

# The Dilemma and Breakthrough of Environmental Accounting in the Reform of Ecological Civilization System

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## Abstract

Environmental accounting not only pays attention to the economic benefits of enterprises, but also emphasizes the social responsibility and environmental protection obligations of enterprises. Environmental accounting, as a new branch of accounting, quantifies and records the impact of enterprise economic activities on the environment, and takes into account both economic and environmental responsibilities. This study focuses on its connection with green development and ecological civilization reform. Analyze the application status quo, clarify the differences and problems at home and abroad, explain its role in the construction of ecological civilization, and explore the institutional and technological challenges faced by the development and reform. It is found that there are domestic and foreign differences and various challenges in the application of environmental accounting. Put forward strategies such as improving regulations and innovating technologies. In the future, it will help with innovation and cooperation to promote green transformation and achieve sustainable development.

**Keywords:** Environmental Accounting, Green Development, Reform of the Ecological Civilization System, Practical Pathways

## 1. Introduction

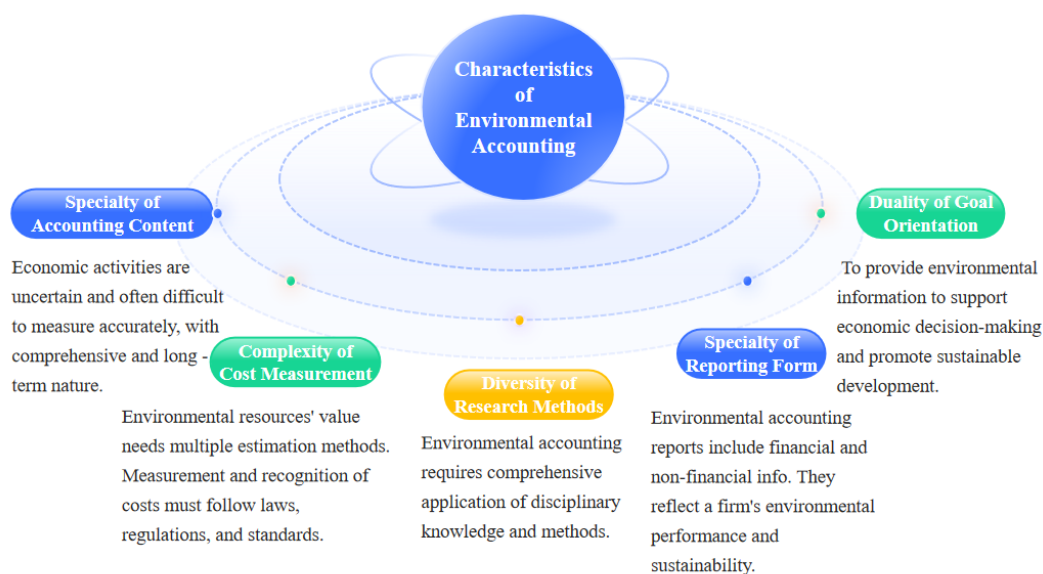
From January 23rd to 24th, 2024, the Ministry of Ecology and Environment held the National Ecological and Environmental Protection Conference in Beijing with great ceremony. The conference explicitly stated that in 2024, the core work in the field of ecological environment will focus on eight aspects, including actively promoting green and low-carbon high-quality development, vigorously advancing scientific and technological innovation in the field of

ecological environment, and accelerating the improvement of the modern environmental governance system. Among these, the most important aspect is actively promoting green and low-carbon high-quality development, which is not only related to sustainable economic development but also to the protection of the ecological environment.

Since the 1970s, resources, the environment, and development have become core issues of widespread concern in the international community. Against the backdrop of increasingly severe global climate change and resource constraints, environmental accounting, as an emerging branch of accounting, has become increasingly important. Environmental accounting is the product of combining green development issues with accounting theoretical methods. It focuses not only on the disclosure and management of traditional accounting economic information but also particularly emphasizes the disclosure and management of environmental information. As a new branch that integrates the fields of environment and accounting, environmental accounting plays an indispensable role in this process. Traditional accounting focuses on the processing of economic information, while environmental accounting, on this basis, places particular emphasis on the disclosure and management of corporate environmental information. Through environmental accounting, companies can better assess and manage their impact on the environment, thereby balancing economic benefits with environmental protection and social responsibility while pursuing economic efficiency. Environmental accounting provides significant decision-making support for achieving sustainable development, enabling companies to pay more attention to environmental protection in the development process and achieve a win-win situation for economic and environmental benefits.

## 2. Basic Concepts and Theoretical Basis of Environmental Accounting

### 2.1 The Concept and Characteristics of Environmental Accounting



**Figure 1. Environmental Accounting Characteristics**

Environmental accounting with currency as the main unit of measurement, based on relevant laws and regulations, the environmental information into the accounting system, measurement, record environmental pollution, environmental prevention, environmental development costs, and the environmental maintenance and the development benefit of reasonable measurement and report, thus comprehensive evaluation of environmental performance and environmental activities on the enterprise financial results. Through the systematic assessment and management of the company's environmental costs, it promotes the enterprise to comprehensively consider the potential impact of its commercial activities on the ecological environment while pursuing economic benefits, aiming to achieve the strategic goal of environmental protection and sustainable development.

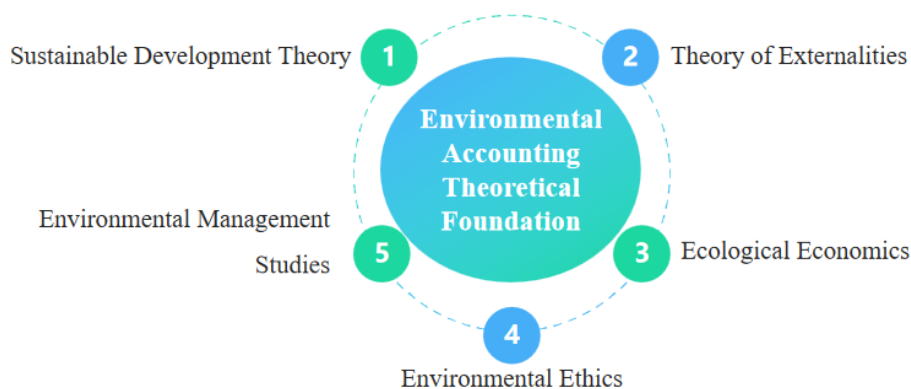
Environmental accounting possesses distinct characteristics. Firstly, the scope of accounting in environmental accounting is not only focused on traditional financial data but also widely covers environmental indicators. Secondly, at the level of cost measurement, environmental accounting is particularly complex, as it needs to consider environmental costs, including the costs of prevention, governance, and restoration of environmental damage, as well as potential losses caused by environmental issues. Moreover, to address the complexity and diversity of various environmental problems, the research methods of environmental accounting are rich and diverse, encompassing quantitative analysis, qualitative analysis, and model simulation, among other techniques.

The reporting format of environmental accounting is also unique, requiring not only the preparation of traditional financial reports but also environmental performance reports and sustainable development reports, to comprehensively demonstrate a company's actual effectiveness in environmental protection. Lastly, the goal orientation of environmental accounting is dualistic, aiming to meet the needs of internal management within enterprises as well as the expectations of external stakeholders.

It is precisely because of these characteristics that environmental accounting plays a crucial role in revealing the impact of corporate economic activities on the environment and in promoting sustainable development. Establishing environmental accounting is an important step towards resource conservation and green development, as advocated by China. With the accounting and reporting of environmental accounting, companies can more effectively identify and manage environmental risks, optimize resource allocation, reduce environmental costs, and enhance environmental performance. At the same time, environmental accounting provides critical decision-making information for external stakeholders, aiding them in assessing a company's environmental responsibilities and sustainable development capabilities, thereby promoting society as a whole towards a greener and more sustainable direction.

## **2.2 The Theoretical Basis of Environmental Accounting**

The theoretical basis of environmental accounting primarily stems from the theories of sustainable development, external theory, and ecological economics, while also considering the impact of environmental ethics and environmental management science. Here, specific explanations are provided for the application of the first two theories.



**Figure 2. Theoretical Basis of Environmental Accounting**

The theory of sustainable development is the theoretical foundation for the establishment and development of environmental accounting. Sustainable development emphasizes the coordinated development of the economy, society, and the environment, requiring that while meeting the needs of the present, the ability of future generations to meet their own needs is not compromised. This concept provides a clear direction for environmental accounting, which is to promote resource conservation and environmental protection by accounting for and monitoring the relationship between a company's economic activities and the environment. Environmental accounting is based on the assumption of sustainable development, incorporating the consumption of natural resources, the protection of ecological resources, and the impact of companies on the environment into the accounting system.

The theory of sustainable development also emphasizes the principle of "fairness," which means balancing efficiency and fairness in economic activities. This provides important guidance for the disclosure of environmental accounting information, requiring companies to fully disclose non-financial information such as environmental costs and resource utilization efficiency while disclosing financial information, to enhance transparency and public trust.

By incorporating externalize into environmental management accounting, companies can more accurately measure the impact of their business operations on the environment and take measures to reduce negative externalize and improve resource utilization efficiency. For example, through a pollution permit trading system, companies can buy or sell pollution rights through market mechanisms, thereby internalizing external costs.

The application of externalize theory requires active government participation and support from market mechanisms. The government can require companies to bear social costs by enacting relevant laws and regulations, such as levying environmental taxes and implementing a pollution fee system, to encourage companies to reduce negative externalities.

### 3. The Application of Environmental Accounting in Ecological Civilization System Reform

#### 3.1. The Current Application Status of Environmental Accounting

The application status of environmental accounting is different in different countries and regions, but overall, its application is gradually expanding and deepening. The following will explain the current situation of environmental accounting from the perspective of home and abroad.

##### 3.1.1. Current Status of Foreign Applications

Developed countries are at the forefront in the application of environmental accounting. The United States, Japan, the European Union, among others, have established stringent environmental accounting standards and policies that mandate the inclusion of environmental factors in financial reporting. For instance, companies are required to disclose detailed environmental costs (covering pollution control, taxes, resource consumption, and other expenses), environmental liabilities, and performance information. Taking Fujitsu Ltd. of Japan as an example, it was one of the first to implement environmental accounting management, following principles to optimize cost classification and account settings, and adopting an independent reporting model to disclose environmental information. This initiative has significantly enhanced the company's environmental and economic benefits, setting a benchmark for global enterprises and effectively promoting the application and development of environmental accounting internationally.

##### 3.1.2. Current Domestic Application Status

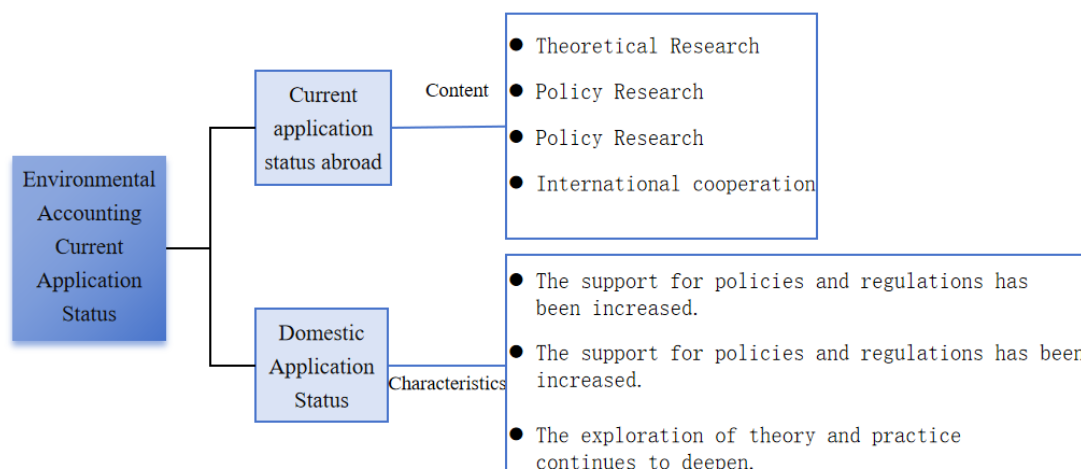


Figure 3. Current Situation of Environmental Accounting Application

Although the practice of environmental accounting in our country started late, it has developed rapidly. The government and enterprises have continuously increased their attention to it, stemming from the deepening advancement of the strategy for ecological civilization construction. At the level of policies and regulations, a series of encouraging policies have been successively introduced, providing guidance and protection for corporate practice. The academic and practical communities are actively exploring and conducting in-depth research on theoretical frameworks, methodological

systems, and application models. Enterprises are accumulating experience in practice, jointly promoting the development of environmental accounting.

However, environmental accounting in our country still faces many difficulties. The standards and systems are not yet perfect, and there is a lack of unified norms for the measurement and disclosure of environmental information, resulting in poor comparability and reliability of corporate reports; some enterprises have a weak sense of environmental responsibility and are resistant to the disclosure of information; there is a scarcity of interdisciplinary professionals, lagging university-related discipline construction, and inadequate corporate talent cultivation and management mechanisms, which severely restrict the widespread application and in-depth development of environmental accounting.

### 3.2 Environmental Accounting Plays an Important Role in the Reform of Ecological Civilization System



Figure 4. The Role of Environmental Accounting

In addition to its natural role in the economic base, the development of accounting also has a positive impact on the superstructure. Through environmental accounting, companies can assess and manage their environmental impact more scientifically, thus balancing environmental protection while pursuing economic benefits. The realization of this dual goal helps to promote the transformation of enterprises towards sustainable development. Environmental accounting plays a significant role in the reform of the ecological civilization system.

Environmental accounting promotes the construction of ecological civilization. By accurately quantifying the costs and benefits of environmental activities, environmental accounting provides various organizations with clearer and more intuitive environmental information. The transparency of this information enables organizations to make wiser and more sustainable decisions, effectively advancing the process of ecological civilization construction. Environmental accounting methods not only help enterprises deeply understand and effectively control the potential negative impacts on the environment during their production processes but also encourage them to adopt more environmentally friendly production methods. By reducing pollution to the environment and the rational use of natural resources, enterprises can achieve a harmonious coexistence of economic growth and environmental protection, ultimately reaching a win-win situation.

Environmental accounting improves resource utilization efficiency. Through the implementation of environmental accounting, companies can deeply uncover waste phenomena and inefficiencies



in the resource utilization process, thereby motivating organizations to adopt a series of effective improvement measures to enhance resource utilization efficiency. With detailed records and in-depth analysis of resource consumption, companies can accurately identify which links in the production process have issues with resource waste. This gives companies the opportunity to optimize these links, reduce unnecessary resource consumption, and ultimately achieve more efficient and sustainable resource management.

Environmental accounting drives green development. By precisely assessing the economic benefits brought about by environmental activities, environmental accounting not only helps organizations identify the significant potential for green development but also guides them towards a more environmentally friendly and sustainable development path. With the analysis provided by environmental accounting, companies can clearly recognize which environmental protection measures are not only beneficial for the environment but also bring significant economic benefits to the enterprise. This enhanced understanding greatly increases the motivation for enterprises to implement these environmental protection measures. As enterprises gradually adopt and execute these measures, they will be able to achieve a transition to green and low-carbon practices, ultimately achieving a dual enhancement of economic and environmental benefits, making a positive contribution to the sustainable development of society.

Environmental accounting enhances social trust. Through environmental accounting, organizations can disclose detailed information about their environmental impact and management measures to the public, which not only increases the transparency of the organization but also greatly enhances public trust in the organization. The improvement of this transparency and trust helps organizations build and maintain a good social image. By regularly releasing environmental reports, companies demonstrate their relentless efforts and significant achievements in environmental protection to the outside world. This not only enhances public recognition of the company's commitment to social responsibility but also significantly improves the company's social reputation. In the current competitive market environment, a company with a good social reputation is more likely to gain consumer favor, stand out among many competitors, and achieve sustainable development.

#### **4. The Challenge of Environmental Accounting Development and Ecological Civilization System Reform**

##### **4.1. Challenges in the Development of Environmental Accounting**

In the ongoing development of environmental accounting, many issues still remain to be addressed. Although progress has been made in this field, there are still numerous challenges in practical operations and theoretical research.

##### **4.1.1. Institutional Construction Issues**

The primary issue faced by environmental accounting in terms of institutional construction is the imperfection of relevant laws and regulations. Although China has established several laws and regulations on environmental protection, there is still a lack of specific regulations for environmental accounting. In the "Accounting Law" and related accounting and auditing standards,

the rights and obligations of parties involved in environmental accounting practices, as well as their legal and economic consequences, have not been clearly defined. This leads to a lack of clear legal basis and guidance in practical operations of environmental accounting, hindering its further development and application.

Disclosure of environmental accounting information is a crucial aspect of environmental accounting, but there is currently no unified system for the disclosure of environmental accounting information in China. This results in a lack of uniform standards and formats for enterprises when disclosing environmental accounting information, which in turn reduces the comparability and reliability of the information. A comprehensive system has not yet been established in China, and the lack of uniformity in related standards means that reports are not significantly valuable to users, making it difficult for them to make informed decisions, thereby limiting the development of enterprises.

#### **4.1.2. Technical Methodology Issues**

In the practical operation of environmental accounting in China, a comprehensive system that integrates macro and micro environmental accounting has not yet been established. Macro environmental accounting mainly involves the government level, while micro environmental accounting focuses on enterprises as the main body. Moreover, the selection and classification of data related to environmental accounting lack unified scientific standards, and the measurement of environmental accounting elements also lacks clear measurement units and attributes. These factors all lead to insufficient accuracy and reliability in the practical operation of environmental accounting.

The technical methods of environmental accounting require not only knowledge of accounting but also the integration of multidisciplinary knowledge such as environmental science and ecology. However, research and application of environmental accounting technical methods in China are still in the preliminary stage, and technical support is still insufficient to meet the needs of practical work. Considering cost factors, the development, introduction, and improvement of green accounting information systems will involve significant financial investment, and technological innovation in this process may impose a high cost burden on enterprises, thereby potentially inhibiting the growth of their economic benefits.

#### **4.1.3. Talent Training Issues**

The field of environmental accounting requires accounting professionals not only to master traditional accounting knowledge but also to have some knowledge of environmental science, sustainable development, and related disciplines. Regrettably, the construction of environmental accounting disciplines in Chinese universities is still inadequate, and accounting students mostly receive education in traditional accounting knowledge, with relatively insufficient understanding and skills in environmental accounting. This situation poses many challenges for corporate accountants when performing environmental accounting calculations, making it difficult for them to adapt to the requirements of environmental accounting development. The ability to process environmental accounting information and data, as well as the ability to solve new problems in practice, is a significant test. In terms of training environmental accounting talents, there are



imperfections in the mechanisms in China. On the one hand, universities have limited resources invested in environmental accounting education, which leads to the inability to meet market demand for professional talents; on the other hand, enterprises face many challenges in the training and management of environmental accounting talents, such as insufficient emphasis on environmental accounting, inadequate incentive mechanisms, etc., which exacerbate the phenomenon of the loss of environmental accounting talents.

#### **4.1.4. Information Sharing Issues**

One of the main obstacles faced by environmental accounting in cross-domain cooperation and information sharing is the imperfection of the information sharing mechanism. Currently, the efficiency of information sharing between different departments is low, and the phenomenon of information silos is widespread. Although the environmental protection and taxation departments each have rich information resources, due to the flaws in the information sharing mechanism, these resources are often wasted and there is a problem with repeated data collection. This not only affects work efficiency but also damages the results of the work.

In the era of big data, the accounting industry has achieved unprecedented scale and depth in the collection, storage, and analysis of financial data. This trend provides strong data support for the decision-making process, but it has also sparked concerns about privacy protection. In the practice of information sharing, sensitive information involved in environmental accounting faces risks of disclosure, tampering, and abuse. Ensuring information security has become an urgent challenge. The lack of an information security management system, insufficient awareness of information security among employees, and imperfect information access permissions and audit mechanisms are all key factors leading to information security risks.

#### **4.2. Challenges of Ecological Civilization System Reform**

The reform of the ecological civilization system constitutes the core link of China's ecological civilization construction. Its goal is to create a sound institutional framework for ecological civilization through a series of systematic, comprehensive, and collaborative reform measures. Despite this, the reform has encountered multiple challenges in the improvement of laws and regulations, the implementation of policies, and the balance and coordination of interests. Moreover, in the process of promoting green development, certain limitations have also been revealed.

##### **4.2.1. In Terms of Laws and Regulations**

Although China promulgated the "Environmental Protection Law of the People's Republic of China (Trial)" in 1979 and has successively introduced a series of laws and regulations in the fields of resource utilization, environmental protection, and ecological civilization construction, there are still deficiencies and imperfections in these institutional provisions. Especially in terms of the legal system for the collaborative governance of ecological civilization, there is an urgent need to further improve legal means to coordinate the mutual relationships among multiple governance entities in the construction of ecological civilization. From an accounting perspective, although the current legal system includes some provisions related to environmental protection, these provisions rarely explicitly involve the specific aspects of corporate environmental accounting.

##### **4.2.2. In Terms of Policy Implementation**

The construction of ecological civilization in contemporary China is not only related to the internal optimization of the ecosystem but also involves adjusting the social structure and optimizing the goals of social transformation. In the past, the field of ecological environment management has faced challenges of formalism and lax management. Governments at all levels have shown insufficient performance in macro-control for ecological protection, and the division of responsibilities among relevant functional departments is not clear. There have been instances of not abiding by the law, lax law enforcement, and not investigating illegal activities during the law enforcement process. The reform of the ecological civilization system aims to establish a natural resource asset property rights system with clear property rights, clear responsibilities, and effective supervision. However, in actual practice, the ambiguity of property rights and the fuzziness of ownership boundaries still exist, which makes it difficult for policies to be effectively implemented.

#### **4.2.3. In Terms of Interest Coordination**

The reform of the ecological civilization system involves numerous stakeholders, including governments, enterprises, social organizations, and the public. These stakeholders have different interest demands in the process of promoting the construction of ecological civilization, which often causes friction in interests. Therefore, it is particularly important to use legal tools to reconcile the relationships among these multiple governance entities. At the level of interest coordination, a reasonable system must be built to promote the realization of interests, ensuring that people can adjust their personal interest concepts and the objects of effective supply within a coherent framework of interest relationships. However, the current interest coordination mechanism still needs improvement, and its ability to resolve conflicts of interest among multiple entities is still limited.

#### **4.2.4. Limitations in Promoting Green Development**

Although the green development strategy has become a key part of the national development blueprint, this concept has not yet taken root in people's hearts in the specific implementation process. Some regions and enterprises still prioritize economic growth and do not pay enough attention to the protection of the ecological environment, which hinders the effective implementation of green development.

Although the state has implemented a series of policies aimed at promoting green development, the support and effectiveness of these policies still need further improvement in actual operations. In the fields of green finance and green taxation, the support for policies is still insufficient, which affects the enthusiasm of enterprises and the public to participate in green development.

The reform of the ecological civilization system faces many challenges in the fields of laws and regulations, policy implementation, and interest coordination, and also shows certain limitations in promoting green development. To meet these challenges and break through the limitations, it is necessary to further improve the legal and regulatory system, enhance the strength of policy implementation, optimize the interest coordination mechanism, and strengthen the concept and technical support for green development. Only in this way can we ensure that the reform of the

ecological civilization system achieves more significant results and realizes the grand goal of green development.

## **5. Countermeasures of Environmental Accounting Development and Ecological Civilization System Reform**

### **5.1. Environmental Accounting Development Countermeasures**

The maintenance of environmental ecology cannot solely rely on the self-awareness of enterprises; it is essential to combine government laws and administrative measures to impose constraints on corporate thoughts and behaviors from the perspective of public power. First and foremost, we must concentrate our efforts on strengthening institutional development and improving relevant laws and regulations to ensure the precision and credibility of environmental accounting information. This requires not only in-depth discussions and formulation at the policy level but also strict enforcement in actual operations to ensure the authenticity of the information. Moreover, to enhance the efficiency of collecting, processing, and analyzing environmental accounting data, we need to develop and promote advanced technological methods. This includes the use of big data, artificial intelligence, and other modern information technologies to increase the speed and accuracy of data processing, providing a more scientific basis for environmental decision-making.

Furthermore, strengthening the cultivation of environmental accounting professionals and enhancing the overall quality and professional skills of practitioners are key to advancing environmental accounting. Only when accounting personnel are proficient in environmental-related economic knowledge and understand the interrelationship between corporate production activities and the environment can they effectively promote the development of environmental accounting.

Lastly, establishing an effective information sharing mechanism to facilitate the flow of environmental accounting information among governments, enterprises, and the public can help improve the transparency of environmental decision-making and public participation. Solving the reliability issues of environmental accounting information has become an urgent task. This can be achieved by establishing a unified information platform for real-time updates and sharing of information, allowing all parties to access and utilize environmental accounting information promptly. Additionally, by strengthening communication and interaction with the public, we can increase public awareness and participation in environmental issues, thus fostering a positive atmosphere where the entire society participates in environmental protection.

### **5.2. Countermeasures of Ecological Civilization System Reform**

In the process of advancing the reform of the ecological civilization system, we should further improve the relevant legal and regulatory system to ensure the scientific and forward-looking nature of policies. This means that at the national level, there is a need for continuous revision and improvement of existing laws and regulations to adapt to the needs of ecological civilization construction, while formulating new laws and regulations to fill gaps and ensure that ecological civilization construction is legally supported. It is essential to strengthen the implementation of the Constitution through various means, effectively utilizing the fundamental legal protection role of

the constitutional text for the reform of the ecological civilization system. In addition, strengthening the enforcement of policies is also crucial. The construction of the ecological civilization system is a complex systems engineering project that requires us to use systematic thinking for comprehensive and meticulous design. It should be ensured that various green policies can be effectively implemented and truly put into practice, thereby bringing about practical results and promoting substantial progress in ecological civilization construction.

To achieve this goal, optimizing the interest coordination mechanism is indispensable. Society needs to balance the relationships between different interest entities, especially to motivate enterprises and the public to participate actively in green development, focusing on the optimization of resource utilization and environmental governance while neglecting the preference for foundational projects such as ecosystem conservation. To realize the functional positioning and interest balance of all participating entities in ecological civilization construction, it is recommended to build a comprehensive interest compensation, incentive, and participation mechanism. Furthermore, strengthening the green development concept and technological support is also key. This study believes that the overall societal awareness and practical ability for green development should be enhanced through technological innovation and knowledge dissemination. This involves not only the promotion of green technology, products, and services but also the strengthening of green education and training to increase public environmental awareness and enthusiasm for participating in ecological civilization construction.

## 6. Conclusion and Outlook

This study delves into the **challenges** and progress of environmental accounting under the background of the reform of the ecological civilization system, emphasizing the core role of environmental accounting in promoting green and low-carbon development, as well as its importance in balancing economic benefits with environmental responsibilities for enterprises. The development of environmental accounting faces challenges in various aspects, including institutional construction, technological methods, professional talent cultivation, and information sharing. At the same time, the reform of the ecological civilization system also has many issues in the improvement of laws and regulations, the effective implementation of policies, the coordination of stakeholders, and strategies for promoting green development. In response to these problems, this study proposes corresponding countermeasures, including improving relevant laws and regulations, developing advanced technologies, strengthening professional talent cultivation, and establishing an information sharing mechanism. In addition, to promote the reform of the ecological civilization system, it is necessary to further improve the legal system, strengthen the enforcement of policies, optimize the interest coordination mechanism, and enhance the promotion and technical support of green development concepts. Looking to the future, environmental accounting will play a more critical role in promoting green development and the reform of the ecological civilization system, while its development will also face opportunities and challenges brought about by technological innovation and international cooperation. At the same time, the article has some limitations, such as insufficient depth in case analysis, inadequate data support, and not comprehensive enough international comparisons.

Looking to the future, with the continuous enhancement of environmental awareness worldwide and the in-depth implementation of green development strategies, the role of environmental accounting will become more prominent. First, environmental accounting will play a more important role in promoting green, low-carbon, and high-quality development. By accurately accounting for and transparently presenting environmental costs, environmental accounting will help enterprises achieve a win-win situation for economic and environmental benefits. Second, environmental accounting will play a more active role in promoting the reform of the ecological civilization system. By improving the environmental accounting system, it will better serve the national green development strategy and promote a comprehensive green transformation of economic and social development.

#### **Author contributions:**

Conceptualization, C.W.; methodology, C.W.; software, C.W.; validation, C.W.; formal analysis, W.Z.; investigation, W.Z.; resources, W.Z.; data curation, W.Z.; writing—original draft preparation, J.C; writing—review and editing, W.Z.; visualization, W.Z.; supervision, W.Z.; project administration, W.Z.; funding acquisition, W.Z. All authors have read and agreed to the published version of the manuscript.

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