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EVALUATION OF READINESS AND CHALLENGES OF CARBON TAX IMPLEMENTATION IN INDONESIA FROM THE PERSPECTIVE OF CLIMATE JUSTICE AND SUSTAINABLE DEVELOPMENT

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Abstract:

Global climate change triggered by increasing greenhouse gas (GHG) emissions has encouraged many countries, including Indonesia, to adopt environmentally-based fiscal policies, one of which is a carbon tax. This article aims to analyze the basic concept of carbon tax, evaluate the readiness and challenges of its implementation in Indonesia, and provide policy recommendations based on international practices and national socio-economic conditions. This study uses a normative legal approach with a descriptive-analytical method based on literature studies. The results of the analysis show that although Indonesia already has a legal framework for carbon tax through the HPP Law and Presidential Regulation No. 98 of 2021, its implementation still faces technical, institutional, and social resistance challenges. Lessons learned from countries such as Sweden, Singapore, and Canada emphasize the importance of fair, gradual, and integrated policy design. Therefore, the implementation of the carbon tax in Indonesia must be accompanied by a clear roadmap, strengthening of the emission monitoring system (MRV), technological incentives, and social compensation mechanisms so that this policy can function as a transformative instrument towards inclusive low-carbon development.

Keywords: Carbon Tax, Climate Change, Fiscal Instruments, Climate Justice, Sustainable Development

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INTRODUCTION

Climate change has become one of the biggest challenges for sustainable development in the 21st century. Its impacts are felt in the form of increasing global temperatures, changes in extreme weather patterns, declining agricultural productivity, rising sea levels, and water and energy resource crises. The 2022 report by the Ministry of Environment and Forestry (KLHK) noted that Indonesia has experienced an average temperature increase of 0.9°C in the last 40 years (Anggraeni et al., 2023). One of the main causes of this phenomenon is the high concentration of greenhouse gases (GHG), especially carbon dioxide (CO_2), which is produced from human activities such as the burning of fossil fuels, deforestation, and industrialization.

In response to this, various countries have implemented an economic approach as an emission control strategy, using market-based policy instruments such as carbon taxes. Carbon taxes are designed to internalize the negative externalities of carbon emissions by imposing a cost burden on business actors or individuals for the emissions they produce. Through this mechanism, economic actors are encouraged to switch to clean energy and low-emission technologies. Theoretically, this instrument not only has a positive environmental impact but also creates a new source of revenue for the country that can be allocated to fund the energy transition, subsidize renewable energy, or compensate vulnerable groups.

Globally, the implementation of carbon taxes has shown significant results. Countries such as Sweden, Finland, and Canada have implemented this policy since the 1990s, and have succeeded in consistently reducing GHG emissions without hampering their economic growth. In Southeast Asia, Singapore became the first country to implement a carbon tax in 2019. The success of these countries provides empirical evidence that carbon taxes are a feasible and effective policy in the context of sustainable economic development (Damayanti, 2021).

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As a developing country and member of the Paris Agreement, Indonesia has also shown a strong commitment to controlling carbon emissions. Through the Nationally Determined Contributions (NDC) document, which is strengthened in Presidential Regulation Number 98 of 2021 concerning the Economic Value of Carbon, Indonesia targets a 31.89% emission reduction with its efforts, and up to 43.20% with international support by 2030 (Dewi et al., 2025). As an initial step, the government has included the carbon tax policy into the national legal framework through Law Number 7 of 2021 concerning Harmonization of Tax Regulations (HPP Law), which came into effect on April 1, 2022. The carbon tax is planned to be imposed first on the coal-fired power generation sector, with an initial rate of IDR 30 per kilogram of CO_2e (Fitriani & Rahmah, 2021).

However, the implementation of the carbon tax in Indonesia has not been without obstacles. There are concerns from the industrial world regarding the impact of this policy on competitiveness, the potential for increased production costs, and the risks to low-income groups. In addition, the readiness of the emission monitoring infrastructure (monitoring, reporting, and verification/MRV), the limited accurate emission database, and low literacy among business actors are technical challenges that cannot be ignored (Ministry of Finance of the Republic of Indonesia, 2022). Local studies also indicate that the carbon tax must be formulated by considering aspects of climate justice, so that the burden of the policy is not disproportionately borne by people with low incomes (Ministry of Environment and Forestry, 2022).

Given the complexities above, it is important to review the design and implementation strategy of the carbon tax in Indonesia so that this policy is not only environmentally successful but also economically feasible and socially just. This article aims to analyze the basic concept of carbon tax, evaluate the readiness and challenges of its implementation in Indonesia, and provide policy recommendations based on international practices and local contexts that are in accordance with national socio-economic characteristics.

METHODS

This study uses a normative legal approach combined with a descriptive-analytical method. This approach was chosen because the topic being studied is closely related to the analysis of legal norms governing environmental fiscal policy, especially the carbon tax in Indonesia. In the normative legal approach, law is viewed as a system of written norms originating from laws and regulations, court decisions, and official policy documents that can be used as a basis for explaining, interpreting, and evaluating a particular legal policy (Anggraeni et al., 2023). The data used in this study are secondary, obtained through library research methods. Data sources consist of three types of legal materials, namely primary, secondary, and tertiary legal materials. Primary legal materials include applicable laws and regulations such as Law Number 7 of 2021 concerning Harmonization of Tax Regulations (UU HPP), Presidential Regulation Number 98 of 2021 concerning the Economic Value of Carbon, and Nationally Determined Contributions (NDC) documents that the Indonesian government has ratified through the Paris Agreement mechanism (Fiscal Policy Agency of the Ministry of Finance, 2022). Secondary legal materials consist of relevant scientific literature such as academic journals, study reports from the Fiscal Policy Agency of the Ministry of Finance, and publications from the Ministry of Environment and Forestry (KLHK) regarding the status and strategy of national carbon emission control[3]. Tertiary legal materials consist of legal dictionaries, encyclopedias, and official government websites that are used to support understanding of technical terms or public policies.

The data analysis technique in this study was carried out descriptively-qualitatively, namely by identifying, describing, and interpreting the contents of legal norms relevant to carbon tax policies. The analysis does not stop at explaining the contents of the regulations, but also evaluates their suitability with the principles of environmental fiscal policy and climate justice. Researchers also compare international practices, especially from countries that have previously implemented carbon tax policies such as Sweden, Canada, and Singapore, as comparative materials to assess the effectiveness of policies being designed in Indonesia (Dewi, 2025).

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This methodological approach is expected to provide a comprehensive picture of the normative and practical conditions of carbon tax policies in Indonesia. In addition, this method also provides a strong analytical basis for formulating policy recommendations that are applicable, adaptive to the national context, and in line with the Sustainable Development Goals (SDGs).

RESULT AND DISCUSSION

Basic Concept of Carbon Tax as an Environmental Fiscal Instrument. Carbon tax is a fiscal instrument developed to address the major challenges of the 21st century, namely climate change due to increased greenhouse gas (GHG) emissions, especially carbon dioxide (CO_2). Conceptually, the carbon tax originates from an environmental economic approach that proposes an externality internalization mechanism, where the social costs of environmental pollution — which have not been included in market prices — are integrated into the price structure through fiscal levies. This tax is designed to correct the market failure that occurs due to carbon emissions that are not burdened with prices, so that economic actors tend to produce and consume goods or services with high emission intensity without considering the long-term impacts on the environment and human health (Anggraeni et al., 2023).

As a policy instrument, the carbon tax not only functions as an environmental control tool but also as a source of state revenue. The main advantage of carbon tax is its flexibility in encouraging behavioral change: instead of prohibiting activities that cause emissions, this policy creates economic incentives for business actors and the community to gradually change technology, production processes, or consumption patterns towards lower emission options. In other words, carbon taxes provide a price signal that gradually reduces dependence on fossil fuels and opens up space for renewable energy investment and green innovation. In addition, carbon tax revenues can be used strategically to finance climate change mitigation programs, clean energy subsidies, or social compensation for communities affected by the energy transition (Fiscal Policy Agency of the Ministry of Finance, 2022).

In global practice, various countries have implemented carbon taxes with varying approaches and rates, depending on their economic context, energy structure, and political readiness. Sweden, for example, has been a pioneer in implementing a carbon tax since 1991 and currently applies the highest rate in the world, at around 137 Euros per ton of CO_2. This country has succeeded in reducing greenhouse gas emissions by more than 25% in two decades, without sacrificing economic growth. In Asia, Singapore implemented a carbon tax in 2019 with a low initial rate but with a commitment to gradually increase it until 2030. These practices show that the success of a carbon tax depends heavily on a consistent, accountable, and integrated policy design with national fiscal and energy policies (Damayanti, 2023).

Indonesia, as a developing country facing dual pressures between economic growth and environmental demands, has begun designing a carbon tax scheme as part of its transition strategy towards low-carbon development. In Law Number 7 of 2021 concerning Harmonization of Tax Regulations (UU HPP), carbon tax is regulated as a new form of environmental tax instrument aimed at encouraging a reduction in carbon emissions. The government has also stipulated that the initial carbon tax rate of IDR 30.00 per kilogram of CO_2 equivalent (CO_2e) will be implemented gradually, starting from the coal-fired power generation sector. The imposition of this carbon tax is in line with Indonesia's commitment in the Nationally Determined Contributions (NDC) document, which targets a 43.2% reduction in emissions with international assistance by 2030 (Dewi et al., 2025). However, it is important to underline that the carbon tax is not merely a fiscal instrument in the narrow sense, but rather part of a transformative policy ecosystem that must be designed with the principles of green budgeting and climate justice. This means that carbon tax policies must be designed by considering their impact on poor and vulnerable groups, and providing incentives for small and medium enterprises to innovate and adapt technology. Therefore, carbon tax as an environmental fiscal instrument needs to be supported by transparency in the use of revenue, strengthening of emission monitoring systems, and massive public education so that its ecological and socio-economic goals can be achieved in a balanced manner.

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Evaluation of Readiness and Challenges of Carbon Tax Implementation in Indonesia. Although Indonesia has taken a step forward by regulating carbon tax in Law Number 7 of 2021 concerning Harmonization of Tax Regulations (HPP Law), as well as establishing a general framework for the economic value of carbon in Presidential Regulation Number 98 of 2021, the implementation of this policy still faces a number of structural, technical, and social obstacles that require serious attention. Carbon tax is a policy that not only involves fiscal aspects, but also requires readiness in terms of derivative regulations, technical infrastructure, institutional capacity, and public understanding. Therefore, evaluating the readiness and challenges of implementation is an important step to ensure the effectiveness and sustainability of this policy.

In terms of regulation, Indonesia does have a legal basis for imposing a carbon tax, but its implementing regulations are still limited and do not cover all potential sectors that contribute to emissions. Until now, the implementation of the carbon tax has only been focused on the coal-based power generation sector as a pilot project. In fact, other sectors such as transportation, the manufacturing industry, and agriculture also have a large contribution to total national emissions. The absence of a comprehensive roadmap and technical regulations regarding tax rates, calculation mechanisms, and emission reporting means that business actors and local governments do not yet have strong legal certainty in implementing this policy. This creates uncertainty in the business world that has the potential to hinder the voluntary adoption of low-emission technology.

Limited technical infrastructure is also a major obstacle to the implementation of the carbon tax in Indonesia. The Monitoring, Reporting, and Verification (MRV) system, needed to measure and track carbon emissions accurately, is still under development and has not been applied evenly across all industrial sectors. Many business actors, especially at the lower to middle levels, do not yet have the tools or capacity to measure emissions from their production processes. This causes a fairly large data gap and makes it difficult to determine carbon tax objects fairly and transparently. Without a strong and nationally integrated MRV system, the potential for tax leakage and unfairness in tax collection is very likely to occur, which can ultimately reduce trust in this policy.

On the institutional side, cross-sector coordination between agencies such as the Ministry of Finance, the Ministry of Energy and Mineral Resources, the Ministry of Environment and Forestry (KLHK), and local governments is still not optimal. The lack of synchronization between fiscal planning and environmental policies has led to duplication of policies or even conflicting policies. For example, on the one hand, the government is pushing for a carbon tax as an energy transition effort, but on the other hand, it is still providing large fossil fuel subsidies, which indirectly weaken the price signal that the carbon tax is intended to create. In addition, the technical capacity of government officials, especially in the regions, is still limited in understanding and managing carbon emission-based policies, both in terms of supervision, calculation, and reporting.

The next challenge is in the social and political aspects. Carbon taxes risk triggering resistance from the business world and the community if adequate compensation policies do not accompany them. In an economic condition that has not fully recovered from the pandemic, new fiscal policies such as carbon taxes can be perceived as an additional burden, especially for energy-intensive industrial sectors. Without effective public communication, carbon taxes can give rise to political and social resistance that hinders their implementation. On the other hand, low-income groups are also vulnerable to indirect impacts, such as rising prices of goods and services due to increased production costs. Therefore, it is necessary to prepare a compensation mechanism or cross-subsidy from carbon tax revenues to ensure that this policy is not regressive and creates new inequalities.

Evaluation of these challenges shows that the implementation of the carbon tax in Indonesia is still in the early stages, full of dynamics. However, this does not mean that it cannot be implemented. With strong political commitment, institutional strengthening, and active involvement of all stakeholders, carbon tax policy can be an important instrument in supporting the transformation of the national economy towards inclusive low-carbon development. For this, strategic steps are needed, such

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as the preparation of a clear and measurable national carbon tax roadmap, investment in a credible and affordable MRV system, and a policy design that is socially just and transparent in the allocation of its revenues. Carbon tax must be positioned not just as a fiscal tool, but as the foundation of a sustainable future economy.

Another interesting example comes from Canada, which implemented a national carbon tax system in 2019 through the Greenhouse Gas Pollution Pricing Act. This policy regulates two main instruments: a carbon tax on fossil fuels and an output-based pricing system for carbon-intensive industrial sectors. Canada shows that implementing a carbon tax can be done while maintaining social equity. The Canadian government returns most of the revenue from the carbon tax to the community in the form of rebates, especially for low-income households. With this scheme, around 80% of households actually benefit from the policy (Damayanti, 2023). This is an important lesson that policy design that takes into account the distribution of economic impacts will strengthen the social legitimacy of a carbon tax.

Meanwhile, developing countries such as Chile and South Africa have shown that carbon taxes are possible in countries with limited fiscal capacity, provided they are implemented in a phased and contextual manner. Chile, for example, started with a low carbon tax (around USD 5 per ton) and only applied it to power plants and large industries. This approach allowed the government to build an emissions monitoring system while simultaneously improving the readiness of other sectors (Dewi et al., 2025). South Africa implemented a similar policy, but added flexibility such as tax exemptions for certain sectors during a transition period, to reduce pressure on strategic economic sectors (Fitriani & Rahman, 2021).

The lessons from the international practices above provide several important points for Indonesia. First, the importance of consistency and sustainability of policies in the long term, so that economic actors have certainty in adapting. Second, there needs to be a fair and transparent revenue recycling mechanism, either in the form of clean energy subsidies, social benefits, or technology incentives. Third, strengthening the emission monitoring infrastructure (MRV) and public literacy is crucial to ensure accountability and public participation in this policy. Fourth, every environmental fiscal policy must be contextualized with the socio-economic conditions and administrative capacity of the state.

By learning from the experiences of other countries, Indonesia does not need to start from scratch. However, adaptation to the local context remains the key to success. With an economic structure that is still dominated by fossil fuels, a fairly high level of social inequality, and limited fiscal capacity, Indonesia's carbon tax policy must be carefully designed so that it can become a transformative instrument that is not only environmentally friendly but also fair and inclusive.

Policy Recommendations in the Indonesian Socio-Economic Context. The implementation of a carbon tax in Indonesia is a strategic step that has great potential in supporting the sustainable development agenda and the transition to a low-carbon economy. However, to ensure the effectiveness and acceptability of this policy in the complex and diverse socio-economic context of Indonesia, it is necessary to formulate adaptive, equitable, and applicable policy recommendations. These recommendations must take into account the national economic structure that still relies on fossil fuels, the government's fiscal capacity, disparities in development between regions, and the relatively high level of social inequality.

First, the government needs to formulate a clear, gradual, and data-based roadmap for implementing a carbon tax. This stage is important to avoid economic shocks, especially for strategic sectors such as energy, manufacturing, and transportation that are still highly dependent on fossil fuels. This roadmap must explain which sectors will be imposed first, how the emission measurement mechanism will be, and when and how much the planned tariff increase will be in the medium to long term. Thus, the business world will have certainty and space to adjust its business strategy progressively. A phased approach, such as that taken by Singapore and Canada, where carbon tax rates

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are increased slowly and accompanied by technology incentives, can serve as a relevant policy reference.

Second, a transparent and fair carbon tax revenue recycling policy is needed. One of the biggest challenges of the carbon tax is its potential impact on low-income groups who are vulnerable to rising prices of goods and energy. Therefore, part of the carbon tax revenue should be allocated to social compensation programs such as direct cash assistance, electricity tariff subsidies for poor households, or improving clean energy-based public services in disadvantaged areas. In addition, the funds can also be used to support retraining programs and capacity building for workers in sectors affected by the energy transition, such as mining and heavy industry. This kind of policy design is important to realize climate justice and avoid social resistance that can thwart broad policy implementation.

Third, the government needs to encourage the use of carbon tax proceeds to encourage innovation and technological transformation in key sectors. One reason why the carbon tax is often perceived as a burden by business actors is that there is no direct support for their efforts to switch to green technology. To that end, the government must create a supportive policy ecosystem, for example, through fiscal incentives for companies investing in low-carbon technology, exemptions from import duties for clean technology imports, or tax credits for renewable energy research and development. These policies will not only increase the competitiveness of the national industry in the green economy era, but also encourage the birth of new environmentally friendly value chains domestically.

Fourth, it is important to strengthen institutional capacity and supervision at the central and regional levels. Given the highly technical and cross-sectoral nature of the carbon tax, effective inter-agency coordination is needed between the Ministry of Finance, the Ministry of Energy and Mineral Resources, the Ministry of Environment and Forestry, and local governments. The capacity of the state apparatus in managing emission reporting, setting tariffs, and verifying business actors' compliance must be strengthened through training, improving the digitalization system, and strengthening supporting regulations such as the standardized MRV (Monitoring, Reporting, and Verification) system. Local governments must also be involved from the start in planning and implementation so that this policy can be accepted and applied contextually according to the characteristics of their regions. Fifth, transparency and public communication are key factors in building the legitimacy of carbon tax policy in society. The government needs to actively socialize the objectives, benefits, and mechanisms of the carbon tax to the public in language that is easy to understand. If the public understands that this policy is not only aimed at increasing state revenues, but also to protect environmental quality, public health, and to realize social justice, then the opportunity for social acceptance will be even higher. Involving civil society, media, and academics in advocacy and education processes can improve environmental literacy while strengthening policy accountability.

By aligning technical, fiscal, social, and public communication aspects, Indonesia has a great opportunity to make carbon tax a transformative instrument in directing the economy to the green path. The successful implementation of the carbon tax will not only strengthen Indonesia's position in international forums related to climate change but also become an important foundation in creating an inclusive, resilient, and sustainable development model at the national level.

CONCLUSION

Carbon tax is one of the strategic fiscal instruments in facing the challenges of climate change and supporting the transition to a green economy. In Indonesia, this policy has sufficient legal basis through the HPP Law and Presidential Regulation Number 98 of 2021, but its implementation still faces various challenges, ranging from limited technical and institutional infrastructure to resistance from the business world and the community. An evaluation of Indonesia's readiness shows that the successful implementation of a carbon tax requires a gradual, transparent, and responsive approach to national social and economic conditions.

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Lessons learned from international practices show that a carbon tax can be effective if accompanied by other policy support, such as the return of revenue for clean energy subsidies, low-carbon technology incentives, and protection for vulnerable groups. Therefore, Indonesia needs to develop a measurable roadmap, strengthen the MRV system, improve cross-sector coordination, and build public literacy and inclusive policy communication. With the right design and implementation, a carbon tax can be a transformative tool in creating environmentally friendly and equitable economic growth.

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