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Strengthening Carbon Tax: Implementing the Paris Agreement and the Green Economy in Indonesia

Ahmad Rizal Roby Ananta[1]✉, Ahmad Dzaki Abidin[2], Iqbal Aryawidya Jhoncilla[3]

[1,2,3]Faculty of Law, Universitas Airlangga, Indonesia

✉ corresponding email: ahmad.rizal.roby-2024@fh.unair.ac.id

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Abstract

Climate change triggered by greenhouse gas emissions from fossil fuels is increasingly threatening the ecosystem and the global economy. A carbon tax is one of the policy instruments implemented in various countries, including Indonesia, to reduce emissions and encourage the transition to a green economy. Indonesia adopted this policy through Law No. 7 of 2021 on Carbon Taxes, with an initial rate of IDR 30 per kg CO_2e (USD 2 per ton CO_2e), making it one of the lowest in the world. This study aims to evaluate the effectiveness of the carbon tax policy in Indonesia by comparing it with Sweden. This country has implemented a carbon tax since 1991 and has succeeded in reducing emissions by 27%. This study uses a normative approach with comparative law, statutory, and conceptual approaches. Data were collected from primary regulations, scientific journals, and international reports related to carbon taxes. The results show that the implementation of the carbon tax in Indonesia still faces various obstacles, such as low rates, dependence on fossil fuels, and suboptimal carbon trading mechanisms.

Introduction

The climate crisis is becoming increasingly apparent as global temperatures rise due to greenhouse gas emissions from human activities, particularly the use of fossil fuels.[1] This warming is fuelling extreme weather, droughts, floods, and agricultural disruptions, threatening the world's food security. The Paris Agreement seeks to limit temperature rise to below 2°C with an ideal target of 1.5°C to prevent polar ice caps from melting, sea level rise, and feedback effects that accelerate global warming.[2] The agreement requires countries to reduce carbon emissions through Nationally Determined Contributions (NDCs) and promote renewable energy, but implementation is still constrained by dependence on fossil fuels and economic interests.[3] If not addressed immediately, climate change will exacerbate environmental, social, and economic crises, so global cooperation is needed to ensure a sustainable future.

A carbon tax in Indonesia is a strategic step in reducing greenhouse gas emissions and achieving the net zero emissions target by 2060.[4] The policy is regulated in HPP *(Harmonisasi Peraturan Perpajakan)* Law No. 7 of 2021. It will initially be implemented on coal-fired power plants through a tariff of IDR 30 per kg CO_2e, making it one of the lowest carbon taxes in the world.[5] Although planned to take effect in April 2022, its implementation has been delayed due to economic factors and industry readiness. The tax uses a cap-and-trade scheme, where companies that exceed emission limits must pay a tax

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1 Slamet Eko Prastiyo, et.al., "How Agriculture, Manufacture, and Urbanization Induced Carbon Emission? The Case of Indonesia," *Environmental Science and Pollution Research* 27, no. 33 (2020): 42093, https://doi.org/10.1007/s11356-020-10148-w.

2 Grasiele Romanzini-Bezerra dan Amanda C. Maycock, "Projected Rapid Response of Stratospheric Temperature to Stringent Climate Mitigation," *Nature Communications* 15, no. 1 (2024): 2, https://doi.org/10.1038/s41467-024-50648-8.

3 Zhenshuang Wang, et.al., "Spatial Correlation Network and Driving Effect of Carbon Emission Intensity in China's Construction Industry," *Buildings* 12, no. 2 (2022): 4, https://doi.org/10.3390/buildings12020201.

4 Vicky Firmansyah, et.al., "Scenario of Renewable Energy Transition from Fossil Energy Resources towards Net Zero Emission in Indonesia," ed. oleh Komariah dan K. Hiramatsu, *E3S Web of Conferences* 467 (2023): 6, https://doi.org/10.1051/e3sconf/202346704005.

5 Lawrence Daniel Ferwinz Andi Lolo, Achmad Dhani Maulana, dan Decmonth Nuel Pasaribu, "Transparansi Pajak Karbon: Digitalisasi Pajak Karbon Sebagai Katalisator Dalam Pembangunan Rendah Karbon di Indonesia," *Jurist-Diction* 5, no. 1 (2022): 214, https://doi.org/10.20473/jd.v5i1.32981.

or purchase emission permits from more efficient entities.[6] The mechanism encourages investment in low-carbon technologies and the transition to clean energy.

However, key challenges arise from the industry's dependence on fossil energy and its potential impact on energy prices and inflation. The success of this policy depends on the effectiveness of the carbon trading mechanism, incentives for green industries, and utilization of tax revenues to support renewable energy. If optimally implemented, a carbon tax can accelerate the transition to a sustainable economy while mitigating the impacts of climate change.

Implementing a carbon tax in Indonesia is an important part of the strategy to mitigate climate change and transition to a green economy.[7] Various studies in the last five years have examined the effectiveness of this policy from multiple perspectives. One study analyzed the potential state revenue from the carbon tax and its impact on carbon emission reduction, which showed that this policy could significantly reduce greenhouse gas emissions in Indonesia.[8] In addition, research on Indonesia's readiness to implement a green economy highlights the importance of a global strategy in facing increasingly complex social, economic, and environmental challenges[9]. Another study compared the effectiveness of carbon taxes with Ultra-Low Emission Zone (ULEZ) policies in controlling pollution. The results showed that carbon taxes are more efficient in reducing emissions and easier to implement on a national scale.[10] In addition to policy aspects, research on green economy and economic growth in

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6 Weihao Wang, Deqing Ma, dan Jinsong Hu, "Study of Carbon Reduction and Marketing Decisions with the Envisioning of a Favorable Event under Cap-and-Trade Regulation," *International Journal of Environmental Research and Public Health* 20, no. 5 (2023): 1, https://doi.org/10.3390/ijerph20054644.

7 Rizky Nur Ihsan dan Rizky Ganda Hutama, "United Nations Economic and Social Council (UNESC): Pemenuhan Hak Asasi Manusia Melalui Penerapan Pajak Karbon di Indonesia," *Padjadjaran Journal of International Relations* 5, no. 2 (2023): 173, https://doi.org/10.24198/padjir.v5i2.47088.

8 Kaca Dian Meila, Astari Dianty, dan Lydia Veronica, "Penerapan Pajak Karbon dalam Mewujudkan Sustainability Development Goals Serta Dampaknya Terhadap Penerimaan Pajak di Indonesia," *Owner* 8, no. 2 (2024): 1849–64, https://doi.org/10.33395/owner.v8i2.2001.

9 Muhkamat Anwar, "Green Economy Sebagai Strategi Dalam Menangani Masalah Ekonomi Dan Multilateral," *Jurnal Pajak dan Keuangan Negara (PKN)* 4, no. 1S (2022): 343–56, https://doi.org/10.31092/jpkn.v4i1S.1905.

10 Liang Ma, Daniel J Graham, dan Marc E J Stettler, "Has the Ultra Low Emission Zone in London Improved Air Quality?," *Environmental Research Letters* 16, no. 12 (2021): 1-16, https://doi.org/10.1088/1748-9326/ac30c1.

Indonesia over the past decade reveals that sustainability-based approaches can support more stable and inclusive economic growth. Thus, implementing a carbon tax should be aligned with green economy policies to have an optimal impact.

Meanwhile, a literature review on the effectiveness of carbon tax in climate change mitigation shows that this policy has been successfully implemented in various countries and has great potential to be replicated in Indonesia.[11] However, for this policy to be effective, it needs more substantial regulatory support, incentives for industries that implement low-carbon technologies, and a transparent monitoring mechanism. Therefore, the results of this study are an essential reference in designing a carbon tax implementation strategy in Indonesia so that it can contribute to emission reduction and realize a sustainable green economy.

Although carbon tax has been widely studied as an instrument for emission reduction and green economy in Indonesia, research gaps still need to be explored.[12] Most studies have only highlighted fiscal and environmental impacts but have not addressed integration with carbon trading, infrastructure readiness, and effects on industry competitiveness and community welfare. The lack of studies on the economic burden on fossil energy-dependent sectors and the impact of carbon taxes on energy prices are also research gaps that need further investigation.

As a novel contribution, this research proposes a holistic approach to carbon tax implementation by considering policy integration, economic impact, and social welfare. The main focus is on how carbon tax serves as a fiscal instrument and a driver of green innovation and sustainable investment. The study also emphasizes the importance of inclusive policies to transition to a green economy effectively, support Indonesia's 2060 net zero emissions target, and create a more equitable energy system.

This study aims to compare the implementation of a carbon tax in Indonesia with that of developed countries to gain the best insights into optimizing this policy. In addition, this study will also provide a strong argument for increasing the carbon tax rate to reduce over-

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11 Hilwa Nurkamila Maghfirani, Namira Hanum, dan Roidah Dzata Amani, "Analisis Tantangan Penerapan Pajak Karbon Di Indonesia," *Juremi: Jurnal Riset Ekonomi* 1, no. 4 (2022): 314–21, https://doi.org/10.53625/juremi.v1i4.746.

12 Robert N Stavins, "The Future of US Carbon-Pricing Policy," *The University of Chicago Press Journal* 20 (t.t.): 10, https://doi.org/10.1086/706792.

exploitation of the environment by the mining industry. Furthermore, the study aims to intervene with the government in accelerating the transition to renewable energy by ensuring that carbon tax revenues are optimally used for investment in green infrastructure. With a more inclusive and data-driven approach, this study is expected to provide strategic recommendations for Indonesia to achieve its 2060 net zero emissions target and create a more equitable and sustainable green economic system.

Method

This research applies normative research[13] with the Comparative Approach, Statute Approach, and Conceptual Approach to evaluate carbon tax policies in Indonesia and Sweden. This normative approach is also the character of this research to examine the legal basis of a carbon tax in the HPP *(Harmonisasi Peraturan Perpajakan)* Law No. 7 of 2021 and compare it with the Swedish Carbon Tax Law 1991, while the conceptual approach is used to measure the conformity of Indonesia's policy with the 2015 Paris Agreement. The research data is collected through a literature study, which includes primary legal materials such as carbon tax regulations in both countries as well as international treaties; secondary legal materials consisting of scientific journals and reports from IPCC, OECD, and World Bank; and tertiary legal materials such as encyclopedias and legal dictionaries that support conceptual analysis.

The analysis compares the tax structure, rates, economic impact, incentives for industry, and effectiveness in reducing carbon emissions in Indonesia and Sweden. This study highlights the advantages of Sweden in implementing a progressive carbon tax that has significantly reduced emissions, as well as the challenges Indonesia faces in optimizing this policy. The main objectives of this study are to analyze the comparative application of carbon taxes, provide recommendations for increasing tariffs to limit the exploitation of natural resources and accelerate the transition to renewable energy through more strategic fiscal policies. In addition, this research assesses whether Indonesia's policies are aligned with the *Paris Agreement* and offers strategies based on Swedish best practices to strengthen the effectiveness of the carbon tax and accelerate the transition to a sustainable green economy.

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13 Peter Mahmud Marzuki, *Penelitian Hukum*, Revisi (Jakarta: Prenada Media, 2017).

Result and Discussion

A. Carbon Tax Regulations in Sweden

Sweden is one of the pioneering countries in implementing a carbon tax as part of a key strategy in environmental policy and climate change impact reduction[14]. It was first enacted in 1991 as part of a tax reform known as *grön skatteväxling* or green tax shift.[15] The move comes in response to growing concerns about greenhouse gas emissions since the late 1980s.[16] This carbon tax was initially applied to various fossil fuels such as gasoline, coal, and diesel oil used in the transportation and domestic heating sectors. The main objective of this policy was to reduce dependence on fossil fuels and encourage the use of renewable energy.

Sweden began imposing a national carbon tax in 1991 through the Carbon Tax Act (Act 1990:582), making it a pioneer in controlling emissions through economic instruments.[17] This tax is imposed on various types of fossil fuels, including coal, oil, natural gas, LPG, and domestic aviation fuel, and was expanded in 2013. Emissions already regulated by the EU ETS scheme are exempt from this tax to avoid double taxation.[18] The tax is levied at the fuel supplier level and covers approximately 40% of total national greenhouse gas emissions. Since its implementation, the tax rate has increased gradually, reaching SEK 1,450 per ton of CO_2 by 2024.

In 2019, the carbon tax generated state revenue of SEK 22.2 billion, equivalent to approximately 1% of total tax revenue. The

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14 Eykel Bryken Barus dan Suparna Wijaya, "Penerapan Pajak Karbon Di Swedia Dan Finlandia Serta Perbandingannya Dengan Indonesia," *Jurnal Pajak Indonesia (Indonesian Tax Review)* 5, no. 2 (28 Juni 2022): 265, https://doi.org/10.31092/jpi.v5i2.1653.

15 Maruf Rahman Maxim dan Kerstin Zander, "Green Tax Reform and Employment Double Dividend in Australia Should Australia Follow Europe's Footsteps? A CGE Analysis," *Margin* 14, no. 4 (2020): 456, https://doi.org/10.1177/0973801020953310.

16 *Ibid.*, 456.

17 Adityawarman Adityawarman, et.al., "Adopting Indirect Carbon Pricing Strategies for Indonesia: Insights from Global Practices Using a Bibliometrics and Systematic Literature Review," *International Journal of Energy Economics and Policy* 15, no. 4 (2025): 363, https://doi.org/10.32479/ijeep.19320.

18 Andrea Flori dan Alessandro Spelta, "Carbon Trade Biases and the Emerging Mesoscale Structure of the European Emissions Trading System Network," *Nature Communications* 16, no. 1 (2025), 345, https://doi.org/10.1038/s41467-025-59913-w.

funds obtained are not explicitly allocated to environmental projects but are included in the state's general budget. The implementation of this policy has proven effective in reducing carbon emissions by approximately 10% between 1990 and 2005, without hindering economic growth.[19] To strengthen its climate commitment, Sweden enacted the Climate Act in 2018, setting a target of net-zero emissions by 2045. The law also mandates annual climate reports and climate policy planning every four years as part of a long-term strategy.

Since its inception, the carbon tax rate has increased significantly. In the early stages, the rate was set at USD 26 per ton of CO_2 equivalent, then increased to USD 32 per ton in 2000.[20] Then, in 2004, the rate sharply increased to USD 95 per ton of CO_2 equivalent. The most significant growth occurred in 2021, when it reached USD 137 per ton of CO_2 equivalent, making Sweden the country with the highest carbon tax rate in the world.[21] In practice, the Swedish government initially provided tax exemptions for several strategic sectors such as industry, mining, agriculture, and forestry to prevent adverse impacts on economic stability. However, these sectors are still required to participate in the European Union Emission Trading Scheme (EU ETS), which has a lower rate than the national carbon tax.[22]

The successful implementation of a carbon tax in Sweden is inseparable from the active role of various parties, especially the human resources involved in the process. The government and policymakers have been instrumental in designing and refining the policy to make it more effective over time. On the other hand, the industrial sector adjusts by innovating and shifting to more efficient and environmentally friendly technologies to reduce the financial impact of the carbon tax.[23] In addition, the Swedish people have a high

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19 Gustavo Moraes Coraça, et.al., "An Assessment of the Long-Term Water, Greenhouse Gas, and Cost Impacts of Low-Carbon in Situ Oil Sands Technologies," *Fuel* 403 (2026): 3, https://doi.org/10.1016/j.fuel.2025.136028.

20 Olena Dobrovolska, et.al., "Environmentally Related Taxes and Their Influence on Decarbonization of the Economy," *Environmental Economics* 15, no. 1 (3 Juni 2024): 175, https://doi.org/10.21511/ee.15(1).2024.13.

21 *Ibid.*, 178.

22 Teresa Lappe-Osthege, "The Ripple Effects of Compliance: Reconfiguring EU Policy Effectiveness in Transboundary Environmental Governance," *JCMS: Journal of Common Market Studies* 62, no. 3 (2024): 657, https://doi.org/10.1111/jcms.13519.

23 Eykel Bryken Barus dan Suparna Wijaya, *Op. Cit*, 267.

level of environmental awareness, so they can accept this policy well and play an active role in reducing their carbon footprint.[24] Thanks to a solid collaboration between government, industry, and society, Sweden reduced its carbon emissions by 27% from the introduction of the carbon tax in 1991 until 2018 without hampering its economic growth.[25] With a comprehensive approach and full support from all elements of society, Sweden has proven that a carbon tax can be an effective instrument in realizing the transition to a sustainable economy.

B. Carbon Tax Regulations in Indonesia

Indonesia has taken a step in implementing a carbon tax as part of its climate change mitigation strategy and transition to a greener economy. This step was realized through Law Number 7 of 2021 concerning Harmonization of Tax Regulations (HPP Law), which was passed on 29 October 2021.[26] This carbon tax encourages the industrial and energy sectors to reduce carbon emissions and switch to cleaner energi.[27] In addition, this policy supports Indonesia's commitment to the Paris Agreement, which targets a 29% reduction in greenhouse gas emissions independently and 41% with international assistance by 2030.[28] The carbon tax implementation is designed to be done in stages, with the initial stage supposed to start on April 1, 2022. At this stage, using a *cap and tax* mechanism, the

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24 Alireza Bahrami, et.al., "Important Criteria for Swedish Construction Companies to Choose Environmentally Friendly Concrete," *Civil Engineering Journal* 9, no. 1 (2023): 201, https://doi.org/10.28991/CEJ-2023-09-01-015.

25 Sverker C. Jagers, Johan Martinsson, dan Simon Matti, "The Impact of Compensatory Measures on Public Support for Carbon Taxation: An Experimental Study in Sweden," *Climate Policy* 19, no. 2 (2019): 150, https://doi.org/10.1080/14693062.2018.1470963.

26 Komang Adi Kurniawan Saputra, et.al., "Potential Carbon Tax in Indonesia: A Literature Review," *International Journal of Environmental, Sustainability, and Social Science* 4, no. 6 (2023): 1672, https://doi.org/10.38142/ijesss.v4i6.891.

27 Uni W. Sagena, et.al., "Program Triple C (Climate Change Class) Untuk Peningkatan Kesadaran Lingkungan Bagi Anak," *JMM (Jurnal Masyarakat Mandiri)* 7, no. 4 (2023): 3240, https://doi.org/10.31764/jmm.v7i4.15756.

28 Alexander Kevin Tjoanto dan Maria Tambunan, "Tantangan dan Strategi dalam Proses Implementasi Kebijakan Pajak Karbon," *Jurnal Riset Akuntansi & Perpajakan (JRAP)* 9, no. 02 (2022): 215, https://doi.org/10.35838/jrap.2022.009.02.20.

carbon tax will only be applied to the coal-fired power plant sector.[29] However, the implementation of this tax has been delayed several times, including until 1 July 2022, and has yet to be fully implemented.

The delays were caused by various factors, including the need to develop more detailed technical regulations and the industrial sector's readiness to deal with the carbon tax.[30] In addition, the government is considering the impact of this policy on economic competitiveness, especially in the post-COVID-19 pandemic recovery. Under the HPP Law, the carbon tax rate is set at a minimum of IDR 30 per kilogram of carbon dioxide equivalent (CO_2e), or IDR 30,000 per ton of CO_2e, which, when converted to US dollars (at an exchange rate of IDR 15,000/USD) is only around USD 2 per ton of CO_2e.[31] Countries like Sweden and Switzerland have even higher rates, at USD 137 and USD 101 per ton of CO_2e.[32] Meanwhile, the carbon price in the EU emissions trading system ranges from USD 80 to USD 100 per ton of CO_2e.[33] With this significant difference in rates, the effectiveness of Indonesia's carbon tax in reducing emissions is questionable. A carbon tax that is too low does not provide enough incentive for industries to switch to cleaner energy sources, so this policy could be less effective in achieving the emission reduction targets that have been set. Although the carbon tax has been included in national regulations, its implementation still faces several challenges. One of the main obstacles is the unpreparedness of technical rules, as more detailed implementing regulations are still being drafted. This creates uncertainty for businesses regarding the implementation mechanism, which sectors will be subject to the subsequent carbon tax, and how the incentive or exemption mechanism will be applied.

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29 Putri Gantine Lestari, "Implementasi Pajak Emisi Karbon untuk Mengatasi Eksternalitas Negatif Emisi Karbon di Indonesia," *In Search* 21, no. 1 (2023): 174, https://doi.org/10.37278/insearch.v22i1.705.

30 Fitri Wahyuni, "Pajak Karbon Sebagai Instrumen Kebijakan Publik Untuk Mitigasi Perubahan Iklim: Telaah Kritis Dan Prospek Di Indonesia," *VISIONER : Jurnal Pemerintahan Daerah di Indonesia* 15, no. 2 (2023): 45, https://doi.org/10.54783/jv.v15i2.906.

31 Yati Nurhayati, et.al., "Carbon Pricing Policy to Support Net Zero Emission: A Comparative Study of Indonesia, Finland and Sweden," *Environmental Policy and Law* 54, no. 1 (2024): 59, https://doi.org/10.3233/EPL-230047.

32 Pınar Çomuk, et.al., "The Foreign Direct Investments, Carbon (CO_2) Emissions, and Economic Growth Nexus: An Empirical Analysis for Turkey and European Union Countries," *WSB Journal of Business and Finance* 57, no. 1 (2023): 89, https://doi.org/10.2478/wsbjbf-2023-0010.

33 *Ibid.*, 90.

In addition, the government is still considering the economic impact and post-pandemic recovery, especially regarding industrial competitiveness. It is feared that a carbon tax that is too high could burden fossil energy-based industries, such as the manufacturing and energy sectors. Another challenge is the imbalance of carbon prices in the global market, where some countries set lower rates or have not even implemented a carbon tax. If Indonesia's carbon tax increases drastically, industries risk moving their operations to countries with lower rates (carbon leakage), which could hamper global emission reduction efforts. In addition, the lack of industry awareness and compliance with the carbon tax remains a challenge. Many companies in Indonesia still rely on fossil fuels because they are cheaper than renewable energy. A lack of understanding about the carbon tax also contributes to the industry's slow adaptation to this policy.

Finally, the lack of integration of the carbon tax with the carbon market is another obstacle to implementing this policy. The government plans to develop a carbon market as part of its emissions reduction strategy, but an integrated carbon trading mechanism is not yet fully operational.[34] As a result, companies that successfully reduce emissions are not incentivized to invest in low-carbon technologies. While Indonesia has taken a step forward by including a carbon tax in national regulations, its effectiveness still depends on gradually increasing the rate and resolving various implementation challenges. The government needs to finalize technical regulations, integrate the carbon tax with the carbon market, and provide incentives for industries that switch to clean energy. With a more thoughtful and planned approach, a carbon tax in Indonesia can effectively support the transition to a green and sustainable economy.

C. Carbon Tax as a Fiscal Instrument, but also as a Driver of Green Innovation and Sustainable Investment

A carbon tax is a fiscal policy that aims to reduce carbon dioxide (CO_2) emissions by imposing a fee on the use of fossil fuels.[35] As an

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[34] Ilham Dwi Rafiqi & Nikmah Mentari, "Comparison of Carbon Trading in Asean Countries: An Explanation from a Policy Perspective," *Journal of Law and Policy Transformation 9*, no. 1 (2024): 1-18, https://doi.org/10.37253/jlpt.v9i1.9044

[35] Daniel Scheitrum, "Impact of Intensity Standards on Alternative Fuel Adoption: Renewable Natural Gas and California's Low Carbon Fuel Standard," *The Energy Journal* 41, no. 2 (2020): 192, https://doi.org/10.5547/01956574.41.2.dsch.

economic policy tool, this tax significantly increases state revenue, which can then be used to support the development of renewable energy, research into environmentally friendly technology, and climate change mitigation programs.[36] In addition, the carbon tax also serves to internalize the negative impacts of pollution by reflecting the social costs in the prices of goods and services.[37] Thus, this tax incentivizes industry and society to reduce dependence on carbon-based energy. In addition to its fiscal benefits, the carbon tax also accelerates innovation in green technology.[38] The increased cost of using fossil fuels due to this tax encourages companies to look for more sustainable alternatives to reduce their tax burden. This accelerates the development and application of clean energy, such as solar and wind power, and improves energy efficiency in various industrial sectors. Carbon taxes also spur the business world to invest more in research and development (R&D) to create innovative solutions that are environmentally friendly and highly competitive in the global market.[39] With the right policies, this tax can drive the transition to a green economy.

The green economy is a development approach that balances economic growth with environmental sustainability and social welfare.[40] This model emphasizes resource utilization efficiency, pollution, and carbon emissions reduction, as well as innovation development based on environmentally friendly technology.[41] In contrast to the traditional economic system, which tends to exploit resources without considering the long-term impact, the green economy adopts sustainable strategies in various sectors such as energy, industry, agriculture, and transportation. The main principles include

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36 Dwi Nusiantari dan Adhipradana Prabu Swasito, "Peran Penerimaan Pajak Dalam Usaha Pemerataan Pendapatan," *Jurnal Pajak Indonesia (Indonesian Tax Review)* 3, no. 1 (2020): 36, https://doi.org/10.31092/jpi.v3i1.670.

37 *Ibid.*, 38.

38 Putri Gantine Lestari, *Op.Cit.*, 175.

39 Mosab I. Tabash, et.al., "Does investment in energy matter for economic growth? Evidence from BRICS countries," *International Journal of Organizational Analysis* 31, no. 7 (2023): 3, https://doi.org/10.1108/IJOA-03-2022-3185.

40 Agus Kiswantono, "Inovasi Energi Hijau: Piezoelektrik Untuk Mengubah Getaran Kendaraan Menjadi Listrik," *Jurnal Informatika dan Teknik Elektro Terapan* 12, no. 3 (3 2024): 1830, https://doi.org/10.23960/jitet.v12i3.4452.

41 Tetiana Horodetska, Maryna Kashynska, dan Denys Vilko, "Methodological Approaches to Managing the Investment Development of Business Structures on the Basis of Greening," *Economics. Finances. Law* 11/2, no. 1 (2022): 6, https://doi.org/10.37634/efp.2022.11(2).1.

energy efficiency, ecosystem protection, creating environmentally friendly jobs, and investing in sustainability solutions.[42] Applying a green economy can help tackle climate change, improve economic stability, create a healthier environment, and ensure the sustainability of resources for future generations.[43] To be successful, implementing a green economy requires policy support that encourages continuous innovation, incentives for green industry, and collaboration between the government, the private sector, and the community.[44]

Furthermore, the carbon tax is vital in encouraging sustainable investment. This tax sends a strong signal to investors that the fossil fuel-based sector will become increasingly unprofitable in the future, thus attracting more capital to the clean energy industry and environmentally friendly technology.[45] In addition, funds obtained from carbon taxes can be used to build sustainable infrastructure, such as clean energy-based public transportation, energy-efficient buildings, and other renewable energy projects.[46] With this step, the carbon tax policy contributes to emission reduction efforts, opens up new economic opportunities, and increases industrial competitiveness in the transition era towards a green economy.

Overall, the carbon tax functions as a fiscal instrument that increases state revenue and is a strategic policy that encourages green innovation and sustainable investment. This tax can be a key element in creating a more sustainable and environmentally friendly low-carbon economy by providing clear economic incentives for efforts to reduce emissions and develop environmentally friendly technologies. For this policy to be effective, careful design and an implementation

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42 Mosab I. Tabash, *Ibid*., 4.

43 Dwi Rahmayani, et.al., "Peningkatan Kapabilitas Green Economy Dalam Pengembangan Desa Wisata Sebagai Upaya Mewujudkan Pembangunan Berkelanjutan," *Kumawula: Jurnal Pengabdian Kepada Masyarakat* 5, no. 1 (2022): 176, https://doi.org/10.24198/kumawula.v5i1.36289.

44 Yun Li, et.al., "The Role of Green Technological Innovation, Fintech, and Financial Development in Environmental Sustainability: A Study on Selected Asian Countries," *Journal of Economics, Finance and Accounting Studies* 6, no. 3 (2024): 33, https://doi.org/10.32996/jefas.2024.6.3.4.

45 Satsita S. Khasanova dan Maryam A. Saydulgerieva, "Green Economy as a Tool for Sustainable Development and a Factor Contributing to the Formation of a Low-Carbon Economy," ed. oleh V. Trukhachev dkk., *BIO Web of Conferences* 82 (2024): 2, https://doi.org/10.1051/bioconf/20248204003.

46 Stephen Acheampong, Tetyana Pimonenko, dan Oleksii Lyulyov, "Sustainable Marketing Performance of Banks in the Digital Economy: The Role of Customer Relationship Management," *Virtual Economics* 6, no. 1 (23 Maret 2023): 20, https://doi.org/10.34021/ve.2023.06.01(2).

strategy that considers the economic and social impacts are needed so that all parties can feel the benefits without burdening more vulnerable groups of society.

The implementation of carbon taxes in Sweden has proven its effectiveness in practice, not just as a theoretical concept.[47] Since its implementation in 1991, the country has successfully reduced greenhouse gas emissions by 33% by 2021, while GDP has increased by over 80% during the same period. This demonstrates that environmentally focused fiscal policies do not hinder economic growth but can support it simultaneously. In 2019, revenue from the carbon tax reached SEK 22.2 billion (approximately €2.3 billion), which was then used to fund government spending without increasing the budget deficit.[48] For Indonesia, Sweden's experience serves as an example that a comprehensively designed carbon tax policy can drive economic growth while helping to reduce emissions, provided transparency mechanisms and social protection measures accompany it.[49]

In Indonesia, carbon tax policies were implemented in 2022 with an initial rate of Rp 30 per kilogram of CO_2e, or approximately USD 2 per ton.[50] This rate is still significantly lower than Sweden's rate of €126 per ton in 2024.[51] If this rate is not gradually increased and adjusted to the development of the carbon market, the positive impact on emission reductions could be minimal. However, suppose this policy is progressively integrated with an emissions trading scheme, and the tax revenue is used to support clean energy or social assistance programs. In that case, its potential for success will be much greater. According to the World Bank's 2022 report, Indonesia could reduce carbon emissions by up to 15% from business-as-usual projections by

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47 Åsa Knaggård dan Roger Hildingsson, "The Adoption of the Swedish Carbon Tax: Influences and Interactions across Multiple Political Levels, Jurisdictions, and Policy Areas," *Policy Studies Journal* 53, no. 2 (2025): 416, https://doi.org/10.1111/psj.70011.

48 Jiahao Zhang, et.al., "Research on the Application of Conjoint Analysis in Carbon Tax Pricing for the Sustainable Development Process of China," *Sustainability* 16, no. 21 (2024): 4, https://doi.org/10.3390/su16219407.

49 Cecilia Higa, et.al., "Coalitions Towards the Carbon Tax in the Swedish Heating Sector," *Sustainability* 12, no. 20 (2020): 5, https://doi.org/10.3390/su12208530.

50 Alda Erfian, et.al., "Determining Carbon Dioxide Emission Factors of Indonesia Coal-Fired Power Plants with CEMS Measurement Data," *Aerosol and Air Quality Research* 24, no. 3 (2024): 6, https://doi.org/10.4209/aaqr.240193.

51 Daniel Lindvall, et.al., "The Role of Fairness for Accepting Stricter Carbon Taxes in Sweden," *Climate* 12, no. 11 (2024): 4, https://doi.org/10.3390/cli12110170.

2030 if carbon prices are raised to USD 10–15 per ton and accompanied by energy subsidy reforms. Therefore, a carbon tax has the potential to become a strategic fiscal instrument to support the low-carbon development agenda while maintaining national economic stability.

D. Legal Strengthening in Indonesia in the Transition to a Green Economy

Indonesia continues strengthening its legal system to support the transition to a green economy by balancing economic growth, environmental protection, and social welfare. Various regulations have been implemented to ensure the sustainability of financial activities, such as Law No. 32 of 2009, which was partially amended in Law No. 6 of 2023 regarding environmental permits and Environmental Impact Assessments (EIA). In addition, Government Regulation No. 22 of 2021 strengthens carbon trading policies and green economic incentives to encourage environmentally friendly investment.

In law enforcement, the government is increasingly strict in overseeing compliance with environmental regulations. The Ministry of Environment and Forestry, which is currently split into two agencies, namely the Ministry of Forestry and the Ministry of Environment and the Corruption Eradication Commission, actively cracks down on environmental violations through administrative and criminal sanctions, up to and including revocation of business licenses.[52] Environmental courts are also increasingly firm in their decisions, demanding the restoration of affected ecosystems. This step is expected to provide a deterrent effect for business actors who neglect their environmental obligations.[53]

The government also implements incentives such as renewable energy subsidies, tax cuts, and green credits to support the green economy. On the other hand, carbon taxes and high emission tariffs are imposed to suppress industries that pollute the

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[52] Inka Muliyani, et.al., "Analisis Implementasi Dalam Mewujudkan Ekonomi Hijau Di Kalimantan Barat," *Jurnal Ilmiah Ekonomi Global Masa Kini* 14, no. 2 (4 Desember 2023): 112, https://doi.org/10.36982/jiegmk.v14i2.3466.

[53] Muh. Sutartib, "Tantangan Administrasi Pengenaan Pajak Karbon Di Indonesia," *Jurnal Anggaran dan Keuangan Negara Indonesia (AKURASI)* 3, no. 2 (29 November 2021): 40, https://doi.org/10.33827/akurasi2021.vol3.iss2.art127.

environment.[54] Presidential Regulation No. 98 of 2021 enables a carbon trading mechanism so companies can obtain financial compensation for emission reductions. In the financial sector, The OJK requires banks to adopt sustainability principles (through POJK No. 51/2017), and together with the IDX, which provides green financing instruments, has introduced a carbon trading mechanism supported by Law No. 4 of 2023 to encourage emission reductions through a regulated carbon exchange, thereby strengthening the legal and financial foundation for a green economy in Indonesia and fiscal incentives and disincentives are strengthening the legal framework for the green economy.[55] The main challenge lies in inter-institutional coordination and policy implementation. Therefore, synergy between the government, the private sector, and the community is key to realizing an inclusive and sustainable green economy.

Conclusion

Carbon tax in Indonesia has great potential to reduce greenhouse gas emissions and encourage the transition to a green economy. However, its implementation still faces challenges like low tariffs, industry dependence on fossil energy, and suboptimal carbon trading mechanisms. To increase its effectiveness, gradual tariff adjustments, incentives for renewable energy, and strengthened regulation and supervision are needed. For the transition to a green economy to be more inclusive and equitable, the government must design a strategy that balances emissions reductions and economic growth. Carbon taxes must be more than just a fiscal instrument; they must catalyze green innovation and sustainable investment. With the right policy reforms based on global best practices, Indonesia can accelerate its 2060 net zero emissions target and build a more resilient and sustainable green economy.

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[54] Kurnia Widya Oktarini, Tiara Nurpratiwi, dan Averroes Ar Razy Tjegame, "Pajak Ekonomi Sirkular Dan Keberlanjutan Lingkungan," *Jemasi: Jurnal Ekonomi Manajemen dan Akuntansi* 19, no. 2 (9 Desember 2023): 206, https://doi.org/10.35449/jemasi.v19i2.672.

[55] Murini Murini, et.al., "Analisis Pengaruh Kebijakan Dividen, Struktur Modal, dan Kinerja Keuangan terhadap Nilai Perusahaan: Studi Kasus pada Perusahaan Publik di Bursa Efek Indonesia," *Jurnal Bisnis dan Manajemen West Science* 2, no. 04 (30 November 2023): 348, https://doi.org/10.58812/jbmws.v2i04.778.

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All authors declared that this work is original and has never been published in any form and in any media, nor is it under consideration for publication in any journal, and all sources cited in this work refer to the basic standards of scientific citation.