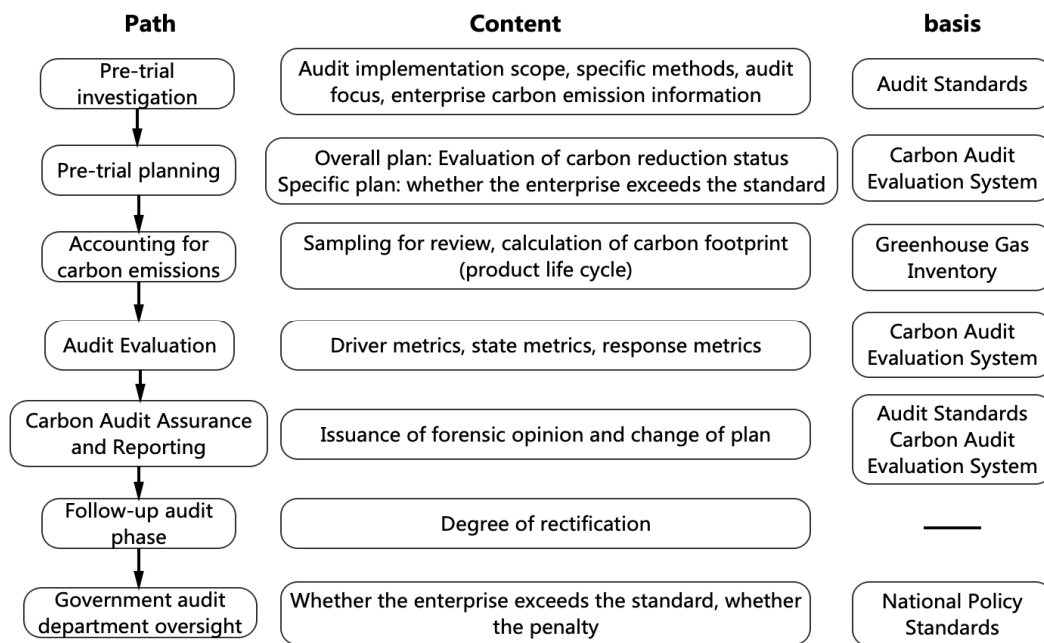


Figure 2. Carbon Audit Implementation Path

## 6. Conclusion

Environmental protection is a global problem to be solved, and now China has taken corresponding actions to deal with climate change and built and started to operate a national carbon emission market, so it is crucial to build a carbon audit framework design and implementation path, to play a preventive and defensive function of carbon audit. However, there are indeed many challenges and opportunities, disadvantages and advantages in carbon auditing. The framework design of carbon auditing must also consider the governmental level and social level, where the government formulates laws and regulations in line with carbon emissions, specific guidelines for carbon accounting and monitors whether enterprises fulfill their social responsibility to reduce carbon emissions, and the society, i.e., the market, should manage the carbon trading market, invariably maintaining a smooth market and ensuring the fairness of carbon trading.

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