Frontiers in Economics and Management Volume 7 Issue 7, 2026
ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

Research on the Evaluation of Corporate Environmental Information Disclosure Quality: A Case Study of Changyuan Electric Power

Luyao Li[1], Yuanchun Yu[2], and Qingxuan He[3]

[1] School of Management, Sichuan University of Science & Engineering, Yibin, China

[2] Professor, School of Management, Sichuan University of Science & Engineering, Yibin, China

[3] School of Management, Sichuan University of Science & Engineering, Yibin, China

Abstract

With the continuous advancement of the carbon peaking and carbon neutrality goals and ecological civilization development, environmental information disclosure has become a key indicator for evaluating corporate sustainable development capabilityThis study selects Hubei Energy Group Changyuan Electric Power Co., Ltd. as the case company.Drawing on relevant domestic and international laws and regulations on environmental information disclosure and considering the characteristics of China's industry practices, the study adopts the content analysis method to construct an environmental information disclosure evaluation index system.The system is based on 17 core indicators covering environmental assets, environmental liabilities, environmental income, and other related aspects. By examining the company's Social Responsibility Reports and ESG Reports from 2021 to 2024, this study calculates the Environmental Disclosure Index (EDI) and analyzes both the EDI and each evaluation indicator. The analysis reveals several weaknesses in the company's current environmental information disclosure practices and examines the factors contributing to these issues. On this basis, corresponding recommendations are developed to improve the quality and effectiveness of environmental information disclosure. The findings may also offer useful insights for other coal-fired power enterprises seeking to strengthen their environmental information disclosure and support their sustainable development efforts.

Keywords

Environmental Information; Quality Evaluation; Information Disclosure.

1. Introduction

At the 20th National Congress of the Communist Party of China, General Secretary Xi Jinping put forward two key strategic orientations: steadily pushing forward the dual-carbon initiative in a proactive and rational manner, and advancing green development to realize harmonious coexistence between humans and the natural ecosystem. The 14th Five-Year Plan for National Economic and Social Development together with the long-term development vision for 2035 both stress the necessity of speeding up industrial low-carbon transformation and tightening corporate responsibilities to disclose environmental data transparently[1]. The power sector belongs to high energy-intensive industries, among which thermal power operators stand out for their massive carbon output. Unlike manufacturing and other industrial sectors, environmental disclosures released by power firms cover more dimensions. Apart from routine pollutant governance, they also need to report carbon emission control progress and the rollout

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

of new energy projects. For the above reasons, it is of great practical significance to conduct in-depth research on environmental information disclosure practices within the power industry.

As a provincial core power subsidiary under National Energy Group, Changyuan Electric Power undertakes multi-type power generation businesses covering thermal, hydropower and clean renewable energy sectors. Over recent years, the enterprise has aggressively scaled up its installed capacity of new energy assets, built a standardized ESG governance framework, and released CSR and ESG sustainability reports on an annual basis. Although the scope of its environmental disclosure has expanded continuously, obvious gaps still exist in three key areas: detailed financial information related to environmental governance, systematic interpretation of climate and environmental risks, and credible supporting verification for all published environmental data.

In light of this industrial development and regulatory background, this paper takes Changyuan Electric Power as the core case study sample. It conducts a systematic analysis of the enterprise's environmental information disclosure practices spanning 2021 to 2024, and constructs a targeted evaluation index system to quantify the quality of its disclosure work. The evaluation results highlight several areas where the company's environmental information disclosure can be further improved. Based on these findings, this paper proposes a series of practical recommendations aimed at addressing the identified issues. These recommendations may also serve as a useful reference for other power enterprises seeking to enhance the quality and effectiveness of their environmental information disclosure.

2. Environmental Information Disclosure Policies

2.1. Domestic Policy Framework

In recent years, China has continuously strengthened its regulatory framework for corporate environmental information disclosure through a series of new laws and policy documents. As regulatory requirements have become more stringent, environmental information disclosure has gradually evolved from a voluntary corporate practice into a mandatory obligation, particularly for industries with high energy consumption and significant pollutant emissions, such as the power sector.

A major milestone was reached in 2022 with the implementation of the Administrative Measures for the Legal Disclosure of Enterprise Environmental Information, the first nationwide ministerial regulation specifically designed to standardize environmental information disclosure by enterprises[2]. Under this regulation, key pollutant discharge entities, listed companies, and bond issuers are required to disclose a broad range of environmental information, including pollutant emissions, carbon emissions, environmental governance arrangements, and emergency response measures. The regulation also requires listed companies to disclose environmental information related to financing activities and specifies the timing and official channels for public disclosure. Its implementation marked a significant shift in China's environmental disclosure system, replacing the previous voluntary approach with a more comprehensive mandatory disclosure framework.

On this basis, China has continued to improve its sustainability disclosure system and institutional framework. In 2024, the Corporate Sustainability Disclosure Standards – Basic Standard (Trial) was officially released, forming the cornerstone of China's unified sustainability disclosure standard system. The standard defines three core principles for disclosed information: reliability, relevance and verifiability. Drawing on mainstream international reporting frameworks, it constructs a sustainability disclosure structure supported by four core pillars: governance, strategy, risk and opportunity management, as well as metrics and targets. Meanwhile, it lays a unified institutional foundation for the formulation of follow-up special standards and industry-specific implementation guidelines.

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

In 2025, the Ministry of Finance launched the Corporate Sustainability Disclosure Standard No. 1 – Climate (Trial), which further refines and clarifies disclosure requirements for climate-related information. Under this standard, enterprises are required to disclose information including their climate governance structure, climate-related risks and opportunities, greenhouse gas emission data and phased emission reduction targets. It also puts forward more detailed specifications for carbon emission accounting rules, carbon trading operations, and the financial impacts brought by climate-related risks. For coal-fired power enterprises in particular, the accounting and compliance management of carbon emission allowances have become indispensable components of environmental information disclosure[3].

Meanwhile, China's capital market regulators have been continuously tightening disclosure requirements for listed firms. In January 2026, the Shanghai, Shenzhen and Beijing stock exchanges jointly revised the Guidelines for the Preparation of Sustainability Reports by Listed Companies. The revised guidelines add new disclosure themes covering pollutant emission control, energy utilization efficiency and water resource management. They also put forward more detailed requirements on data measurement methodologies, disclosure scope definition and financial impact analysis. For instance, enterprises are required to standardize the calculation of comprehensive energy consumption, and disclose specific information such as pollutant monitoring methods, discharge outlet details, and the impacts of environmental governance activities on corporate financial statements.

To further improve the accounting and management of carbon emissions in the power sector, the Ministry of Finance issued the Interim Provisions on the Accounting Treatment of Carbon Emissions Trading. The provisions establish clearer accounting requirements for carbon emission allowances by specifying how they should be recognized, measured, and presented in corporate financial statements. This provides a more standardized basis for enterprises to account for carbon-related transactions and disclose relevant financial information. They require enterprises to disclose the carrying value of carbon emission allowances, relevant trading activities and annual compliance costs, thus building a closer linkage between carbon-related information disclosure and corporate financial accounting work.

In addition, the State-owned Assets Supervision and Administration Commission (SASAC) has steadily promoted the construction of ESG management systems among central state-owned enterprises in recent years. It has clearly required listed companies under central SOEs to continuously improve the quality of their ESG reports. By 2024, nearly all listed enterprises controlled by central SOEs had released official ESG reports, and environmental information disclosure has been integrated into the performance evaluation systems of some central enterprises.

On the whole, the evolution of relevant policies in recent years shows that China's environmental information disclosure requirements have become increasingly comprehensive and sophisticated. Against the background of the dual-carbon strategic goals, regulatory supervision over environmental information disclosure in the power industry has been notably intensified, placing higher quality standards on the disclosure work of relevant enterprises.

2.2. International Policy Framework

By contrast with China's still-evolving environmental disclosure regulatory system, relevant institutional arrangements in Europe and the United States took shape at a far earlier stage and have grown into well-established, sophisticated governance frameworks. In the United Kingdom, the Environment Act further reinforces corporate environmental governance obligations, mandating that enterprises elevate the public transparency of their environmental operation and governance data. In the United States, the Securities and Exchange Commission (SEC) has been steadily advancing the formulation and implementation of climate-specific disclosure regulations in recent years. The primary objective of these regulations is to improve

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

the disclosure of climate-related risks and their potential effects on corporate operations and financial performance. Listed companies are therefore required to report greenhouse gas emissions and provide information on their climate governance arrangements in a more transparent and consistent manner.

Besides government regulations, international sustainability reporting frameworks have also played an important role in shaping corporate environmental information disclosure. Among them, the GRI Sustainability Reporting Standards developed by the Global Reporting Initiative (GRI) are widely used in ESG reporting. Similarly, the International Sustainability Standards Board (ISSB) introduced the IFRS Sustainability Disclosure Standard S2, Climate-related Disclosures, which requires companies to disclose climate-related information covering governance, strategy, risk management, and performance metrics.

China's sustainability disclosure framework has gradually incorporated many elements of the ISSB standards while remaining closely aligned with domestic policy objectives. Compared with international frameworks, greater attention is given to supporting the national "Dual Carbon" strategy, promoting green industrial transformation, and meeting the regulatory requirements applicable to state-owned enterprises. As a result, China's disclosure system reflects both international reporting practices and the country's broader sustainable development priorities.

3. Analysis of the Quality of Environmental Information Disclosure by Changyuan Electric Power

3.1. Company Profile

Changyuan Electric Power was established in 1995 and was listed on the Shenzhen Stock Exchange in 2000. The company is primarily engaged in thermal power generation while also operating businesses related to hydropower, renewable energy development, electricity distribution, and power retailing. Controlled by the National Energy Group, it has long been one of the major electricity suppliers in Hubei Province, with thermal power continuing to account for a substantial share of its business activities.

Between 2021 and 2024, the company experienced steady business growth. During this period, total assets increased from RMB 23.354 billion to RMB 40.362 billion, accompanied by continuous investment in renewable energy projects. In response to China's "Dual Carbon" strategy, the company accelerated the development of wind and photovoltaic projects while expanding its installed renewable energy capacity, resulting in a more diversified power generation portfolio.

The company also strengthened its ESG reporting practices during these four years. Environmental information disclosed in its reports became more comprehensive, covering topics such as pollution control, energy conservation, emission reduction, and renewable energy development. Nevertheless, some aspects of the disclosure remain relatively limited, particularly with respect to the completeness of environmental data and the level of detail provided in the supporting explanations.

3.2. Approaches to Environmental Information Disclosure

In 2021, environmental information was disclosed only through the company's Social Responsibility Report. The relevant content was concentrated in a single section on environmental responsibility, with relatively limited disclosure coverage and insufficient supporting data.

A noticeable improvement was made in 2022 following the publication of the company's first standalone ESG Report. The report introduced a dedicated environmental chapter, allowing environmental information to be presented in greater detail. During the same year, additional information on environmental protection investment and government subsidies was

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

incorporated into the annual report, improving the integration of environmental disclosure with financial reporting.

The ESG reporting framework was further optimized in 2023. Environmental information was reorganized into a clearer structure, making the disclosed content more systematic and easier for stakeholders to understand. It reorganized all environmental disclosures into three core modules: environmental governance, green industrial transition, and low-carbon operational development. In 2024, the ESG Report adopted a reporting framework consisting of "Governance," "Strategy," "Impact, Risk and Opportunity Management," and "Metrics and Targets," which is consistent with the requirements of the Corporate Sustainability Disclosure Standards. Compared with previous reports, the environmental information was classified in greater detail, and the scope of disclosure was further expanded.

Despite these improvements, the company has not yet issued a standalone environmental information disclosure report. Environmental information is still dispersed across the ESG Report and the annual report. In addition, some environmental data are reported using inconsistent statistical methodologies and disclosure scopes across the two reports, which affects the consistency and comparability of the disclosed information.

3.3. Environmental Information Disclosure Content

3.3.1. Environmental Financial Information

Environmental Protection Investment:In 2021, the company did not separately disclose the amount of its environmental protection investment. In 2022, environmental protection investment reached RMB 110 million. In 2023, total expenditures on workplace safety and environmental protection amounted to RMB 105.95 million. In 2024, total environmental protection investment increased to RMB 204.13 million. These expenditures were primarily used for upgrading flue gas desulfurization and denitrification facilities, carbon emission control, environmental protection facilities for renewable energy projects, and the construction of a fully enclosed dry coal storage facility at the Jingmen subsidiary. However, the company did not disclose the specific investment allocated to individual projects, such as desulfurization upgrades, carbon emission control, and renewable energy environmental facilities. It also failed to explain the financial impacts of these investments. As a result, the disclosures do not fully satisfy the financial impact disclosure requirements specified in the Guidelines for the Preparation of Sustainability Reports by Listed Companies.

Carbon Emissions Trading:In 2021, the company reported carbon emissions of 25.26 million tons through internal verification, with a carbon emission intensity of 0.81 tCO_2/MWh. In 2022, it issued the Measures for Carbon Emissions Management (Trial). In 2024, the company completed third-party verification of its 2023 carbon emissions data and fulfilled all annual carbon inventory and compliance obligations for regulated emission entities. Revenue generated from green electricity, green certificate trading, and carbon-related financial transactions exceeded RMB 22 million. However, the company did not disclose detailed information on the transaction value or the balance of carbon emission allowances. It also failed to disclose the financial statement impacts of carbon emission rights in accordance with the requirements of the Climate-related Disclosure Standard.

Government Green Subsidies:From 2021 to 2024, the company did not separately disclose the amount of government subsidies related to environmental protection. Instead, government subsidies were presented as an aggregated figure in the annual reports. In 2024, the Jingzhou subsidiary received a special government award of RMB 5.27 million for its comprehensive wastewater treatment project under the local high-quality development initiative. That said, the company has not disclosed how this subsidy is treated in its accounting records, nor has it clarified the link between the subsidy and its actual environmental performance — both items are explicitly required under relevant regulatory policies.

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

Environmental Costs:In 2022, the firm's spending on desulfurization and denitrification operations reached roughly RMB 230 million. This figure was not presented as a separate line item in public disclosures, and was instead consolidated into total operating costs. In 2024, the company did not provide a detailed breakdown of environmental costs. Instead, it disclosed only that comprehensive energy consumption per RMB 10,000 of output value was 3.85 tons of standard coal equivalent. It did not disclose detailed comprehensive energy consumption data in accordance with the requirements of the Guidelines for the Preparation of Sustainability Reports by Listed Companies.

3.3.2. Environmental Performance Information

Pollutant Emissions:In 2024, sulfur dioxide, nitrogen oxides, and particulate matter emissions were 2,191.1 tons, 3,837.24 tons, and 369.42 tons, respectively. The compliance rate for pollutant emissions reached 99.99%. However, the company did not provide detailed information on monitoring methods or the distribution of emission outlets. Compared with the latest guidelines on pollutant emission disclosure, the relevant disclosures remain insufficient.

Energy Consumption:Coal consumption for power generation decreased from 295.93 g/kWh in 2022 to 293.77 g/kWh in 2024. In 2024, the company recycled 168,000 cubic meters of rainwater. Nevertheless, the reported data were not calculated using the standardized methodology required by the relevant guidelines. The company also did not disclose the effects of these environmental initiatives on operating cash flows.

Green Transition Performance:The proportion of installed renewable energy capacity increased from 10.98% in 2021 to 25.93% in 2024. In 2024, the co-combustion of sludge saved approximately 20,000 tons of standard coal. Although the company disclosed its progress in renewable energy development, it provided limited discussion of how its carbon reduction targets are aligned with its long-term corporate development strategy.

3.3.3. Environmental Management Information

Organizational Structure:The company established leadership groups responsible for ecological and environmental protection and low-carbon development. It also introduced management measures related to carbon business operations. These governance arrangements generally comply with the governance disclosure requirements of the Climate-related Disclosure Standard.

Institutional Development:The company issued environmental protection management measures and promoted the development of "Zero-Waste Enterprises." However, it did not explain how these internal management systems are aligned with China's "Dual Carbon" strategy.

Technological Innovation:Several of the company's energy-saving technologies have received internationally recognized certifications for technological advancement. Nevertheless, the company did not disclose how these technologies contribute to addressing climate-related risks.

3.3.4. Environmental Responsibility Information

Positive Contributions:In 2024, the company traded 449 million kWh of green electricity and generated RMB 904,700 in revenue from green certificate transactions. It also added 0.171 square kilometers of green space. However, no information was disclosed regarding biodiversity conservation.

Negative Information:The company reported no major environmental penalties during the study period. However, it did not disclose minor environmental issues or the corresponding corrective actions. This practice does not fully satisfy the principle of balanced information disclosure.

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

4. Evaluation of the Quality of Environmental Information Disclosure by Changyuan Electric Power

4.1. Construction of the Evaluation Index System

Table 1. Evaluation Indicators for Environmental Information Disclosure

Numble	Category	Evaluation Indicator	Scoring Criteria
1	Environmental Financial Information	Environmental Assets	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
2		Environmental Liabilities	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
3		Environmental Revenue	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
4		Environmental Costs	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
5		Disclosure of Carbon Emission Allowance Accounting	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
6		Disclosure of Renewable Energy Subsidies	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
7	Environmental Management Information	Environmental Policies and Objectives	Not disclosed = 0; Disclosed = 1; Disclosure aligned with relevant policies = 2
8		Environmental Management Organization	Not disclosed = 0; Disclosed = 1; Clear disclosure of organizational responsibilities = 2
9	Environmental Performance Information	Environmental Risks	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
10		Pollutant Emissions	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Comprehensive disclosure in accordance with policy requirements = 3
11		Energy Consumption	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Standardized accounting in accordance with policy requirements = 3
12		Waste Recycling and Utilization	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
13	Environmental Responsibility Information	Environmental Penalties and Regulatory Notices	Not disclosed = 0; Qualitative disclosure = 1; Quantitative disclosure = 2; Combined qualitative and quantitative disclosure = 3
14		Environmental Education and Training	Not disclosed = 0; Disclosed = 1; Quantified disclosure = 2
15		Impacts of National Environmental Policies and Industry Environmental Conditions on the Company	Not disclosed = 0; Disclosed = 1; Disclosure integrated with strategic analysis = 2
16	Information Reliability	Independent Third-Party Assurance	Not disclosed = 0; Disclosed = 2
17	Policy Compliance	Compliance of Disclosure Content and Reporting Format	Significant non-compliance = 0; Partial compliance = 0.5; Basic compliance = 1.5; Full compliance = 2

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

To provide a comprehensive evaluation of the quality of environmental information disclosure by Changyuan Electric Power, this study develops an evaluation index system based on the Administrative Measures for the Legal Disclosure of Enterprise Environmental Information, the disclosure requirements for the power industry specified in the Self-regulatory Guidelines No. 3 for Listed Companies on the Shenzhen Stock Exchange-Industry Information Disclosure, and other relevant regulations. In addition, relevant academic literature is reviewed, and the evaluation system is tailored to the actual disclosure practices of Changyuan Electric Power. The study adopts the content analysis method to construct the evaluation framework[4].

The evaluation index system was developed with reference to the Administrative Measures for the Legal Disclosure of Enterprise Environmental Information together with disclosure requirements applicable to the power industry. To better reflect the characteristics of Changyuan Electric Power, the indicators were refined according to the company's actual disclosure practices. In addition to conventional indicators related to environmental finance and environmental performance, two indicators with strong industry relevance were incorporated into the framework, namely carbon emission allowance accounting disclosure and renewable energy subsidy disclosure. The final evaluation framework consists of 17 indicators covering six dimensions: environmental financial information, environmental management, environmental performance, environmental responsibility, information reliability, and policy compliance.

The scoring criteria were established according to both the completeness and the level of detail of the disclosed information. Qualitative disclosure was evaluated separately from quantitative disclosure. Where only numerical information was reported without supporting explanations, the corresponding quantitative scoring criteria were applied. By contrast, disclosures containing both descriptive discussion and quantitative evidence received higher scores under the comprehensive evaluation standard. Where textual descriptions, concrete numerical data and supporting background materials are all available, the item will be scored using a mixed qualitative-quantitative standard.

After scoring every single indicator, all individual scores are aggregated to calculate the Environmental Disclosure Index (EDI). This quantitative metric serves to measure the overall standard of environmental information disclosure released by Changyuan Electric Power. The full list of evaluation indicators and matching scoring criteria can be found below.

When developing the evaluation index framework, this study optimizes indicator settings by integrating the operational features of coal-fired power enterprises and the actual disclosure status of Changyuan Electric Power. Most existing studies on environmental information disclosure center on universal indicators such as pollutant discharge and environmental protection investment. Yet for coal-fired power enterprises, carbon emission management, renewable energy transition and environmental governance costs have gradually become core components of environmental information disclosure. Accordingly, apart from conventional indicators covering environmental assets, environmental liabilities and environmental costs, this study incorporates two industry-specific indicators: the disclosure of carbon emission allowance accounting and renewable energy subsidies, so as to better reflect coal-fired power enterprises' environmental governance practices and green transition efforts under the dual-carbon goals.

Two core indicators, environmental assets and environmental liabilities, are designed to assess the disclosure completeness of information involving environmental protection equipment investment, environmental governance expenditure and potential environmental obligations. The indicator for carbon emission allowance accounting disclosure focuses on whether the enterprise publishes details about the accounting treatment, compliance performance and trading activities of carbon allowances. Given the massive carbon emissions generated by coal-fired power enterprises, carbon trading has emerged as a critical factor influencing their

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

operational costs and financial outcomes, which endows this indicator with strong industry pertinence.

Meanwhile, the renewable energy subsidy disclosure indicator is set to evaluate information related to the enterprise's green transformation progress. In recent years, renewable energy has taken up a growing share in Changyuan Electric Power's business portfolio, making government subsidies, green electricity trading and related activities indispensable parts of the enterprise's environmental information disclosure. For this reason, this study includes renewable energy subsidy disclosure as a targeted evaluation dimension.

For the environmental performance dimension, indicators covering pollutant emissions, energy consumption, and waste recycling and utilization are adopted to measure the actual effect of the enterprise's environmental governance practices. Among them, pollutant emission data and power generation coal consumption serve as direct evidence of the enterprise's energy conservation and emission reduction performance, and also represent core regulatory focuses for the power industry.

Furthermore, to adapt to the increasingly strict regulatory requirements for environmental information disclosure, this study adds two supplementary indicators: policy compliance and independent third-party assurance. The policy compliance metric checks whether corporate disclosed materials align with the Corporate Sustainability Disclosure Standards and matching industrial guidelines. By contrast, the independent third-party verification item measures how verifiable and trustworthy the released environmental data are. Since Changyuan Electric Power has not adopted any third-party verification mechanism for its environmental disclosures so far, this metric directly reveals the defects in the reliability of its environmental data.

4.2. Calculation of the Environmental Disclosure Index (EDI)

Table 2. Scoring Results of the Environmental Information Disclosure Evaluation (Points)

Numble	Evaluation Indicator	2021	2022	2023	2024
1	Environmental Assets	1	1	1	2
2	Environmental Liabilities	1	1	1	1
3	Environmental Revenue	2	3	3	3
4	Environmental Costs	1	1	1	2
5	Disclosure of Carbon Emission Allowance Accounting	1	1	2	2
6	Disclosure of Renewable Energy Subsidies	1	2	2	3
7	Environmental Policies and Objectives	1	1	1	2
8	Environmental Management Organization	1	1	1	2
9	Environmental Risks	0	0	0	1
10	Pollutant Emissions	2	3	3	2
11	Energy Consumption	2	2	2	2
12	Waste Recycling and Utilization	1	1	1	2
13	Environmental Penalties and Regulatory Notices	1	1	1	1
14	Environmental Education and Training	0	0	1	1
15	Impacts of National Environmental Policies and Industry Environmental Conditions on the Company	1	1	1	2
16	Independent Third-Party Assurance	0	0	0	0
17	Compliance of Disclosure Content and Reporting Format	0.5	0.5	1.5	1.5
18	Total Score	15.5	17.5	20.5	27.5
19	Maximum Score	45	45	45	45
20	Environmental Disclosure Index (EDI)	34.44	38.89	45.56	61.11

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

The Environmental Disclosure Index (EDI) was calculated by evaluating all 17 indicators included in the established assessment framework. The analysis was based on Changyuan Electric Power's annual reports, Social Responsibility Reports, and ESG Reports published from 2021 to 2024. Scores assigned to each indicator were summed to obtain the total evaluation score, while the maximum score represents the highest value that can be achieved under the evaluation framework. The EDI was then calculated using the following formula:

$$\text{EDI} = \frac{\text{Total Score}}{\text{Maximum Score}} \times 100 \quad (1)$$

The evaluation results show that Changyuan Electric Power's Environmental Disclosure Index (EDI) increased from 34.44 in 2021 to 61.11 in 2024, with intermediate values of 38.89 in 2022 and 45.56 in 2023. This upward trend suggests a gradual improvement in the company's environmental information disclosure over the period covered by the study.

4.3. Results Analysis

The EDI results indicate that the quality of environmental information disclosure at Changyuan Electric Power improved continuously between 2021 and 2024. The increase became more pronounced after 2023, which may be associated with the company's regular publication of ESG reports and the continued expansion of its renewable energy business.

A review of the individual indicators shows that the company performed relatively well in areas such as pollutant emission disclosure, environmental management, and renewable energy development. Information disclosed in these aspects was generally more complete than that provided for several other evaluation indicators. The scores of several indicators increased substantially over the study period. For example, the improvements in the scores for renewable energy subsidy disclosure and environmental management organization indicate that the company has expanded its disclosure of environmental management information in recent years.

Despite these improvements, the overall evaluation results reveal several notable shortcomings in the company's environmental information disclosure. First, the depth of environmental financial information disclosure remains insufficient, as environmental protection investments and environmental costs are not supported by detailed analysis. Second, environmental risk disclosure is relatively limited, with little quantitative information provided on risks associated with carbon price fluctuations and changes in environmental policies. Third, the company did not obtain independent third-party assurance during the four-year study period. Consequently, the reliability of certain environmental data depends primarily on the company's self-disclosure. Finally, although pollutant emission and energy consumption data have been reported, supporting information, such as monitoring methods and statistical methodologies, remains incomplete. Compared with the requirements of the current Corporate Sustainability Disclosure Standards and the latest industry guidelines, the company's environmental information disclosure still has considerable room for improvement.

5. Problems in the Environmental Information Disclosure of Changyuan Electric Power

5.1. Inconsistent Disclosure Formats

Currently, environmental information released by the enterprise is scattered across multiple independent reporting documents. Back in 2021, all environmental-related contents were exclusively presented in the annual Social Responsibility Report, accounting for roughly 10% of the full report’s total volume. The company rolled out its first standalone ESG Report in 2022,

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

which covered more systematic and comprehensive environmental information. Despite these improvements, the company still does not publish a dedicated environmental information disclosure report, and a unified reporting framework has yet to be established. As a result, relevant environmental information remains dispersed across different reports, making it less convenient for stakeholders to obtain a complete understanding of the company's environmental performance. This fragmented disclosure approach may also reduce the effectiveness of regulatory supervision and public monitoring.

5.2. Insufficient Detail in Environmental Financial Information Disclosure

The environmental information currently disclosed by the company does not yet fully meet the detailed requirements of relevant regulations and disclosure standards. For example, expenditures on environmental protection and routine environmental management are reported only as aggregated amounts, with no separate disclosure for major projects such as flue gas desulfurization or denitrification upgrades. In addition, limited information is provided on the accounting treatment of carbon emission allowances and government environmental subsidies, making it difficult to assess how these items relate to the company's environmental management activities. The disclosure of pollutant emissions is also incomplete, as important information such as monitoring methods and impact assessments is not presented in sufficient detail. Taken together, these issues suggest that the company's disclosure content remains incomplete and still falls short of the increasingly detailed requirements introduced by recent environmental disclosure policies and reporting standards.

5.3. Lack of Explanations for the Measurement Basis of Environmental Data

Most of the company's environmental data is generated through its internal statistical and accounting systems, while independent verification procedures have not yet been introduced. As a result, important indicators, including carbon emission data, are disclosed without external assurance or third-party verification. In addition, differences in statistical methods across reporting years reduce the comparability of the disclosed information. The absence of consistent calculation standards also affects the reliability and credibility of the environmental data presented in the company's reports. To take a specific example, the company failed to specify the monitoring methods applied to pollutant emission measurement in 2024, which has raised concerns about possible adjustments to its statistical caliber and calculation rules. The absence of independent assurance mechanisms and sufficient supporting explanatory notes directly undermines the credibility of the publicly released environmental information[5].

5.4. Inadequate Internal Management Mechanisms

Currently, the enterprise has yet to set up a dedicated functional department responsible for unified environmental information management, and the division of duties between the environmental protection department and the finance department remains ambiguous and ill-defined. Furthermore, there is no well-established systematic mechanism for tracking regulatory developments and updating internal management policies in a timely manner, which leads to a lagged response to newly introduced regulations and requirements related to the dual-carbon strategic goals. In addition, the company’s internal staff training programs and performance appraisal system have not integrated responsibilities concerning environmental information disclosure, which further weakens internal motivation and sense of accountability for producing high-quality environmental disclosure materials.

5.5. Insufficient Alignment between the Disclosure Framework and the Characteristics of the Power Industry

The company's current environmental disclosure framework does not fully capture the operational characteristics of the power industry. For instance, information on carbon emission

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

allowance trading and green electricity transactions is disclosed only in general terms, with limited quantitative data or detailed explanation. These indicators are closely related to the environmental performance of coal-fired power enterprises but are not presented in sufficient depth in the company's reports. Furthermore, the existing reporting framework has yet to fully incorporate the latest industry-specific disclosure requirements and regulatory guidance. As a result, the overall usefulness and effectiveness of the company's environmental information disclosure are somewhat constrained.

6. Recommendations for Improving the Quality of Environmental Information Disclosure by Changyuan Electric Power

6.1. Publish a Standalone Environmental Information Disclosure Report to Establish a Unified Reporting Platform

A dedicated Environmental Information Disclosure Report should be prepared to integrate environmental information that is currently dispersed across different corporate reports. Consolidating relevant information into a single reporting document would improve the consistency and accessibility of environmental disclosures. At the same time, a unified reporting framework and standardized disclosure format should be adopted to ensure that environmental data remain comparable across reporting periods. Consistent statistical methods should also be applied in both the annual report and the ESG Report to avoid discrepancies between different disclosure documents.

The company could further strengthen its disclosure system by establishing a centralized environmental data management platform and providing an online channel through which stakeholders can access environmental information. These measures would improve the transparency of environmental disclosure while making relevant information more readily available to regulators, investors, and the public.

6.2. Enhance the Disclosure of Carbon Trading, Environmental Protection Investment, and Other Detailed Information

The company should further improve the quality of its environmental disclosures by expanding the range of quantitative information reported. More detailed information on environmental protection investment and operating expenditures should be provided, including separate disclosures for major projects such as flue gas desulfurization and denitrification upgrades. Additional information on the transaction value and carrying amount of carbon emission allowances would also enhance the transparency of financial disclosures.

Greater attention should also be given to explaining the accounting treatment and use of government environmental subsidies, together with their contribution to environmental management activities. To improve data consistency, pollutant emission and energy consumption indicators should be measured using standardized methods that comply with relevant national and industry requirements. The reports could further include an assessment of how environmental performance influences the company's financial position and operating results. Given the characteristics of the coal-fired power industry, information on carbon management activities and green electricity trading should also be incorporated into the regular environmental disclosure framework.

6.3. Introduce Independent Third-Party Assurance and Standardize Statistical Methodologies

To further enhance the credibility of its publicly released environmental information, the enterprise is recommended to establish a sound independent third-party assurance mechanism. Core environmental and climate-related data shall be subject to verification by

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

accredited independent assurance institutions, and the official verification conclusions shall be fully disclosed in the published report. Meanwhile, the company shall develop unified and standardized statistical calibers and data monitoring workflows for all types of environmental data. Supporting explanatory notes shall also be attached to the reporting documents, so as to guarantee the consistency, cross-period comparability and verifiability of disclosed information across all reporting cycles[6].

6.4. Establish a Dedicated Management Department and Strengthen Policy Monitoring

For the purpose of standardizing internal environmental information governance, the enterprise is advised to set up a specialized functional department in charge of unified environmental information management, and clarify explicitly its organizational structure and corresponding division of duties. The work of environmental information disclosure shall be fully embedded into the company's overall management system to ensure standardized top-down implementation.

Besides, a dynamic regulatory tracking mechanism shall be established to keep abreast of the latest policy developments and adjust disclosure practices in a timely manner, so as to guarantee full compliance with newly introduced regulations and guidelines. Responsibilities concerning environmental information disclosure shall also be integrated into internal management rules and the performance appraisal system, which helps reinforce work accountability and enhance the initiative of relevant departments to deliver high-standard disclosure outcomes.

6.5. Improve Disclosure Content by Reflecting the Characteristics of the Coal-Fired Power Industry

To improve the industry adaptability of its disclosure system, the enterprise shall further align its environmental information disclosure rules with the prevailing reporting standards applicable to the power sector, and take the initiative to draw on the latest industry-specific disclosure guidelines. It can also carry out in-depth cooperation with industry associations and regulatory authorities to explore disclosure practices that better fit the operational characteristics of coal-fired power enterprises. Such an optimization approach will help ensure all disclosure indicators fully meet the latest industry regulatory requirements. Furthermore, the company shall actively participate in environmental disclosure practices related to green electricity trading platforms, and integrate information on its core competitive strengths - such as specific green electricity trading performance data - into its routine environmental information disclosure framework.

7. Conclusion

Taking Changyuan Electric Power as the core research case, this paper conducts a systematic analysis of the enterprise's environmental information disclosure practices, drawing on its publicly released annual reports, social responsibility reports and ESG reports spanning 2021 to 2024. Based on the analysis presented in this study, an evaluation framework built around the Environmental Disclosure Index (EDI) was developed to assess the overall quality of environmental information disclosure by Changyuan Electric Power.

The evaluation results indicate that the company's environmental information disclosure improved steadily during the study period. In recent years, greater attention has been given to renewable energy development, pollutant emission control, and carbon management, resulting in more comprehensive disclosure in these areas. At the same time, the introduction and continuous improvement of ESG reporting have broadened the scope of environmental

ISSN: 2692-7608 DOI: 10.6981/FEM.202607_7(7).0016

disclosure, extending it beyond traditional pollution control to include topics related to low-carbon transition and carbon management.

Despite these improvements, several limitations remain. Disclosure of environmental investment, operating expenditures, and carbon trading information is still relatively limited. In addition, environmental risk information is presented mainly in a descriptive manner, while quantitative analysis of the financial impacts associated with policy changes and carbon price fluctuations remains insufficient. Meanwhile, the enterprise has not yet introduced an independent third-party assurance mechanism, meaning the verifiability and credibility of its environmental data still have considerable room for further optimization.

These existing shortcomings are closely associated with the incomplete development of the enterprise's environmental accounting system and its relatively immature environmental data management mechanism. In parallel, China's overall environmental information disclosure institutional framework is still in a stage of continuous evolution, with differentiated disclosure standards across different industries. All these factors have jointly increased the complexity and practical difficulty of carrying out standardized environmental information disclosure for enterprises.

Based on the above research findings, this paper proposes that Changyuan Electric Power should further upgrade its environmental information disclosure quality by improving environmental accounting practices, enriching environmental risk disclosure contents, enhancing data transparency, and strengthening cross-departmental coordination. For coal-fired power enterprises, the continuous advancement of the dual-carbon strategic goals has made environmental information disclosure increasingly critical, as it is now closely linked to enterprises' green transformation progress and their access to external financing resources.

Acknowledgments

This research was Supported by The Innovation Fund of Postgraduate, Sichuan University of Science & Engineering (Y2025141).

References

[1] Zhang, K. Q. (2018). Disclosure quality, media attention, corporate governance and the market response to corporate environmental information disclosure. Communication of Finance and Accounting, (24), 74–78.

[2] Chen, X. J. (2022). Building China's ESG information disclosure system from the perspective of international policy evolution. China Banking, (7), 21–24.

[3] Xu, R. J. (2021). Research on the evaluation of environmental information disclosure quality: A case study of Hisun Pharmaceutical [Master's thesis]. East China University of Technology.

[4] Li, C. Y., & Ma, T. Q. (2023). Research on the evaluation of corporate environmental information disclosure quality-A case study of H Company. Enterprise Science and Technology & Development, (1), 111.

[5] Liu, Z. Y., & Wang, X. Z. (2025). The impact of green credit policy on financing constraints of heavily polluting enterprises: Evidence from the perspective of environmental information disclosure. Enterprise Economy, 44(3), 27.

[6] Wang, M. B., Ye, T., & Kong, D. M. (2024). Green manufacturing and corporate environmental information disclosure: Evidence from China's green factory initiative. Economic Research Journal, 59(2), 116.