

Research on Environmental Accounting Information Disclosure Issues of Baosteel

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Abstract: Under the backdrop of China's "dual-carbon" strategy, the green transformation of the steel industry is of critical importance, in which environmental accounting information disclosure serves as a key supporting mechanism. This paper examines Baosteel as a case study. Based on an analysis of its publicly available reports from 2018 to 2023, it is found that the company leads its peers in terms of disclosure continuity and systematic reporting. However, problems such as insufficient comprehensiveness, lack of third-party auditing, and inadequate quantitative data remain. It is recommended that the government develop detailed industry-specific disclosure guidelines and strengthen third-party audit supervision. Companies should enhance training for environmental accounting professionals, raise environmental awareness within management, and deeply integrate sustainable development into corporate strategy.

Keywords: Environmental Accounting; Baosteel; Information Disclosure

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1 Introduction

In recent years, the process of global climate governance has accelerated significantly, making "carbon neutrality" a core issue in national development strategies worldwide. As the world's largest carbon emitter, China clearly proposed its strategic goals of "achieving carbon peak by 2030 and carbon neutrality by 2060" in 2020. The steel industry, being a foundational sector of the national economy, accounts for approximately 15% of the country's total carbon emissions, making it a critical area for achieving the dual carbon goals. Against this backdrop, environmental accounting information disclosure serves as an important tool for quantifying corporate environmental responsibility and plays a key role in promoting the green transformation of the steel industry.

As a leading enterprise in China's steel industry, Baoshan Iron & Steel Co., Ltd. (Baosteel) has long ranked among the top in global competitiveness evaluations of steel companies. With an annual output exceeding 30 million tons, the company took the lead in releasing the Chinese steel industry's first "Climate Action Report" in 2021, demonstrating its proactive stance in environmental protection. However, data from the Institute of Public & Environmental Affairs show that in 2019, Baosteel and its subsidiaries received cumulative environmental penalties amounting to 1.735 million RMB, yet the company did not disclose this penalty information in its annual reports. This phenomenon indicates that, despite making environmental commitments at the strategic level, there are still significant deficiencies in the actual information disclosure practices, reflecting an urgent need to improve the environmental accounting information disclosure system within the steel industry.

2 Theoretical Basis of Environmental Accounting Information Disclosure

2.1 Conceptual Framework and Policy Requirements

Environmental accounting information disclosure refers to the practice where enterprises disclose the environmental impacts of their operations to stakeholders using both monetary measurements and descriptive narratives. It covers environmental assets, liabilities, costs, and performance.

Globally recognized frameworks such as TCFD and ISSB emphasize the principle of double materiality: disclosures must reflect both the financial impact of climate change on the company and the company's impact on the environment.

In China, environmental disclosure follows a hybrid mandatory-voluntary approach. The 2018 Corporate Governance Guidelines for Listed Companies require major polluters to disclose environmental information, and the 2021 Measures for the Management of Legal Disclosure of Enterprise Environmental Information made carbon and pollutant emission data mandatory. Companies are also encouraged to adopt international standards like ISO 14031 and GRI to voluntarily report forward-looking information such as environmental targets and green technology innovations.

2.2 Specificity of the Steel Industry and Necessity of Disclosure

The steel industry is a key focus of environmental regulation, with its sulfur dioxide and nitrogen oxide emissions each exceeding 10% of the national industrial total, necessitating strict environmental information disclosure responsibilities.

For enterprises, comprehensive disclosure of environmental risks can reduce financing costs. Companies with strong environmental performance are more likely to gain access to green credit and attract ESG investments. A notable example is Baosteel's successful issuance of RMB 1 billion in green bonds in 2022.

Under China's dual-carbon policy, the steel industry has been incorporated into the national carbon market, transforming carbon emission disclosure from a voluntary practice into a mandatory obligation. This shift has not only strengthened disclosure requirements but also provided institutional support for the industry's green transition.

3 Analysis of Environmental Accounting Information Disclosure Status of Baosteel

3.1 Conceptual Framework and Policy Requirements

Baosteel operates major manufacturing bases in Shanghai Baoshan, Wuhan Qingshan, Zhanjiang Dongshan, and Nanjing Meishan, making it one of the world's most comprehensive carbon steel producers. It ranks second globally in crude steel output and leads in the production of automotive sheets and high-grade electrical steel. The company emphasizes technological innovation and green development, focusing on the R&D and production of high-end products such as advanced high-strength automotive steel and grain-oriented silicon steel, significantly enhancing China's self-sufficiency in high-end steel products.

As a leading enterprise in a heavily polluting industry, Baosteel places great importance on environmental protection and sustainable development. It actively discloses environmental accounting information and publishes environmental performance data through annual reports, social responsibility reports, and sustainability reports. Guided by the concept of "green steel," the company promotes energy conservation, emission reduction, and the development of eco-friendly steel plants, striving to achieve coordinated economic and environmental progress.

3.2 Current Status of Environmental Accounting Information Disclosure at Baosteel

A horizontal comparison reveals that Baosteel's environmental accounting information disclosure system has been continuously optimized. Firstly, the channels for disclosure have diversified, evolving from early supplementary disclosures in annual reports to a multidimensional system encompassing "annual reports + social responsibility reports + sustainability reports + specialized climate action reports." Secondly, the platform has embraced digital transformation. In 2022, Baosteel launched an intelligent carbon data platform, enabling real-time monitoring of carbon emissions.

Table 3-1: Distribution of Environmental Information Disclosure Channels by Baosteel (2018 - 2023)

Methods of Disclosure	2018	2019	2020	2021	2022	2023
Annual Report	√	√	√	√	√	√
Sustainability Report	√	√	√	√	√	√
Social Responsibility Report	×	×	√	√	√	√
Specialized Environmental Report	×	×	×	√	√	√

Note: "√" indicates disclosed; "×" indicates not disclosed

3.3 Progress in Disclosure of Key Quantitative Data by Baosteel

The disclosure of environmental performance indicators by Baosteel shows a positive trend, reflecting increased transparency in emissions and improved resource efficiency. According to the data in Table 3-3, from 2018 to 2023, Baosteel's comprehensive energy consumption per ton of steel decreased from 581 kgce/t to 570 kgce/t, a reduction of 1.9%.

Freshwater consumption per ton of steel dropped to 2.6 m³/t, a cumulative decrease of 16.1%, indicating continuous improvement in resource utilization efficiency and the effective application of energy and water-saving technologies.

At the same time, SO₂ emissions decreased from 42,000 tons to 15,000 tons, a reduction of 64.3%, demonstrating that upgrades to desulfurization equipment and the implementation of clean production measures in recent years have been effective. Additionally, the comprehensive utilization rate of solid waste reached 99.5%, an increase of 0.5% compared to the previous period, indicating that the circular economy model is now operating at a mature level. In 2023, CO₂ emission reductions reached 958,000 tons, an increase of 57.6% compared to 2022, highlighting Baosteel's significantly intensified efforts in advancing its low-carbon transition.

Table 3-2: Comparison of Environmental Accounting Information Disclosure Carriers and Content of Baosteel (2018 - 2023)

Methods of Disclosure	2018	2020	2022	2023	Cumulative Change
Comprehensive Energy Consumption per Ton of Steel (kgce/t)	581	577	573	570	↓ 1.9%
Freshwater Consumption per Ton of Steel (m ³ /t)	3.1	2.9	2.7	2.6	↓ 16.1%
SO ₂ Emissions (10,000 tons)	4.2	3.8	1.9	1.5	↓ 64.3%
Comprehensive Utilization Rate of Solid Waste (%)	99.0	99.2	99.4	99.5	↑ 0.5%
CO ₂ Emission Reduction (10,000 tons)	-	-	60.8	95.8	↑ 57.6%

Data Source: Annual Reports and Sustainability Reports of Baoshan Iron & Steel Co., Ltd.

Baosteel discloses environmental accounting information through its annual reports and sustainability reports, which feature extensive coverage and substantial content presented through a combination of quantitative and qualitative methods. However, the disclosure exhibits a noticeable bias, emphasizing descriptions of environmental facilities, emissions, and waste treatment, while lacking detailed financial data such as environmental investment amounts and specific expense breakdowns.

Although the company continues to highlight environmental protection in its reporting themes and has progressively expanded related content, the authenticity and comprehensiveness of such disclosures remain questionable. For instance, in 2021, Baosteel received penalties for exceeding emission standards, yet its report claimed full compliance. Similarly, in 2023, the company did not recognize a liability for its carbon allowance shortfall.

As an industry benchmark, Baosteel demonstrates advanced practices in disclosure formats and topic coverage. Nevertheless, shortcomings persist in data authenticity, the presentation of negative information, and the detailed disclosure of environmental financial data.

4 Core Issues in Baosteel's Environmental Accounting Information Disclosure

4.1 One-Sided Disclosure with a Clear Bias Toward Positive Information

Baosteel's environmental information disclosure demonstrates a notable selective bias. In its annual and sustainability reports, the company provides detailed descriptions of positive aspects such as pollutant discharge compliance, carbon reduction achievements, green manufacturing initiatives, and environmental investments, aiming to project a strong environmental image. However, in cases of environmental violations—such as the penalties incurred in 2020 and 2021—Baosteel failed to issue interim reports as required, addressing these incidents only briefly in the annual reports without disclosing specific exceedance data, penalty details, environmental impacts, or corrective measures. This approach highlights a disclosure strategy that emphasizes positive information while downplaying negative issues.

4.2 Fragmented Disclosure Forms and Low Comparability

Baosteel's environmental information disclosure suffers from significant fragmentation. Key data such as total carbon emissions, quota compliance details, and accounting treatments are scattered across its Sustainability Report, Environmental Report, and the notes to its annual financial statements. This violates the principle of integrated disclosure and increases the cost of information retrieval for users.

Furthermore, the disclosure exhibits inconsistencies in accounting standards. For instance, the statistical methodology for water consumption was altered between 2021 and 2022 without any explanation, undermining data comparability. The criteria for capitalizing environmental protection expenditures also lack transparency, and similar projects received

inconsistent accounting treatments in different years without justification. These issues severely compromise the comparability of environmental performance data and the effectiveness of its evaluation.

4.3 Lack of Quantitative Information and Low Degree of Monetization

Baosteel's environmental accounting information disclosure exhibits significant monetization deficiencies. Although the company reported a total environmental investment of RMB 5.8 billion in 2022, it failed to distinguish between capital expenditures and operating expenses, obscuring the economic nature of these funds. Furthermore, a substantial volume of environmental assets—such as carbon quotas and emission rights—are not recognized in the financial statements, and environmental benefits lack monetized measurement. For example, the emission reduction benefits and derived economic value of the hydrogen-based shaft furnace project have not been quantified.

This measurement gap hinders investors' ability to assess the financial returns on environmental investments, violates the accounting matching principle, and ultimately impairs the usefulness of the information for decision-making and the evaluation of transition effectiveness

5 Recommendations for Improving Environmental Accounting Information Disclosure of Baosteel

5.1 Establish Industry-Specific Disclosure Standards for the Steel Sector

As a highly energy-intensive and high-emission industry, the steel sector requires stricter information disclosure regulations. At present, the absence of detailed environmental accounting disclosure rules tailored to heavily polluting industries in China has led to superficial and selective reporting, where companies often avoid disclosing critical environmental issues, significantly undermining the usefulness of the information. It is recommended that the Ministry of Ecology and Environment take the lead in formulating specific measures for environmental accounting information disclosure for the steel and other key sectors. These measures should clarify disclosure requirements, emphasize industry-specific characteristics, and mandate the reporting of negative information such as carbon emissions, pollutant discharges, environmental penalties, and corrective actions. Such targeted institutional arrangements will enhance the comprehensiveness and comparability of information, providing stakeholders with reliable data to support decision-making and contributing to the achievement of China's dual-carbon goals.

5.2 Implement Third-Party Assurance for Environmental Information

Establishing a third-party verification mechanism is crucial for improving the quality of environmental information disclosure. It is advised to prioritize special audits of key indicators such as carbon emissions and environmental protection investments, engaging qualified accounting firms for verification. A multi-dimensional data validation system should be constructed, which may include introducing international institutions to evaluate environmental product declarations and facilitating the real-time integration of corporate emission data with government monitoring platforms for automated cross-checking. Enterprises should also be required to separately disclose third-party verification results in their annual reports, including the audit scope, adjustments, and corrective measures. Transparent supervision of this kind will help prevent data inaccuracies and significantly enhance the credibility of environmental information.

5.3 Enhance Corporate Awareness of Environmental Information Disclosure

Enterprises need to promote both conceptual understanding and institutional development, transforming environmental responsibility into a driver for sustainable growth. They should recognize that environmental information disclosure is not only a compliance requirement but also a vital means to enhance competitiveness and brand value. It is recommended that environmental protection be integrated into the core corporate strategy, with green development plans formulated and environmental management systems improved. Demonstrating leadership commitment through establishing environmental responsibility evaluation mechanisms is essential. Additionally, linking environmental performance with employee assessments and implementing incentive structures will encourage more proactive and standardized disclosure, supporting national dual-carbon objectives.

5.4 Improve Employees' Professional Competence and Environmental Awareness

Enterprises should establish systematic training programs, regularly organizing workshops for financial staff on environmental cost accounting, carbon asset management, and other professional skills. Inviting experts for seminars and case study discussions can further enhance the team's expertise. Proactive recruitment of professionals specializing in environmental accounting will strengthen disclosure capabilities. Moreover, fostering environmental awareness across the entire workforce through activities such as environmental knowledge contests, sharing of best practices in green production, and recognition of eco-friendly performance can help embed sustainable concepts into corporate culture, driving the overall transition toward green and low-carbon operations.

6 Conclusion

This study examines the environmental accounting information disclosure practices within the steel industry, using Baosteel as a case study, and identifies three major common challenges: companies often engage in selective disclosure, avoiding negative environmental data; the monetization of environmental impacts remains difficult; and there is a lack of third-party independent verification mechanisms. These shortcomings reduce the usefulness of information for decision-making and hinder the effective allocation of green financial resources.

Although disclosure content has become increasingly diverse, the absence of unified standards has resulted in fragmented and inconsistent information quality. A deeper issue lies in the fact that environmental responsibility must be fulfilled through substantive measures—such as internal performance evaluations, optimizing energy consumption structures, and promoting industrial transformation—rather than merely through the announcement of goals.

A systematic improvement requires multiple measures: establishing industry-specific disclosure standards, creating a collaborative supervision system involving the government, third-party institutions, and the public, strengthening the training of environmental accounting professionals, and encouraging enterprises to integrate environmental protection into their development strategies. Only through these efforts can substantial progress in disclosure quality be achieved.

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