

The Effect of Carbon Tax On Carbon Emission Disclosure with Environmental Performance as a Mediating Variable in Energy Sector Companies Listed on the Indonesia Stock Exchange

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This research aims to examine how carbon taxes affect Carbon Emission Disclosure (CED), with environmental performance serving as a mediating variable, focusing on energy sector firms listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. A quantitative approach was employed, relying on secondary panel data sourced from the annual reports and sustainability reports of each company. Through purposive sampling, 32 observations were collected and subsequently analyzed using multiple linear regression with SPSS 25. The conclusions specify carbon taxes have a significant effect on both CED and environmental performance; however, environmental performance itself was not found to have a significant effect on CED and failed to act as a mediator in the relationship between carbon taxes and CED. This research provides results that are in line with legitimacy theory and stakeholder theory, which assert that fiscal regulatory pressure in the form of a carbon tax directly encourages energy sector companies to expand the transparency of their carbon emissions disclosures in order to maintain legitimacy in the eyes of the government, investors, and the public.

INTRODUCTION

Increasing the concentration of Greenhouse Gases (GHGs) is one of the causes of climate change which is currently an important issue that is the cause of one of the global challenges that has a wide impact on the environment, economy, and development sustainability, so it requires serious handling from various parties. International Energy Agency (2025) notes that global CO₂ emissions from the energy and industrial sectors increased by 0.8% in 2024 and reached a new record high, with a concentration of CO₂ in the atmosphere of 422.5 ppm. In Indonesia, based on an inventory Kementerian Energi dan Sumber Daya Mineral (2020) that refers to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, the energy sector is the largest contributor to GHG emissions. As a form of commitment to reducing the impact of climate change, the Government of Indonesia increased the Nationally Determined Contributions (NDC) goals were updated, aiming for 29% to 31.89% self-achieved and 41% to 43.20% with global

support (Kementerian LHK, 2021). The target shows that the energy sector has a very strategic role in achieving the national emission reduction target.

The large contribution of the energy sector to carbon emissions is also shown by data Low Carbon Development Indonesia (2026), which states that the energy and transportation sectors account for 50.6% of total national emissions in 2022 or around 1 giga ton of CO₂eq, and are projected to increase to 59% or around 1.4 giga tons of CO₂eq by 2030 if not balanced with adequate mitigation efforts. On the other hand, the realization of reducing GHG emissions in the energy sector based on Kementerian ESDM (2024) has increased consistently from 29 million tons of CO₂ in 2021 to 127.67 million tons of CO₂ in 2023. This condition shows that the pressure on energy sector companies to control carbon emissions is getting bigger. Therefore, companies are not only required to control emissions, but also show accountability for the management of carbon emissions to stakeholders.

One form of accountability is realized through CED, which is the disclosure of information about carbon emissions in annual reports and sustainability reports. As regulatory pressures and demands from governments, investors, and the public increase, firms aren't only required to reduce carbon emissions, but also to convey information about the management of these emissions in a transparent manner. Through CED, stakeholders can assess the firms assurance to managing environmental impacts, fulfilling environmental obligations, and supporting climate change mitigation efforts. However, empirical conditions show that the CED rate in energy sector firms listed on IDX is still relatively low. Based on Nurjamilah & Hartikayanti (2025) the average CED score of 21 energy sector firms during the 2021–2024 period, it only reached 35.19 on a scale of 0–100 with a standard deviation of 24.07. Results show that Carbon Emission Disclosure practices are still varied and have not been carried out optimally by all companies. As a result information on environmental risks, emissions management strategies, and corporate commitments to sustainability has not been fully able to meet the needs of stakeholders. This condition indicates that factors or instruments are still needed that can encourage companies to increase the transparency of CED.

One of the instruments that is expected to be able to encourage increased transparency is the carbon tax policy. The Government of Indonesia regulates carbon taxes through Law Number 7 of 2021 concerning the Harmonization of Tax Regulations (HPP) with a minimum rate of IDR 30 per kilogram of CO₂e (Undang-Undang RI, 2021). The presence of the instrument shows the government's commitment to building a carbon emission control mechanism while providing a regulatory signal to companies that the management and reporting of carbon emissions will be an important part of sustainable corporate governance. The regulatory pressure is expected to encourage companies, especially the energy sector, to improve environmental management while expanding the disclosure of carbon emission information as a form of accountability to stakeholders. Therefore, the enactment of the HPP Law is a relevant context to test the influence of carbon taxes on Carbon Emission Disclosure.

Research on the factors that affect CED has developed quite extensively. Irwhantoko & Basuki (2016) found that company size, profitability, competition, company growth, and reputation of Public Accounting Firms had a positive effect on CED, while debt to equity ratio had a negative effect. Subsequent studies on energy sector companies on the Indonesia Stock Exchange also tested various CED determinants, such as Return On Assets and market value (Nurjamilah & Hartikayanti, 2025). In the research Yulianti & Waworuntu (2025) belongs to media exposure, leverage, profitability, liquidity, company size. The findings show that previous research

is still dominated by internal company characteristic factors, while government regulatory factors as drivers of CED are still relatively little studied.

As environmental policies in Indonesia develop, research on the impact of carbon taxes on CED is starting to get attention. Putri et al. (2024) found that carbon taxes have a positive effect on Carbon Emission Disclosure. However, the study uses cross-sector samples so that it does not specifically describe the condition of energy sector companies. In addition, environmental performance (EP) is also widely researched as a factor that CED. Putri & Wirakusuma (2025) and Woen & Setijaningsih (2025) found that environmental performance had a positive effect on CED. On the contrary, Rahmawati et al. (2024) it shows that environmental performance as an intervening variable has no effect on CED. These differences in results indicate that the relationship between environmental performance and Carbon Emission Disclosure is still inconsistent, requiring further testing.

Based on the literature search, there is still a research gap. Research that examines the effect of carbon taxes on CED in energy sector firms in Indonesia is still very limited. In addition, research that places environmental performance as a mediating variable in the association amongst carbon tax and CED has also not been widely conducted. As a result, the mechanism of influence of carbon taxes on Carbon Emission Disclosure through environmental performance is still not empirically proven. Based on these gaps, this study provides novelty by placing environmental performance as a mediating variable in the relationship between carbon tax and CED in energy sector firms listed on IDX.

To understand the relationship between the influence of carbon tax on CED and the mediating variable of environmental performance, this study is based on stakeholder theory and legitimacy. Quoted in the journal owned by Darmoyo et al. (2026), the theory of legitimacy according by Suchman which companies need to gain social legitimacy by revealing operational activities carried out in accordance with values and norms in society. Meanwhile, stakeholder theory by Freeman states that a firms will rise in value if it is able to fulfill its obligations to stakeholders such as the government, investors, creditors, and shareholders. According to Kusuma (2017), the higher the company's value, the more capable it will be in fulfilling its responsibilities to stakeholders. Effective environmental disclosure and management increase trust and strengthen the legitimacy of the company in the eyes of stakeholders (Laela & Widuri, 2025).

The placement of environmental performance as a mediating variable is based on the assumption the influence of carbon taxes on CED does not occur directly, but through changes in the company's behavior in improving its environmental performance. Regulatory pressures due to carbon taxes encourage companies to improve environmental management and reduce carbon emissions, which is further reflected in improved environmental performance. Companies with better environmental performance tend to disclose carbon emissions information more broadly as a form of accountability and an effort to gain legitimacy from stakeholders. The mechanism is in line with the theory of legitimacy and stakeholder theory as a form of government responsibility for the legitimacy of the government as well as for stakeholders such as investors and the government.

This research is expected to make a contribution in line with the development of legitimacy theory and stakeholder theory in explaining the pressure of fiscal regulation that carbon taxes can affect CED behavior in energy sector firms listed on IDX through the environmental performance of companies, as well as enrich the literature on Carbon Emission Disclosure in the context of developing countries such as Indonesia. In addition, the results of this study are expected to be

material for policy consideration in evaluating the effectiveness of carbon tax policies on improving environmental performance and transparency in CED in the energy sector. Based on this description, the research using data from companies in the energy sector of IDX in 2021-2024 aims to analyze the behavior of firms in disclosing carbon emissions with the influence of carbon tax fiscal policies and the indirect influence of environmental performance as a mediating variable.

From the above background, the hypotheses that can be formulated are as follows:

The Effect of Carbon Tax on Carbon Emission Disclosure

The effect of carbon tax on CED in energy sector companies predicts that companies will more often disclose carbon emissions as part of assurance to environmentally friendly business operations and aligns with signal theory (Putri et al., 2024). The existence of a government policy on carbon tax applied to energy sector companies shows a reduction in carbon dioxide (CO₂) emissions without damaging economic growth. This explains that the carbon tax has a positive effect on companies to increase CED as an instance of corporate clarity and accountability (Ghazouani et al., 2020).

H1: Carbon tax has a significant effect on CED in energy sector firms in 2021-2024

The Effect of Carbon Tax on Environmental Performance

Based on the theory of legitimacy, the implementation of a carbon tax has the potential to encourage an increase in environmental performance because the carbon tax functions as a policy instrument that internalizes the external costs of carbon emissions so as to provide an encouragement to companies to improve energy efficiency and reduce GHG emissions so that the company's operational practices become more environmentally friendly and can maintain the company's legitimacy to the public and investors (Nuryatun & Augustine, 2025). The more effective the implementation of the carbon tax, the greater the improvement in environmental performance for the company. This shows that the carbon tax has a significant influence on environmental performance as an incentive for companies to increase or maintain the company's legitimacy.

H2: Carbon Tax has a significant effect on environmental performance in energy sector firms in 2021-2024

The Influence Environmental Performance on Carbon Emission Disclosure

The theory of legitimacy explains that good environmental performance will increase the disclosure of carbon emissions to investors and stakeholders, because companies that have good environmental performance can provide benefits to increase company value (Rahmawati et al., 2024). This shows that good environmental performance tends to disclose carbon emission information as a form of environmental accountability, providing information for stakeholders, and efforts to obtain and maintain the company's legitimacy as a form of concern for the environment.

H3: Environmental performance has a significant effect on CED in energy sector firms in 2021-2024

The Influence of Environmental Performance in Mediating the Effect of Carbon Tax on Carbon Emission Disclosure

The implementation of a carbon tax can improve environmental performance to reduce the tax burden of carbon emission activities and if the company's environmental performance improves, it can reflect the company's commitment to environmental management so that it can transparently disclose carbon emissions (Rahmawati et al., 2024). The implementation of carbon tax can influence companies to improve their environmental performance which is used to reduce the tax burden of carbon emission activities, so that environmental performance improvements can be used to disclose carbon emissions more transparently (Wahyuningrum et al., 2024). This explains that carbon tax functions as a fiscal instrument that can reduce carbon emissions and as an encouragement for firms to optimize or maintain their environmental performance, So that good environmental performance can encourage companies to disclose carbon emissions transparently.

H4: Environmental performance mediates the effect of carbon taxes on CED in energy sector firms in 2021-2024

The following is the theoretical framework of the results of the hypothesis formulation:

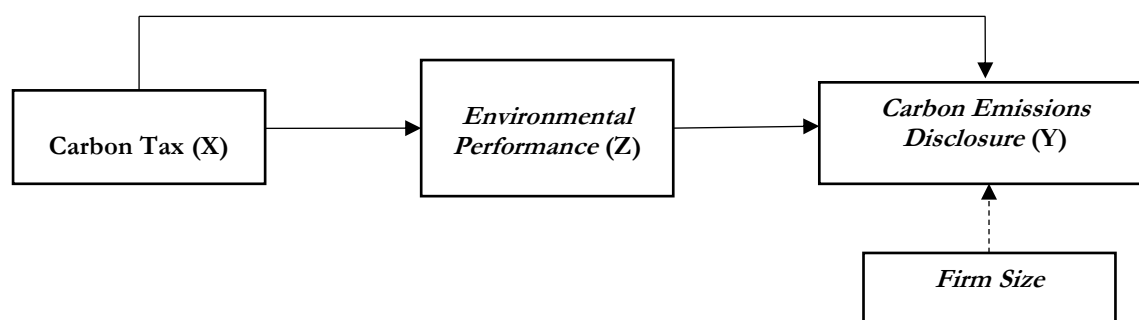


Figure.1 Theoretical framework

Source: Researcher-processed data, 2026

METHODS

This study uses a descriptive quantitative approach using the causal association among Carbon Tax, CED, and Environmental performance. Carbon tax is positioned as an independent variable, CED as a dependent variable, while Environmental performance as a mediating variable. A quantitative approach is used to objectively test the relationships amongst variables based on empirical data.

The methodology employed in this inquiry involves the examination of pre-existing data, which has been sourced from the official annual financial statements and sustainability reports of energy firms listed on the Indonesia Stock Exchange. This data collection period covers the years commencing 2021 and concluding in 2024. The dataset comprises panel data, integrating both time series and cross-sectional elements, so that it can provide a more comprehensive picture of the association among variables during the research period. The research sample was determined using purposive sampling techniques based on certain criteria that were in accord with the research goals. Furthermore, data were analyzed using a method that had been established to test

the direct influence of the Carbon Tax on CED as well as the indirect influence through environmental performance as a mediating variable.

SPSS 25 software was utilized for conducting data analysis via Multiple Linear Regression. The Multiple Linear Regression method was chosen because of the influence of the independent variable of carbon tax with the dependent variable of CED with the mediating variable of environmental performance and consideration of the control variable firm size.

Regression equation to test the influence of independent variables on dependent variables using mediation variables and considerations of control variables:

$$\text{Model 1 : CED} = \alpha + \beta_1\text{CT} + \beta_4\text{SIZE} + \epsilon_1$$

$$\text{Model 2 : EP} = \alpha + \beta_2\text{CT} + \beta_3\text{SIZE} + \epsilon_2$$

$$\text{Model 3 : CED} = \alpha + \beta_1\text{CT} + \beta_3\text{EP} + \beta_4\text{SIZE} + \epsilon_3$$

Description:

α : Constant

CT: Carbon Tax

SIZE: Firm Size

CED: Carbon Emission Disclosure

EP: Environmental Performance

Q: Standar Error

Table 1. Sample Criteria

No	Category	Sum
1.	Energy sector firms (IDX) from 2021-2024	240
2.	Not publishing annual reports from 2021-2024	(36)
3.	Not publishing ongoing reports from 2021-2024	(80)
4.	Not using GRI (Global Reporting Initiative) disclosures from 2021-2024.	(60)
5.	Non-PROPER Companies	(32)
Number of observation data		32

Source: Researcher-processed data, 2026

The operational definition has included independent variables, dependent variables, mediation variables, and control variables, as well as measurements for each variable.

Table 2. Variable Operational Definition

NO.	Variable	Definition	Measurement	Source
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1	Carbon Tax (X)	Carbon tax is a levy imposed on carbon emissions resulting from activities produce greenhouse gas emissions as a fiscal instrument climate adoption.	Measurement of variables carbon tax in Indonesia, using a rate of Rp30 per kilogram of CO ₂ e Carbon Tax = Total Carbon Emissions x Tax Rate	(Putri et al., 2024)
2	Carbon Emission Disclosure (Y)	Carbon Emission Disclosure is the disclosure of information about carbon emissions submitted by the company in greenhouse gas emission management is demonstrated transparently through the annual or sustainability report.	CED measurement is premised on 18 Carbon Emission Disclosure items. Each item is given a score of 1 if disclosed and a score of 0 if not disclosed. The CED score is obtained from the sum of the scores of all items disclosed by the company. $CED = \frac{\sum di}{N}$	(Irwhantoko & Basuki, 2016)
3	Environmental Performance (Z)	Managing and controlling the environmental consequences of the firms operations. concluded implementation of policies, environmental management systems, and the achievement of environmental targets.	This measurement uses PROPER (Enterprise Performance Rating Assessment Program in Environmental Management). Environmental performance is assessed by the use of color as a measuring tool. The following values are given to each color: Black = 1; Red = 2;	(Yana et al., 2025)

			Blue= 3; Green = 4; Gold= 5	
4	Firm Size	Average net sales for the relevant year define a company's size. The size of the firm reflects the company's potential to generate cash flow and greater information access capabilities.	Size of firm is calculated by: Firm Size = Ln Total Assets	(Larasati et al., 2023)

Source: Researcher-processed data, 2026

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1. Descriptive Statistical Test Results

Variable	N	Min.	Max.	Mean	Std. Deviation
Carbon Tax	32	21.65	25.87	24.0091	1.24872
Firm Size	32	7.84	24.22	18.3572	5.40307
Environmental Performance	32	3	5	4.03	0.740
CED	32	0.56	1.00	0.8278	0.15784
Valid N (listwise)	32				

The carbon tax variable has mean 24.0091 and standard deviation 1.24872, designates the value of the carbon tax burden between the sample companies is relatively homogeneous because the distribution of the data is not too far from the mean value. A broad spectrum of firm sizes, from 7.84 to 24.22, is observed with mean 18.3572, which reflects a considerable variation in firm size among the energy sector companies in the research sample.

The environmental performance variable has mean 4.03 which shows that in general firms environmental performance is quite good. Meanwhile, the Carbon Emission Disclosure variable has mean 0.8278 with minimum 0.56 and maximum 1.00, specifies the degree of CED in the sample company is relatively high, with the average value closely mirroring the peak score

Classic Assumption Test

Normality Test

Table 2. Normality Test Results (Kolmogorov Smirnov)

Regression	Asymp. Sig. (2-tailed)	Description
Regresi Model 1	0,200	Normal Distribution

Regresi Model 2	0,200	Normal Distribution
Regresi Model 3	0,200	Normal Distribution

Assessing the regression model for normality is achieved through a specific test designed to identify whether all variables utilized in the current study are distributed normally. The condition for classifying the research data as normal is met when the Monte Carlo significance level is observed to be greater than 0.05 ($>0,05$).

Analysis of the test outcomes revealed that the significance level computed across all three regression models amounted to 0.200. Given that this figure is demonstrably larger than the standard significance level criterion of 0.05 ($0.200 > 0.05$), the results strongly suggest that the normality assumption, pertaining to a normal distribution, has been satisfactorily met by Model 1, 2 and 3 Regression.

Multicollinearity Test

Table 3. Multicollinearity Test Results

Regression Model	Variable Independen	Collinearity Statistics	
		Tolerance	VIF
Regresi Model 1	Carbon Tax	0,924	1,082
	Firm Size	0,924	1,082
Regresi Model 2	Carbon Tax	0,924	1,082
	Firm Size	0,924	1,082
Regresi Model 3	Carbon Tax	0,704	1,420
	Firm Size	0,565	1,771
	Environmental Performance	0,630	2,293

Assessing multicollinearity serves the critical function of evaluating the extent of association between predictor variables. A regression model is deemed to possess desirable characteristics when its independent variables exhibit no discernible correlation with one another. Conversely, if these variables are found to be correlated, it implies a departure from orthogonality, characterized by a correlation value that deviates from the ideal of zero between any two independent variables. Multicollinearity in a regression model is indicated when tolerance ≤ 0.10 , or when VIF ≥ 0.10 . (Gozhali, 2018).

Analysis of all independent variables in the three regression models reveals they had a tolerance value greater than 0,10 ($\geq 0,10$) and VIF less than 10 (≤ 10). The analysis indicates that multicollinearity is not present in the three regression models.

Heteroscedasticity Test

Table 4. Heteroscedasticity Test Results

Regression Model	Independent Variables	Sig.	Description
Regresi Model 1	Carbon Tax	0,963	Homoskedasticity
	Firm Size	0,675	Homoskedasticity

Regresi Model 2	Carbon Tax	0,478	Homoskedasticity
	Firm Size	0,185	Homoskedasticity
Regresi Model 3	Carbon Tax	0,983	Homoskedasticity
	Firm Size	0,673	Homoskedasticity
	Environmental Performance	0,904	Homoskedasticity

The heteroscedasticity test serves to identify disparities in residual variance among observations. A good regression model is one that is homogeneousdasticity where the significance is greater than 0.05 (>0.05).

The test results presented all independent variables in all three regression models had significance is greater tahn 0.05 (>0.05). Three model regressions show no signs of heteroscedasticity or homoscedasticity.

Determination Coefficient Test (R^2)

Table 5. R^2 Test Results

Back	Adj. R^2
Regresi Model 1	0,380
Regresi Model 2	0,534
Regresi Model 3	0,363

Assessing the model's capacity to account for variations in dependent variables, R^2 falls between 0 and 1. A minimal R^2 signifies a limited explanatory contribution from independent variables. When R^2 is near 1, the independent variable accounts for nearly all the information required to forecast the dependent variable's fluctuations (Gozhali, 2018).

In Model 1, Adjusted R^2 0.380 shows the carbon tax and firm size together are explicable 38.0% of the variation in CED and factors external to the model account for the remaining 62.0%.

In Model 2, Adjusted R^2 0.534 shows the carbon tax and firm size are explicable 53.4% of the variation in environmental performance, which indicates that the model's predictive ability is quite strong.

As for Model 3, Adjusted R^2 0.363 confirmations the addition of environmental performance as a mediating variable is able to explain 36.3% of CED variations and a proportion of 63.7% is accounted for by diverse elements.

TEST F

Table 6. F Test Results (Annova)

Regression Model		Sum of Squares	Df	Mean Square	F	Sig.
Regresi Model 1	Regression	0,324	2	0,162	10.505	0.000
	Residual	0,448	29	0,15		
	Total	0,772	31			

Regresi Model 2	Regression	9,567	2	4,748	118,743	0,000
	Residual	7,402	29	0,255		
	Total	16,969	31			
Regresi Model 3	Regression	0,328	3	0,109	6,898	0,001
	Residual	0,444	28	0,016		
	Total	0,772	31			

For all models, the F-test indicated statistical significance, with p-values < 0.05. In Model 1, F value 10.505 and significance 0.000 was obtained; in Model 2, F value 118.743 and significance 0.000 was obtained; and in Model 3, F value 6.898 and significance 0.001 was obtained. Analysis indicates that the independent variables in each model collectively exert a significant influence on the dependent variables.

T Test

Regression Analysis

Table 7. T Test Results (Regression Analysis)

Regression Model		Unstandarized B	Coefficients Std. Error	Standardized Coefficient Beta	T	Sig.
Regresi Model 1	(Constant)	-0,943	0,475		-1,986	0,057
	Carbon Tax	0,076	0,019	0,605	4,110	0,000
	Firm Size	-0,004	0,004	-0,120	-0,816	0,421
Regresi Model 2	(Constant)	-0,048	1,931		-0,025	0,980
	Carbon Tax	0,227	0,076	0,384	3,007	0,005
	Firm Size	-0,075	0,017	-0,548	-4,296	0,000
Regresi Model 3	(Constant)	-0,942	0,481		-1,957	0,060
	Carbon Tax	0,071	0,022	0,564	3,304	0,003
	Firm Size	-0,002	0,006	-0,062	-0,325	0,747
	Environmental Performance	0,023	0,46	0,106	0,487	0,630

the T test quantifies the influence of an independent variable on a dependent variable (Gozhali, 2018). The hypothesis is declared acceptable, if the significance < 0.05 and the direction of the regression coefficient is in pursuant to the hypothesized direction of influence, indicates a significant impact of the independent variable on the dependent variable. The hypothesis is declared rejected if the significance value > 0.05, the independent variable does not exert a meaningful effect on the dependent variable. The results of the regression model 1 aim to test carbon taxes and firm size on CEDs. In regression model 2, the aim is to test carbon taxes and firm size on environmental performance. while the regression model 3 aims to test the carbon tax, firm size, and environmental in CED.

Model 1 Regression Analysis

As revealed by the regression analysis, the model 1 equation is obtained as follows:

$$Y = \alpha + \beta_1 CT + \beta_4 SIZE + \epsilon_1$$

$$Y = -0.943 + 0.076 - 0.004 + \epsilon_1$$

The regression model 1 shows that the significance for the carbon tax is 0.000 and the firm size is 0.421. The carbon tax has a significant effect on CED because it is less than 0.05 ($0.000 < 0.05$). Meanwhile, firm size had no significant effect because it was more than 0.05 ($0.421 > 0.05$).

Model 2 Regression Analysis

As revealed by the regression analysis, the model 2 equation is obtained as follows:

$$Z = \alpha + \beta_2CT + \beta_2SIZE + e$$

$$Z = -0.048 + 0.227 - 0.075 + e$$

In regression model 2, it shows the significance of the carbon tax is 0.005 and the firm size is 0.000. These two variables demonstrably influence environmental performance, because less than 0.05 ($0.005 < 0.05$); ($0.000 < 0.05$).

Model 3 Regression Analysis

As revealed by the regression analysis, the model 3 equation is obtained as follows:

$$Y = \alpha + \beta_1CT + \beta_3EP + \beta_4SIZE + e_3$$

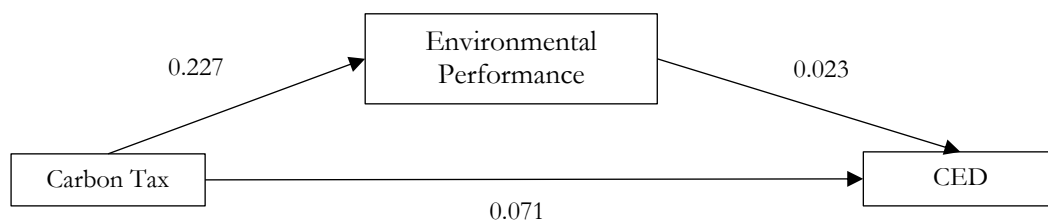
$$Y = -0.942 + 0.071 - 0.002 + 0.023 + e_3$$

In regression model 3, it shows that the significance of the carbon tax is 0.003 and the firm size is 0.747 and the environmental performance is 0.630. The carbon tax has a significant effect on CED because $0.003 < 0.05$. Meanwhile, firm size has no effect on CED because the value is greater than 0.05 ($0.747 > 0.05$) and also environmental performance doesn't have a significant effect on CED because $0.630 > 0.05$.

Path Analysis

A path analysis was performed to ascertain the direct and indirect influence of the Carbon Tax on CED through Environmental Performance, with Firm Size as the control variable. The path analysis was carried out by looking at the coefficient of the influence of the Carbon Tax on Environmental Performance in Model 2, then looking at the coefficient of the influence of Environmental Performance on CED and the direct influence of the Carbon Tax on CED in Model 3. The results of the path analysis are then used to calculate the indirect influence of the Carbon Tax on CED through Environmental Performance.

Subsequent to the regression test, the coefficient of the Carbon Tax on Environmental Performance pathway was 0.227, the Environmental Performance pathway coefficient on CED was 0.023, and the coefficient of the direct influence of the Carbon Tax on CED was 0.071. The path analysis model can be described as follows.



Analysis of the pathway indicates that the direct influence given by the Carbon Tax on CED is 0.071, while the indirect influence of the Carbon Tax through Environmental Performance on CED is $0.227 \times 0.023 = 0.005$. Thus, the direct influence (0.071) $>$ indirect influence (0.005). This condition shows the influence of the Carbon Tax on CED is greater directly than through

Environmental Performance. In addition, the Environmental Performance pathway to CED is not significant because it has a significance value of $0.630 > 0.05$, so Environmental Performance does not play a role as an intervening variable in the association among Carbon Tax and CED.

DISCUSSION

The Effect of Carbon Tax on Carbon Emission Disclosure

Subsequent to the regression test outcomes for model 1, with a p-value $0.000 < 0.05$ and coefficient 0.076, the carbon tax demonstrates a notable effect on CED. Thus, H1 which states the carbon tax has a significant effect on CED in energy sector firms is declared acceptable. These results point to the greater the carbon tax burden a firm bears, the more often it will disclose carbon emissions.

In agreement with the findings made by Putri et al. (2024), which asserts that carbon taxes have a positive effect on CED, even though the study uses samples across mining sectors. Legitimacy theory supports this observed condition, where the enactment of a carbon tax through the HPP Law is a regulatory pressure that encourages energy sector companies to show accountability and transparency over the management of their carbon emissions to the government, investors, and the public to maintain their operational legitimacy. Further evidence is provided by this investigation that the significant influence of carbon taxes on CED consistently occurs in energy sector companies.

The Effect of Carbon Tax on Environmental Performance

Subsequent to the regression test outcomes for model 2, carbon tax has a significant effect on environmental performance with significance 0.005 (< 0.05) and a positive coefficient 0.227. Thus, H2 which states the carbon tax has a significant effect on environmental performance in energy sector companies is declared acceptable. These findings show that the carbon tax burden imposed reassures firms to optimize environmental performance, as reflected in the average PROPER score of 4.03 which is in the category of environmental performance of good to good.

The results are in line by Nuryatun & Augustine (2025), carbon taxes have a positive and significant influence on environmental performance. In congruence with the theory of legitimacy of the implementation of a carbon tax that has the potential to encourage an increase in environmental performance because the carbon tax functions as a policy instrument that internalizes the external costs of carbon emissions so as to provide an encouragement for companies to improve energy efficiency and reduce GHG emissions so that the company's operational practices become more environmentally friendly and can maintain the company's legitimacy to the public and investors. Further evidence is provided by this investigation, which confirms that significant influence of carbon taxes on environmental performance consistently occurs in energy sector companies.

The Environmental Performance on Carbon Emission Disclosure

Subsequent to the regression test outcomes for model 3, Environmental performance's influence on CED was found to be non-significant, with $0.630 > 0.05$. Accordingly, H3 which states environmental performance has a significant effect on CED in energy sector firms is rejected. Results indicate a firm's good environmental performance is not necessarily followed by extensive CED.

In agreement with the findings made by Rahmawati et al. (2024) those who stated environmental performance has no effect on CED. However, the outcomes of are different from the findings of results carried out by environmental performance that have positively influence on Carbon Emission Disclosure. Putri & Wirakusuma (2025) these divergent findings imply that the connection between environmental performance and CED is still inconsistent and may be influenced due to the inherent qualities of the industry, the research period, and the environmental performance measurement instruments used.

The Influence of Environmental Performance in Mediating the Effect of Carbon Tax on Carbon Emission Disclosure

The findings of the path analysis showed that the direct effect of carbon tax on Carbon Emission Disclosure was 0.071, while the indirect effect through environmental performance was only $0.227 \times 0.023 = 0.005$. The value of the direct influence that is much greater than the indirect influence, coupled with the insignificance of the environmental performance pathway to CED (sig. $0.630 > 0.05$), suggests that environmental performance isn't involved as a mediating factor in the connection among carbon tax and CED. Accordingly, H4 reports environmental performance mediates the effect of carbon taxes on CED in energy sector firms was rejected.

The results of research indicate the carbon tax directly affects Carbon Emission Disclosure, without going through a mechanism to improve environmental performance first. In other words, the pressure of fiscal regulation in the shape of a carbon tax directly encourages companies to provide more clarity on disclosing carbon emission information, a type of fulfilling accountability to stakeholders and efforts to maintain legitimacy, even though the environmental performance achieved by the company is still not optimal.

CONCLUSION

It can be concluded from the research conducted that carbon tax exerts a considerable effect on CED practices, leading to the greater the carbon tax burden borne by the firm, the more extensive the CED conducted. Carbon taxes have also been proven to substantially influences on environmental performance, which shows that the policy can encourage improvements in the company's environmental performance. However, environmental performance has not been shown to substantially influences on CED. Good environmental performance is not necessarily followed by optimal CED. Consistent with environmental performance hasn't been confirmed to play a role as a mediating variable in the association among carbon tax and Carbon Emission Disclosure, because carbon tax has been proven to directly affect Carbon Emission Disclosure without going through a mechanism to improve environmental performance first.

These findings indicate that the fiscal regulatory pressure of carbon taxes directly encourages energy sector companies to enhance clarity in reporting carbon emission information, as a form of accountability and an effort to maintain legitimacy to governments, investors, and the public. The implication is that the carbon tax policy has proven to be effective as an instrument to encourage transparency in emission disclosure, but it has not optimally encouraged improvements in environmental performance that have an impact on optimal disclosure. This study has limitations in sample coverage and a limited period for energy sector firms on the IDX, so the results aren't optimal. The next study is suggested to expand the number of samples and observation periods in other sectors and consider other variables such as ESG, CSR, GCG, profitability, liquidity, and media exposure, as well as others in order to attain a holistic perspective of the determinants of CED. In addition, further research can use different analysis methods to develop a grasp of the determinants or factors that affect Carbon Emission Disclosure.

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