
COMPARATIVE ANALYSIS OF CARBON EMISSION DISCLOSURE BASED ON GRI 305 IN COAL MINING COMPANIES



Nabilah Iffat Arianti¹
Universitas Brawijaya, Malang, Indonesia
nabilah24.iff@gmail.com

Gugus Irianto²
Universitas Brawijaya, Malang, Indonesia
gugusir@ub.ac.id

Abstract

The dynamics between regulatory compliance and market orientation create complexity in carbon accounting practices. This study analyzes carbon emission disclosure strategies based on GRI 305 at PT Bukit Asam Tbk (PTBA) and PT Adaro Andalan Indonesia Tbk (AADI). Using a comparative case study method on the 2024 Sustainability Reports, this research examines how differences in ownership status influence reporting patterns. The results indicate that PTBA applies strategic readability through detailed technical disclosures to fulfill regulatory legitimacy, whereas AADI adopts a green catering approach aligned with market signaling. Despite their differing approaches, both entities demonstrate a pattern of greenhushing, characterized by minimal quantitative information on downstream Scope 3 emissions. It is concluded that reporting strategies prioritize legitimacy fulfillment and market responsiveness over comprehensive value chain transparency.

Keywords: Carbon Emission Disclosure; GRI 305; Greenhushing; Green Catering; Strategic Readability

INTRODUCTION

Following the 2015 Paris Agreement, carbon emission transparency has become a critical requirement in contemporary business sustainability (Ivanova et al., 2022). This is particularly significant in Indonesia, where the coal mining sector holds a dual role serving as an economic pillar while simultaneously contributing substantially to the national carbon footprint (Crippa et al., 2025). Although climate risk has reshaped the investment landscape by prioritizing Environmental, Social, and Governance (ESG) considerations, the absence of stringent mandatory reporting regulations in Indonesia has created significant disparities in information quality (Wright & Nyberg, 2024). This is further confirmed by research conducted by Ariani et al. (2024), which found that climate change disclosures in Indonesia's mining sector remain heavily dependent on ownership structure rather than genuine environmental awareness. Given that reporting remains largely voluntary, information asymmetry persists, complicating stakeholder decision-making. This condition also creates opportunities for greenwashing practices, whereby companies construct an environmentally friendly image without empirical operational evidence to substantiate their claims (Coen et al., 2022). In the Indonesian context, such practices often manifest in ambiguous marketing claims that ultimately generate confusion among stakeholders (Nisa & Sisdiyanto, 2025).

Within the dynamics of voluntary reporting, the literature identifies several tactical strategies. One of these is green catering, whereby companies emphasize environmentally friendly narratives to attract investors despite minimal substantive action (Tian et al., 2024). Another strategy offering a different perspective is greenhushing or green silence. This strategy occurs when companies selectively limit the publication of environmental achievements, functionally minimizing excessive public scrutiny or mitigating the risk of greenwashing accusations should future targets not be achieved (Font et al., 2017). The strategic choices adopted by companies often depend on market conditions and the intensity of business competition. This phenomenon becomes increasingly relevant when firms perceive that transparency may invite accusations of greenwashing or consumer backlash, prompting them to downplay sustainability communication (greenhushing) to avoid public skepticism (Khan et al., 2025). Furthermore, the quality of disclosure is closely related to report readability. According to Gounopoulos et al. (2025), companies facing high risk or poor environmental performance tend to present complex and less comprehensible reports, reflecting the concept of Strategic Readability. The complexity of technical presentation may increase readers' cognitive burden, theoretically shifting stakeholder evaluation from substantive emission performance toward methodological disclosure precision.

To address information asymmetry and enhance reporting quality, the Global Reporting Initiative (GRI) provides specific standards through GRI 305: Emissions 2016. Although comprehensive, prior studies indicate that the adoption rate of GRI standards remains relatively low and inconsistent (Matuszak et al., 2025). Moreover, evidence suggests that companies providing extensive GRI-aligned disclosures may actually exhibit poor emission performance (Coen et al., 2022). Despite these findings, research specifically examining detailed item-by-item compliance with GRI 305 standards within Indonesia's mining industry remains limited, particularly when considering the influence of ownership status. State-owned enterprises (SOEs) such as PT Bukit Asam Tbk (PTBA) have previously been identified as providing incomplete and low-quality environmental disclosures (Hariswan et al., 2022), while private firms such as PT Adaro Andalan Indonesia Tbk (AADI)

face distinct international market pressures. Addressing this gap, the present study aims to analyze and comparatively assess the completeness and depth of compliance with GRI 305: Emissions 2016 between these two entities. The novelty of this research lies in integrating technical GRI analysis with an ownership based lens to uncover the underlying motives behind reporting divergence.

This emission disclosure phenomenon can be explained through the perspectives of Legitimacy Theory and Stakeholder Theory. Legitimacy Theory posits that businesses operate within a broader social system and must align their operations with societal values to ensure survival (Dowling & Pfeffer, 1975). In seeking and maintaining legitimacy, companies face varying institutional pressures. In line with institutional theory, SOEs tend to respond to coercive pressures from government regulation to secure political legitimacy, whereas private firms respond to market pressures to obtain economic legitimacy (DiMaggio & Powell, 1983). Empirical studies on listed companies in Indonesia also demonstrate that higher institutional ownership is significantly positively correlated with broader carbon emission disclosure (Angelina & Handoko, 2023). Environmental disclosure thus becomes a strategic tool for managing these diverse pressures (Mousa & Hassan, 2015). Meanwhile, Stakeholder Theory emphasizes that corporate success depends on the ability to manage relationships with various stakeholders who have interests in corporate activities (Jones, 1995). Accordingly, disclosure practices are shaped by stakeholder expectations to build reputation and loyalty (Sweeney & Coughlan, 2008). Based on this theoretical framework, this study proposes that SOEs are projected to engage in coercive isomorphism through technical disclosures to comply with regulatory demands, while private firms are projected to adopt strategic disclosures aligned with market legitimacy.

REVIEW OF LITERATURE

Following the 2015 Paris Agreement, carbon emission transparency has become a central issue in corporate sustainability discourse. Prior studies emphasize that climate related disclosure is increasingly shaped by Environmental, Social, and Governance (ESG) considerations and investor pressure (Ivanova et al., 2022). In Indonesia, the coal mining sector represents a paradoxical context, functioning both as an economic driver and a significant contributor to national carbon emissions (Crippa et al., 2025). However, the absence of strict mandatory reporting regulations has led to substantial disparities in disclosure quality (Wright & Nyberg, 2024). Empirical evidence indicates that climate disclosure practices in Indonesia's mining industry are strongly influenced by ownership structure rather than intrinsic environmental commitment (Ariani et al., 2024). The voluntary nature of reporting further exacerbates information asymmetry and increases the risk of greenwashing practices (Coen et al., 2022), often manifested in ambiguous sustainability claims (Nisa & Sisdianto, 2025).

The literature also identifies tactical strategies within voluntary sustainability reporting. Green catering refers to the selective promotion of environmentally friendly narratives to attract investors despite limited substantive environmental action (Tian et al., 2024). In contrast, greenhushing or green silence involves deliberately limiting environmental disclosures to avoid public scrutiny or potential accusations of greenwashing (Font et al., 2017; Khan et al., 2025). Additionally, disclosure quality is closely linked to report readability. The concept of Strategic Readability suggests that firms with high

environmental risk or poor performance may present complex and technical reports, potentially shifting stakeholder attention from substantive emission outcomes to methodological details (Gounopoulos et al., 2025).

To reduce information asymmetry, the Global Reporting Initiative (GRI) introduced GRI 305: Emissions 2016 as a standardized disclosure framework. Although comprehensive, prior research indicates inconsistent adoption and relatively low compliance levels (Matuszak et al., 2025). Some studies further reveal that extensive GRI-based disclosure does not necessarily reflect strong emission performance (Coen et al., 2022). Nevertheless, limited research has examined detailed item-level compliance with GRI 305 within Indonesia's mining sector, particularly in relation to ownership differences.

From a theoretical perspective, Legitimacy Theory and Stakeholder Theory provide explanatory foundations for emission disclosure behavior. Legitimacy Theory argues that organizations seek alignment with societal norms to maintain survival (Dowling & Pfeffer, 1975), while institutional pressures shape organizational responses (DiMaggio & Powell, 1983). Empirical findings suggest that institutional ownership positively influences the extent of carbon disclosure (Angelina & Handoko, 2023), positioning environmental reporting as a strategic legitimacy tool (Mousa & Hassan, 2015). Meanwhile, Stakeholder Theory highlights the importance of managing stakeholder relationships and meeting their expectations to sustain corporate reputation and loyalty (Jones, 1995; Sweeney & Coughlan, 2008). Together, these perspectives explain how ownership structure may drive divergent disclosure strategies in carbon emission reporting.

RESEARCH METHOD

The application of a comparative case study was intended to obtain an in depth understanding of carbon emission disclosure practices (Miles et al., 2014). This research presents a systematic and factual description of the phenomenon under investigation in accordance with the function of a descriptive research design (Sugiyono, 2013). The use of a comparative case study approach was selected to enable a thorough analysis and to identify systematic comparisons between two entities with contrasting ownership characteristics (Wahyuningrum, Rizkyana, et al., 2025). The object of the study focuses on companies within the coal mining subsector listed on the Indonesia Stock Exchange (IDX). Sample selection employed purposive sampling to obtain comprehensive and relevant cases (Wahyuningrum, Puspita, et al., 2025). The specific unit of analysis examined was the 2024 Sustainability Reports of PT Bukit Asam Tbk (PTBA) and PT Adaro Andalan Indonesia Tbk (AADI). These entities were selected based on ownership status, operational scale as major producers, availability of public data, and explicit use of the GRI 305 standard in their reporting. The selection of the 2024 fiscal year was based on the availability of the most recent complete reports to ensure valid and relevant comparative data between the two entities.

The type of data used in this study was secondary data in the form of public documents obtained from official publications or external sources (Bougie & Sekaran, 2019). Data collection was conducted through documentation study, whereby researchers systematically collected, read, and reviewed relevant sustainability reports (Miles et al., 2014). The primary research instrument referred to the Global Reporting Initiative (GRI) 305: Emissions 2016 standard as the analytical framework and benchmark. The research

category was defined as the level of compliance with emission disclosure requirements, measured using a checklist instrument based on the five GRI 305 indicators (305-1 to 305-5). Measurement was conducted using a qualitative coding scheme. The code “Full” was assigned when the company presented quantitative data along with its methodology; “Partial” was assigned when disclosure was limited to certain segments without comprehensive data; and “Not Disclosed” was assigned when the information was entirely absent.

Data analysis employed a qualitative content analysis approach to systematically examine non-financial reporting (Krippendorff, 2019). The analytical process followed four systematic stages adapted from the framework of Miles et al. (2014). The first stage involved developing an analytical instrument (coding scheme) consisting of a detailed checklist based on the requirements of GRI 305-1 through GRI 305-5. The second stage was data coding, during which researchers matched report information with the checklist and provided qualitative notes regarding the depth and completeness of disclosure. The complexity of qualitative notes was identified through the use of specific technical terminology, inclusion of chemical or mathematical formulas with high complexity for general readers, and sentence length. The coding results were then presented in a comparative matrix (data display) to visualize similarities and differences. To minimize subjectivity in coding, each assessment was rigorously verified against the technical definitions and reporting boundaries specified in the GRI 305 standard. The final stage involved drawing conclusions and interpreting the findings using the perspectives of Legitimacy Theory and Stakeholder Theory to explain patterns of divergence or convergence in the reporting practices of the two companies.

RESULTS AND DISCUSSION

This study employs a comparative analysis of carbon emission disclosures from PTBA and AADI using the GRI 305: Emissions 2016 standard. The analysis focuses on five strategic indicators. A summary of the quality and disclosure strategies is presented in Table 1 below.

Table 1.
Comparative Analysis of Carbon Emission Disclosure Strategies

GRI Indicator	PT Bukit Asam Tbk (PTBA)	PT Adaro Andalan Indonesia Tbk (AADI)	Analysis
305-1 (Scope 1)	Disclosed (959,697 tCO2e). Specific technical details (formulas, biogenic emissions) presented within the main report.	Disclosed (180,260 tCO2e). Basic methodology presented separately (appendix).	PTBA uses technical detail as a legitimacy strategy.
305-2 (Scope 2)	Partially disclosed (131,633 tCO2e). Complies with location-based labeling.	Partially disclosed (10,009 tCO2e). Focus on Renewable Energy Certificate (REC) purchases (market-based).	AADI’s approach accommodates investor preferences through market instruments.

GRI Indicator	PT Bukit Asam Tbk (PTBA)	PT Adaro Andalan Indonesia Tbk (AADI)	Analysis
305-3 (Scope 3)	Partially disclosed (1,316 tCO ₂ e). Limited to business travel.	Not disclosed. Disclosure limited to qualitative narratives on partner efficiency.	Indicates a legitimacy gap addressed through a greenwashing strategy.
305-4 (Intensity)	Disclosed. Ratio of tCO ₂ e per Rupiah revenue & production output.	Disclosed. Ratio of tCO ₂ e per Rupiah revenue & production output.	Both use efficiency metrics as a positive signal to stakeholders.
305-5 (Reduction)	Disclosed. Summary table outlining 13 initiatives.	Partially disclosed. Narrative centered on EV and solar panel initiatives.	AADI applies green catering without full transparency.

Source: Processed data from the 2024 Sustainability Reports.

The analysis of the 2024 Sustainability Reports reveals a contrasting divergence in disclosure strategies between PTBA and AADI in implementing the GRI 305 standard. These findings indicate that the differences in emission reporting between the two entities reflect structural conditions, namely differences in ownership status, where PTBA is a State Owned Enterprise (SOE) while AADI is a private company. As summarized in Table 1, the data demonstrate a consistent pattern of divergence in which PTBA tends to emphasize in-depth technical discussions related to regulatory compliance, whereas AADI is more oriented toward strategic market signaling.

The data in Table 1 reveal two distinct approaches. PTBA’s reporting reflects bureaucratic compliance, as evidenced by its effort to present highly detailed technical information within the main body of the report, ranging from calculation formulas to references to applied standards. These findings confirm the study’s proposition that PTBA’s behavior reflects the mechanism of Coercive Isomorphism as proposed by DiMaggio and Powell (1983) in response to regulatory pressures. As an SOE, PTBA faces regulatory pressures in which organizational legitimacy is highly dependent on compliance with state regulations. External pressure from the government encourages PTBA to implement a highly detailed reporting structure as a form of formal compliance to demonstrate full adherence to applicable rules.

In contrast, AADI adopts a pragmatic strategy aligned with market mechanisms. This is reflected in its reporting, where AADI appears to prioritize initiatives with strong investment appeal, such as the purchase of Renewable Energy Certificates (REC) and the transition to electric vehicles (EVs), while minimizing exposure to complex technical details. Unlike PTBA, whose approach is driven by state compliance logic, AADI appears to operate under market logic. AADI’s strategic response can be explained through the Institutional Logics perspective proposed by Thornton et al. (2015), whereby the company responds to competitive pressures strategically by filtering data to enhance relevance for investors and stakeholders. The information presented tends to be more concise, theoretically consistent with reporting patterns that emphasize informational efficiency for investors.

Based on 2024 data, PTBA recorded total direct emissions of 959,697.45 metric tons of CO_{2e}. This high emission volume originates from intensive fossil fuel combustion in mining heavy equipment and power plant operations directly managed by the company. Within the current Carbon Economic Value (NEK) regulatory framework, an emission figure approaching one million tons places the company in a high-risk exposure position due to the significant potential compliance costs it may bear in the future. Each ton of carbon emitted now represents a financial liability demanding serious regulatory attention.

In addressing this substantial Scope 1 emission burden, PTBA appears to implement a reporting strategy aimed at balancing the exposure of its emission figures with corporate image considerations. Referring to the findings of Gounopoulos et al. (2025) regarding Strategic Readability, companies facing high environmental risk tend to construct reports using more complex and technical language structures. In PTBA's case, this phenomenon is reflected in the presentation of highly specific methodological details within the main report. PTBA explicitly discloses its calculations, including the mathematical emission formula ($E = \text{Fuel Consumption (liters)} \times \text{Emission Factor (kg/TJ)} \times \text{NCV (TJ/liter)}$), as well as specific energy conversion factors, such as 1 liter of High Speed Diesel equivalent to 0.036 GJ.

This complex technical information structure indicates characteristics of Strategic Readability, where high information complexity may limit accessibility for stakeholders. Such a strategy potentially increases readers' cognitive burden by presenting excessive amounts of information and employing technical terminology, references to international standards such as IPCC and ISO 14064, and various chemical coefficients. Theoretically, this approach may shift stakeholder evaluation focus. The dominance of technical narratives may reduce attention to the substantial emission volume itself and redirect it toward the completeness and methodological sophistication of the applied calculations.

For an SOE such as PTBA, this approach represents a means of building legitimacy amid strict regulatory scrutiny. The complexity of the report demonstrates strong technical capability to regulators and the public. The structure of the reporting implicitly conveys the message that although the company's operations generate significant environmental impacts, management maintains full control and a comprehensive understanding of every unit of emissions produced. Thus, strategic readability in this context functions to meet regulatory accountability standards with a high level of precision.

On the other hand, AADI reported Scope 1 emissions of 180,260 tCO_{2e}. Although lower than PTBA's figure, this number still reflects the operational intensity of mining activities. AADI presents its direct emission calculation methodology separately in the appendix, unlike PTBA, which integrates detailed technical explanations within the main report. This simplification reflects AADI's consistent market orientation—delivering reports with minimal technical complexity while remaining relevant to investors and emphasizing strategically framed and easily digestible sustainability actions. This strategy is well-founded, considering recent empirical evidence in Indonesia's coal mining sector indicating that carbon emission disclosure has a positive and significant effect on firm value (Putri et al., 2025).

This is also reflected in AADI's Scope 2 emissions reporting, which recorded 10,009 tCO_{2e} and indicates the use of a market-based method. This figure is supported by the company's strategic purchase of 166 Renewable Energy Certificates (REC). This suggests a

shift in corporate focus from direct operational energy efficiency toward administratively reducing emissions through financial instruments.

The divergence in reporting strategies between the two entities reinforces the distinction between bureaucratic legitimacy fulfillment and responsiveness to market signals. PTBA's approach, characterized by complex technical details, aligns with the concept of strategic readability described by Gounopoulos et al. (2025), whereby firms with high environmental risk increase report complexity to manage stakeholder perceptions. In contrast, AADI's simplification strategy aligns with findings by Huang et al. (2025), which emphasize that report readability serves as a crucial positive signal in reducing information asymmetry in capital markets. By avoiding excessive technical terminology and relocating methodological details to the appendix, AADI effectively strengthens a transparency signal that is easier for investors to process, which has been empirically shown to enhance firm value. This suggests that AADI not only engages in green catering but also leverages report readability as a signaling mechanism to attract economic incentives from the capital market.

The use of 166 REC units by AADI can be understood through the Greenhouse Gas Protocol accounting framework, which distinguishes between location-based and market-based methods, as explained by Bjørn et al. (2022), and as reflected in the Scope 2 disclosure requirements of GRI 305. Under the market-based approach, companies are permitted to report zero emissions for electricity consumption validated by renewable energy certificate purchases, regardless of the actual energy source within the grid where they operate. Bjørn et al. (2022) explain that this mechanism allows companies to replace grid emission factors administratively with renewable energy claims. Physically, however, the electricity supplied to AADI's mining facilities may still predominantly originate from local coal-fired power plants. Yet, from an accounting and administrative perspective, the carbon footprint is considered neutralized through financial instruments (REC). This creates a fundamental distinction between market-based emission reductions and physical emission reductions at the operational site (location-based).

A fundamental weakness emerging from this strategy that warrants attention is the concept of additionality. Scientific literature highlights that REC purchases are often non-additional, meaning they do not necessarily stimulate the development of new renewable energy capacity. REC certificates frequently originate from existing power plants that would continue operating regardless of whether the certificates are purchased. Consequently, this mechanism carries a risk of low additionality, where certificate purchases may not directly correlate with increased renewable energy capacity within the grid. In AADI's case, if the purchased REC do not trigger new renewable energy projects replacing fossil fuel generation, then the reported 10,009 tCO_{2e} figure represents administrative compliance that may overestimate the company's climate mitigation effectiveness.

Beyond the use of administrative instruments such as REC, AADI further strengthens its sustainability narrative through the installation of rooftop solar panels generating 345.2 MWh of energy. Compared to the company's total mining energy consumption, this figure appears relatively minor. However, strategically, it plays an important role. The installation of solar panels can be viewed through the Green Catering perspective proposed by Tian et al. (2024), whereby companies tend to disclose information or implement initiatives aligned with market preferences and global investor expectations.

The solar installation serves as a tangible manifestation of AADI's sustainability commitment, easily observable and verifiable, unlike REC, which are intangible. According to Stakeholder Theory, this can be interpreted as AADI's effort to meet investor expectations for visible evidence of energy transition. This aligns with findings by Safitri et al. (2025), which indicate that strong environmental performance in Indonesian coal companies is perceived as a positive signal by the market and is reflected in stock price increases. Tian et al. (2024) further argue that catering strategies are often pursued to achieve high capital market returns by shaping a more positive emission image and emphasizing initiatives that are visible to the market, regardless of their proportion relative to total operational emissions.

From the data related to the physical emission intensity indicator (GRI 305-4), new insights emerge regarding differing operational efficiencies between the two entities. The data reveal a significant disparity, with AADI reporting a remarkably low production emission intensity of 0.00271 tCO_{2e} per ton of production. In contrast, PTBA reported a substantially higher intensity of 0.027 tCO_{2e} per ton of production. Statistically, this indicates that for every ton of coal produced, AADI records an emission intensity ten times lower than PTBA in minimizing its carbon footprint. This difference may be explained by variations in operational mandates and structural responsibilities borne by each entity.

For a purely private entity such as AADI, emission efficiency aligns directly with a single-bottom-line profitability logic: minimizing fossil energy input per ton of production automatically reduces operational costs and increases shareholder value. In contrast, PTBA's position as a State-Owned Enterprise (SOE) places it in a situation described by Fitriningrum (2020) as a phenomenon of conflicting objectives or dual contradictory goals. SOEs are not solely required to focus on commercial profit but also bear a Public Service Obligation (PSO) to fulfill the government's socio-political objectives. Fitriningrum (2020) further explains that the dominance of government intervention in determining social objectives often distorts managerial performance, causing SOEs to face efficiency constraints not experienced by private firms. In this context, PTBA's high emission intensity is a consequence of the state mandate it carries. As an SOE, it is required to prioritize national energy supply security over mere business efficiency considerations. This is consistent with global findings showing that state ownership participation in corporate structures tends to align corporate strategies with national political mandates, unlike private firms that are more flexible in responding to market incentives (Yuan et al., 2025).

The PSO burden is reflected in the Domestic Market Obligation (DMO) policy, which mandates coal supply for domestic needs. Research by Natalia et al. (2022) explains that within Indonesia's regulatory framework, coal has a dual function: as an economic commodity and as a strategic asset for national defense in terms of energy security. PTBA's role as an SOE requires the company to ensure that national electricity supply remains the top priority. This condition makes production targets a central concern and often indicates efficiency challenges in operational assets or increasingly complex mining conditions, thereby triggering higher fuel consumption. This situation contrasts with AADI, which has greater flexibility in managing production strategies aligned with maximizing profitability. Profitability has indeed been proven to be a key determinant of carbon emission disclosure in Indonesia's coal subsector, where highly profitable companies possess more resources to conduct strategic reporting (Melja et al., 2022).

Among the various reporting strategies adopted by each entity, there is a crucial yet frequently overlooked area: Scope 3 emissions. In the context of global carbon accounting, it is widely acknowledged that the carbon footprint of the coal mining industry does not primarily originate from upstream mining operations, but from downstream value chains. This fact is emphasized in the technical guidance issued by CDP (2024), which explicitly states that for coal mining companies, the combustion of sold coal represents the largest portion of total corporate emissions inventory. This aligns with the findings of Delevingne et al. (2020), who estimate that Scope 3 emissions in the mining sector often account for a significant share of total emissions. CDP (2024) further stresses that calculating emissions in this category is crucial for companies to understand their exposure to climate transition risks.

However, empirical data from the 2024 sustainability reports of both entities indicate inconsistency with this materiality principle. PTBA reported Scope 3 emissions of only 1,316 metric tons of CO₂e. This figure reflects a limited scope, as it covers only Business Travel emissions, a minor component that does not align with CDP's materiality emphasis on product combustion. Meanwhile, AADI adopted a different approach by not disclosing quantitative figures at all and limiting its reporting to qualitative narratives concerning partner efficiency.

This pattern of minimizing downstream emission disclosure can be explained through the perspective of Greenhushing. Font et al. (2017) define this phenomenon as a strategic corporate action to selectively limit communication about sustainability practices in order to avoid negative scrutiny or accusations of inconsistency between reporting claims and actual practices. In high-risk industries, greenhushing functions as a defensive strategy in response to decarbonization pressures. Referring to the transition risks outlined by CDP (2024) and Delevingne et al. (2020), transparent reporting of Scope 3 Category 11 emissions often representing substantial volumes could potentially expose companies to climate liabilities and influence investor perceptions. Therefore, the limited information presented by PTBA and AADI may constrain transparency regarding the link between corporate activities and downstream emission impacts.

This lack of transparency generates tangible financial risks amid evolving climate regulations in Indonesia. Such risks materialized with the issuance of Presidential Regulation of the Republic of Indonesia Number 98 of 2021 concerning the Implementation of Carbon Economic Value for Achieving Nationally Determined Contribution Targets and Controlling Greenhouse Gas Emissions in National Development. Fundamentally, this regulation transforms carbon into an economic commodity for extractive industries in Indonesia. It serves as the legal basis for carbon tax implementation and formally converts carbon into a tradable or taxable economic asset. Under Articles 1 and 47, each emission unit now carries economic valuation with fiscal consequences for corporations. The regulation introduces carbon trading schemes through the establishment of an Emission Cap (BAE) for strategic sectors, including energy, thereby forcing companies to internalize their ecological costs.

In its implementation, PTBA faces highly material fiscal risks due to the Cap-and-Tax and Cap and Trade mechanisms stipulated in Article 48. Considering its substantial Scope 1 emissions burden and emission intensity reaching 0.027 tCO₂e per ton of production, the risk of exceeding the government-imposed cap is significant. If this occurs, PTBA faces two strategic dilemmas with material cash flow implications: purchasing emission allowances from other companies (Trade) or paying tax levies on excess emissions (Tax).

PTBA's reporting strategy, which emphasizes data complexity, may satisfy current administrative compliance. However, this approach will be insufficient when regulations require financial accountability for every ton of emissions released.

On the other hand, AADI faces long-term vulnerability related to Article 58 concerning levies on carbon content. Although the purchase of Renewable Energy Certificates (REC) successfully reduces Scope 2 emissions, this strategy represents a short-term solution amid global regulatory trends increasingly targeting supply chains. If regulators expand the levy object to include Scope 3 emissions, AADI could face substantial financial burdens. In this context, greenhushing or limited disclosure of downstream chain emissions—may become counterproductive when value chain transparency becomes a legal obligation.

Nevertheless, the urgency of mitigating such fiscal risks has not been fully accommodated within the current supervisory framework. Corporate readiness for carbon taxation is hindered by the flexibility embedded in Financial Services Authority Regulation Number 51/POJK.03/2017 concerning the Implementation of Sustainable Finance for Financial Service Institutions, Issuers, and Public Companies. Upon closer examination, this regulation provides discretionary space that may potentially lead to symbolic disclosures. Although Articles 10 and 12 explicitly mandate sustainability reporting, the regulation focuses more on the availability of reports rather than the depth of substantive content. Evaluations of POJK 51/2017 implementation show that while formal compliance rates have increased, many entities still face structural barriers in substantively internalizing sustainable finance principles (Oka & Hermawan, 2025).

Furthermore, enforcement mechanisms under Article 30 remain weak, as sanctions are limited to administrative penalties in the form of written warnings. For large corporations, such sanctions lack material financial impact. Economically, the risk of administrative penalties is therefore perceived as lower than the potential reputational losses resulting from the disclosure of sensitive emission data. Consequently, the current regulatory ecosystem remains confined to minimum compliance, where PTBA considers procedural compliance with high technical complexity sufficient, while AADI tends to maintain its position through selective market signaling strategies.

CONCLUSION

This study finds that differences in ownership status between state owned enterprises (SOEs) and private companies create significant divergence in carbon emission disclosure strategies in response to institutional and market pressures. PT Bukit Asam Tbk (PTBA) tends to adopt coercive isomorphism by employing strategic readability through complex technical details as a regulatory legitimacy strategy to manage public perception of its high emission levels. In contrast, AADI operates under market logic with a pragmatic strategy oriented toward commercial value. This strategy is manifested through the use of administrative instruments such as Renewable Energy Certificates (REC) and the selection of green catering type disclosures, such as solar panel installations, while minimizing technical exposure that does not directly generate economic incentives.

Another crucial finding is that behind this strategic divergence, the study reveals an underlying convergence in defensive behavior: both entities demonstrate convergent tendencies consistent with greenhushing patterns, characterized by limited material

disclosure of Scope 3 (downstream) emissions. This convergence indicates that current sustainability reporting practices remain oriented toward minimum compliance and prioritize symbolic compliance aspects over transparent and comprehensive environmental accountability.

This study has a primary limitation in that its scope is confined to two companies within a single reporting period, thus requiring caution in generalizing the findings to the entire mining industry. In addition, reliance on secondary data namely sustainability reports may contain subjective managerial bias without in-depth external audit verification. Based on these limitations, future research is recommended to expand the sample across sectors and apply a longitudinal time frame to capture more comprehensive compliance trends. For regulators, it is recommended to strengthen supervisory mechanisms under POJK Regulation No. 51/2017 by mandating disclosure of value chain emission materiality and imposing stricter sanctions. For companies, it is recommended to promptly transform their reporting models and focus on more precise carbon financial data orientation, considering that the future implementation of Carbon Economic Value (NEK) regulation and carbon taxation will require strict fiscal accountability for every unit of emissions generated.

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