

Implementation of carbon tax in Indonesia: Literature Review on Its potential and impact

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Abstract

Carbon tax is a fiscal instrument designed to reduce greenhouse gas emissions and support the transition to a green economy. Although carbon tax has the potential to reduce emissions, its implementation still faces a number of challenges. This study aims to analyze the potential and impact of carbon tax implementation in Indonesia through a literature review approach. Carbon tax is a fiscal instrument designed to reduce greenhouse gas emissions while supporting the transition to a green economy. The research method used a literature review by examining indexed scientific articles from 2019 to 2025 that are relevant to the topic of the potential and impact of carbon tax. The results of the study show that carbon tax in Indonesia has great potential to increase state revenue, promote energy efficiency, accelerate investment in renewable energy, and change the behavior of the community and business actors towards the use of low-emission technologies. However, carbon tax also has complex impacts, including increased production costs, decreased competitiveness of certain industries, a regressive burden on low-income households, and the potential for a slowdown in the agricultural sector. In conclusion, carbon tax can be an effective policy instrument in climate change mitigation efforts if it is designed with balanced consideration of economic, social, and environmental aspects. To ensure successful implementation, clear supporting regulations, compensation mechanisms for vulnerable groups, and integration with other green fiscal policies are required.

Keywords: carbon tax, potential, impact, literature review, Indonesia

INTRODUCTION

Climate change has emerged as one of the most critical global challenges of the 21st century, prompting countries worldwide to adopt various policy instruments aimed at reducing greenhouse gas emissions. Among these instruments, the carbon tax has gained significant attention due to its dual function as an environmental regulatory tool and a fiscal mechanism that incentivizes the transition toward a low-carbon economy. Empirical evidence from numerous countries demonstrates that carbon taxation can effectively reduce emissions, improve energy efficiency, and stimulate technological innovation, although its implementation often presents economic, social, and political challenges that require comprehensive policy design.

National greenhouse gas emissions in Indonesia have shown a fluctuating yet predominantly upward trend over the past two decades, driven largely by the energy and forestry sectors. Emissions surged significantly between 2000 and 2015, with the energy sector emerging consistently as the largest contributor primarily due to coal-dominated electricity generation. The land-use and forestry sectors also remain major sources of emissions, accounting for nearly half of Indonesia's total emissions in several years. Although a temporary decline occurred after 2019, partly attributed to reduced economic activity during the COVID-19 pandemic, overall emission levels remain substantially higher than in the early 2000s. The persistent dominance of fossil-fuel consumption and land-use change underscores the structural decarbonization challenges Indonesia faces. This empirical pattern highlights the urgent need for comprehensive mitigation instruments particularly carbon taxation to curb emissions in high-impact sectors and accelerate the transition toward a low-carbon economy.

Carbon tax in Indonesia is a fiscal instrument designed to reduce greenhouse gas emissions and support the transition to a green economy. Regulations related to carbon tax were first stipulated in Law Number 7 of 2021 concerning Harmonization of Tax Regulations. Carbon tax in Indonesia is applied to sectors that produce significant carbon emissions, such as coal-fired power plants. Although carbon tax has the potential to reduce emissions and increase state revenue, its implementation still faces a number of challenges, such as delays in its initial planned implementation in 2022, as well as a lack of derivative regulations that make it difficult to implement effectively. In addition, there are concerns that this tax could have a regressive impact, especially on low-income groups. However, if implemented properly, carbon tax could be an important tool for achieving Indonesia's emission reduction targets, including reaching Net Zero Emissions by 2060.

In implementing carbon taxes, it is necessary to consider the economic impact so that it is not regressive for low-income communities. Arlinghaus, Böhringer, and Requate (2021) show that integrating carbon taxes with green fiscal incentives can increase industrial investment in low-carbon technologies (Arlinghaus et al., 2021). This proves that carbon taxes can change behavior towards consuming more environmentally friendly goods and services.

In Asia, carbon taxes have begun to be implemented in several countries with varying results. Li, Lin, and Wang (2020) emphasize that carbon taxes encourage low-carbon technological innovation in China when integrated with other fiscal policies (Li et al., 2020). Zhang, Zhou, and Zhou (2019) found that carbon taxes on heavy industry can reduce emissions, but economic impacts need to be evaluated to ensure competitiveness is not compromised (Zhang et al., 2019). In Indonesia, carbon taxes have the potential to increase state revenue and encourage energy transition, but implementing regulations are still incomplete (Rahayu & Sulistyawati, 2022). Public discourse on progressive carbon taxes and the use of tax revenues for green energy can strengthen public acceptance (Hadiyanto et al., 2023). The challenges of implementing carbon taxes in Indonesia related to the readiness of the industrial sector and coordination between government agencies (Kurniawan & Santoso, 2021).

Previous studies have also highlighted the relationship between carbon taxes and innovation and economic welfare. Previous study showed that carbon taxes can promote energy efficiency and green innovation if the rates and targets are clear (Carattini et al., 2017). Chevallier and Ielpo emphasized the need to evaluate the social distribution of carbon tax impacts to reduce public resistance (Chevallier & Ielpo, 2020). In South Korea, Lee and Park showed that carbon taxes were effective in reducing emissions in the energy sector, but additional policy support such as green technology subsidies was still required. In addition, a study by the World Bank emphasized the importance of a strong regulatory framework and monitoring system to ensure the effectiveness of carbon taxes (World Bank, 2021). Overall, the literature emphasizes that the implementation of carbon taxes must be contextual, combining fiscal policy and environmental regulation, and taking into account the economic and social readiness of the country concerned. In addition, when implementing carbon taxes, it is necessary to consider the impact on various sectors so that they are not regressive for low-income communities. The implementation of carbon taxes continues to generate pros and cons, and therefore its execution in Indonesia has not yet proceeded as initially planned. This study aims to examine previous research on the potential and impacts of carbon taxes in order to develop a comprehensive framework that can serve as a reference for the Indonesian government in implementing carbon tax policies. The fact that carbon taxes have not been fully implemented further motivates this research to explore how carbon taxes are perceived in terms of their potential and impacts, thereby contributing to the formulation of more effective policy strategies.

This study offers novelty through a comprehensive synthesis approach to carbon tax implementation in Indonesia. Unlike previous studies that generally examine carbon taxes separately from the perspectives of fiscal potential, environmental effectiveness, or sectoral and distributional impacts, this research integrates these three dimensions within the specific Indonesian context, which remains at the pre-implementation stage under Law Number 7, 2021 concerning the Harmonization of Tax Regulations. Furthermore, this study draws on the most recent literature from 2019–2025, reflecting the evolving global carbon policy landscape following the Net Zero Emissions commitments and the post-pandemic economic recovery. Therefore, this research provides a more

contextual, up to date, and balanced evaluation of the potential and structural challenges of carbon tax implementation in Indonesia as a developing country whose economic structure is still largely dominated by coal based energy.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Literature Review and Hypothesis Development

Carbon tax is a tax imposed on carbon emissions that have a negative impact on the environment. In this case, carbon emissions include methane, carbon dioxide, and other greenhouse gases. Carbon tax will be imposed on economic activities related to carbon emissions, in terms of production and consumption. In the case of production, manufacturers that produce carbon emissions during the manufacturing process will be subject to carbon tax, and in the case of consumption, users will be subject to carbon tax on the use of goods and services that produce carbon emissions. Because carbon tax has the ability to reduce emissions while increasing energy efficiency in industry and the transportation sector, its implementation has become an important focus in climate change mitigation policy. Cevik, Kretschmer, and Tusch found that by increasing the demand for clean energy and reducing carbon transportation, carbon taxes can influence consumer behavior (Cevik et al., 2020). Since 2019, Indonesia has been considering carbon taxes as part of its strategy to reduce greenhouse gas emissions at the national level.

However, this policy is still in the early stages of implementation (Susanti & Nugroho, 2021). Putri and Rahmawati state that the success of carbon taxes is highly dependent on industry readiness, especially in sectors that use fossil fuels (Putri & Rahmawati, 2022). Falcão et al. conducted international research showing that the implementation of carbon taxes is highly dependent on institutional support, effective oversight, and integration with renewable energy incentive mechanisms (Falcão et al., 2020). Meanwhile, Akhavan-Hejazi et al. emphasize that the redistribution of revenue from carbon taxes and tariff structures greatly affect policy sustainability and public acceptance (Akhavan-Hejazi et al., 2021). Noor and Kuncoro found that, in the context of Southeast Asia, carbon taxes can encourage the adoption of low-emission technologies and reduce energy intensity, but this faces political obstacles (Noor & Kuncoro, 2019).

A study by Helgerud et al. found that carbon taxes can also encourage environmentally friendly progress, especially when implemented alongside subsidies for research and development of clean technologies (Helgerud et al., 2020). Conversely, Tantular and Sari found that public understanding of the economic impact is crucial for the implementation of carbon taxes in developing countries (Tantular & Sari, 2021). According to research conducted by Zhao et al., industrial investment patterns and energy efficiency are influenced by carbon taxes (Zhao et al., 2020). However, the level of effectiveness of carbon taxes varies across industries. In addition, Roberts and Spence (Roberts & Spence, 2021) propose an adjustable carbon tax to offset changes in energy prices around the world. Bui et al. conducted empirical research emphasizing the importance of monitoring and evaluation systems to ensure business compliance (Bui et al., 2020).

Finally, recent research shows that carbon taxes have great potential to reduce climate change, promote energy transition, and encourage technological innovation. However, their implementation is highly dependent on policy design, industry readiness, and public and institutional support (Akhavan-Hejazi et al., 2021; Falcão et al., 2020; Parry et al., 2014).

METHODS

This study uses a literature review research strategy to explore the potential and impact of carbon tax implementation in Indonesia. According to Littel et al, a literature review is a comprehensive search effort followed by the synthesis of search results with specific questions (Littel et al., 2008) . The search related to the potential, impact, and implementation strategies of carbon tax then synthesized the results of previous studies that had been conducted. By integrating the findings and perspectives of many empirical studies, a literature review can answer research questions with a strength that a single study does not have (Snyder, 2019). This study uses a literature study with the steps from Snyder (2019), namely, first, determining the research objectives; second, after determining the objectives,

determining the article search by conducting a gradual review by reading the abstract first, selecting and then reading the article thoroughly, then filtering it and ensuring that the article meets the inclusion criteria. The third stage is analysis. The fourth step is to ensure the depth and accuracy of the articles, and the fifth step is to write down the interpretation of the articles in accordance with the research objectives of the author. Previous research was searched for through the Elsevier Scopus and Google scholar. Articles were searched for from 2019 to 2025. The article search was conducted by entering keywords such as "carbon tax potential," "impact carbon tax," and "carbon tax policy."

RESULT AND DISCUSSION

Snyder's (2019) method consists of two stages. The first stage is to determine the research objective, which is to analyze the potential, impact, and implementation strategy of carbon tax in Indonesia. The second stage is to search for articles related to this research on the Elsevier Scopus website. Next, the research period was limited to 2019-2025, assuming that it is still relevant to current conditions. The initial search using the keywords "carbon tax" and "impact of carbon tax" on the Elsevier Scopus website yielded 7,115 articles, which were then adjusted to the researcher's objective of studying the potential and impact of carbon tax in Indonesia. Next, the researcher used Scimago Journal to view the journal index based on Scopus research. Scientific articles that have been indexed by Scimago are considered credible results (Albab & Tjaraka, 2024) and articles that have been accredited by Sinta 2 to Sinta 4.

Implementation Of Indonesia's Carbon Tax

Indonesia has demonstrated its role in mitigating climate change through the implementation of a carbon tax, as stipulated in Law Number 7 of 2021 concerning Harmonization of Tax Regulations (HPP Law). This law includes provisions on carbon tax in Article 13, which regulates the determination of carbon tax; subjects, timing, rates, and use (allocation). Essentially, carbon tax is imposed on activities that have a negative impact on the environment, such as damage, pollution, and environmental degradation. This is in line with Indonesia's commitment at the 6th Climate Change Summit to actively participate in climate crisis management. The main points include mobilizing climate finance and innovation, participating in market planning and carbon pricing, and creating a transparent, inclusive, and fair carbon economy ecosystem (Purola & Lehtonen, 2022). The carbon tax was initially intended to be applied to the coal-fired power plant sector starting April 1, 2022, at a rate of IDR 30,000 per ton of CO₂ equivalent; however, its implementation has been postponed until 2025 to ensure the readiness of the carbon market mechanism and other supporting infrastructure (Suryani, 2022).

In an economic context, the implementation of carbon taxes is anticipated to facilitate the transition to a green economy by reducing dependence on fossil fuels and strengthening investment in the renewable energy sector. Research conducted by Halizah and Furqon shows that carbon taxes have the capacity to increase state revenues and modify the behavior of individuals and commercial entities towards reducing carbon emissions, as well as to encourage the advancement of energy-efficient and environmentally friendly technologies (Halizah & Furqon, 2024). The implementation of carbon taxes is expected to reduce carbon emissions, as has been proven in other countries (Pratama et al., 2022).

The implementation of carbon tax is designed to modify the behavior of industry and society with the aim of facilitating the transition to a sustainable economy characterized by reduced carbon emissions. In accordance with the Taxation Harmonization Law (UU HPP), carbon tax is imposed on goods or activities that produce carbon emissions. Certain countries, including the United Kingdom and Sweden, have effectively achieved carbon emission reductions through the imposition of carbon taxes, which simultaneously generate beneficial economic effects by promoting the adoption of renewable energy sources (Pratama et al., 2022).

Previous research shows that the government's readiness to enforce carbon taxes is relatively strong, supported by a definitive legal framework, exemplified by Law No. 7 of 2021 and Presidential Regulation No. 98 of 2021. The government, acting through the Ministry of Finance, is currently

developing the necessary regulatory measures to facilitate the implementation of carbon taxes. However, several challenges could hinder the successful implementation of this initiative, including opposition from the industrial sector, inadequate outreach efforts, and ambiguity surrounding regulatory guidelines. Therefore, it is crucial to engage in educational initiatives aimed at public and industry stakeholders, as well as to encourage effective collaboration between the legislative and executive branches to overcome these obstacles

Carbon Tax Potential In Indonesia

Globally, carbon tax policies have been adopted by more than 40 countries and 20 subnational regions, covering around 13% of total global greenhouse gas emissions (Digitemie & Ekemezie, 2024). Indonesia has great potential when implementing a carbon tax to achieve its goal of zero carbon emissions by 2060. This potential can be seen from the state revenue from the energy sector if a carbon tax is implemented. Indonesia is the country with the highest carbon emissions in the world. Due to the high amount of carbon emissions from the energy sector, the government has implemented a carbon tax through a law on tax regulation harmonization (Pratama et al., 2022). Pratama's research shows that the Indonesian government can potentially earn carbon tax revenue from the energy sector worth IDR 23.651 trillion from the carbon tax imposed. This shows that carbon tax can be a source of revenue for the government that can be used to fund environmental initiatives or social programs.

Carbon taxes have the potential to flexibly influence behavior, such as influencing the behavior of businesses and the public to gradually change technologies, production processes, or consumption patterns related to the use of goods and services with lower emissions. The implementation of carbon taxes can encourage companies and individuals to switch to more environmentally friendly technologies and practices, as well as improve energy efficiency. In addition, carbon taxes create potential for investment in renewable energy from changes in the behavior of the public and business actors, and revenue from carbon taxes can strategically finance climate change mitigation programs, clean energy subsidies, or social compensation for the community (Purnama et al., 2025). A well-designed carbon pricing policy can result in significant emission reductions while encouraging innovation and investment in clean (Digitemie & Ekemezie, 2024). Carbon taxes are a policy instrument with significant potential in climate change mitigation and greenhouse gas emission reduction efforts (Wang et al., 2021).

Indonesia's significant carbon absorption potential makes it an important player in environmental sustainability. This potential can enhance Indonesia's position in the global arena and should form the basis of Indonesia's economy. Moz-Christofolletti and Pereda studied the impact of implementing a carbon tax in Brazil, with a target of reducing greenhouse gas (GHG) emissions by 43 percent below 2005 levels by 2030, in line with the Nationally Determined NDC (Moz-Christofolletti & Pereda, 2021). Research on carbon taxes in China conducted by Tong et al. (2022) used a dynamic general equilibrium model to analyze the feasibility of reaching peak carbon and found that carbon taxes are more effective in reducing pollution emissions than other mitigation efforts. In addition, the green finance approach can also be used to direct green investment, support green industries, and implement carbon tax and green finance transformations because carbon taxes are fiscal policy instruments designed to internalize the external costs of greenhouse gas emissions, particularly carbon dioxide (CO₂), with the main objectives of reducing emissions and supporting the transition to a low-carbon economy (Simmonds et al., 2021). Overall, carbon taxes play an important role in global strategies to achieve climate targets, including commitments in the Paris Agreement to limit global temperature rise to below 2°C. The success of this policy is highly dependent on cross-sector coordination, public participation, and continuous evaluation to ensure positive environmental and social impacts (Emeka-Okoli et al., 2024). The potential of carbon tax mentioned above can be used as a reference for the government to create effective carbon tax policies.

The Impact Of Carbon Taxes On Indonesia

In addition to the potential of carbon tax, the government needs to identify the impact of carbon tax in order to create effective carbon tax policies. The agricultural sector in Indonesia plays an important role and is not immune to the impact of carbon tax. According to Siregar et al, the implementation of carbon tax has caused a significant decline in agricultural production in Indonesia (Siregar & et al., 2025). The results of research combining Miyazawa's energy input-output model show a decline of 2.17 billion if the carbon tax is only applied to the agricultural sector, but if the carbon tax is applied to all economic sectors, the decline in the agricultural sector will increase by 16.37 billion. For rural incomes in Indonesia, carbon tax has a regressive impact on income distribution, where low-income households experience a more intense decline in income than high-income groups. In addition to the impact of carbon tax on agriculture, research conducted in Australia shows that carbon tax has an impact on coal electricity prices and market behavior. The carbon tax has caused a shift in market behavior from coal-fired power plants to other low-carbon fuel sources due to the increase in coal electricity prices as a result of the carbon tax (Wong & Zhang, 2021). The impact of the implementation of the carbon tax on the economic sector has caused an increase in the price of vehicle fuel for the community. Xiang and Lawley state that the implementation of a carbon tax can lead to a significant increase in fuel prices, which can then cause opposition to the carbon tax policy (Xiang & Lawley, 2019). In the business sector, a carbon tax can cause an increase in textile industry production prices of up to 9.25% (Tjoanto & Tambunan, 2022). This is due to an increase in the financial burden on the plastic industry caused by the imposition of carbon taxes. In addition, the competitiveness of local plastic producers may decline due to an increase in the potential for plastic product imports into Indonesia from countries that have not implemented carbon taxes. Another impact on the business and economic sectors is that carbon taxes can increase production costs, thereby reducing the competitiveness of local production compared to imports. The overall economic impact is expected to reduce consumption levels, particularly affecting people's purchasing power when production costs increase. This situation has sparked pros and cons among the public, with supporters seeing carbon tax as beneficial for the environment and creating new job opportunities, while opponents argue that policies that address emissions and poverty cannot work simultaneously. For example, an increase in electricity tariffs could burden low-income households. Public rejection of the carbon tax policy is based on the business sector's view that carbon taxes disrupt the economy, distrust of the government's management of carbon tax revenues, and skepticism about the government's ability to reduce emissions, with the allocated funds not related to environmental issues (Haptari & Widiastuti, 2023)

In the environmental sector, the implementation of carbon tax will encourage a shift from fossil fuels to more environmentally friendly fuels (Selvi & Rachmatulloh, 2020). An analysis of the impact of carbon tax implementation in Indonesia shows that the electricity sector, as the largest producer of carbon emissions, will be subject to the highest tax rate of 23.6%. Other sectors, including construction and various transportation sectors, will experience price increases. For the electricity sector, the increase in electricity prices will be very significant, ranging from 55% to 57% in various simulation sectors. Other sectors will experience relatively small price increases of around 0% to 4%. This price increase is mainly caused by increased production costs due to higher energy prices. In addition, the prices of labor and non-labor inputs will also increase (Luthfiana Rahma & Hastuti, 2025)

Regarding the impact of carbon tax implementation on households, urban households face greater challenges due to a more significant increase in living costs compared to rural households with the same income level. This difference arises from different consumption patterns. Rural households allocate around 31.7% of their income to food, which is less affected by carbon taxes. On the other hand, urban households spend relatively little on food but more on energy-intensive sectors such as transportation and electricity (Luthfiana Rahma & Hastuti, 2025). A study on carbon tax in the Philippines also found that urban households bear a higher burden than rural households (Cabalu et al., 2015).

CONCLUSION

Based on the results of the literature review, the implementation of carbon tax in Indonesia has significant potential in supporting the transition to a green economy and achieving the 2060 Net Zero Emission target. Carbon tax has the potential to increase state revenue that can be used to fund environmental programs, renewable energy, and social compensation. In addition, this instrument can also encourage businesses and the community to switch to more environmentally friendly technologies and practices.

However, the implementation of carbon tax also has a number of impacts that need to be anticipated. Positive impacts can be seen in increased clean energy investment, energy efficiency, and reduced emissions. On the other hand, negative impacts may arise in the form of increased production costs, potential decline in industrial competitiveness, additional burdens on low-income households, and the risk of policy regressivity. Vital sectors such as energy, transportation, and agriculture are the most affected by the implementation of carbon tax.

Therefore, the implementation of carbon tax in Indonesia must be carefully designed by considering social, economic, and environmental aspects in a balanced manner. Policy design needs to integrate other fiscal instruments, regulatory support, and compensation mechanisms for vulnerable groups. With proper planning, carbon tax can be an effective instrument in reducing greenhouse gas emissions while maintaining economic stability and public welfare.

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