Journal of Innovation and Development
ISSN: 2958-4752 | Vol. 15, No. 3, 2026

Dilemmas and Optimization Countermeasures of Government Environmental Audit Under the Dual-Carbon Goals

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Abstract: The proposal of the carbon peaking and carbon neutrality goals has promoted China's economic and social development into a new stage of comprehensive green transformation. As an important supervisory force in the national governance system, government environmental audit plays an irreplaceable role in safeguarding the implementation of the dual-carbon strategy, regulating the operation of the carbon governance system, and promoting the coordinated development of ecological environmental protection and high-quality economic development. Based on the policy orientation of the dual-carbon goals and the actual situation of audit work, this paper systematically analyzes the practical dilemmas faced by China's government environmental audit in system construction, content coverage, method application and other aspects. Combined with China's environmental governance practice and the development needs of audit work, it puts forward targeted optimization countermeasures from the dimensions of improving the audit system, expanding the audit content, and innovating audit methods. This paper provides theoretical reference and practical guidance for building a modern government environmental audit system adapted to the dual-carbon goals, strengthening the effectiveness of audit supervision, and helping the dual-carbon goals to be achieved as scheduled.

Keywords: Dual-Carbon Goals; Government Environmental Audit; Audit Dilemmas; Optimization Countermeasures.

1. Introduction

The "dual-carbon" goals have been elevated to the level of national strategy, serving as a core guide for China's high-quality economic and social development. The report of the 20th National Congress of the Communist Party of China explicitly called for "advancing carbon peaking and carbon neutrality in a well-conceived and systematic way." The Recommendations of the Central Committee of the Communist Party of China on Formulating the 15th Five-Year Plan for National Economic and Social Development further clarified the need to drive comprehensive green transformation across the economy and society under the guidance of the dual-carbon goals, promoting coordinated efforts in emission reduction, pollution control, green expansion, and economic growth, thereby strengthening the ecological security barrier. In July 2024, the Decision of the Central Committee of the Communist Party of China on Further Deepening Reform Comprehensively to Advance Chinese Modernizationand the Opinions on Accelerating Comprehensive Green Transformation in Economic and Social Development were issued successively, establishing a dual-carbon policy framework centered on "one new mechanism, two systems, and three institutions," marking that China's green transition has entered a phase of systematic implementation. In November 2025, the State Council released the white paper China's Actions on Carbon Peaking and Carbon Neutrality, affirming that the dual-carbon goals represent a major decision based on intrinsic requirements for sustainable development and China's responsibility toward human civilization, bearing on the long-term development of the Chinese nation and the building of a community with a shared future for mankind.

Against this backdrop, the oversight value of government environmental auditing has become increasingly prominent. The 2024 National Audit Work Conference explicitly included ecological conservation and green low-carbon development as key audit priorities. In 2025, the National Audit Office further designated the coordinated promotion of emission reduction, pollution control, green expansion, and growth as a key focus, emphasizing deepening audit reform and innovation, advancing full audit coverage, and building a centralized, unified, comprehensive, authoritative, and efficient audit supervision system. As an independent economic oversight activity conducted in accordance with the law, government environmental auditing adheres to the philosophy of "diagnosing issues, treating existing problems, and preventing potential risks." Through policy implementation supervision, resource efficiency evaluation, emission data verification, and institutional improvement, it carries out whole-process, all-round tracking supervision over the implementation of dual-carbon-related policies, providing solid safeguards for achieving the dual-carbon goals. Compared with developed countries in Europe and America, China's environmental auditing started relatively late. The introduction of the dual-carbon goals has further exposed shortcomings in the existing audit system. How to break through the limitations of traditional auditing and build a modern environmental audit system adapted to dual-carbon requirements has become a critical issue of common concern in both academic and practical circles.

2. Real-World Dilemmas Facing Government Environmental Auditing Under the Dual-Carbon Goals

In recent years, China's government environmental auditing has made continuous progress and played a significant role in environmental governance and ecological

protection. However, against the backdrop of the dual-carbon goals and in the face of new requirements and challenges posed by green low-carbon development, government environmental auditing still confronts multiple dilemmas, primarily in the audit system, audit content, and audit methods.

2.1. An Incomplete Audit System with Low Alignment to Dual-Carbon Goals

China's current government environmental audit system remains inadequate and misaligned with the dual-carbon goals, manifesting mainly in two aspects:

First, the audit legal and regulatory framework is imperfect. Existing environmental audit laws and regulations—such as the Audit Law of the People's Republic of Chinaand the Environmental Protection Law of the People's Republic of China—primarily address traditional pollution control and environmental fund supervision, offering only principled provisions on government environmental auditing. There is a lack of specialized audit laws and regulations targeting the dual-carbon goals, with no clear stipulations regarding the audit scope, standards, and responsibilities for emerging areas such as carbon emission reduction auditing, carbon asset management auditing, and ecological carbon sink auditing. This results in insufficient legal basis for audit work and non-standardized audit practices.

Second, the audit standard system is absent. Under the dual-carbon goals, government environmental auditing covers emerging fields including carbon emission reduction, carbon sinks, and green energy. However, China has yet to establish a robust government environmental audit standard system, lacking unified standards for carbon emission accounting, carbon reduction effectiveness evaluation, and ecological carbon sink auditing. When conducting audits, auditors can only rely on personal experience or refer to relevant industry standards, leading to a lack of objectivity and comparability in audit results and compromising audit quality. Moreover, there is no comprehensive set of specific evaluation criteria or audit guidelines for environmental auditing. When measuring environmental costs and benefits scientifically, auditors lack objective benchmarks and can only apply standards designed for other types of audits. This fails to meet the specialized demands of environmental auditing under the dual-carbon context, inevitably resulting in insufficient audit evidence and subjective judgment, thereby increasing audit risks[1].

2.2. Narrow Audit Scope Failing to Fully Cover Dual-Carbon-Related Fields

Current government environmental auditing remains focused on traditional areas such as environmental fund auditing and pollution control auditing, with insufficient coverage of emerging fields related to the dual-carbon goals. The narrow audit scope struggles to meet the environmental governance needs under the dual-carbon goals, as reflected in the following:

First, insufficient depth in auditing the implementation of carbon emission reduction policies. Although some regions have conducted audits on carbon reduction policies, the focus tends to be on the dissemination of policy documents rather than an in-depth examination of actual implementation effects, existing problems, and root-cause analysis. Audits often fail to promptly reveal bottlenecks and difficulties in policy execution, hindering policy optimization. For example, when auditing the implementation of local governments' carbon peaking action plans, audits often concentrate solely on plan formulation and deployment, while neglecting comprehensive audits of resource allocation, measure implementation, and effectiveness feedback during execution, thus failing to accurately assess the actual impact of policy implementation.

Second, inadequate coverage of emerging fields. Under the dual-carbon goals, emerging areas such as carbon asset management, carbon trading, carbon capture, utilization and storage (CCUS), and ecological carbon sinks have become focal points of environmental governance. However, current government environmental audits cover these areas inadequately, with most regions yet to initiate relevant audit work. For instance, there is a lack of audit oversight over the compliance of corporate carbon asset management, the operation of carbon trading markets, and the effectiveness of CCUS technology applications, making it difficult to mitigate risks and foster healthy development in these sectors.

Third, insufficient implementation of performance auditing. Current government environmental auditing remains predominantly compliance-oriented, with limited depth in auditing environmental governance performance and carbon reduction outcomes. A performance evaluation system aligned with the dual-carbon goals has not been established, preventing comprehensive and objective assessment of the effectiveness of government environmental governance actions and impeding improvements in governance performance. For example, audits of the utilization efficiency of environmental protection funds and carbon reduction funds are often superficial, focusing merely on compliance while neglecting correlation analysis between fund input and carbon reduction outcomes or ecological improvement. This falls short of the audit objective of "maximizing fund utilization efficiency."

2.3. Outdated Audit Methods Unable to Meet Dual-Carbon Requirements

Under the dual-carbon goals, government environmental auditing spans broader and more complex domains, demanding higher professionalism and scientific rigor in audit methodologies. However, China's current audit methods remain outdated, relying heavily on traditional manual and book-based audits, and fail to adapt to new requirements, as evidenced by:

First, excessive reliance on traditional methods and low adoption of information-based auditing. Current audits still prioritize conventional techniques such as document review, on-site inspection, and interviews, with limited application of modern technologies like big data, artificial intelligence, and remote sensing. Under the dual-carbon context, data related to carbon emissions and eco-environmental quality are massive and diverse, which traditional methods struggle to process rapidly and accurately. This impedes the timely identification of audit risks and undermines audit efficiency and quality[2].

Second, lack of methodological innovation and specificity. Specialized audit methods and techniques are absent for emerging areas such as carbon trading and carbon sinks, forcing auditors to adapt traditional approaches that fail to meet sector-specific needs. For instance, auditing carbon trading markets lacks dedicated methods for examining transaction prices, volumes, and compliance, making it difficult to accurately uncover operational issues.

Additionally, advanced analytical tools such as spatial econometric models are underutilized, hindering accurate assessment of the spatial spillover effects of government auditing on carbon reduction and compromising the scientific validity and comprehensiveness of audit conclusions.

Third, difficulties in audit evidence collection and lack of effective means. Auditing under the dual-carbon goals requires evidence from specialized fields such as carbon emission accounting and ecological carbon sink measurement, demanding technical expertise and robust data support. However, auditors currently lack effective evidence-gathering mechanisms, struggling to obtain accurate and complete audit evidence. For example, measuring ecological carbon sinks requires professional eco-environmental monitoring data and vegetation coverage data, which are often scattered across different departments and inaccessible to auditors, affecting the accuracy and completeness of evidence collection. Furthermore, inadequate protection of shared data leads to difficulties in accountability following data breaches, causing data providers to withhold sensitive information and further exacerbating evidence-collection challenges.

3. Optimization Strategies for Government Environmental Auditing Under the Dual-Carbon Goals

To address the aforementioned dilemmas and in line with China's environmental governance practices and auditing realities, this paper proposes the following optimization strategies from the perspectives of improving the audit system, expanding audit content, innovating audit methods, strengthening talent development, and refining coordination mechanisms, so as to promote high-quality development of government environmental auditing and support the achievement of the dual-carbon goals.

3.1. Improve the Audit System to Enhance Alignment with Dual-Carbon Goals

A sound audit system is fundamental to the effective functioning of government environmental auditing. In view of the requirements of the dual-carbon goals, improvements should focus on the legal-regulatory framework and the audit standard system:

First, refine the audit legal and regulatory system. Accelerate the development of laws and regulations governing government environmental auditing in relation to the dual-carbon goals. Building on existing laws such as the Audit Lawand the Environmental Protection Law, formulate specialized audit regulations targeting the dual-carbon goals, clarifying the audit scope, standards, and responsibilities for emerging areas including carbon reduction auditing, carbon asset management auditing, and ecological carbon sink auditing, thereby providing explicit legal grounds for audit work. Meanwhile, strengthen coherence among relevant laws and regulations, clarify the division of responsibilities between audit authorities and departments such as environmental protection, development and reform, and energy, and establish coordination mechanisms between audit enforcement, environmental law enforcement, and carbon regulation enforcement, so as to enhance the authority and effectiveness of audit enforcement[3].

Second, establish a robust audit standard system. Develop a unified and standardized government environmental audit standard system tailored to the dual-carbon goals, defining clear standards for carbon emission accounting, carbon reduction effectiveness evaluation, ecological carbon sink auditing, and carbon trading auditing. Drawing on international best practices and considering China's specific conditions, formulate sector-specific audit standards for different industries and fields to ensure objectivity and comparability in audit work. For example, develop unified corporate carbon accounting methods, clarify measurement standards for ecological carbon sinks, and standardize audit criteria for carbon trading markets, providing clear guidance for auditors. Additionally, establish a dynamic update mechanism for audit standards, revising them in a timely manner in response to progress in dual-carbon implementation and evolving environmental governance needs, so as to maintain alignment with policy objectives. Furthermore, develop comprehensive environmental audit guidelines and operational rules specifying audit scope, content, procedures, and methods, mitigating partiality and limitations in environmental auditing and improving overall audit quality.

3.2. Expand Audit Content to Achieve Full Coverage of Dual-Carbon-Related Areas

Aligning with the core requirements of the dual-carbon goals, government environmental audit content should be expanded to transition from traditional auditing to green low-carbon auditing, covering all relevant domains comprehensively:

First, deepen audits of carbon reduction policy implementation. Focus on the implementation of dual-carbon-related policies, intensifying audits of carbon peaking action plans, clean energy substitution policies, and energy-intensive industry control policies. Conduct in-depth analyses of actual policy outcomes, expose bottlenecks and challenges in implementation, and propose targeted recommendations to facilitate policy refinement. For instance, audit the completion status of local governments' carbon peaking targets, the progress of clean energy substitution policies, and the upgrading or phasing-out of energy-intensive industries, ensuring effective policy implementation. Meanwhile, pay attention to how factors such as inefficient government intervention and high energy consumption affect policy outcomes, urging local governments to optimize implementation approaches and enhance policy efficacy.

Second, broaden audit coverage of emerging fields. Incorporate emerging areas such as carbon asset management, carbon trading, CCUS, and ecological carbon sinks into the audit scope, and strengthen audit oversight in these domains. For example, conduct corporate carbon asset management audits to supervise carbon emission accounting and carbon quota management; carry out carbon trading market audits to standardize market operations and mitigate trading risks; and perform ecological carbon sink audits to evaluate the enhancement of ecosystem carbon sequestration capacity and promote carbon sink development. Additionally, strengthen audits of regional collaborative carbon reduction governance, paying attention to the spatial spillover effects of government auditing, and encourage inter-regional coordination in carbon reduction efforts to avoid undesirable governance outcomes such as pollution transfer.

Third, reinforce performance auditing and construct a dual-carbon-oriented performance evaluation system. Shift away

from a compliance-dominated audit model by expanding performance auditing and developing an evaluation system aligned with the dual-carbon goals. Take carbon reduction effectiveness, eco-environmental quality improvement, and fund utilization efficiency as core indicators to comprehensively and objectively assess the effectiveness of government environmental governance actions. For example, establish a carbon reduction performance evaluation index system comprising indicators such as the carbon emission decline rate, share of clean energy, and increase in ecological carbon sinks to conduct holistic assessments of local governments' carbon reduction performance. Strengthen audits of the utilization efficiency of environmental and carbon reduction funds, analyzing the correlation between fund input and carbon reduction outcomes or ecological improvement, so as to steer funds toward high-efficiency, low-carbon sectors and improve capital allocation efficiency.

3.3. Innovate Audit Methods to Enhance Efficiency and Quality

First, promote the transition to information-based auditing and increase the application of modern technologies. Invest in and deploy advanced audit tools such as big data, artificial intelligence, remote sensing, and geographic information systems. Establish a government environmental audit information platform to integrate data from ecological monitoring, energy consumption, and carbon emissions, enabling data sharing and real-time analysis to boost audit efficiency.

Second, develop specialized audit methods to improve relevance and professionalism. Design dedicated audit approaches and techniques for emerging dual-carbon-related areas to meet their specific requirements.

Finally, refine the audit evidence collection mechanism and enhance evidence-gathering capacity. Strengthen communication and collaboration with departments such as environmental protection, development and reform, energy, and forestry, and establish robust data-sharing mechanisms to ensure auditors can access comprehensive and accurate data. Concurrently, bolster technical support by forming specialized audit technical teams and explore collaboration mechanisms with third-party professional institutions to leverage external expertise and improve the accuracy and completeness of audit evidence.

4. Conclusion

Achieving the "dual-carbon" goals is a protracted endeavor. As a vital component of the national governance system, government environmental auditing must evolve in step with the times. Confronted with challenges such as the absence of standards and lagging technologies, only by improving top-level design, embracing cutting-edge technologies, and reconstructing evaluation frameworks can we forge a sharp "green audit sword." This requires not only self-reform within audit institutions but also collective participation across society. Only through such concerted efforts can we ensure that the dual-carbon strategy stays on course without deviation, laying a solid ecological foundation for the sustainable development of the Chinese nation.

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