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THE INFLUENCE OF CORPORATE SOCIAL RESPONSIBILITY ON ESG PERCEPTION AND SUSTAINABLE DEVELOPMENT GOALS ACHIEVEMENT: THE MEDIATING ROLE OF GREENWASHING IN INDONESIAN ENERGY COMPANIES

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Abstract: *This study examines the effect of Corporate Social Responsibility (CSR) on Environmental, Social, and Governance (ESG) perception and Sustainable Development Goals (SDGs) achievement, with grìeìenwashing as a mìediating variablìe. Thìe study focusìes on ìenìergy sìector companiìes listìed on thìe Indonìesia Stock Exchangìe during thìe 2021–2025 pìeriod. Using purposivìe sampling, thìe final samplìe consists of 82 companiìes with 410 firm-yìear obsìervations. Thìe data wìerìe analyzìed using panìel data rìegrìession with EViìews 13. Modìel sìelìection tìests indicatìe that thìe random ìeffìects modìel is thìe most appropriatìe ìestimation modìel. Thìe findings show that CSR has no significant ìeffìect on ESG pìercìeption, but has a positivìe and significant ìeffìect on SDGs achiìevìemìent. CSR also has no significant ìeffìect on grìeìenwashing. Furthìermorìe, grìeìenwashing has a nìegativìe and significant ìeffìect on both ESG pìercìeption and SDGs achiìevìemìent. Howìevìer, thìe Sobìel tìest rìesults indicatìe that grìeìenwashing doìes not mìediatìe thìe rìelationship bìetwìeìen CSR and ESG pìercìeption, nor thìe rìelationship bìetwìeìen CSR and SDGs achiìevìemìent. Thìesìe findings suggìest that grìeìenwashing acts morìe as a dirìect factor that wìeakìens sustainability outcomìes rathìer than as a mìediating mìechanism bìetwìeìen CSR and ESG or SDGs. This study contributìes to thìe CSR, ESG, SDGs, and grìeìenwashing litìeraturìe by providing ìempirical ìevidìencìe from thìe Indonìesian ìenìergy sìector.*

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Keywords: *Corporate Social Responsibility, Environmental, Social, and Governance, Sustainable Development Goals, Greenwashing, Energy Companies*

Introduction

Sustainability issues have increasingly encouraged companies to move beyond profit-oriented objectives and integrate social responsibility, environmental protection, and good governance into their business strategies. In this context, Corporate Social Responsibility (CSR) has become an important instrument for companies to demonstrate their commitment to society, the environment, and stakeholders. CSR is no longer viewed merely as philanthropy, but as part of a broader sustainability strategy that can strengthen legitimacy, reputation, and stakeholder trust (Aguinis & Glavas, 2012; Gillan et al., 2021a).

Along with the growing emphasis on sustainable business practices, Environmental, Social, and Governance (ESG) has become an important framework for assessing corporate sustainability performance. A positive ESG perception indicates that a company is considered to have strong commitments to environmental management, social responsibility, and transparent governance. ESG issues are particularly important for energy sector companies because their operations are closely related to natural resource utilization, carbon emissions, environmental impacts, and the global pressure toward a low-carbon energy transition.

The Indonesian energy sector provides a relevant context for this study. Energy companies play a strategic role in supporting economic growth and national energy security, while at the same time facing strong sustainability pressures. Indonesia's primary energy mix in 2024 remains dominated by coal at 40.37%, oil at 28.82%, and natural gas at 16.17%, while renewable energy accounts for only 14.65% (Kementerian Energi dan Sumber Daya Mineral, 2024). This condition places energy companies in a complex position. They are expected to maintain economic performance and energy supply, while also demonstrating commitment to emission reduction, energy transition, and sustainability agendas. These pressures are further reinforced by Indonesia's commitment to achieving Net Zero Emissions in the energy sector by 2060 and the implementation of sustainable finance obligations for issuers and public companies through POJK No. 51/POJK.03/2017 (Otoritas Jasa Keuangan, 2017).

In addition to ESG, the Sustainable Development Goals (SDGs) have become a global framework that encourages corporate participation in sustainable development. Through CSR, companies can contribute to the SDGs through environmental programs, community empowerment, energy efficiency, emission reduction, social welfare improvement, and responsible governance. Therefore, CSR can be positioned as a strategic mechanism that connects corporate activities with the global sustainability agenda, particularly SDGs that are relevant to the operational context of energy companies.

However, CSR disclosure does not always reflect genuine sustainability commitment. Companies may use sustainability communication to build a positive image without being supported by adequate sustainability performance. This condition is associated with greenwashing, which refers to misleading, exaggerated, selective, or incomplete sustainability communication that does not fully represent actual corporate performance ((de Freitas Netto et al., 2020a; Delmas & Burbano, 2011; Lyon & Montgomery, 2015). Greenwashing can reduce

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the credibility of CSR and ESG information because stakeholders may question the authenticity of corporate sustainability claims (Parguel et al., 2011; Yu et al., 2020). In the SDGs context, selective and unverifiable sustainability disclosure may also lead to impact washing, particularly when companies claim contributions to the SDGs without sufficient evidence of measurable outcomes (Lashitew, 2021).

Previous studies have generally examined CSR as a corporate practice for supporting sustainability and responding to stakeholder expectations. However, limited empirical attention has been given to the mediating role of greenwashing in the relationship between CSR, ESG perception, and SDGs achievement, particularly in the Indonesian energy sector. This gap is important because energy companies face high environmental risk, regulatory pressure, transition demands, and public legitimacy challenges. Therefore, examining greenwashing in this context provides a more critical understanding of whether CSR strengthens sustainability outcomes or is weakened by symbolic sustainability communication.

Based on this research gap, this study aims to examine the effect of CSR on ESG perception and SDGs achievement, as well as to investigate the mediating role of greenwashing in these relationships. This study is expected to contribute to the literature on CSR, ESG, SDGs, and greenwashing by providing empirical evidence from energy sector companies listed on the Indonesia Stock Exchange. Practically, the findings are expected to provide insights for companies, regulators, and investors in improving the transparency, accountability, and credibility of sustainability disclosure.

Literature Review

The relationship between Corporate Social Responsibility (CSR), Environmental, Social, and Governance (ESG), Sustainable Development Goals (SDGs), and greenwashing can be explained through stakeholder theory and legitimacy theory. Freeman's stakeholder theory, explains that companies should consider the interests of broader stakeholders, not only shareholders (Freeman, 2010). From this perspective, CSR serves as a mechanism for companies to respond to stakeholder expectations regarding social and environmental responsibility.

Legitimacy theory explains that companies seek to obtain and maintain social legitimacy by aligning their activities with societal values, norms, and expectations (Suchman, 1995). CSR, ESG disclosure, and SDGs-related reporting can therefore be understood as corporate efforts to communicate sustainability commitment. However, when sustainability communication is not supported by actual performance, it may become symbolic and lead to greenwashing. Therefore, the relationship between CSR, ESG, SDGs, and greenwashing needs to be examined critically, particularly in the energy sector, where companies face high environmental risks and strong pressure for energy transition.

Corporate Social Responsibility

Corporate Social Responsibility (CSR) refers to corporate responsibility for the economic, social, and environmental impacts of business activities. CSR is not limited to philanthropy, but reflects the company's commitment to integrating stakeholder interests into its strategies, policies, and operational practices. (McWilliams, 2020) define CSR as organizational actions

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and policies that consider stakeholder interests and address economic, social, and environmental impacts.

In the energy sector, CSR is particularly important because corporate operations are closely related to natural resource utilization, carbon emissions, environmental risks, and social relations with surrounding communities. Therefore, CSR in this sector should not be viewed merely as a social program, but as a mechanism for demonstrating corporate accountability for the environmental and social consequences of business activities. In this study, CSR is measured using a CSR disclosure index based on CSR-related items disclosed in annual reports or sustainability reports.

Environmental, Social, and Governance

Environmental, Social, and Governance (ESG) is a framework used to assess corporate sustainability performance based on three main dimensions: environmental, social, and governance. The environmental dimension includes emission management, energy efficiency, natural resource use, waste control, and climate change mitigation. The social dimension reflects corporate relationships with employees, communities, consumers, and other stakeholders. Meanwhile, the governance dimension covers transparency, accountability, business ethics, board structure, regulatory compliance, and risk management (Gillan et al., 2021; (Gillan et al., 2021b; S. Hassan, 2024a).

ESG perception is important because it reflects how stakeholders evaluate a company's sustainability commitment. Companies with strong ESG performance are more likely to be perceived as responsible, credible, and oriented toward long-term sustainability. In the energy sector, ESG perception is particularly strategic because companies face public and regulatory pressure related to energy transition, carbon emission reduction, and environmental accountability. Therefore, transparent CSR disclosure supported by actual sustainability performance can strengthen stakeholder perception of corporate ESG practices ((Eccles et al., 2014; Nugroho et al., 2024).

In this study, ESG perception is measured using an ESG score that reflects the environmental, social, and governance dimensions of the company. A higher ESG score indicates a stronger perception of corporate sustainability performance.

Sustainable Development Goals

Sustainable Development Goals (SDGs) are a global development agenda that encourages inclusive, sustainable, and balanced development across economic, social, and environmental dimensions. In the corporate context, SDGs provide a strategic framework for aligning business activities with broader sustainability objectives. Companies can contribute to the SDGs through CSR programs, ESG disclosure, emission reduction, community empowerment, energy access, decent work creation, environmental protection, and responsible governance.

It is important to note that companies do not directly "achieve" the SDGs, but contribute to their achievement through relevant sustainability policies, programs, and disclosures. Recent studies show that SDG disclosure can be assessed through disclosure breadth and depth, including the number of SDGs reported and the extent of corporate actions disclosed to

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support those goals ((Zampone & Guidi, 2024). In addition, firm-level SDG disclosure is closely related to ESG performance, stakeholder engagement, and sustainability reporting practices (Bose et al., 2024). In the energy sector, corporate contribution to the SDGs is particularly relevant to SDG 7 on affordable and clean energy, SDG 8 on decent work and economic growth, SDG 12 on responsible consumption and production, SDG 13 on climate action, and SDG 15 on life on land.

However, corporate SDG disclosure may also become symbolic when companies selectively report SDG-related activities without measurable and verifiable impact. This condition may lead to SDG-washing, where companies claim contribution to the SDGs without demonstrating substantive performance ((Bosone et al., 2025a; del Río et al., 2024a). Therefore, SDGs achievement in this study is measured using an SDGs disclosure/achievement index based on relevant SDGs items disclosed in annual reports or sustainability reports. A higher index indicates a stronger level of corporate disclosure or contribution related to SDGs achievement.

Greenwashing

Greenwashing refers to misleading, exaggerated, selective, or incomplete sustainability communication that does not fully reflect a company's actual sustainability performance (Teichmann et al., 2023). It occurs when companies present a positive environmental or sustainability image while the disclosed claims are not adequately supported by substantive performance evidence (Dorfleitner & Utz, 2024). In the context of CSR, ESG, and SDGs, greenwashing becomes a critical issue because it can reduce the credibility of sustainability disclosure and weaken stakeholder trust in corporate sustainability commitments.

Recent studies show that greenwashing is increasingly discussed in relation to ESG disclosure and sustainability reporting. Sneideriene & Legenzova (2025) emphasize that greenwashing threatens the accuracy and reliability of ESG reporting because it reduces disclosure quality, complicates decision-making, and affects stakeholder trust. Lublóy et al. (2025) further explain that firm-level greenwashing measurement is commonly associated with selective disclosure and decoupling, namely the gap between symbolic sustainability communication and substantive corporate action. Similarly, Lagasio (2024) introduces ESG-washing detection by assessing discrepancies between portrayed and actual sustainability practices in corporate disclosures.

In this study, greenwashing is measured using a greenwashing index based on the gap between sustainability claims and sustainability-related performance indicators. A higher greenwashing index indicates a greater discrepancy between corporate sustainability communication and actual sustainability performance. This measurement is relevant because greenwashing is not only reflected in the presence of sustainability claims, but also in the inconsistency between what companies disclose and what they actually demonstrate through measurable sustainability performance.

Corporate Social Responsibility and ESG Perception

Corporate Social Responsibility (CSR) is an important mechanism through which companies demonstrate their commitment to social responsibility, environmental protection, and stakeholder interests. From the perspective of stakeholder theory, CSR enables companies to

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respond to the expectations of communities, investors, regulators, employees, and other parties affected by corporate activities. When CSR is implemented consistently and transparently, it can strengthen stakeholder trust and improve perceptions of the company's Environmental, Social, and Governance (ESG) performance.

Previous studies have shown that CSR is closely related to ESG perception. Belas et al. (2024) found that CSR contributes to positive attitudes toward the understanding and acceptance of ESG practices. Similarly, Nugroho et al. (2024) showed that CSR initiatives and ESG practices are interconnected in shaping stakeholder responses, particularly consumer perceptions of corporate responsibility. Therefore, stronger CSR disclosure and implementation are expected to improve stakeholder perception of corporate ESG performance.

H1: Corporate Social Responsibility has a positive effect on ESG perception.

Corporate Social Responsibility and Sustainable Development Goals Achievement

Corporate Social Responsibility (CSR) plays an important role in supporting Sustainable Development Goals (SDGs) because it translates corporate sustainability commitments into more concrete social, environmental, and economic programs. Through CSR, companies can contribute to SDGs achievement through community empowerment, environmental protection, energy efficiency, emission reduction, social welfare improvement, and responsible governance practices.

Previous studies support the relationship between CSR and SDGs. S. et al. (2024a) show that CSR initiatives can be aligned with the SDGs through the triple bottom line approach, which integrates economic, social, and environmental dimensions. Similarly, (Tyan et al., 2025) found that CSR strategy contributes to SDG disclosure and corporate performance, particularly when supported by appropriate organizational structures and corporate governance mechanisms. Therefore, stronger CSR implementation and disclosure are expected to increase corporate contribution to SDGs achievement.

H2: Corporate Social Responsibility has a positive effect on Sustainable Development Goals achievement.

Corporate Social Responsibility and Greenwashing

Corporate Social Responsibility (CSR) can strengthen corporate legitimacy when it is implemented substantively and supported by actual sustainability performance. However, CSR may also create the risk of greenwashing when companies use sustainability communication selectively, excessively, or inconsistently with their real practices. In this context, greenwashing occurs when there is a gap between CSR claims disclosed by companies and their actual sustainability performance.

Previous studies support this argument. Mu & Lee (2023) show that CSR-related greenwashing can reduce stakeholder trust and weaken stakeholder identification with the company. Xu et al. (2023) also found that greenwashing in sustainability reporting can reduce shared value creation by increasing information asymmetry and lowering disclosure quality. Therefore, transparent and accountable CSR is expected to reduce greenwashing, whereas symbolic or poorly substantiated CSR may increase the risk of greenwashing.

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H3: Corporate Social Responsibility has a negative effect on greenwashing.

Greenwashing and ESG Perception

Greenwashing can weaken ESG perception because it reduces the credibility of sustainability information disclosed by companies. When companies communicate sustainability claims selectively, excessively, or inconsistently with their actual performance, stakeholders may question the authenticity of the company's environmental, social, and governance commitments. As a result, greenwashing creates a gap between the sustainability image presented by the company and the ESG perception formed by stakeholders.

Previous studies support this argument. Yu et al. (2020) found that greenwashing in ESG disclosure can mislead stakeholders and reduce the reliability of sustainability information. Bosone et al. (2025b) showed that greenwashing is associated with discrepancies between corporate sustainability disclosure and external stakeholder perceptions. In addition, S. Hassan (2024b) emphasized that greenwashing in ESG reporting can damage reporting credibility, weaken stakeholder trust, and affect ESG-based decision-making. Therefore, higher greenwashing practices are expected to reduce positive stakeholder perception of corporate ESG performance.

H4: Greenwashing has a negative effect on ESG perception.

Greenwashing and Sustainable Development Goals Achievement

Greenwashing can weaken Sustainable Development Goals (SDGs) achievement because it reduces the credibility of corporate sustainability claims. When companies link CSR programs or sustainability reports to the SDGs selectively, excessively, or without sufficient performance evidence, their contribution to the SDGs may be perceived as symbolic rather than substantive. In this context, greenwashing may develop into SDG-washing or impact washing, where companies claim to support sustainable development goals without demonstrating clear, measurable, and verifiable impacts.

Previous studies support this argument. del Río et al. (2024a) show that greenwashing and SDG-washing may occur when there is a mismatch between planned indicators and actual outcomes in corporate SDGs engagement. Similarly, Costa et al. (2025a) found that corporate SDGs reporting can become symbolic when companies merely associate their activities with SDGs without proving substantial contributions through clear indicators. Therefore, higher greenwashing practices are expected to reduce the credibility of corporate SDGs achievement.

H5: Greenwashing has a negative effect on Sustainable Development Goals achievement

The Mediating Role of Greenwashing

Greenwashing may act as a mediating variable in the relationship between Corporate Social Responsibility (CSR), ESG perception, and Sustainable Development Goals (SDGs) achievement. Substantive and transparent CSR can reduce the risk of greenwashing because sustainability claims are more likely to be supported by actual performance. In contrast, symbolic CSR or image-oriented sustainability communication may increase greenwashing when corporate claims are not aligned with real sustainability practices.

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Greenwashing is relevant in this relationship because it reflects the gap between sustainability communication and actual corporate performance. Delmas & Burbano (2011) explain that greenwashing occurs when companies communicate positive environmental claims without adequate environmental performance. de Freitas Netto et al. (2020b) further emphasize that greenwashing may appear through selective, vague, exaggerated, or unverifiable sustainability claims. Recent studies also show that greenwashing can weaken the credibility of ESG reporting and SDGs-related disclosure because stakeholders may perceive corporate sustainability claims as symbolic rather than substantive (Costa et al., 2025a; del Río et al., 2024a; A. Hassan et al., 2013)

Therefore, greenwashing may explain why CSR does not always lead to stronger ESG perception or credible SDGs achievement. If CSR disclosure is perceived as symbolic or misleading, its positive effect on sustainability outcomes may be weakened through greenwashing. Based on this argument, the following hypotheses are proposed:

H6: Greenwashing mediates the effect of Corporate Social Responsibility on ESG perception.

H7: Greenwashing mediates the effect of Corporate Social Responsibility on Sustainable Development Goals achievement.

Methodology

This study employs a quantitative approach using panel data regression analysis. The population consists of energy sector companies listed on the Indonesia Stock Exchange during the 2021–2025 period. The sample was selected using purposive sampling based on several criteria: companies consistently listed in the energy sector during the observation period, companies that published annual reports or sustainability reports, and companies with complete data related to CSR, ESG, SDGs, and greenwashing. Based on these criteria, the final sample consists of 82 companies with 410 firm-year observations.

Corporate Social Responsibility is positioned as the independent variable. ESG perception and SDGs achievement are used as dependent variables, while greenwashing is positioned as the mediating variable. The analysis was conducted using EViews 13. The estimation process included descriptive statistics, panel data model selection, diagnostic tests, panel data regression, and mediation testing using the Sobel test.

The panel data regression models are specified as follows:

Model 1 examines the effect of CSR on greenwashing:
$GW = \alpha + \beta 1CSR + \varepsilon$

Model 2 examines the effect of CSR and greenwashing on ESG perception:
$ESG = \alpha + \beta 1CSR + \beta 2GW + \varepsilon$

Model 3 examines the effect of CSR and greenwashing on SDGs achievement:
$SDGs = \alpha + \beta 1CSR + \beta 2GW + \varepsilon$
.

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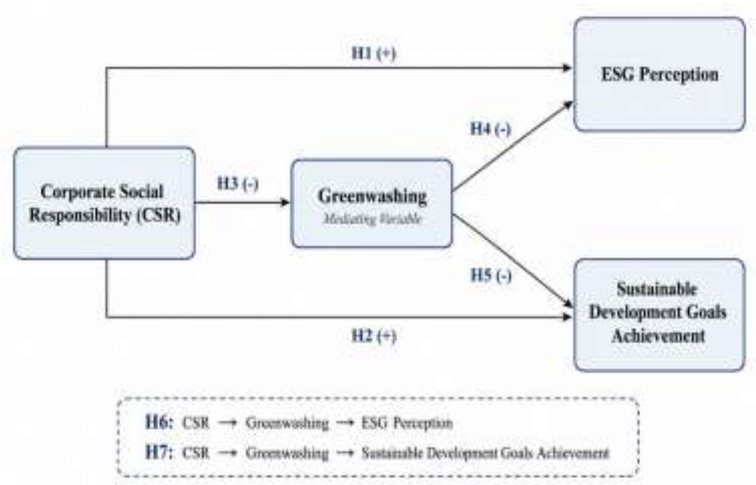

Figure 1. Research framework

Results and Discussion

Descriptive Statistics

Table 1: Descriptive Statistics n=410

	CSR	ESG	SDGS	GW
Mean	0.351388	74.98324	0.678455	41.39959
Median	0.310345	75.57000	0.833333	41.44000
Maximum	0.931034	94.99000	1.000000	59.20000
Minimum	0.068966	55.11000	0.166667	23.22000
Std. Dev.	0.200293	11.23199	0.282486	7.477597
Skewness	0.652048	-0.079029	-0.454731	-0.026782
Kurtosis	2.730338	1.903990	1.883415	2.502105
Jarque-Bera	30.29534	20.94792	35.42884	4.283956
Probability	0.000000	0.000028	0.000000	0.117422
Sum	144.0690	30743.13	278.1667	16973.83
Sum Sq. Dev.	16.40804	51598.50	32.63747	22869.01
Observations	410	410	410	410

Source: Eviews 13 data processing results

The descriptive statistics indicate that the study uses 410 observations. CSR has a mean value of 0.351388, suggesting a relatively low level of CSR disclosure, while ESG has a mean value of 74.98324, indicating a relatively high ESG score among the sampled companies. SDGs has a mean value of 0.678455, reflecting a moderate to high level of SDGs-related disclosure. Greenwashing has a mean value of 41.39959 and a median of 41.44000, indicating a relatively balanced distribution. The Jarque-Bera test shows that CSR, ESG, and SDGs are not normally distributed, while greenwashing does not significantly deviate from normality because its probability value is greater than 0.05.

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Panel Data Model Selection

Table 2: Chow test

Effiects Tìest	Statistic	d.f.	Prob.
Pìeriod F	0.658756	(4,402)	0.6210
Pìeriod Chi-squarìe	2.678695	4	0.6129

Source: Eviews 13 data processing results

The Redundant Fixed Effects Test was conducted to determine whether period fixed effects are required in the panel data model. The results show that the probability values of Period F and Period Chi-square are 0.6210 and 0.6129, respectively. Since both values are greater than the 5% significance level, the null hypothesis cannot be rejected. This indicates that period fixed effects are not significant in the model. Therefore, the model does not require period fixed effects, and further model selection can proceed using the Hausman and Lagrange Multiplier tests.

Table 3: Hausman test

Corrìelatìed Random Effiects - Hausman Tìest
Equation: Untitlìed
Tìest pìeriod random ìeffiects

Tìest Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Pìeriod random	1.930464	3	0.5870

Source: Eviews 13 data processing results

The Hausman test was conducted to determine whether the fixed effects or random effects model is more appropriate. The results show that the Period random test has a Chi-square statistic of 1.930464 with a probability value of 0.5870. Since the probability value is greater than the 5% significance level, the null hypothesis cannot be rejected. This indicates that the random effects model is more appropriate than the fixed effects model. Therefore, the random effects model is used for the panel data regression analysis.

Table 4: LM test

	Tìest Hypothìesis		
	Cross-sìection	**Timìe**	**Both**
Brìeusch-Pagan	226.5093	0.722087	227.2314
	(0.0000)	(0.3955)	(0.0000)
Honda	15.05023	-0.849757	10.04125
	(0.0000)	(0.8023)	(0.0000)

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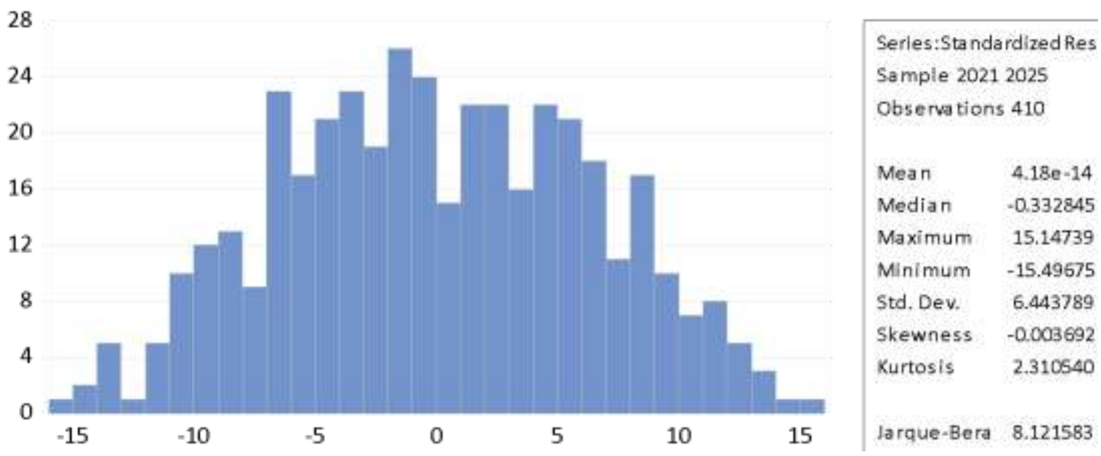
King-Wu	15.05023 (0.0000)	-0.849757 (0.8023)	2.435331 (0.0074)
Standardized Honda	15.23924 (0.0000)	-0.559984 (0.7123)	4.594121 (0.0000)
Standardized King-Wu	15.23924 (0.0000)	-0.559984 (0.7123)	-0.341035 (0.6335)
Gourieroux, et al.	--	--	226.5093 (0.0000)

Source: Eviews 13 data processing results

The Lagrange Multiplier test was conducted to determine whether the random effects model is more appropriate than the common effects model. The Breusch-Pagan test shows that the probability value for the cross-section effect is 0.0000 and for the combined effect is 0.0000, both of which are lower than the 5% significance level. Therefore, the null hypothesis of no random effects is rejected. This result indicates that the random effects model is more appropriate than the common effects model.
Meanwhile, the probability value for the time effect is 0.3955, which is greater than 0.05. This indicates that the random effect is not significant across time periods. Overall, the LM test suggests that unobserved heterogeneity is more relevant across companies than across time periods. Therefore, the random effects model is considered appropriate for estimating the panel data regression in this study.

Model Diagnostic Test.

Table 5: Normality test



Source: Eviews 13 data processing results

The normality test of the residuals shows a Jarque-Bera value of 8.121583 with a probability value of 0.017235. Since the probability value is lower than the 5% significance level, the null hypothesis of normality is rejected. This indicates that the residuals are not normally distributed at the 5% significance level. However, the skewness value is close to zero,

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suggesting that the residual distribution is relatively symmetrical and does not show extreme skewness. Considering the relatively large number of observations, this non-normality is not expected to substantially affect the validity of the panel regression results.

Table 6: Multicollinearity test

	ESG	SDGS	GW	CSR
ESG	1.000000			
SDGS	0.033822	1.000000		
GW	-0.818413	-0.066970	1.000000	
CSR	0.020008	0.831596	-0.028853	1.000000

Source: Eviews 13 data processing results

The multicollinearity test was conducted by examining the correlation among variables. Based on the final regression specification, the independent variables used simultaneously in the ESG and SDGs models are CSR and greenwashing. The correlation between CSR and greenwashing is -0.028853, indicating a very weak relationship. Therefore, the final regression models do not indicate a serious multicollinearity problem among the independent variables.

Although the correlation matrix shows relatively high correlations between ESG and greenwashing and between CSR and SDGs, these correlations do not directly indicate multicollinearity in the final regression models because ESG and SDGs are treated as dependent variables in separate models. Thus, the regression models are considered acceptable from the perspective of correlation-based multicollinearity testing.

Table 7: Heteroscedasticity test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.195390	0.030923	6.318656	0.0000
CSR	-0.008981	0.039527	-0.227202	0.8204
SDGS	0.143585	0.040397	3.554367	0.0004
ESG	-0.034610	0.034545	-1.001909	0.3170
GW	0.021526	0.031769	0.677579	0.4984

Source: Eviews 13 data processing results

The heteroscedasticity test shows that CSR, ESG, and greenwashing have probability values greater than 0.05. However, SDGs has a probability value of 0.0004, which is lower than the 5% significance level. This result indicates the presence of heteroscedasticity in the model. Therefore, the panel data regression was estimated using robust standard error to obtain more reliable standard errors and significance levels. Consequently, the interpretation of the hypothesis testing is based on the robust regression results.

Results of the panel data regression

Panel data regression was conducted to examine the relationships among CSR, ESG, SDGs, and greenwashing. Before interpreting the regression results, this study first determined the most appropriate estimation model using the Redundant Fixed Effects Test, Hausman Test, and Lagrange Multiplier Test. The results indicate that the random effects model is more appropriate than both the fixed effects and common effects models. Specifically, the Lagrange

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Multiplier Test shows significant random effects in the cross-section dimension, while the time effect is not significant. Therefore, the random effects model is used as the main estimation model for hypothesis testing.

Table 8: Panel Data Model Selection Results

Pìengujian	Statistict	Prob.	Kìeputusan
Rìedundant Fixìed Effiects Tìest	Pìeriod F = 0.658756	0.6210	Pìeriod fixìed ìeffiects arìe not rìequirìed
Hausman Tìest	Chi-squarìe = 1.930464	0.5870	Random ìeffiects modìel is prìefierrìed
Lagrangìe Multipliìer Tìest	Brìeusch-Pagan Both = 227.2314	0.0000	Random ìeffiects modìel is prìefierrìed ovìer common ìeffiects modìel

Source: Eviews 13 data processing results

The panel data model selection results indicate that the random effects model is the most appropriate estimation model. The Redundant Fixed Effects Test shows a probability value of 0.6210, indicating that period fixed effects are not required. The Hausman Test produces a probability value of 0.5870, which supports the use of the random effects model rather than the fixed effects model. Furthermore, the Lagrange Multiplier Test shows a probability value of 0.0000, indicating that the random effects model is more appropriate than the common effects model. Therefore, the random effects model is used as the main estimation model in this study.

Table 9.: Results of Panel Data Regression with Robust Standard Error

Variable	Model 1:GW	Prob.	Model 2: ESG	Prob.	Model 3: SDGs	Prob.
C	-	-	126.7473	0.0000	0.506843	0.0012
CSR	-1.077179	0.5616	2.493515	0.3881	1.170822	0.0000
GW	-	-	-1.234149	0.0000	-0.003310	0.0430
Model	Random Effect		Random Effect	-	Random Effect	
Robust SE	Yes	-	Yes		Yes	

Source: Eviews 13 data processing results

The panel data regression results with robust standard error show that, in Model 1, CSR has a negative coefficient of -1.077179 with a probability value of 0.5616. Since the probability value is greater than 0.05, CSR does not have a significant effect on greenwashing. Therefore, H3 is not supported.

In Model 2, CSR has a positive coefficient of 2.493515 with a probability value of 0.3881. This result indicates that CSR does not have a significant effect on ESG. Thus, H1 is not supported. Meanwhile, greenwashing has a negative coefficient of -1.234149 with a probability value of 0.0000, indicating that greenwashing has a negative and significant effect on ESG. Therefore, H4 is supported.

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In Model 3, CSR has a positive coefficient of 1.170822 with a probability value of 0.0000. This finding shows that CSR has a positive and significant effect on SDGs, so H2 is supported. Furthermore, greenwashing has a negative coefficient of -0.003310 with a probability value of 0.0430, indicating that greenwashing has a negative and significant effect on SDGs. Thus, H5 is supported.

Overall, the results indicate that CSR significantly improves SDGs achievement but does not significantly affect ESG perception or greenwashing. In contrast, greenwashing has a significant negative effect on both ESG perception and SDGs achievement

Table10: Sobel Test Results for Mediating Effect of Greenwashing

Hypothesis	Mediation Path	Indirect Effect	Sobel Std. Error	Sobel z-statistic	p-value	Decision
H6	CSR → Greenwashing → ESG	1,329399	2,288874	0,580809	0,5614	Not supported
H7	CSR → Greenwashing → SDGs	0,003565	0,006428	0,554638	0,5791	Not supported

The Sobel test results show that greenwashing does not mediate the relationship between CSR and ESG perception. This is indicated by the Sobel z-statistic of 0.580809 with a p-value of 0.5614, which is greater than the 5% significance level. Therefore, H6 is not supported.

Furthermore, the mediation test for the relationship between CSR and SDGs achievement through greenwashing also shows an insignificant result. The Sobel z-statistic is 0.554638 with a p-value of 0.5791, indicating that the indirect effect of CSR on SDGs achievement through greenwashing is not statistically significant. Therefore, H7 is not supported.

Overall, these findings indicate that greenwashing does not function as a mediating variable in the relationship between CSR and sustainability outcomes. Instead, greenwashing appears to act as a direct factor that weakens ESG perception and SDGs achievement.

Table 11: Summary of Hypothesis

Hypothesis	Relationship	Expected Sign	Result	Decision
H1	CSR → ESG	Positive	Positive, not significant	Not supported
H2	CSR → SDGs	Positive	Positive, significant	Supported
H3	CSR → Greenwashing	Negative	Negative, not significant	Not supported
H4	Greenwashing → ESG	Negative	Negative, significant	Supported
H5	Greenwashing → SDGs	Negative	Negative, significant	Supported
H6	CSR → Greenwashing → ESG	Mediation	Not significant	Not supported
H7	CSR → Greenwashing → SDGs	Mediation	Not significant	Not supported

The findings show that CSR does not significantly affect ESG perception. This result suggests that CSR disclosure or CSR-related activities do not automatically improve stakeholder perception of ESG performance. In the context of energy companies, stakeholders may require more substantive evidence of environmental, social, and governance performance rather than relying solely on CSR disclosure. This finding is consistent with the argument of

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legitimacy theory, which suggests that corporate disclosure may function as a legitimacy tool, but its effectiveness depends on the credibility and substance of the information disclosed.
In contrast, CSR has a positive and significant effect on SDGs achievement. This finding indicates that CSR programs are more directly associated with SDGs-related activities, particularly when companies disclose social, environmental, and community development programs that can be linked to specific SDGs. In the energy sector, CSR activities such as community empowerment, environmental conservation, energy efficiency, and social development may contribute to SDGs-related disclosure and achievement.

The study also finds that greenwashing has a negative and significant effect on both ESG perception and SDGs achievement. This finding supports the view that greenwashing weakens the credibility of corporate sustainability claims. When companies engage in exaggerated or selective sustainability communication, stakeholders may perceive the company's ESG performance as less credible. Similarly, SDGs-related claims may be viewed as symbolic rather than substantive when they are not supported by measurable and verifiable sustainability performance.

However, the mediation test shows that greenwashing does not mediate the relationship between CSR and ESG perception or between CSR and SDGs achievement. This finding indicates that greenwashing does not explain the mechanism through which CSR affects sustainability outcomes. Instead, greenwashing appears to have a direct negative effect on ESG perception and SDGs achievement. Therefore, the main contribution of this study is the finding that greenwashing directly weakens sustainability outcomes, even though it does not function as a mediating mechanism in the CSR–sustainability relationship.

Discussion

After presenting the descriptive statistics, model selection tests, diagnostic tests, panel regression results, and mediation test, this section discusses the main findings in relation to the theoretical framework and previous studies.

Corporate Social Responsibility and ESG Perception

The panel data regression results show that CSR has a positive coefficient on ESG perception, but the effect is not statistically significant. This finding indicates that CSR disclosure alone is not sufficient to improve ESG perception among energy sector companies. Although CSR may signal corporate commitment to social and environmental responsibility, stakeholders may require more credible, measurable, and verifiable sustainability performance before forming a positive ESG perception.

This result is consistent with Christensen et al. (2022), who found that ESG disclosure may increase disagreement among ESG rating agencies rather than reduce it, indicating that more disclosure does not always lead to a clearer or more positive ESG assessment. Similarly, Berg et al. (2022) showed that ESG ratings vary substantially across rating providers due to differences in measurement scope, weighting, and methodology, making ESG perception dependent not only on corporate disclosure but also on how sustainability information is evaluated. Therefore, the insignificant effect of CSR on ESG perception in this study suggests that CSR disclosure needs to be supported by substantive sustainability performance and credible reporting mechanisms.

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Corporate Social Responsibility and Sustainable Development Goals Achievement

The finding indicates that CSR strengthens corporate contribution to Sustainable Development Goals achievement. This suggests that CSR is not merely a reputational tool, but also functions as a practical mechanism through which companies translate sustainability commitments into social, environmental, and economic programs. In the energy sector, CSR activities such as community empowerment, environmental protection, energy efficiency, emission reduction, social welfare, and responsible governance are closely related to SDGs-oriented corporate practices.

This finding is in line with S. et al. (2024b) who explain that CSR initiatives can be aligned with the SDGs through the triple bottom line approach, which integrates economic, social, and environmental dimensions. Similarly, Tyan et al. (2025) show that CSR strategy contributes to SDG disclosure and firm performance, particularly when supported by appropriate organizational structures and governance mechanisms. Thus, CSR can be understood as an important corporate instrument for supporting sustainable development through measurable and relevant sustainability programs.

Overall, this finding confirms that CSR plays a substantive role in connecting corporate responsibility with the broader sustainable development agenda. For energy companies, CSR becomes especially important because the sector is closely linked to environmental impacts, community relations, energy transition, and long-term sustainability commitments.

Corporate Social Responsibility and Greenwashing

The finding indicates that CSR does not necessarily reduce greenwashing practices. From the perspective of stakeholder theory, CSR should function as a mechanism for companies to respond to stakeholder expectations regarding social and environmental responsibility. However, CSR disclosure alone may not be sufficient to convince stakeholders if the information provided is not supported by measurable, transparent, and verifiable sustainability performance.

This finding can also be explained through legitimacy theory. Companies may use CSR disclosure to maintain social legitimacy and create a positive sustainability image. However, when CSR communication is more symbolic than substantive, it may fail to reduce greenwashing. In this context, CSR can become a legitimacy strategy rather than an accountability mechanism, especially when corporate sustainability claims are not clearly aligned with actual environmental and social performance.

The finding is consistent with Mu & Lee (2023) who explain that CSR-related greenwashing can weaken stakeholder trust and reduce stakeholder identification with the company. Similarly, Xu et al. (2023) show that greenwashing in sustainability reporting may increase information asymmetry and reduce the quality of sustainability disclosure. Therefore, CSR can reduce greenwashing only when it is implemented transparently, supported by real sustainability performance, and communicated with sufficient evidence. However, the statistical result in this study shows that CSR does not significantly reduce greenwashing. Thus, H3 is not supported.

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Overall, this finding suggests that CSR should not be assessed merely from the extent of disclosure, but also from the credibility and consistency between sustainability claims and actual corporate performance.

Greenwashing and ESG Perception

The finding confirms that greenwashing weakens ESG perception. This indicates that when companies communicate sustainability claims selectively, excessively, or without sufficient evidence, stakeholders may question the credibility of the company's environmental, social, and governance commitments. In the energy sector, this issue becomes more critical because companies operate in industries with high environmental exposure, carbon emission concerns, and strong public scrutiny. Therefore, sustainability claims that are not supported by actual performance may reduce stakeholder confidence in corporate ESG quality.

From the perspective of stakeholder theory, companies are expected to provide credible and transparent information to meet stakeholder expectations. However, greenwashing creates information asymmetry because stakeholders receive sustainability messages that may not fully reflect actual corporate performance. This weakens the ability of stakeholders to assess ESG performance accurately. Meanwhile, legitimacy theory explains that companies may use ESG disclosure to maintain social legitimacy. However, when ESG communication is perceived as symbolic or misleading, it may damage legitimacy rather than strengthen it.

This finding is consistent with Yu et al. (2020) who show that greenwashing in ESG disclosure can reduce the reliability of sustainability information and mislead stakeholders. Bosone et al. (2025c) also explain that greenwashing reflects a discrepancy between corporate sustainability disclosure and external stakeholder perception. Similarly, S. Hassan (2024a) emphasizes that greenwashing in ESG reporting can damage reporting credibility, weaken stakeholder trust, and affect ESG-based investment decisions.

Overall, this finding suggests that ESG perception depends not only on the extent of sustainability disclosure, but also on the credibility and consistency between corporate claims and actual sustainability performance. When greenwashing is present, stakeholders may perceive ESG disclosure as less reliable. Therefore, H4 is supported.

Greenwashing and Sustainable Development Goals Achievement

The finding indicates that greenwashing weakens Sustainable Development Goals achievement. This suggests that when companies connect their CSR programs or sustainability reports to the SDGs without sufficient evidence of real impact, their contribution may be perceived as symbolic rather than substantive. In the energy sector, this issue is particularly important because companies are expected to demonstrate measurable contributions to emission reduction, energy transition, environmental protection, and community welfare.

From the perspective of stakeholder theory, companies are expected to provide credible and accountable sustainability information to stakeholders. However, greenwashing reduces the reliability of SDGs-related disclosure because stakeholders may find it difficult to distinguish between genuine contribution and symbolic claims. Legitimacy theory also explains that companies may use SDGs disclosure to maintain public legitimacy. However, when such

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disclosure is not supported by measurable outcomes, it may lead to SDG-washing or impact washing, thereby weakening the credibility of corporate contribution to the SDGs.

This finding is supported by del Río et al. (2024b) who show that greenwashing and SDG-washing may occur when there is a mismatch between planned sustainability indicators and actual outcomes in corporate engagement with the SDGs. Costa et al. (2025b) also argue that corporate SDG reporting can become symbolic when companies merely associate their activities with the SDGs without demonstrating substantive contribution through clear and measurable indicators. Therefore, greenwashing can reduce the credibility of SDGs achievement by creating a gap between sustainability claims and actual corporate impact.

Overall, this finding suggests that SDGs achievement should not be assessed only from the extent of SDGs disclosure, but also from the quality, measurability, and credibility of the reported contribution. Companies need to provide clear evidence of their sustainability outcomes to ensure that SDGs-related disclosure reflects substantive performance rather than symbolic communication. Therefore, H5 is supported.

The Mediating Role of Greenwashing

The findings indicate that greenwashing does not mediate the relationship between Corporate Social Responsibility and ESG perception, nor the relationship between Corporate Social Responsibility and Sustainable Development Goals achievement. This suggests that CSR does not influence ESG perception and SDGs achievement through greenwashing. In other words, greenwashing does not function as an explanatory mechanism that connects CSR with the two sustainability outcomes examined in this study.

From the perspective of stakeholder theory, CSR is expected to respond to stakeholder expectations through credible and transparent sustainability practices. However, when CSR disclosure does not significantly reduce greenwashing, the mediating role of greenwashing becomes weak. This indicates that stakeholders may evaluate CSR, ESG, and SDGs-related performance separately, rather than perceiving greenwashing as the channel through which CSR affects sustainability outcomes.

This finding can also be explained through legitimacy theory. Companies may use CSR and sustainability disclosure to maintain legitimacy, but such disclosure does not automatically reduce the risk of greenwashing or strengthen sustainability outcomes. Greenwashing may exist as a separate risk in corporate sustainability communication, especially when sustainability claims are not supported by measurable and verifiable performance. Therefore, although greenwashing has a direct negative effect on ESG perception and SDGs achievement, it does not mediate the effect of CSR on these outcomes.

This result is consistent with the argument that greenwashing reflects a gap between sustainability(de Freitas Netto et al., 2020b; Delmas & Burbano, 2011), 2020b; Delmas & Burbano, 2011). It also supports the view that symbolic sustainability communication can weaken the credibility of ESG and SDGs-related disclosure when companies fail to provide clear evidence of substantive impact (Costa et al., 2025b; del Río et al., 2024b). Overall, the findings suggest that greenwashing is more appropriately understood as a direct factor that weakens sustainability outcomes, rather than as a mediating mechanism in the relationship

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between CSR and ESG perception or SDGs achievement. Therefore, H6 and H7 are not supported.

Conclusion

This study examines the effect of Corporate Social Responsibility on ESG perception and Sustainable Development Goals achievement, with greenwashing as a mediating variable in Indonesian energy companies. The findings show that CSR does not significantly affect ESG perception, but has a positive and significant effect on SDGs achievement. This indicates that CSR is more directly reflected in SDGs-related corporate activities than in ESG perception.
The study also finds that CSR does not significantly reduce greenwashing. However, greenwashing has a negative and significant effect on both ESG perception and SDGs achievement. This suggests that greenwashing weakens the credibility of sustainability disclosure and reduces the perceived quality of corporate sustainability performance. Furthermore, greenwashing does not mediate the relationship between CSR and ESG perception or between CSR and SDGs achievement. Therefore, greenwashing is better understood as a direct risk factor that weakens sustainability outcomes rather than as a mediating mechanism.

Theoretical and Practical Implications

Theoretically, this study contributes to the literature on CSR, ESG, SDGs, and greenwashing by showing that greenwashing does not necessarily operate as a mediating mechanism between CSR and sustainability outcomes. Instead, greenwashing functions as a direct factor that weakens ESG perception and SDGs achievement. This finding enriches stakeholder theory and legitimacy theory by demonstrating that sustainability disclosure must be supported by credible, measurable, and verifiable performance.

Practically, the findings provide important implications for companies, regulators, and investors. Energy companies need to improve the transparency and credibility of CSR and sustainability disclosure by ensuring that reported claims are supported by clear performance indicators. Regulators should strengthen sustainability reporting standards and encourage external assurance to reduce the risk of greenwashing. Investors should also evaluate sustainability information critically by considering the consistency between corporate claims and actual sustainability performance.

Limitations and Future Research

This study has several limitations. First, the sample is limited to energy sector companies listed on the Indonesia Stock Exchange during the 2021–2025 period, so the findings may not be fully generalizable to other sectors or countries. Second, the study relies on secondary data from annual reports, sustainability reports, and related disclosure indicators, which may not fully capture the actual implementation of CSR, ESG, SDGs, and greenwashing practices. Third, the mediation effect is tested using the Sobel test, which provides useful statistical evidence but may not fully capture more complex causal relationships among the variables.
Future research is recommended to expand the sample by including other sectors, cross-country comparisons, or longer observation periods. Future studies may also use alternative methods such as structural equation modelling, dynamic panel analysis, or qualitative case studies to obtain deeper insights into how greenwashing affects sustainability outcomes. In addition, future research can examine the role of sustainability assurance, corporate governance quality,

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regulatory pressure, and stakeholder scrutiny as moderating variables in the relationship between CSR, greenwashing, ESG perception, and SDGs achievement.

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