Accounting for Air: Carbon Trading Disclosure in Financial Statements

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Abstract. This article aims to present a structured reporting flow of carbon trading as part of green accounting practices within corporate financial statements in Indonesia. Using a descriptive qualitative approach through comprehensive library research, this study synthesizes existing academic literature, applicable accounting standards, and regulatory frameworks governing carbon trading to explain the recognition, measurement, and disclosure of emission rights and obligations. The study finds that carbon absorption capacity can be recognized as an intangible asset under PSAK 19, while revenue from selling carbon credits is treated as non-operating revenue and the purchase of credits is recorded as non-operating expenses in accordance with PSAK 23 and PSAK 32. Beyond descriptive reporting, this article critically evaluates the suitability of existing PSAK standards for carbon-related transactions and identifies regulatory gaps between financial accounting rules and Indonesia's Carbon Economic Value mechanism. The reporting flow presented is expected to provide a conceptual foundation for integrating carbon transactions into corporate financial reporting in a more consistent and transparent manner.

Keywords: Carbon Trading, Green Accounting, Disclosure.

1 Introduction

One sign of the changing times is the rapid pace of the industrial revolution. This is directly proportional to the increase in population growth, which can unknowingly lead to the exploitation of resources and accelerate ecological damage. The increase in extreme weather events and environmental crises poses a serious challenge to global economic development [1]. Today, the environmental crisis has become a crucial issue that is touted as one of the causes of the slowdown in sustainable progress for humanity. According to Li & Zakaria (2024) [2], many countries have promoted carbon emission reduction, and the United Nations Climate Change Conference has developed an important framework to determine emission reduction tasks for each country and global

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temperature control target set by the Kyoto Protocol and the Paris Agreement. In accordance with the Paris Agreement, to achieve the target of net zero emissions by mid-century, companies must immediately formulate policies and implement them in the context of decarbonization [3]. One form of decarbonization is the European carbon emissions trading system, which has a major impact on promoting low-carbon emissions reduction, as this trading system is one of the largest carbon trading markets in the world [4].

When it comes to reducing carbon emissions, carbon emissions trading projects are an important step that can be taken to optimize the allocation of carbon emission resources through the market, provide economic incentives for emission reduction, help achieve emission reductions at an affordable cost, and assist in controlling greenhouse gas (GHG) emissions. According to Ali, et al (2021) [5], over the past four decades, GHG emissions have more than doubled. Indonesia is committed to realizing a low-emission future through the Enhanced Nationally Determined Contribution (ENDC) document, which sets a voluntary GHG emission reduction target of 31.89% to 43.20% compared to Business as Usual (BAU) by 2030. Based on Presidential Regulation No. 98 of 2021 concerning the Implementation of Carbon Economic Value for the Achievement of Nationally Determined Contribution Targets and Greenhouse Gas Emission Control in National Development [6], Minister of Environment and Forestry Regulation No. 21 of 2022 concerning the Implementation of Carbon Economic Value [7], and Financial Services Authority Regulation No. 14 of 2023 concerning Carbon Trading through the Carbon Exchange [8], the buying and selling of Carbon Units through market mechanisms is carried out in an effort to reduce GHG emissions.

Companies with excess carbon emissions can purchase carbon credits from companies that produce very little carbon emissions or from companies that are able to absorb carbon emissions, which are listed on the Carbon Exchange. For companies that purchase carbon credits, the implementation of a carbon emissions trading mechanism by the government changes the behavior of companies whose emissions were initially free of charge to become an operational cost. This is directly proportional to companies that can sell their carbon credits. According to Angi (2024) [9], the surplus from potential carbon absorption can be recognized as Non-Operating Revenue with recording and disclosure following the provisions of PSAK 23 (2010) or PSAK 32 (2007). The existence of tradable carbon emission rights has caused significant changes in the world of accounting.

Although research on carbon trading has developed, the integration of the concept of carbon trading into Indonesian financial reporting still shows practical gaps. Until now, PSAK does not have specific standards regarding carbon accounting, so companies use interpretations of PSAK 19, PSAK 23, PSAK 32, and PSAK 57. This condition gives rise to inconsistencies. This article offers a novelty in the form of a systematic mapping of the carbon trading reporting flow in financial statements prepared based on applicable standards and regulations, which can serve as the basis for the preparation of national carbon accounting guidelines.

2 Methods

This study uses a descriptive qualitative approach that aims to provide an in-depth understanding of carbon trading reporting practices in the context of green accounting. Data was obtained through a literature review of scientific literature, PSAK 19, PSAK 23, PSAK 32, PSAK 57, Perpres 98/2021, Permen LHK 21/2022, and POJK 14/2023. The analysis was conducted through concept tracing, regulatory comparison, and the formulation of carbon reporting flow mapping.

3 Results and Discussion

3.1 Stakeholder Theory

The stakeholder theory introduced by Freeman (1984) in Vaio, et al (2023) [10] defines stakeholders as an important group for companies, which includes shareholders and other parties who can influence the company's objectives. Furthermore, Preston (1990) in Vaio, et al (2023) [10], states that shareholders, employees, customers, and the community are the main stakeholders. From these two statements, it can be concluded that stakeholder theory is a concept that provides reasoning about individuals and groups who provide feedback on important information regarding company activities between interested parties. Companies that disclose carbon emissions and green accounting can be assumed to have adopted stakeholder theory, whereby through disclosure and sustainable environmental management, the company has exercised transparency by sharing relevant information as a form of accountability to the environment to interested parties, including the community and investors.

3.2 Green Accounting

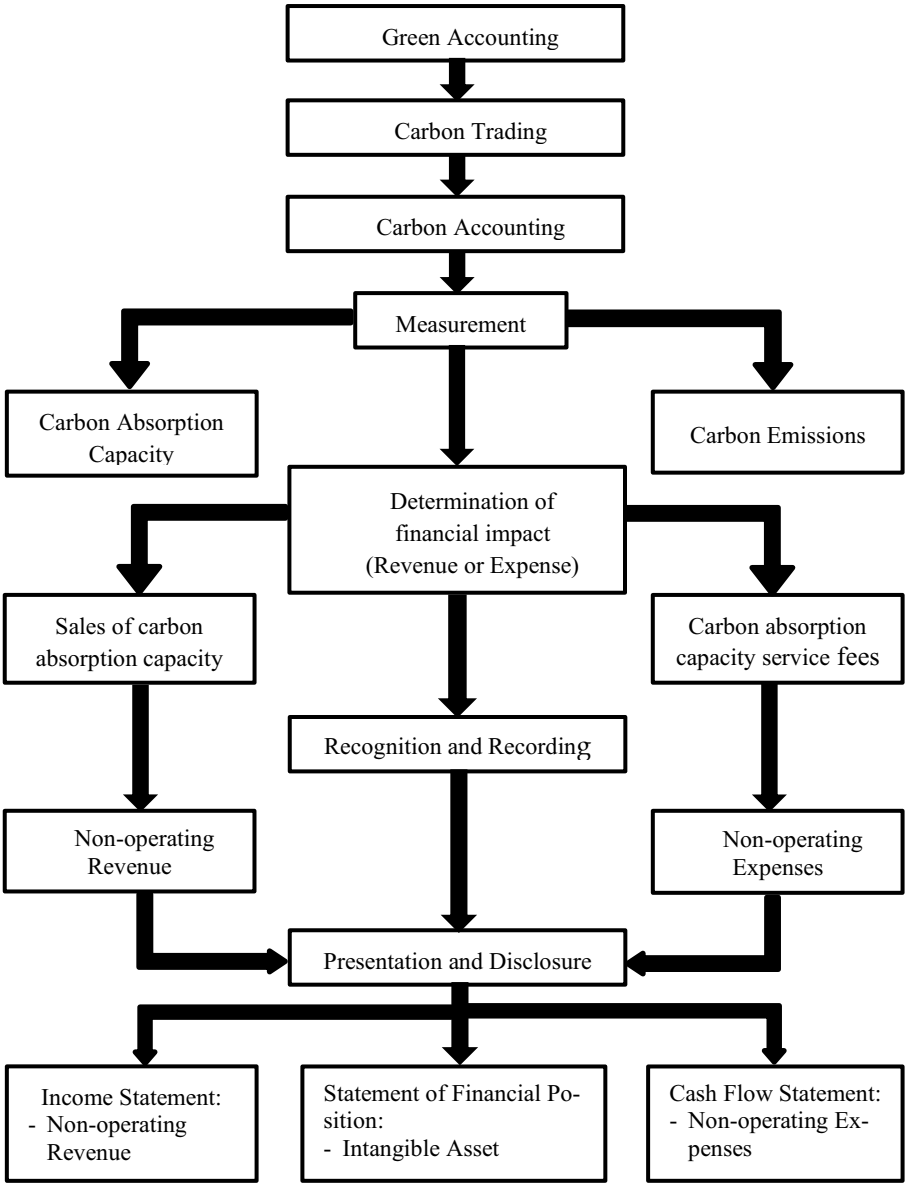
Green accounting is one of the effective tools used to measure a company's sustainability performance. Green accounting, also known as environmental accounting, is a term related to steps that can be taken to add environmental costs to the application of accounting concepts and procedures in companies and non-profit organizations [11]. According to Angi (2024) [9], green accounting aims to connect environmental sustainability principles to accounting records.

According to Khan & Gupta (2023) [12], the United States Environmental Protection Agency categorizes green accounting into three parts, namely environmental financial accounting, environmental management accounting, and national income accounting. Environmental financial accounting is an accounting system related to reporting information about environmental assets, costs, and liabilities in financial reports intended for stakeholders or interested parties for decision making. Environmental management accounting is the process of identifying and measuring environmental costs, where this information will be used by internal management for policy development and strategic planning. Meanwhile, national income accounting is an accounting system that focuses

on natural resources, which includes information on the use and assessment of renewable natural resources of a country or region.
Iksan (2008) in Wardana (2024) [13] states that there are two functions of green accounting, namely the internal function related to internal parties within the company, where leaders are responsible for making decisions to analyze effective and efficient environmental maintenance costs. The other is an external function related to financial reporting, where companies are considered responsible for disclosing the output of environmental maintenance activities in the form of accounting data.

3.3 Mapping the Carbon Trading Reporting Process

The carbon trading reporting flowchart is designed to illustrate the relationship between the processes of emissions measurement, accounting recognition, and presentation in financial statements. The first stage begins with the process of measuring carbon emissions and carbon absorption capacity, which is carried out through a verification mechanism in accordance with the provisions of the Ministry of Environment and Forestry (KLHK). The results of these measurements form the basis for determining whether an entity has a surplus or deficit of tradable emissions.
In the next stage, recognition and recording are carried out. Entities that have a surplus of carbon absorption capacity can recognize this potential as an Intangible Asset in accordance with PSAK 19, because emission rights meet the characteristics of an identifiable asset even though they are not physically tangible. Conversely, entities that purchase carbon credits record them as Non-Operating Expenses in accordance with PSAK 23 or PSAK 32, because the transaction is carried out to fulfill environmental compliance obligations and is not a primary operational activity.
The third stage involves recognizing revenue or expenses. When an entity sells carbon credits, the revenue received is recorded as Non-Operating Revenue, while entities that purchase carbon credits recognize the expenditure as a non-operating expense. In the final stage, all transactions related to carbon emissions are presented and disclosed in the financial statements. Carbon assets are recorded in the Statement of Financial Position, revenue and expenses are recorded in the Income Statement, while cash flows related to carbon transactions are presented in the Cash Flow Statement according to the nature of the transaction. This chart provides a comprehensive conceptual framework for how companies can record and report carbon trading activities transparently and in accordance with applicable accounting standards.



Carbon Trading Reporting Flowchart
Source: Author

3.4 Carbon Trading

According to POJK 14/2023 [8], carbon trading is a market-based mechanism carried out to reduce GHG emissions through the buying and selling of carbon units on a carbon exchange. Carbon trading is the buying and selling of carbon credits, whereby

companies with excess carbon emissions can purchase carbon credits from companies that produce very little carbon emissions or from companies that are able to absorb carbon emissions (companies with green projects). Through carbon trading, governments can monitor the amount of carbon emissions produced by their countries in an organized manner and help monitor the amount of carbon emissions circulating in the atmosphere.

3.5 Carbon Accounting

Carbon accounting has different meanings for each individual. According to Revellino (2020) [14], carbon accounting is often described as accounting for emissions. For scientists, carbon accounting is an activity carried out to measure GHG emissions accurately and scientifically. Meanwhile, for the International Accounting Standards Board, carbon accounting refers to accounting related to rights and obligations for emissions traded in emissions trading. According to Gibassier, et al. (2020) [15], carbon accounting is a tool used to instill strategies in companies to effectively implement low-carbon actions through a consolidation process into specific tools. Carbon accounting specifically provides an understanding of climate change issues through metric calculations and through regulatory standards and tools designed to estimate a company's emissions [16]. According to Johnson, et al (2024) [3], the main objective of carbon accounting is to assess a company's impact on the environment and measure the value of its carbon emissions, both as assets and liabilities, as well as to provide information needed by internal and external parties.

In terms of carbon accounting implementation, Danone, a French multinational company engaged in the consumer goods sector, has implemented a carbon accounting system in its corporate management. According to Gibassier & Schaltegger (2015) [17], the carbon accounting system implemented by Danone's management consists of two accounting approaches, namely product carbon accounting, which is used to collect all product-related data and combine carbon emissions for each country business unit based on sales, and location-based carbon accounting, which is used to collect all location-specific data and combine carbon emissions according to country business units.

Carbon accounting is useful in helping companies monitor their progress in reducing their carbon footprint. Carbon accounting is designed as a system used to collect, process, and evaluate data related to carbon emissions through accounting methods and procedures to support decision-making by stakeholders [18]. This is why carbon accounting plays an important role in sustainability practices, where carbon accounting provides such information through analysis and disclosure in financial reports [19].

The development of the concept of carbon accounting shows differences in approach between countries and accounting standards bodies. In international practice, the International Accounting Standards Board once issued IFRIC 3 Emission Rights. However, this interpretation was later withdrawn because it was deemed to cause profit volatility due to inconsistencies between the accounting treatment of emission assets and emission control obligations. The withdrawal of IFRIC 3 shows that the recording of carbon emission rights and obligations has structural challenges and has not yet found an ideal standard that is globally agreed upon.

In Indonesia, the absence of specific standards on carbon accounting means that entities use a variety of existing standards, such as PSAK 19 for intangible assets, PSAK 23 for revenue, PSAK 32 for expenses, and PSAK 57 for environmental provisions. Although the use of these standards is still permitted, this approach is interpretative rather than normative, thus potentially creating inconsistencies between companies. In addition, the characteristics of carbon credits as tradable instruments raise the debate of whether they are more appropriately recognized as intangible assets, inventories, or even financial instruments. Therefore, further study is needed to formulate carbon accounting standards that are in line with Indonesia's Carbon Economic Value regulations and global carbon market practices.

3.6 Carbon Trading Disclosure in Financial Statements

In order to achieve sustainable economic and social development balanced with climate risk management, policies promoting energy conservation and low-carbon structures are needed. According to Shen, et al. (2020) [20], among the many government policies that have been created to regulate carbon dioxide emission reduction methods, the carbon pricing mechanism is a solution that can be implemented through carbon trading and carbon taxation. In their study, Shen, et al. (2020) [20] stated that carbon taxation is difficult to implement due to various obstacles. Therefore, carbon trading mechanisms are currently more popular.

Speaking of carbon trading mechanisms, according to Li & Zakaria (2024) [2], based on the accounting approach regarding the initial recognition of emission rights, most emission-producing entities do not take into account the acquisition of emission allocations granted. From the results of the investigation, three views emerged regarding the initial recognition of purchased allocations, namely intangible assets, inventories, and costs or expenses. From the results of Li & Zakaria's (2024) [2] study in China, it was previously stated that there were five companies that declared purchased carbon emission rights as intangible assets, because carbon emission rights do not have a physical form but can be identified. There was one emitting company that recognized carbon emission rights as inventory, and there were seven emitting companies that chose to recognize purchased carbon emission rights as costs or expenses. However, based on this study, it was also found that only a few companies disclose carbon trading information in their financial statements or notes to financial statements specifically. Some companies disclose information focused on corporate governance and environmental and social responsibility in their annual reports, while neglecting to disclose carbon trading or emissions control, which are only briefly explained and not supported by quantitative data. There are also some companies that choose not to disclose their carbon emissions because they are considered part of company secrets.

From the results of a study conducted by Angi (2024) [9] on Consumer Non-Cyclical Sector Companies in Indonesia, it is stated that the recording and disclosure of carbon absorption capacity ownership is recognized as an intangible asset as stipulated in PSAK 19 of 2010 and PSAK 57 of 2009. The costs incurred by companies related to environmental aspects are recognized as non-operating expenses or environmental and social expenses in accordance with the provisions of PSAK 23 (2010) and PSAK 32

(2007). Meanwhile, income derived from surplus carbon absorption potential is recognized as non-operating revenue, as referred to in PSAK 23 (2010) and PSAK 32 (2007). In addition, companies that have calculated the estimated costs of environmental services since the beginning of the period can recognize them as provisions, as stipulated in PSAK 57 (2009).

However, carbon trading disclosures in financial reports still face considerable challenges. Studies in various countries show that some companies do not disclose detailed information related to emission rights and carbon trading activities because they consider it to be confidential strategic information. In addition, some entities only include disclosures related to corporate social responsibility (CSR) without presenting quantitative data on their emission rights and obligations. Similar findings have also been observed in Indonesia, where companies still show significant variation in their disclosure of carbon transactions.

The gap between environmental regulations and financial reporting standards exacerbates this inconsistency. National regulations such as Presidential Regulation No. 98 of 2021 promote transparency on carbon activities, but PSAK does not yet provide explicit guidelines on how carbon credits should be disclosed in financial reports. This situation has led companies to adopt different accounting approaches. Therefore, harmonization between environmental policies and accounting standards is needed so that carbon trading disclosures are more focused, comparable, and meet the information needs of investors, regulators, and the general public.

Beyond its technical implications, the mapping of the carbon trading reporting process proposed in this study contributes to the development of green accounting by providing a structured framework for integrating carbon trading activities into financial reporting. This framework demonstrates how environmental externalities arising from carbon trading can be recognized and presented within conventional accounting systems. From a stakeholder theory perspective, the proposed reporting process enhances transparency and accountability by enabling stakeholders to better understand how firms recognize, measure, and report carbon-related assets, costs, and revenues. Consequently, financial reporting functions not only as a compliance mechanism but also as an important communication tool between firms and their stakeholders in addressing climate-related responsibilities.

Moreover, this study extends existing discussions on carbon accounting by aligning regulatory requirements with accounting practices through a coherent reporting logic. Previous studies have largely focused on emission measurement or voluntary sustainability disclosures, whereas this research emphasizes the accounting treatment and financial statement implications of carbon trading transactions. By operationalizing green accounting principles within the existing PSAK framework, the proposed reporting process offers a practical reference for entities operating in jurisdictions where specific carbon accounting standards have not yet been established. This contribution is particularly relevant for developing economies, including Indonesia, where carbon market regulations and accounting practices are still in the process of development.

4 Conclusion

This article contributes by systematically mapping the carbon trading reporting flow as part of the application of green accounting in financial statements. Based on the results of the study, it is known that carbon absorption can be recognized as an intangible asset, while carbon credit sales are recognized as non-operating revenue and carbon credit purchases are recorded as non-operating expenses. Although existing PSAK can be used as a basis for recognition, its use is still interpretive because there are no specific standards governing carbon accounting. These findings indicate the need for more comprehensive accounting guidelines to improve the consistency and transparency of carbon reporting in Indonesia.

The implications of this study are that companies need more consistent internal accounting policies so that carbon transactions can be reported reliably and comparably. For regulators, this mapping model can serve as a basis for developing national carbon accounting standards and strengthening the literature on sustainability accounting in Indonesia.

Recommendations for further research include conducting empirical studies of companies that have participated in carbon trading through the Indonesia Carbon Exchange to see how accounting treatments are applied in practice. In addition, cross-country comparisons of carbon reporting standards are needed to identify best practices that Indonesia can adopt. Future research could also explore the potential for developing carbon accounting standards as part of PSAK reform to support the transition to a low-carbon economy.

5 Limitations and Future Research

This study has several limitations. First, the analysis is based on a conceptual approach using literature review and regulatory analysis, without empirical evidence from companies involved in carbon trading. Therefore, the findings mainly reflect a conceptual and regulatory perspective rather than actual accounting practices applied by firms. Second, the absence of a specific carbon accounting standard within the current PSAK framework limits the evaluation of consistency in accounting treatments among companies. As a result, the proposed reporting process should be viewed as a conceptual reference, not as a binding accounting standard.

Future research may address these limitations by examining companies that participate in Indonesia's carbon market to understand how carbon trading transactions are recognized, measured, and disclosed in practice. Comparative studies across countries with more established carbon accounting practices may also provide useful insights for developing accounting guidance. In addition, future studies could focus on the development of a specific carbon accounting standard that aligns environmental regulations with financial reporting requirements to improve consistency and transparency.

References

[1] Y. Sun, Y. Wei, and Y. Wang, "Do Green Economy Stocks Matter for the Carbon and Energy Markets? Evidence of Connectedness Effects and Hedging Strategies," *China Finance Review International*, Nov. 2024, doi: 10.1108/CFRI-05-2024-0229.

[2] S. Li and Z. Zakaria, "The Phenomenon of China's Carbon Accounting Policies and Practices," *Journal of Accounting and Organizational Change*, 2024, doi: 10.1108/JAOC-03-2024-0094.

[3] M. P. Johnson, J. Strobel, and G. Trencher, "Between the Lines: Linking Carbon Management to Carbon Accounting Actions in the Pursuit of Corporate Decarbonization," *Accounting, Auditing and Accountability Journal*, 2024, doi: 10.1108/AAAJ-01-2024-6822.

[4] S. Hu, D. Li, and X. Wang, "Study on the Influence of Carbon Trading Pilot Policy on Energy Efficiency in Power Industry," *Int. J. Clim. Chang. Strateg. Manag.*, vol. 15, no. 2, pp. 159–175, Apr. 2023, doi: 10.1108/IJCCSM-04-2022-0046.

[5] E. B. Ali, V. P. Anufriev, and B. Amfo, "Green Economy Implementation in Ghana as a Road Map for a Sustainable Development Drive: a Review," *Sci. Afr.*, vol. 12, Jul. 2021, doi: 10.1016/j.sciaf.2021.e00756.

[6] Perpres, *Peraturan Presiden Nomor 98 Tahun 2021 tentang Penyelenggaraan Nilai Ekonomi Karbon untuk Pencapaian Target Kontribusi yang Ditetapkan Secara Nasional dan Pengendalian Emisi Gas Rumah Kaca dalam Pembangunan Nasional*. 2021.

[7] PermenLHK, *Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor 21 Tahun 2022 tentang Tata Laksana Penerapan Nilai Ekonomi Karbon*. 2022.

[8] POJK, *Peraturan Otoritas Jasa Keuangan Nomor 14 Tahun 2023 tentang Perdagangan Karbon melalui Bursa Karbon*. 2023.

[9] Y. Febiani Angi, "Perlakuan Akuntansi Karbon pada Perusahaan Sektor Consumer Non Cyclicals di Indonesia." *Jurnal Akuntansi: Transparansi dan Akuntabilitas*, vol. 12, no. 2, pp. 88-98.

[10] A. Di Vaio, L. Varriale, M. Lekakou, and M. Pozzoli, "SDGs Disclosure: Evidence from Cruise Corporations' Sustainability Reporting," *Corporate Governance (Bingley)*, vol. 23, no. 4, pp. 845–866, Apr. 2023, doi: 10.1108/CG-04-2022-0174.

[11] M. Meliana Taurisianti and E. Penti Kurniawati, "Perlakuan Akuntansi Karbon di Indonesia," *Jurnal Ekonomi dan Bisnis*, vol. 17, no. 2, pp. 81–105, 2014.

[12] S. Khan and S. Gupta, "Using a Hermeneutic Phenomenological Approach to Twitter Content: A Social Network's Analysis Of Green Accounting As A Dimension of Sustainability," *Qualitative Research in Financial Markets*, vol. 15, no. 4, pp. 672–692, Jul. 2023, doi: 10.1108/QRFM-02-2022-0031.

[13] A. Ghufron Al Majid Wardana, "Akuntansi Lingkungan dalam Teori dan Praktek," *Jurnal Akuntansi, Keuangan, Perpajakan dan Tata Kelola (JAKPT)*, vol. 1, no. 3, pp. 40-44, 2024.

[14] S. Revellino, "Ac-Counting for Carbon Emissions: Simulating Absence Through Experimental Sites of Material Politics," *Sustainability Accounting, Management and Policy Journal*, vol. 11, no. 3, pp. 613–640, Apr. 2020, doi: 10.1108/SAMPJ-04-2017-0033.

[15] D. Gibassier, G. Michelon, and M. Cartel, "The Future of Carbon Accounting Research: 'We've Pissed Mother Nature Off, Big Time,'" Apr. 23, 2020, *Emerald Group Holdings Ltd.* doi: 10.1108/SAMPJ-02-2020-0028.

[16] M. Le Breton and F. Aggeri, "The Emergence of Carbon Accounting: How Instruments and Dispositifs Interact in New Practice Creation," *Sustainability Accounting, Management and Policy Journal*, vol. 11, no. 3, pp. 505–522, Apr. 2020, doi: 10.1108/SAMPJ-09-2017-0111.

[17] D. Gibassier and S. Schaltegger, "Carbon Management Accounting and Reporting in Practice: a Case Study on Converging Emergent Approaches," *Sustainability Accounting, Management and Policy Journal*, vol. 6, no. 3, pp. 340–365, Sep. 2015, doi: 10.1108/SAMPJ-02-2015-0014.

[18] A. Di Vaio, A. Zaffar, and M. Chhabra, "Intellectual Capital Through Decarbonization for Achieving Sustainable Development Goal 8: a Systematic Literature Review and Future Research Directions," *Journal of Intellectual Capital*, vol. 25, no. 7, pp. 54–86, 2024, doi: 10.1108/JIC-05-2024-0131.

[19] L. Gheyathaldin Salih, "Decarbonization and the Obstacles to Carbon Credit Accounting Disclosure in Financial Statement Reports: the Case of UAE," *Asian Journal of Accounting Research*, vol. 9, no. 2, pp. 169–180, Apr. 2024, doi: 10.1108/AJAR-04-2023-0128.

[20] N. Shen, Y. Zhao, and R. Deng, "A Review of Carbon Trading Based on an Evolutionary Perspective," Dec. 09, 2020, *Emerald Group Holdings Ltd.* doi: 10.1108/IJCCSM-11-2019-0066.

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