# Regulating ESG Disclosure in High-Carbon Enterprises: The Case of China's Thermal Power Industry

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**Abstract: Under China's "dual carbon" goals, the legal framework for ESG disclosure by high-carbon enterprises has become central to ecological governance. ESG disclosure in the thermal power sector reveals a structural misalignment in regulatory logic: the capital market's "investor protection" paradigm is ill-equipped to address environmental public risk governance. Effective regulation thus entails a reorientation toward "environmental risk governance." Anchored in the precautionary principle, mandatory and differentiated environmental disclosure should be established as a foundational legal obligation for high-carbon enterprises. Taking the thermal power industry as a case study, this article proposes a tripartite legal framework-structural reconfiguration, accountability reinforcement, and collaborative governance-to provide institutional support for the green transition of high-carbon industries.**

**Keywords: ESG Information Disclosure; High-Carbon Enterprises; Thermal Power; Environmental Risk Governance**

## 1. Introduction: Inadequate Regulatory Effectiveness and Institutional Roots of ESG Disclosure in the Thermal Power Sector

Since China formally announced its "dual carbon" goals in 2020, carbon reduction has become the central strategic priority of ecological advancement. For high-carbon enterprises-key economic and social actors within China's energy market-ESG performance has emerged as a core metric of sustainable development. While robust ESG practices may enhance corporate reputation and reduce capital costs[1], they may also increase short-term expenses, compelling firms to balance profitability against social responsibility[2]. China's ESG development remains nascent, and the legal framework governing institutional supply and enforcement requires urgent improvement[3].

The thermal power sector accounts for over 40% of China's carbon emissions. Its ESG performance profoundly affects the green transition of high-carbon enterprises and the trajectory toward the "dual carbon" goals. Consider Huaneng Power International, a leading thermal power producer: between 2020 and 2021, several subsidiaries incurred environmental penalties exceeding RMB 2 million, yet declined disclosure on the grounds that "no environmental penalty information requires disclosure pursuant to regulatory requirements." Such concurrent non-disclosure and data fabrication underscore the weak enforcement plaguing corporate environmental disclosure under the current regime. This article adopts the thermal power sector as an analytical lens to contribute to legal scholarship on ESG disclosure by high-carbon enterprises.

## 2. Regulatory Landscape and Challenges: ESG Disclosure in China's Thermal Power Industry

### 2.1 The International Evolution of Regulatory Models: Trends in Mandatory Legislation and Industry-Specific Standards

ESG disclosure regulation is undergoing a fundamental shift from voluntary to mandatory frameworks. The EU's 2022 Corporate Sustainability Reporting Directive (CSRD) introduced the "double materiality" principle[4]; California's 2023 Climate Corporate Data Accountability Act mandates Scope 1–3 emissions disclosure for large corporations[5]; and jurisdictions such as Japan and Singapore are aligning with International Sustainability Standards Board standards[6-7]. International regulation increasingly emphasizes industry-specific guidance, with the ISSB's implementation guidance drawing upon SASB's sector-specific metrics[8]. For the fossil fuel

 

power sector, SASB standards require disclosure of greenhouse gas emissions, air quality, water management, ecological impacts, and asset retirement obligations[9]. Misrepresentation litigation, directors' fiduciary duties, and third-party assurance independence have emerged as focal points in both scholarship and regulatory practice. High-carbon ESG disclosure regulation abroad has thus entered an era of mandatory, standardized, and legally accountable disclosure.

### 2.2 ESG Disclosure in China's Thermal Power Industry: An Empirical Portrait of Divergence, Imbalance, and Distortion

Although ESG report disclosure rates among A-share thermal power companies have increased annually, overall quality remains low. Empirical studies indicate that environmental regulation has improved ESG performance, yet transparency and comparability remain inadequate, warranting expanded mandatory disclosure[10]. Evaluation using principal component analysis and entropy-weighted TOPSIS reveals generally low and volatile ESG disclosure quality[11]. Within the sector, according to public data from third-party rating agencies, divergence between leading firms and smaller enterprises is pronounced: firms with market capitalization exceeding RMB 10 billion average 68.07 ESG points, significantly above the industry average of 62.40, while smaller firms' disclosures remain largely perfunctory.

Disclosure content exhibits over-generalization and under-specialization. Measured against SASB fossil fuel power standards-which require disclosure of emissions, air quality, water management, ecological impacts, and asset retirement plans-domestic firms report primarily basic indicators (total carbon emissions, environmental expenditures), with Scope 3 emissions and climate scenario analysis virtually absent. Teng and Xie's evaluation of 33 high-carbon listed firms (2017–2021) revealed significant quality disparities, pervasive greenwashing, and limited decision-usefulness[12]. Wang and Cheng further demonstrated that post-"dual carbon" carbon reduction pressures incentivized improved disclosure levels without corresponding increases in actual emission reduction investments-a pronounced greenwashing accommodation effect[13].

Information distortion and systemic falsification further undermine disclosure credibility. In 2025, Deping Thermal Power Plant was penalized for three consecutive years of falsified carbon emission data[14]; Ningxia Tianrui Thermal Energy was fined RMB 420 million for failing to surrender emission allowances[15]; and 2026 central inspection reports highlighted systemic data falsification and excessive emissions among coal-fired enterprises[16]. These cases reveal a fundamental contradiction in voluntary, capital market-oriented disclosure: enterprises prioritize the "signaling function" of ESG information over its "governance function." Industry reports consistently note inconsistent standards, low disclosure rates for key data, and marked discrepancies in qualitative indicators-confirming that information distortion pervades environmental disclosure across high-carbon sectors.

### 2.3 Institutional Supply and Implementation Predicaments in Domestic Regulation

Domestic scholarship on ESG disclosure has concentrated primarily on jurisprudential foundations, the mandatory-voluntary dichotomy, and high-carbon industry applications. Yet significant gaps persist: the analytical lens remains anchored in securities law or corporate governance theory, with insufficient excavation of environmental law attributes; sector-specific analyses lack actionable differentiation strategies; and integration pathways with existing environmental law mechanisms remain underexplored.

International experience offers templates of mandatory, differentiated, and accountable regulation; domestic research reveals weaknesses in legal positioning, industry adaptation, and implementation coordination. The underlying cause is a misaligned regulatory logic: the capital market's "investor protection" paradigm dominates ESG disclosure by high-carbon enterprises, neglecting its essential character as a tool for environmental public risk governance. A paradigm shift from "investor protection" to "environmental risk governance," grounded in the precautionary principle, is therefore imperative.

## 3. Central Thesis: Reframing the Regulatory Logic from Investor Protection to Environmental Risk Governance

Viewed through a jurisprudential lens, the predicament stems from a structural

 

misalignment of regulatory logic. When disclosure is guided predominantly by "investor protection," enterprises prioritize capital market signaling over truthful representation of environmental risks, even resorting to fraudulent means to maintain the appearance of compliance[17]. Scholars have characterized this phenomenon as "ESG carbonwashing"-overemphasizing carbon initiatives while selectively neglecting other ESG dimensions, thereby misleading stakeholders. Empirical studies confirm a significant post-"dual carbon" increase in carbonwashing among high-emission enterprises[18]. This corroborates the central thesis: a disclosure regime predicated on capital market logic cannot adequately address environmental public risk governance; a fundamental reorientation toward "environmental risk governance" is indispensable.

### 3.1 The Inevitability of Logical Transition: A Jurisprudential Justification Based on the Precautionary Principle and the "Dual Carbon" Goals

The Precautionary Principle is a core tenet of environmental law, legislatively affirmed in Article 6 of China's Eco-Environmental Code[19-20]. Its application to ESG disclosure regulation for high-carbon enterprises is fully justified. Thermal power's environmental impacts are cumulative, long-term, and irreversible. The national carbon market covers approximately 5.1 billion tons of $CO_2$ annually, encompassing over 2,200 power enterprises[21]; data veracity directly impacts market fairness and the "dual carbon" trajectory[22-23]. The Interim Regulations on Carbon Emissions Trading Administration specifically target data fraud, exemplifying regulation of carbon disclosure from an environmental risk governance perspective.

The conventional "investor protection" paradigm centers on share price impacts and offers primarily ex-post remedies, failing to address ex-ante mitigation of public environmental risks. The Precautionary Principle mandates preventive measures before serious environmental damage occurs. As a core instrument for identifying and assessing environmental risks, information disclosure should derive normative force from this principle: enterprises should report not only historical environmental performance but also forward-looking information-transition plans, climate scenario analyses, stranded asset risks. Empirical studies demonstrate that carbon trading pilots significantly enhanced ESG performance and disclosure quality among high-emission listed enterprises[24-25]. When environmental regulatory instruments are embedded in market mechanisms, improved ESG disclosure reflects not merely passive compliance but proactive strategic adjustment-providing robust institutional support for integrating the Precautionary Principle into disclosure regulation..

### 3.2 Reshaping Obligatory Attributes: Mandatory and Differentiated Environmental Disclosure as a Legal Duty of High-Carbon Enterprises

Under current law, environmental disclosure is largely viewed as social responsibility or a derivative securities law obligation, with ambiguous legal standing and weak enforcement. Comprehensive, accurate, and timely disclosure of environmental risks should be defined as a foundational legal obligation for high-carbon enterprises-a position justified by extending the Polluter Pays Principle to the informational domain.

The EU CSRD's "double materiality" principle offers a critical reference, requiring reporting on both financial implications and environmental/social impacts, thereby embedding protection of the environmental commons within statutory disclosure obligations[26]. Domestically, China's Guidance for Listed Companies on Sustainability Disclosure represents the first systematic mandatory rule, with disclosure rates rising significantly. Revised 2025 regulations further elevate the legal hierarchy of sustainability disclosure[27-28]. However, the mandatory nature of these rules primarily targets the act of disclosure itself, with insufficient differentiation in content requirements. The thermal power sector should construct a quantitative, comparable, and auditable mandatory indicator system-focused on carbon intensity, water stress, and biodiversity impacts-aligned with carbon market accounting rules and pollution discharge permit systems.

### 3.3 Enhanced Functional Positioning: Constructing a Legal Leverage Framework

 

**for Green Transition and Pluralistic Governance**

The transformation of regulatory logic necessitates an upgrade in functional positioning. ESG information should evolve from a mere investor reference into a legal lever driving green transformation and multi-stakeholder governance. At the administrative level, quality disclosure may be linked to pollution discharge permits and environmental funds. At the judicial level, preventive environmental public interest litigation can treat false disclosure as an independent ground for fault determination[29-30]. At the social level, standardized disclosure provides institutional channels for public participation[31]. Through such functional expansion, ESG disclosure becomes embedded within the enforcement network of environmental law, effectuating a leap from "information tool" to "governance nexus."

## 4. Pathways to Resolution: Constructing a Legal and Regulatory Framework for ESG Information Disclosure in the Thermal Power Sector

Having established the imperative of reorienting regulatory logic toward environmental risk governance, this chapter turns to institutional design. The thermal power sector-the largest single carbon emission source, poised between mandatory and voluntary disclosure-offers a quintessential case study. Drawing upon the EU CSRD's double materiality and ISSB's sector-specific standards[32], while building upon China's existing Guidelines for Sustainability Reporting, this chapter constructs a tripartite legal framework comprising structural reconfiguration, accountability reinforcement, and collaborative governance.

### 4.1 Framework Reconfiguration: Differentiated and Mandatory Legal Obligations

A two-tier legislative architecture should be adopted: a principle provision in the Environmental Protection Law establishing mandatory disclosure obligations for key pollutant-discharging entities, with delegated authority to the Ministry of Ecology and Environment for detailed measures; concurrent revisions to the Energy Law and Electricity Law should embed industry-specific requirements. The CSRC's 2025 revised Information Disclosure Measures already elevate the legal hierarchy of sustainability disclosure[33]; future efforts should align environmental and securities law obligations.

Disclosure standards must be quantified and differentiated. A core indicator inventory-covering carbon emissions, carbon intensity, unit retirement pathways, and water stress-should be developed, with phased progression toward forward-looking metrics. The 2026 Guidelines add modules on pollutant emissions, energy utilization, and water use; the Ministry of Finance jointly issued Corporate Sustainability Disclosure Standard No. 1-Climate (Trial), transitioning Scope 3 disclosure to standardization[34-35]. Tiered obligations should be established according to enterprise size and emission magnitude, with materiality shifting from "share price sensitivity" to "environmental risk significance."

The double materiality principle requires localized adaptation[36]. Impact materiality should be strengthened, focusing on whether corporate activities significantly affect the environment. Transition periods or simplified requirements should be established for small and medium-sized enterprises.

### 4.2 Strengthening Safeguards: Legal Accountability and Regulatory Coordination

Systematic Refinement of Legal Liability. Administrative penalties for false disclosure should be increased, with daily penalty mechanisms and suspension of operations introduced. The 2026 Regulations on Ecological and Environmental Monitoring enumerate six categories of data falsification with corresponding penalties, offering a legislative model of "enumerated conduct plus quantified penalties" for ESG disclosure[37]. Civil liability should recognize false disclosure as an independent ground for fault in environmental public interest litigation, with punitive damages supported. The 2026 judicial interpretation includes greenhouse gas emission testing and reporting intermediaries within the scope of "providing false certification documents." Corporate law should clarify board supervisory responsibilities, bringing material misstatements within directors' duty of diligence[38].

Mechanisms for Coordinating Regulatory Responsibilities. Regulatory coordination should establish a mechanism where environmental authorities lead content standards and financial

 

regulators oversee enforcement. An inter-ministerial joint conference should harmonize interpretation and application of disclosure standards[39].

Introduction and Regulation of Third-Party Independent Verification. Mandatory assurance for ESG reports of major emitting enterprises should be progressively implemented, with qualification standards jointly formulated by environmental and market regulation authorities[40]. The "dual penalty system" and employment prohibition provisions in the Regulations on Ecological and Environmental Monitoring provide an instructive institutional model. Initially, verification may focus on carbon emission data, leveraging the national carbon market's existing evaluation mechanisms, before expanding to full ESG report assurance.

### 4.3 Collaborative Governance: Multi-Stakeholder Networks

ESG disclosure quality should be integrated into corporate environmental credit evaluation, linked to green credit approvals and environmental fund allocation, establishing a "disclosure-evaluation-incentive" feedback loop[41]. Empirical research confirms that robust ESG performance enhances bank credit access and reduces borrowing costs[42]. The Supreme People's Court should issue guiding cases clarifying burden of proof and compensation standards for false disclosure in environmental public interest litigation. A unified ESG information inquiry system based on government information platforms should facilitate public oversight.

## 5. Conclusion

Legal regulation of ESG disclosure by high-carbon enterprises must transcend capital market logic toward a paradigm of environmental risk governance. Where corporate environmental information concerns both capital allocation efficiency and ecological security, the starting point of legal regulation should return to environmental law's core concerns-risk prevention and protection of the public interest. ESG disclosure by high-carbon enterprises thus constitutes a foundational institutional arrangement in the rule of law for ecological civilization.

This study extends the research on ESG disclosure from the business and economic law paradigm to the environmental law paradigm, revealing the inherent tension between these two regulatory logics and exploring pathways for their coordination within the framework of environmental law. This shift in perspective enriches interdisciplinary research at the intersection of environmental law and disclosure theory, while also providing analytical tools to address the rule-of-law requirements of the "Dual Carbon" strategy. However, it should be noted that this paper primarily develops its arguments at the institutional level, with limited empirical testing at the corporate level. Furthermore, the analysis focuses on the thermal power generation sector and lacks cross-industry comparisons with other high-carbon sectors such as steel and cement. Future research could expand in these directions while also conducting follow-up evaluations of the effectiveness of judicial remedies for ESG disclosure.

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