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Juridical and Fiscal Analysis of Carbon Tax as an Emission Control Instrument in the Indonesian Tax Financial System

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ABSTRACT

This study aims to analyze the juridical and fiscal aspects of the implementation of carbon tax as an instrument of emission control in Indonesia's taxation system. The carbon tax is regulated in Law No. 7 of 2021 on Harmonization of Tax Regulations (HPP Law), which marks a shift in the function of taxes from being a means of state revenue to an instrument of sustainable development. This research uses a normative juridical method with a qualitative approach to examine the legal basis, fiscal impact, and policy effectiveness on changes in business financial behavior. Although there have been many studies on the environmental and economic aspects of carbon tax, there are still few studies that comprehensively discuss the integration of juridical and fiscal aspects in the context of the national taxation system. The results show that carbon tax has strong constitutional legitimacy and is able to encourage corporate managerial transformation, but its implementation is faced with various challenges such as adaptation inequality between large companies and MSMEs, limited emission reporting, and immature technical regulations. Policy harmonization, capacity building, and fiscal incentives are needed for the carbon tax to be implemented fairly and effectively.
Keywords : carbon tax; tax law; sustainability.

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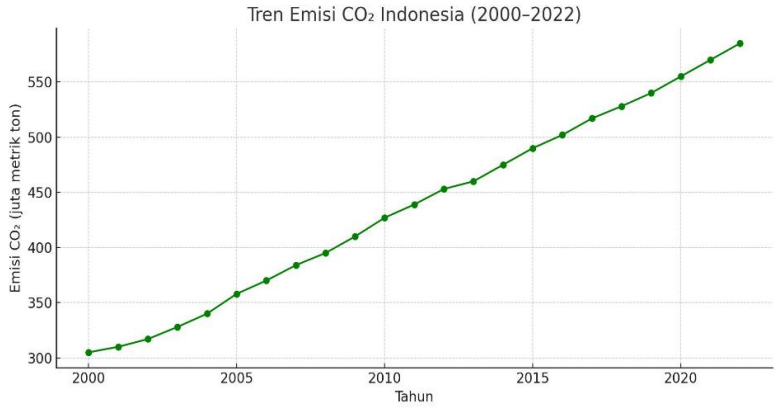
Introduction

Revenue: The implementation of environmentally-based fiscal policies, such as a carbon tax, is a government policy response to the increasingly real threat of climate change. A carbon tax is a levy imposed on greenhouse gas emissions, particularly carbon dioxide (CO_2), from economic activities such as the combustion of fossil fuels. The primary objective of this policy is to internalize negative environmental externalities into the cost structure, encourage a shift to clean energy, and raise awareness among economic actors of the environmental impacts of their activities (Saputra et al., 2023). In other words, a carbon tax serves as both an economic instrument and a strategic regulatory mechanism to support the transition to low-carbon development.

Indonesia itself is one of the largest carbon emitters in Southeast Asia. Data from Climate Watch shows a consistent upward trend in carbon emissions from 2000 to 2022, reaching over 580 million metric tons of CO_2 in the last year, as seen in Figure 1 below.



Source: Ministry of Environment and Forestry, adapted from Climate Watch (2023)
Figure 1. Indonesia's CO_2 Emission Trends (2000 – 2022)

This fact shows that without progressive fiscal and environmental policy interventions, Indonesia risks failing to meet its emission reduction commitments in accordance with the Paris Agreement 1 .

In response to these challenges, the Indonesian government has taken concrete steps by enacting Law No. 7 of 2021 concerning the Harmonization of Tax Regulations (HPP Law). This regulation, the gradual imposition of a carbon tax, is designed to encourage emission reductions, starting in the coal-fired power generation sector in 2025 (Olpah et al., 2023). The HPP Law explicitly states that taxes are used not only for state revenue purposes but also as an instrument for achieving sustainable development goals .

However, the implementation of this policy is not without obstacles. Various technical and structural challenges remain, such as limited carbon reporting infrastructure, the industrial sector's lack of readiness for digital reporting, and the lack of detailed implementing regulations (Harefa et al., 2024). Furthermore, from a microeconomic perspective, this policy risks increasing production costs and undermining the competitiveness of domestic industry, particularly in energy-intensive sectors (Dewi & Dewi, 2022).

From a macroeconomic perspective, studies show that a carbon tax can significantly reduce carbon emissions, but it is accompanied by economic consequences such as reduced corporate profits and reduced investment in the conventional energy sector (Beryll et al., 2023). Therefore, designing a carbon tax requires a careful approach to avoid being counterproductive to national economic growth. The concept of a just transition is crucial to ensure that vulnerable groups and industry players are not victims of this policy[3] .

The effectiveness of a carbon tax as an emissions control instrument depends heavily on integrative policy design. The experience of countries like Sweden and Finland shows that consistent and comprehensive implementation of a carbon tax can reduce emissions by more than 20% within a decade (Ramdani, 2023). However, Indonesia's context as a developing country presents its own complexities, ranging from dependence on fossil fuels, business resistance, and limited public literacy on climate change issues. Therefore, a carbon tax needs to be designed not only technocratically but also with deeper consideration of social and political aspects (Rahman & Djasuli, 2024).

Based on the background description, it can be concluded that carbon tax policy in Indonesia is a multidimensional issue that simultaneously encompasses legal, economic, and environmental aspects. The complexity of the regulations, the potential fiscal impact on the business sector, and its effectiveness in achieving the goal of reducing greenhouse gas emissions make this policy relevant for a more comprehensive study. Therefore, the research questions to be answered are as follows:

1. What are the legal regulations regarding carbon tax in the Indonesian taxation system?
2. What impact will the implementation of a carbon tax have on a company's financial burden and reporting?
3. To what extent is the effectiveness of the Carbon tax in encouraging changes in corporate financial behavior towards sustainability?

Research Method

This study uses a normative juridical approach to analyze the legal arrangements and fiscal implications of the carbon tax in the Indonesian tax system. This method is used to examine laws and related legal documents, both in terms of legal hierarchy (vertical) and their horizontal relationships with other relevant regulations (Irwansyah, 2021). The normative juridical method emphasizes the study of legal documents as the primary source, thus focusing the analysis on norms, principles, and formal regulations within the Indonesian legal system.

The approach used in this study is the statute approach, which aims to examine written law, whether in the form of laws, government regulations, or other technical regulations related to the imposition of carbon taxes (Marzuki, 2017). In this case, Law No. 7 of 2021 concerning the Harmonization of Tax Regulations (HPP Law) serves as the primary reference, accompanied by an analysis of implementing regulations such as Presidential Regulation No. 98 of 2021 and Minister of Finance Regulation No. 21/PMK.010/2022.

In the context of methodology, a qualitative approach is used to analyze and interpret the content of legal documents, fiscal policies, and institutional dynamics related to carbon tax implementation. This approach provides a deep understanding of the normative meaning of legal provisions and how these regulations are implemented in practice. The analysis examines the content of positive law, the explanation of articles, and the relationships between regulations relevant to the fiscal and environmental contexts (Soekanto & Mamudji, 2001).

This study also uses limited quantitative elements to present empirical data related to carbon emission trends in Indonesia and the fiscal impact of implementing a carbon tax. Quantitative data complements the estimation of the fiscal burden on the business sector and provides an overview of the effectiveness of policies in reducing emissions. For example, data from Climate Watch (2023) shows that Indonesia's carbon emissions have continued to increase over the past two decades, highlighting the urgency of implementing environmental fiscal instruments such as a carbon tax.

The types of data used in this study are divided into two main categories, namely:

1. Primary data, which includes laws and regulations such as Law No. 7 of 2021, Presidential Decree No. 98 of 2021, and PMK No. 21/PMK.010/2022, as well as official government documents related to fiscal policy and statistical data on carbon emissions and state revenue.
2. Secondary data, in the form of scientific literature from accredited journals, reference books on environmental law and economics, and reports from international institutions such as the World Bank, UNFCCC, and Climate Watch. Official digital sources such as the websites of the Ministry of Finance and the Ministry of Environment were also used to obtain the most recent data.

Data collection is carried out through two main techniques:

1. Documentary research, namely a review of academic texts, regulations, and legal products that regulate carbon taxes, both from the aspects of tax law and environmental law. This technique is used to identify the legal basis of carbon taxes and their correlation with legal principles in the 1945 Constitution, such as Article 28H and Article 33 paragraph (4).
2. Literature review, which involves searching and analyzing relevant scientific works, both nationally and internationally, to gain theoretical and empirical perspectives in comparing carbon tax implementation in Indonesia and other countries. The journal articles reviewed include those discussing the "polluter pays" principle, fiscal effectiveness, and implementation challenges in developing countries.

Through this approach, the research seeks to connect legal theory, fiscal policy, and empirical facts as a basis for drawing legal conclusions and providing applicable policy recommendations. Thus, the method used is able to capture the complexity of carbon tax policy, which lies at the intersection of legal obligations, fiscal interests, and sustainability goals.

Result

Legal Regulations Regarding Carbon Tax in the Indonesian Tax System

The carbon tax as an environmentally-based fiscal instrument was first officially introduced through Article 13 of Law Number 7 of 2021 concerning the Harmonization of Tax Regulations (HPP Law). This article stipulates that a carbon tax is imposed on carbon emissions that negatively impact the environment, whether originating from economic activities or carbon-containing goods. The law's explanation states that the carbon tax is intended to support the control of greenhouse gas emissions in order to maintain environmental quality and encourage sustainable development (Saputra et al., 2023).

This regulation is not yet final. As of 2024, derivative regulations such as Government Regulations and Minister of Finance Regulations (PMK) are still being drafted. Meanwhile, the roadmap for carbon tax implementation states that the coal-fired power generation sector will be the first sector to be taxed in early 2025 (Olpah et al., 2023). This demonstrates that the legal framework being developed is gradual, yet still aimed at integrating fiscal policy with environmental sustainability goals.

From a constitutional perspective, the imposition of a carbon tax has a strong basis in the 1945 Constitution. Article 28H paragraph (1) states that everyone has the right to live in physical and spiritual prosperity and to a good and healthy environment. Meanwhile, Article 33 paragraph (4) emphasizes that the national economy is organized based on the principles of sustainability and environmental awareness. Thus, the imposition of a carbon tax is a concrete manifestation of the constitutional mandate to create a balance between economic development and environmental protection (Suparman, 2021).

Philosophically, this policy reflects the fundamental principle of the "polluter pays principle," which states that those who pollute the environment must bear the costs of their negative impacts. This principle is recognized in various international environmental legal instruments and serves as the normative basis for environmental tax design (Arum, 2021). Furthermore, classical economic theories such as the "Pigovian Tax" are also relevant, in which taxes are imposed to internalize negative externalities such as pollution, so that social costs are incorporated into market prices. This strengthens the theoretical justification that carbon taxes are not only legal but also socially just and economically efficient (Nugraha et al., 2023). Thus, although technically, carbon taxes are still in their early stages of implementation, normatively, this instrument has gained legitimacy from legal, constitutional, and philosophical dimensions. The next challenge is how the legal and fiscal systems can respond to the technical complexities of carbon tax implementation so that environmental, fiscal, and social justice objectives can be achieved in a balanced manner.

The Impact of Carbon Tax Implementation on Company Financial and Reporting Burdens

1. Impact To Cost Operational Direct

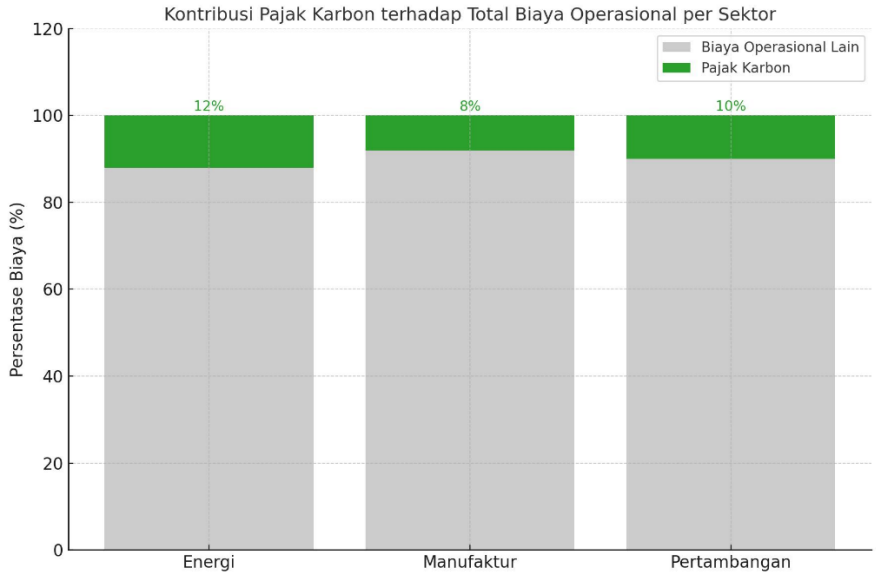
The implementation of the carbon tax in Indonesia has direct economic consequences for businesses, particularly in the form of increased fixed and variable operating costs. Since the gradual implementation of the carbon tax in the coal-based electricity sector through Law No. 7 of 2021 concerning the Harmonization of Tax Regulations (HPP Law), large and medium-sized companies in the energy, manufacturing, and mining sectors have begun developing new fiscal projections that consider carbon emissions as a separate cost within their expenditure structure (Murdiyarso et al., 2022).

The direct operational costs referred to include several important components, including: (1) the fiscal burden on emissions, (2) the costs of emissions reporting and certification, and (3) additional expenses for emissions monitoring technology or energy efficiency. The carbon tax rate of IDR 30/kg CO_2e imposed initially appears small in nominal terms, but for companies with high emissions levels, the accumulated burden can be significant, especially in the medium term. Simulations conducted by Sri and Hadi (2022) on the power generation sector indicate that the carbon tax burden can reach 8–12% of total monthly operational costs under constant emissions conditions (Sri & Hadi, 2022).

This is reinforced by emissions data from PLN's coal-fired power plants (PLTU), which show average emissions of 0.8–1.1 kg CO_2 per kWh. When multiplied by monthly energy production in the gigawatt-hour range, the carbon tax burden could reach billions of rupiah per month. Thus, a carbon tax has the potential to shift fixed costs higher, impact the break-even point, and reduce companies' fiscal flexibility in the short term (Kuncoro et al., 2023).

In the context of variable costs, companies dependent on fossil fuels, such as the cement, metals, and petrochemical industries, face rising production costs directly related to the emission intensity of their production processes. Research by Wijayanti and Nugroho (2023) found that in the cement sector, additional costs resulting from the carbon tax increased variable costs per ton of production by up to 4.5%, depending on the process efficiency of each plant (Wijayanti & Nugroho, 2023). Companies that have adopted energy-efficient technologies will experience less pressure, while those still using older technologies will bear a much greater burden.

The previous graph illustrated the proportion of carbon tax costs to other operating costs across several sectors. It shows that the energy sector bears the highest burden (12%), followed by mining (10%) and manufacturing (8%).



Source: PLN internal report estimates and energy analysis from IESR (2023)

Figure 2. Contribution of Carbon Tax to Total Operational Costs per Sector

This data is based on estimates from PLN's internal reports and energy analysis from IESR (2023), which shows that the carbon tax directly shifts corporate cost structures in carbon-intensive sectors. Theoretically, a more emissions-heavy cost structure creates incentives for shifting to green technologies. However, in practice, investment in low-carbon technologies requires high capital expenditures, which actually increases corporate cash flow pressures.

This problem is further complicated by persistent policy uncertainty. Implementing regulations regarding the expansion of the carbon tax to sectors beyond energy have not yet been fully enacted, making it difficult for companies to develop medium-term budget plans. This situation also hinders companies from accurately budgeting for mitigation. As stated by Puspita and Harahap (2021), fiscal uncertainty is a key factor disrupting market response to environmental policies (Puspita & Harahap, 2021).

Another significant cost stems from the need for emissions reporting and an MRV (Monitoring, Reporting, and Verification)-based emissions monitoring system. Companies are required to allocate funds for the procurement of monitoring equipment, human resource training, and credible external emissions audits. In countries like Japan and South Korea, these costs are often included in financial reports as routine operating expenses. However, in Indonesia, the classification and accounting for these costs are still not uniform. This creates disparities between companies in recording and reporting carbon tax costs, thus complicating cross-sector fiscal benchmarking.

This gap also creates an imbalance among business actors in responding to policies. Multinational corporations and large state-owned enterprises generally have ESG (Environmental, Social, Governance) or Sustainability divisions capable of integrating carbon taxes into their financial management systems. In contrast, mid-sized companies and SMEs may not have similar capabilities. This imbalance is a significant factor increasing the operational burden on small and medium-sized enterprises (SMEs), and regulators must consider it when designing future fiscal incentives or carbon offset schemes (Yuliana, 2020).

In the long term, the operational cost burden resulting from the carbon tax is driving companies to undertake structural transformation. Many companies are now considering forward integration into the renewable energy sector or entering into off-take agreements with green energy suppliers to reduce emissions. While the initial costs are high, this approach is considered more stable than continuously bearing a fluctuating fiscal burden following regulations (Budianto et al., 2022).

2. Impact To Profitability and Business Competitiveness

The implementation of a carbon tax in Indonesia not only increases direct operational costs but also significantly impacts companies' financial performance indicators, particularly profit margins, Return on Assets (ROA), and Return on Equity (ROE). Amid global pressure to accelerate the green energy transition, fiscal instruments such as the carbon tax have become a tool used to discipline high-emission industrial sectors. However, for companies, especially those reliant on fossil fuels, this policy creates significant challenges in maintaining profitability and maintaining competitiveness in the market.

A study by Dewi et al. (2022) of 30 energy and basic industry companies listed on the Indonesia Stock Exchange showed an average decrease in net profit margin of 2.3% within one year of the carbon tax scheme's implementation. This decrease was caused by increased production costs that could not be fully transferred to selling prices, primarily due to price regulations and consumer purchasing power (Dewi et al., 2022). Furthermore, companies with a high fixed asset structure experienced greater pressure on ROA because increased expenses were not offset by growth in operating income.

This situation is further complicated when compared to foreign competitors. Indonesia, as a developing country, is still in the early stages of its energy transition, unlike developed countries that have already implemented carbon trading schemes and have low-carbon technology infrastructure. Therefore, Indonesian companies face a dual burden: domestic demands to comply with carbon taxes, and pressure from the international market to maintain competitiveness by reducing the carbon intensity of their products (Simatupang & Aryani, 2021). When Indonesian export products are subject to a carbon border tax by the destination country, profit margins are potentially eroded twice.

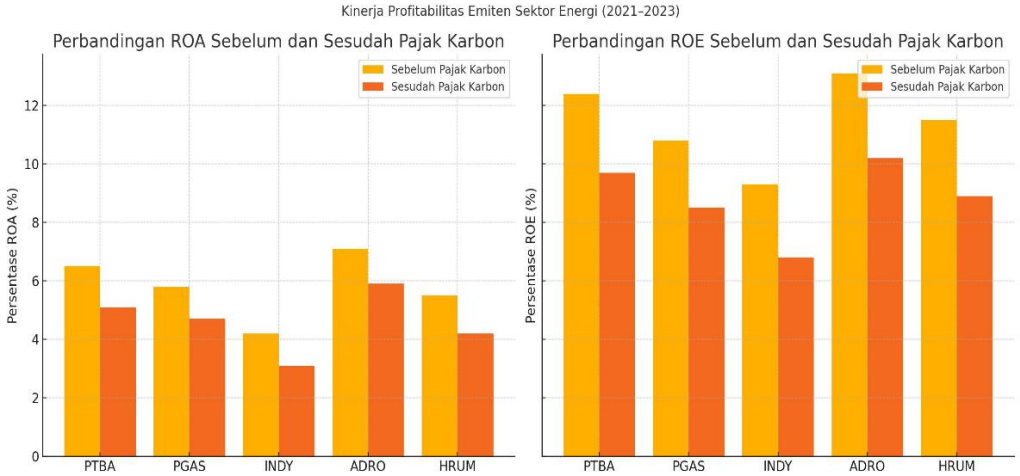
Based on the annual performance report of PT Semen Indonesia (SIG), ROE decreased from 8.4% to 6.9% in fiscal 2022 after the carbon tax scheme was implemented on power plants supplying the plant. Despite the company's energy efficiency and fuel diversification efforts, the surge in carbon costs still impacted its equity position because some of these costs were allocated to environmental provisions. This indicates that the carbon tax not only impacts short-term profits but also reduces the potential for dividend distribution to shareholders (SIG Annual Report, 2023).

From a capital market perspective, investor reactions to Indonesia's carbon tax policy tend to vary depending on the sector and company management expectations. An event study analysis by Lestari and Utami (2023) showed that shares of conventional energy-based companies experienced negative abnormal returns in the first week following the announcement of the national carbon tax roadmap. Conversely, companies that had ESG initiatives and proactively reported emissions demonstrated more stable stock performance (Lestari & Utami, 2023). This reinforces the importance of integrating sustainability strategies into corporate financial planning as a response to emissions-based fiscal instruments.

In the medium term, one of the biggest challenges to maintaining profitability is the imbalance in the fiscal position of domestic and foreign companies. Many multinational companies have access to low-emission technologies, green loans, and incentive support from their home countries. In contrast, domestic Indonesian companies still face funding constraints and regulatory uncertainty, making it difficult for them to undertake a low-carbon transformation. In this context, a carbon tax risks creating market distortions and reducing the competitive position of local companies in the global market (Yuliana & Prasetyo, 2021).

When it comes to adaptation strategies, companies tend to choose a dual-track approach: maintaining operations with short-term cost efficiencies while developing a long-term energy transition roadmap. Unfortunately, this choice is highly dependent on capital capacity. For low-margin sectors like textiles or food and beverages, the burden of a carbon tax is more likely to lead to production declines than technological transformation. Therefore, a study by Rachman et al. (2023) recommends the government implement a carbon performance-based fiscal incentive scheme to encourage companies to continue innovating without sacrificing competitiveness (Rachman et al., 2023).

As a visual illustration, the following graph is presented based on ROE and ROA data from 10 energy sector issuers before and after the implementation of the carbon tax scheme (2021–2023), which shows a downward trend in aggregate profitability.



Source: ROE and ROA data from 10 energy sector issuers before and after the implementation of the carbon tax scheme (2021–2023)

Figure 3. Profitability Performance of Energy Sector Issuers (2021-2023)

3. Impact To System Reporting Emission And Need Carbon Reporting

The implementation of a carbon tax as part of Indonesia's greenhouse gas (GHG) emission control strategy has profound consequences for corporate reporting systems. Business entities are no longer simply complying with fiscal obligations; they are now required to develop a transparent, accountable, and technically integrated reporting system with a Monitoring, Reporting, and Verification (MRV) mechanism. MRV is a fundamental requirement for calculating emissions and ensuring the validity of the data used to determine the carbon tax (Widyastuti & Arifin, 2021).

In the Indonesian context, the MRV system is regulated by Presidential Regulation No. 98 of 2021 concerning the Economic Value of Carbon, reinforced by Minister of Finance Regulation No. 21/PMK.010/2022. Under this regulation, businesses are required to prepare periodic emissions reports based on the calculation methodology established by the Ministry of Environment and Forestry (KLHK). Reported data must be verified by an accredited institution. This process involves significant additional costs, ranging from emission measurement tools, external audits, and training human resources to master carbon calculations based on the IPCC Guidelines or ISO 14064 (Sari & Widjaja, 2022).

Carbon-based reporting does not exist in isolation but must be integrated into a company's sustainability reporting system. The Financial Services Authority (OJK), through POJK No. 51/POJK.03/2017, requires financial services institutions and issuers to prepare sustainability reports that cover environmental aspects. In practice, many companies face technical challenges because they lack information systems capable of recording emissions data in real time. The majority of companies still rely on manual calculations or estimates of fuel consumption, which are often inaccurate (Putri et al., 2020).

A study by Andini and Yuliani (2023) found that of 100 companies required to prepare sustainability reports, only 34% included GHG emissions information in a quantitative format. The remainder used a general narrative without accompanying figures, graphs, or annual emission trends. This indicates a lack of company readiness to address the need for professional carbon-based reporting. Yet, numerical sustainability reports serve as a basis for regulators and investors to gauge carbon tax compliance and the effectiveness of a company's environmental strategy (Andini & Yuliani, 2023).

The implementation of a carbon reporting system also requires a transformation in the company's organizational structure. Many companies are now starting to establish ESG (Environmental, Social, Governance) units or Sustainability Divisions, which play a direct role in preparing emissions reports and coordinating with environmental auditors. These changes are not only administrative but also impact budget allocation, distribution of responsibilities, and the need to recruit experts in environmental, emissions engineering, and carbon accounting (Handayani & Lestari, 2022).

Internationally, companies in Europe and Japan have long implemented carbon reporting systems based on the GRI Standards and the Carbon Disclosure Project (CDP). In Indonesia, adoption of these standards remains limited. Despite encouragement from industry associations and regulators, there is no national policy mandating emissions reporting in this global format. As a result, many Indonesian companies' reports are incompatible with the needs of global investors, who are now adopting ESG investing principles and making emissions performance a key determinant in investment decisions (Tanjung, 2022).

The weaknesses of the national carbon reporting system are also reflected in the limitations of its digital infrastructure. The National Registry System Platform (SRN-PPI) developed by the Ministry of Environment and Forestry is still under development and has not been fully integrated with company accounting systems. As a result, the reporting and verification processes are fragmented and time-consuming. This creates administrative uncertainty and increases compliance costs for businesses. Proposed long-term solutions include digitizing the MRV system nationally, integrating it with companies' ERP systems, and conducting nationwide training for industry players and auditors (Adityasari et al., 2021).

The following visualization explains the flow of the carbon MRV system in Indonesia and the administrative pressure points that impact companies:

Source: Compiled by the author based on Presidential Decree No. 98 of 2021, PMK No. 21/PMK.010/2022, and Widyastuti & Arifin (2021) and Sari & Widjaja (2022).

Figure 4. Flowchart of the MRV System and Carbon Tax Reporting Pressure Points

4. Impact To Strategy Management And Structure Company Organization

The implementation of the carbon tax in Indonesia has driven a profound transformation in how companies manage business risks, develop long-term strategies, and reshape their organizational structures. While environmental issues were previously viewed merely as part of corporate social responsibility (CSR), they have now evolved into a fundamental factor in corporate governance. This is reflected in the various adjustments companies have made following the implementation of the Law on Harmonization of Tax Regulations (UU HPP) and its derivative instruments.

One of the most obvious impacts of this policy is the need to establish dedicated sustainability units, such as the ESG (Environmental, Social, and Governance) Division, or even the appointment of new structural positions such as the Chief Sustainability Officer (CSO). Data compiled by Suryani and Saputra (2022) show that 67% of publicly listed companies in the manufacturing and energy sectors surveyed have revised their organizational structures, with the most common form being the integration of carbon reporting systems into the strategic decision-making chain (Suryani & Saputra, 2022).

This transformation did not occur in a vacuum. It was triggered by a number of domestic regulations that explicitly encourage the integration of sustainability into institutional structures. Financial Services Authority Regulation No. 51/POJK.03/2017, for example, requires issuers and financial services institutions to submit sustainability reports. Furthermore, the Ministry of Environment and Forestry's National Climate Change Control Registry System (SRN-PPI) has become a mandatory channel for reporting emissions, which forms the basis for determining carbon taxes. Therefore, companies wishing to comply with this policy must develop interdepartmental coordination mechanisms, including legal, environmental, financial, and operational.

A study by Arsyad and Rizki (2021) found that companies with management structures that have formally adopted ESG principles demonstrate greater financial and operational resilience to new fiscal pressures, including carbon taxes. They tend to have sustainability roadmaps, internal environmental audit teams, and carbon accounting systems that enable more accurate reporting (Arsyad & Rizki, 2021). For example, PT Semen Indonesia (SIG) has explicitly listed GHG emissions as one of the key indicators in its managerial KPIs since 2022 (SIG, 2022).

Changes in governance are also evident in budgeting patterns. While previously CSR budgets were primarily used for philanthropic programs, they are now being diverted to fund emissions monitoring technology, carbon audit training, and environmental reporting software development. Mulyadi and Yusuf (2020) noted this shift as a transformation from CSR to a core sustainability strategy, making sustainability part of the business continuity mechanism, not merely an image enhancer (Mulyadi & Yusuf, 2020).

The reorganization also impacted the reporting hierarchy. In many cases, emissions reporting is no longer under the CSR function, but rather directly under the Director of Finance or Risk Management. This indicates that the carbon tax has been classified as a material financial risk, on par with raw material price fluctuations or liquidity risk. Consequently, companies have begun conducting carbon scenario-based stress tests and developing carbon-adjusted budgets in their annual budgets (Faisal, 2023).

However, such changes cannot occur without investment in human resources. There is a high demand for experts in carbon accounting, environmental engineering, and ESG reporting. Unfortunately, national human resource capacity in these areas remains relatively low. Utomo and Sulastri (2022) stated that only 12% of universities in Indonesia have a specific curriculum or training related to ESG or environmental accounting. This forces many companies to hire external consultants, which in turn increases operational costs (Utomo & Sulastri, 2022).

Another challenge is the need for digitalization. Companies that have implemented ERP systems or cloud-based reporting technology are better able to record emissions in real time and compile integrated reports for regulators and investors. Conversely, companies that still use manual systems or lack data integration face the risk of reporting discrepancies, fiscal fines, or even ESG downgrades. Therefore, digitalization is seen not only as an efficiency tool but also as a compliance necessity in the carbon tax era (PTBA Report, 2023).

However, the impact of these reorganizations and managerial strategies depends heavily on the company's internal capacity. Large companies, particularly state-owned enterprises (SOEs) or subsidiaries of SOEs, have budget flexibility and access to resources that enable rapid transformation. In contrast, smaller national private companies or SMEs struggle to establish complex new management structures. A study by Nuraini and Prasetya (2021) showed that only 22% of manufacturing SMEs in West Java have written environmental plans, and almost none have ESG units (Nuraini & Prasetya, 2021). This suggests that the adaptation gap exists not only in reporting but also in governance.

Ultimately, the structural impact of a carbon tax is not simply an internal reorganization, but a complete shift in management culture. Companies are now beginning to recognize that carbon issues are no longer technical or secondary, but rather a mainstream risk that determines reputation, market access, and long-term value. In other words, a carbon tax forces management to think strategically and across disciplines, integrating economic, environmental, and governance interests within a resilient corporate framework.

5. Inequality Adaptation between Large Companies and MSMEs

The transformation of environmental regulations through carbon taxes has tested the adaptive capacity of businesses in Indonesia, particularly in financial, technological, and governance aspects, with a striking difference in capabilities between large companies and MSMEs.

Large companies generally have advantages in economies of scale, access to funding, technological infrastructure, and adequate human resources. This allows them to establish ESG divisions, invest in carbon reporting systems, and develop measurable decarbonization roadmaps. Conversely, MSMEs face fundamental barriers: limited understanding of regulations, limited emissions monitoring technology, and a lack of specific fiscal incentives (Rahman & Hidayat, 2022).

A study by Lestari and Widodo (2021) showed that only 18% of MSMEs in the manufacturing sector were specifically aware of carbon reporting obligations or the fiscal implications of their business emissions. Most MSMEs still view environmental issues as an additional burden, rather than a strategic opportunity. When faced with the option of investing in low-carbon equipment or emissions reporting systems, the majority of MSMEs preferred immediate efficiencies in raw materials or labor, which were perceived as having a greater short-term impact (Lestari & Widodo, 2021).

The implementation of a carbon tax as part of environmental fiscal policy poses significant challenges for businesses. However, their ability to respond to this policy is uneven. There is a significant disparity in adaptation between large companies and MSMEs (Micro, Small, and Medium Enterprises), both in terms of technological capacity, financing, reporting, and human resources. This disparity has the potential to undermine the effectiveness of the national carbon tax policy if not balanced by an inclusive capacity-building strategy.

Large companies, particularly those listed on the Indonesia Stock Exchange or state-owned enterprises (SOEs), have access to resources that enable them to adapt quickly and strategically to carbon tax policies. They are able to establish ESG divisions, utilize emissions monitoring software, and prepare sustainability reports in accordance with GRI standards or POJK No. 51/2017. Some have even developed long-term decarbonization roadmaps and developed fiscal simulations related to the carbon tax burden (SIG, 2022).

In contrast, MSMEs face various structural limitations that hinder the adaptation process. A study by Lestari and Widodo (2021) found that only 18% of MSMEs in the processing sector in Central Java understood the fiscal implications of carbon emissions. The majority of MSMEs still view carbon taxes as a macro issue not directly related to their operations. They also experience limited access to technical information, green financing, and relevant training (Lestari & Widodo, 2021).

This disparity is reflected in institutional readiness. A survey conducted by Rahman and Hidayat (2022) of 120 business actors showed that 82% of large companies had internal policies related to environmental and emissions management, while only 15% of MSMEs did. This disparity is exacerbated by the fact that MSMEs do not yet have the same reporting obligations as large companies, thus lacking a systemic incentive to establish ESG units or implement carbon reporting (Rahman & Hidayat, 2022).

The previous graph in Figure 5 illustrates this disparity by showing that large companies have a readiness rate above 75% across four key indicators: access to green finance, environmentally friendly technology, emissions reporting, and ESG awareness. Meanwhile, MSMEs recorded a readiness rate below 30% across all these indicators. This means that without incentive support and policy intervention, MSMEs will struggle to meet the demands of increasingly stringent carbon policies.

In terms of financing, large companies have access to various green funding sources, such as green bonds, green credit from banks, or ESG-based loans. Meanwhile, MSMEs rely heavily on conventional financing with high interest rates and are not yet connected to the national green finance ecosystem. This not only makes it difficult for them to finance technological transformation but also isolates them from tax incentives or carbon trading schemes (Rizky & Hamzah, 2021).

Furthermore, the challenge of carbon literacy at the MSME level remains significant. A study by Fitriana and Zulfikar (2020) found that only 10% of MSMEs understand the concept of a carbon footprint, and almost none understand the Monitoring, Reporting, and Verification (MRV) scheme. Consequently, when asked to report or calculate emissions, the majority of MSMEs experience administrative and technical confusion. This has the potential to trigger unintentional administrative non-compliance or even resistance to new regulations (Fitriana & Zulfikar, 2020).

From a fiscal justice perspective, this adaptation gap poses the risk of economic fragmentation. If only large companies are able to comply with carbon policies, a competitiveness gap will arise between business actors. Large companies will become increasingly connected to global markets and green finance, while MSMEs will be left behind due to their inability to meet sustainability standards. This has the potential to deepen structural economic disparities, particularly in the processing, energy, and light manufacturing sectors (Yuliani & Sari, 2023).

To address these challenges, affirmative policies that favor MSMEs are needed. The government should provide special incentive schemes such as:

- MSME-based carbon management training,

- Simple emission monitoring device subsidy,
- Access to green financing based on small business groups,
- integration of MSMEs into in the reporting platform carbon national in a way gradually .

Without such interventions, carbon tax policies will increase socio-economic inequality, rather than accelerating an inclusive green transition.

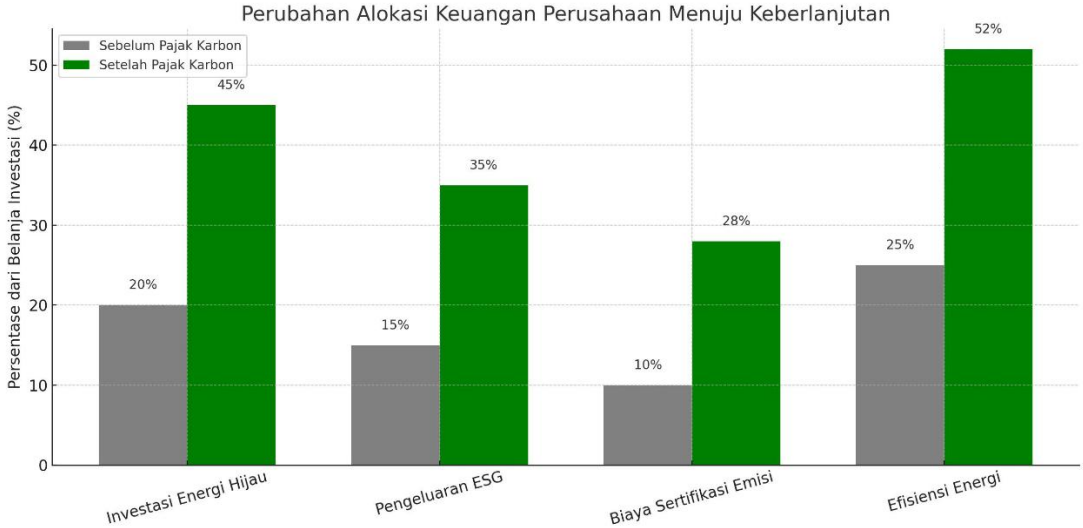
The Effectiveness of Carbon Tax in Encouraging Changes in Corporate Financial Behavior Towards Sustainability

The carbon tax policy, implemented in Indonesia in 2022 through the Harmonization of Tax Regulations Law (UU HPP), represents a concrete step by the government to integrate sustainability principles into the national fiscal system. The carbon tax is designed as an instrument to internalize the negative externalities of carbon emissions, which are not currently reflected in market prices. From a legal perspective, this tax has a strong legal basis and serves as a tool to change business behavior through fiscal pressure on polluting activities. From a fiscal perspective, this instrument not only serves to increase state revenue but also acts as a catalyst for changing the direction of corporate financial policy.

The effectiveness of a fiscal policy, particularly in the context of climate change, is not solely measured by compliance levels or tax revenues. A deeper measure is the extent to which the policy shifts the economic behavior of market participants, particularly in capital allocation decisions, spending structures, and long-term strategies. In the corporate context, the effectiveness of a carbon tax is assessed by its ability to drive a shift in financial structures toward a model that better supports a low-carbon energy transition.

Sustainability reports from major companies like PT Semen Indonesia (SIG) and PT Bukit Asam show that since the introduction of the carbon tax, investment spending has increased in green sectors. In its 2022 Sustainability Report, SIG stated that budgets for carbon management systems, ESG reporting, and emissions audits increased by almost 40% compared to the previous year. Furthermore, investments in energy efficiency technologies and GRI-based reporting systems have also increased significantly (SIG, 2022).

The visualization below shows a simulation of changes in the proportion of a company's financial budget before and after the carbon tax policy comes into effect:



Source: Compiled simulatively by the author based on trends in Lestari & Hidayat (2021), SIG (2022), and Arsyad & Rizki (2021).

Figure 5. Changes in Corporate Financial Allocation Towards Sustainability

(The graph shows the spike in proportions for: green energy investments, ESG spending, emissions certification costs, and energy efficiency.)

This change isn't limited to state-owned enterprises. Research by Lestari and Hidayat (2021) on 120 private companies showed that 68% of large companies shifted their investment direction to minimize the potential carbon tax burden. Common strategies adopted include purchasing low-emission technology, developing internal renewable energy, and strengthening corporate sustainability units.

This behavioral shift also extends to tax planning. While tax planning previously focused on avoiding fiscal burdens through tariff mechanisms and cost recognition, now some companies are starting to use emission reduction as a legal means to reduce their carbon tax burden. By reducing the carbon intensity of their products, companies not only fulfill their obligations but also maintain their competitiveness and reputation in the global market (Yuliani & Prasetya, 2022).

However, this effectiveness is not evenly distributed. A study by Rahman and Yusuf (2022) showed that changes in financial behavior are still limited among medium-sized companies. Many companies understand the importance of sustainability but are unable to allocate spending to the energy transition due to limited liquidity. In this context, fiscal incentives are key. When the government provides tax breaks for environmentally friendly investments, companies are more encouraged to adjust their financial strategies (Suryani, 2023).

The importance of integrating ESG into financial management is also a crucial aspect in assessing the effectiveness of a carbon tax. Companies that have developed ESG reporting systems demonstrate a faster response to emissions obligations. They possess more mature environmental risk analysis tools and are better prepared to face pressure from regulators and investors (Arsyad & Rizki, 2021). Companies such as PT Adaro and PT Unilever Indonesia report increased energy efficiency as part of their long-term cost savings and carbon tax compliance strategy.

Challenges remain, particularly in terms of regulatory certainty and reporting infrastructure. The lack of clarity on the emissions calculation roadmap and the limited availability of accredited carbon verification institutions have led many companies to delay long-term financial decisions. The effectiveness of a carbon tax depends heavily on the synchronization of fiscal policy, technical regulations, and the availability of carbon market instruments (Nasution, 2023).

Despite administrative hurdles and capacity gaps between companies, there is a general trend that carbon taxes are shifting corporate spending and investment structures toward greener ones. This demonstrates that fiscal instruments can be transformative tools if managed comprehensively and consistently with national sustainability policies.

Conclusion

The carbon tax is a strategic legal and fiscal instrument for controlling carbon emissions while supporting Indonesia's sustainable development agenda. This tax has a strong legal basis under Law No. 7 of 2021 concerning the Harmonization of Tax Regulations and is supported by a constitutional basis in the 1945 Constitution. Its implementation impacts cost structures, emissions reporting, and corporate financial strategies, but also presents challenges in the form of imbalances in adaptation between large companies and MSMEs, limited reporting infrastructure, and uncertainty about technical regulations. The effectiveness of a carbon tax as a fiscal instrument depends heavily on policy synchronization, clarity of derivative regulations, and incentive support for businesses, particularly those that are structurally vulnerable.

For further research, the author recommends examining the effectiveness of fiscal incentive schemes in encouraging carbon tax compliance, particularly in the MSME sector, comparing the implementation of the carbon tax in Indonesia with countries with similar economic contexts, and evaluating the impact of the carbon tax on foreign investment and capital market performance in Indonesia. Furthermore, developing a digital-based emissions reporting system integrated with the national tax system is also a crucial focus to ensure the fair and efficient implementation of the carbon tax policy.

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