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GREEN INVESTMENT DISCLOSURES AND SUSTAINABLE GROWTH OF LISTED OIL AND GAS COMPANIES IN NIGERIA

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Abstract

Despite growing investments in environmentally sustainable practices, oil and gas companies continue to face environmental challenges such as oil spills, gas flaring, and poor waste management, which threaten their sustainable growth. The main objective of this study was to examine the effect of green investment disclosures on sustainable growth of listed oil and gas companies in Nigeria. The research design adopted in this study was ex-post facto, secondary data were used and the population of the study was 9 listed oil and gas companies of which purposive sampling technique was employed to select 6(six) companies as the sample size. The method of data analysis used was ordinary least square regression analysis and the statistical package employed was E-views version 13. The result of the analysis revealed that renewable energy investment disclosure has significant positive effect (coef. 0.48205; p-value 0.0028) on sustainable growth rate; waste management disclosure (coef. 0.17063; p-value of 0.0125) has positive significant effect on the sustainable growth rate; and energy efficiency disclosure (coef. 0.020983; p-value 0.0380) has a positive significant effect (coef. 0.020983; p-value 0.0380) on the sustainable growth rate of listed oil and gas companies in Nigeria. Therefore, it was concluded that green investments disclosures are key drivers of sustainable growth in the Nigerian oil and gas sector. It was therefore recommended among others that Firms should integrate renewable energy into their long-term strategic and capital expenditure plans in order to reduce dependence on fossil fuel based energy sources, lower energy costs, and mitigate exposure to energy price volatility.

1.0 Background to the study

The global push towards sustainable development has intensified concerns about environmental degradation, climate change, and the long-term viability of natural resource dependent industries (Ardianto, 2025). According to the Extractive Industries Transparency Initiative (EITI), oil and gas contribute around 65% of government revenue and over 85% of total exports in Nigeria. Yet, the sector's economic importance is accompanied by persistent environmental degradation and social instability. Oil spills and gas flaring are among the most pressing environmental problems confronting Nigeria's oil-producing communities, especially in

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the Niger Delta (Federal Ministry of Environment, 2023). For instance, in 2024 Nigeria's National Oil Spill Detection and Response Agency (NOSDRA) reported that nearly 29,498 barrels of crude oil were spilled across land, inland waters, swamps, and coastal areas, exacerbating ecological damage and undermining the livelihoods of host communities (The Guardian Newspaper,2024).

Moreover, Nigeria has been identified as one of the countries that flares more associated natural gas than any other, wasting vast quantities of energy resources while contributing to greenhouse gas emissions and air pollution. (EPA, 2021).). National gas flaring has substantial economic and environmental costs. Over a recent four-year period, oil companies operating in Nigeria flared approximately 1.2 trillion cubic feet of gas, resulting in an estimated 65.9 million tonnes of CO_2 emissions and economic losses nearing $3.9 billion, despite the existence of legislation aimed at eliminating routine flaring. (The Guardian Nigeria, 2024). Such environmental mismanagement has compounded community grievances, fueling unrest, vandalism, and persistent conflicts that disrupt production and deter investment.

The regulatory environment, though evolving, has struggled to keep pace with these environmental concerns. Nigeria's gas flaring reduction commitments, reflected in its updated Nationally Determined Contribution (NDC) under the Paris Agreement, include targets such as zero routine flaring by 2030 and a conditional 47% reduction in methane emissions by 2031, yet implementation and enforcement remain significant challenges. (Federal Ministry of Environment, 2023). Meanwhile, regulatory agencies such as NOSDRA and the Niger Delta Development Commission (NDDC) have faced criticism for weak enforcement capacity and lack of coordination in combating ecological degradation. Furthermore, frequent disruptions to production arising from community conflicts and environmental protests have negatively affected firms' financial stability and growth prospects (Nkanta et al., 2025). In response, Green investment has become an important strategic tool for achieving sustainable growth and stability in this sector.

Green investment is an investment in environmentally friendly technologies and projects with a low environmental impact. Both developed, and developing nations are eligible for such investment opportunities. Renewable refers to the allocation of capital toward projects and technologies that generate energy from renewable sources, such as solar, wind, hydroelectric, geothermal, and biomass (Ardianto, 2025). Waste management investment refers to the financial resources allocated by a firm toward the treatment, recycling, disposal, and reduction of waste generated from its operations. Energy efficiency investment refers to expenditures made by a firm to reduce energy consumption per unit of output through improved technologies, equipment, or operational processes. It refers to the cost of implementing measures or technologies that reduce energy consumption while maintaining the same level of output (Jadoon et al., 2023) When these eco-friendly investments are efficiently put in place by firms, it significantly improves firms long term stability through improved sustainable growth.

Sustainable growth, measured by the sustainable growth rate, reflects a firm's ability to expand operations using internally generated resources without undermining financial stability

Wang et al. (2024). For listed oil and gas companies in Nigeria, achieving sustainable growth has become increasingly difficult due to volatile crude oil prices, high operating costs, aging infrastructure, environmental liabilities, and exposure to transition risks**.** These challenges suggest that traditional growth strategies centered solely on fossil fuel exploitation may no longer be sufficient to guarantee long-term growth and survival (Thuong, 2025; EPA, 2021)). According to Ardianto (2025), green investment offers a viable pathway for addressing these peculiar Nigerian challenges. Investments in renewable energy can help reduce reliance on gas flaring and diesel-powered operations, while waste management investments can mitigate environmental pollution and reduce conflicts with host communities (Xu et al., 2023). Energy efficiency investments further enable firms to lower operational costs and improve resource utilization in an industry known for high energy intensity. Through these channels, green investment may enhance firms' operational resilience, stakeholder trust, and capacity for sustainable growth.

Despite the relevance of green investment to the Nigerian oil and gas sector, empirical evidence on its effect on sustainable growth remains limited. Existing Nigerian studies have largely focused on environmental disclosure, corporate social responsibility, or short-term financial performance, with little attention paid to actual environmental investment expenditures and their long-term growth implications. Moreover, the unique environmental and institutional realities of Nigeria suggest that findings from developed economies may not be directly applicable.

Many oil and gas firms in Nigeria still rely heavily on fossil fuel–based energy sources for their operations. This reliance contributes to continued gas flaring and high energy costs, reducing the firms' ability to achieve sustainable growth. Without significant investment in renewable energy sources such as solar, wind, or biomass, firms may remain exposed to energy price volatility and environmental risks that undermine their long-term growth potential. Also,poor waste disposal practices and ineffective waste treatment systems continue to cause environmental pollution and community dissatisfaction. Inadequate waste management increases the risk of oil spills, soil contamination, and water pollution, leading to increased regulatory penalties and social conflicts. These problems reduce operational efficiency and can negatively affect firms' sustainable growth prospects if not adequately addressed through strategic investment in waste management infrastructure and practices. The empirical studies reviewed revealed some gaps. It was observed that most of the empirical studies focused majorly on other sectors of the economy companies (Ardianto, 2025*;* Chariri et al., 2023; Jadoon et al., 2022. It was also realized that other studies focused on the non-quantitative disclosure practices without considering the cost implications (Indra, 2023; Li et al., 2022). It was thus as a result of these identified gaps that this study was undertaken to ascertain the effect of green investment on sustainable growth of listed oil and gas companies in Nigeria.

2.0 REVIEW OF RELATED LITERATURE AND HYPOTHESES DEVELOPMENT

Renewable energy investment and sustainable growth rate

Renewable energy investment refers to the capital expenditure made by firms to incorporate clean and sustainable energy sources such as solar, wind, biomass, or hydro into their operations

(Ardianto, 2025). The relationship between renewable energy investment and sustainable growth is grounded in the fact that renewable energy reduces firms' reliance on conventional fossil fuel-based energy, which is often expensive, unreliable, and associated with high environmental risks (Alsagr et al., 2025). By reducing energy costs and stabilizing energy supply, renewable energy investment cost enhances operational efficiency and strengthens the internal financing capacity of firms, which is essential for sustainable growth. In addition, Ardianto (2025) noted that renewable energy investment helps firms comply with environmental regulations and reduce carbon emissions, thereby lowering the risk of penalties and reputational damage. Jialong (2023) examined the effect of green investment on sustainable business development for China. This study identified opportunities and challenges for sustainable business development in China and the potential of green investment to address environmental issues. The study found that renewable energy investment has significant effect on sustainable business development. Awino et al. (2023) examined influence of Green financial investments on growth of companies in the capital markets in Kenya. The study found that Green Financial Investments had significant influence on Growth of companies. Tang (2023) investigated whether green investment improves company performance. Based on the data of listed companies in heavy pollution industries from 2008 to 2020, this paper constructs a panel fixed effect model to examine whether green investment will improve the performance of firms. The study found that green investment has a positive role in promoting company performance. Indriastuti and Chariri (2021) examined the role of green investment and corporate social responsibility investment on sustainable performance. This study found that green investment and CSR investment have insignificant effect on financial performance and sustainable performance. Thus based on the forgoing, it was hypothesized that;

H_{01}: Renewable energy investment has no significant effect on sustainable growth rate of listed oil and gas companies in Nigeria.

Waste management investment and sustainable growth rate

Waste management investment involves expenditures on waste treatment, recycling systems, safe disposal mechanisms, and environmental clean-up technologies. Poor waste management practices often lead to soil and water contamination, which can cause severe environmental damage, disrupt operations, and result in substantial financial losses (Budiono & Dura, 2021). By investing in proper waste management systems, firms can minimize these risks and ensure compliance with environmental regulations. This, in turn, enhances operational stability and reduces the likelihood of costly disruptions. Additionally, improved waste management strengthens the firm's reputation and social license to operate, especially in host communities that are directly affected by environmental pollution (Jadoon et al., 2022). Chariri et al. (2023) examined the effect of green investment disclosure on financial performance. They found out that environmental waste management has a significant negative effect on financial performance. Ubokudom et al. (2024) examined the effect of waste management costs, environmental cleanup costs and environmental safety costs on return on assets of these companies. Their analysis revealed that waste management costs have insignificant negative effect on return on assets. Nkanta et al (2025 examined the effect of accounting on market value and revealed that waste accounting has no significant effect on earnings multiple. Based on the foregoing, this study hypothesized that;

H_{02}: Waste management investment does not have any significant effect on sustainable growth rate of listed oil and gas companies in Nigeria.

Energy efficiency investment cost and sustainable growth rate

Energy efficiency investment cost refers to the capital expenditure that firms make to reduce energy consumption through the adoption of modern technologies, improved processes, and energy-saving practices (Indriastuti & Chariri, 2021). In the oil and gas industry, such investments may include upgrading equipment to more energy-efficient models, optimizing production processes to reduce energy waste, and implementing energy management systems that monitor and control energy use. The relationship between energy efficiency investment cost and sustainable growth is based on the idea that improving energy efficiency enhances a firm's ability to generate more output with less energy input, thereby reducing operating costs and increasing profitability (Tang, 2023). In an energy-intensive sector like oil and gas, high energy consumption often translates into high production costs and lower profit margins. By investing in energy efficiency, firms can significantly reduce these costs, strengthen their internal financing capacity, and improve their long-term growth potential.

According to Obagbuwa and Chummun (2025), energy efficiency investment cost contributes to environmental sustainability by lowering greenhouse gas emissions and reducing the firm's carbon footprint. This improved environmental performance can help firms comply with regulatory requirements and avoid penalties associated with excessive emissions and energy waste. In Nigeria, where the oil and gas sector faces persistent challenges such as gas flaring, high energy costs, and frequent operational disruptions, energy efficiency investments cost can enhance operational stability and resilience. By reducing energy dependence and improving process efficiency, firms can better withstand energy price volatility and supply constraints, which support consistent and sustainable growth over time (Taswin et al., 2025). Ardianto (2025) investigated the effect of green investment on stock returns and examines whether ROA moderates this relationship. A quantitative approach was applied to panel data from 10 SRI KEHATI-listed companies (2019–2023). Green investment was measured using the energy efficiency investment and panel regression analysis was conducted. Findings indicate that energy efficiency investment positively influences stock returns, with ROA. Obagbuwa and Chummun (2025) investigated the connection between green investment, eco-efficiency, and firm value amidst increased global emphasis on environmental sustainability. The study used a generalised method of moments (GMM) to analyse a panel of the top 40 listed companies on the Johannesburg Stock Exchange (JSE) from 2015 to 2022. The top 40 listed companies represent 80% of the total listed companies on JSE market capitalisation. The findings show that the relationship between eco-efficiency and firm value is positive and statistically significant. Taswin et al. (2025) investigated the impact of green investment on the financial sustainability of companies in West Java, Indonesia, using quantitative analysis of a sample of 100 companies. The results showed a moderate level of green investment among the companies, with a positive correlation between green investment and financial sustainability indicators (ROI, Net Profit Margin) and a negative correlation with Debt to Equity Ratio. Thus it was hypthosized:

$H_0$3: Energy efficiency investment has no significant effect on sustainable growth rate of listed oil and gas companies in Nigeria.

2.1 Theoretical framework

This study anchored on signaling theory and legitimacy theory. Signaling theory as propounded by Michael Spence in 1973 explains reasons for firms' incentive to report information voluntarily to the capital market: voluntary disclosure is necessary in order for firms to compete successfully in the market for risk capital. According to Alsagr et al. (2025), insiders know more about a company and its future prospects than investors do; therefore, investors will protect themselves by offering a lower price for the company. However, signaling theory states that the value of the company can be increased if the firm voluntarily reports (signals) private information about itself through corporate social responsibility activities that is credible hence reduce outsider uncertainty (Ardianto, 2025).

This theory support this study because it is believed that green investment disclosure is a signaling tool especially now when it is still at a voluntary stage. Green investments disclosures and ESG practices can be seen as positive signals from the company to the market and stakeholders, showing a commitment to sustainability and social responsibility, which in turn can enhance reputation and investor confidence.

Legitimacy theory relates to the social contract between the firm and local society (Deegan et al., 2002; Mathews, 1993; Patten, 1991). The fundamental argument of legitimacy theory is that an organization can survived if it operates in the scope of society norms (Gray et al., 1996). To maintain the legitimacy in the society, firm voluntarily discloses their social and environmental information to legitimize their business operation and give a good perception of social responsibility (Deegan et al., 2002; 2002; Patten, 1991). Some studies (e.g. Deegan et al., 2002; Deegan and Gordon, 1996; Gray et al., 1996) use legitimacy theory to explain social and environmental disclosure. The theory is hinged on the assumption that accounting for sustainable development and the associated role of management accounting in sustainable development is used as a communication mechanism to inform and/or manipulate the perception of the entity's actions (Mistry et al., 2014). The objectives of this theory can be identified as describing the relationship between a company and the community; explain companies' motivations for social and environmental disclosures; present how companies can use legitimacy strategies; determine the impacts of social and environmental disclosures on the public and society.

3.0 METHODOLOGY

The research design adopted in this study was Ex post facto, this design was suitable for this study because data employed were historical obtained from secondary sources. The population of this study was nine (9) listed oil and gas firms in Nigeria as reported by Nigerian Exchange Goup (NGX). The sample size of this study comprised six (6) oil and gas companies listed in Nigerian Exchange Group which were purposively selected. Secondary data source was employed to generate data for analysis. This study employed the Ordinary Least Square regression technique to examine the interaction among the variables and estimate the relevant

data. The econometric model used in establishing the effect of green investment cost disclosures on sustainable growth of listed oil and gas companies was adapted from the study of **(**Awino et al. 2023) and modified to suit this study as presented below:
Sustainable growth = *f*(Green investment disclosures)
Sustainable growth rate = *f*(Renewable energy investment, waste management investment and energy efficiency investment)

SUGR = $\beta_0 + \beta_1 REIV_{it} + \beta_2 WAMI_{it} + \beta_3 ENIV_{it} + u_{it}$ …….……(i)

Where
SUGR = Sustainable growth rate
REIV = Renewable energy investment cost
WAMI = waste management investment cost
ENIV = energy efficiency investment cost
β_0 = constant slope to be estimated
$\beta_1 - \beta_3$ = intercept to be estimated
i = i^{th} firm
t = time period
u = error term

The variables used in this study were measured as presented in table 3.1

Table 3.1: Operationalization of variables

Variable	Measurement	Sources	Apriori expectation
Sustainable growth rate	Retention rate x return on equity	Amosun and Akintoye (2021)	
Renewable energy Investment (Independent variable)	Log of Renewable energy cost.	Chariri et al. (2023)	+ve
Waste management investment (Independent variable)	Log of waste management cost.	Nkanta et al. (2025)	+ve
Energy efficiency investment (Independent variable)	Log of energy efficiency cost	Awino et al. (2023)	+ve

Source: Author's Operationalization (2026)

4.0 Analysis and discussion

4.1.1 Descriptive statistics

Table 4.1 Descriptive statistics of the effect of green investment on sustainable growth rate of listed oil and gas companies in Nigeria.

Statistic	SUGR	REIV (N'M)	WAMI (N'M)	ENIV (N'M)
Mean	0.090234	31.8396	19.84393	42.24920
Median	0.035991	30.0000	11.87600	15.30056
Maximum	0.203912	63.0000	39.84227	98.09243
Minimum	-0.108307	3.0000	1.01000	3.60000

Std. Dev.	0.056248	13.0277	13.7060	19.1311
Skewness	7.603346	1.25820	2.534469	2.398816
Kurtosis	8.548086	16.4098	9.660038	8.656174
Jarque-Bera	527.5751	1993.939	525.3768	412.5719
Probability	0.000000	0.000000	0.000000	0.000000
Sum	5.41404	1910.376	1190.636	2534.952
Sum Sq. Dev.	0.189	10179.86	11178.20	21685.47
Observations	60	60	60	60

Source: Author's computation (2026)

The descriptive statistics in table 3.1 presents the summary statistics for the variables used in the study, namely SUGR**,** REIV**,** WAMI**,** and ENIV, based on 60 observations**.** The result shows that SUGR has a mean value of 0.090234**,** indicating that on average the value of SUGR among the sampled firms during the study period is approximately 9.02%**.** The median value of 0.035991 is lower than the mean, suggesting that the distribution of SUGR is positively skewed**.** The maximum and minimum values of 0.203912 and –0.108307 respectively indicate that while some firms recorded relatively high values, others experienced negative outcomes during the period under review. The standard deviation of 0.056248 shows that the variable does not deviate widely from its mean, implying relatively moderate variability. For REIV**,** the mean value is 31.8396, with a median of 30.0000**,** indicating that most of the observations cluster around the average value. The maximum and minimum values of 63.0000 and 3.0000 respectively suggest a wide range of variation in REIV among the sampled firms. The standard deviation of 13.0277 further indicates that there is a moderate dispersion of REIV values around the mean. The descriptive statistics for WAMI show a mean value of 19.84393 and a median value of 11.87600**,** indicating that the distribution is somewhat skewed to the right since the mean exceeds the median. The maximum value of 39.84227 and minimum value of 1.01000 reveal that the variable varies substantially among the firms. The standard deviation of 13.7060 confirms that there is a considerable level of dispersion in WAMI values. Similarly, ENIV records a mean value of 42.24920 and a median value of 15.30056**,** indicating that the distribution is positively skewed. The maximum and minimum values of 98.09243 and 3.60000 respectively show significant variation across the observations. The standard deviation of 19.1311 further suggests a noticeable spread of ENIV values around the mean.

4.2.1 Correlation analysis

Table 4.2 Correlation analysis for the relationship between green investment and sustainable growth rate of listed oil and gas companies in Nigeria

	SUGR	**REIV**	**WAMI**	**ENIV**
SUGR	1.000000			
REIV	-0.013576	1.000000		
WAMI	0.415091	0.313765	1.000000	
ENIV	0.232702	-0.039899	0.362547	1.000000

Source: Author's computation (2026)

From table 4.2 there is no association between sustainable growth rate (SUGR) and renewable energy investment cost (-0.013576). Conversely, there is a positive and moderate correlation between waste management investment (WAMI) and sustainable growth rate (0.415091). Finally, there is a weak and positive association between energy efficiency investment cost and sustainable growth rate (SUGR) (0.232702). Since the correlation coefficients are moderate, there is no room to suspect the presence of multi-collinearity.

4.2.2 Regression analysis

Table 4.3 Regression analysis for the effect of green investment cost on sustainable growth rate of listed oil and gas companies in Nigeria

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.093638	0.096153	2.927838	0.0071
REIV	0.48205	0.000137	3.180690	0.0028
WAMI	0.170631	0.018124	2.583814	0.0125
ENIV	0.020983	24.09389	2.126166	0.0380
R-squared	0.348158	Mean dependent var		0.070234
Adjusted R-squared	0.335012	S.D. dependent var		0.562481
S.E. of regression	0.568359	Akaike info criterion		1.735259
Sum squared resid	56.53069	Schwarz criterion		1.823953
Log likelihood	-151.1733	Hannan-Quinn criter.		1.771221
F-statistic	2. 850158	Durbin-Watson stat		2.344795
Prob(F-statistic)	0.027942			

Source: Author's computation (2026)

Table 4.3 above shows an F-statistic of 2.850158 with p-value of 0.027942 indicating that overall, the green investment have significant effect on sustainable growth of listed oil and gas companies in Nigeria. The model gave an R-squared value of 0.348158 which means that 35% of the changes in the dependent variable can be explained by the independent variables of this study. However, the unexplained part is captured in the error term.

4.4 Discussion of findings

Renewable energy investment has a regression coefficient of 0.48205 and a p-value of 0.0028 which implies that renewable energy investment cost has significant positive effect on sustainable growth rate of listed oil and gas companies in Nigeria. The positive coefficient implies that an increase in investment in renewable energy leads to a corresponding increase in the sustainable growth rate of the firms. This finding indicates that investments in renewable energy enhance the long-term growth capacity of oil and gas companies by improving operational efficiency, reducing energy-related costs, and mitigating exposure to environmental and regulatory risks. This finding aligns with the work of Ardianto (2025) and Alsagr et al. (2025) who noted that green investment cost positively influences stock returns, with ROA strengthening this effect.

Also, waste management investment (WAMI) has a positive and statistically significant effect on the sustainable growth rate of listed oil companies, as indicated by a regression coefficient of 0.170631 and a p-value of 0.0125**.** The positive coefficient suggests that increased investment in waste management practices contributes to improvements in firms' sustainable growth rate. This finding implies that effective waste management investments such as spending on waste treatment facilities, recycling systems, pollution control technologies, and safe disposal mechanisms, enhance the long-term growth capacity of oil companies. The findings of this study aligns with the work of Bjerborn Murai and Kirima (2024) who noted that green investment cost has significant effect on financial performance.

Finally, energy efficiency investment has a positive and statistically significant effect on the sustainable growth rate of listed oil and gas companies in Nigeria, as evidenced by a regression coefficient of 0.020983 and a p-value of 0.0380**.** The positive coefficient implies that increased investment in energy-efficient technologies and processes contributes to improvements in firms' sustainable growth rate. Investments in energy-efficient equipment, optimized production processes, and energy-saving technologies help firms reduce energy consumption and operating costs over time. The findings of this study support the work of Obagbuwa and Chummun (2025) who concluded that the relationship between eco-efficiency and firm value is positive and statistically significant.

5.0 Conclusion and recommendations

This study examined the effect of green investment cost on the sustainable growth of listed oil and gas companies in Nigeria, with particular emphasis on renewable energy investment cost**,** waste management investment, and energy efficiency investment cost**.** The empirical findings provide strong evidence that green investment cost plays a significant role in enhancing the sustainable growth rate of firms in the oil and gas sector. Taken together, the findings suggest that

green investments are not merely environmental or regulatory compliance mechanism but strategic investments that enhance firms' long-term growth potential. By integrating environmentally responsible practices into their operational and investment decisions, listed oil and gas companies in Nigeria can improve resource efficiency, reduce environmental and regulatory risks, and strengthen their competitive position. The study therefore concluded that green investment cost is a key driver of sustainable growth in the Nigerian oil and gas sector**.** Based on the findings and recommendations of this study, the study recommended that the management of oil and gas companies in Nigeria should increase allocation of resources to renewable energy projects such as solar, wind, and bioenergy to power operational activities. Firms should integrate renewable energy into their long-term strategic and capital expenditure plans in order to reduce dependence on fossil fuel based energy sources, lower energy costs, and mitigate exposure to energy price volatility. Also, the management of oil and gas companies, should adopt internationally recognized environmental management standards and continuously improve waste handling practices to minimize environmental pollution and regulatory sanctions.

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