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The Effect of Green Accounting, Corporate Social Responsibility, and Environmental, Social, and Governance on Firm Value with Profitability as a Moderating Variable in Energy Sector Companies Listed on the Indonesia Stock Exchange

Tiara Febria[1*], Heni Safitri[2], Dedi Hariyanto[3]
[1,2,3] Faculty of Economics and Business, Muhammadiyah University of Pontianak, Pontianak, Indonesia

**Corresponding Author: febriatiara05@gmail.com*

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ABSTRACT

This study aims to analyze the effects of Green Accounting, Corporate Social Responsibility (CSR), and Environmental, Social, and Governance (ESG) on Firm Value, with Profitability as a moderating variable, in energy sector companies listed on the Indonesia Stock Exchange in 2024. This study employed a quantitative approach using purposive sampling. The research sample consisted of 66 energy sector companies, and the data were analyzed using Moderated Regression Analysis (MRA). The results indicate that Green Accounting has a positive and significant effect on Firm Value, whereas CSR and ESG do not have significant effects on Firm Value. Profitability has a positive and significant effect on Firm Value. Profitability strengthens the effect of Green Accounting on Firm Value, does not moderate the effect of CSR on Firm Value, and weakens the effect of ESG on Firm Value. Simultaneously, Green Accounting, CSR, ESG, Profitability, and the interaction variables have significant effects on Firm Value. The coefficient of determination of the moderation model is 41.1%, indicating that the variables in the model explain 41.1% of the variation in Firm Value, while the remaining variation is influenced by other factors outside this study.

INTRODUCTION

Climate change and environmental degradation have increased attention to the implementation of sustainability practices in corporate business activities. The IPCC report (2023) shows that human activities have caused a 1.1°C increase in global temperature above pre-industrial levels and have contributed to increased greenhouse gas emissions from various economic sectors. In 2022, Indonesia was recorded as one of the countries with the highest carbon dioxide emission levels in the world (Worldometer, 2022). This finding is supported by data showing that Indonesia ranked sixth among the largest carbon-emitting countries globally in the same year (Kompas, 2023). In line with these developments, the level of compliance

among listed companies regarding sustainability reporting reached 94% by the end of 2024 (Bisnis.com, 2025).

Sustainability issues are closely related to the energy sector because the operational characteristics of this sector are directly associated with the utilization of natural resources and carbon emissions. The Indonesian government has targeted a reduction in energy sector emissions of up to 358 million tons of CO_2 by 2030 through the Enhanced Nationally Determined Contribution (E-NDC) scheme (ESDM, 2023). In addition, the Indonesia Stock Exchange has developed an ESG Reporting platform to enhance transparency in the disclosure of sustainability information by listed companies (Bisnis.com, 2025). Greater attention to sustainability aspects is also reflected in the revocation of business licenses of four nickel mining companies in Raja Ampat due to violations of environmental regulations (ESDM, 2025). These conditions indicate that environmental, social, and governance aspects are increasingly becoming part of the activities and disclosures of energy sector companies.

The development of sustainability practices has increased attention to various factors that may affect firm value. Green Accounting is understood as the process of recognizing, measuring, recording, and disclosing environmental aspects within a company's accounting system (Lako, 2018). Corporate Social Responsibility (CSR) represents a company's responsibility toward stakeholders through economic, social, and environmental dimensions (Susanto & Ardini, 2016). Meanwhile, Environmental, Social, and Governance (ESG) describes company performance based on environmental, social, and governance dimensions (Hariyanto & Ghozali, 2024). In the capital market, firm value reflects investors' perceptions of a company's prospects and performance, one of which can be measured using Tobin's Q (Dzahabiyya et al., 2020).

Previous studies have shown inconsistent findings regarding the relationship between sustainability practices and firm value. Lestari & Khomsiyah (2023) found that Green Accounting has a significant effect on firm value. Similar findings were reported by Erwanto (2024), who found a positive effect of Green Accounting on firm value. However, Salsabila & Widiatmoko (2022) found that Green Accounting does not have a direct effect on firm value. Regarding CSR, Pratama & Serly (2024) found a significant effect on firm value, whereas Rachman et al. (2024) found that CSR disclosure does not have a significant effect. Regarding ESG, Heldayat & Sulfitri (2025) and Anggarista et al. (2024) found a positive effect on firm value, while Susanto & Hastuti (2025) reported that ESG does not have a significant effect on firm value.

In addition to the inconsistent findings regarding the effects of Green Accounting, CSR, and ESG on firm value, previous studies on the role of profitability as a moderating variable have also shown inconsistent results. Kristanti (2022) found that profitability moderates the relationship between CSR and firm value. Similar findings were reported by Husna & Henny (2024), who found that profitability strengthens the relationship between CSR and firm value in the energy sector. Laksana & Ashari (2024) also reported that profitability moderates the relationship between managerial ownership and firm value. In contrast, Maftukhah et al. (2025) found that profitability does not moderate the relationship between sustainability reporting and firm value. These differences indicate that there is still room for further research on the role of profitability in the relationship between sustainability practices and firm value.

Based on the empirical phenomenon and the findings of previous studies, this study aims to analyze the effects of Green Accounting, Corporate Social Responsibility, and

Environmental, Social, and Governance on firm value in energy sector companies listed on the Indonesia Stock Exchange in 2024. In addition, this study also aims to analyze the role of profitability as a moderating variable in the relationship between Green Accounting, Corporate Social Responsibility, Environmental, Social, and Governance, and firm value.

RESEARCH METHOD

This study employed a quantitative method with an associative approach to analyze the relationships among Green Accounting, Corporate Social Responsibility (CSR), Environmental, Social, and Governance (ESG), Profitability, and Firm Value. A quantitative approach was selected because the study focuses on hypothesis testing through statistical analysis based on the positivist paradigm (Sugiyono, 2023). The research data were collected through documentation techniques using the sustainability reports and annual reports of energy sector companies listed on the Indonesia Stock Exchange in 2024. The population consisted of 91 energy sector companies, while the sample was determined using purposive sampling, resulting in 66 companies that met the research criteria: publishing financial statements for 2024, disclosing CSR based on the GRI Standards, and reporting environmental costs.

The independent variables in this study were Green Accounting (X_1), CSR (X_2), and ESG (X_3). Firm Value (Y) was used as the dependent variable, while Profitability (Z) was used as the moderating variable. Green Accounting was measured using the ratio of environmental costs to net income (Lestari & Khomsiyah, 2023). CSR was measured using the Corporate Social Responsibility Disclosure Index (CSRDI) developed by Haniffa & Cooke (2005), while ESG was measured using the ESG Disclosure Index (ESGI) developed by Whitelock (2015). Profitability was proxied by Return on Equity (ROE) (Kasmir, 2019), while Firm Value was measured using Tobin's Q ratio (Chung & Pruitt, 1994).

Data analysis was conducted through classical assumption tests, including a normality test using Kolmogorov–Smirnov, a multicollinearity test using Tolerance and Variance Inflation Factor (VIF) values, a heteroscedasticity test using the Glejser method, an autocorrelation test using the Run Test, and a linearity test using the Lagrange Multiplier method by comparing the calculated chi-square value with the critical chi-square value (Ghozali, 2021). Hypothesis testing was conducted using Moderated Regression Analysis (MRA) to examine both direct effects and the moderating role of Profitability in the relationships between Green Accounting, CSR, ESG, and Firm Value. In addition, this study used the correlation coefficient test (R) to measure the strength of relationships among variables (Sugiyono, 2023), the coefficient of determination test (R^2) to measure the ability of the model to explain the dependent variable, the F-test to examine simultaneous effects, and the t-test to examine the partial effects of each variable in the research model (Ghozali, 2021).

RESULTS AND DISCUSSION

Classical Assumption Test

a. Normality Test

The normality test in this study was conducted to determine whether the residual data were normally distributed. The results of the Kolmogorov–Smirnov (K-S) test were used as the basis for determining the feasibility of further analysis. The normality test results are presented in Table 1.

Table 1. Normality Test Results

Test	Value

N (Sample)	66
Test Statistic	0.043
Asymp.Sig.(2-tailed)	0.100

Source: Processed Data, 2026

Based on the results in Table 1, the One-Sample Kolmogorov–Smirnov test showed a Test Statistic value of 0.043 and an Asymp. Sig. (2-tailed) value of 0.100, which is greater than 0.05. This indicates that the residuals were normally distributed; therefore, the normality assumption in the moderation regression model was fulfilled.

b. Multicollinearity Test

The multicollinearity test was conducted to ensure that the independent variables did not have high correlations that could disrupt the stability of the regression model. This test used Tolerance and Variance Inflation Factor (VIF) values, with the criterion that multicollinearity does not occur when the Tolerance value is greater than 0.10 and the VIF value is less than 10. The test results are presented in Table 2.

Table 2. Multicollinearity Test Results

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Green Accounting (X_1)	0.562	1.781
	CSR (X_2)	0.688	1.455
	ESG (X_3)	0.441	2.270
	Profitability (Z)	0.607	1.648
	Green Accounting*Profitability	0.205	4.872
	CSR*Profitability	0.312	3.206
	ESG*Profitability	0.189	5.291
Dependent Variable: Firm Value.			

Source: Processed Data, 2026

Based on the multicollinearity test results in Table 2, all research variables had Tolerance values above 0.10 and VIF values below 10. These results indicate that there were no multicollinearity symptoms in the regression model. Therefore, Green Accounting, Corporate Social Responsibility, Environmental, Social, and Governance, Profitability, and all interaction variables met the multicollinearity assumption and were suitable for use in the moderation regression analysis.

c. Heteroscedasticity Test

The heteroscedasticity test aimed to determine whether there was an inequality in the variance of residuals across observations in the regression model. The test was conducted using the Glejser test by regressing the absolute residual values to detect heteroscedasticity. The decision criterion was that heteroscedasticity does not occur if the significance value is greater than 0.05, whereas heteroscedasticity occurs if the significance value is less than 0.05. The results are presented in Table 3.

Table 3. Heteroscedasticity Test Results

Variable	Sig.
Green Accounting	0.649

CSR	0.193
ESG	0.217
Profitability (Z)	0.667
Green Accounting*Profitability	0.701
CSR*Profitability	0.754
ESG*Profitability	0.721
Dependent Variable: Firm Value	

Source: Processed Data, 2026

Based on Table 3, all variables had significance values greater than 0.05. This indicates that there were no symptoms of heteroscedasticity in the regression model; therefore, the model was suitable for further analysis.

d. Autocorrelation Test

The autocorrelation test was conducted using the Run Test to determine whether the residuals in the regression model occurred randomly. The model was considered free from autocorrelation symptoms when the Asymp. Sig. (2-tailed) value was greater than 0.05. The autocorrelation test results are presented in Table 4.

Table 4. Autocorrelation Test

Test	Value
Test Value[a]	-3,78864
Z	-,913
Asymp. Sig. (2-tailed)	,361

Source: Processed Data, 2026

Based on Table 4, the test results showed a significance value of 0.361, which is greater than 0.05. These results indicate that the residuals in the regression model did not experience autocorrelation. Therefore, the autocorrelation assumption was fulfilled, and the regression model was suitable for further analysis.

e. Linearity Test

The linearity test aimed to examine the appropriateness of the functional specification of the model and to determine whether the relationships among variables were linear or non-linear, such as quadratic or cubic relationships. The linearity test results are presented in Table 5.

Table 5. Linearity Test Results Using the Lagrange Multiplier Method

Model Summary Augmented				
Model	**n**	**R^2 of Augmented Model**	**Calculated χ^2 (n × R^2)**	**Critical χ^2 (df = 1, α = 5%)**
1	66	0.031	2.046	3.841

Dependent Variable: Firm Value.
Predictors: (Constant), ESG*Profitability, CSR*Profitability, Green Accounting*Profitability, Profitability, ESG, CSR, Green Accounting

Source: Processed Data, 2026

Based on the linearity test results using the Lagrange Multiplier method in Table 5, the calculated χ^2 value was 2.046, which was smaller than the critical χ^2 value of 3.841 at a 5% significance level. These results indicate that the model was linear. Therefore, the linearity assumption was fulfilled, and the regression model was suitable for further hypothesis testing.

Hypothesis Test

a. Moderated Regression Analysis (MRA)

Moderated Regression Analysis (MRA) was used to examine the effects of Green Accounting (X_1), CSR (X_2), and ESG (X_3) on Firm Value (Y), with Profitability (Z) as a moderating variable. The MRA results are presented in Table 6.

Table 6. Moderated Regression Analysis Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.728	0.352		2.068	0.040
	Green Accounting (X_1)	0.318	0.117	0.245	2.718	0.007
	CSR (X_2)	0.062	0.115	0.041	0.539	0.591
	ESG (X_3)	0.092	0.114	0.076	0.806	0.421
	Profitability (Z)	0.462	0.098	0.430	4.715	0.000
	Green Accounting*Profitability	0.097	0.039	0.403	2.487	0.014
	CSR*Profitability	0.018	0.032	0.061	0.563	0.574
	ESG*Profitability	-0.089	0.037	-0.420	-2.405	0.017
Dependent Variable: Firm Value.						

Source: Processed Data, 2026

Based on Table 6, the regression equation obtained was:

$$\mathbf{Y = 0.728 + 0.318X_1 + 0.062X_2 + 0.092X_3 + 0.462Z + 0.097X_1*Z + 0.018X_2*Z - 0.089X_3*Z + e}$$

The interpretation of the regression equation is as follows:

1) The constant value of 0.728 indicates that when all independent variables, the moderating variable, and the interaction variables are equal to zero, Firm Value remains at 0.728.
2) The Green Accounting regression coefficient of 0.318 indicates that an increase of one unit in Green Accounting tends to increase Firm Value by 0.318 units.
3) The CSR regression coefficient of 0.062 indicates that an increase of one unit in CSR tends to increase Firm Value by 0.062 units.
4) The ESG regression coefficient of 0.092 indicates that an increase of one unit in ESG tends to increase Firm Value by 0.092 units.
5) The Profitability regression coefficient of 0.462 indicates that an increase of one unit in ROE tends to increase Firm Value by 0.462 units.
6) The interaction coefficient of Green Accounting*Profitability of 0.097 indicates that Profitability strengthens the positive effect of Green Accounting on Firm Value.
7) The interaction coefficient of CSR*Profitability of 0.018 indicates a positive relationship direction. However, because the significance value is 0.574, which is greater than 0.05, Profitability is not proven to moderate the effect of CSR on Firm Value.
8) The interaction coefficient of ESG*Profitability of −0.089 indicates that Profitability weakens the effect of ESG on Firm Value.

b. Correlation Coefficient Analysis

The correlation coefficient test in this study was used to measure the strength of the relationship between the independent and dependent variables and to assess the effect of the moderating variable on the relationship. The correlation coefficient test results are presented in Table 7.

Table 7. Correlation Coefficient Test Results (R)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.641[a]	0.411	0.387	0.70321
Predictors: (Constant), ESG*Profitability, ESG, CSR, Profitability, Green Accounting, CSR*Profitability, and Green Accounting*Profitability.				
Dependent Variable: Firm Value.				

Source: Processed Data, 2026

Based on the correlation coefficient test in Table 7, the correlation coefficient value (R) was 0.641. This indicates a strong relationship between Green Accounting, CSR, and ESG, with Profitability as a moderating variable, and Firm Value.

c. Coefficient of Determination Test

The coefficient of determination test (R^2) was used to measure the ability of the independent variables to explain variations in the dependent variable. Based on Table 7, the R^2 value was 0.411. This means that Green Accounting, CSR, and ESG, with Profitability as a moderating variable, explain 41.1% of the variation in Firm Value, while the remaining 58.9% is influenced by other variables not examined in this study.

D. Simultaneous Test (F Test)

The F-test was used to test the significance of the regression model simultaneously, namely to determine whether all independent variables jointly have a significant effect on the dependent variable and to assess the feasibility of the regression model. The F-test results are presented in Table 8.

Table 8. Simultaneous Test Results (F Test)

Model	Sum of Squares	Mean Square	F	Significance
Regression	58.364	8.338	14.729	.000b
Residual	110.636	0.592		
Dependent Variable: Firm Value Predictors: (Constant), ESG*Profitability, ESG, CSR, Profitability, Green Accounting, CSR*Profitability, and Green Accounting*Profitability.				

Source: Processed Data, 2026

Based on the F-test results in Table 8, the significance value was 0.000, which is less than 0.05. This indicates that Green Accounting, CSR, ESG, Profitability, and the interaction variables simultaneously have a significant effect on Firm Value. The moderating role of Profitability is subsequently determined through the significance testing of each interaction variable.

e. Partial Test (t Test)

The t-test was used to test the significance of the partial effect of each independent variable on the dependent variable and to determine the individual effect of each variable in the regression model. The t-test results are presented in Table 9.

Table 9. Partial Test Results (t Test)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.728	0.352		2.068	0.040
	Green Accounting (X_1)	0.318	0.117	0.245	2.718	0.007
	CSR (X_2)	0.062	0.115	0.041	0.539	0.591
	ESG (X_3)	0.092	0.114	0.076	0.806	0.421
	Profitability (Z)	0.462	0.098	0.430	4.715	0.000
	Green Accounting*Profitability	0.097	0.039	0.403	2.487	0.014
	CSR*Profitability	0.018	0.032	0.061	0.563	0.574
	ESG*Profitability	-0.089	0.037	-0.420	-2.405	0.017
Dependent Variable: Firm Value.						

Source: Processed Data, 2026

Based on the t-test results in Table 9, with a critical t-value of 2.002, the findings are as follows:

1) Green Accounting (X_1) had a regression coefficient of 0.318, a calculated t-value of 2.718, and a significance value of 0.007. Since the calculated t-value was greater than the critical t-value and the significance value was less than 0.05, Green Accounting had a positive and significant effect on Firm Value.
2) CSR (X_2) had a regression coefficient of 0.062, a calculated t-value of 0.539, and a significance value of 0.591. Since the calculated t-value was lower than the critical t-value and the significance value was greater than 0.05, CSR did not have a significant effect on Firm Value.
3) ESG (X_3) had a regression coefficient of 0.092, a calculated t-value of 0.806, and a significance value of 0.421. Since the calculated t-value was lower than the critical t-value and the significance value was greater than 0.05, ESG did not have a significant effect on Firm Value.
4) Profitability had a regression coefficient of 0.462, a calculated t-value of 4.715, and a significance value of 0.000. Since the calculated t-value was greater than the critical t-value and the significance value was less than 0.05, Profitability had a positive and significant effect on Firm Value.
5) The Green Accounting*Profitability interaction had a coefficient of 0.097, a calculated t-value of 2.487, and a significance value of 0.014. This indicates that Profitability significantly moderates the effect of Green Accounting on Firm Value in a positive direction. The higher the profitability of the company, the stronger the positive effect of Green Accounting on Firm Value.
6) The CSR*Profitability interaction had a coefficient of 0.018, a calculated t-value of 0.563, and a significance value of 0.574. This indicates that Profitability does not moderate the effect of CSR on Firm Value. The level of profitability neither strengthens nor weakens the relationship between CSR and Firm Value.
7) The ESG*Profitability interaction had a regression coefficient of −0.089, a calculated t-value of −2.405, and a significance value of 0.017. This indicates that Profitability significantly moderates the effect of ESG on Firm Value in a negative direction. The higher the profitability, the weaker the effect of ESG on Firm Value.

DISCUSSION

The Effect of Green Accounting on Firm Value

The results indicate that Green Accounting has a positive and significant effect on Firm Value. This finding shows that energy sector companies that allocate and disclose environmental costs more effectively tend to receive more positive market evaluations. In the energy sector, information related to environmental management is important because company operations are directly associated with the use of natural resources, emissions, waste, and environmental risks. The implementation of Green Accounting may provide a signal that the company is committed to controlling environmental impacts and maintaining business sustainability. This condition can increase investor confidence because the company is considered better prepared to face environmental risks and regulatory pressures. This finding is consistent with Lestari and Khomsiyah (2023) and Erwanto (2024), who found that Green Accounting affects Firm Value.

The Effect of Corporate Social Responsibility on Firm Value

The results indicate that CSR does not have a significant effect on Firm Value. This finding suggests that the level of CSR disclosure among energy sector companies has not become a primary consideration for investors in assessing companies. Although CSR reflects a company's concern for society and the environment, investors may prioritize financial indicators, profit prospects, operational risks, and business stability. This condition may also indicate that CSR disclosure by companies is not always perceived as an activity that provides a direct economic impact. Therefore, an increase in CSR disclosure does not automatically increase Firm Value. This finding is consistent with Rachman et al. (2024) and Rasyid et al. (2022), who found that CSR does not have a significant effect on Firm Value.

The Effect of Environmental, Social, and Governance on Firm Value

The results indicate that ESG does not have a significant effect on Firm Value. This finding suggests that ESG disclosure has not yet become a primary basis for investors in assessing energy sector companies during the research period. Investors may still focus more on a company's ability to generate profits, commodity market conditions, business risks, and growth prospects. The insignificant effect of ESG may also indicate that the quality and completeness of ESG disclosure among energy sector companies have not been evenly distributed. When ESG information is not presented consistently, investors may not be able to compare corporate sustainability performance optimally. This finding is consistent with Susanto and Hastuti (2025), who found that ESG does not have a significant effect on Firm Value.

The Effect of Profitability on Firm Value

Profitability has a positive and significant effect on Firm Value. This finding indicates that companies with a greater ability to generate profits tend to have higher firm value. Profitability provides a positive signal to investors that the company is able to manage its resources and capital effectively to generate profits. In the energy sector, the ability to generate profits also reflects a company's capacity to cope with commodity price fluctuations, substantial capital requirements, and operational risks. Therefore, companies with high profitability tend to be more attractive to investors. This finding is consistent with Santika and Wijaya (2024) and Malik (2025).

Profitability Moderates the Effect of Green Accounting on Firm Value

Profitability is proven to strengthen the effect of Green Accounting on Firm Value. The positive interaction coefficient indicates that the implementation of Green Accounting has a greater effect on Firm Value in companies with high profitability. Companies with strong profits tend to be more capable of supporting sustainable environmental management without disrupting their operational capacity. This condition may make Green Accounting information more credible to investors because it is considered to be supported by adequate financial capacity. Thus, companies that combine environmental performance with strong profitability tend to receive more positive market evaluations.

Profitability Moderates the Effect of CSR on Firm Value

Profitability is not proven to moderate the effect of CSR on Firm Value. This means that high or low profitability does not strengthen or weaken the relationship between CSR and Firm Value. This condition suggests that the success of CSR in influencing investor assessments is not determined solely by a company's ability to generate profits. For investors, CSR may be assessed more based on program quality, tangible social impacts, consistency of implementation, and transparency of disclosure. Therefore, companies with high profitability may not necessarily experience an increase in Firm Value if their CSR implementation is not considered relevant or does not provide directly observable benefits.

Profitability Moderates the Effect of ESG on Firm Value

Profitability is proven to moderate the effect of ESG on Firm Value in a negative direction. This finding indicates that as Profitability increases, the effect of ESG on Firm Value tends to weaken. In companies that already demonstrate strong profitability, investors may focus more on financial information and potential investment returns than on ESG information. This finding does not mean that ESG is unimportant. However, when profitability is high, ESG may become additional information whose contribution to investor assessments is relatively smaller. Conversely, in companies with lower profitability, ESG disclosure may serve as an additional signal that helps investors assess the company's sustainability and governance quality.

CONCLUSION AND SUGGESTIONS

This study shows that Green Accounting has a positive and significant effect on Firm Value in energy sector companies listed on the Indonesia Stock Exchange in 2024. Meanwhile, Corporate Social Responsibility and Environmental, Social, and Governance do not have significant effects on Firm Value. Profitability is proven to have a positive and significant effect on Firm Value. In the moderation test, Profitability strengthens the effect of Green Accounting on Firm Value. Profitability is not proven to moderate the effect of CSR on Firm Value. In contrast, Profitability weakens the effect of ESG on Firm Value. Simultaneously, Green Accounting, CSR, ESG, Profitability, and the interaction variables have significant effects on Firm Value. The coefficient of determination of 41.1% indicates that the research model explains 41.1% of the variation in Firm Value, while the remaining 58.9% is influenced by other factors outside this study. Therefore, energy sector companies need to strengthen the implementation of Green Accounting and maintain profitability to increase investor confidence. This study is limited by its research object, which only includes energy sector companies, the observation period, which is limited to 2024, and the use of Green Accounting, CSR, ESG, and Profitability variables. Therefore, the ability of the model to explain variations in Firm Value remains limited. Future studies may consider extending the observation period, expanding the

scope to other company sectors, and adding other variables that may affect Firm Value to obtain more comprehensive findings.

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