

Research on Environmental Accounting Information Disclosure of Mining Enterprises in China under the Context of Carbon Neutrality

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Abstract. With the rapid development of the current economy, environmental and resource protection has received increasing attention, and the public's demand for the quality of the living environment has also been continuously improving. In 2021, the goal of "carbon neutrality" was written into the government work report for the first time, and China stated that it will unswervingly achieve it. Under the background of carbon neutrality, the development of China's economic entities will inevitably be affected [1]. One of the most direct and effective ways for enterprises to demonstrate the implementation of the country's "dual carbon" strategy and the fulfillment of environmental obligations is to disclose environmental accounting information. Mining enterprises, as units under key monitoring, must fully and effectively disclose environmental accounting information [2]. Enterprises should disclose all data information transparently and include environmental accounting in the company's accounting scope.

Keywords: Mining enterprises, environmental accounting information disclosure, and accounting.

1. Introduction

1.1. Scientific Significance

Environmental accounting information disclosure is the act of enterprises disclosing financial information related to the environment to investors and stakeholders in the process of fulfilling their social responsibilities and protecting the environment. In his report at the 19th National Congress of the Communist Party of China, General Secretary Xi Jinping pointed out: "We must work hard to solve prominent environmental problems, strengthen polluter responsibility, and improve the system of mandatory disclosure of information, etc., to build a new environmental governance system in which the government takes the lead, enterprises are the main body, and social organizations and the public participate together." This shows that environmental protection is one of the key issues in China today [3].

Environmental accounting information disclosure by enterprises can help all sectors of society gain a clearer understanding of their environmental information, thereby strengthening supervision of enterprises and promoting their healthy development in a cleaner and more efficient direction. Therefore, strengthening the regulation and constraint of environmental accounting information disclosure is an important means of improving the environmental awareness of enterprises in highly polluting industries.

1.2. Practical Significance

From a practical point of view, timely environmental accounting information disclosure can benefit the company's own economic development. Disclosure of environmental information is not only to meet government requirements, but also a reflection of responsibility for ecological environmental protection. Environmental accounting information disclosure can provide accurate information to stakeholders, reflecting whether the company is implementing environmental protection policies in a timely manner [4]. For example, in the mining industry, proactively publishing high-quality environmental accounting information can not only make enterprises value their work achievements and maintain long-term development, but also increase the information understanding of other stakeholders, thereby enhancing the company's reputation.

1.3. Application Prospects

By studying the current disclosure status, identifying disclosure difficulties, and conducting in-depth analysis, enterprises can propose suggestions to improve the current situation. This can improve corporate disclosure awareness, thereby improving disclosure standards and enabling corporate environmental accounting disclosure to move from low quality to high quality, meeting the environmental information needs of stakeholders, especially financial information, and helping information users make decisions more quickly and efficiently. Through a virtuous cycle of environmental accounting information disclosure, it can help enterprises and industries achieve green development together [5].

2. The Current Status of Environmental Accounting Information Disclosure by Mining Enterprises in China

2.1. Methods of Environmental Accounting Information Disclosure

Existing environmental disclosure forms are broadly divided into two types: independent reporting and supplementary reporting. Independent environmental reporting is primarily for enterprises whose main business is environmental projects. This method involves setting up separate three financial statements for environmental accounting data, and detailed disclosures are made in a dedicated report of the impact of environmental factors on corporate financial reports, operating results, etc [6]. Supplementary reporting means that companies do not need to design and compile environmental disclosure forms, but add environmental accounting-related items to annual reports, social responsibility reports, chairman's reports, etc., directly adding corresponding environmental accounting accounts to the financial statements in the reports and disclosing non-quantifiable environmental accounting information in the notes. This type of report disclosure saves the company manpower and financial resources, making disclosure more convenient and rapid.

2.2. The Current Status of Environmental Accounting Information Disclosure by Mining Enterprises in China

2.2.1. Environmental Pollution Problems of Mining Enterprises in China

Most mining enterprises in China operate in four major sectors: mining, smelting, trade, and finance. In the process of mining, enterprises will produce environmental problems such as soil erosion and dust pollution. In the smelting sector of mining enterprises, waste gas, wastewater, solid waste, noise pollution, etc., which have a major impact on the environment, will also be produced. See Table 1 for details [7].

In general, environmental problems of mining enterprises in China are becoming increasingly prominent. The production and operation of mining companies have a significant impact on the environment, and the environmental load is complex and diverse, making the environmental governance situation very severe. Therefore, it is very important to pay attention to the development of environmental accounting, improve the information disclosure system, and more fully play the role of environmental accounting information disclosure.

Table 1. Major Products of Metallurgical Enterprises.

Company Name	Major Products	Processing Methods	Equity Ratio/%
Xiyu Metal	Lead bullion, sulfuric acid, gold bullion, silver bullion and other precious metals	Oxygen bottom blowing smelting to side blowing reduction vaporization zinc smelting process	92.57
Qinghai Copper Industry	Cathode copper, sulfuric acid	Oxygen-enriched bottom blowing smelting - bottom blowing blowing smelting continuous blowing technology	100
Western Copper Materials	Cathode copper	Anode furnace fire refining, electrolytic wet refining and vertical copper smelting furnace treatment of residual pole process	100
Qinghai Xianghe	Zinc powder, sulfuric acid, comprehensive treatment of tailings and slag	Fire refining and chemical acid production process	100
Qinghai Xianghe	Ammonium metavanadate	Stone coal vanadium extraction	84.43

2.2.2. Environmental Accounting Disclosure Content of Mining Enterprises in China

This article selects typical mining enterprises in China as samples and analyzes their annual reports, ESG reports, social responsibility reports, environmental reports, etc., from 2018 to 2023, to study their disclosed accounting information content. Overall, environmental information in annual reports is not a major focus, and is mainly concentrated in environmental reports and ESG reports, and the content focus of these four reports also differs.

Analysis of environmental accounting information disclosure also includes qualitative and quantitative analysis. By studying these two aspects, the quality of environmental accounting information disclosure can be determined. Qualitative disclosure of environmental accounting information mainly includes pollutant discharge compliance, construction and operation of pollution control facilities, environmental impact assessment of construction projects, emergency plans for sudden environmental events, self-monitoring of the environment, etc. From the perspective of qualitative analysis of environmental accounting information disclosure, Shanxi Coal, China Coal Energy, etc., have already made detailed disclosures in the five aspects of pollutant discharge compliance, etc., while companies such as Zhongjin Gold and Guang Hui Energy lack detailed data. From the perspective of quantitative analysis of environmental accounting information disclosure, it mainly refers to the capital expenditures incurred by the company for energy conservation and emission reduction or pollution control, expenditures related to environmental protection, and some environmental restoration funds and sustainable development reserves. Among them, Shanxi Coal Company has clearly disclosed in its 2023 financial statements the capital expenditures incurred by the company for energy conservation and emission reduction or pollution control, as well as research and development expenditures related to environmental protection. However, Western Gold lacks data in this area and has not disclosed the company's environmental restoration funds and sustainable development reserves.

3. Analysis of Problems and Causes in Environmental Accounting Information Disclosure by Mining Enterprises in China

3.1. Problems in Environmental Accounting Information Disclosure by Mining Enterprises in China

3.1.1. Unclear Definition of Environmental Accounting Information

The environmental accounting information disclosure of most mining enterprises in China is mainly carried out through supplementary reporting, lacking environmental accounting accounts. Their environmental financial information is reflected in the notes to the annual report, and there are

no accounts that can clearly reflect the environmental financial information of mining enterprises. In terms of environmental assets, it should be possible to better reflect the investment status of environmental facilities through the account of work in progress. In addition, the environmental protection equipment of many companies is disclosed together with various other equipment and has not been separately distinguished. In terms of environmental liabilities, environmental protection expenditures, and environmental revenue, it is impossible to clearly see the environmental amount issue from the disclosure in the supplementary report. Environmental accounting information disclosure is not comprehensive enough and cannot highlight the annual disclosure issues in the annual report.

In summary, the environmental accounting information disclosed by mining enterprises in China is messy, unclear, and the disclosure methods are single, the content is not comprehensive, and there are no accounts that can specifically evaluate environmental accounting information. It cannot clearly and directly reflect the company's annual environmental accounting issues, specific environmental investment, etc.

3.1.2. Scattered Distribution of Environmental Accounting Information and Incomplete Disclosure

The content of environmental accounting information disclosure by mining enterprises in China is relatively scattered and does not centrally reflect environmental accounting information, with a high degree of arbitrariness. Although most companies have disclosed environmental accounting information in annual reports, environmental reports, and ESG reports, there is an excessive amount of content disclosed in the reports, leading to scattered disclosed information. First, the relevant information in the social responsibility report is concentrated in the environmental protection module, with a small length and a rough overview. Second, there is relatively detailed disclosure of accounting information in annual reports, environmental reports, and ESG, but the disclosed environmental accounting information involves multiple locations such as important matters and notes, making it inconvenient to view and identify problems, which increases the difficulty of finding effective information.

In summary, the environmental accounting information of mining enterprises in China is scattered, lacks detailed data tables to support it, the description is mostly textual, disclosure methods are limited, the intuitiveness is poor, and it is not easy to find effective information, resulting in users of environmental accounting information being unable to fully and truthfully understand the company's environmental accounting information and cannot make detailed and objective evaluations.

3.1.3. Lack of Reliability in Disclosed Information

The reliability of accounting information disclosed by companies is also a key factor in evaluating its quality. At present, enterprises generally choose to disclose environmental accounting information voluntarily, as there are no mandatory unified specific regulations. First, companies generally choose to disclose positive information, while concealing negative information that is unfavorable to the company, or even modifying and fabricating some information. Second, although environmental accounting has been discussed in academia for a long time, there is still a lack of practical guidance. Employees who carry out environmental accounting information disclosure may lack professional knowledge, affecting the accuracy of information. Therefore, the information disclosed by mining enterprises in China is somewhat unreliable to a certain extent.

3.2. Cause Analysis

3.2.1. Imperfect Environmental Accounting System

Although China has conducted a lot of research in the field of environmental accounting information disclosure, research and development in the construction of an environmental accounting system is still relatively slow and is still in a stage of exploration and research. There are no clear standards for defining basic accounting information such as environmental assets and environmental costs. Due to the lack of this system, there are differences in the disclosure of the same environmental

accounting information by different enterprises. For example, in terms of the treatment of environmental assets, some companies only include completed and commissioned environmental protection facilities in environmental assets, and those under construction are not included, while some companies choose to include both. Due to the lack of a clear accounting system for definition, many mining enterprises have low disclosure enthusiasm and are unwilling to spend too much manpower and financial resources to disclose this information, resulting in many enterprises having non-standard and incomplete environmental accounting information disclosure.

3.2.2. Lack of Environmental Accounting Standards and Systems

Currently, relevant laws and regulations regarding environmental accounting information disclosure in China are not yet sound, and there are no standard accounting standards to guide various companies in disclosure. Furthermore, China's regulatory intensity and penalty intensity for environmental accounting disclosure are relatively small. The amount of the penalty is insignificant compared to the benefits it brings, leading many mining enterprises to pay less attention to environmental accounting information disclosure.

Although the Ministry of Environmental Protection, the China Securities Regulatory Commission, and the Stock Exchanges have successively issued relevant documents such as the "Management Measures for Environmental Information Disclosure by Enterprises According to Law," these documents mainly concern non-financial environmental accounting information of enterprises and rarely involve quantifiable environmental financial information [8]. Environmental accounting information is difficult to reflect its situation through traditional financial reports, and there is no standard determination system, so problems are easily encountered in practical operations, which makes enterprises have a strong subjective initiative when disclosing environmental accounting information, and the disclosed information lacks negative information.

3.2.3. Lack of Independent Third-Party Audit

At present, mining enterprises in China mainly conduct environmental accounting audits during the implementation of routine audits by audit institutions, and do not specifically hire audit institutions or environmental monitoring institutions to inspect environmental information. Therefore, the environmental accounting information released by many mining enterprises in China is likely to have been beautified to a certain extent, resulting in stakeholders obtaining information lacking credibility, which is not conducive to making correct decisions. In addition, China has not yet formed a mature environmental accounting information audit methodology. Registered accountants do not specifically consider environmental impact factors when performing audit procedures, so China urgently needs to promote environmental accounting theory construction and gradually carry out environmental auditing work. Environmental auditing has a long way to go.

4. Improvement Measures for Environmental Accounting Information Disclosure by Mining Enterprises in China

4.1. Improve Environmental Accounting and Concentrate Disclosure in Independent Reports

Because the financial information of environmental accounting information disclosure by mining enterprises in China is unclear and scattered, it is difficult to consult. In order for information users to have a clearer understanding of the company's environmental impact, financial information should be disclosed separately and centrally in a dedicated section of the environmental report. On this basis, the environmental accounting information disclosure of enterprises should also continue to disclose the environmental management system certification situation and increase the disclosure of environmental risks. Information related to energy consumption, pollutant discharge, etc., and other non-financial information should be disclosed in combination with quantitative and qualitative information for easy understanding. The improved independent financial report should include at least the following items, see Table 2. [9].

Table 2. Environmental Report Contents.

I. Basic Information	1. Company Information
	2. Compilation Instructions
II. Environmental Management Status	1. Environmental Management System and Management Regulations
	2. Environmental Objectives and Completion Status
	3. Enterprise Environmental Business Projects
	4. ISO14001 Environmental Management System Certification and Implementation Status
	5. Education and Training Related to Environmental Protection
	6. Implementation of Relevant Laws and Regulations
	7. Emergency Plan for Environmental Accidents
	8. Environmental Risks
III. Environmental Financial Information	1.Environmental Accounting Statements
	2.Notes to Environmental Accounting Statements
	3. Achieved Environmental Benefits
IV. Environmental Protection Measures and Performance	1. Material Flow Analysis
	2. Development of Environmental Protection Technology and Products
	3. Recovery and Recycling of Waste Products
	4. Recovery and Recycling of Waste Products
	5. Greenhouse Gas Emissions and Reduction Measures
	6. Waste Discharge and Reduction Measures
	7. Environmental Load and Reduction Measures in Logistics
	8. Total Wastewater Discharge and Reduction Measures
	9. Generation and Treatment and Disposal of Solid Waste
	10. Management of Hazardous Chemicals
	11. Noise Pollution Status and Control Measures
	12. Green Procurement Status and Related Countermeasures
V. Relationship with Society and Stakeholders	1. Participation in Social Environmental Protection Public Welfare Activities
	2. Environmental Information Disclosure and Communication

4.2. Improve Environmental Accounting Information Disclosure Laws and Regulations

The most fundamental way to improve the quality of environmental accounting information disclosure by companies is to improve laws and regulations and perfect legislation. First, relevant departments should include the content of environmental information disclosure, supervision and management, and legal liability of companies in the revision of the “Environmental Protection Law” and other relevant laws. They should also unify the items and indicators to be disclosed, making them specific and clear, so as to ensure that the information disclosed by different companies has a certain degree of comparability both vertically and horizontally [10]. Second, legislation on environmental information disclosure should be accelerated, and it is also necessary to strengthen the mandatory requirements for listed companies in heavy pollution industries to disclose environmental information, promoting the improvement of the quality of environmental accounting information disclosure in domestic companies through listed companies, combining mandatory and voluntary disclosure [11]. This not only conforms to the current economic and social development of China, but also achieves the goal of improving the environmental responsibility of enterprises.

4.3. Conduct Special Environmental Audits to Enhance Disclosure Reliability

Conduct special environmental accounting audits to ensure that the company’s environmental accounting information disclosure is true and legal, safeguarding and enhancing its compliance and

reliability. Although the current situation in China is that there is no mature theoretical system to support the practice, China can conduct audits from multiple perspectives and in diverse ways. Environmental accounting is a comprehensive discipline, and it also requires high requirements for auditors, so it is possible to try to conduct special environmental audits in heavy pollution industries. Relatively speaking, registered accountants have higher comprehensive qualities and are more independent, objective, and fair in the implementation process, which is also conducive to information users making decisions [12]. Therefore, the government should accelerate environmental audit legislation, set up pilot programs for special environmental audit activities, and gradually expand traditional audits to “environmental audits +,” achieving parallel development.

5. Conclusion

Under the background of carbon neutrality, it is crucial for mining enterprises in China to improve their environmental accounting information disclosure system. To enhance the quality and reliability of environmental accounting information disclosure, it is necessary to clarify the definition of financial information, strengthen information disclosure, improve laws and regulations, and conduct special environmental audits. Through these measures, mining enterprises can contribute to sustainable development and meet the growing demands for environmental transparency and accountability.

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