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Environmental Performance and Carbon Emission Disclosures: A case of Indonesian Manufacturing Companies

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Abstract. Having population more than 250 million, Indonesia is among countries with high carbon emissions. As industry sector of this country contributes significantly to carbon emissions, the Ministry of Environment and Forestry of Indonesia requires companies to implement PROPER—a program to control negative impacts of companies' operations on environment. The objective of study is to identify the impacts of PROPER on carbon emission disclosure. Environmental performance measured by PROPER has five levels *i.e.* black, red, blue, green, and gold. Black is considered the lowest rating with score 1 and gold is the best performance with score of 5. The study employs 18 indicators suggested by Carbon Disclosure Project (CDP) to measure carbon emission disclosure. These indicators are classified into five categories *i.e.* climate change, green house gas, energy consumption, reduction and cost, and accountability of emission carbon. By using purposive sampling, this study collects data from 100 manufacturing companies listed on IDX. On average manufacturing companies earn blue rating with carbon emission disclosure reach the percentage of 21%. PROPER rating positively and significantly affect each category of carbon emission disclosure. The government and related parties need to facilitate these companies to improve their environmental performance and carbon emission disclosure.

1. Introduction

The research shows that carbon emission causes a climate change, earth temperature rise, polar ice melting, and other environmental issues. As a country with population more than 250 million, Indonesia is one country with intensive carbon emission [1]. Many economic activities are inevitably supported with consumption of fossil fuel. There is a tendency that a country's economic growth is positively related to the amount of its carbon emission [2]. Therefore, all countries must participate in reducing carbon emission with any possible strategies. Indonesia has targeted a reduction of its carbon emission at 29% by 2030 [3]. Therefore, the Indonesian Ministry of Environment and Forestry obligates all industrial companies to implement PROPER, a program to reduce companies' negative impacts on the environment and social [4]. Some research has identified the influence of this program on companies' transparency in environmental management. Yanto, Hasan [5] find that environmental performance positively influences Carbon Emission Disclosure (CED). The Carbon Disclosure Project defines 18 indicators of carbon emission disclosure, consisting of climate change (CC), greenhouse gas (GHG), energy consumption (EC), reduction and cost (RD), and accountability of emission carbon (AEC) [6]. Researches on the influence of PROPER on each of CED categories are quite limited. Therefore, this research aims at identifying the influence of PROPER on CED categories.



2. Literature Review

The legitimacy theory is a theory on which a company is based in voluntarily disclosing its social and environmental accountability report [7]. The legitimacy theory states that corporate activities must adjust to the society's concepts, belief values, and social terms [8]. This theory contends that a company needs to inform its purpose in line with that of the society. A company performs environmental disclosure in effort to acquire legitimacy of the community where it is located.

The stakeholder theory explains that a company must be responsible to its stakeholders [9]. In this case, a company must maintain good relationships with its stakeholders by accommodating their desires and needs. One strategy a company may use to maintain a good relationship with its stakeholders is to extensively disclose environmental information. Januarti and Apriyanti [10] also propose that a company needs to consider stakeholders' interest, since corporate operation may influence stakeholders' quality of life.

2.1. PROPER Program

The Indonesian Ministry of Environment and Forestry establishes an acknowledgement rating for corporate environmental performance, namely PROPER—the *Programme* for Environmental Performance Rating—in environmental management since 2002 as an effort to preserve the environment. PROPER is corporate effort in solving or controlling water pollution, air pollution, hazardous and toxic waste (B3) treatment, and community's social-environmental activities. This PROPER's performance assessment system is indicated in color pursuant to performance rating. There are five ratings, namely gold, green, blue, red and black [11]. Gold is rated 5 and the highest rating, and black is rated 1 and the lowest rating.

2.2. Carbon Emission Disclosure

Carbon Emission Disclosure or CED is one example of environmental disclosure which is part of supplement report expressed in Indonesian Financial Accounting Standard (PSAK) No. 1 (revision 2009) paragraph 12. This environmental disclosure covers greenhouse intensity and energy consumption, corporate governance and strategy with regard to climate change, performance in greenhouse gas emission reduction target, risks and opportunities related to climate change impacts [12].

The width of carbon emission item disclosure is measured using the index developed by the Carbon Disclosure Project (CDP). Company which discloses item as specified will be scored 1. This score 1 will be summed up as a whole and divided by the maximum number of disclosed item. Choi, Lee [6] specify 18 CED indicators which fall into the following five categories: (1) Climate Change; (2) Green House Gas; (3) Energy Consumption; (4) Reduction and Cost; and (5) Accountability of Emission Carbon.

Some previous researches find that PROPER positively influences the width of carbon emission disclosure. Dawkins and Fraas [13] find that corporate environmental performance influences corporate climate change disclosure. Meanwhile, Al-Tuwaijri, Christensen [14] state that environmental performance significantly influences environmental disclosure. Yanto, Hasan [5] also find that PROPER significantly influences carbon emission disclosure (CED). However, PROPER's influence on each category of carbon emission is unknown like that developed by Choi, Lee [6].

Climate change is the implication of global warming increasingly felt real by the world society [15]. There are two indicators a company must disclose, namely risks related to climate change and climate change's implications in finance, business, and opportunity [6]. With this disclosure, company will actively participate in climate change mitigation.

Green House Gas (GHG) means gas resulted from earth warming released to the atmosphere to form greenhouse effect [16]. Corporate greenhouse gas emission disclosure consists of methodology used to count greenhouse gas emission, existence of external verification of GHG emission quantity, total greenhouse gas emission generated, GHG emission disclosure by source, GHG emission disclosure by facility or segment level, and comparison of GHG emission between current and previous years.

Energy Consumption (EC) means the amount of energy used by a building on a monthly or annual basis. The counting covers area with air conditioner. EC is a reference for observing the amount of energy conserved by a building. In industrial application, the counting covers the amount of energy used for one unit of product produced [17]. Moreo⁴, Choi, Lee [6] state that a company's energy consumption disclosure may consist of: amount of energy consumed, quantity of energy used from renewable resources, and energy disclosure by type, facility or divisions.

Greenhouse gas may be reduced by ceasing deforestation, forest restoration, and improving forest utilization management. Peatland restoration can be a good strategy for carbon reduction. Indonesia has the biggest potential to gain mitigation benefit from peatland restoration and conversion [18]. Corporate greenhouse gas emission reduction disclosure includes detailed strategy of GHG reduction, specifications of level target and year of GHG emission reduction, emission reduction and cost, and future emission cost taken into consideration in capital budget planning [6].

Accountability is meant to be accountable. An organization or company will be declared accountable if it is able to explain its condition. Carbon emission accountability is the indication of commitment of a company's board of committee or other executive body. They are the ones held responsible for any actions related to climate change and for supervisory activities of corporate advancement in encountering climate change [6].

3. Methodology

This study employs quantitative approach by collecting secondary data from companies' annual reports that published in www.idx.co.id. The population of the study is all manufacturing companies listed on the Indonesia Stock Exchange (IDX) in 2017 reaching the number of 149. To collect data, the study uses purposive sampling—selecting companies by using several criteria. The criteria for selecting samples are follows: (1) the company publishes annual reports on www.idx.co.id in the year of 2017; (2) The company is listed on PRPOER rating in the period of 2017-2018; and (3) The company explicitly or implicitly discloses carbon emission in its annual reports. By using those criteria, this research collects 100 annual financial statements in year of 2017.

There are two main variables of the study *i.e.* PROPER rating and Carbon Emission Disclosure (CED). PROPER is used to measure company's environmental performance while CED is intended to measure carbon emissions reported by Indonesian manufacturing companies. Carbon emission disclosure is taken from the financial statements by employing CDP indicators [6]. The study lists any information from annual reports that meet the CDP indicators. According to Choi, Lee [6] these indicators are classified into five categories *i.e.* (1) Climate Change; (2) Green House Gas; (3) Energy Consumption; (4) Reduction and Cost; and (5) Accountability of Emission Carbon. Meanwhile, the environmental performance is proxied with PROPER rating issued by the Ministry of Environment and Forestry.

⁵ This research employs percentage, correlation and regression descriptive analyses. Percentage analysis is used to identify the extent ³ carbon emission disclosure based on the five categories. This analysis is also used to determine the average rate of environmental performance measured by PROPER rating. The study also uses correlation analysis to understand the association between environmental performance with both CED. This correlation depicts the relationship between two variables without any interference from other variables. Lastly, simple regression is used to identify the impacts of PROPER on CED both in total and categories. Therefore, the study performs six regression analyses *i.e.* one regression analysis is intended to understand the impact of PROPER on CED in total and five regression analyses are used to identify the influence of PROPER on each category of CED. The results of regression analyses are used to test the hypotheses proposed by the study.

4. Research Result

4.1. Descriptive Statistics

This research finds that the average carbon emission disclosure of the 100 manufacturing companies is only 21%. The highest disclosure of is that of Energy Consumption at 38%, followed with Reduction and Cost at 23% and Accountability of Emission Carbon at 18%. Meanwhile, environmental

performance measured by PROPER is scored 3 or Blue. The following Table 1 presents more detailed percentage based on categories and total CED.

Table 1 Carbon Emission Disclosure by Category (100 Companies)

Variable	No of Indicator	No of Disclosed	% Disclosure
Carbon Emission Disclosure (CED)	18	373	21%
Climate Change (CC)	2	20	10%
Green House Gas (GHG)	7	112	16%
Energy Consumption (EC)	3	114	38%
Reduction and Cost (RC)	4	91	23%
Accountability of Emission Carbon (AEC)	2	35	18%

4.2. Regression Analysis

This research employs a simple regression analysis with PROPER rating as an independent variable. This research's dependent variables are CED and its categories, namely CC, GHG, EC, RC, and AEC. The analysis results show that PROPER rating positively influences CED with t value=9.24 ($p<0.01$) and total influence of 47%. The environmental performance also significantly influences each of CED categories. PROPER significantly influences GHG with t value=7.60 ($p<0.01$) and contribution of 36%. PROPER influences CC with t value=7.04 ($p<0.01$) and contribution of 36%. PROPER influences RC at 9% with t value=3.33 ($p<0.001$). For detail, Table 2 below presents the summary of correlation and regression analysis results.

Table 2 The Impacts of PROPER on CED

	Environmental Performance (PROPER)			
	r	F _{reg}	r ²	t
Carbon Emission Disclosure (CED)	0.68**	85.44**	0.47	9.24**
Climate Change (CC)	0.58**	49.57**	0.34	7.04**
Green House Gas (GHG)	0.61**	57.68**	0.36	7.60**
Energy Consumption (EC)	0.36**	14.30**	0.12	3.78**
Reduction and Cost (RC)	0.32**	11.09**	0.09	3.33**
Accountability of Emission Carbon (AEC)	0.39**	17.27**	0.15	4.16**

** Significant at the 0.01 level

5. Discussion

The research results show that manufacturing companies' environmental performance significantly influences CED. This finding supports the research conducted by Al-Tuwaijri, Christensen [14], Dawkins and Fraas [13], Yanto, Hasan [5]. On the other hand, Indonesian industrial companies' environmental performance only reaches score 3 (blue). To improve carbon emission management transparency, manufacturing companies must continuously improve their environmental management. To participate in carbon emission reduction as suggested by Ge, Friedrich [1], the Indonesian Government must facilitate and put pressure on manufacturing companies to improve their environmental performance. Yanto, Hasan [5] state that PROPER is an environmental program to generate environmental information. Therefore, a good implementation of PROPER will generate environmental information to be disclosed the public. This information distribution will give companies future benefits [8, 9].

The percentage descriptive analysis shows that the CED level and disclosure of each of industrial companies' categories are still low. In other words, the companies need to disclosed carbon emission information more to external parties. The analysis results also show that some categories tend to have better disclosure. For example, energy consumption (EC) is a category with data relatively easier to collect, thus it has the best disclosure. These data are only related to energy usage for offices and for production [17]. The carbon emission reduction and cost data [6] are also easily collected, thus it has

more extensive disclosure. Climate change has the low⁷ disclosure. The reason of this is likely that the companies have not further analyzed the risks of climate change and the implications of climate change in corporate finance, business, and opportunity.

PROPER's influence on the disclosure of each category is statistically significant at 1%, but the magnitude of PROPER's influence on the disclosure of each category differs. For example, EC has the highest disclosure at 38%, but PROPER's influence is only 12%. GHG disclosure is 16%, but environmental performance's influence is relatively high at 26%. PROPER's influence on CED is 47%, while the remaining 53% is influenced by other factors. Board of Directors (BoDs) and Board of Commissioners (BoCs) are most likely to have great influence on the disclosure of CED categories. Therefore, further research of the role of BoD and BoC in improvement of environmental performance and CED is needed.

As a country with intensive carbon emission [1], Indonesia must start to intensify its effort to reduce carbon emission with any possible strategies like that suggested by Minnemeyer, Harris [18]. The Government and relevant parties need to utilize environmentally-friendly energy to replace fossil fuel. This way, it will be possible to achieve the carbon emission reduction target at 29% by 2030 [3]. This strategy needs to be implemented considering that a country's economic growth is closely related to its fuel usage [2].

6. Conclusion

Indonesia currently makes a significant contribution to global carbon emission. To mitigate carbon emission growth, the Indonesian Government through the Ministry of Environment and Forestry enforces PROPER aiming at mitigating corporate operation's negative impacts on the environment. This program significantly influences the Indonesian manufacturing companies' carbon emission disclosure. This program also positively influences the disclosure of five categories of carbon emission designated by CDP.

The role of Board of Directors and Board of Commissioners in environmental performance and carbon emission disclosure is likely to be fundamental. The Government, Indonesia Chartered Accountant (IAI), and relevant parties need to affirm, facilitate and put pressure on all manufacturing companies operating in Indonesia to continuously improve their environmental performance. The Government needs to obligate every company to perform CED maximally to have the carbon emission mitigation target achieved by 2030.

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