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The Effect of Carbon Emission Disclosure, Green Investment, and Environmental Performance on Company Value in Energy Sector Companies Listed on the Indonesia Stock Exchange in 2021-2024

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ABSTRACT

This study aims to analyze the influence of Carbon Emission Disclosure, Green Investment, and Environmental Performance on company value in energy sector companies listed on the Indonesia Stock Exchange (IDX) during the period 2021–2024. This finding is motivated by the increasing attention to climate change issues and corporate sustainability, especially in the energy sector, which has a high level of carbon emissions. This finding uses a quantitative method with a causality approach. The study population is all energy sector companies listed on the IDX during the period 2021–2024. The sampling technique used purposive sampling, resulting in 132 research data. The data used is secondary data obtained from annual reports and sustainability reports. The data analysis technique uses multiple linear regression analysis with the help of the SPSS program version 24. The findings indicate that Carbon Emission Disclosure does not affect company value, Green Investment hurts company value, and Environmental Performance does not affect company value. The research findings indicate that investors in the energy sector are more oriented towards financial aspects than environmental aspects in assessing companies.

Keywords: Carbon Emission Disclosure, Company Values, Environmental Performance, Green Investment.

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INTRODUCTION

Environmental issues have become a major concern in various countries due to increasing greenhouse gas (GHG) emissions, which have resulted in global warming (Nuurhasanat 2024). The energy sector contributes significantly to carbon emissions due to the high use of fossil fuels in corporate operations. This situation has caused energy sector companies to face pressure from governments, investors, and the public to pay greater attention to environmental aspects and implement sustainable business practices (Mulyani 2023). Increased GHG emissions, related to gas (CO2), are the main reason for the rise in global temperatures, which impacts various aspects of life.

Industrial activity and the energy sector are major contributors to increasing carbon emissions due to the high use of fossil fuels in corporate operations (Yuliandhari 2023). Concern for corporate sustainability is growing as the concept of sustainable growth develops, emphasizing the alignment of economic, social, and environmental aspects. Companies are not simply required to generate profits but are also obligated to address the environmental risks generated by their operational activities (Mulyani 2023). In this context, companies have begun implementing various environmental policies as a form of social responsibility and an effort to maintain corporate sustainability in the future. The energy sector is among those contributing to national carbon emissions. This situation has led to energy companies facing pressure from the government, investors, and the public to pay greater attention to environmental aspects and implement sustainable business practices (Gunawan 2024).

Corporate value serves as a primary indicator used by investors to evaluate a company's potential. Corporate value represents the company's primary objective as a measure of its performance success and ability to create prosperity for shareholders (Kasmiati 2021). High corporate value reflects the level of investor confidence in the company's ability to generate profits in the future (Nuurhasanat 2024). The corporate value indicator in this study is Tobin's Q. According to (Fina 2024), Tobin's Q is a ratio used by multiplying the closing share price by the total shares outstanding, adding the total book value of liabilities, and dividing it by the total book value of assets. Over time, investor assessments are no longer solely based on financial data, but are also influenced by non-financial data, including environmental disclosures and the company's sustainability performance (Yuliandhari 2023).

One form of environmental obligation is Carbon Emission Disclosure (CED). CED is a company's transparency in reporting data on carbon emissions generated and the company's emission management plans. According to Yuliandhari (2023), CED is a company activity that includes the process of recording, recognizing, measuring, and disclosing the level of carbon emissions generated from the company's operational activities. This disclosure is expected to provide a positive indication to investors regarding the company's commitment to environmental sustainability (Mulyani 2023). This study uses a carbon emission disclosure checklist developed by (Bae Choi, 2013). This checklist is derived from an information request form from the Carbon Disclosure Project (CDP). This checklist contains 18 disclosure items from five categories related to climate change risks and opportunities, greenhouse gas emission disclosure, energy consumption, and carbon emission accountability. Previous research has shown different results regarding the effect of carbon emission disclosure on company value. Several studies, such as (Yuliandhari 2023), (Astuti et al., 2025), and (Mulyani 2023), suggest that carbon emission disclosure can increase company value. However, studies by (Fina 2024) and (Gunawan 2024) indicate that carbon emission disclosure has no significant impact on company value due to low investor and stakeholder attention to environmental issues.

In addition to disclosing carbon emissions, green investment is also a crucial factor in supporting corporate sustainability (Adam 2024). Green investment is a form of corporate investment in activities and technologies oriented towards environmental conservation. Green investment is seen as capable of improving a company's operational efficiency and strengthening its reputation among investors (Astuti et al., 2024). Green investment not only functions as an environmental protection effort but also as a long-term strategy that can improve efficiency, corporate reputation, and corporate value through sound environmental management (Adam 2024). The indicator in this study, developed by Dewi and Aryati (2024), is environmental investment costs divided by total assets. Previous research has shown different results regarding the effect of green investment on firm value. Research by Astuti et al., 2025 found that green investment has a positive effect on firm value because it can improve the company's image and attractiveness. However, research by Amanda et al., 2024 and Nuurhasanat (2024) shows that green investment does not have a significant effect on firm value because investors focus more on profits and market performance.

Environmental performance is also a benchmark for a company's success in managing its environmental impact. In this finding, environmental performance is proxied using carbon intensity, which describes a company's level of efficiency in generating economic output relative to its carbon emissions (Vaicondam et al. 2025). Several studies have shown that companies with low carbon intensity tend to have higher corporate value because efficient emissions management is seen as an indicator of environmental performance and corporate sustainability. This finding is supported by research (Mariani et al. 2024) and (Benkraiem et al. 2022). However, research (Widiyaningsih and Jati 2024) indicates that environmental performance does not affect company value because companies are deemed unable to fulfill their social contracts and maintain business sustainability.

The empirical phenomenon of low corporate attention to carbon emissions reporting is still evident in Indonesia's energy sector. Several companies have not consistently reported GHG emissions data in their annual reports and sustainability reports. Furthermore, corporate investment in environmentally sound activities remains relatively small, as companies tend to focus on achieving short-term profits rather than long-term environmental investments. This research is supported by signaling theory, which indicates that companies will convey signals to investors through data published to third parties. Reporting environmental information such as Carbon Emission Disclosure, Green Investment, and Environmental Performance is expected to send a positive signal to investors about the company's contribution to environmental sustainability and future opportunities. The better the environmental information a company provides, the greater the level of investor confidence in the company.

The uniqueness and novelty of this study lies in the use of the Environmental Performance variable, proxied by carbon intensity in the Indonesian energy sector. Furthermore, this finding combines three environmental variables Carbon Emission Disclosure, Green Investment, and Environmental Performance in a single research model on firm value. The finding focuses on energy companies with high carbon emissions, making them relevant to the issues of sustainability and climate change, which are currently a global concern (Arjanto 2022). Based on the description of empirical phenomena, supporting theories, and the research gaps in previous research, this finding constitutes an important aspect to examine in order to obtain empirical results regarding the relationship between Carbon Emission Disclosure, Green Investment, and Environmental Performance and firm value. This finding is expected to contribute to improving environmental accounting references and serve as a source of assessment for investors, companies, and controlling parties in policymaking related to corporate sustainability. Therefore, the purpose of this finding is to examine the influence of Carbon Emission Disclosure, Green Investment, and Environmental Performance on the value of companies in the energy sector listed on the Indonesia Stock Exchange (IDX) for the 2021–2024 period.

METHODS

This study employed a quantitative research method with a causality approach. The causality approach is used to explain the relationship between independent and dependent variables. The independent variables in this study include Carbon Emission Disclosure, Green Investment, and Environmental Performance, while the dependent variable is company value. The sample in this study focused on energy companies listed on the Indonesia Stock Exchange (IDX) for the observation period of 2021-2024. The sampling technique used purposive sampling, based on company standards that published annual reports and sustainability reports consecutively during the study year and disclosed data related to carbon emissions and other variables. Based on these criteria, 132 research samples were obtained.

The information retrieval technique was carried out through a record study and used secondary information in the form of annual reports and sustainability reports of energy sector companies listed on the IDX during the 2021–2024 period. This finding utilizes the independent variable Carbon

Emission Disclosure measured using carbon emission reporting indicators based on disclosure items found in the company's sustainability documents. Green Investment is measured using the total cost of environmental investment compared to the company's total assets. Environmental Performance is proxied using carbon intensity calculated by total carbon emissions compared to the company's total sales. The dependent variable Company Value is measured using the Tobin's Q ratio.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

Table 1. Descriptive Statistical Analysis

	N	*Min*	*Max*	*Mean*	*Std. Deviation*
Nilai Perusahaan	132	0,51	26,15	1,68	2,80
Carbon Emission Disclosure	132	0,39	0,89	0,67	0,12
Green Investment	132	0,00001	2,14	0,06	0,31
Environmental Performance	132	0,00006	0,70	0,07	0,10
Valid N (listwise)	132				

Source: data processing results (2026)

The descriptive statistics in Table 1 indicate the total number of research data, which is 132. The company value variable has the lowest value of 0.51 and the highest value of 26.15, with an average value of 1.68. This condition indicates that the value of energy sector companies has a very large level of variation. The Carbon Emission Disclosure variable has the lowest value of 0.39 and the highest value of 0.89, with an average value of 0.67, indicating that a number of companies have implemented carbon emission reporting in the very good category. The Green Investment variable has an average value of 0.06, with the lowest value of 0.00001 and the highest value of 2.14, indicating that environmental investment in energy sector companies is still relatively low and uneven across companies. Meanwhile, the Environmental Performance variable has an average value of 0.07, with the lowest value of 0.00006 and the highest value of 0.70, indicating changes in the level of productivity of carbon emission control for each energy sector company.

Classical Assumption Test

Normality Test

Table 2. Normality Test

N	102	Memenuhi Asumsi Uji Normalitas
Test Statistic	0,07	
Asymp. Sig. (2-tailed)	0,2	

Source: data processing results (2026)

Table 2 Normality Test, obtained the Asymp. Sig. (2-tailed) result of 0.2. This significance value is above the 0.05 limit, so it is concluded that the residual data in the model is normally distributed.

Multicollinearity Test

Table 3. Multicollinearity Test

	Nilai Tolerance	**VIF**	**Kesimpulan**
Carbon Emission Disclosure	0,914	1,095	Tidak Ada Multikolineritas
Green Invesment	0,916	1,092	Tidak Ada Multikolineritas
Environmental Performance	0,994	1,006	Tidak Ada Multikolineritas

Source: data processing results (2026)

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Based on the multicollinearity test values in table 3, each independent variable obtained a tolerance result higher than 0.10 and a VIF result lower than 10. The results indicate that there is no multicollinearity in each independent variable in the regression model, so the research deserves further analysis.

Autocorrelation Test

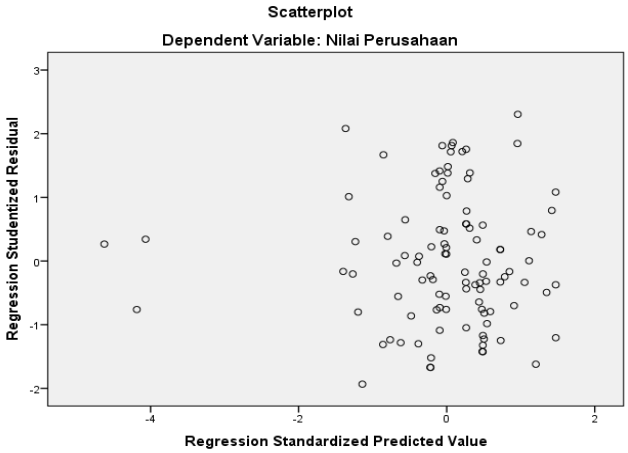
Table 4. Autocorrelation Test

dL	dU	DW	4-dU	Keterangan
1,6086	1,7345	1,989	2,2655	Bebas Auto Korelasi

Source: data processing results (2026)

In Table 4, the autocorrelation test using the Durbin-Watson method yields a DW of 1.989. This result falls between the dU value of 1.7345 and the (4 - dU) value of 2.2655, indicating that the regression model is not affected by autocorrelation. Therefore, the regression model in this study complies with the classical assumptions of autocorrelation and is suitable for further analysis.

Heteroscedasticity Test



Picture 1. Heteroscedasticity Test

In Figure 1, the heteroscedasticity test identifies that the residual points are randomly distributed above and below the 0 mark on the Y-axis, thus not producing a specific model. These results indicate that the regression model does not exhibit heteroscedasticity, thus fulfilling the classical assumption of heteroscedasticity.

Multiple Regression Analysis

Table 5. Multiple Regression Analysis

Variabel	*Unstandardized Coefficients*		*Standardized Coefficients*
	B	***Std. Error***	***Beta***
(Constant)	1,160	0,117	
Carbon Emission Disclosure	-0,269	0,171	-0,158
Green Investment	-0,165	0,059	-0,281
Environmental Performance	-0,235	0,174	-0,130

Source: data processing results (2026)

In Table 5, the constant value in the Unstandardized Coefficients column is 0.068, the Carbon Emission Disclosure variable is -0.269, the Green Investment variable is -0.165, and the

Environmental Performance variable is 0.235. From this SPSS output, we have obtained the following equation:

$$NP : 1,160 - 0,269CED - 0,126GI - 0,235EP + 0,117$$

The results of the regression analysis show a constant value of 1.160, meaning that if carbon emission disclosure, green investment, and environmental performance are zero, then the company value is proxied by Tobin's Q of 1.160. Furthermore, carbon emission disclosure has a negative regression coefficient of -0.269, indicating that every one-unit increase in this variable can reduce the company's value by 0.269, assuming that other variables remain unchanged. In addition, green investment also has a negative effect of -0.126, indicating that every one-unit increase in this variable will reduce the company's value by 0.126, assuming that other variables remain unchanged. Meanwhile, environmental performance has a regression coefficient of -0.235, meaning that every one-unit increase in this variable will reduce the company's value by 0.235, assuming that other variables remain unchanged. Overall, all variables show a negative relationship to company value in the study.

Model Feasibility Test

Table 6. Model Feasibility Test

Model	*Sum of Squares*	Df	*Mean Square*	F	Sig.
Regression	0,401	3	0,134	3,409	0,021[b]
Residual	3,839	98	0,039		
Total	4,239	101			

Source: data processing results (2026)

In Table 6, the model feasibility test yielded a significance level of 0.021, which is less than 0.05. These results indicate that the variables Carbon Emission Disclosure, Green Investment, and Environmental Performance simultaneously have a relationship with company value. Therefore, the regression model in this study is deemed suitable for further analysis.

Coefficient of Determination Test

Table 7. Coefficient of Determination Test

Model	R	*R Square*	*Adjusted R Square*
1	0,357[a]	0,127	0,100

Source: data processing results (2026)

In Table 7, the coefficient of determination test yields an Adjusted R Square of 0.127, or 12.7%. These results indicate that the variables Carbon Emission Disclosure, Green Investment, and Environmental Performance contribute 12.7% to the firm's value, while the remaining 87.3% is influenced by other variables outside the research model. This suggests that other variables are more prominent in determining firm value.

Hypothesis Testing

Table 8. Hypothesis Testing

Variabel	T	Sig.	Keterangan
(Constant)	9,882	0,000	
Carbon Emission Disclosure	-1,570	0,120	Tidak Berpengaruh
Green Investment	-2,796	0,006	Berpengaruh Negatif
Environmental Performance	-1,352	0,180	Tidak Berpengaruh

Source: data processing results (2026)

Table 8 shows that carbon emission disclosure has no effect on firm value, with a p-value of 0.120 > 0.05, thus rejecting H1. Meanwhile, green investment has a significant effect on firm value, with a p-value of 0.006 < 0.05, thus accepting H2. Environmental performance also has no effect on firm

value, with a p-value of 0.180 > 0.05, thus rejecting H3. Overall, only the green investment variable was found to have a relationship with firm value in this study.

Discussion

The Impact of Carbon Emission Disclosure on Company Value

The study found that carbon emission disclosure had no significant impact on company value. The findings indicated that companies' CO2 emission reporting failed to foster investor confidence in the company's value. This situation illustrates that investors in the energy sector still prioritize financial data over non-financial data in making investment decisions. Carbon emission reporting is still considered supplementary data and has not yet become a significant consideration for investors in assessing company opportunities.

From a signaling theory perspective, carbon emissions reporting should convey a positive signal to investors regarding a company's commitment to environmental sustainability. However, in reality, this signal has not been fully responded to by the market because investors are still focused on short-term profits. These findings align with research by (Fina 2024), (Gunawan 2024), and (Ramdani and Nugraha 2022), which indicates that carbon emissions disclosure has no effect on company value. This low impact is due to investors' limited attention to environmental issues and the suboptimal dissemination of information regarding the importance of carbon emissions disclosure.

The Influence of Green Investment on Company Value

The findings indicate that green investment has a negative impact on company value. These results suggest that growth in environmental investment is accompanied by a reduction in company value. This situation may be caused by investors viewing green investment as an additional cost that can reduce company profits in the short term. Green investment generally requires significant costs, and its benefits are only realized in the long term. Investors in the energy sector typically consider a company's profit-generating capacity rather than its commitment to environmental investment. Consequently, increasing environmental investment costs can undermine market perceptions of a company's performance.

In signaling theory, green investment should convey a positive signal regarding a company's long-term opportunities. However, this finding indicates that the market has not responded positively to green investment because the economic benefits cannot yet be directly experienced. These findings align with research by (Nuurhasanat 2024), (Astuti et al., 2024), and (Wijayanti 2024), which conclude that green investment has not been able to increase company value because investors still focus on financial aspects rather than environmental sustainability.

The Influence of Environmental Performance on Company Value

The findings indicate that environmental performance has no significant impact on company value. This suggests that a company's efficiency in managing carbon emissions is not yet a significant factor in its value growth. Investors tend to consider environmental performance when selecting investment decisions. This indicates that the market still focuses more on financial indicators than on environmental sustainability indicators.

Based on signaling theory, optimal environmental performance should convey a positive signal to investors regarding a company's commitment to managing its environmental impact. However, in practice, investors in the energy sector still prioritize profitability and market conditions over environmental risk efficiency. These findings align with research by Widiyaningsih and Jati (2024), Rahmawati and Yuyetta (2024), and Ulfamawaddah et al. (2023), which concluded that environmental performance has no effect on company value. This low impact indicates that companies have not yet considered environmental performance as an added value that can increase investor confidence.

CONCLUSION

Based on the tested findings, it was concluded that Carbon Emission Disclosure had no effect on company value in energy sector companies listed on the IDX during the 2021–2024 period. These results indicate that company CO2 emission reporting is not a primary factor in investors' assessment of company growth, as investors still focus on financial information and the company's ability to generate profits. Green Investment negatively impacted company value, indicating that increasing environmental investment is seen as an additional cost that can reduce company profits in the short term, thus influencing investors' perceptions of company value. Meanwhile, Environmental Performance did not impact company value because environmental performance, as proxied by carbon intensity, has not yet become a primary focus for investors in assessing investment decisions. Overall, the findings suggest that investors in energy sector companies still consider financial aspects over environmental aspects when assessing company value.

These findings are expected to support the development of literature on carbon emission disclosure, green investment, and environmental performance in relation to corporate value. Furthermore, these findings are expected to foster corporate awareness and concern, particularly in sectors directly related to the environment, to pay greater attention to sustainability and environmental sustainability in the areas where companies operate.

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