

THE EFFECT OF CARBON EMISSION DISCLOSURE ON FIRM VALUE WITH ENVIRONMENTAL AWARD AS A MODERATING VARIABLE

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Abstrak

Penelitian Nilai perusahaan dapat dipengaruhi oleh banyak faktor, salah satunya adalah keterbukaan perusahaan dalam melaporkan emisi karbon yang dihasilkan dari aktivitas operasionalnya. Studi ini disusun untuk mengukur kekuatan hubungan antara keterbukaan tersebut dengan nilai perusahaan, sembari menempatkan penghargaan lingkungan sebagai faktor yang diduga turut menentukan kuat-lemahnya hubungan itu. Riset dirancang dengan pendekatan kuantitatif berbasis data sekunder yang bersumber dari laporan tahunan maupun laporan keberlanjutan perusahaan energi yang sahamnya diperdagangkan di Bursa Efek Indonesia sepanjang 2020 hingga 2025. Dari 76 perusahaan yang semula menjadi populasi, proses penyaringan sampel secara purposive menyisakan 46 perusahaan yang layak diteliti, dengan total 276 titik data; angka ini menyusut menjadi 253 setelah data ditransformasi dan nilai-nilai pencilan disingkirkan. Untuk mengolah data, digunakan regresi linear berganda serta Moderated Regression Analysis (MRA) melalui program IBM SPSS Statistics versi 25. Temuan yang diperoleh memperlihatkan arah hubungan yang positif antara keterbukaan emisi karbon dan nilai perusahaan, kendati pengaruhnya tidak cukup kuat untuk dinyatakan signifikan secara statistik. Penghargaan lingkungan pun ternyata tidak mampu memperkuat maupun memperlemah hubungan itu secara berarti. Kendati begitu, ketika keterbukaan emisi karbon diuji bersamaan dengan variabel kontrol berupa leverage, ukuran perusahaan, dan return on assets, pengaruhnya terhadap nilai perusahaan justru terbukti signifikan.

Kata Kunci: Pengungkapan Emisi Karbon, Penghargaan Lingkungan, Nilai Perusahaan, Sektor Energi

Abstract

Firm value can be shaped by numerous factors, one of which is how openly a company reports the carbon emissions generated by its operations. This study was designed to measure the strength of

the link between such disclosure and firm value, while treating environmental award as a factor that may determine how strong or weak that link becomes. Built on a quantitative, secondary-data approach, the research draws on annual and sustainability reports published by energy-sector firms traded on the Indonesia Stock Exchange from 2020 through 2025. Out of 76 firms forming the original population, a purposive screening process left 46 firms eligible for study, contributing 276 data points in total; this figure fell to 253 once the data were transformed and outlying values were removed. Multiple linear regression together with Moderated Regression Analysis (MRA), run through IBM SPSS Statistics version 25, was used to process the data. What emerged was a positive but statistically weak link between carbon emission disclosure and firm value. Environmental award likewise failed to meaningfully strengthen or weaken that connection. Still, once carbon emission disclosure was tested together with the control variables leverage, firm size, and return on assets, its combined influence on firm value did turn out to be significant.

Keywords: Carbon Emission Disclosure, Environmental Award, Firm Value, Energy Sector

A. INTRODUCTION

For Investment decisions rarely rest on numbers alone; investors also lean on their read of firm value as a proxy for how well management is expected to steward long-term wealth creation (Fitriana et al., 2024). The old habit of judging a company purely by its quarterly earnings has grown less reliable as sustainability concerns work their way deeper into ordinary business practice. Institutional investors around the globe increasingly scrutinize how a firm manages its Environmental, Social, and Governance (ESG) exposure, with environmental risk drawing particular attention because of the way it feeds directly into projected cash flows and overall risk assessments.

Corporate valuation today cannot be separated from the trajectory of climate change. According to the Sixth Assessment Report issued by the Intergovernmental Panel on Climate Change (IPCC), the planet's average temperature has already climbed 1.1°C past pre-industrial levels, and absent a sharp cut in greenhouse gas output, the 1.5°C ceiling may well be crossed by the early 2030s (IPCC, 2023). Fossil-based power generation coal, oil, and gas combined is responsible for over three-quarters of the world's greenhouse gas emissions (Energy

Institute, 2024), which places firms in this industry squarely in the path of tightening regulation, closer stakeholder oversight, and the disruptions accompanying the broader energy transition.

Indonesia's own emissions trajectory tells a similar story: CO₂ output hit 704.4 million tons in 2023, the eighth-highest figure globally and the highest in Southeast Asia, placing the country fifth in Asia overall; the total climbed from 543 million tons in 2020 to 728 million tons projected for 2025 (Energy Institute, 2024). Coal-fired power generation drives much of this increase within the energy sector, which is exactly why how these firms report and control their carbon footprint has become such a pressing question in national sustainability policy.

Carbon Emission Disclosure (CED) is best understood as a voluntary reporting practice, one in which firms share quantitative and qualitative details about the carbon their operations generate across Scope 1, 2, and 3 categories (Wahyuningrum et al., 2024). Done well, it lets a company show investors it is serious about cutting emissions, and it chips away at the information gap that otherwise separates insiders from the market. Yet Nurhayati et al. (2021) caution that disclosure alone rarely moves firm value—only once it is externally validated, say through an environmental award, does it read as genuine achievement rather than a public-relations exercise.

The literature testing how CED relates to firm value has yet to settle on one answer. Fitriana et al. (2024), Oktavia and Murtanto (2024), Putri and Agustin (2023), and Alsaifi et al. (2020) each report a positive, statistically meaningful link, implying markets do notice and reward candid carbon reporting. Hadiwibowo et al. (2023) and Pradnyawati and Werastuti (2024) land on the opposite conclusion, finding a negative association, while Ticoalu and Agoes (2023) and Septiana and Ardiana (2024) detect no effect at all. Read together, these divergent results point to a relationship that is highly context-dependent, one that only holds weight once investors have some way of confirming that what a firm discloses matches what it actually does, rather than dismissing it as greenwashing.

That confirming mechanism already exists in Indonesia in the form of PROPER (Corporate Performance Rating Program), run by the Ministry of Environment and Forestry (KLHK), which supplies a layer of third-party credibility that self-disclosure on its own cannot match. Fitriasari and Andayani (2025), Widhiastuti et al. (2025), and Nuskiya et al. (2025) all report that carrying a PROPER-based accolade, combined with independently checked emission performance, lifts firm value in a meaningful way particularly once a firm's environmental efforts earn outside recognition. Findings of this sort make a strong case for handling environmental award as its own separate moderating variable, one capable of showing under what circumstances CED actually pays off in higher firm value.

That said, few studies have gone as far as isolating environmental award as an independent moderator of the CED-firm value link, and this gap is especially visible in Indonesia's energy sector, where most work still treats PROPER as an ordinal score rather than carving out the top Gold and Green tiers into their own dummy variable (Shafira, 2024; Septiana & Ardiana, 2024). Much of this research also stops short of 2021 missing two policy shifts of real consequence: the rollout of Indonesia's carbon tax under Law No. 7/2021, and the September 2023 launch of the IDXCarbon exchange, both of which reshaped the incentives energy firms face around carbon disclosure (Halizah & Furqon, 2024). This study steps into that gap, tracking energy companies on the Indonesia Stock Exchange (IDX) from 2020 through 2025 and using a binary Gold/Green PROPER dummy to capture environmental award.

Against this backdrop, the study carries the title “The Effect of Carbon Emission Disclosure on Firm Value with Environmental Award as a Moderating Variable in Energy Sector Companies Listed on the Indonesia Stock Exchange for the 2020-2025 Period,” with the twin aims of pinning down carbon emission disclosure's effect on firm value and testing whether environmental award moderates that relationship.

Signaling Theory

Spence (1973) originally put forward Signaling Theory to explain a simple puzzle: why do stronger firms bother sending deliberate signals to outsiders at all? The answer lies in differentiation such signals only work if they cost something real to produce, enough that weaker firms cannot cheaply fake them. Carbon Emission Disclosure fits this description in the present study, standing in as evidence of a firm's genuine push to control its emissions, stay within environmental regulation, and weave sustainability into how it runs day to day. When disclosure is complete and candid, it shrinks the gap in what management and outside investors each know, which can in turn pull down the risk premium investors demand, cheapen the cost of equity, and lift firm value Tobin's Q included (Nguyen et al., 2021; Luo et al., 2023).

Legitimacy Theory

Legitimacy Theory, traces back to Dowling and Pfeffer (1975) and was later extended by Suchman (1995); its core claim is that firms operate under an unwritten social contract with the communities around them, so staying in business long-term means visibly meeting society's expectations. Energy firms feel this pressure more acutely than most, given that their central business pulling fossil fuels out of the ground and burning them cannot help but leave an environmental mark. CED, seen through this lens, becomes a working tool for managing legitimacy, and winning an environmental award such as a Gold or Green PROPER rating adds something disclosure alone cannot: tangible, government-backed proof that the firm has cleared or exceeded environmental benchmarks, closing whatever legitimacy gap investors might otherwise perceive.

Firm Value

Firm value captures how investors, taken collectively, judge a company's performance, and this judgment typically shows up in share-price movement on the capital market. A climbing firm value points to growing shareholder wealth and firmer market confidence in what lies ahead for the company (Brigham & Houston, 2019). Analysts commonly reach for Tobin's Q, Price to Book Value (PBV), or Price Earnings Ratio (PER) to capture it (Dayanty & Setyowati, 2020). Here,

Tobin's Q is the chosen measure: it weighs a firm's market value against what it would cost to replace its assets, arrived at by adding the market value of equity to the book value of total debt and dividing that sum by total book assets (Tharavanij, 2024).

Carbon Emission Disclosure (CED)

CED describes a voluntary reporting habit in which firms lay out both the numbers and the narrative behind the greenhouse gases their operations produce, spanning Scope 1 (direct), Scope 2 (indirect, tied to purchased energy), and Scope 3 (everything else across the value chain), following the GHG Protocol (Maryanti et al., 2025). To gauge CED quality, this study relies on the 18-item checklist built by Choi et al. (2013), which spreads across five dimensions Climate Change, Greenhouse Gas Emissions, Energy Consumption, Reduction and Cost, and Accountability of Emission Carbon. Scoring is binary per item (1 when disclosed, 0 otherwise), and the final index comes from dividing the count of disclosed items by 18 and converting that to a percentage.

Environmental Award

An environmental award is essentially a stamp of approval an outside body places on firms whose environmental record clears the bar set by regulation (Nurhayati et al., 2021; Elida, 2023). Indonesia's own version of this is the PROPER rating from KLHK, built on hands-on field checks and widely treated as the most credible marker of its kind; it sorts firms into five color tiers Gold, Green, Blue, Red, and Black (KLHK, 2023). Here, Environmental Award takes the form of a dummy variable: 1 for a Gold or Green PROPER rating, 0 for Blue, Red, or Black, on the logic that only the top two tiers signal environmental performance that genuinely goes beyond compliance and therefore carries real weight with capital markets.

The Effect of Carbon Emission Disclosure on Firm Value

A firm that lays out its carbon emissions openly and in full detail is, in effect, telling the market it knows how to spot, quantify, and manage its environmental exposure. Under Signaling Theory, that message narrows the gap between what management knows and what investors know, eases the risk premium investors ask for, and in theory should be rewarded with a stronger valuation. Several studies back this up: Bahriansyah and Lestari (2022), Putri and Agustin (2023), Fitriana et al. (2024), Septiana and Ardiana (2024), and Ramadani and Mukhtaruddin (2025) all report a positive CED-firm value link, though Shafira (2024) and Marlina and Herawaty (2024) push back somewhat, noting that carbon disclosure does not always win over the market. This leads to the hypothesis:

H1: Carbon Emission Disclosure exerts a positive effect on firm value.

The Moderating Role of Environmental Award

Why does the CED-firm value evidence swing so widely? Part of the answer is that disclosure quality on its own rarely convinces the market, because investors have gotten better at spotting greenwashing and discount disclosure that comes without outside verification (Ramirez-Orellana et al., 2022). An environmental award such as Gold or Green PROPER status is meant to close that gap turning a claim only the firm itself is making into one that outsiders have checked since the scrutiny applied by KLHK auditors and the independent PROPER Advisory Board is costly enough that weak performers simply cannot clear it. Hardiyansah et al. (2021) show directly that environmental performance validated from outside strengthens the CED-firm value link, which is grounds for expecting something similar among IDX-listed energy firms. Hence:

H2: Environmental Award positively moderates the effect of Carbon Emission Disclosure on Firm Value, such that CED's positive effect on firm value becomes stronger for companies that receive an Environmental Award.

B. METHOD

This study follows a quantitative, causal design built to test how Carbon Emission Disclosure connects to Firm Value and whether Environmental Award changes the strength of that connection. The population studied is energy-sector firms on the Indonesia Stock Exchange spanning 2020 to 2025, with secondary data pulled from three places: the official IDX platform, the companies' own websites, and the portal run by the Ministry of Environment and Forestry (KLHK), the source for PROPER ratings. Of 76 energy firms on the IDX during this window, purposive sampling left 46 that met the study's criteria, together contributing 276 firm-year data points; once the data went through transformation and outlier removal, 253 observations remained for the final analysis. Working in IBM SPSS Statistics version 25, the analysis moved from descriptive statistics and classical assumption checks, into multiple linear regression to gauge Carbon Emission Disclosure's direct pull on Firm Value, and finally into Moderated Regression Analysis (MRA) to check whether Environmental Award altered that pull. Each hypothesis stood or fell based on the significance of its regression coefficient or interaction term.

C. RESULTS AND DISCUSSIONS

1. Descriptive Statistics

After the initial dataset went through transformation and outlier removal, the study was left with 253 firm-year observations covering 46 energy companies listed on the IDX across 2020–2025.

Table 1. Descriptive Statistics
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Nilai Perusahaan	253	-,862594794	1,519886290	,16074440934	,479435250094
Carbon Emission Disclosure	253	,00	44,44	7,2917	8,80038
Leverage	253	,019260831	731,429760300	4,75703458274	46,019375941450
Ukuran Perusahaan	253	24,89143669	32,75568563	29,3581310325	1,65318379367

Return on Assets	253	-41,059175600	61,634591030	6,34976474613	12,709620011389
Environmental Award	253	0	1	,17	,373
Valid N (listwise)	253				

Source: Processed Data by SPSS version 25 (2026)

As shown in Table 1, Carbon Emission Disclosure ranges from 0.00% (recorded by AKRA, BULL, KOPI, and RAJA, none of which disclosed any of the 18 checklist items) Table 1 puts the low end of Carbon Emission Disclosure at 0.00% the score for AKRA, BULL, KOPI, and RAJA, none of which checked off a single one of the 18 checklist items against a high of 44.44% posted by ADRO in 2024, with the sample averaging 7.29%. In practical terms, the typical energy firm discloses fewer than two of the eighteen CED items. Firm value, captured through Tobin's Q, bottoms out at -0.863 for DSSA in 2021 and peaks at 1.520 for GEMS the same year, averaging 0.161 overall. Environmental Award carries a mean of 0.17, telling us that roughly one in six firm-year observations among them ADRO, BSSR, BUMI, GEMS, HRUM, MEDC, and PTBA carried a Gold or Green PROPER rating at some point during the study window.

2. Classical Assumption Testing

a. Normality Test

Data transformation and outlier removal were not, on their own, enough to fix the residuals' non-normal distribution as flagged by the initial Kolmogorov-Smirnov asymptotic significance, so the normality assumption was checked again using the Monte Carlo Exact Test instead.

**Table 2. Normality Test
One-Sample Kolmogorov-Smirnov Test**

		Unstandardized Residual
N		253
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	.42633067
Most Extreme Differences	Absolute	.061
	Positive	.061
	Negative	-.029
Test Statistic		.061
Asymp. Sig. (2-tailed)		.024 ^c
Monte Carlo Sig. (2- tailed)	Sig.	.294 ^d
	99% Confidence Interval	Lower Bound
		Upper Bound
		.306

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. Based on 10000 sampled tables with starting seed 926214481.

Sumber: *Output SPSS (2025)*

Source: Processed Data by SPSS version 25 (2026)

Since the Monte Carlo significance figure of 0.294 clears the 0.05 cutoff (0.294 > 0.05), the residuals can be treated as normally distributed, satisfying this assumption of the regression model.

b. Multicollinearity Test

Table 3. Multicollinearity Test

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Carbon Emission Disclosure	.696	1.437
	Leverage	.990	1.010
	Ukuran Perusahaan	.601	1.665
	Return on Assets	.913	1.095
	Environmental Award	.752	1.330

a. Dependent Variable: Y

Source: Processed Data by SPSS version 25 (2026)

Every variable clears a Tolerance above 0.10 while staying under a VIF of 10, which rules out multicollinearity as a concern for this model.

c. Heteroscedasticity Test

Table 4. Heteroscedasticity Test (Glejser)

Coefficients^a

Model		Sig.
1	(Constant)	.000
	Carbon Emission Disclosure	.600
	Leverage	.173
	Ukuran Perusahaan	.001
	Return on Assets	.864
	Environmental Award	.482

a. Dependent Variable: ABS_RES

Source: Processed Data by SPSS version 25 (2026)

The Glejser test puts most of the independent variables comfortably above the 0.05 significance mark, meaning heteroscedasticity is not a widespread problem. Firm Size breaks that pattern, dipping below 0.05 and flagging heteroscedasticity tied specifically to

that one variable. A Weighted Least Squares (WLS) fix was tried, but it ended up spreading heteroscedasticity to variables that had previously been clean, so the original model was kept as-is the issue sits with a single control variable and leaves the key independent and moderating variables untouched.

d. Autocorrelation Test

Table 5. Autocorrelation Test

Model Summary^b	
Model	Durbin-Watson
1	2.143

Source: Processed Data by SPSS version 25 (2026)

Looking up the Durbin-Watson table for $k = 5$ and $n = 253$ gives $dL = 1.76033$ and $dU = 1.82531$, which puts $4-dU$ at 2.17469 . The model's own Durbin-Watson figure of 2.143 sits comfortably inside the dU -to- $4-dU$ band ($1.82531 < 2.143 < 2.17469$), so autocorrelation does not appear to be an issue here.

3. Multiple Linear Regression Analysis

To isolate what Carbon Emission Disclosure contributes to firm value, multiple linear regression was run with Leverage, Firm Size, and Return on Assets held constant as controls.

Table 6. Multiple Linear Regression Analysis

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	3.230	.590	
	Carbon Emission Disclosure	.000	.004	.009
	Leverage	.001	.001	.061
	Ukuran Perusahaan	-.106	.021	-.367
	Return on Assets	.008	.002	.208

a. Dependent Variable: Nilai Perusahaan

Source: Processed Data by SPSS version 25 (2026)

Table 6 yields the following regression equation:

$$Y = 3.230 + 0.000CED + 0.001DER - 0.106SIZE + 0.008ROA + e$$

Reading the equation, a constant of 3.230 would be the predicted firm value if every independent and control variable dropped to zero. CED's coefficient rounds essentially to zero (0.000), pointing to a barely-there positive link with firm value. Firm Size pulls in the opposite direction at -0.106, so growing one unit larger costs a firm roughly 0.106 in value, whereas ROA moves things upward: a one-unit gain in ROA adds about 0.008 to firm value.

4. Hypothesis Testing

Partial Test (t-Test) Hypothesis 1

**Table 7. Partial Test (t-Test)
Coefficients^a**

Model	t	Sig.
1 (Constant)	5.476	.000
Carbon Emission Disclosure	.124	.902
Leverage	1.041	.299
Ukuran Perusahaan	-5.157	.000
Return on Assets	3.487	.001

a. Dependent Variable: Nilai Perusahaan

Source: Processed Data by SPSS version 25 (2026)

Carbon Emission Disclosure comes back with a significance value of 0.902 well above 0.05—and a t-statistic of just 0.124, falling short of the 1.651 t-table cutoff. Put simply, CED's pull on firm value is positive but not strong enough to call statistically real, so H0 stands and H1 is set aside. Among the controls, Firm Size cuts against firm value in a significant way (sig. = 0.000), Return on Assets pushes it up significantly (sig. = 0.001), and Leverage shows no meaningful effect either way (sig. = 0.299).

From here, MRA was used to build two further equations testing whether Environmental Award changes how CED relates to firm value.

**Table 8. Moderated Regression Analysis Equation 2
Coefficients^a**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	4.077	.604	6.751	.000
	Carbon Emission Disclosure	-.001	.004	-.015	.825
	Leverage	.001	.001	.056	.321
	Ukuran Perusahaan	-.137	.021	-.471	.000
	Return on Assets	.006	.002	.154	.010
	Environmental Award	.358	.084	.278	.000

a. Dependent Variable: Nilai Perusahaan

Source: Processed Data by SPSS version 25 (2026)

Equation 2 produces the following result:

$$Y = 4.077 - 0.001CED + 0.001DER - 0.137SIZE + 0.006ROA + 0.358EA + e$$

Environmental Award's own coefficient is positive and clearly significant (sig. = 0.000), which on its own setting aside any interplay with CED says that firms carrying a Gold or Green PROPER rating tend to post higher firm value.

Table 9. Moderated Regression Analysis Equation 3

		Coefficients ^a			
Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	4.141	.611		6.782
	Carbon Emission Disclosure	.001	.004	.015	.190
	Leverage	.001	.001	.057	1.007
	Ukuran Perusahaan	-.139	.021	-.480	-6.480
	Return on Assets	.006	.002	.154	2.593
	Environmental Award	.425	.124	.331	3.438
	CED*EnvironmentalAwards	-.006	.008	-.075	-.738

a. Dependent Variable: Nilai Perusahaan

Sumber: *Output SPSS (2026)*

Source: Processed Data by SPSS version 25 (2026)

The regression results for Equation 3 are presented in Table 9:

$$Y = 4.141 + 0.001CED + 0.001DER - 0.139SIZE + 0.006ROA + 0.425EA - 0.006(CED \times EA) + e$$

Partial Test (t-Test) – Hypothesis 2

What matters here is the interaction term, CED × Environmental Award: its coefficient sits at -0.006, its t-statistic at -0.738 (smaller in magnitude than the 1.651 t-table benchmark), and its significance at 0.461, well past the 0.05 cutoff. Taken together, these numbers say Environmental Award does not meaningfully moderate how CED relates to firm value, so H0 holds and H2 does not.

Goodness of Fit Test (F-Test)

Table 10. Goodness of Fit Test (F-Test)

ANOVA ^a				
Model		Sum of Squares	F	Sig.
1	Regression	8.744	11.023	.000 ^b
	Residual	49.181		
	Total	57.924		
a. Dependent Variable: Nilai Perusahaan				
b. Predictors: (Constant), Return on Assets, Leverage, Carbon Emission Disclosure, Ukuran Perusahaan				

Source: Processed Data by SPSS version 25 (2026)

An F value of 11.023 paired with a significance level of 0.000 (below 0.05) tells us that, taken as a group, Carbon Emission Disclosure, Leverage, Firm Size, and Return on Assets do move the needle on firm value evidence that the overall model holds up against the data.

Coefficient of Determination (R²)

Table 11. Coefficient of Determination (R²)
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.389 ^a	.151	.137	.445319515497

a. Predictors: (Constant), Return on Assets, Leverage, Carbon Emission Disclosure, Ukuran Perusahaan

Source: Processed Data by SPSS version 25 (2026)

With R Square at 0.151, this set of four variables Carbon Emission Disclosure, Leverage, Firm Size, and Return on Assets together accounts for just over 15% of the movement in firm value, leaving nearly 85% explained by forces the model does not capture.

Discussion

1. The Effect of Carbon Emission Disclosure on Firm Value

H1 bet on a positive link between Carbon Emission Disclosure and firm value. What the data show instead is a direction that is positive but far too weak to call statistically meaningful (Sig. = 0.902 > 0.05), so H1 does not hold up. In other words, carbon disclosure may carry the theoretical potential to lift firm value through greater environmental transparency, but among the energy firms studied here, that potential has not translated into any real market payoff. One plausible reading is that investors still treat carbon disclosure as more of a box-ticking exercise than a genuine performance signal, weighting short-term measures like profitability and operational efficiency far more heavily than long-run sustainability credentials.

Muntazia (2025) reports much the same pattern no significant CED effect on firm value among energy and manufacturing firms on the IDX between 2020 and 2024 as does Gunawan and Berliyanda (2024) looking at manufacturing, agriculture, and energy firms from 2018 to 2022. The picture looks different in Hardiyansah et al. (2021) and Yuliandhari et al. (2023), both of which turned up a significant positive CED effect in the energy sector for 2020–2022; the gap between these results and the present findings could well trace back to differences in sample makeup, the years covered, or how far each capital market has matured in pricing environmental concerns.

2. The Moderating Role of Environmental Award

H2 expected Environmental Award to strengthen the CED-firm value relationship. The data run counter to that expectation: the interaction effect turns out negative and clearly non-significant (Sig. = 0.461 > 0.05), so H2 is not supported. What this suggests is that winning an environmental award has done little to sharpen how the market reacts to carbon disclosure perhaps because investors read such recognition as more symbolic than substantive, carrying no firm promise of stronger cash flows or lower costs down the road. Even firms that both disclose emissions and hold an environmental award seem to leave investors focused mainly on hard financial numbers like profitability and leverage.

This lines up neatly with Signaling Theory's logic: a signal only really counts when it cuts directly into uncertainty about a firm's financial future, and an environmental award being more administrative than financial in character simply doesn't clear that bar as an added signal. Muntazia (2025) reaches a similar conclusion, finding that financial performance likewise fails to moderate the CED-firm value link among energy and manufacturing firms, though this sits at odds with Blesia et al. (2023), who found Good Corporate Governance does moderate the relationship in a significant way. The contrast points to something worth noting: a moderator's usefulness here seems to hinge less on whether it carries symbolic weight, as an award does, and more on whether it directly reshapes how investors read a firm's risk and financial prospects.

D. CONCLUSIONS

This research set out to gauge how carbon emission disclosure connects to firm value among IDX-listed energy companies over 2020–2025, and to check whether environmental award tightens that connection. What emerged is a carbon emission disclosure effect that leans positive but falls short of statistical significance, alongside an environmental award that fails to moderate the relationship in any meaningful way. Even so, once leverage, firm size, and return on assets enter the picture as controls, carbon emission disclosure does contribute to a jointly significant effect on firm value though a large slice of firm value's variation still sits outside what this model can explain. Read together, these results point to a market where carbon disclosure and formal environmental recognition have not yet become the deciding factors in how Indonesian energy firms get valued; investors still lean heavily on the basics profitability, size, and debt. One limitation worth flagging is the study's reliance on a dummy variable for environmental award, which cannot pick up differences in how credible, weighty, or broad a given recognition actually is, and the relatively narrow variable set used here also leaves much of firm value's variance unaccounted for.

E. SUGGESTIONS

For companies, the takeaway is to keep the cost of environmental reporting under control so it doesn't quietly eat into profitability, and to tighten up asset management as a more concrete way of winning investor trust rather than treating carbon disclosure or environmental recognition as boxes to check. Investors would do well not to lean on environmental disclosure and awards alone when deciding where to put their money, but to weigh them against fundamentals like profitability (Return on Assets) and firm size, both of which this study finds do move firm value in a significant way. Regulators and other stakeholders, meanwhile, have a role to play in pushing environmental transparency further and setting sharper, more measurable standards for carbon reporting, so that genuine environmental effort stands a better chance of being picked up and rewarded by capital markets.

Later research could push the observation window further out, pull in a wider set of companies, and test other moderating or independent variables Good Corporate Governance, Green Accounting, or Sustainability Report quality among them alongside a more graded, ordinal, or continuous way of measuring environmental award, all of which would sharpen our grasp of what actually drives firm value in the energy sector.

REFERENCES

- Alsaifi, K., Elnahass, M., & Salama, A. (2020). Carbon disclosure and financial performance: UK environmental policy. *Business Strategy and the Environment*, 29(2), 711–726. <https://doi.org/10.1002/bse.2426>
- Bahriansyah, R., & Ginting, L. (2022). Pengungkapan emisi karbon terhadap nilai perusahaan dengan media exposure sebagai variabel moderasi. *Jurnal Riset Akuntansi dan Perpajakan*, 9(2), 124–136. <https://doi.org/10.35838/jrap.2022.009.02.11>
- Brigham, E. F., & Houston, J. F. (2019). *Fundamentals of financial management* (15th ed.). Cengage Learning.
- Choi, B. B., Lee, D., & Psaros, J. (2013). An analysis of Australian company carbon emission disclosures. *Pacific Accounting Review*, 25(1), 58–79. <https://doi.org/10.1108/01140581311318968>

- Dayanty, R., & Setyowati, L. (2020). Pengaruh nilai perusahaan dan kinerja keuangan terhadap harga saham. *Jurnal Akuntansi dan Keuangan*, 8(1), 45–58.
- Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: Social values and organizational behavior. *Pacific Sociological Review*, 18(1), 122–136. <https://doi.org/10.2307/1388226>
- Elida, R. (2023). Pengaruh kinerja lingkungan PROPER terhadap nilai perusahaan pada perusahaan manufaktur yang terdaftar di Bursa Efek Indonesia. *Jurnal Akuntansi dan Bisnis*, 12(1), 78–92.
- Energy Institute. (2024). Statistical review of world energy 2024 (73rd ed.). Energy Institute.
- Fitriasari, D., & Andayani, T. (2025). Environmental performance and firm value: Evidence from Indonesia Stock Exchange. *Jurnal Akuntansi dan Keuangan Indonesia*, 22(1), 1–18. <https://doi.org/10.21002/jaki.2025.001>
- Fitriana, N., Rahmawati, E., & Nuraini, A. (2024). Pengungkapan emisi karbon untuk meningkatkan nilai perusahaan: Apakah kinerja keuangan mampu memoderasi? *Jurnal Studi Akuntansi dan Keuangan*, 7(2), 112–130. <https://doi.org/10.35145/jsak.v7i2.3521>
- Ghozali, I. (2021). Aplikasi analisis multivariate dengan program IBM SPSS 26 (10th ed.). Badan Penerbit Universitas Diponegoro.
- Gunawan, B., & Berliyanda, K. L. (2024). Pengaruh green accounting, pengungkapan emisi karbon, dan kinerja lingkungan terhadap nilai perusahaan. *Reviu Akuntansi dan Bisnis Indonesia*, 8(1), 44–58. <https://doi.org/10.18196/rabin.v8i1.21075>
- Hadiwibowo, I., Limartya, D., & Azis, M. T. (2023). Pengungkapan emisi karbon, penerapan green accounting dan kinerja lingkungan pada nilai perusahaan. *Jurnal Riset Akuntansi Mercu Buana*, 9(2), 78–92. <https://doi.org/10.26486/jramb.v9i2.3652>
- Halizah, N., & Furqon, M. A. (2024). Carbon tax implementation in Indonesia towards a sustainable green economy. *Lemhannas RI Policy Brief*, 12(3), 1–15.
- Hardiyansah, M., Agustini, A. T., & Purnamawati, I. G. A. (2021). The effect of carbon emission disclosure on firm value: Environmental performance and industrial type. *Journal of Asian Finance, Economics and Business*, 8(1), 123–133. <https://doi.org/10.13106/jafeb.2021.vol8.no1.0123>
- IPCC. (2023). Climate change 2023: Synthesis report. Intergovernmental Panel on Climate Change. <https://www.ipcc.ch/report/ar6/syr/>
- Kementerian Lingkungan Hidup dan Kehutanan (KLHK). (2023). Laporan hasil penilaian PROPER 2022–2023. KLHK.

- Luo, L., Xu, J., & Weng, C. (2023). Environmental information disclosure and firm value: The moderating role of environmental performance. *Business Strategy and the Environment*, 32(4), 1852–1868. <https://doi.org/10.1002/bse.3228>
- Marlina, D., & Herawaty, V. (2024). Pengaruh pengungkapan emisi karbon, kinerja perusahaan, eco-efficiency terhadap nilai perusahaan dimoderasi kinerja lingkungan. *El-Mal: Jurnal Kajian Ekonomi dan Bisnis Islam*, 5(3), 1440–1456. <https://doi.org/10.47467/elmal.v5i3.4892>
- Maryanti, E., Sari, R. N., & Haryono, L. (2025). Carbon emission disclosure dan kinerja keuangan: Bukti dari perusahaan sektor energi Indonesia. *Jurnal Akuntansi Multiparadigma*, 16(1), 112–128.
- Nguyen, P. A., Kecskés, A., & Mansi, S. (2021). Does corporate social responsibility create shareholder value? The importance of long-term investors. *Journal of Banking & Finance*, 112, 105217. <https://doi.org/10.1016/j.jbankfin.2017.09.013>
- Nurhayati, R., Taylor, G., Rusmin, R., Tower, G., & Chatterjee, B. (2021). Environmental disclosures, environmental performance, and firm value. *Business Strategy and the Environment*, 30(1), 490–501. <https://doi.org/10.1002/bse.2633>
- Nuskiya, M. F., Mohamed, N., & Balasingam, N. (2025). Emission performance and firm value in ASEAN: The role of environmental recognition. *Sustainable Finance Review*, 8(1), 54–72.
- Oktavia, R., & Murtanto. (2024). Carbon emission disclosure dan green investment terhadap firm value. *Jurnal Inovasi Akuntansi*, 6(2), 77–91. <https://doi.org/10.24912/jia.v6i2.29814>
- Pradnyawati, I. A. K., & Werastuti, D. N. S. (2024). Pengaruh pengungkapan emisi karbon, biaya lingkungan, dan good corporate governance terhadap nilai perusahaan. *Jurnal Riset Akuntansi*, 14(2), 112–127. <https://doi.org/10.23887/jra.v14i2.73851>
- Putri, D. H., & Agustin, H. (2023). Apakah inovasi hijau dan pengungkapan emisi karbon berdampak terhadap nilai perusahaan? *Jurnal Akademi Akuntansi*, 6(3), 301–317. <https://doi.org/10.22219/jaa.v6i3.25801>
- Ramadani, T., & Mukhtaruddin. (2025). Carbon emission disclosure dan nilai perusahaan: Perspektif teori sinyal pada perusahaan high profile. *Jurnal Riset Akuntansi*, 15(1), 44–62.
- Ramirez-Orellana, A., Martinez-Romero, M. J., & Sciascia, S. (2022). Is environmental disclosure a signal of quality or greenwashing? An analysis of the moderating role of investor protection. *Borsa Istanbul Review*, 22(4), 696–707. <https://doi.org/10.1016/j.bir.2021.09.004>
- Septiana, P. A., & Ardiana, P. A. (2024). Pengaruh pengungkapan emisi karbon, kinerja lingkungan, eco-efficiency, dan green innovation terhadap nilai perusahaan. *Jurnal Ilmiah Wahana Pendidikan*, 10(5), 1–15. <https://doi.org/10.5281/zenodo.10891642>

Shafira, T. M. (2024). Pengaruh carbon emission disclosure terhadap nilai perusahaan dengan kinerja lingkungan sebagai variabel moderasi (Studi pada perusahaan sektor energi yang terdaftar di Bursa Efek Indonesia tahun 2020–2022). *AKADEMIK: Jurnal Mahasiswa Ekonomi dan Bisnis*, 4(2), 78–94.

Spence, A. M. (1973). Job market signaling. *The Quarterly Journal of Economics*, 87(3), 355–374. <https://doi.org/10.2307/1882010>

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3), 571–610. <https://doi.org/10.2307/258788>

Sugiyono. (2022). Metode penelitian kuantitatif, kualitatif, dan kombinasi (mixed methods) (4th ed.). Alfabeta.

Tharavanij, P. (2024). Tobin's Q as a measure of firm value: Theory and evidence. *Journal of Finance and Accounting Research*, 6(1), 22–41. <https://doi.org/10.1007/s41549-024-00089-7>

Ticoalu, R. A. R., & Agoes, S. (2023). Nilai perusahaan dan pengaruh moderasi kebijakan dividen: Pengungkapan dari emisi karbon, manajemen risiko dan tata kelola. *Jurnal Aplikasi Akuntansi*, 8(1), 64–80. <https://doi.org/10.29303/jaa.v8i1.211>

Wahyuningrum, I. F. S., Ihlashul'amal, M., Utami, S., Djajadikerta, H. G., & Sriningsih, S. (2024). Pengungkapan emisi karbon dan nilai perusahaan: Peran moderasi kinerja lingkungan. *Jurnal Akuntansi dan Keuangan Indonesia*, 21(2), 189–207.

Widhiastuti, N. L. P., Sujana, I. K., & Putri, I. G. A. M. A. D. (2025). The effect of PROPER on firm value: Evidence from Indonesian manufacturing companies. *Jurnal Ilmiah Akuntansi dan Bisnis*, 20(1), 78–95. <https://doi.org/10.24843/JIAB.2025.v20.i01.p06>

Yuliandhari, W. S., Saraswati, H., & Safari, M. (2023). Pengaruh carbon emission disclosure, eco-efficiency dan green innovation terhadap nilai perusahaan. *Owner: Riset dan Jurnal Akuntansi*, 7(4), 3345–3358. <https://doi.org/10.33395/owner.v7i4.1782>