

## THE ROLE OF GREEN ACCOUNTING AND CARBON EMISSION DISCLOSURE IN INCREASING FIRM VALUE



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### Abstract

This research analyzes the role of green accounting and carbon emission disclosure in determining firm value. The population in the study consisted of companies that participated in the Company Performance Assessment Program in Environmental Management (PROPER) organized by the Ministry of Environment and Forestry (KLHK) during the 2020-2023 period. This research uses a purposive sampling technique in determining the sample with a sample size of 20 companies each year and is processed with the help of SPSS 25. This research uses multiple linear regression analysis to test the effect of green accounting and carbon emission disclosure on firm value. The research results indicate that green accounting significantly impacts firm value, and foreign ownership as a moderating variable strengthens the substantial and positive relationship between green accounting and firm value. Meanwhile, the carbon emission disclosure variable indicates that the results are insignificant to firm value.

**Keywords:** Green Accounting; Carbon Emission Disclosure; Firm Value

## INTRODUCTION

The business world has shown rapid economic development and growth in recent years. Discussions on environmental pollution, such as carbon emissions, climate change, and rising global temperatures, keep up with the development and growth of the economy. Indonesia and various countries around the world are busy discussing global warming. The United Nations Framework Convention on Climate Change (UNFCCC) stipulates international political commitments related to environmentally friendly economic development. Several countries have agreed to reduce carbon emissions and climate change by implementing the UNFCCC, which discusses the climate transition known as the Kyoto Protocol. Countries that have ratified and ratified the Kyoto Protocol automatically have a legislative obligation referring to procedures. The Kyoto Protocol aims to manage and control the balance of greenhouse gas emission concentrations in the atmosphere to avoid levels that can harm and threaten the stability of the earth's climate system. In the accounting practice that is developing in Indonesia, the Institute of Accountants Indonesia (IAI) has regulated environmental accountability in PSAK 01 paragraph 14, which is a manifestation of commitment and obligation to protect the environment, where the company will publish a report on social responsibility activities in reducing the effects of Greenhouse Gases (GHG).

In addition, the Ministry of Environment & Forestry (KLHK) of the Republic of Indonesia stipulated Decree number 127 of 2002 as the legal basis for the creation of the Performance Rating Assessment Program (PROPER), which aims to strengthen the consistency of stakeholders in maintaining sustainability and environmental protection. There are five levels of color in the PROPER assessment, including the best gold, followed by green, blue, red, and black. The red and black levels in the Performance Rating Assessment Program (PROPER) status indicate that PROPER participants do not carry out the provisions of laws and regulations in their efforts to manage the environment and its sustainability. Even in its business practices, the company has the potential to take actions or omissions that cause damage and pollution to the environmental ecosystem. The number of PROPER participants decreased from 2016 to 2020. In addition, the number of non-

compliant PROPER participants fluctuated (up and down) over the last decade. However, the number of non-compliant PROPER participants increased significantly to 889 by 2022.

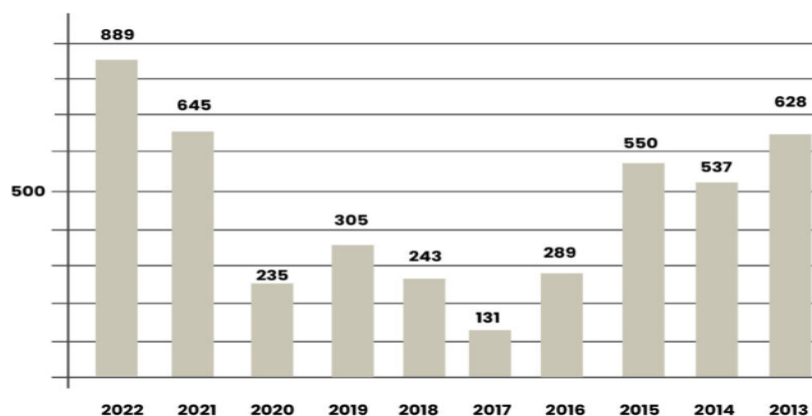


Figure 1

**Graph of Companies Not Complying with PROPER Assessment**

Source: Ministry of Environment & Forestry of the Republic of Indonesia, 2022

## LITERATURE REVIEW

The theory applied in this research is stakeholder theory. In previous research, Angelina and Enggar (2021) explained that an organization's management carries out activities that are considered vital by stakeholders and then submit reports on these activities to stakeholders. Meanwhile, Rusmana and Si Made (2020) found that companies are not entities that only focus on and act for their internal interests but are obliged to provide added value to stakeholders. In addition, legitimacy theory is also applied to this research analysis. In legitimacy theory, this was discovered by several previous studies (for example, Angelina & Enggar, 2021). Angelina and Enggar (2021) explain that organizations always try to ensure that they carry out activities according to the regulations and norms of the society in which they operate. This theory can inspire and motivate entities to submit sustainable reports. This research presents novelty by more comprehensively examining the relationship between green accounting, carbon emission disclosure, and firm value. In addition, this study's analysis differs from the previous one because it includes a moderating variable in the form of foreign ownership.

To maintain their social legitimacy, companies must operate by the values, norms, and expectations of the society in which they operate. Green accounting has a significant

contribution and role in increasing firm value because it can influence the level of trust of stakeholders. Companies' achievements in optimizing their profit potential can be assessed based on investor interest and trust. As the company's value increases, the company's image will automatically improve among investors. This research is supported by previous research, such as Amira & Siswanto (2022), Dewi & Narayana (2020), and Abdurrahman (2019), showing that the application of green accounting has a reasonably significant positive influence on the value of a company. Description of the following hypothesis:

Ha<sub>1</sub>: Green accounting has a positive effect on firm value.

According to stakeholder theory, if a company is more comprehensive in conveying disclosure of its value, it will increase its value. Company efforts made voluntarily to provide information about carbon emissions can indicate additional firm value in a positive direction. In this case, companies that voluntarily provide information related to carbon emissions generally show higher firm value, which means that the company's openness in presenting environmental data, including carbon emissions, can send a positive signal to investors and increase firm value. According to Wahyuningsih & Rika (2021), Carbon Emission Disclosure reflects the entity owner's efforts to explain carbon emissions in the company's annual report. Climate phenomena provide useful information for managing risks in companies and creating a positive image in the eyes of the public. This research is supported by several studies, such as Kurnia et al. (2020) and Lee & Jin Hyung Cho (2020), showing that transparency of carbon emissions information positively impacts firm value in Indonesia and Korea. Description of the following hypothesis:

Ha<sub>2</sub>: Carbon Emission Disclosure has a positive effect on firm value.

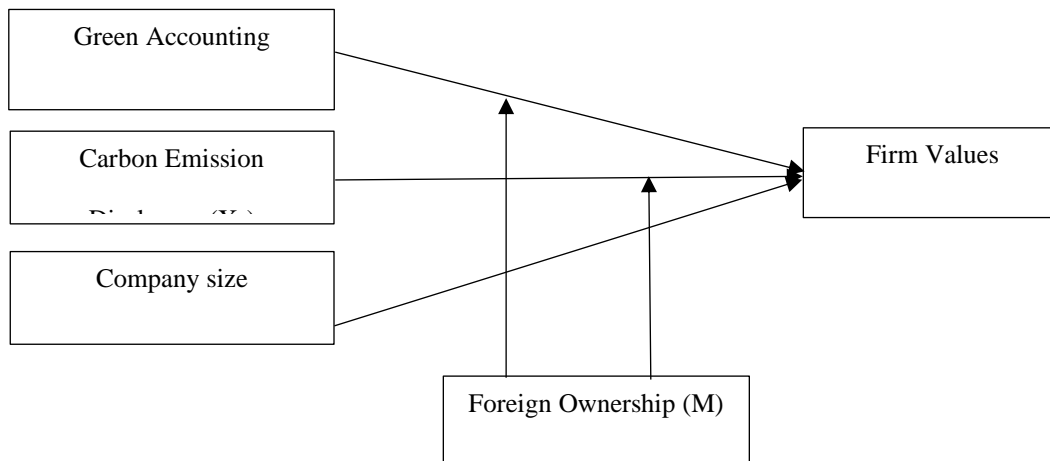
Foreign investors usually encourage or control management regarding corporate governance and environmental concerns as a form of gratitude for their profits from the countries where they invest. According to Soleha (2022), the percentage of foreign investors with diverse backgrounds can improve the monitoring function, thereby having an impact on improving corporate governance and minimizing risks, which ultimately contributes to and has a positive effect on the company's value. Although additional information on carbon emissions has been empirically proven to impact a company's value positively, companies

still need to plan and consider the benefits and expenses generated by disclosure, as each disclosure involves costs in the process and implementation. This research is in line with Kim et al. (2020). Breakdown for the following hypothesis:

Ha<sub>3</sub>: Foreign ownership strengthens the positive relationship between green accounting and firm value.

A company's transparency regarding carbon emission information is in line with the theory of legitimacy. Carbon emissions are gas emissions that come from the combustion of carbon-based compounds. Therefore, carbon emissions refer to the release of carbon into the atmosphere. This gas also causes global weather changes and greenhouse gas emissions. According to the legitimacy theory, companies operating in a community or public environment must adhere to values and norms and be responsible for their operations. When a company discloses its carbon emissions, the public will obtain information through a report on its environmental responsibility. This is consistent with previous studies by Gazany & Annie (2021) and Kim et al. (2020). Breakdown for the following hypothesis:

Ha<sub>4</sub>: Foreign ownership strengthens the positive relationship between Carbon Emission Disclosure and firm value.



**Figure 2**  
**Research Model**

Source: Research Data, 2024.

## RESEARCH METHOD

The research is conducted through causal studies using quantitative methods. The population in the study includes 388 data on companies from the energy sector registered on the Indonesia Stock Exchange (IDX) in 2020 - 2023, where energy sector companies generally contribute to carbon emissions and other pollution. This research uses purposive sampling techniques and multiple linear regression analysis techniques, and it is processed with the help of SPSS 25. The research sampling criteria include companies that were continuously on the Indonesia Stock Exchange (BEI) in 2020 - 2023 (388 data), companies that did not consistently follow the PROPER of the Ministry of Environment and Forestry (KLHK) in 2020 - 2023 (100 data), and companies that did not continuously publish sustainability reports in 2020 – 2023 (208 data), bringing the total number of clean samples obtained to 80 data.

Firm value (NP) is an overall measure of the economic value of a company or the valuation value of a company's share price. When share prices increase, the firm value will become more optimal and grow, and the shareholders' welfare will improve. Referring to other research conducted by Ramadani & Danang (2024), Aeni & ETTY (2023), and Dewi & Ajeng (2020), the ratio scale in firm value as the dependent variable is:

$$\text{Tobins Q} = \frac{\text{Market Value of Common Stock} + \text{Book Value of Company Debt}}{\text{Total Company Assets}} \dots\dots\dots(1)$$

Green accounting (GA) can be represented using the PROPER report published by the Republic of Indonesia's Ministry of Environment and Forestry (KLHK). The Company Performance Rating Assessment Program (PROPER) is one of the government's steps in optimizing the environmental supervision management of a company by the provisions based on applicable laws and regulations and the initiation of the Ministry of Environment and Forestry (MoEF). The environmental performance assessment (PROPER) is represented by the numbers 1-5 and calculated by the PROPER's color rating score.

**Table 1**  
**PROPER Rating Criteria**

<b>Color</b>	<b>Score</b>	<b>Status</b>
Gold	5	Very Very Good
Green	4	Very Good

Blue	3	Good
Red	2	Bad
Black	1	Very Bad

Source: PROPER Secretariat, Ministry of Environment and Forestry

Carbon Emission Disclosure is a component of the environmental disclosure report described in law. The measurement of variables refers to research from Rusmana and Si Made (2020), followed by research by Choi et al. (2013). In determining and measuring the extent of disclosure of carbon emissions, companies can use a checklist based on the information request form and data contained in the Carbon Disclosure Project (CDP). Five segments are relevant to carbon emissions and climate change, including climate change risks and opportunities, consumption of Greenhouse Gas Emissions (GHG), Energy Consumption (EC), reduction of greenhouse gases and costs (RC), and Accountability for Carbon Emissions (AEC). Furthermore, these five segments are further divided into 18 specified items. Calculations in the Carbon Emission Disclosure index include calculating the score for each disclosure item using a dichotomous scale, where the minimum score is 0 and the maximum score is 18. Therefore, if all items are disclosed according to the information in the report, the company's score is 18. Next, the scores are added up for each company.

The moderation variable in this research is foreign ownership (FO), represented by the total distribution of shares owned by foreign investors to outstanding shares in that period. The following formula determines the foreign ownership variable:

$$FO = \frac{\text{Total shares owned by foreign investors}}{\text{The number of shares outstanding in that period}} \dots\dots\dots(2)$$

The control variable is proxied by company size (SIZE), measured via the natural logarithm (Ln) of the number of company assets in each period. The following formula determines company size:

$$SIZE = \text{Ln}(\text{Total Company Assets}) \dots\dots\dots(3)$$

The multiple linear regression equation is:

$$Y = \beta_0 - \beta_1 GA + \beta_2 CED + \beta_3 SIZE - \beta_4 GA.FO + \beta_5 CED.FO + \epsilon \dots\dots\dots(4)$$

Information:

- Y = Firm Value
- $\beta_0$  = Constant
- $\beta_1 - \beta_6$  = Regression Coefficient

- GA ( $X_1$ ) = Green Accounting  
 CED ( $X_2$ ) = Carbon Emissions Disclosure  
 FO (M) = Foreign ownership  
 SIZE (K) = Company size  
 $\varepsilon$  = The amount of residual value atau error

## RESULTS AND DISCUSSION

**Table 2**  
**Descriptive Statistical Test Results**

Variable	N	Min.	Max.	Mean	Std. Deviation
NP	80	0,53	726,42	31,44	131,82
GA	80	3,00	5,00	3,52	0,65
CED	80	0,11	1,00	0,78	1,47
FO	80	0,00	1,00	0,29	0,29
SIZE	80	1,00	1,15	2,84	3,01

Source: Research data, 2024.

Refer to Table 2, the results of descriptive statistical tests, the firm value (NP) variable as the dependent variable has a minimum value of 0.53 (PT J Resources Asia Pacific Tbk.), a maximum value of 726.42 (PT Adaro Energy Indonesia Tbk), a mean of 31.44 and standard deviation of 131.82. Green accounting as an independent variable proxied by GA has a minimum value of 3.00, a maximum value of 5.00, a mean of 3.52, and a standard deviation of 0.65. Carbon Emissions Disclosure as an independent variable proxied by CED has a minimum value of 0.11 (PT Ifishdeco Tbk), a maximum value of 1.00, a mean of 0.78, and a standard deviation of 1.47. Foreign ownership as a moderating variable proxied by FO has a minimum value of 0.00, a maximum value of 1.00, a mean of 0.29, and a standard deviation of 0.29. Company size (SIZE) as a control variable has a minimum value of 1.0, a maximum value of 1.15, an average value of 2.84, and a standard deviation of 3.01.

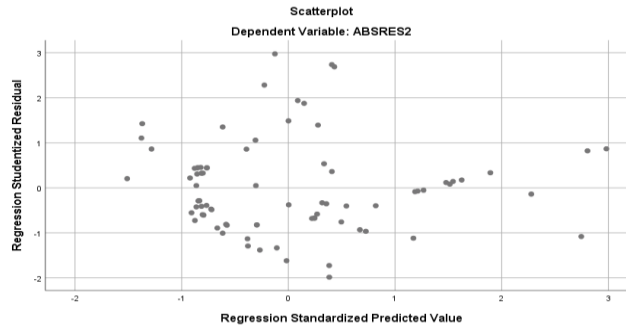
**Table 3**  
**Multicollinearity Test Results**

Variable	Tolerance	VIF	Description
GA	0,883	1,13	Multicollinearity free
CED	0,912	1,09	Multicollinearity free
FO	0,919	1,08	Multicollinearity free
SIZE	0,950	1,05	Multicollinearity free

Source: Research data, 2024.

Refer to Table 3. The results of the multicollinearity test are expressed through tolerance and VIF values. The tolerance value shows results > 0.1, and the VIF value < 10. Therefore, the test results are free of multicollinearity.

**Figure 3**  
**Heteroscedasticity Test Results**



Source: Research Data, 2024

According to Figure 3, the results of the heteroscedasticity test can be concluded that the scatterplot output is spread quite well below number 0 on the Y axis, which means that overall, the symptoms of heteroscedasticity were not found.

**Table 4**  
**Autocorrelation Test Results**

Model	K	n	dL	dU	4-dU	4-dL	DW	Hasil
1	4	79	1,53	1,74	2,26	2,47	1,654	Autocorrelation Free

Source: Research data, 2024

According to Table 4 of the autocorrelation test results, the Durbin Watson (DW) value lies between dU and 4-dU; therefore, it can be considered autocorrelation-free. This table explains that the Durbin Watson (DW) value lies between the dL and dU values where  $dL < d < dU$  ( $1.53 < 1.654 < 1.754$ ). This means that the data is accessible from autocorrelation.

**Table 5**  
**Coefficient of Determination Test Results (Adjusted R<sup>2</sup>)**

Model	Adjusted R <sup>2</sup>
1	0,331

Source: Research data, 2024

According to Table 4 of the coefficient of determination (R<sup>2</sup>) test, the Adjusted R<sup>2</sup> value is 0.331, or 33.1 % of the variation in firm value, dominated by green accounting and

Carbon Emissions Disclosure (CED). Meanwhile, other variables not included in this research regression model can influence 66.9%.

**Table 6**  
**F Test Results**

Model	Sig.	Conclusion of Results
1	0,000	Model Fit

Source: Research data, 2024

According to Table 5, the F test results have a sig value of 0.000, which means a significance value of  $0.000 < 0.05$ . Thus, this model is adequate for use in this research.

**Table 7**  
**Hypothesis Test Result**

No	Variable	B	Significance	Conclusion
1	(Constant)	-291,63	0,000	
2	GA	100,95	0,000***	Ha <sub>1</sub> accepted
3	CED	1,69	0,310	Ha <sub>2</sub> not accepted
4	GAM	35,31	0,000***	Ha <sub>3</sub> accepted
5	CEDM	-140,38	0,000***	Ha <sub>4</sub> accepted

Significance 5% (\*\*\*)

Source: Research Data, 2024

According to Table 6 of the hypothesis test results, the green accounting (GA) variable shows a significance value of  $0.000 < 0.05$ . Therefore, the research results support the first hypothesis (Ha<sub>1</sub>) that green accounting significantly affects firm value. Green accounting has a positive influence on firm value; this supports another research, namely Amira & Siswanto (2022), Dewi & Narayana (2020), and Abdurrahman (2019). These results prove that the application of green accounting is in line with legitimacy theory. Companies should operate following the values, norms, and expectations of the society in which they operate to maintain their social legitimacy. Green accounting ensures the continuity of the company's long-term operations. This sustainability makes the company more desirable and appeals to investors looking for long-term stability, which can add value to the company itself.

Furthermore, based on the results of hypothesis testing, the Carbon Emission Disclosure (CED) variable shows a significance value of  $0.310 > 0.05$ , where this result

rejects the second hypothesis (Ha2), namely that Carbon Emission Disclosure has a positive effect on the firm value. This research is in line with the findings of Anggita et al. (2022) and Ramadhan et al. (2023) that information about carbon emissions provided by companies needs to be more relevant and essential for investors to influence their assessment of firm value. Besides, increasing carbon emission disclosure does not mean the company's value will increase. This emphasizes that other factors are more important in influencing firm value than simply disclosing carbon emissions.

Based on the test results, the green accounting variable moderated by foreign ownership (GAM) shows a significance value of  $0.000 < 0.05$ , where these results support the third hypothesis (Ha3) that foreign ownership moderation can strengthen the positive influence of green accounting on firm value. This research is in line with the findings of Kim et al. (2020), which explain that the percentage of foreign investors with diverse backgrounds can improve the controlling function. This increased monitoring function improves corporate governance and minimizes risks, positively impacting firm value. Companies with foreign ownership tend to increase transparency and environmental responsibility, ultimately growing investor confidence and overall firm value.

Based on the test results, the Carbon Emission Disclosure variable moderated by foreign ownership (CEDM) shows a significance value of  $0.000 < 0.05$ , where the results of this research support the fourth hypothesis (Ha4), namely that moderation of foreign ownership strengthens the positive influence of Carbon Emission Disclosure on firm value. This research aligns with the findings of Gazany & Anni (2021), which explains that foreign investors usually have high expectations of company transparency and accountability. Comprehensive disclosure of carbon emissions can harmonize information between company management and investors and foster investors' trust.

## **CONCLUSION**

Green accounting has a significant and positive effect on firm value, Carbon Emission Disclosure does not affect firm value, foreign ownership can moderate the relationship between green accounting and Carbon Emission Disclosure on firm value, while company size as a control variable can create a significant and positive relationship in connection with

green accounting and Carbon Emission Disclosure on firm value. This research obtains results to update the theory that has been found, develops the results of previous research, and presents empirical data relating to matters that can influence firm value. The ultimate goal is to reflect the company's commitment and responsibility towards the environment, which can build investors' trust in the company and increase the company's social legitimacy.

This research has limitations, including in terms of the population chosen, namely the type of energy industry sector, because this sector is the primary source of carbon emissions in the world, including in Indonesia, in the 2020-2023 period. Further research can develop a population from other industrial sectors that is responsive to environmental issues and not limited to the energy sector. For more optimal research studies, recommendations for further research include: (1) increasing the scope of the industrial research sector, and not limited to the energy sector; (2) adopting other measurements as substitute options for the firm value variable; and (3) include other variables that are stronger in terms of things that influence firm value, apart from the green accounting and Carbon Emission Disclosure variables.

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