

Indonesia's Green Taxonomy Transitions to Decarbonization Through Sustainable Finance

Wika Harisa Putri¹, Elma Ayu Aprialita², Rini Raharti³ and Nindyo Cahyo Kresnanto⁴

¹⁻²Accounting Department, Janabadra University

Email: wikaharisa@janabadra.ac.id, elmaaprialita@gmail.com

³Economics Department, Janabadra University

Email: riniraharti@janabadra.ac.id

⁴Civil Engineering Department, Janabadra University

Email: nindyo_ck@janabadra.ac.id

Abstract—The corporate realm has forsaken conventional business practices in favour of embracing an approach that incorporates a sustainability framework. The initiatives that emerged in the past as corporate social responsibility (CSR) are now becoming more defined due to the shared global threat and issue of global warming. Decarbonization is an imperative measure that must be implemented as a compulsory contribution to mitigate the risks of global warming and climate change, which now pose significant dangers to business continuity. Corporate social responsibility and decarbonization are closely linked ideas that enhance a company's long-term viability, aligning with public perception and competitive edge. By incorporating corporate social responsibility (CSR) and decarbonization initiatives, organizations can effectively improve their social and financial performance, leading to a more sustainable and profitable future. To tackle climate change and achieve the Net Zero Emissions (NZE) target, the Indonesian government has adopted a Green Taxonomy as part of its sustainable finance strategy. This paper explores the process of Indonesia's Green Taxonomy in the transition to decarbonization, highlighting the critical role of sustainable finance in confronting climate change. The qualitative study will depict the difference between Indonesia's Green Taxonomy 1.0 and Indonesian Sustainable Finance Taxonomy 2.0.

Index Terms— Green Taxonomy, Decarbonization, Sustainable Finance, Net Zero Emissions, CSR.

I. INTRODUCTION

Decarbonization is synonymous with steps to ensure business activities minimize emissions. Energy system transformation is one of the biggest challenges faced by Indonesia from now to 2050 to ensure the achievement of the Net Zero Emission target (Rahman et al., 2023). These challenges include the need to modernize outdated infrastructure, the high initial investment required for renewable energy projects, and the complex task of transitioning from a fossil fuel-based economy to one that relies on renewable sources. However, until now, the use of fossil energy, especially oil and coal, has yet to be replaced with renewable energy. Some of the reasons for using renewable energy are limited supply and the impact on product prices, which become uncompetitive due to the high cost of renewable energy.

Indonesia, with the world's largest biodiversity and a rapidly developing economy, is at a crucial juncture in its

energy transition. In this context, the Indonesian government has taken a significant step by adopting the Indonesian Sustainable Finance Taxonomy /TKBI (Indonesian Financial Services Authority /OJK, 2024), a framework specifically designed to facilitate the transition to decarbonization through sustainable finance. This taxonomy plays a pivotal role in directing investment towards projects and activities that support the reduction of greenhouse gas emissions, adaptation to climate change, and maintenance of biodiversity and ecosystems.

Implementing TKBI is a crucial part of Indonesia's comprehensive efforts to achieve the Net Zero Emissions (NZE) target, in line with global commitments such as the Paris Agreement. Through TKBI, Indonesia is developing precise criteria and standards for classifying sustainable and environmentally friendly economic activities. TKBI encompasses vital sectors such as renewable energy, sustainable mining, waste management, and green infrastructure. By establishing clear guidelines on what constitutes a green investment, TKBI not only helps investors, companies, and financial institutions allocate their resources more effectively but also contributes significantly to achieving Indonesia's environmental and social goals.

Indonesia's approach to sustainable finance through TKBI shows the country's commitment to sustainable development and climate change and opens up new opportunities for inclusive and sustainable economic growth. By integrating environmental considerations into investment decisions, TKBI is essential in changing Indonesia's economic development paradigm towards a greener, cleaner and more sustainable model.

This paper will qualitatively discuss the transition of the Indonesian Green Taxonomy as the first guide that regulates the steps for implementing the green transition and the transition of this guide into the Indonesian Sustainable Finance Taxonomy. This article also describes the implementation and the expected contribution in supporting Indonesia's efforts to achieve decarbonization and sustainable finance. This paper will also discuss the challenges and opportunities faced in implementing TKBI, as well as the implications for the Indonesian economy and environment in the global context.

II. LITERATURE REVIEW

A. *Indonesian Green Taxonomy*

The Indonesian Green Taxonomy/THI (Indonesian Financial Services Authority /OJK, 2022) aims to categorize economic activities based on their environmental impact by developing a classification of the green sector, which is a significant need in the transition of the Financial Services Sector to encourage the implementation of sustainable finance in efforts to mitigate and adapt to climate change in Indonesia. The Indonesian Green Taxonomy (THI) Edition 1.0 classification is divided into three main categories: green, yellow and red. The green category includes activities that do not significantly impact the environment, implement minimum safeguards, positively impact the environment, and are aligned with the environmental objectives of the Taxonomy. The yellow category is activities that do not have a significant impact, while the red category includes activities that harm the environment. This classification creates an environmentally friendly industry by avoiding greenwashing practices (Lagoarde-Ségot, 2024). Greenwashing is a communication strategy that only provides an environmentally friendly image without actually carrying out activities that impact environmental sustainability (Cinceoglu & Strauß, 2024). In this way, the Green Taxonomy can be used by relevant stakeholders to obtain information regarding financing, funding or green investment and to understand risk management (Lata & Kumar, 2022).

The focus on carbon emissions in THI underscores the importance of reducing greenhouse gas (GHG) emissions in climate change mitigation efforts. One of the sectors that receives the most attention in this context is the energy sector, the largest sector contributing to reducing GHG emissions, with a projected average annual growth in business as usual/BAU (2010 - 2030) of 6.7%. This data shows that low carbon management and development in the energy sector and other sectors is the main focus of THI, to support global and national goals in keeping the increase in global average temperature below two °C and trying to limit the temperature increase to 1.5°C, by commitments in the Paris Agreement. To reduce carbon emissions in the context of the Indonesian Green Taxonomy (THI), several strategic steps that can be taken include 1) Developing Low Carbon Development, 2) Increasing Energy Efficiency, 3) Adopting Science-Based Principles, 4) Encouraging Sustainable Financial Innovation and 5) Implementation Environmental Management System. Through these steps, THI aims to support Indonesia in achieving its GHG emission reduction target by committing to the Enhanced Nationally Determined Contribution (NDC) for the Paris Agreement. THI aims to reduce GHG emissions with The Indonesian ENDC target of 43.20% with international assistance or 31.89% with internal effort (Ministry of Environment and Forestry as National Focal Point UNFCCC, 2022).

B. Indonesian Sustainable Finance Taxonomy/TKBI 2.0

The Indonesian Sustainable Finance Taxonomy (TKBI) is a classification of economic activities designed to support sustainable development efforts and goals in Indonesia, covering economic, environmental and social aspects. TKBI aims to increase capital allocation and sustainable financing to support Indonesia's Net Zero Emission (NZE) target achievement. TKBI was prepared by emphasizing the principles of scientific and credible, interoperable and supporting national interests, as well as inclusive. The TKBI framework, elements, and criteria are meticulously aligned with the ASEAN Taxonomy for Sustainable Finance (ATSF), and national policies are the primary references. TKBI considers taxonomies that apply at international and regional levels (interoperability) to facilitate Indonesia's gradual and just transition (just transition). TKBI is designed to be applied to various user scales, corporate/non-UMKM and UMKM. The approach to grouping economic activities in TKBI is similar to that of THI, which adopted the Indonesian Standard Industrial Classification (Klasifikasi Baku Lapangan Usaha Indonesia -KBLI) 2017. During the transition period, the assessment in THI is still used as long as it does not conflict with TKBI. Economic activities that fall within the scope of THI and TKBI will be assessed using the assessment mechanism in TKBI.

TKBI is a reference guide for capital allocation and financing for sustainable activities by various parties, including the government/regulators, financial services institutions (LJK), rating agencies, investors (national and international investing in Indonesian territory), and other stakeholders. TKBI assists in portfolio classification, determining requirements for financial instruments/products based on sustainability, disclosure of sustainable financial performance, and due diligence processes. TKBI also aims to avoid greenwashing, social washing and impact washing practices (Bond & Dusik, 2022; Lashitew, 2021). By the living document nature of TKBI, the development and updating of TKBI is carried out in stages so that it is in line with various developments, including national interest priorities, technology and policy, global and regional taxonomies (ATSF), as well as sector focus on ENDC Indonesia. The steps for using the TKBI are 1) Prioritizing Inclusive Aspects, 2) Adjusting the Assessment Approach, 3) Meeting Green PROPER Criteria, 4) Optimizing Resource Use, 5) Offering Products as Services, 6) Reducing Emissions, 7) Fulfillment of Technical Requirements. TKBI is used as a guide to improve sustainability practices and contribute to more sustainable and inclusive economic development in Indonesia (Kumar and Lata, 2022).

C. Decarbonization

Decarbonization refers to reducing carbon dioxide (CO₂) and other greenhouse gas emissions to combat climate change. This goal can be achieved through various strategies, including the development and implementation of renewable energy technologies, energy efficiency, carbon capture and storage (CCS), and changes in consumption policies and behaviour. Decarbonization is a complex process involving various sectors and requires coordination between government, industry, and society. This effort aims to reduce carbon emissions and create a more sustainable and environmentally friendly energy system for the future. The connection between decarbonization and the green taxonomy for sustainable finance lies in their shared goal of promoting investment and economic activity that contributes to the clean energy transition and reduced carbon emissions. Green taxonomy is a framework or classification that establishes clear criteria for sustainable or green investment. This framework allows investors, companies and governments to identify projects and initiatives that contribute to decarbonization and meet environmental sustainability goals (Rahman et al., 2023).

Decarbonization in sustainable finance has received significant attention in recent years. Research shows that there is enough capital to support the decarbonization of high-income countries fairly and sustainably (Galvin, 2020). Green finance has been identified as an essential factor in driving high-quality energy development and facilitating the decarbonization of the economy, with analysis focusing on the agendas of countries such as the United States, China and Russia (Jia, 2022; Wang & Dong, 2024). The role of green finance in advancing efforts to combat climate change and achieve decarbonization is also increasingly emphasized, providing powerful insights for researchers, policymakers, investors and stakeholders (Fu et al., 2024).

By applying a green taxonomy, sustainability finance seeks to allocate financial resources to projects that positively impact the environment. These projects can include renewable energy initiatives such as solar and wind farms, energy efficiency measures like building insulation, and carbon capture and storage technologies. The green taxonomy supports decarbonization efforts through this mechanism by facilitating investment flows to essential sectors transitioning to a low-carbon economy. Additionally, a green taxonomy can help reduce the risk of "greenwashing," namely false claims by companies that they are more environmentally friendly or sustainable than they are (Danilov, 2022; Teichmann et al., 2023).

With a clear definition of 'green' activities, a green taxonomy increases transparency and can increase investor confidence in sustainable investments, thereby accelerating decarbonization efforts. In this context, the

relationship between decarbonization and the green taxonomy for sustainable finance is mutually beneficial and synergistic, where the green taxonomy provides a tool to guide and increase investment in decarbonization solutions, thereby playing a significant role in the achievement of global goals to limit global warming and promote sustainable development.

D. Relationship between the Indonesian Taxonomy for Sustainable Finance/TKBI and decarbonization

The relationship between the Indonesian Sustainable Finance Taxonomy and decarbonization is significant in the context of encouraging sustainable economic activities and environmentally friendly finance. TKBI serves as a framework for classifying economic sectors based on sustainability, which aligns with decarbonization goals. Decarbonization, especially in the energy sector, is very important to avoid the negative impacts of climate change and encourage sustainable economic growth (Nugroho et al., 2023). In addition, using Indonesia's presidency of the G20 to develop a green economy and decarbonization emphasizes the strategic importance of aligning financial policies with decarbonization goals (Afandi, 2022).

TKBI takes a comprehensive approach to supporting Indonesia's Net Zero Emissions (NZE) efforts and targets, with a strong focus on the positive impact on the environment. It is structured as a classification of economic activities instrumental in achieving Indonesia's sustainable development targets, strongly emphasising decarbonization. This support is not limited to one aspect but encompasses economic, environmental, and social aspects. The environmental goals are diverse, including climate change mitigation and adaptation, healthy ecosystems and biodiversity protection, resource resilience, and the transition to a circular economy. TKBI's classification of economic activities is based on their environmental impact, particularly their potential to reduce carbon emissions. This classification entails stringent requirements for economic activities to meet specific GHG emission limits, utilize Carbon Capture and Storage (CCS) technology, and commit to transitioning energy to cleaner and more sustainable sources. For example, requirements for economic activities to meet certain GHG emission limits include having a verified/validated emissions reduction roadmap and reducing GHG emissions (lifecycle emissions) by at least 12.5% from Business as Usual by 2030 or based on government regulations/stipulations.

III. METHODS

This study adopts a qualitative approach to comprehensively understand the transition from the Indonesian Green Taxonomy Guide 1.0/THI (Indonesian Financial Services Authority /OJK, 2022) to the Sustainable Finance Taxonomy Guide 2.0/TKBI. The study meticulously follows a systematic and structured approach, including a thorough literature review method with content analysis. The review encompasses a wide range of literature, including Indonesian government policy documents related to the Indonesian Green Taxonomy 1.0/THI and decarbonization, as well as the Indonesian Sustainable Finance Taxonomy 2.0/TKBI. The analysis of these documents aims to understand the THI framework, including the principles and criteria used to classify activities as “green” or “transitional” in sustainable finance.

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IV. RESULT AND DISCUSSION

THI and TKBI are pivotal policy instruments developed by the Financial Services Authority (OJK) in collaboration with various stakeholders, including researchers, policymakers, and professionals in the finance and environmental sectors. This joint effort aims to foster sustainable economic activities and environmentally friendly finance in Indonesia (Sati, 2022). The Indonesian Green Taxonomy 1.0 was designed to classify and qualify economic sectors for sustainability, reflecting the collective wisdom of these stakeholders. Similarly, the Indonesian Sustainable Finance Taxonomy aims to implement environmentally friendly finance based on

business types and colour codes such as PROPER (Ariyanti et al., 2023). This taxonomy is not just a tool, but a shared guidepost, steering investment decisions and financial activities towards sustainable development goals (SDGs).

Developing and implementing this transformative taxonomy is crucial to achieving sustainable finance and production across countries (Dariah et al., 2023). The significance of this taxonomy was further underscored by the increasing scientific production and regulatory initiatives following the 2015 Paris Agreement, which showcased a global trend towards integrating sustainability into financial decision-making (Rodriguez-rojas et al., 2022). Moreover, the role of this taxonomy in promoting green finance is evident in a comprehensive study that gathered insights into perceptions and attitudes regarding sustainability bonds, ESG integration, and green taxonomies among loan officers in commercial banks (Surmanidze et al., 2023). This fact demonstrates the tangible impact of this taxonomy on financial practices and regulatory initiatives. The following are the distinct features of the Indonesian Green Taxonomy 1.0 and the Indonesian Sustainable Finance Taxonomy, which are detailed in the table below:

TABLE I. THE DIFFERENCE BETWEEN THI 1.0 AND TKBI 2.0

Scope	THI 1.0	TKBI 2.0
Environmental Scope and Objectives	THI only has two Environmental Objectives; EO1- Climate Change Mitigation and EO2- Climate Change Adaptation	TKBI expands the scope of Environmental Objectives (EOs) compared to THI. In addition to EO1—Climate Change Mitigation and EO2—Climate Change Adaptation, which are included in THI, TKBI added new EOs to increase interoperability with taxonomies applicable in other regions and make it easier to identify EOs that have a major contribution to economic activity.
Classification of Economic Activities	THI classifies economic activities in the categories "Green", "Yellow", and "Red", which, in the transition period, can be equated with the classifications "Green", "Transitional" and "does not meet classification" in TKBI.	TKBI classifies economic activity into two main classifications, "Green" and "Transitional". The "Green" classification is in line with the commitment to keep global temperature rise below 1.5°C by the Paris Agreement, including considering Indonesia's NZE in 2060 (or earlier) and meeting social aspects.
Adjustment of Assessment Approach	The THI is an initial document that adopts the global assessment approach that existed when it was formulated.	TKBI adopts an assessment approach adapted to national and global developments, including alignment with national interests and SDGs, policy developments related to climate change, and initiatives/policies related to transition financing.
Economic Activity Assessment	If an economic activity falls within the scope of the THI but is not included in the TKBI, the assessment is carried out using the mechanisms and criteria in the THI. This provision shows that the assessment of THI is valid as long as it does not conflict with TKBI, showing adaptation and flexibility in assessing economic activity.	TKBI is still supported by the coverage in THI.
Addition of Social Aspects and Do No Significant Harm/DNSH	THI has not explicitly regulated Do No Significant Harm/DNSH	TKBI clarifies the requirements not to cause damage/loss to other EOs (Do No Significant Harm - DNSH) and fulfil all social aspects as part of the "Green" classification criteria.

The difference of the classification of economic sectors for sustainability in THI and TKBI depicted in the Picture 1 below:

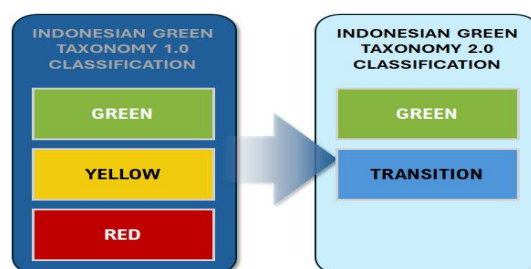


Figure 1. The difference classification between THI and TKBI

The Implementation and Impact of the Indonesian Green Taxonomy in the Transition to Decarbonization has provided results in the form of 1) Refining the Standard Definition of Economic Activities so that it is in line with the Sustainable Development Goals (TPB/SDGs), 2) minimizing multiple interpretations, greenwashing, social washing, and impact washing (Bond & Dusík, 2022), 3) Encouraging Investment in Climate Change Adaptation and Mitigation, 4) Ensuring Sustainable Environmental Impact, and 5) Supporting Government Regulations and Policies such as one of the key regulations that underpin the Indonesian Green Taxonomy is the ESDM Ministerial Regulation No. 2 of 2023. This regulation pertains to the Implementation of Carbon Capture and Storage, and it plays a crucial role in the transition to decarbonization.

The transition from THI to TKBI is a comprehensive effort that includes Sustainable Finance strategies, policies and programs. This commitment should instill confidence in investors, as it involves optimizing fiscal, macroprudential, monetary, payment system and macroprudential policy support, as well as developing databases and infrastructure to support the implementation of Sustainable Finance. The main steps in the government's development planning towards decarbonization by TKBI include various strategic aspects aimed at encouraging the transition to a low-carbon economy and supporting the achievement of the net-zero emissions (NZE) target, including refining economic activity definition standards, database and infrastructure development, coordination in developing a sustainable taxonomy, adaptation and collaboration in a just transition and prioritises scientific and credible principles that support economic development, focusing on growth, environmental sustainability, and social issues.

V. CONCLUSIONS

TKBI, with its clear framework, has successfully integrated sustainability principles into the Indonesian financial system. This success story reassures investors, companies, and financial institutions that TKBI is a reliable guide in identifying and selecting projects or initiatives that align with environmental and social goals. It has effectively encouraged the private and public sectors to invest in projects supporting energy transition, emission reduction, and sustainable development. The increased funding allocations to renewable energy projects, biodiversity conservation, and circular economy initiatives are tangible evidence of this.

TKBI has emerged as a key instrument in supporting Indonesia's transition towards a greener and more sustainable economy. Its focus on credible and scientific sustainability principles provides clear guidance for investors and economic actors. However, to maximize its impact, it is crucial to emphasize the ongoing efforts needed to update, adapt, and increase understanding of TKBI and sustainable finance more broadly. This is a call to action for all stakeholders to contribute to achieving Net Zero Emissions (NZE) more quickly.

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