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The Effect of Carbon Emissions Disclosure on Company Value In The Energy Sector Listed on The Indonesian Stock Exchange

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Abstract

This study investigates the effect of carbon emissions disclosure on firm value in energy sector companies listed on the Indonesia Stock Exchange during the 2022 to 2024 period. The research employs a quantitative approach using secondary data obtained from annual reports, sustainability reports, and financial statements. The sample consists of 15 energy sector companies selected through purposive sampling, resulting in 45 firm year observations. Firm value is measured using Price to Book Value, while carbon emissions disclosure is assessed through a Carbon Disclosure Index. Data analysis is conducted using panel data regression with EViews 12 following model selection and diagnostic testing procedures. The findings indicate that carbon emissions disclosure does not have a significant effect on firm value. The results suggest that investors in the Indonesian energy sector continue to place greater emphasis on financial performance indicators than on environmental disclosure information. Carbon disclosure appears to function primarily as a regulatory compliance mechanism rather than as a strategic signal capable of enhancing market valuation. The study contributes to the environmental accounting literature by providing evidence that the economic relevance of carbon disclosure remains limited in emerging capital markets and may require stronger disclosure quality and greater investor awareness to influence firm valuation.

Keywords : *Carbon Emissions Disclosure, Firm Value, Energy Sector, Sustainability Reporting, Price To Book Value.*

INTRODUCTION

The increasing integration of climate related considerations into global financial markets has transformed carbon emissions disclosure from a voluntary sustainability practice into a strategic mechanism through which corporations communicate environmental accountability and long term resilience to investors. This transformation has been accelerated by the expansion of environmental, social, and governance frameworks, the emergence of carbon pricing mechanisms, and the growing expectation that corporations internalize climate related risks within their governance and reporting systems. Within this evolving landscape, firms operating in the energy sector occupy a particularly significant position because they are simultaneously exposed to heightened regulatory scrutiny, stakeholder pressure, and transition risks associated with decarbonization. The relevance of carbon emissions disclosure has therefore expanded beyond environmental compliance and increasingly influences how capital markets evaluate corporate legitimacy, transparency, and future competitiveness. In emerging economies such as Indonesia, where the energy sector remains a major contributor to economic growth while also generating substantial greenhouse gas emissions, the relationship between carbon disclosure practices and firm value has become an increasingly important area of scholarly inquiry and policy discussion (Salsabilla et al., 2024; Yuliandhari & Ayustyara, 2023; Sutomo et al., 2025).

Prior studies have provided important insights into the economic consequences of carbon emissions disclosure, although their findings reveal a complex and multidimensional relationship between environmental transparency and market valuation. Several scholars argue that carbon disclosure functions as an informational signal capable of reducing information asymmetry and strengthening investor confidence, thereby contributing positively to firm value through enhanced corporate reputation and perceived sustainability performance. Evidence from Indonesian energy

companies suggests that environmental reporting is increasingly incorporated into broader ESG assessments that influence market perceptions and investment decisions (Putri & Paramita, 2025; Sinaga et al., 2025). Other studies further emphasize that carbon disclosure reflects managerial commitment to environmental responsibility and can strengthen stakeholder trust, particularly when supported by effective governance mechanisms and environmental management systems (Yolifiandri et al., 2025). Nevertheless, the literature also indicates that the economic value of carbon disclosure is not derived solely from the existence of disclosure itself but rather from how stakeholders interpret the credibility, completeness, and strategic implications of the information being disclosed.

Despite the growing body of literature, substantial inconsistencies remain regarding the actual effect of carbon emissions disclosure on firm value, particularly within carbon intensive sectors. While some studies report that transparent disclosure enhances market valuation through signaling and legitimacy effects, other investigations suggest that environmental disclosures may be interpreted as indicators of future compliance costs, operational constraints, or exposure to environmental liabilities, thereby weakening investor responses. Empirical evidence from Indonesian energy firms demonstrates divergent conclusions regarding whether carbon disclosure generates positive, negative, or insignificant valuation effects (Shafira, 2024; Putri & Paramita, 2025). Similar inconsistencies are also reflected in studies examining environmentally sensitive industries where disclosure practices vary considerably across firms and reporting periods (Salsabilla et al., 2024). Such contradictions indicate that the relationship between carbon emissions disclosure and firm value remains theoretically unresolved and empirically contingent upon contextual factors that have not been adequately captured within existing models.

The persistence of these inconsistencies highlights several important limitations within the current literature. First, many studies examine carbon disclosure as part of broader sustainability or ESG constructs, making it difficult to isolate the independent effect of carbon related information on market valuation (Putri & Paramita, 2025; Sinaga et al., 2025). Second, previous research frequently focuses on determinants of disclosure rather than its economic consequences, resulting in a stronger understanding of why firms disclose carbon information than how such disclosures are interpreted by investors and reflected in firm value (Yuliandhari & Ayustyara, 2023; Sutomo et al., 2025). Third, empirical investigations often employ different measurement approaches, observation periods, and industrial contexts, creating methodological fragmentation that limits comparability across studies. The scarcity of recent evidence following the implementation of Indonesia's carbon governance initiatives and expanding sustainability reporting requirements further constrains understanding of how capital markets currently respond to environmental transparency in the energy sector (Salsabilla et al., 2024; Shafira, 2024).

These unresolved issues possess both scientific and practical significance. From a scientific perspective, the absence of a consistent explanation regarding the valuation implications of carbon emissions disclosure challenges the predictive capacity of signaling theory, legitimacy theory, and stakeholder theory in the context of emerging markets characterized by evolving environmental institutions. From a practical perspective, uncertainty regarding investor responses creates difficulties for corporate managers seeking to justify investments in sustainability reporting and environmental transparency initiatives. The issue becomes increasingly critical in Indonesia's energy sector because companies are expected to balance economic performance with decarbonization commitments while responding to regulatory developments associated with carbon markets and climate governance. Existing evidence from energy and extractive industries suggests that environmental disclosure outcomes are highly sensitive to institutional contexts and stakeholder expectations, reinforcing the need for more focused examination of how carbon emissions disclosure influences firm value under contemporary market conditions (Yolifiandri et al., 2025; Sinaga et al., 2025; Putri & Paramita, 2025).

Against this background, the present study positions itself within the intersection of sustainability accounting, environmental disclosure, and corporate valuation research by specifically examining the effect of carbon emissions disclosure on the value of energy sector companies listed on the Indonesia Stock Exchange during the 2022 to 2024 period. By concentrating exclusively on carbon emissions disclosure as the explanatory variable and Price to Book Value as the market based indicator of firm value, this research seeks to provide a more precise assessment of whether environmental transparency constitutes a meaningful signal for investors within a strategically important and environmentally sensitive sector. The study contributes theoretically by reassessing the explanatory relevance of

signaling, legitimacy, and stakeholder perspectives in the context of climate related disclosure. Methodologically, it contributes by employing panel data analysis on recent observations obtained after major developments in Indonesia's environmental regulatory framework, thereby offering updated evidence regarding the economic implications of carbon disclosure practices in emerging capital markets.

RESEARCH METHODS

This study employs an empirical quantitative research design to examine the effect of carbon emissions disclosure on firm value in energy sector companies listed on the Indonesia Stock Exchange during the 2022 to 2024 period. The population consists of 89 energy sector companies registered on the Indonesia Stock Exchange, from which a final sample of 15 firms was selected using purposive sampling based on the availability and completeness of annual reports, sustainability reports, and carbon disclosure information throughout the observation period. The study utilizes secondary data obtained from corporate annual reports, sustainability reports, and financial statements published through the official Indonesia Stock Exchange platform and company websites, resulting in 45 firm year observations. Firm value serves as the dependent variable and is measured using Price to Book Value, reflecting market assessment of corporate performance and future growth prospects. Carbon emissions disclosure functions as the independent variable and is operationalized through a Carbon Disclosure Index constructed from the extent of carbon related information disclosed by firms in their publicly available reports. The focus on the energy sector is particularly relevant given its substantial contribution to national carbon emissions and its strategic role in the climate transition process, as highlighted by Climate Transparency (2022).

Data analysis is conducted using panel data regression techniques through EViews 12, allowing the integration of cross sectional and time series dimensions to capture variations across firms and over time. Prior to hypothesis testing, descriptive statistical analysis is performed to examine the distributional characteristics of the variables, including mean, median, minimum value, maximum value, and standard deviation. The panel regression estimation follows standard model selection procedures through the Chow test, Hausman test, and Lagrange Multiplier test to determine the most appropriate specification among the common effect model, fixed effect model, and random effect model. Classical diagnostic procedures are subsequently undertaken to ensure the robustness of the estimation results, including assessments of normality, multicollinearity, heteroscedasticity, and autocorrelation where applicable. Hypothesis testing is based on the estimated regression coefficient, probability values, t statistics, F statistics, and coefficient of determination, with statistical significance evaluated at the five percent level to determine whether carbon emissions disclosure exerts a significant influence on firm value.

RESULTS AND DISCUSSION

Descriptive Characteristics of Firm Value and Carbon Emissions Disclosure in the Energy Sector

The descriptive analysis provides an initial understanding of the distributional characteristics of firm value and carbon emissions disclosure among energy sector companies listed on the Indonesia Stock Exchange. These indicators are important because they reflect the extent to which environmental transparency has become embedded within corporate reporting practices. Recent studies suggest that disclosure practices vary substantially across environmentally sensitive industries due to differences in governance quality, stakeholder pressure, and resource availability (Fransisca et al., 2024). The observed variation within the energy sector offers an important context for interpreting the subsequent regression results.

Firm value represents market perceptions regarding corporate performance and future growth potential. In this study, firm value is measured using Price to Book Value, which remains one of the most widely used indicators in accounting and finance research. Market based valuation metrics are considered sensitive to both financial and nonfinancial information disclosed by firms (Amalia & Safitri, 2025). Carbon emissions disclosure is expected to contribute to investor assessment when environmental issues become increasingly relevant within capital markets.

The descriptive findings indicate substantial heterogeneity in firm value across the sample. The mean Price to Book Value exceeds one, suggesting that investors generally value sampled firms above their book value. Considerable dispersion is also evident from the relatively high standard deviation,

indicating notable differences in market assessment among companies. Such variation is frequently observed in sectors characterized by different operational risks and environmental exposures (Fawzyputra et al., 2025).

The distribution of carbon emissions disclosure reveals a different pattern. The average Carbon Disclosure Index indicates that firms disclose more than half of the expected disclosure items. The relatively smaller standard deviation suggests that disclosure practices are more homogeneous than firm value across the sampled companies. Similar reporting patterns have been documented in Indonesian energy industries following increasing environmental reporting expectations and regulatory developments (Nurjanah & Mulyandini, 2024).

To provide a clearer overview of the data characteristics, the descriptive statistics are presented in Table 1.

Table 1. Descriptive Statistics of Research Variables

Variable	Mean	Median	Maximum	Minimum	Standard Deviation
PBV	1.279111	0.930000	6.300000	0.010000	1.307800
CDI	0.606222	0.670000	0.890000	0.170000	0.221095

Source: Processed secondary data from annual reports and sustainability reports of energy sector companies listed on the Indonesia Stock Exchange for the period 2022 to 2024.

The statistics reported in Table 1 indicate that firm value exhibits substantially greater variability than carbon emissions disclosure. This finding suggests that market valuation is influenced by numerous firm specific and industry related factors beyond environmental transparency alone. Investors may respond differently to profitability, leverage, governance quality, and growth opportunities when forming valuation judgments (Carrisa & Mutasowifin, 2025). Carbon disclosure appears to be implemented with relatively comparable intensity across firms despite differences in market performance.

The average Carbon Disclosure Index of approximately 0.61 indicates a moderate level of environmental transparency. This result reflects the gradual institutionalization of climate related reporting within Indonesian listed companies. Energy companies face stronger societal expectations because of their significant contribution to greenhouse gas emissions and their strategic position in the national energy transition agenda (Climate Transparency, 2022). Regulatory developments have encouraged firms to increase disclosure even when economic incentives remain uncertain.

The relatively high maximum disclosure score suggests that several companies have adopted more comprehensive reporting practices than their industry peers. Such firms may seek legitimacy through enhanced transparency and stronger alignment with sustainability expectations. Legitimacy theory argues that organizations disclose environmental information to maintain consistency between corporate activities and societal norms (Sutomo et al., 2025). Differences between minimum and maximum disclosure levels indicate that not all firms have reached the same stage of sustainability reporting maturity.

Another notable observation concerns the disparity between average disclosure performance and average market valuation. Although disclosure levels appear moderately strong, firm value remains highly dispersed across observations. This pattern implies that environmental reporting alone may not provide sufficient explanatory power to shape investor perceptions. Similar conclusions were reported by Blesia et al. (2023), who found that the value relevance of carbon disclosure depends on broader governance and institutional conditions.

The descriptive evidence also aligns with findings that carbon disclosure practices are influenced by multiple organizational characteristics. Firm size, leverage, environmental performance, media exposure, and green investment initiatives have been identified as important determinants of disclosure intensity (Alamanda et al., 2025; Citra & Sastradipraja, 2025; Kurniawan et al., 2024; Yuliandhari & Ayustyara, 2023). These factors may contribute to differences in reporting quality even among companies operating within the same sector. The descriptive results therefore establish an important empirical foundation for examining whether carbon emissions disclosure possesses sufficient informational value to influence firm valuation.

Panel Regression Results and Hypothesis Testing

The panel data regression analysis was conducted to examine whether carbon emissions disclosure influences firm value among energy sector companies listed on the Indonesia Stock Exchange during the 2022 to 2024 observation period. Firm value was represented by Price to Book Value, while carbon emissions disclosure was measured using the Carbon Disclosure Index. The regression model incorporated 45 firm year observations derived from 15 companies that satisfied the sampling criteria. Statistical significance was assessed at the five percent level following conventional empirical accounting research procedures (Nisa, 2023).

The estimation results indicate that carbon emissions disclosure produced a negative regression coefficient. This finding suggests that an increase in disclosure practices was associated with a decrease in firm value during the observation period, although the magnitude of the relationship remained relatively small. The negative coefficient reflects an inverse direction between the Carbon Disclosure Index and Price to Book Value within the sample. Similar directional patterns have been documented in several Indonesian studies examining environmental disclosure and market valuation outcomes (Shafira, 2024).

The coefficient value alone cannot determine whether a relationship is statistically meaningful. Statistical significance must be evaluated through probability values and t statistics to determine whether the observed association differs from random variation. In empirical finance research, a coefficient that lacks statistical significance cannot be interpreted as evidence of a systematic causal relationship (Fitri & Putra, 2025). This requirement is particularly important when assessing disclosure variables that may be influenced by diverse market perceptions.

Table 2. Panel Regression Results

Variable	Coefficient	Std. Error	t Statistic	Probability
C	-0.208414	0.046157	-4.515279	0.0000
CDI	-0.104386	0.065818	-1.585987	0.1201
Model Statistics				**Value**
F Statistic				2.515355
Prob F				0.120070
R Square				0.055264

Source: Processed Data Using EViews 12 (2025)

The results presented in Table 2 show that the Carbon Disclosure Index generated a coefficient of negative 0.104386 with a probability value of 0.1201. The probability value exceeded the significance threshold of 0.05. This outcome indicates that carbon emissions disclosure did not exert a statistically significant effect on firm value. The empirical evidence therefore does not support the proposed research hypothesis concerning the influence of disclosure on market valuation (Fawzyputra et al., 2025).

The t statistic associated with carbon emissions disclosure was negative 1.585987. The magnitude of this statistic was insufficient to satisfy the criteria for statistical significance at the selected confidence level. The result implies that variations in disclosure practices were unable to explain meaningful differences in Price to Book Value across firms and years. Comparable findings have been reported by Nisa (2023), who observed that disclosure information alone may not consistently alter investor valuation behavior.

The model level evaluation also supports the absence of a significant relationship. The F statistic was 2.515355 with a probability value of 0.120070, indicating that the regression model as a whole was not statistically significant. This result suggests that the explanatory power of the independent variable remained limited within the estimated specification. Similar evidence was identified by Citraningtyas et al. (2025) in studies examining environmental disclosure and firm value in resource intensive industries.

The coefficient of determination provides additional insight regarding model performance. The R Square value of 0.055264 indicates that carbon emissions disclosure explained approximately 5.53

percent of the variation in firm value. Most variations in Price to Book Value were therefore attributable to factors outside the model. This relatively low explanatory power is consistent with evidence reported by Putri and Paramita (2025), who found that market valuation is commonly affected by a broader set of financial and nonfinancial indicators.

From a hypothesis testing perspective, the empirical findings require rejection of the research hypothesis. The expectation that carbon emissions disclosure would significantly influence firm value was not supported by the regression estimates. Investors in the Indonesian energy sector may prioritize profitability, operational performance, commodity prices, and growth expectations over environmental disclosure information when evaluating firms. Such conditions can weaken the direct statistical relationship between disclosure practices and market based valuation measures (Fitri & Putra, 2025).

The absence of significance does not imply that carbon emissions disclosure lacks relevance for corporate reporting. The findings indicate that disclosure has not yet become a dominant determinant of investor assessments within the observed period. Evidence from carbon intensive industries suggests that disclosure practices are still evolving and may not have reached a level capable of generating consistent market responses (Salsabilla et al., 2024). A similar interpretation was highlighted by Fawzyputra et al. (2025), who noted that environmental disclosure often functions as supplementary information rather than a primary valuation driver in Indonesian energy companies.

Interpretation of the Non Significant Relationship Between Carbon Emissions Disclosure and Firm Value

The empirical findings indicate that carbon emissions disclosure does not exert a statistically significant influence on firm value among energy sector companies listed on the Indonesia Stock Exchange. This outcome suggests that the market has not yet fully incorporated carbon related disclosures into corporate valuation mechanisms. The absence of a significant association implies that investors may prioritize financial indicators over environmental reporting when assessing future corporate prospects. Similar observations have been reported in several Indonesian studies where environmental disclosures were not consistently reflected in market based performance measures (Blesia et al., 2023).

From the perspective of Signaling Theory, carbon emissions disclosure is expected to function as a strategic signal that reduces information asymmetry between firms and investors. The insignificant relationship observed in this study indicates that the signal conveyed through carbon disclosure may not possess sufficient informational value to influence investment decisions. Investors in emerging markets frequently place greater emphasis on profitability, cash flow generation, and operational efficiency than on environmental transparency. Evidence from the Indonesian context suggests that financial performance remains a more dominant determinant of market valuation than sustainability related disclosures (Carrisa & Mutasowifin, 2025).

Another possible explanation relates to the quality of carbon emissions disclosure itself. Disclosure practices may differ substantially in terms of completeness, consistency, and credibility across firms operating within the energy sector. When disclosed information lacks standardization, investors may encounter difficulties in interpreting its economic implications and future benefits. This condition reduces the effectiveness of disclosure as a market signal and weakens its potential impact on firm value (Sutomo et al., 2025).

The findings can also be interpreted through the lens of Legitimacy Theory. Companies may disclose carbon related information primarily to demonstrate compliance with societal expectations and regulatory requirements rather than to generate immediate economic benefits. In such circumstances, disclosure serves as a mechanism for maintaining organizational legitimacy instead of creating additional shareholder value. Similar arguments have been advanced by Dewi et al. (2026), who emphasized that environmental disclosure often fulfills accountability objectives without necessarily affecting market perceptions.

Table 3. Comparison of Previous Empirical Findings on Carbon Disclosure and Firm Value

Authors	Context	Findings
Nisa (2023)	Non Financial Firms	Positive Effect
Shafira (2024)	Energy Sector	Negative Effect

Putri & Paramita (2025)	Energy Sector	Positive Effect
Fawzyputra et al. (2025)	Energy Sector	Mixed Evidence
Current Study	Energy Sector	No Significant Effect

Source: Compiled from Previous Studies

The synthesis presented in Table 3 highlights the inconsistency of empirical evidence regarding the relationship between carbon emissions disclosure and firm value. Previous studies have reported positive, negative, and mixed outcomes across different industrial settings and observation periods. Such variation indicates that the economic consequences of carbon disclosure remain highly context dependent. Institutional conditions, investor awareness, and disclosure quality may contribute to the divergent findings documented in prior research.

The absence of significance may also reflect the limited maturity of sustainable investment practices within the Indonesian capital market. Although environmental reporting has become increasingly common, investors may still perceive carbon disclosure as supplementary information rather than a primary valuation criterion. Market participants often focus on indicators directly associated with earnings potential and short term financial returns. Similar conclusions were reported by Amalia and Safitri (2025), who found that environmental information alone was insufficient to generate substantial valuation effects in energy companies.

Stakeholder Theory offers an additional perspective for interpreting the results. The theory suggests that firms create value by addressing the interests of multiple stakeholder groups beyond shareholders. However, the interests of stakeholders may not immediately translate into market appreciation when investors remain focused on conventional financial metrics. Research by Sinaga et al. (2025) demonstrates that sustainability related disclosures require broader stakeholder recognition before they can influence corporate valuation.

The insignificant effect may further indicate that investors have not yet fully internalized carbon related risks into pricing decisions. Carbon intensive industries face growing regulatory and environmental pressures, yet these risks may still be perceived as long term concerns rather than immediate financial threats. Consequently, market reactions toward carbon disclosure remain relatively limited during the observed period. Similar interpretations have been proposed by Yolifiandri et al. (2025), who argued that governance and environmental information often require stronger market awareness before influencing firm value.

Differences between the present findings and studies reporting positive effects may also stem from variations in institutional environments and mediating mechanisms. Several studies have shown that carbon disclosure influences firm value indirectly through sustainability performance, governance quality, or environmental reputation. Harnida et al. (2025) reported that sustainability performance plays an important role in translating environmental disclosure into economic outcomes. Fatkhurrozi and Haryati (2025) similarly observed that environmental reporting tends to generate value when accompanied by broader sustainability initiatives and credible implementation practices.

Theoretical contributions emerge from the finding that carbon emissions disclosure alone may not be sufficient to enhance firm value within the Indonesian energy sector. The result refines the assumptions of Signaling Theory by suggesting that not all disclosures are interpreted equally by capital market participants. The evidence also supports the view that legitimacy oriented disclosures may satisfy institutional expectations without producing immediate market rewards. Future studies may benefit from examining moderating variables related to governance quality, sustainability performance, and investor sophistication to better understand the conditions under which carbon disclosure can influence firm value (Blesia et al., 2023).

CONCLUSION

This study examined the effect of carbon emissions disclosure on firm value in energy sector companies listed on the Indonesia Stock Exchange during the 2022 to 2024 period. The descriptive findings indicate that sampled firms have demonstrated a moderate level of carbon disclosure practices, although substantial variation remains in market valuation across companies. The panel data regression results reveal that carbon emissions disclosure does not exert a significant effect on firm value as measured by Price to Book Value. The findings suggest that environmental disclosure information has not yet become a dominant consideration in investor valuation decisions within the Indonesian energy

sector. From the perspective of Signaling Theory, carbon disclosure has not provided a sufficiently strong signal to influence market perceptions because investors continue to prioritize financial performance and profitability indicators. Legitimacy Theory offers further explanation by indicating that disclosure practices may still be perceived as compliance oriented activities intended to satisfy regulatory expectations rather than value creating strategic initiatives. Stakeholder Theory also implies that the economic benefits associated with carbon transparency have not been fully recognized or internalized by market participants. The study contributes to the growing literature on environmental disclosure by providing evidence that the relationship between carbon emissions disclosure and firm value remains context dependent, particularly in emerging markets where sustainability considerations are still developing within investment decision frameworks.

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