

# Implementation of Green Accounting and Carbon Emission Disclosure in Indonesia

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**Abstract.** Environmental problems that are currently the main issue are climate change and global warming. This is the reason why companies must implement *Green Accounting and Carbon Emission Disclosure* practices in company operations. This research aims to analyze the implementation of *Green Accounting and Carbon Emission Disclosure* in companies in Indonesia. The method used in the research is qualitative using literature review techniques. The research results reveal that the implementation of *Green Accounting* and disclosure of *Carbon Emission Disclosure* in Indonesia is still not optimal. *Green Accounting and Carbon Emission Disclosure* in Indonesia are still voluntary. So this research provides recommendations to strengthen regulations, increase human resource capacity, and provide incentives for companies to implement *Green Accounting and Carbon Emission Disclosure* practices. Thus, accounting has an important role in helping to realize the 13th *Sustainable Development Goals* (TPB/SDGS), which is a hot issue that is of concern to many parties.

**Keywords:** Green Accounting, Carbon Emission Disclosure

## 1. Introduction

*Sustainable Development Goals* (SDGS) is a plan for designing sustainable world development which has been approved by world leaders as a global development agreement. In 2015 the *Millennium Development Goals* (MDGS) ended and was continued with the SDGS agenda which has 17 goals and 169 targets with the hope of being achieved by 2030. One of the goals to be achieved is regarding handling climate change which is the 13th goal. and calls for action that must be implemented immediately on the grounds that the impacts that have occurred have been felt by every country.

Starting in 1800, humans caused environmental damage which became the main factor resulting in climate change in the world. There are several things that cause high temperature increases

resulting from business operational activities, such as burning fossil fuels (oil, gas, coal). In addition, the main sources of carbon emissions are caused by the use of waste, energy, forestry, agriculture and land use activities [1]. With the development of industry, the requirements that companies must fulfill in terms of caring for the environment are increasing, so that the company's main focus today is no longer just on financial profits, but also on caring for the environment and the welfare of the surrounding community. [2].

The accounting profession has a role in efforts to realize SDGs, especially in the economic sphere. Accountants can be a guide to how countries and business entities create value at various scales [3]. Things that can be used as guidelines regarding contributions that can be made in dealing with environmental problems in the field of accounting are by analyzing the impacts that occur on companies after implementing *Green Accounting and Carbon Emission Disclosure* [4].

*Green Accounting* is a design in which the accounting department does not only deal with incoming and outgoing financial objects and transactions, but is an accounting process that identifies, calculates, records and reports financial, social and environmental transactions in one accounting report [5].

*Carbon Emission Disclosure* or carbon emission disclosure is a company's effort to reduce greenhouse gas emissions (including carbon emissions) in order to maintain sustainability. Disclosure of carbon emissions to a company provides information not only about the amount of carbon emissions, but also about plans for reducing the company's carbon emissions. Good companies can be recognized by the fact that their activities produce less carbon dioxide, and the decrease is getting smaller every year. Reducing carbon emissions is a very effective way that companies can plan to protect the environment [6].

Research on *Green Accounting* that has been carried out includes [7] and [8] explained that the implementation of *Green Accounting* affects company value. Apart from that, research on *Carbon Emission Disclosure* was carried out by [9] and [10], also concluded that *Carbon Emission Disclosure* has an effect on company value. Most studies only aim to test whether *Green Accounting and Carbon Emission Disclosure* affect company value or other metrics. Therefore, this research aims to find out further information through a qualitative approach regarding how to implement *Green Accounting and Carbon Emission Disclosure* in companies in Indonesia, whether it is optimal or not.

## **2. Literature Review**

### **2.1 Green Accounting**

*Green accounting* is an accounting stage that identifies, calculates, records and reports financial, social and environmental transactions optimally, integrated and appropriately so that they can

be utilized by stakeholders in decision making and economic and non-economic management [5].

*Green accounting* or environmental accounting has the meaning of a transaction in identifying, prioritizing, qualifying and incorporating environmental costs into business decisions included in company reports [4].

Thus, conclusions can be drawn regarding *green accounting*, namely a type of accounting that provides information related to financial, social and environmental accounting that is complete and can be used in making decisions.

## **2.2 Carbon Emission Disclosure**

According to Choi et al *Carbon Emission Disclosure* is a voluntary disclosure of carbon emissions formed from a company's production activities [11].

*Carbon Emission Disclosure* is a report regulated in limited liability company law no. 40 of 2007 article 66C which requires companies to report social and environmental responsibility activities in their annual reports [12].

*Carbon Emission Disclosure* is voluntary on the basis of preparation in Indonesia is the Global Reporting Initiative (GRI) standard 305 (2016) related to emissions and is part of the sustainability report or annual report [13].

So, it can be concluded that *Carbon Emission Disclosure* is a disclosure to assess carbon emissions resulting from a company's voluntary production process.

## **3. Research Method**

The method used in this research is qualitative using literature review techniques. Qualitative is a method used in research with natural object conditions with the main instrument being the researcher with a philosophical basis of postpositivism [14]. Meanwhile, literature review is a method of collecting data whose sources come from various types of articles, journals, and books.

## **4. Result and Discussion**

### **4.1 The Role of Accounting in Realizing Sustainable Development Goals (SDGs)**

*Sustainable Development Goals* (SDGs) is a world development agenda that has a series of goals set to achieve a better and more sustainable life. Climate change is one of the environmental

issues that is of concern to all parties, so that handling climate change is one of the goals of the world development agenda to be achieved by 2030. On 31 October 2021 - 12 November 2021, a Climate Change Conference was held organized by the UN or known as COP26 in Glasgow, Scotland. The peak of COP26 activities took place on November 1-2 when world leaders met and gathered to express their commitment to tackling climate change. Indonesia's 7th President was also present at this important moment to show his seriousness in dealing with the issue of climate change.

The role of accounting that can be carried out in dealing with environmental problems and as a step to realizing *Sustainable Development Goals* is by analyzing the impact that occurs on the company after implementing *Green Accounting* and *Carbon Emission Disclosure* [4].

*Green Accounting* is a design where the accounting department does not only deal with incoming and outgoing financial objects and transactions, but is an accounting process that identifies, calculates, records and reports financial, social and environmental transactions in one accounting report [5].

*Carbon Emission Disclosure* is a company's effort to reduce greenhouse gas emissions (including carbon emissions) in order to maintain sustainability. Disclosure of carbon emissions in companies provides information not only about the amount of carbon emissions, but also about plans related to reducing the company's carbon emissions. Good companies can be recognized by the fact that their activities produce less carbon dioxide, and the decrease is getting smaller every year. Reducing carbon emissions is a very effective way that companies can plan to protect the environment [6].

#### **4.2 Implementation of Green Accounting and Carbon Emission Disclosure in Companies in Indonesia**

*Green Accounting* is a form of accountability reporting related to the company's commitment to the importance of preserving and protecting the environment so that the company can continue to operate [15]. The implementation of *Green Accounting* in Indonesia has not been effective because there are still many companies that do not pay attention to the environmental impacts that arise from their business operations. This is because the implementation of *Green Accounting* in Indonesia is still voluntary [16]. Besides that, the implementation of *Green Accounting* is still not effective due to the lack of information for stakeholders and there are concerns about additional costs from the impact of implementation which are recognized as expenses that cannot be included in the report [2].

As an effort to measure the amount of carbon dioxide (CO<sub>2</sub>) in the atmosphere which has a negative impact originating from business activities, in the field of accounting there is a *Carbon Emission Disclosure* which is part of Carbon Accounting. *Carbon Emission Disclosure* is a contribution to environmental issues, one of which is global warming which is usually disclosed

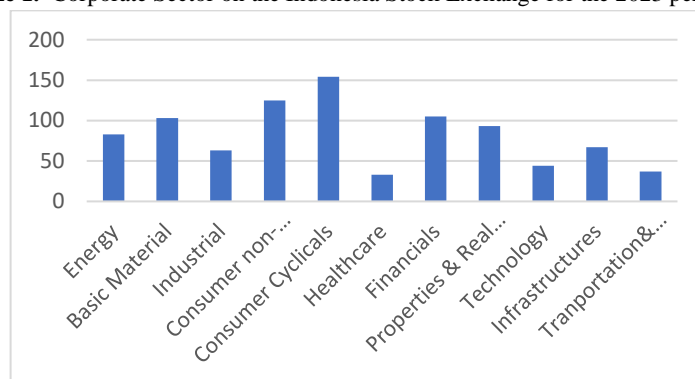
through company annual reports or sustainability reports [17]. Reporting carbon emissions to stakeholders as part of climate change accountability is important for all economic actors.

In efforts to reduce carbon emissions, developing countries, including Indonesia, do not have obligations, because it is voluntary. However, the role of developing countries is very necessary to achieve these goals, one of which is the UNFCCC goal. Developing countries become a link between developed countries that will invest in developing countries that will form various sectors that can reduce carbon emissions.

Increasing company value is the focus of activities carried out in profit-oriented companies and will indirectly result in business competition. This often results in negligence of responsibility towards the environment [18].

Company Value is a description of the condition of a company based on company performance and public assessment of various factors regarding the company [19]. Company value is one of the goals of establishing a company because it is an assessment and evaluation indicator for stakeholders to make investment decisions. So maintaining the stability of company value is very important to do. The following is a list of company sectors on the Indonesian Stock Exchange in 2023.

**Table 1.** Corporate Sector on the Indonesia Stock Exchange for the 2023 period.



Source: Processed

Company activities in various sectors are one of the factors causing environmental problems, including climate change. Therefore, implementing *Green Accounting* and *Carbon Emission Disclosure* in various company sectors is a solution that can be implemented. *Green Accounting* reporting in companies can help stakeholders in making decisions by seeing the extent of the company's sustainable development [20]. Apart from that, the company's concern for *Carbon Emission Disclosure* is another factor in increasing company value because the issue of climate change has become a global issue [21].

Companies in the energy sector are companies that are closely related to environmental activities, so the application of green accounting and carbon emission disclosure should be implemented in company reports. The *Sustainability Report* is an important instrument in ESG reporting for Indonesian companies which describes the company's strategy in responding to climate risks, stakeholder involvement and better ESG performance. So, the implementation of *Green Accounting* and *Carbon Emission Disclosure* in Indonesian companies can be seen from the *Sustainability Report*.

**Table 2.** Energy Companies Listed on the Indonesia Stock Exchange for the 2023 period.

	Exist	Not
Sustainability Report	56 Companies	27 Companies
The Company's efforts to reduce emissions	50 Companies	33 Companies
Emissions Disclosure and Measurement	42 Companies	41 Companies

Source: Processed

*Carbon emission disclosure* in Indonesia is voluntary. Based on data on energy companies listed on the Indonesian Stock Exchange, 42 companies out of a total of 83 companies have met the criteria. So the implementation is still said to be unstable or not optimal.

Perusahaan Gas Negara Tbk is one of the companies in the Indonesian energy sector that can be used as an example, supported by concrete evidence for the period studied in 2023, namely: Has reported a Sustainable Report, in the company performance rating assessment program (PROPER) Perusahaan Gas Negara Tbk together with its subsidiaries The company received 3 Gold PROPERs and 6 Green PROPERs, apart from receiving various awards related to sustainability, one of which was the 2023 Corporate Emission Transparency Award by B-Universe.

With the implementation of *Green Accounting* and *Carbon Emission Disclosure* in various company sectors, it is hoped that it can reduce various impacts that can arise, such as reducing *Green House Gases* (GHG) which are the cause of global warming and ultimately result in climate change. Also, by implementing *Carbon Emission Disclosure* it is possible to restore damaged deforested forests, because the function of forests has a large role in absorbing greenhouse gases. As stated by the *World Meteorological Organization* (WMO), the main factors for greenhouse gas emissions are the combustion of non-renewable energy containing hydrocarbons and cement production which proves the involvement of business entities in production or operational activities.[22].

Based on previous research conducted by [7], [8], [9], [10] the implementation of *Green Accounting* and *Carbon Emission Disclosure* affects Company Value, which is the main

indicator used to assess and determine company decisions for investors, creditors and other stakeholders.

#### **4.3 Regulations, Good Practices and Challenges in Implementing Green Accounting and Carbon Emission Disclosure**

There are various obstacles and challenges to the implementation of *Green Accounting* and *Carbon Emission Disclosure* in Indonesia, such as the lack of specific knowledge and skills regarding this matter. Apart from that, there are difficulties in measuring the cost and benefit values of externalities resulting from industrial processes. The limited understanding of Environmentally Friendly Accounting among economic actors is largely due to their lack of awareness about the importance of disclosing environmental information and the need for integrated accounting practices. In addition, carbon emissions disclosure is still largely voluntary, making it difficult for companies to implement this practice consistently. As a result, implementing carbon emission disclosure is still difficult.

In Indonesia, various regulations and good practices are starting to be implemented in an effort to deal with climate change issues, such as:

1. RPJMN policy for 2020-2024 regarding handling climate change
2. There are efforts to implement sustainability reporting standards, and initiatives which encourages public companies to adopt the sustainable practices of various organizations. Until now many Indonesian companies have prepared and presented sustainability reporting.
3. Ratifying various commitments or agreements that have been agreed upon, such as agreeing to the climate change convention, namely Law no. 6 of 1994 concerning ratification of the United Nations Framework Convention on Climate Change (UNFCCC).
4. Indonesia agreed to reduce greenhouse gas emissions by ratifying the Kyoto Protocol through Law no. 17 of 2004 on June 28 2004.
5. Indonesia's commitment to efforts to reduce carbon emissions continues to be increased and further strengthened with the enactment of Presidential Regulation Number 61 of 2011 with contents regarding regulations related to action plans for reducing greenhouse gases and Presidential Regulation Number 71 of 2011 with contents regarding the implementation of a national GHG inventory.
6. Statement by the Minister of Energy and Mineral Resources (ESDM) Arifin Tasrif, Indonesia has determined the Enhanced-Nationally Determined Contribution (E-NDC) where Indonesia will increase its carbon emissions reduction target from 29% which is equivalent to 835 million tons of CO<sub>2</sub> to 32% which is equivalent to 912 million tonnes of CO<sub>2</sub> by 2030 [23].

Indonesia's contribution in efforts to reduce carbon emissions is very helpful in realizing the goals of the *United Nations Framework Convention on Climate Change* (UNFCCC). As is known, forests have a function in absorbing carbon, so Indonesia's role as a country that has extensive forests that can absorb carbon from Indonesia's own products and also carbon from other countries is very helpful in efforts to reduce emission levels. Based on data from the

Directorate General of Forestry Planning and Environmental Management (PKTL) of the Ministry of Environment and Forestry (KLHK), the area of forest land in Indonesia in 2022 is 96.0 million hectares or equivalent to 51.2% of the total land area of Indonesia.[24]

The recommendation from the *Kyoto Protocol*, namely the *Clean Development Mechanism* (CDM), explains the form of cooperation between developed and developing countries in reducing greenhouse gases, where in explaining the mechanism, developed countries will provide funds for developing countries to manage forests which have a function as an absorber. greenhouse gas. In this case, Indonesia can collaborate and gain benefits from this to reduce the level of emissions which are the impact of forest degradation and deforestation.

Strong regulations and investment from developed countries are what developing countries need to reduce gas emissions. Also, the transition to a low carbon economy is very necessary in changing the industrial base which is carried out with the aim of maintaining greenhouse gas concentrations at a level equivalent to 450 ppm CO<sub>2</sub> and preventing global warming from exceeding 2° C [25].

Starting in 2020, an agreement called the Paris Agreement has been agreed to control and manage greenhouse gas emissions. Indonesia has a commitment to reduce greenhouse gas emissions by 29% by 2030. In addition, there is an estimate of 41% if there is international support [26]. The Intergovernmental Negotiating Commission (INC) is an intergovernmental body that negotiates the *Climate Change Convention* which is proof of the UN's concern in addressing the global climate. This agreement was ratified at the Earth Summit in Brazil in June 1992. Indonesia was one of the countries that signed this convention. The climate change agreement divides the country into two parts. Developed countries are included in Annex I and developing countries are included in non-Annex I.

## **5. Conclusion**

Accounting has an important role in helping to realize the 13th *sustainable development goals* (TPB/SDGS), which is a hot issue that is being widely discussed and is an urgency for all parties. Things that can be used as guidelines regarding contributions that can be made in dealing with environmental problems in the field of accounting are by analyzing the impacts that occur on companies after implementing *Green Accounting and Carbon Emission Disclosure*.

Company value is one of the goals of establishing a company because it is an assessment and evaluation indicator for stakeholders to make investment decisions. Based on previous research that has been conducted, there are several results that the implementation of *Green Accounting and Carbon Emission Disclosure* affects company value. However, based on data that researchers conducted by looking at the *Sustainability Report*, the *implementation of Green Accounting and Carbon Emission Disclosure in companies in Indonesia is still not optimal*.



Several factors that influence the non-optimal implementation of *Green Accounting* and *Carbon Emission Disclosure* in Indonesia can be caused by a lack of awareness and concern for the environment, limited resources, the absence of mandatory regulations, and also the disclosure of *Green Accounting* and *Carbon Emission Disclosure* in Indonesia is still voluntary.

Therefore, this research provides recommendations to strengthen regulations, increase human resource capacity, and provide incentives for companies that implement *Green Accounting* and *Carbon Emission Disclosure* practices.

## References

- [1] D. Labiba and W. Pradoto, "SEBARAN EMISI CO2 DAN IMPLIKASINYA TERHADAP PENATAAN RUANG AREA INDUSTRI DI KABUPATEN KENDAL," *Jurnal Pengembangan Kota*, vol. 6, no. 2, p. 164, Dec. 2018, doi: 10.14710/jpk.6.2.164-173.
- [2] Chairia, J. Veronika Br Ginting, P. Ramles, and F. Ginting, "IMPLEMENTASI GREEN ACCOUNTING (AKUNTANSI LINGKUNGAN) DI INDONESIA: STUDI LITERATUR," *Jurnal Akuntansi Published by Program Studi Akuntansi STIE Sultan Agung*, vol. 8, no. 1, pp. 40–49, 2022, [Online]. Available: <https://financial.ac.id/index.php/financial>
- [3] B. Karyanto and R. Martiana, "PERAN AKUNTAN DAN PERUSAHAAN MENUJU TUJUAN PEMBANGUNAN BERKELANJUTAN (SUSTAINABLE DEVELOPMENT GOALS/SDGS) 2030," *Jurnal Studia*, vol. 8, pp. 15–30, 2020, [Online]. Available: <https://www.un.org/sustainabledevelopment/blog/2015/12/sustainable->
- [4] K. T. Yasrawan and D. N. S. Werastuti, "BAGAIMANA PERAN DAN PENERAPAN AKUNTANSI HIJAU DI INDONESIA?," *Jurnal Akuntansi Kontemporer*, vol. 14, no. 3, pp. 151–161, Sep. 2022, doi: 10.33508/jako.v14i3.3514.
- [5] A. Lako, "AKUNTANSI HIJAU: Isu, Teori & Aplikasi," 2018.
- [6] A. N. Fathia and V. Sulfitri, "PENGARUH CSR, CARBON EMISSION DISCLOSURE DAN KINERJA LINGKUNGAN TERHADAP KEBERLANJUTAN PERUSAHAAN DENGAN VISI MISI SEBAGAI VARIABEL MODERASI," *REALIBLE ACCOUNTING JOURNAL*, vol. 3, 2023, [Online]. Available: [www.idntimes.com](http://www.idntimes.com)
- [7] M. Faranika, "ANALISIS PENGARUH GREEN ACCOUNTING DAN KUALITAS AUDIT TERHADAP NILAI PERUSAHAAN," *Jurnal Ekonomi dan Bisnis*, vol. 1, pp. 141–160, 2023.
- [8] S. Monica and V. Sulfitri, "PENGARUH GREEN ACCOUNTING, CORPORATE SOCIAL RESPONSIBILITY DAN FINANCIAL DISTRESS TERHADAP NILAI PERUSAHAAN PADA PERUSAHAAN MANUFAKTUR SEKTOR CONSUMER GOODS YANG TERDAFTAR DI BEI 2019-2021," *Jurnal Ekonomi Trisakti*, vol. 3, no. 2, pp. 3035–3048, Sep. 2023, doi: 10.25105/jet.v3i2.17999.
- [9] T. Hardianti and S. D. Mulyani, "Pengaruh Carbon Emission Disclosure Dan Ukuran Perusahaan Terhadap Nilai Perusahaan Dengan Kinerja Lingkungan Sebagai Variabel Moderasi," *Jurnal Ilmiah Wahana Pendidikan*, vol. 9, no. 9, pp. 275–291, 2023, doi: 10.5281/zenodo.7951766.

- [10] P. P. R. A. Dewi and N. P. Budiadnyani, "CARBON EMISSION DISCLOSURE, UKURAN PERUSAHAAN, PROFITABILITAS DAN LEVERAGE: NILAI PERUSAHAAN," *Jurnal Ilmiah MEA (Manajemen, Ekonomi, dan Akuntansi)*, vol. 8, pp. 2030–2044, 2024.
- [11] M. Yusuf, "DETERMINAN CARBON EMISSION DISCLOSURE DI INDONESIA," 2020. [Online]. Available: <https://lokadata.beritagar.id>
- [12] O. Rusmana and S. M. N. Purnaman, "PENGARUH PENGUNGKAPAN EMISI KARBON DAN KINERJA LINGKUNGAN TERHADAP NILAI PERUSAHAAN," *Jurnal Ekonomi, Bisnis dan Akuntansi (JEBA)*, vol. 22, 2020.
- [13] E. D. Nursulistyo, Y. A. Aryani, and B. Bandi, "The Disclosure of Carbon Emission in Indonesia: A Systematic Literature Review," *Jurnal Dinamika Akuntansi dan Bisnis*, vol. 10, no. 1, pp. 1–18, Dec. 2022, doi: 10.24815/jdab.v10i1.27974.
- [14] SUGIYONO, *METODE PENELITIAN Kuantitatif, Kualitatif, dan R&D*. 2022.
- [15] K. Bela, D. Said, and S. Rasyid, "Green Accounting: Reality And Disclosure (Studies In The Forestry Industry In South Papua)," *Management Studies and Entrepreneurship Journal*, vol. 4, no. 3, pp. 3198–3205, 2023, [Online]. Available: <http://journal.yrpiiku.com/index.php/msej>
- [16] Hartiah and S. P. Permata, "Studi Literatur Riview Analisis Penerapan Green Accounting Terhadap Kinerja Keuangan Perusahaan," *Journal of Sharia Economic and Business*, vol. 1, 2022.
- [17] R. I. Bahriansyah and Y. Lestari Ginting, "Pengungkapan Emisi Karbon Terhadap Nilai Perusahaan dengan Media Exposure Sebagai Variabel Moderasi," *Jurnal Riset Akuntansi & Perpajakan (JRAP)*, vol. 9, no. 02, pp. 249–260, Dec. 2022, doi: 10.35838/jrap.2022.009.02.21.
- [18] I. Hidayat, T. Ismail, M. Taqi, and A. S. Yulianto, "The Effects of Environmental Cost, Environmental Disclosure and Environmental Performance on Company Value with an Independent Board of Commissioners as Moderation," *International Journal of Energy Economics and Policy*, vol. 13, no. 3, pp. 367–373, May 2023, doi: 10.32479/ijeep.14159.
- [19] A. Dwi Lestari and Khomsiyah, "Pengaruh Kinerja Lingkungan, Penerapan Green Accounting, dan Pengungkapan Sustainability Report Terhadap Nilai Perusahaan," *Jurnal Ekonomi Bisnis, Manajemen dan Akuntansi (Jebma)*, vol. 3, pp. 527–539, 2023, [Online]. Available: <https://www.globalreporting.org/>

- [20] H. A. Riyadh, M. A. Al-Shmam, H. H. Huang, B. Gunawan, and S. A. Alfaiza, "The analysis of green accounting cost impact on corporations financial performance," *International Journal of Energy Economics and Policy*, vol. 10, no. 6, pp. 421–426, 2020, doi: 10.32479/ijeep.9238.
- [21] P. Kurnia, D. P. Emrinaldi Nur, and A. A. Putra, "Carbon emission disclosure and firm value: A study of manufacturing firms in Indonesia and Australia," *International Journal of Energy Economics and Policy*, vol. 11, no. 2, pp. 83–87, 2021, doi: 10.32479/ijeep.10730.
- [22] S. Ayu Laksani, R. Andesto, and D. Jaya Kirana, "Carbon Emission Disclosure Ditinjau dari Nilai Perusahaan, Leverage dan Media Exposure," *Studi Akuntansi dan Keuangan Indonesia*, vol. 3, no. 2, 2020.
- [23] Humas EBTKE, "Indonesia Tetapkan E-NDC, Sektor Energi Miliki Target Tekan Emisi 358 juta CO<sub>2</sub> di 2030," *Direktorat Jenderal Energi Baru Terbarukan dan Konservasi Energi*, 2023. [Online]. Available: [https://ebtke.esdm.go.id/post/2023/12/07/3669/indonesia.tetapkan.e-ndc.sektor.energi.miliki.target.tekan.emisi.358.juta.co2.di.2030#:~:text=%22Adapun%20pada%20sektor%20energi%2C%20Indonesia,5%2F12\)%20waktu%20setempat](https://ebtke.esdm.go.id/post/2023/12/07/3669/indonesia.tetapkan.e-ndc.sektor.energi.miliki.target.tekan.emisi.358.juta.co2.di.2030#:~:text=%22Adapun%20pada%20sektor%20energi%2C%20Indonesia,5%2F12)%20waktu%20setempat)
- [24] PPID, "Laju Deforestasi Indonesia ," *Kementerian Lingkungan Hidup dan Kehutanan*, 2023.
- [25] G. Leontinus and R. Siringoringo, "PROGRAM DALAM PELAKSANAAN TUJUAN PEMBANGUNAN BERKELANJUTAN (SDGs) DALAM HAL MASALAH PERUBAHAN IKLIM DI INDONESIA," *Jurnal Kajian Ilmu dan Pendidikan Geografi*, vol. 05, 2022.
- [26] PPID, "Indonesia Tagih Komitmen Negara Maju Terhadap Perjanjian Paris," *Kementerian Lingkungan Hidup dan Kehutanan*, 2019.