

# The Implementation Path of Carbon Audit for Enterprises in the Context of "Dual Carbon"

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**Abstract:** *With the increasingly severe global climate change, the proposal of "dual-carbon" goal is not only an optimization of the national strategy of sustainable development, but also points out the direction for the transformation and development of modern enterprises. Carbon audit is an important tool to assess and guide the carbon emission of enterprises, and the optimization of its implementation path is an important issue in the process of environmental policy and enterprise strategy implementation. The paper explores the scientific implementation path of enterprise carbon audit under the background of "dual carbon", analyzes the challenges and opportunities faced by enterprise carbon audit at this stage, and puts forward the corresponding optimization strategy, so that theoretical and practical guidance for enterprises is provided to achieve the goal of green and low-carbon development.*

**Keywords:** *carbon audit; the context of dual carbon; auditing path*

## 1. Introduction

In the context of "peak carbon dioxide emissions" and "carbon neutrality", carbon audit is no longer a single evaluation of environmental behavior, but an important strategic initiative to promote the deep integration of modern enterprises into the global green economic system. The whole audit process will be carried out throughout the development of an enterprise, and at the same time, it involves the examination of the enterprise's traditional energy utilization plan and emission behavior, which demonstrates the enterprise's innovative ability and its sense of environmental protection responsibility in an all-round way. How to create a clear and efficient carbon audit implementation path in the context of "dual carbon" is a priority issue for modern enterprises to think about.

## 2. The main task of "dual-carbon"

Under the guidance of the goal of "dual carbon", the implementation path of corporate carbon audit presents multi-dimensional development requirements, focusing on the double enhancement of "accuracy" and "applicability". *The Opinions of the State Council of the Central Committee of the Communist Party of China on the Complete and Accurate Implementation of the New Development Idea and Making Good Work of Peak Carbon Dioxide Emissions and Carbon Neutrality* (hereinafter referred to as "*The Opinions*") provide a macro-guidance for the implementation of corporate carbon audit, and clearly define the emission reduction targets and paths. Under this framework, the main task of corporate carbon audit is to establish an internal audit mechanism that is in line with the national "dual carbon" policy system, and to ensure the effectiveness of the emission reduction measures and the foresight of the strategy.

First of all, enterprises should create a dual accounting system for energy consumption and greenhouse gas emissions based on physical quantities. Through refined management, it realizes accurate recording and monitoring of the whole process from energy procurement and use to emission. On this basis, together with life cycle analysis (LCA) and other methods, the carbon footprint of each link is analyzed to provide decision-making support for subsequent carbon emission reduction. Then, in terms of industrial restructuring and technological innovation, corporate carbon audit needs to focus on "modern technology" and "green environmental protection" at the same time. The utilization rate of clean energy, research and development of investment of low-carbon technologies and its transformation, and the degree of greening of products should be paid more attention to. In addition, through the audit results, enterprises should be inspired to participate in the market-oriented carbon trading, and through the "cost-benefit" analysis, the capital should be guided to flow into the field of

carbon emission reduction, so as to improve the competitiveness of enterprises in the market. Next, enterprise carbon audit should strengthen the systematic thinking, comprehensively consider the environmental benefits and economic benefits, and establish a green financial and tax incentive mechanism in line with the characteristics of enterprises. Based on the audit results, the internal carbon price and carbon cost accounting method should be formulated accurately to form an effective internal incentive and constraint mechanism to guide all staff to save energy and reduce emissions. Finally, it is necessary to improve the audit process of compliance with laws and regulations, and dynamically adjust the compliance strategy of the enterprise by combining the audit results, so that the operation of the enterprise is not negatively affected by the policy changes, and at the same time, through the enhancement of regulatory compliance, the enterprise's sense of social responsibility and brand value can be enhanced.<sup>[1]</sup>

Corporate carbon audit should not only practice the guiding principles in *the Opinions*, but also continue to explore and optimize them in practice, and feedback them to the policy formulation level to form a closed-loop optimization iterative mechanism. This requires a high degree of professionalism and foresight on the part of the corporate audit department. At the same time, enterprises should take the initiative to cooperate with external audit and assessment institutions, and learn from advanced experiences and practices at home and abroad to jointly promote the deepening and refinement of corporate carbon audit.

### **3. Practical measures of carbon audit for enterprises in the context of "dual carbon"**

#### ***3.1. Improving the top-level design of carbon audit***

In the context of "dual carbon", it is particularly important to improve the top-level design of carbon audit in the practical measures of carbon audit for enterprises. This design should not only clarify the strategic objectives, but also ensure the operability and practical effectiveness of the measures.

First, companies should establish a comprehensive carbon management framework. This includes detailed planning from the high-level strategy to the operational level, with a clear indication of how carbon neutrality can be achieved through carbon audit. At the strategic level, it is necessary to integrate the national "dual carbon" goal with the enterprise's development goals, and establish long-term planning and short-term goals for carbon neutrality. At the operational level, specific emission reduction measures, such as energy-saving reform, optimization of energy structure, and innovation of low-carbon technologies, should be formulated based on the results of carbon emission data monitoring and accounting, and the responsibilities should be detailed to ensure that each measure has a clear implementation body and deadline for completion. Second, a rigorous internal audit process must be established to accurately account for and continuously monitor carbon emissions data. Enterprises should adopt internationally recognized greenhouse gas emission accounting standards, such as the GHG Protocol, to ensure the authenticity and comparability of data. In addition, through the introduction of third-party auditing, internal audits are provided with verification of independence and objectivity to enhance their credibility. Meanwhile, during the audit process, information technology such as big data analysis and cloud computing are applied to improve the efficiency and accuracy of data processing. Finally, the top-level design of carbon audit should have a dynamic adjustment mechanism. According to the audit results and changes in the external environment, such as policy adjustments, market fluctuations, the carbon management strategy and implementation plan of the enterprise should be revised in a timely manner. Such a mechanism not only improves the adaptability of enterprises to changes, but also facilitates the continuous improvement of their carbon audit practices, so the harmonious coexistence of enterprises and the environment can be eventually realized.<sup>[2]</sup>

A sound top-level design provides strategic guidance for the practice of carbon audit, which is the key to realizing the "dual carbon" goal. In this process, we should continue to explore and innovate to ensure the effectiveness and foresight of corporate carbon audit by using data as the support, technology as the means, and systematic thinking as the guidance.

#### ***3.2. Reforming the regulatory model of carbon audit***

In the context of "dual carbon", the regulatory model of corporate carbon audit needs to be innovated in order to respond to the increasingly severe environmental challenges and stringent policy requirements. An effective regulatory model should continue to introduce technological innovation to

improve the accuracy and efficiency of regulation.

First, the core of the reform should focus on the authenticity and transparency of carbon data. It requires that companies establish a standardized carbon emission data reporting system. The use of blockchain technology can realize the tamper-resistant nature of data and ensure that the whole process from data collection, processing to reporting is transparent and traceable. In addition, the use of smart contracts can automatically trigger the corresponding regulatory measures when the data reaches the preset conditions, enhancing the automation and intelligence of regulation. Then, the reform of the regulatory model requires the introduction of a dynamic regulatory mechanism. Unlike traditional periodic audit, dynamic regulation relies on continuous data monitoring and real-time analysis, as well as timely response to environmental impact assessments. Such a mechanism can realize real-time monitoring of carbon emissions through the deployment of sensor networks; trend prediction and behavioral identification of corporate carbon emissions can be carried out with the help of big data analysis; and abnormal emissions can be timely warned and responded through artificial intelligence algorithms. Ultimately, the innovation of the regulatory model also needs to seek support in policies and market mechanisms. The establishment of incentives and disciplinary mechanisms linked to carbon audit results, such as tax incentives and green credit, can effectively stimulate enterprises to reduce emissions. At the same time, strengthening cross-border collaboration, such as convergence with the international carbon trading market, can provide enterprises with a broader market operating space.

Reforming the regulatory model of carbon auditing should be supported by technological innovation, oriented by dynamic regulation, and assisted by market mechanisms to establish a scientific, fine and efficient carbon regulatory system. This path not only provides a clear carbon management orientation for enterprises, but also contributes the strength of enterprises to the realization of the "dual carbon" goal of the whole society.

### ***3.3. Sound implementation plan of carbon audit***

Under the background of "dual carbon", the implementation plan of enterprise carbon audit needs to be precisely constructed to ensure that it has a clear operation, but also that it does not lose the scientific and technological foresight and innovation.

First of all, the basis of the implementation plan is to clarify the scope and standard of carbon audit. It requires that enterprises take the internationally accepted carbon emission accounting standards as a reference and formulate individualized accounting templates in combination with the specific conditions of enterprises. On this basis, informatization means, such as the carbon management module integrated in the ERP system, are adopted to realize the automation and accuracy of data collection. And then, combining modern information technology such as cloud computing and big data, carbon data is analyzed in depth to support decision-making. Second, the implementation program needs to strengthen internal control and process management. By setting up a dedicated carbon audit team, it ensures seamless cross-departmental collaboration and forms closed-loop management. In the process, internal audit software tools, such as AI-based predictive analytics tools, are applied to provide early warning of potential carbon emission anomalies, thus realizing forward-looking risk management. Then, the program should refine the implementation steps, including but not limited to the development of detailed work plans, time nodes, responsibility allocation and training mechanisms. In particular, specific operational guidelines should be formulated for different industry characteristics, such as the manufacturing industry focusing on the energy efficiency of production lines, while the service industry focuses on the green management of office environments. Through a deep grasp of the characteristics of the industry, the implementation program can be closer to the reality, so the relevance and effectiveness of the implementation can be enhanced. Finally, the implementation program should include a continuous improvement mechanism. Dynamic optimization of the carbon audit process can be achieved by drawing on the PDCA (Plan-Do-Check-Act) management cycle model. It is ensured that the program is revised and improved necessarily through regular feedback of internal and external audit results, so as to adapt to changes in the external environment and upgrades in internal management.<sup>[3]</sup>

Combined with the above points, a sound carbon audit implementation plan not only provides a road map for enterprises to operate, but also ensures that the actions of enterprises in the implementation of the "dual carbon" strategy are orderly and efficient, so that every step in the process of carbon reduction is truly accurate and reliable.

### ***3.4. Practising carbon audit information disclosure***

Under the background of "dual carbon", the disclosure of carbon audit information is not only a manifestation of corporate transparency, but also the cornerstone of building a green financial system. The practice of information disclosure should be centered on improving the authenticity, completeness and consistency of data, so a set of scientific, standardized and forward-looking disclosure mechanism can be built.

The first step of information disclosure is to establish a unified carbon information disclosure standard. Currently, many enterprises adopt self-defined standards, which makes it difficult to compare information and reduces the validity and decision-making value of data. Therefore, it is especially important to refer to international frameworks such as TCFD (Task Force on Climate-related Financial Disclosures) and integrate the characteristics of the industry to form a local standard with universality and guidance. At the same time, enterprises should establish a standardized data collection and management process to ensure the accuracy and timeliness of disclosure information. In addition, carbon audit disclosure should not only focus on static annual reports, but also emphasize dynamic continuous disclosure. It means that enterprises should establish a mechanism for cyclical updating, and continuously report their carbon emission status, progress in reducing emissions, and related risk management measures to stakeholders through multiple channels, such as the official website of the enterprise and social media platforms. In this process, technologies such as blockchain are utilized to ensure that data is tamper-proof and easily traceable, which can increase the credibility of the information. Finally, the real value of information disclosure lies in its role in guiding corporate behavior. Therefore, in practice, enterprises should also be stimulated to deeply integrate information disclosure with internal carbon management, and transform externally disclosed carbon information into inputs for internal management decisions. For example, through the implementation of a performance evaluation system centered on information disclosure, the results of carbon audits can be directly linked to management performance and employee rewards and punishments, thus promoting the low-carbon transformation of the entire organization.<sup>[4]</sup>

The disclosure of carbon audit information should be practiced from the establishment of standards, process optimization to technical support and other dimensions, so as to form a set of dynamic, interactive and feedback mechanism of perfect information disclosure system. This will not only help enterprises establish a green image, but also realize sustainable development under the goal of "dual carbon" strategy, and promote the prosperity of the green financial market, contributing the wisdom and strength of Chinese enterprises to the realization of the global low-carbon economy.

### ***3.5. Cultivating excellent talents for carbon audit***

In the context of the "dual carbon" strategy, the cultivation of carbon audit talents for enterprises is particularly critical, which is directly related to the realization of carbon emission reduction targets and the healthy development of the carbon trading market. Excellent carbon audit talents are the key for enterprises to realize the perfection of the carbon emission accounting, monitoring, reporting and verification (MRV) system, and they are also an important force to promote the green and low-carbon transformation.

First of all, establishing a sound talent training system is the foundation. Carbon management and auditing related majors should be set up in institutions of higher learning, and multi-level and multi-disciplinary education and training should be carried out, covering knowledge areas such as carbon asset management, carbon finance, carbon market analysis, so as to provide the market with professionals with a systematic knowledge structure and practical operational capabilities. At the same time, enterprises also need to carry out targeted on-the-job training, so that employees can master the domestic and international carbon emission accounting methods, carbon auditing standards, and related regulations and policies in a timely manner. Then, the combination of practice and theory should be strengthened to promote the cultivation of innovative talents. Practical teaching and case analysis should become an important part of carbon audit education. By cooperating with enterprises and setting up practical training bases, students have the opportunity to participate in real projects, combine theoretical knowledge with practical operation, and cultivate their ability to solve practical problems. At the same time, universities, research institutions and enterprises are encouraged to jointly carry out research in the field of carbon auditing for promoting the deep integration of academia and industry, and jointly exploring the best practices and innovative paths in the field of carbon auditing. Finally, talent incentives and career development planning should be paid attention to. The training of carbon

audit professionals should not be limited to the teaching of knowledge and skills, but should also focus on the expansion of their career development prospects. Enterprises and government departments can join hands to establish a carbon auditing professional qualification certification system to enhance the social recognition of the profession. Through the establishment of a clear career advancement path, research funds and incentive mechanisms, talents are stimulated to deepen their cultivation and innovative development in this field.

Thus, enterprises should continue to deepen the innovation of carbon audit talent training mode. Through the reform of the education system, the deep integration of practice and theory, and the construction of professional incentive mechanism, high-quality carbon audit talents should be cultivated to meet the future market demand, so as to lay a solid talent foundation for realizing the goal of low-carbon development.

### ***3.6. Implementation of carbon audit supervision and evaluation***

In the context of "dual carbon", the supervision and assessment mechanism of carbon audit for enterprises should not be absent. The mechanism not only requires strictness, but also ensures its adaptability and foresight, so as to promote enterprises to actively respond to the national carbon emission reduction policy and realize green development.

First of all, the design of the supervision and assessment system should reflect the scientific and rigorous nature. A set of assessment system covering the whole process of carbon emission of enterprises can be established to control the source of carbon emission, supervise the process, and then evaluate the results, forming a closed-loop management. In addition, the system should specify the assessment frequency, indicator system, evaluation method and result application mechanism. The indicator system should cover carbon emissions, emission reduction efficiency, application and innovation of emission reduction technologies. The evaluation method should be based on internationally accepted standards and optimized in accordance with domestic real situation to ensure its scientific rationality. Second, the supervision and assessment should adopt information technology to improve efficiency and transparency. With the help of big data, blockchain and other technologies, real-time monitoring, tracking and auditing of carbon emission data can be realized to ensure the authenticity and tamper-resistance of the data. Such technological support can enhance the efficiency of carbon audit and reduce costs, as well as helping to improve the trust of enterprises and the public in the results of carbon audits. Finally, the implementation of supervision and assessment cannot be separated from strict responsibility mechanisms and incentives. Enterprises that meet or exceed their carbon emission reduction targets should be rewarded through policies such as tax incentives and green credit. On the contrary, for enterprises that fail to meet carbon emission standards, they should be guided to strengthen their investment in environmental protection technology and improve their management systems, apart from taking corresponding punitive measures. In addition, the professionalism and code of conduct of carbon auditors are equally important and need to be ensured through the establishment of a professional certification system, regular training and assessment.<sup>[5]</sup>

Through the above measures, a fair, scientific and efficient enterprise carbon audit supervision and assessment system can be constructed to provide a solid guarantee for realizing the goals of "peak carbon dioxide emissions" and "carbon neutrality", and at the same time, enterprises will also promote their transformation and upgrading and build a new green and low-carbon economic development model.

## **4. Conclusion and outlook**

Under the guidance of the "dual carbon" goal, corporate carbon audit is an important support for carbon emission reduction. It is not only the embodiment of corporate social responsibility, but also a key link in promoting the green development strategy. Therefore, it is of great significance to build a perfect and efficient carbon audit implementation path. Looking ahead, corporate carbon audit should adapt to environmental changes and keep pace with technological progress. With the maturity of artificial intelligence, big data and other technologies, the precision and efficiency of carbon audit will be significantly improved. Meanwhile, the cultivation of interdisciplinary talents will provide richer perspectives and methodological support for carbon audit. On this basis, enterprises should take the initiative to embrace change, improve their internal management system, to ensure that carbon auditing is in line with international standards, and highlight their environmental protection responsibility and image.

To sum up, the future path of corporate carbon audit should adhere to the core of science, take technological progress as the driving force, and institutional innovation as the guarantee, to construct a new carbon audit system that meets international standards and adapts to the market demand. In the process, the joint efforts of enterprises, the government and all sectors of the society will provide inexhaustible power for realizing the goals of peak carbon dioxide emissions and carbon neutrality, and jointly draw a grand blueprint for low-carbon development.

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