Carbon accounting and Green House Gas Accounting (GHG): the implementation of green accounting and Corporate Social Responsibility (CSR) in Indonesia

Contabilidade de carbono e contabilidade de Gás da Casa Verde (GCV): a implementação da contabilidade verde e Responsabilidade Social Corporativa (RSC) na Indonésia

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ABSTRACT
Carbon Accounting is the systematic measurement of carbon emissions, subsequently followed by the establishment of a strategy to decrease the emissions. The costs associated with this reduction effort are subsequently measured and reported to the stakeholders of the company. Carbon accounting implementation offers significant advantages for countries, including Indonesia, permitting the government to quantitatively assess and track annual fluctuations in greenhouse gas emissions within the national atmosphere. Companies can incorporate carbon calculations into the framework of their Corporate Social Responsibility (CSR) initiatives, which can yield a favorable outcome for the company. Furthermore, the advantages for society at large encompass the mitigation of air pollution and the generation of innovative employment prospects for local communities.

Keywords: green accounting, carbon accounting, Corporate Social Responsibility (CSR).
RESUMO
A Contabilidade do Carbono é a medição sistemática das emissões de carbono, seguida subsequentemente do estabelecimento de uma estratégia para diminuir as emissões. Os custos associados a este esforço de redução são posteriormente medidos e comunicados às partes interessadas da empresa. A implementação da contabilidade de carbono oferece vantagens significativas para os países, incluindo a Indonésia, permitindo que o governo avalie quantitativamente e acompanhe as flutuações anuais de emissões de gases de efeito estufa na atmosfera nacional. As empresas podem incorporar cálculos de carbono no âmbito de suas iniciativas de Responsabilidade Social Corporativa (RSC), o que pode gerar um resultado favorável para a empresa. Além disso, as vantagens para a sociedade em geral incluem a mitigação da poluição atmosférica e a geração de perspectivas de emprego inovadoras para as comunidades locais.


1 INTRODUCTION
The international concerns related to global warming and climate change have become widespread due to their far-reaching effects across the entire surface of the Earth. At this point, international negotiations have presented several options to mitigate the escalating consequences of climate change. However, the effects of climate change persist, with one notable impact being the steady rise in global average temperature.

The recognition and tangible experience of the consequences of global warming have prompted individuals worldwide to develop concern and consciousness towards their surroundings, as well as explore diverse methods to mitigate ecological degradation (Candra et al., 2023). Environmental consciousness is gradually increasing and evolving worldwide. The signing of the Kyoto Protocol by multiple nations worldwide marked the pinnacle of this process. The Kyoto Protocol serves as an amendment to the United Nations Framework Convention on Climate Change (UNFCCC), an international agreement specifically addressing the matter of global warming.

The main factors contributing to global warming are currently economic activity and human consumption (Ja’far dan Kartikasari, 2009). The protocol requires that governments of ratifying countries, business entities, and consumers must promptly undertake initiatives to adapt their behavior in accordance with a novel economic paradigm, namely the era of environmental economics, as conducted by (Ja’Far and Kartikasari, 2009) namely “Carbonomics”.

The Carbonomics Era has the potential to serve as a catalyst for environmental preservation and addressing the growing concern of global warming. One of the proposals
put forth in the Tokyo protocol is the acknowledgment of a carbon trading scheme (Llisha et al., 2023). The trading model can be defined as follows: Initially, companies establish a contractual agreement (under government regulation) regarding the specific amount of carbon dioxide (CO2) as their products will generate. Companies that generate CO2 emissions below the prescribed threshold are assigned a credit value. Alternatively, in the event that a company surpasses the designated limit for CO2 emissions, they have the option to purchase credits from other companies that have emissions levels below the specified threshold.

Carbon trading implies the rise of carbon cost management, which encompasses the optimization of CO2 emissions in the utilization of resources, labor expenses, factory overheads, environmental overheads, and adherence to carbon accounting standards (Ja'far and Kartikasari, 2009). Carbon cost management represents a contemporary approach that combines the notion of environmentally focused economic transactions, leading to the emergence of carbon accounting and Green House Gas Accounting (GHG). Carbon accounting involves quantifying the carbon emissions generated by industrial processes, determining reduction objectives, implementing systems and initiatives to decrease carbon emissions, and providing information on these advances (Louis et al., 2010). Carbon accounting enables companies to quantify the amount of carbon emissions generated by their operations. This information allows company management to develop and implement strategies aimed at reducing carbon emissions. Additionally, these reductions can be reported to company stakeholders.

The carbon emissions reporting system is utilized to establish a uniform framework for corporations to report their carbon management to stakeholders. By utilizing a standardized carbon emissions report, it is possible to assess a company's carbon efficiency and environmental performance in a standardized and consistent manner. (Shodiq and Febri, 2015, Dwijendra et al., 2023). The implementation of carbon accounting reporting has the potential to elicit a favorable reaction from company stakeholders, ultimately resulting in economic advantages for the company. The company's commitment to the environment and local communities, as evidenced by their carbon accounting reporting, can significantly enhance the company's business operations. (Dwijayanti, 2011).

The emergence of Green accounting, also known as green accounting, originated in Europe during the 1970s. Subsequently, research on green accounting topics gained momentum in the 1980s (Bebbington, 1997: Gray, et al., 1996). This is demonstrated by
the numerous environmental regulations that govern the conduct of the corporate and industrial sectors.

Green accounting is a form of accounting that focuses on how a company integrates environmental benefits and costs into its economic decisions and financial outcomes. Green accounting is the practice of integrating environmental advantages and disadvantages into economic decision making. Green accounting pertains to the collection and analysis of environmental data, as well as the implementation of environmental audit systems. Green accounting primarily aims to tackle socio-environmental issues that hinder the attainment of sustainable development in a nation and shape the conduct of companies involved in social and environmental responsibility matters (Dong et al., 2023). In addition, green accounting serves as a means of ensuring accountability to stakeholders and aligning company initiatives with the overall company objectives.

2 LITERATURE REVIEW
2.1 LEGITIMACY THEORY

The theory of legitimacy has gained significant recognition in the realm of social and environmental accounting, as noted by William Tilling in 2004. Nevertheless, a significant number of researchers who offer valuable insights into corporate voluntary disclosure continue to harbor profound skepticism. Deegan (2002) states that legitimacy theory examines the interactions between companies and society. Legitimacy theory posits that organizations consistently strive to align their activities with the constraints and norms of society. Community legitimacy is a crucial factor for companies to foster future growth and development. This can serve as a means for formulating corporate strategy, particularly in regards to endeavors to establish its position in an increasingly sophisticated society.

Legitimacy theory, as defined above, refers to the deliberate actions taken by a company to establish and uphold its relationships within the broader social context, with the aim of gaining acceptance and approval. The viability of a company, irrespective of its financial prosperity, hinges on its legitimacy. The viability of a company hinges on its capacity to sustain connections with the environment and local community.
2.2 THE THEORY OF STAKEHOLDERS

The concept of Stakeholders theory was initially proposed by R. Edward Freeman in 1984 in his book titled "Strategic Management: A Stakeholder Approach". According to Freeman (2004), companies are not only obligated to maximize shareholder profits, but also have a societal responsibility. In terms of corporate valuation, Stakeholder theory posits that a company is not solely focused on pursuing its own interests, but rather it must also deliver advantages to various stakeholders, including shareholders, creditors, consumers, suppliers, government, society, analysts, and other relevant parties. Therefore, the presence of a company is significantly impacted by the assistance rendered by stakeholders to the company (Ghozali & Chariri, 2007). The stakeholder theory explicitly takes into account the impact of stakeholder group expectations regarding information disclosure policies on company activities. This tool serves as a means for executives to effectively handle the information requirements of various influential stakeholders, such as shareholders, employees, consumer investors, and regulators.

2.3 CARBON ACCOUNTING

Carbon Accounting refers to the process of measuring and quantifying the amount of carbon dioxide and other greenhouse gas emissions produced by an organization or activity. Carbon Accounting is a comprehensive accounting procedure that combines the identification, quantification, recording, consolidation, and communication of financial, social, and environmental data into a single accounting report. This report is beneficial for users to evaluate and make informed economic and non-economic choices, particularly concerning the carbon emissions generated by the company.

Taurisianti & Kurniawati (2016) state that carbon accounting encompasses various fundamental principles, including the calculation and reporting of greenhouse gas emissions by organizations. Carbon accounting involves the documentation of financial reports pertaining to the emission of carbon by a company. This recording enables companies to quantify the amount of carbon emissions derived from the measurement procedure. In order to devise suitable strategies for reducing carbon emissions in the upcoming period and provide a report to company stakeholders, company managers need to take action.

Conclusions can be inferred from the diverse CA definitions provided above. Carbon Accounting (CA) is a systematic approach used to quantify carbon emissions,
develop strategies to mitigate carbon emissions, and document and communicate the associated costs to stakeholders.

2.4 GREEN ACCOUNTING

Green accounting is an academic discipline that examines and evaluates the utilization of resources by companies, specifically those that have a significant influence on the environment (Deegan, 2013). Green accounting refers to the process of incorporating the environmental impacts of an event into financial reports. Green accounting is a method of disclosing a company's environmental impact.

Green accounting research primarily focuses on the utilization of corporate accounts to reveal environmental effects and examine the influence of environmental factors on companies. Multiple prior studies have analyzed the sustainable development framework, as demonstrated by the works of Burritt and Tingey ho!y!oak (2012) and Booth (2018). Additional studies also examine the calculations related to water and carbon (Bowen et al., 2011).

The primary objective of green accounting is to serve as a tool for environmental management and communication with the public. It aims to enhance the quantity and quality of pertinent information available to those who require or can utilize it. This enables them to gain insight into the company's initiatives in addressing environmental pollution and its associated responsibilities, as conveyed through reports. Financial status of the company. Green accounting is a method of documenting a company's activities that are associated with the expenses related to the environment (Carolina and Martusa, 2009).

The subsequent provisions pertain to Green Accounting, specifically:

1. The Environmental Management Law, also known as Law Number 23 of 1997.
   This legislation governs the responsibilities of individuals who engage in or have responsibilities for the preservation, administration, and dissemination of precise and reliable environmental information. Legal ramifications have been established for infractions that result in environmental contamination and devastation.

2. Law Number 25 of 2007 pertains to Capital Investment.
   This legislation mandates that all investors, whether operating as a business entity or as individuals, must fulfill their obligations regarding corporate social responsibility, environmental preservation, and the preservation of cultural traditions within the local community. Failure to comply with these obligations may result in sanctions such as
written warnings, limitations, suspension, and termination of investment activities and/or facilities.

3. Law Number 40 of 2007 which pertains to Limited Liability Companies. This legislation mandates that companies involved in natural resource industries incorporate assessments of social and environmental obligations as justifiable and feasible budgeted expenditures. Non-compliance with this will result in penalties as per relevant laws and regulations.

4. Decree KEP-134/BL/2006, issued by the Chairman of the Capital Markets and Financial Institutions Supervisory Agency, mandates the submission of annual reports by issuers or public companies. This legislation mandates that annual reports, which include Corporate Governance, must provide a detailed account of the actions taken and expenses incurred by the company in fulfilling its social and environmental responsibilities to society.

5. Indonesian Financial Accounting Standards (PSAK) Number 32, which deals with accounting for forestry, and Number 33, which deals with accounting for general mining, are both applicable. These two Public Sector Accounting Standards (PSAK) govern the requirements for companies in the mining sector and owners of *Hak Pengusaha Hutan* (HPH) to include environmental items in their financial reports.

3 METHODS

This study incorporates qualitative research methodology, specifically utilizing literature review or literature study research methods. In this literature review, the author analyzes the concepts and theories explored in existing literature, including textbooks, authoritative websites, theses, and scientific journals.

4 RESULT AND DISCUSSION

4.1 INTRODUCTION TO CARBON ACCOUNTING

The development of carbon accounting was driven by the Kyoto protocol, an amendment to the United Nations Framework Convention on Climate Change (UNFCCC), an international agreement addressing global warming. As stated in a press release by the UN Environment Program, as cited by Widosari (2005), the Kyoto Protocol is a legally binding agreement that requires developed nations to collectively decrease their greenhouse gas emissions by 5.2% compared to 1990
levels. It is worth noting that this target translates to a reduction of 29% when compared to the projected emissions in 2010 without the protocol. The objective is to decrease the mean emissions of six greenhouse gasses, namely carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs, and PFCs, which are calculated as an average over a five-year timeframe spanning from 2008 to 2012. The national targets for greenhouse gas emissions reductions are as follows: 8% for the European Union, 7% for the United States, 6% for Japan, 0% for Russia, and allowable increases of 8% for Australia and 10% for Iceland.

The Kyoto Protocol, which was signed by multiple nations in December 1997 in Kyoto, Japan, has subsequently been signed by several additional countries. Other nations retain the option to endorse or address it at the United Nations Headquarters in New York in March 1999. 39 developed nations pledged to decrease their greenhouse gas (GHG) emissions from 2008 to 2012. Setyaningrum (2015) identifies three regulatory mechanisms in the Kyoto Protocol that exhibit:

1. Collaborative Implementation

   Joint Implementation is a mechanism that allows developed countries (Annex I) to collaborate on projects across borders with the goal of reducing carbon emissions.

2. Carbon Trading

   This is a mechanism facilitating the purchase and sale of emissions allowances among developed nations. Industrialized nations that produce greenhouse gas emissions below the authorized thresholds have the opportunity to trade their emissions allowances with other industrialized nations that are unable to meet their obligations. Nevertheless, while there are restrictions on the emissions that can be advertised, the act of buying emissions still satisfies one’s obligations.

3. The Clean Development Mechanism (CDM)

   The Net Sharing Mechanism is designed to facilitate the achievement of carbon emission reduction targets by developed countries (Annex I), while enabling developing countries (non-Annex I) to implement sustainable development programs. Developed nations can achieve this by allocating resources towards emission reduction initiatives or other programs aimed at mitigating or sequestering greenhouse gas emissions on Earth. Subsequently, the outcomes will appear.
4.2 ADVANTAGES OF CARBON ACCOUNTING FOR A COMPANY IMPLEMENTATION OF CORPORATE SOCIAL RESPONSIBILITY (CSR)

Accurate implementation of carbon accounting calculations can yield benefits for multiple stakeholders. One of them targets companies that have incorporated carbon calculations into their business operations. Carbon calculation is the systematic process of quantifying carbon emissions, devising strategies to mitigate carbon emissions, and documenting and communicating the associated costs to a company's stakeholders.

A company can incorporate its carbon accounting reporting into its corporate social responsibility (CSR) report. Expenditures borne by corporations and other endeavors pertaining to carbon computations can serve as an expression of the company's commitment to curbing carbon emissions, as well as its environmental conscientiousness.

The company's endeavors should be documented in carbon accounting to enable stakeholders to acknowledge and value the company's contribution to environmental conservation. An effective assessment can significantly enhance the company's long-term viability. Carbon accounting is a branch of accounting that encompasses aspects pertaining to carbon in a company's financial statements. Below are several advantages that companies can gain from implementing carbon accounting:

1. Assisting companies in minimizing their carbon emissions.
   Carbon accounting facilitates the reduction of carbon emissions in businesses by furnishing data on a company's emissions and aiding in the optimization of business strategies.

2. Expanding Greenhouse Gas (GHG) Absorption Areas
   Businesses can employ carbon accounting to increase the capacity for greenhouse gas absorption. Implementing this measure can effectively mitigate carbon emissions and ensure the long-term preservation of environmental sustainability.

3. Make a positive impact on the environment
   Carbon accounting aids in the preservation of environmental sustainability by facilitating the reduction of carbon emissions in business.

4. Companies have the option to incorporate carbon accounting reporting either as a voluntary disclosure or as part of their corporate social
responsibility (CSR) efforts. By means of this reporting, stakeholders can evaluate the company's involvement and impact in mitigating carbon emissions.

5. Enhance the reputation of the company. Implementing carbon accounting can enhance companies' reputation as environmentally conscious and sustainable, thereby gaining public trust and support.

4.3. ADVANTAGES OF CARBON ACCOUNTING FOR THE GOVERNMENT

Environmentally conscious accountants conduct carbon footprint calculations. This process entails aggregating the emissions of diverse greenhouse gasses, including carbon dioxide, methane, and hydrofluorocarbons, from different events and organizations throughout a year. These emissions are then converted into units of carbon dioxide equivalent (CO2e). Carbon accounting enables governments to quantify and track variations in the quantity of greenhouse gas emissions discharged into their nation's atmosphere on an annual basis.

The Ministry of Environment and Forestry in Indonesia is currently working on the development of the Indonesian National Carbon Calculation System, with assistance from the National Aerospace Studies Institute. This system is specifically designed as a comprehensive greenhouse gas emissions calculation system to facilitate the measurement, reporting, verification, and implementation of emission reduction or avoidance initiatives in the land sector.

4.4. ADVANTAGES OF CARBON ACCOUNTING FOR SOCIETY

The practice of carbon accounting offers significant advantages to Indonesian society as a whole. The implementation of carbon accounting in industry will lead to a decrease in air pollution levels in major urban areas. By adopting this approach, the quality of air will be enhanced, thereby safeguarding people's well-being. Another advantage that can be derived is the presence of top-notch amenities and infrastructure, particularly in areas beyond the heavily wooded islands. Implementing and developing a robust carbon accounting system would offer a significant benefit for the Indonesian government.

Apart from that, implementing carbon accounting in Indonesia will provide new job opportunities for local communities. The practice of carbon accounting will give rise
to a specialized occupation focused on quantifying carbon emissions. In addition, this can also serve as a chance to fulfill the requirements of accounting experts, specifically carbon accountants in Indonesia. Hence, the implementation of carbon accounting will yield significant advantages for the Indonesian population.

5 CONCLUSION

Carbon accounting is a systematic approach used to quantify carbon emissions, followed by the development of a plan to decrease these emissions. This involves documenting the associated expenses and communicating them to the stakeholders of the company. Implementing carbon accounting yields significant advantages for a nation. Companies, government, and society are the stakeholders who can reap the advantages of implementing accounting. By incorporating carbon accounting into CSR reporting, companies can cultivate a favorable perception among stakeholders, leading to potential economic advantages. Furthermore, carbon accounting on the part of the government can foster collaboration with other developed nations.

As greenhouse gas emissions have gained national importance, accountants who prioritize environmental sustainability are actively participating in this endeavor. Environmentally conscious accountants employ sustainable accounting methods to quantify the carbon footprint generated by an organization through the utilization of carbon accounting techniques. This enables these organizations to acknowledge and comprehend the influence of their activities on the climate and cultivate consciousness and make informed choices to initiate the restriction and potentially reduction of greenhouse gas emissions.
REFERENCES


