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# The Effect of Company Competition, Company Size and Environmental Performance on Carbon Emissions Disclosure

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**ABSTRACT**

This study aims to determine whether or not there is an effect of company competition, company size, and environmental performance on disclosure of carbon emissions. This research was conducted on energy sector companies listed on the Indonesia Stock Exchange (IDX) for the 2018-2021 period, totaling 237 companies obtained by purposive sampling. The method of analysis in this study is multiple regression analysis with IBM SPSS Statistics 26 software to test the variables of company competition, company size, and environmental performance on carbon emissions disclosure. The results of this study indicate that partially company competition have no effect on disclosure of carbon emissions. While company size and environmental performance affects the disclosure of carbon emissions. Simultaneously, company competition, company size, and environmental performance together affect the disclosure of carbon emissions.

**Keywords:** Carbon Emission Disclosure, Company Competition, Company Size, Environmental Performance

## INTRODUCTION

The conversation about environmental damage seems to be a never-ending topic in the international community. Starting from several phenomena such as the ice in Antarctica that began to melt, the heat wave in Australia, to the increasing temperature of sea water. These events are a sign that climate change on earth has begun to occur. According to a report from CNN Indonesia (2019), researchers argue that carbon emissions collected and absorbed by the oceans are the main cause of global warming, which is around 93%. According to Purbasari (2009) stated that environmental pollution affects environmental functions both social and biotical functions (Santika & Lutfi, 2021).

Based on a review by Climate Transparency 2020, there has been a 140% increase in carbon emissions in Indonesia between 1990 and 2017. The increase in emissions reached 581 MtCO2 (Metric Tons of Carbon Dioxide Equivalent) in 2019. CO2 emissions from fuel combustion are the largest driver of overall carbon emissions in Indonesia. The industrial sector is the largest contributor of emissions at 37%, followed by the transportation sector at 27% and the electricity and heat generation sector at 27%. This shows that Indonesia's contribution to carbon emission reduction is inadequate. By 2030 Indonesia must be able to reduce carbon emissions below 662 MtCO2 and below 51 MtCO2 by 2050. The goal is to meet the requirement of a reasonable temperature on the earth's surface (Mursanti & Tumiwa, 2020).

Many countries must take responsibility for the damage to the earth that is increasingly impacting the environment due to global warming. The production of carbon emissions from some countries is one of the most alarming causes. Greenhouse gases are the cause of global warming, which in turn has an impact on climate change on earth. The heat trapped by these greenhouse gases can cause the temperature on earth to get hotter. Indonesia ranks among the ten largest greenhouse gas contributors in the world. Indonesia contributes around 2.03% of gas emissions that pollute the air in the world. According to the World Resources Institute (WRI), the countries that are the largest contributors to greenhouse gas emissions on earth are China, the United States, the European Union, India, Russia, Japan, Brazil, Indonesia (CNN Indonesia, 2021).

Indonesia developed a Nationally Determined Contribution (NDC) which was signed in Paris in 2015. It contains a 29% reduction in carbon emissions by 2030 if Indonesia does business as usual (Media Indonesia, 2022). However, if Indonesia receives support and cooperates with international countries, it can reduce carbon emissions by 41% (APBI-ICMA 2020). Since 2020, the NDC has been implemented, and monitoring is carried out. The government invites businesses to support the zero-emission program in 2030 by disclosing carbon emissions, which aims to maintain environmental sustainability. However, in Indonesia, carbon emission disclosure is still voluntary, so not all companies disclose carbon emissions.

The changing consumption patterns of people due to climate change policies have been considered by companies gradually (Luo, Tselioudis, & Rossow, 2022). Business actors should be involved in efforts to preserve the environment from the impacts of climate change. One way to do this is to include an emissions disclosure component in the company's annual report or sustainability report. Considering that in recent years there have been demands from various levels of society and the worsening environmental conditions, companies must make maximum efforts to deal with these problems. To avoid threats, especially for companies that produce greenhouse gases, companies will try to gain legitimacy from stakeholders by disclosing carbon emissions (Berthelot & Robert, 2011).

Research on carbon emission disclosure has been done before. One of them is conducted by Hilmi, Puspitawati, and Utari (2020) with the research title The Effect of Competition, Profit Growth and Environmental Performance on Disclosure of Carbon Emission Information in Companies. This study uses independent variables of competition, profit growth and environmental performance, as well as carbon emissions for the dependent variable. Research related to the practice of disclosing carbon emissions has been done before and shows inconsistent results. According to Hilmi, Puspitawati, and Utari (2020), company competition has no influence on carbon emission disclosure. This is because companies that have a larger market share will not necessarily disclose carbon emissions more widely. Companies are more focused on strategies used to reduce the risk of climate change and reduce greenhouse gas emissions. Companies that care about environmental sustainability will be more recognized by the wider community, so that companies will also continue to innovate to produce environmentally friendly products and strive to use renewable energy. Meanwhile, research by Pranasyahputra, Elen, and Dewi (2020) shows that company competition has a significant positive effect on carbon emission disclosure.

According to Selviana and Ratmono (2019) company size has a significant positive effect on carbon emission disclosure. This is because companies with large sizes will produce more pollutants than smaller companies. When the company produces more pollutants, the company will also try to reduce these pollutants, one of which is by disclosing carbon emissions. In addition, the company will also focus on programs that aim to maintain environmental sustainability. This will lead to high expectations from external parties towards larger companies. More corporate disclosure will increase trust for management that management manages its resources well (Luo, Tselioudis, & Rossow, 2022). But the results of this study differ from research conducted by Wiratno and Muaziz (2020) which shows that company size has no effect on disclosure of carbon emissions.

According to Hilmi, Puspitawati, and Utari (2020) environmental performance has a significant influence on carbon emission disclosure. Environmental performance is consistent with stakeholder theory, because it can be used by stakeholders to find out and monitor company activities to keep paying attention to environmental sustainability. Environmental performance is also consistent with legitimacy theory where companies that have good environmental performance will disclose carbon emissions more widely. This is because in order for the company to gain trust from the public that the company has participated in preserving the environment. The basis for generalizing the effect of environmental performance measured using PROPER on carbon emission disclosure is due to the significant influence of the results of this study. However, this result is different from research conducted by Apriliana (2019) and research by Selviana and Ratmono (2019) which states that environmental performance has no influence on carbon emission disclosure.

Disclosure of carbon emissions is important because it is a form of transparency to stakeholders regarding the company's efforts to address the impacts of climate change and global warming (Carbon Disclosure Project, 2009). Disclosure of carbon emissions is regulated in OJK Circular No. 30/SEOJK.04/2016, which is about the obligation of issuers to include social and environmental responsibility reports in annual reports or sustainability reports. A sustainability report is not only a reporting tool, but also an important instrument in achieving sustainable development goals and positively managing corporate impacts.

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## LITERATURE REVIEW

### Carbon Emissions Disclosure

Carbon gas emissions are gases produced by factories, vehicles, garbage burning, etc. that are considered damaging to the environment and can lead to global warming. It can also be defined as carbon dioxide or carbon monoxide in the atmosphere, produced by vehicles and industrial processes (Aminzadegan, Shahriari, Mehranfar, & Abramović, 2022).

Carbon dioxide (C02) is the gas that contributes the most carbon emissions compared to other gases, which cannot be separated from company activities. Therefore, companies are required to disclose carbon emissions to stakeholders because it has an impact on the stakeholder's environment. Disclosure of carbon emission disclosure in Indonesia itself is still voluntary, because there is still no regulation or law that requires such disclosure.

Disclosure of sustainability reporting is still voluntary, and there is no reporting standard (Puspita, 2015). Sustainability reporting is a medium of communication with stakeholders, especially environmental and social performance. Therefore, a type of accounting engineering called carbon accounting was developed as a step to reduce the increasing effects of global warming. This is expected to be a benchmark in the formulation of ecological policies in an entity.

Companies today must be more open to information relating to company activities. Companies should not only focus on making profits, but also contribute to environmental sustainability and benefit stakeholders. This is based on the goal of sustainable development to continuously promote economic, social and environmental balance. Disclosure of carbon emissions is the company's commitment to be responsible for the environmental impacts it causes in the social, economic and environmental realms (Akhiroh & Kiswanto, 2016).

### The Effect of Corporate Competition, Company Size, and Corporate Environment on Carbon Emissions Disclosure

In economic theory, the effect of competition on product quality is uncertain. The struggle carried out by companies in the same industry to win market share or customer share is shown in one industry competition. More competitive companies tend to disclose more information to reduce information asymmetry between management and shareholders. However, smaller companies will avoid it because it can be known by rivals (Birt, Bilson, Smith, & Whaley, 2006). Competition is considered as one of the pressures for companies with the same industry sector. The state of the industrial environment with a high level of competition encourages competing companies to disclose carbon emissions more widely (Pranasyahputra, Elen, & Dewi, 2020; Ramadhan, Ermaya, & Wibawaningsih, 2021).

Company size is a measure of the size of a company which is assessed based on the size of total assets, total sales, total profits, tax burden and others (Brigham & Houston, 2016). Large companies are considered to have large resources and will also have greater operational activities. Large companies with many operational activities tend to produce pollutants such as greenhouse gas emissions. Large companies will receive greater pressure from stakeholders. This is because large companies will carry out more activities than small companies, so the resulting impact on the social environment is more.

Large companies have a big responsibility, they will face problems if they do not meet the expectations of society (Selviana & Ratmono, 2019; Dewi & Kurniawan, 2020). To avoid the legitimacy gap, companies must disclose greenhouse gas emissions completely as evidence that the company is involved in preserving the environment (Glennerster & Jayachandran, 2023).

According to Environmental Law No. 32 of 2009, environmental performance is the effort made by companies to preserve the environment and prevent damage arising from operational activities. Companies with high environmental performance are positively associated with environmental disclosure, especially climate change (Dawkins & Frass, 2011). Companies that are proactive towards environmental development have an incentive to voluntarily disclose environmental information, such as information regarding carbon emissions disclosure. This is done to reveal the type of performance they are doing, in addition to being directly observed by investors and other external stakeholders.

Companies that have received a PROPER rating from the government are considered to have been proactive towards the environment. This is considered as an encouragement for companies to voluntarily disclose carbon emissions which will be useful for stakeholders, shareholders, and the wider community to obtain information from company activities. The PROPER rating is also used as evidence that the company has carried out actions and activities in accordance with applicable norms or laws to gain legitimacy from the surrounding community.

Previous research examining the effect of environmental performance on disclosure of carbon emissions is Saptiwi (2019) and Hilmi, Puspitawati, and Utari (2020) said that environmental performance has a positive effect on disclosure of carbon emissions.

Based on previous studies and existing theories, the hypothesis of this study is formulated as follows:
H1: Company competition affects the disclosure of carbon emissions
H2: Company size affects the disclosure of carbon emissions
H3: Environmental Performance affects the disclosure of carbon emissions

## RESEARCH METHOD

### Population and Sample

The population in this study are energy companies listed on the Indonesia Stock Exchange in 2018-2021. The sampling criteria in this study include (1) The company publishes annual reports from 2018-2021; (2) Disclose carbon emissions. The data in this study are secondary data. The data used in this study are financial report data obtained from financial statements; environmental performance data obtained from the Ministry of Environment and Forestry portal; carbon emission disclosure data obtained from the company's sustainability report.

### Research Variables and Their Measurement

This research variable consists of dependent and independent variables. The dependent variable in this study is Carbon Emissions Disclosure. This measurement uses an index developed by (Choi, Lee, & Psaros 2013). This index was developed from the Carbon Disclosure Project. A score of 1 is given to disclosures that comply with the index, while a score of 0 is given if there is no disclosure of an item in the index. The way the index is calculated is as follows:

$$CED = \frac{\sum di}{M} \times 100\%$$

Notes: CED = Carbon Emission Disclosure; ∑di = Total number of scores 1 that the company can disclose; M = Maximum number of scores of disclosure items (18 items). Disclosure items are shown in appendix 1.

The independent variables used in this study are Company Competition (KP), Company Size (UK) and Environmental Performance (KL). Company Competition is the proportion of market share owned by a company compared to the total market share of the sector used. The measurement of Company Competition used is:

$$\sum_{i=1}^{n} \left(\frac{Sit}{St}\right)^2$$

Description: Sit = Sales value of company i in year t; St = Total sales of all energy companies in year t; Sit/St = Market share of company i in year t; n = Number of companies in the energy industry.

Company size is a measure to determine the size of the company. Company size is measured by the formula Natural Logarithm of Total Assets. Environmental performance relates to how well the organization manages the environmental aspects of its activities, products, services and their impact on the environment (Jannah and Muid 2014). Environmental performance in this study is measured using the Company Performance Rating Assessment Program (PROPER) obtained by the company. This award is given by the Ministry of Environment and Forestry using five colors as a reference, namely: 0 (Does not disclose PROPER); 1 (Black / very bad); 2 (Red / bad); 3 (Blue / good); 4 (Green / very good); 5 (Gold / very good).

The data in this study were analyzed using multiple linear regression. The aim is to determine the relationship between the independent variable (independent) and the dependent variable (dependent). The regression model is:

**CED = α + b1KP + b2UK + b3KL + e**

Description: CED (Carbon Emission Disclosure scoring index); α (Constant); b123 (Regression coefficient of the independent variable); KP (Company Competition); UK (Company Size); KL (Environmental Performance); e (Error Term).

## RESULTS

The following is an overview of the acquisition of data processed in this study using SPSS software:

**Table 1. Data Table**

| Description | Sample |
|---|---|
| List of energy sector companies on the Indonesia Stock Exchange in 2018-2021 | 66 |
| Energy sector companies that are delisted from the Indonesia Stock Exchange | (4) |
| Companies that do not disclose sustainability reports from 2018-2021 | (1) |
| Number of sample companies | 61 |
| Total research observation data (61 x 4 years) | 244 |
| Incomplete data | 7 |
| Total data processed | 237 |

Based on the table above, the number of samples in this study is 237 observations. The next step is descriptive analysis. The aim is to provide an overview of the processed data. The following is a descriptive analysis of the observed data in this study:

**Table 2. Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| KP_Company Competition | 237 | 0.00 | 0.14 | 0.02 | 0.03 |
| UK_Company Size | 237 | 22.60 | 32.38 | 30.12 | 37.67 |
| KL_Environmental Performance | 237 | 0.0 | 5.0 | 1.0 | 1.7 |
| CED_Carbon Emissions Disclosure | 237 | 0.06 | 0.67 | 0.30 | 0.13 |
| Valid N (listwise) | 237 | | | | |

Based on the table above, the mean for company competition (KP) is close to the null value (0.02), so the competition between companies is getting better, because no company is too prominent. While the standard deviation value for company size (UK) is smaller than the mean value, this means that the distribution of data for the company size variable is evenly distributed and the data is well distributed. The data above shows that the size of the company varies greatly, the greater the total assets owned by the company, the greater the size of the company. The standard deviation for environmental performance (KL) is greater than the mean, this means that the distribution of data for environmental performance variables is uneven and the data is not well distributed. In addition, there is a significant difference between one variable and another. The results of the descriptive test above can be concluded that the greater the value of environmental performance, the better the environmental performance of a company. Conversely, if the value of environmental performance is close to zero then the environmental performance of a company is getting worse. On average, companies disclose carbon emissions (CED) only 5 to 6 items out of 18 items. The conclusion that can be drawn is that energy sector companies have not disclosed carbon emissions thoroughly.

Furthermore, the classical assumption test was carried out, and the test results showed that the data in this study were free from classical assumption problems. The regression test results are shown in table 3 and table 4 below. Table 3 shows the model feasibility test (F test) with the aim of measuring whether the regression model in the study is feasible. The result is that this research model is suitable for further analysis. This is indicated by the F significance value of 0.000 (less than 0.05).

**Tabel 3. Goodness of Fit Test Results (F Test)**

| ANOVA[a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 1,960 | 3 | ,653 | 68,576 | ,000[b] |
| | Residual | 2,220 | 233 | ,010 | | |
| | Total | 4,180 | 236 | | | |
| a. Dependent Variable: CED_Carbon Emissions | | | | | | |
| b. Predictors: (Constant), KL_Environmental Performance, UK_Company Size, KP_Company Competition | | | | | | |

Furthermore, the t test is carried out to determine how much influence partially between the independent variable and the dependent variable. To determine whether the independent variable affects the dependent variable if the significance value of t is less than 0.05. The partial test results are shown in Table 4 below:

**Table 4. Multiple Linear Regression Analysis**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -,637 | ,162 | | -3,942 | ,000 |
| | KP_Company Competition | ,335 | ,382 | ,074 | ,877 | ,381 |
| | UK_Company Size | ,032 | ,006 | ,407 | 5,483 | ,000 |
| | KL_Environmental Performance | ,021 | ,006 | ,268 | 3,423 | ,001 |
| a. Dependent Variable: CED_ CED_Carbon Emissions | | | | | | |

Based on Table 4, the independent variables that significantly influence the disclosure of carbon emissions are company size and environmental performance. While the market competition variable does not affect the disclosure of carbon emissions. Therefore, hypothesis 1 in this study is not supported, while hypotheses 2 and 3 in this study are supported.

## DISCUSSION

Hypothesis 1 in this study wants to test the effect of market competition (KP) on carbon emission disclosure (CED), the result is that market competition has no effect on carbon emission disclosure. The results of this study support the research of Hilmi et all (2013). Companies that have a larger market share do not necessarily disclose carbon emissions more widely. Usually, companies will focus more on strategies used to deal with climate change risks and reduce greenhouse gases. Companies engaged in the energy sector are bound to have more pollutants than other companies. Thus, companies in the energy sector will try to maintain their corporate reputation in order to continue to receive support from the community, because companies not only focus on profits but also focus on environmental sustainability. Thus, the company will be seen by the public that the company cares about the surrounding environment. Many companies, especially those engaged in the energy sector, always try to maintain environmental stability, because they believe that the company will not develop without the help of the surrounding environment. The company will get a good impression in the eyes of the community because it cares about the environment. In addition, companies that care about the environment will create products that are friendly to the environment.

Hypothesis 2 in this study wants to test the effect of company size (UK) on carbon emission disclosure (CED), the result is that company size (UK) affects carbon emission disclosure. The results of this study support Selviana and Ratmono's research (2019) and Dewi & Kurniawan's research (2020). Companies with larger sizes are considered to produce more pollutants than smaller companies. When the company produces more pollutants, the company will also try to reduce these pollutants, one of which is by disclosing carbon emissions. In addition, the company will also focus on programs that aim to maintain environmental sustainability. This raises high expectations from external parties towards large companies. Another reason is the confidence of the company because the bigger a company is, the better its resources are and the more supportive it is to expand environmental disclosures.

Hypothesis 3 in this study wants to test the effect of environmental performance (KL) on disclosure of carbon emissions (CED), the result is that environmental performance (KL) affects the disclosure of carbon emissions. The results of this study support previous research conducted by Saptiwi (2019) and Hilmi, Puspitawati, and Utari (2020). Companies with low environmental performance do not disclose information to avoid negative exposure, while companies with good environmental performance voluntarily disclose information about their company's performance. Energy companies are one of the companies that contribute the most greenhouse gas emissions in Indonesia. So, it is very necessary to disclose carbon emissions in energy sector companies, because people need real evidence from companies and evidence in the form of reports on company activities. Information disclosed by a company can provide benefits to the company because it increases the company's value.

## CONCLUSION

Based on the data analysis and discussion that has been carried out, it can be concluded that the company's competition variable has no effect on the disclosure of carbon emissions. So that the first hypothesis in this study is not supported. The second hypothesis in this study is supported, namely company size affects the disclosure of carbon emissions. Likewise, the environmental performance variable also affects the disclosure of carbon emissions, so the third hypothesis in this study is supported.

The limitation in this study is the element of subjectivity in determining disclosure points. The determination of these disclosure points can differ from one researcher to another, depending on the researcher's point of view. This is because there is no standardized provision as a reference. The carbon emission measurement points in this study are sourced from Choi, Lee, and Psaros (2013) developed from the Carbon Disclosure Project. These measurements are taken from research conducted abroad, so it could be that the application is not suitable for companies in Indonesia.

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**DECLARATION OF CONFLICTING INTERESTS**
This article is original and has never been published.

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