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Do the Disclosure of Environmental Management Accounting and Independent Assurance Affect Profitability?

Hempry Putuhena[1*], Leonard D. M. Sangur[2], M. Rifkhi Fauzan S[3], Paskanova C Gainau[4]
[1*, 3, 4] Pattimura University, Indonesia
[2] Indonesia University, Depok, Indonesia
Email : hempryputuhena@gmail.com[1]*, leonard.day.mas.sangur@gmail.com[2], rifkhifauzans@gmail.com[3], paskanova@gmail.com[4]

Author's correspondence : hempryputuhena@gmail.com

Abstract This study aims to examine the effect of water usage, energy consumption, carbon emissions produced, waste generated, independent Assurance, and environmental expenditures on Return On Equity. (ROE). This study provides information about entities that are socially responsible and whether their financial performance will improve or not after the implementation of corporate social and environmental activities. The independent variables in this study are water usage, energy consumption, carbon emissions produced, waste generated, independent Assurance, and environmental expenditures. ROE in this study is the dependent variable. The secondary data required for the study comes from the sustainability reports of 35 companies in 2023, and then the relationship between the independent and dependent variables is tested using EViews. The results of data management in the study indicate that there is an effect between water usage, waste generated, and environmental expenditures on ROE, thus supporting H1, H4, and H6. This condition is reversed with energy consumption, carbon emissions produced, and independent Assurance, where these three variables do not have an effect on ROE, proving that H2, H3, and H5 are not supported. The implication of this study is that management can achieve sustainable profits by disclosing activities that support environmental sustainability and using independent parties to guarantee the sustainability reports that have been created, thereby gaining more trust from stakeholders, which affects ROE.

Keywords: Environmental, Management, Accounting, Independent, Assurance

1. INTRODUCTION

In recent years, there have been arguments for and against environmental disclosure; the requirement to report environmental effects resulting from operational activities can be viewed as either beneficial or detrimental. A number of regulations require companies to show that they are committed in attaining social and environmental sustainability (Putuhena et al., 2024). Although there are challenges in implementing environmental impact disclosures, the pressure on business to balance financial goals and environmental needs is a controversial issue (Cornellissen & Mukwarami, 2024). In addition to financial considerations, organizations must also take non-financial factors into account. (Tandiono et al., 2023). The purpose of this information disclosure is to give all stakeholders accurate and trustworthy information about the company, including non-financial and financial information (Dobre et al., 2015) in order for it to be appropriately and accurately utilized in decision-making. Companies listed on the stock exchange must take environmental sustainability issues seriously, especially in light of

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the recent trend that investors and consumers favor business that practice environmental sustainability (Dzomonda & Fatoki, 2021; Johnson & Schaltegger, 2016).

According to good management theory, a company's social performance is linked to its management practices since improved relationships with all stakeholders lead to an improvement in overall performance (Simionescu et al., 2020; Waddock & Graves, 1997). Concern for the environment in which a company operates is a sign of environmental sustainability. Demands for openness in the company's handling of environmental issues have come from a variety of sources as a result of increased awareness of environmental preservation (Pamungkas et al., 2023). Along with information on external guarantor and the environmental expenditures the company has sacrificed, disclosure of water and energy usage, carbon emissions, and waste from operations is a significant problem.

The operational activities of the company make water usage significant. The requirement for water extends beyond operating tasks; it also covers meeting employee needs and office operations. However, the problem that can arise is the lack of water for life. The health, dignity, and well-being of many people worldwide are severely harmed by water scarcity, which can be brought on by either natural or human-caused factors (Anang et al., 2024). There are rising expectations in society that the private sector, which is frequently implicated in global water challenges, must fulfill its responsibility in addressing this issue on a regional and global scale. Water consumption reporting has been a standard practice in sustainability reports, many of which have mentioned how value creation and sustainable company growth may be facilitated by eco-friendly practices (Den et al., 2018).

It is well known that both the government and private sector must work together to meet national energy saving goals. Despite government initiatives, some companies view energy saving as a duty rather than a chance to improve management and technology and accomplish constructive organizational change (Fan et al., 2017). Companies are now very concerned about raising awareness about energy consumption, and they may use it to their advantage for both environmental and company sustainability.

Because of the carbon emissions, there will be more air pollution, which will contaminate the ecosystem. Companies that reduce their carbon footprint also increase their financial profits (Miah et al., 2021). A company's carbon efficiency can affect long-term performance expectations as expressed in market valuation, regardless of its relationship to short-term profitability (Trinks et al., 2020).

The realization that companies have duties to several stakeholders in addition to their financial commitments is the foundation for the rise of environmental waste management and

more general sustainability practices. Customers, staff members, the community, investors, the government, and suppliers are some examples of these stakeholders. One of the many undesirable chemicals or toxins discharged by a company's production process is waste, which can include components that are unwanted or useless (Aniebiet & Emenyi, 2024). While generating waste is not illegal, improper disposal of waste can be dangerous. Human advancement, both socially and technologically, is closely linked to waste. It is now a common occurrence in many nations, and measures must be taken to lessen its effects. Stakeholders want the company to be able to limit the amount of waste that is generated as a result of its operating procedures, which calls for an efficient work process. In the eyes of stakeholders, work effectiveness becomes a critical factor in adding value to the company.

Generally speaking, guarantee is a procedure that gives assurance about the degree of trustworthiness that may be attributed to the data that has been presented. Strong and comprehensive guarantee statements in the CSR report can help increase confidence and dependability, especially for stakeholders that share an interest in how the firm achieves its social, environmental, economic, and ethical duties (Jones & Solomon, 2010). An independent party's guarantee boosts stakeholders' trust in the environmental issues that have been revealed. One of the strategies to improve the company's standing with the public is the guarantee offered by an independent third party.

Concern for the environment in a financial sense is another factor that company must take into account. According to the company's financial resources, environmental expenditures are required to stop operational operations from having a detrimental impact on the environment. A high amount of environmental expenditures indicates a company's commitment to better managing environmental challenges in its operations (Ifada & Jaffar, 2023). By attracting new clients and keeping hold of current ones, the publication of this information boosts stakeholder trust, which can lead to an improvement in the company's performance.

Return on investment becomes the main orientation for investors, so the greater the return on investment, the more pleasing it is for investors. One tool to measure the return on investment made by investors is to use the ROE (Return On Equity) proxy as a measure of profitability. ROE compares the profit earned with the total equity owned, thus being able to accommodate all the equity owned by the company and also utilizing all the equity owned to generate profit. ROE also focuses on the return to shareholders, which ultimately pleases the shareholders. Various events and information disclosures made by the company become one of the bases for decision-making by stakeholders. Investment decisions using ROE heavily

depend on the steps that the company has taken and will take to survive amidst competition. The sustainability of a company requires environmental sustainability, and environmental sustainability has become a sensitive issue for potential decision-makers. Information on environmental performance disclosure must be provided by the company to support decisions by stakeholders, which can ultimately contribute positively to the company.

Companies that produce, distribute, and sell energy—such as coal, electricity, natural gas, and petroleum—are the main subject of this study. Companies in the energy sector overuse natural resources for their personal gain. These operational actions have detrimental long-term implications. The extensive consumption of energy and water will have an effect on the ecosystem since there will be less energy available and less clean water in the surrounding areas. Furthermore, the waste and carbon emissions produced will have a detrimental impact on the air quality and pollution levels in the local environment. Because they can lower the standard of living in the area, these actions are therefore extremely harmful to the ecosystem.

Investors will assume a certain amount of risk and be able to make wise investments if they comprehend the cause-and-effect relationships between environmental and social performance, independent guarantor, and ROE. Furthermore, the results can reveal information regarding socially conscious organizations and whether or not implementing corporate social and environmental initiatives will boost their financial performance.

2. HYPOTHESIS DEVELOPMENT

Signaling theory refers to an action taken by company management to provide guidance to investors on how management provides important information so that it becomes an important consideration before investors make a decision. Company management has more information related to the company's operational activities compared to external parties. Thus, it is expected that company management is able to provide signals to external parties through financial reports or company sustainability reports that can be trusted and will provide certainty regarding the company's sustainability prospects in the future. In the context of this study, disclosure of sustainable information by the company is a signal that indicates that company management views the company's prospects as good, management wants to show that the company is very oriented towards sustainability with complete disclosure of information. It is hoped that complete disclosure of information will be a good signal in maintaining and acquiring consumers so that profitability increases. Furthermore, it can provide a good return on investment for investors**.**

Water usage is now a crucial component in sustaining a company's production operations. This is due to the growing perception that water pressure could impede economic expansion and jeopardize attempts to advance social justice and maintain healthy ecosystems. One aspect of corporate social responsibility (CSR) is the adoption of sustainable water usage policy. Companies generally adopt a variety of actions to cut down on usage and create plans for sustainable water usage (Den et al., 2018). Water usage has become a performance tool for companies that has been studied by several researchers. Previous research by Ji et al (2023) who conducted research on 259 companies from 2015-2021 showed that poor water management will weaken financial performance. Similar results had previously been obtained by Armstrong (2004) in the agricultural industry group in Australia that revealed that water usage affects profitability. Dzomonda & Fatoki (2021) showed similar results concluding that water usage affects financial performance in 32 companies listed on the Johannesburg Stock Exchange. In accordance with the previous statement, it can be concluded that water usage by companies will affect financial performance.

H1: Water usage shows an effect on ROE

Energy consumption is defined as the quantity of energy used to produce output or activities. Fuel and electricity are examples of energy utilization. Because of its many definitions, energy consumption—or, on the other hand, energy efficiency—has drawn more and more attention from both the general public and scholars (Algül & Erenel, 2024). The definition of energy consumption is the quantity of energy used to generate one unit of output. Enhancing energy efficiency has the potential to aid in initiatives for sustainable development. The potential to lessen the effect on the environment and raise the value of the company is one of the major advantages of energy efficiency and energy use reduction. The company's operations depend on the energy consumption, and when energy is used efficiently, goals are met that directly boost the performance of the company. Numerous earlier academics have examined the relationship between energy consumption and financial performance. Zuoza & Pilinkienė (2019) found that the intensity of energy consumption affects the profitability of the paper industry. Fan et al (2017) conducted research using data from 2010-2014 and discovered that energy consumption affects ROE. Both studies are supported by the results from Iliemena (2020) which led in the conclusion that there is a relationship between energy management and profitability. This argument has shown that energy consumption will affect financial performance.

H2: Energy consumption shows an effect on ROE

Environmental degradation, overuse of natural resources, and the pervasive pollution caused by toxic carbon components are just a few of the issues that have recently inspired new policies from both the government and domestic and international companies (Ganda & Milondzo, 2018). Sustainability of the company and sustainability of the environment are both affected by the growth of commercial competitiveness. The result is pollution of the environment, which causes climate change and jeopardizes the viability of life. Stakeholders carefully examine the information provided in the sustainability report. The company's carbon emissions can be addressed by stakeholders. Prior to making financial decisions, this knowledge is essential since it greatly influences how the public perceives the organization. Numerous tests have been conducted to examine the connection between financial performance and carbon emissions. Ganda & Milondzo (2018) concluded that carbon emissions have a negative effect on ROE in 63 companies in South Africa in 2015. Nichita et al (2021) found that low carbon emission levels would increase profitability in the chemical industry in Central-Eastern Europe during the period 2015-2019. Van Emous et al (2021) drew the conclusion that lowering carbon emissions has an effect on financial performance using a cross-country dataset that comprises 9,265 observations on 1,785 companies from 53 different countries between 2004 and 2019. This demonstrates the strong correlation between the company's financial performance and the amount of carbon emissions it produces.

H3: Carbon emissions produced shows an effect on ROE

Waste generated will have a negative effect not only on the community but also on the company. It is important for the company to reduce the waste generated as a result of its operational activities. According to Hornsby et al (2017) due to persistent problems in the development and application of efficient waste management since the mid-1990s, environmental issues pertaining to the effects of present waste management techniques have drawn a lot of public attention. The problem of waste management has been there for a while, but it has gained more attention recently. Therefore, in order to create a sustainable environment, these issues must be resolved (Maleka et al., 2017). Sustainability issues have become a major concern for companies, so research has been conducted on the relationship between environmental issues focused on waste management and profitability. Gull et al (2022) found that there is a negative relationship between waste generated and financial performance in companies across 41 countries from 2002 to 2019. Maleka et al (2017) who first discovered a connection between the profitability of companies in the mining and industrial industries between 2007 and 2016 and the goal of lowering waste consumption. This data suggests a connection between profitability and the amount of waste generated.

H4: Waste generated shows an effect on ROE

One form of a company's report is the sustainability report, also known as the Sustainability Report. Based on Global Reporting Intiative (2016), The process of assessing, revealing, and holding stakeholders—both internal and external—responsible for the organization's capacity to meet sustainable development objectives is known as sustainability report. Information about the company's performance in the social, environmental, and economic spheres is included in its sustainability report. The purpose of this report is to update all stakeholders on the company's performance through the media. The company uses the sustainability report as a measurement tool to meet its goals regarding the triple bottom line. Mgbame & Ilaboya (2013) defined an environmental audit as an assessment of a company's environmental management practices with the goal of enhancing environmental management and assuring a particular degree of reliability for the environmental data supplied. Public confidence in the way environmental performance data is presented will be bolstered by the guarantee of an independent assurance. Public investment interest may be piqued by that trust, which would improve financial performance. Mgbame & Ilaboya (2013) explained that profitability is affected by independent assurance in providing assurance on sustainability reports for 160 companies in Nigeria. Research conducted by García-Sánchez et al (2019) revealed that independent an assurance of sustainability reports affects financial performance using 10 years of data from companies in various countries. In line with previous research support, it is suspected that guarantee from independent verifiers affects the profitability of companies.

H5: Independent Assurance shows an effect on ROE

Environmental accounting defines environmental expenditures as environmental conservation costs, which include investments in assets to enhance the quality of the environment as well as costs for prevention, mitigation, and identifying strategies to lessen the effect on the environment, such as environmental restoration, disaster recovery, and other initiative (Nuzula, 2018). The company's financial sacrifices for environmental sustainability are demonstrated by the disclosure of environmental expenditures. As a result, it is evident that this knowledge can improve the company's reputation, which will affect its future financial success. The statement is supported by research by Dinniyah & Nuzula (2021) who found that environmental expenditures affect all profitability indicators in 20 chemical companies in Japan from 2016 to 2018. Amahalu (2020) expressing a similar point that emphasized that environmental expenditures determine profitability measured by net profit margin in 11 oil and

gas companies from 2010-2019 in Nigeria. Both studies are supported by Peters & Adeagbo (2024) who revealed that the disclosure of environmental expenditures affects the profitability of manufacturing companies in Nigeria. Thus, it can be inferred that expenditures affect the profitability of companies.

H6: Environmental expenditures show an effect on ROE

3. RESEARCH METHOD

A quantitative test will be conducted on the previously presented hypothesis. Quantitative research is a study that empirically tests the relationship between independent and dependent variables. The study's independent variables include water usage, energy consumption, carbon emissions produced, waste generated, independent assurance, and environmental expenditures. In this study, the dependent variable is ROE. The EViews application is used to evaluate the association between independent and dependent variables, and the continuous reports of 35 enterprises in 2023 provide the secondary data required for the study. The research model and variable measurement are shown here

Table 1. Variables Measurement

Variables	Definition	Measurement
Water Usage	Describes the amount of water consumption used by a company for activities producing goods or services during a certain period.	Water Usage / Revenue
Energy Consumption	Describes the amount of energy consumption used by a company for activities producing goods or services during a certain period.	Energy Consumption / Revenue
Carbon Emission Produced	Describes the amount of carbon emissions produced by a company for activities producing goods or services during a certain period.	Carbon Emission Produced / Revenue
Waste Generated	Describes the amount of waste produced by a company for activities producing goods or services during a certain period.	Waste Generated / Revenue
Independent Assurance	Explains the existence of an independent assurance to assess the sustainability report reported by the company for 1 period.	Value 1 If there is an Independent Assurance for the sustainability report Value 0 if there is no Independent Assurance for the sustainability report
Environment Expenditure	Explains the amount of costs that a company spends to improve the environment resulting from the company's operational activities in a certain area during 1 period.	Log n (Environment Expenditure)
ROE	Explains the returns obtained by investors/shareholders during 1 period from a company	Net Income / Total Equity

Source: Data Processed (2024)

4. RESULT AND DISCUSSION

Table 2. Classic Assumption Test

Item	Tool	Result
Normalitas	Jarque-Bera	Prob. > 0,05
Multikolinearitas	Variance Inflation Factor	Centered VIF < 10
Heteroskedatisitas	Breusch-Pagan-Godfrey	Prob. > 0,05

Source: EViews Output (2024)

According to the findings, this study passes the traditional assumption test since the data is homogeneous, regularly distributed, and uncorrelated with the independent variables, all of which make it appropriate for regression analysis.

Table 3. Regression Result

Hypothesis	Description	Prob	t-Statistic	Decision
H1	Water usage shows an effect on ROE	0.0006	-3.868693	Accepted
H2	Energy consumption shows an effect on ROE	0.0749	-1.849852	Rejected
H3	Carbon emissions produced shows an effect on ROE	0.9952	0.006037	Rejected
H4	Waste generated shows an effect on ROE	0.0346	-2.220536	Accepted
H5	Independent Assurance shows an effect on ROE	0.5044	0.676251	Rejected
H6	Environmental expenditures show an effect on ROE	0.0211	2.443437	Accepted

Source: Data Processed (2024)

Based on the results above, out of the 6 independent variables used in the model, only 3 variables are significant, which are the Water Usage Intensity, Waste Intensity, and Environmental Expenditures variables, which have significant values < 0.05.

Table 4 Capability Test

R-squared	0.490608
Adjusted R-squared	0.381453

Source: EViews Output (2024)

The test results show an Adjusted R-squared value of 0.3815 or 38.15%, indicating that the independent variables in the model can explain the ROE variable, while the rest is explained by variables outside the model. This Adjusted R-squared value falls into the moderate category.

The test results clearly suggest that H1 "Water usage shows an effect on ROE" is accepted because the significance value of 0.0006 < 0.05 is negative, as shown in Table 3. This is explained by the fact that mining enterprises' usage of water for operational purposes will have an effect on shareholders' return on investment. The entity's performance will undoubtedly improve with high water usage, which will affect the decline in the return on equity offered; conversely, low water usage will result in an increase in the return on equity. Nonetheless, this circumstance demonstrates once again that the company can effectively optimize water usage to increase returns on equity. The company's commitment to environmental sustainability is demonstrated by its efficient usage of water. Sustainability in water usage helps the company projects a favorable image to stakeholders. As a result, the company gains trust and loyalty, which boosts its profitability. The findings of this study concurs with (Cornellissen & Mukwarami, 2024; Fu & Jacobs, 2022; Ji et al., 2023) which reveals that the company's water usage will affect ROE.

Different results are obtained in the H2 test "Energy consumption shows an effect on ROE," which is rejected because the significance value of 0.0749 > 0.05. This clarifies why the energy used by the company to carry out its operational activities does not affect its return on equity. According to this study, the company is likewise free to use or not use energy to the fullest extent possible without considering the shareholders' return on equity. The company's profitability does not immediately reflect the effect of energy usage. Consumers and possible investors are not yet paying attention to the rise in ROE brought on by knowledge on energy usage. Potential investors and consumers focused on equity returns have not yet realized the value of energy usage data; instead, they only take into account data that responds rapidly to the company's profitability. The results also concur with (Pons et al., 2013; Simionescu et al., 2020) who revealed that energy use does not have an effect on ROE.

H3 testing "Carbon emissions produced shows an effect on ROE" is rejected because the significance value of 0.0749 > 0.05. The profitability of the company is not affected by the quantity of carbon emissions it produces throughout its operations. The company's carbon emissions haven't yet had an effect on the increase in profitability; stakeholders have not thought about carbon emission data while making decisions. As a result, stakeholders disregard the company's carbon emission data when making business decisions. The amount of carbon emissions produced will be a significant factor in the company's business decision-making, even though the disclosure of carbon emissions has not yet gained attention in the near future due to growing environmental consciousness. The companies must reduce the amount of carbon emissions it produces going forward. The research findings is supported by (Özşahin

Koç & Deran, 2024; Simionescu et al., 2020) who were able to explain that there is no effect of the carbon emissions produced on ROE.

Testing H4 "Waste generated shows an effect on ROE" is accepted because the significance value of 0.0346 < 0.05 and is negative**.** The study finds a negative effect of the waste generated on financial performance. This implies that waste management primarily affects financial performance through the company's operational costs. The waste generated is inversely proportional to ROE. The greater the waste generated indicates that the company is operating at maximum capacity, which triggers an increase in operational costs that will eventually reduce profits, thereby lowering ROE. Conversely, generating minimal waste will result in optimal ROE. The waste generated is a reflection of the company's operations. The company is required to operate effectively to reduce the factory waste generated. Effective operational activities will lead the company to create added value for consumers, which ultimately results in increased profitability. The results of this study is justified by (Gull et al., 2022; Simionescu et al., 2020) which were able to explain that there is an effect of the waste generated on ROE.

Testing H5 "Independent assurance shows an effect on ROE" is rejected because the significance value of 0.5044 > 0.05. It is expected that the disclosure of some components in sustainability reports will enable stakeholders to evaluate the company's concerns in light of sustainability. It is anticipated that a higher return on equity will result from the disclosure of the sustainability report. Naturally, the disclosure needs to be verified by an independent evaluator who may offer criticisms regarding sustainability reporting and also analyze the company's reports. But this study came to a different conclusion. The fifth hypothesis was rejected, suggesting that the return on equity is unaffected by the existence of independent assurance when assessing sustainability reports. The situation explains why stakeholders have not yet expressed disapproval of the existence of independent assurance on sustainability reports; for them, the availability of sustainability reports that are widely accessible is the most crucial factor. Furthermore, some people believe that data from financial reports can forecast returns on equity. This in line with (Sholekha & Astuti, 2024) who discovered that there is no relationship between independent assurance and ROE.

Testing H6 "Environmental expenditures show an effect on ROE" is accepted because the significance value of 0.0211 < 0.05 and is positively directed. According to the study's findings, the company's environmental investments will have an effect on the public perception toward the company, which will in turn have an effect on shareholders' return on equity. Significant environmental investments show the company's commitment to environmental

protection, which helps sustainability initiatives. The public is becoming concerned about environmental expenditures, particularly stakeholders. As a result, every environmental activity becomes crucial information for prospective customers and investors. It is important to disclose environmental expenditures. The claim that companies are more likely to adopt sustainable practices and boost profitability if they reveal their environmental expenditures lends credence to this. To attain the best return on equity (ROE), it is crucial for the companies to reveal their environmental expenditures. The findings are in accordance with (Cornellissen & Mukwarami, 2024; Dinniyah & Nuzula, 2021) who attested the influence between environmental expenditures and ROE.

5. CONCLUSION AND SUGGESTION

The purpose of this study is to demonstrate how environmental management accounting and independent guarantors affect mining companies' return on equity (ROE) in 2023. By utilizing eviews to examine the correlation between independent and dependent variables from 35 mining companies. Water usage, waste generated, and environmental expenditure all have an effect on ROE, according to the study's data management results, supporting H1, H4, and H6. Energy consumption, carbon emissions produced, and independent assurance reverse this condition, showing that H2, H3, and H5 are not supported and that these three factors have no effect on ROE.

Information from this study is pertinent to the management of a company, particularly when it comes to environmental disclosure. The findings of this investigation show that certain factors affect ROE while others do not. Nonetheless, by guiding initiatives that promote environmental sustainability, management can provide long-term financial gains. Additionally, in order to increase stakeholder trust, management can enlist the help of outside parties to ensure the sustainability report. Therefore, the data that management has provided may contribute to higher earnings, which in turn may affect ROE.

The final sample size was determined because not all companies declared environmental elements entirely, and the number of samples was very small, which meant that it did not optimally reflect the performance of the mining industry. These are just two of the limitations that this study encounters. Given that the independent variables in this study were only able to predict ROE of 38.15%, it is hoped that future studies will be able to use time series data to make observations. Additionally, it is hoped that future researchers will be able to generalize these findings to different industries and add additional independent variables

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