

Advances in Taxation Research

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How the carbon tax affects the economy and environment: Point of view of a corporate taxpayer

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Received: 2023, 04, 21 Accepted: 2023, 05, 30

Available online: 2023, 05, 31

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KEYWORDS	ABSTRACT
<p>Keywords: carbon tax, corporate taxpayers, renewable energy, economic impact, environmental sustainability</p> <p>Conflict of Interest Statement: The author(s) declares that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.</p> <p>Copyright © 2023 ATR. All rights reserved.</p>	<p>Purpose: This study examines the effects of carbon taxation on the economy and the environment from the perspective of corporate taxpayers. The research focuses on coal-fired power facilities in South Sulawesi province, particularly PT PLN Indonesian Power Barru. It explores how carbon taxation influences business operations, government revenue allocation, and environmental sustainability.</p> <p>Research Design and Methodology: A qualitative research approach was employed, utilizing interviews, observations, and document analysis to gather in-depth insights. The case study method was used to analyze the impact of carbon taxation on corporate financial strategies and decision-making processes related to emissions reduction and energy transitions.</p> <p>Findings and Discussion: The findings indicate that while carbon taxation generates revenue that can be allocated to critical sectors such as healthcare and education, it also increases business operational costs. The resulting rise in electricity tariffs poses financial challenges for industries dependent on fossil fuels. In response, businesses explore alternative strategies to reduce emissions, including adopting renewable energy sources and investing in cleaner technologies.</p> <p>Implications: The study highlights the need for a balanced policy approach that ensures economic stability while promoting environmental sustainability. Policymakers should consider implementing incentives to facilitate corporate adaptation to carbon taxes and encourage investment in green energy solutions. Future research should explore the long-term impact of carbon taxation on corporate financial resilience and sustainable economic development in Indonesia.</p>

Introduction

As a developing country, Indonesia faces substantial challenges in formulating and implementing development strategies to enhance its citizens' welfare. A key component of national development is the availability of sufficient financial resources, with tax revenue serving as a crucial funding source. However, despite ongoing efforts to improve tax compliance, many taxpayers continue to engage in tax avoidance strategies, thereby undermining the realization of state revenue (Friskianti & Handayani, 2014; Nurfadila & Muslim, 2021). One of the primary obstacles to achieving optimal tax revenue is the persistently low level of taxpayer compliance, where individuals and corporations fail to fulfill their legal tax obligations (Ramadani et al., 2021). The gap between expected and actual tax

revenues highlights the urgent need for more effective fiscal policies. Tax collection inefficiency restricts the government's capacity to invest in essential sectors such as infrastructure, healthcare, and education. Consequently, achieving long-term economic stability and sustainable growth remains a formidable challenge without sufficient tax revenue. Moreover, persistent tax evasion and avoidance underscore the necessity for a more comprehensive tax system that ensures compliance while fostering an economic environment conducive to business growth (Prichard et al., 2019). The global environmental crisis has escalated due to climate change, mainly driven by increasing greenhouse gas (GHG) emissions, particularly carbon dioxide (CO₂). Since the pre-industrial era, human activities have significantly contributed to rising CO₂ emissions, leading to severe environmental consequences such as extreme weather variations, air pollution, and ecosystem degradation (Boguslavsky et al., 2022). According to the European Commission, CO₂ concentration levels in the atmosphere surged by 48% in 2020 compared to the pre-industrial period before 1750. This increase has exacerbated global warming, depleted the ozone layer, and heightened environmental risks. In response, the Indonesian government introduced a carbon tax as part of its climate change mitigation strategy (Wimala & Jeremy, 2022). The policy, ratified under the Harmonized Tax Law (UU HPP) on October 7, 2021, and implemented on April 1, 2022, initially targeted coal-fired power plants, imposing a base rate of IDR 30.00/kg CO₂e. By imposing financial liabilities on carbon emitters, the government aims to curb environmental degradation while encouraging a transition to sustainable energy sources. However, the implications of this taxation policy on corporate financial strategies remain contentious.

A carbon tax is a levy imposed on carbon emissions generated through economic activities in production and consumption processes (Tax, 2020). It applies to manufacturing companies emitting carbon during production and consumers utilizing goods or services contributing to carbon emissions. The primary objectives of a carbon tax are threefold: to drive economic and behavioral shifts toward low-carbon activities, to support medium- and long-term GHG emission reduction targets, and to foster innovation and investment in environmentally friendly technologies (Indonesia Ministry of Finance, 2021). Carbon taxation is a regulatory mechanism incentivizing industries to adopt greener, more sustainable practices by imposing financial penalties on emissions. Various studies have examined the economic and environmental effects of carbon taxation. For instance, Friskianti & Handayani (2014) highlight the role of tax policies in generating state revenue and fostering economic development. Nurfadila & Muslim (2021) emphasize that low tax compliance remains a critical challenge in optimizing tax collection. Pattiasina (2019) underscores the persistent issue of corporate tax avoidance, which undermines fiscal policy effectiveness. In the environmental context, Hansen et al. (2013) identify a significant increase in carbon emissions since the pre-industrial era, exacerbating global warming and climate change. While these studies provide insights into the financial and ecological implications of carbon taxation, there remains a need for further research on its impact from the corporate taxpayer's perspective.

Despite extensive studies on carbon taxation's economic and environmental impacts, a significant research gap persists in understanding how corporate taxpayers perceive and respond to this policy. Existing literature predominantly examines carbon tax implementation from macroeconomic and ecological standpoints, focusing on its effectiveness in reducing carbon emissions and its broader economic implications. However, limited attention has been given to the influence of carbon taxation on corporate financial decision-making, operational strategies, and long-term planning. Current studies broadly assess compliance with carbon tax regulations but fail to explore how corporations navigate this financial burden while maintaining competitiveness. The extent to which carbon tax policies function as deterrents or incentives for sustainable business practices remains underexplored. While prior research has investigated consumer and producer responses to carbon taxation, there is insufficient understanding of corporate compliance strategies, cost mitigation approaches, and economic incentives. Key issues such as industry adaptation to carbon taxation, cost pass-through mechanisms, and long-term competitiveness implications have yet to be thoroughly examined. Addressing these gaps will provide a deeper understanding of how carbon taxation affects corporate economic performance and environmental outcomes.

This study introduces a novel perspective by analyzing how corporate taxpayers perceive and implement carbon tax policies, specifically focusing on their financial performance, operational

adjustments, and long-term sustainability strategies. Unlike previous research that primarily examines carbon tax effects at macroeconomic or environmental levels, this study investigates corporate decision-making processes, offering insights into how businesses navigate regulatory challenges while striving for profitability and compliance. By incorporating the corporate taxpayer's perspective, this research aims to identify the key obstacles companies face in adapting to carbon taxation and evaluate the policy's effectiveness in achieving environmental and economic objectives. Based on the identified research gaps, this study seeks to provide a more comprehensive understanding of how carbon tax regulations can be optimized to enhance corporate tax compliance while fostering a transition toward a low-carbon economy. Through this approach, the study contributes to the broader discourse on sustainable business practices, regulatory frameworks, and the evolving role of corporate responsibility in mitigating environmental impact.

Literature Review

Stakeholder theory

Stakeholder Theory asserts that a corporation is not solely an entity focused on maximizing shareholder value but also holds responsibilities toward various stakeholders, including creditors, suppliers, shareholders, consumers, society, and the government. (Bedi & Singh, 2024). In modern business environments, companies are expected to create value beyond profit generation, integrating social and environmental considerations into their strategic decision-making. This perspective has gained increasing relevance as corporate sustainability and environmental concerns have taken center stage. Firms must comply with regulations and proactively engage in practices that align with the expectations of various stakeholders. (Callery & Kim, 2024) The challenge is to balance financial objectives with broader social and environmental responsibilities, particularly in light of increasing regulatory measures such as carbon taxation. Yunus et al. (2020) Stakeholder pressure is critical in shaping corporate responses to carbon-related regulations and influencing disclosure practices and investment decisions.

The implementation of carbon tax policies introduces a new dynamic in corporate-stakeholder relationships. Governments enforce these taxes as a regulatory mechanism to mitigate carbon emissions and achieve climate goals, while society and consumers demand greater accountability from businesses regarding their environmental impact. (Adam et al., 2022). Zhang and Luo (2023) highlight that firms that fail to meet these expectations risk reputational damage and financial consequences. Meanwhile, investors and shareholders remain concerned about the potential erosion of profitability due to increased tax burdens. (Clarkson et al., 2015). Creditors and financial institutions favor companies that demonstrate environmental commitments, often granting better financing to firms actively reducing their carbon footprint. (Liesen et al., 2015). Similarly, Luo & Tang (2014) Argue that companies with high carbon emissions face higher capital costs and reduced investor confidence. Carbon taxation directly affects stakeholder relationships, influencing corporate strategy and financial performance. Firms must navigate the tension between compliance and maintaining competitiveness in the market. While some view carbon taxes as an economic burden, others leverage them as an opportunity to innovate and differentiate their business models. (Nußholz et al., 2019). By integrating environmental policies into core business strategies, companies can enhance their market positioning, build stronger relationships with stakeholders, and contribute to long-term sustainability goals. Ultimately, Stakeholder Theory provides a robust framework for understanding how businesses respond to carbon tax policies and how these responses shape broader corporate strategies.

Carbon Emissions and Global Warming

Carbon emissions refer to the release of gases produced from the combustion of carbon-based compounds into the atmosphere, including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) (Almaeda et al., 2023). Among these gases, CO₂ is the most significant contributor to climate change due to its long atmospheric lifespan and ability to enhance the greenhouse effect. (Fernando & Hor, 2017) The rapid increase in CO₂ concentration is primarily driven by industrial activities, transportation, and fossil fuel consumption, which account for 67% of total global emissions. Fossil fuel combustion is widely

acknowledged as a dominant source of greenhouse gas emissions, necessitating urgent mitigation efforts. (Johnsson et al., 2019). In response to these escalating emissions, numerous countries have introduced regulatory policies such as carbon taxes and emissions trading systems to curb environmental damage and encourage the transition toward sustainable energy sources. Understanding the sources and nature of carbon emissions is essential for governments, industries, and societies in formulating effective emission reduction strategies. Additionally, research has emphasized the need for corporate transparency in reporting carbon emissions, as disclosure practices influence regulatory compliance and public perception. (Almaeda et al., 2023).

The relationship between carbon emissions and global warming is well established. Scientific evidence links increasing greenhouse gas concentrations to rising global temperatures and climate instability. (Triana, 2008). The Center for International Forestry Research (CIFOR) has reported that global warming results from the entrapment of infrared radiation in the Earth's atmosphere, primarily caused by greenhouse gases such as CO₂ and CH₄. These gases contribute to extreme climate changes, including glacier melting, rising sea levels, and more frequent natural disasters. Beyond environmental consequences, global warming also poses severe economic risks, affecting agriculture, water resources, and energy production. Studies have shown that climate change-driven temperature shifts negatively impact crop yields, leading to food insecurity and economic instability in vulnerable regions. Moreover, businesses are increasingly experiencing operational challenges due to climate-related disruptions in supply chains, forcing many companies to adopt sustainability strategies to reduce carbon footprints and comply with environmental regulations. As regulatory frameworks become stricter, corporate adaptation to carbon mitigation policies is no longer optional but necessary for long-term competitiveness. This shift underscores the growing importance of sustainability in business operations, as firms must balance environmental responsibility with economic viability.

Carbon Tax

A carbon tax is a levy imposed on every unit of carbon emissions contributing to environmental degradation (Tax, 2020). The term carbon emissions in this context refers to greenhouse gases such as carbon dioxide (CO₂), methane (CH₄), and other greenhouse gases that trap heat in the atmosphere. The primary purpose of a carbon tax is to create a financial disincentive for industries and consumers that generate excessive emissions, thereby encouraging a transition toward more sustainable economic activities. From a production standpoint, carbon taxes are applied to manufacturers that release significant carbon emissions during their industrial processes. Meanwhile, from a consumption perspective, this Tax is imposed on goods and services that contribute to carbon emissions through their use and distribution. By internalizing the environmental costs of carbon-intensive activities, the carbon tax is an economic instrument to reduce greenhouse gas emissions and mitigate climate change (Tax, 2020). Beyond its role as a fiscal tool, the carbon tax is also designed to function as a regulatory mechanism to control emissions and steer economic behavior toward sustainability. As Selvi et al. (2020) The carbon tax is regulated by influencing corporate and consumer decisions and compelling businesses to adopt cleaner technologies and production methods. According to the Indonesian Ministry of Finance (Kemenkeu, 2021), a carbon tax is a policy instrument that aligns with government objectives to reduce emissions and promote environmental responsibility. The function of the carbon tax as a regulator ensures that economic actors are held accountable for their environmental impact while simultaneously driving investment in green technology, renewable energy, and sustainable practices.

Illustration of Carbon Tax Implementation

The Cap and Tax mechanism will be used to calculate the carbon tax. The following section presents three scenarios and the determination of the carbon tax amount that companies must pay. This case study will use the example of a coal-fired Steam Power Plant (PLTU) (Indonesia Ministry of Finance, 2021). The law of the Republic of Indonesia reinforces this Number 7 of 2021 on the Harmonization of Tax Regulations, as well as the regulations on Carbon Economic Value Implementation (Presidential Regulation of the Republic of Indonesia Number 98 of 2021 on the

Implementation of Carbon Economic Value to Achieve Nationally Determined Contribution Targets and Greenhouse Gas Emission Control in National Development).



Figure 1. Power Plant Unit A

Generating Unit A Generating capacity: 800MW Emission ceiling: 0.918 tCO₂/Mwh Gross electricity production: 6,100,000 MWh Total GHG emissions: 5,800,000 tCO₂ Emission ceiling for A: 0.918 x 6,100,000 = 5,599,800 tCO₂ Generating unit A does not participate in carbon emissions trading or carbon emissions offsetting Carbon Tax Calculation DPP = Total GHG Emissions - emissions ceiling (Tax Base) = 5,800,000 tCO₂ - 5,599,800 tCO₂ = 200. 200 tCO₂ Tax payable = DPP x tax rate = 200,200 tCO₂ x Rp 30,000/tCO₂ = Rp 6,006,000,000 Reduction = Rp 0 Carbon tax payment = Tax payable - reduction = Rp 6,006,000,000 - Rp 0 = Rp 6,006,000,000 (assuming no reduction in carbon tax payable is given).



Figure 2. Generating Unit B

Generating Unit B Generating capacity: 800MW Emission ceiling: 0.918 tCO₂/Mwh Gross electricity production: 6,100,000 MWh Total GHG Emissions: 5,800,000 tCO₂ Emission ceiling for A: 0.918 x 6,100,000 = 5,599,800 tCO₂ Generating unit B receives 200,200 tCO₂ of SIE/SPE to be submitted as a carbon tax deduction Carbon Tax Calculation DPP = Total GHG Emissions - emissions ceiling (Tax Base) = 5,800,000 tCO₂ - 5,599,800 tCO₂ = 200,200 tCO₂ Tax payable = DPP x tax rate = 200. 200 tCO₂ x Rp 30,000/tCO₂ = Rp 6,006,000,000 Deduction = 200,200 tCO₂ x Rp 30,000 = Rp 6,006,000,000 Carbon tax payable = Tax payable - deduction = Rp 6,006,000,000 - Rp 6,006,000,000 = Rp 0 (assuming a carbon tax deduction is granted with all SIE/SPE submitted).



Figure 3. Generating Unit C

Generating Unit C Generating capacity: 800MW Emission upper limit: 0.918 tCO₂/Mwh Gross electricity production: 6,100,000 MWh Total GHG emissions: 5,800,000 tCO₂ Emission ceiling for A: 0.918 x 6,100,000 = 5,599,800 tCO₂ Generating unit C receives SIE/SPE of 100,100 tCO₂ to be submitted as a carbon tax deduction Carbon Tax Calculation DPP = Total GHG Emissions - emissions ceiling (Tax Base) = 5,800,000 tCO₂ - 5,599,800 tCO₂ = 200,200 tCO₂ Tax payable = DPP x tax rate =

200. $200 \text{ tCO}_2 \times \text{Rp } 30,000/\text{tCO}_2 = \text{Rp } 6,006,000,000$ Deduction = $100,100 \text{ tCO}_2 \times \text{Rp } 30,000 = \text{Rp } 3,003,000,000$ Carbon tax payable = Tax payable - deduction = $\text{Rp } 6,006,000,000 - \text{Rp } 3,003,000,000 = \text{Rp } 3,003,000,000$ (assuming a reduction in carbon tax payable is granted with all SIE/SPE submitted).

Economics

Economics, originating from the Greek words *oikos* (household) and *nomos* (rules), encompasses resource management to meet human needs. Over time, economic principles have evolved to include regulatory policies that optimize market mechanisms for efficiency and sustainability (Lorek & Spangenberg, 2014). A key regulatory approach is carbon taxation, which internalizes the environmental costs of carbon-intensive industries, influencing financial decision-making and market structures. Rather than serving solely as a fiscal instrument, carbon taxes guide industries and consumers toward responsible resource consumption. Companies subject to carbon taxation are encouraged to invest in cleaner technologies and enhance energy efficiency, aligning with global sustainability objectives (Yan et al., 2023). This transition fosters economic adaptation to low-carbon business models, ensuring resilience and competitiveness. Additionally, carbon taxation stimulates carbon markets, allowing emission allowances to be traded and creating financial incentives for reductions (Espanan, 2023). This system balances industrial emissions by trading six primary greenhouse gases, including carbon dioxide, methane, and nitrous oxide (Delpont, 2018). By ensuring cost-effective emission reductions, carbon markets promote technological innovation and green investment (Li & Gao, 2022). Sweden exemplifies the success of carbon taxation, having reduced emissions while increasing GDP by 50% between 1990 and 2019. For emerging economies like Indonesia, integrating carbon taxation with economic strategies presents an opportunity for sustainable growth and fiscal stability.

Environment

The environment comprises physical, biological, and human components essential for ecological balance. According to Indonesia's Environmental Management Act No. 23 of 1997, it includes all elements influencing human well-being. Economic and industrial growth has intensified resource depletion and environmental degradation, primarily through excessive greenhouse gas emissions (Miao et al., 2024). Carbon taxation mitigates these effects by assigning financial value to emissions, incentivizing businesses to adopt sustainable practices. Sweden's carbon tax implementation since 1991 resulted in a 27% emissions reduction by 2018, proving the effectiveness of such policies in curbing emissions without impeding economic growth (Jonsson et al., 2020). The sharpest decline occurred in the early 2000s following a tax rate increase (Barus & Wijaya, 2022). These findings highlight that structured carbon tax policies can drive environmental improvements while maintaining economic stability. Carbon taxation generates revenue reinvested in renewable energy, public transportation, and energy efficiency programs, reinforcing long-term sustainability commitments (Vassileva et al., 2015). In the early stages of carbon taxation, Indonesia can adopt similar strategies to reduce emissions and finance green development. Implementing carbon pricing mechanisms, such as emissions trading and carbon credit systems, enhances regulatory efficiency and economic incentives. However, policy success relies on adequate frameworks, transparent implementation, and vigorous enforcement (Harrison, 2010). Without these, businesses may evade regulations or relocate to areas with weaker environmental laws. To balance economic competitiveness with ecological responsibility, Indonesia must design an equitable carbon tax model that ensures industries are not disproportionately burdened while achieving significant emission reductions (Olpah et al., 2023). Lessons from Sweden can inform refined carbon tax regulations, sustainable industrial practices, and alignment with global environmental commitments.

Research Design and Methodology

This study employs a qualitative research design with a case study approach, focusing on the economic and environmental impact of carbon tax implementation at PLTU Batu Barru. The study aims to explore the perspectives of corporate taxpayers on carbon taxation, assess the financial burden on businesses, and analyze the potential environmental benefits. The research is conducted through

structured observations and in-depth interviews with key stakeholders, ensuring a comprehensive understanding of the implications of the carbon tax policy. The study focuses on PLTU Batu Bara Barru, a coal-fired power plant subject to carbon tax regulations. The primary subjects of this research include corporate representatives, financial officers, environmental managers, and policymakers involved in carbon tax implementation. Additionally, the study considers the views of government agencies, industry experts, and regulatory bodies to provide a holistic perspective on the policy's economic and environmental impact.

Data is collected using semi-structured interviews, direct observations, and document analysis. Interviews with corporate stakeholders at PLTU Batu Bara Barru explore their perceptions of carbon taxation, financial implications, and potential mitigation strategies. Direct observations help assess the power plant's operational readiness to comply with the carbon tax policy. At the same time, document analysis involves reviewing government policies, financial reports, and industry regulations related to carbon tax implementation. The research instruments, including interview protocols and observation checklists, are developed to ensure data reliability and validity. The qualitative data are analyzed using thematic analysis, allowing researchers to identify patterns and recurring themes in stakeholder responses. Comparative analysis examines differences in perspectives between corporate taxpayers and policymakers. A policy impact assessment is also conducted to evaluate carbon taxation's economic and environmental effects on PLTU Batu Bara Barru. Findings from the analysis provide evidence-based insights for refining carbon tax policies, ensuring they effectively balance ecological goals with industrial competitiveness.

Findings and Discussion

The Impact of Carbon Taxes on the Economy

Structured observations and interviews with company representatives reveal that carbon taxation presents opportunities and challenges for businesses and stakeholders. Economically, this policy enables the government to generate additional tax revenue, which can be allocated to essential sectors such as healthcare, education, and public infrastructure development. This revenue stream enhances public welfare, particularly for communities affected by industrial waste. Furthermore, the implementation of carbon taxation incentivizes companies to adopt environmentally friendly technologies, which may improve industrial competitiveness in the long term as the global economy transitions toward sustainability. However, companies have raised concerns regarding the increased financial burden carbon taxation imposes. Higher operational costs, particularly in fossil fuel-dependent industries such as PLTU Batu Bara Barru, could increase prices for goods and services. As production costs escalate, businesses and electricity consumers face financial strain, potentially reducing household purchasing power. This scenario risks economic contraction, where declining demand and increased production costs negatively impact domestic and international market competitiveness. Businesses advocate for government incentives or compensatory mechanisms to mitigate adverse effects and maintain industrial competitiveness. Recommended interventions include reductions in electricity tariffs, lower shipping costs, and tax incentives for companies investing in low-carbon technologies or transitioning to renewable energy. Beyond financial incentives, regulatory preparedness remains a primary concern. Companies emphasize that carbon tax policies must be implemented with clear and transparent mechanisms to ensure industry fairness. Without equitable regulations, disparities could arise, benefiting large corporations with substantial capital while disadvantaging small and medium enterprises (SMEs) with limited resources for green technology investments. In the case of PLTU Batu Bara Barru, the company is exploring the purchase of emission permits from firms with lower emissions through the Cap-and-Trade mechanism. However, the success of this system depends on regulatory readiness and stringent oversight, as Indonesia has limited experience in managing carbon trading schemes. The government must conduct thorough assessments to balance environmental goals with economic sustainability and ensure that carbon taxation does not hinder national economic growth.

Illustration of Carbon Tax Calculation Based on the Ministry of Finance of the Republic of Indonesia

The Indonesian Ministry of Finance estimates that PLTU Batu Bara Barru is subject to an Rp carbon tax. 8,493,570,000, significantly increasing operational costs and affecting business sustainability. As a coal-fired power plant, it falls within the scope of industries targeted by carbon taxation due to substantial greenhouse gas (GHG) emissions. Companies may purchase emission allowances from lower-emitting firms under the Cap-and-Trade system to mitigate these financial impacts. However, the feasibility of this approach depends on accurate emission monitoring, transparency in trading mechanisms, and strict regulatory enforcement. Unlike countries with established carbon taxation frameworks like Sweden and the European Union, Indonesia faces unique challenges, including industrial reliance on fossil fuels and economic disparities. The carbon tax may disrupt industrial operations, strain businesses, and slow economic growth without adequate preparation. The government must adopt a phased approach, ensuring that the transition to a low-carbon economy does not undermine industrial productivity and consumer purchasing power. Policymakers must carefully assess carbon taxation's economic and social impacts on key sectors such as energy, manufacturing, and transportation. If improperly managed, increased costs could be passed on to consumers through higher electricity tariffs, affecting household affordability and industrial competitiveness. To balance environmental objectives with economic sustainability, policymakers should implement gradual tax increases, financial incentives for businesses transitioning to green energy, and targeted support for industries highly dependent on fossil fuels.

The Impact of Carbon Tax on the Environment

A carbon tax is crucial for addressing environmental challenges, particularly global warming, climate change, and public health risks. By imposing financial penalties on industries emitting excessive greenhouse gases, businesses are compelled to reevaluate their operational strategies and seek sustainable alternatives. This tax is a market-driven incentive for companies to transition toward cleaner energy solutions and sustainable business practices. At PLTU Batu Bara Barru, the carbon tax encourages a shift to low-carbon alternatives such as renewable energy. Regulatory obligations and the long-term economic benefits of energy efficiency are driving investments in solar, wind, and geothermal technologies. Many industries historically relying on fossil fuels are actively exploring these renewable energy sources to meet carbon reduction targets while maintaining energy security. However, carbon taxation alone may not be sufficient to curb emissions. Complementary measures are necessary, including promoting electric vehicles (EVs), expanding EV charging infrastructure, and increasing investment in renewable energy sources such as solar, wind, hydro, and bioenergy. Carbon capture and storage (CCS) technology offers another viable approach, capturing CO₂ emissions from high-emission industries before they are released into the atmosphere. Additionally, improving electricity consumption efficiency can significantly lower the demand for fossil fuel-generated power. Encouraging households and enterprises to adopt energy-efficient practices supported by innovative grid technologies can facilitate this transition. Adopting co-firing technology and blending biomass with coal in power generation further reduces reliance on coal. A strategic approach to phasing out coal-fired power plants through early retirement programs is also essential, though careful management is required to prevent energy supply disruptions. The success of carbon tax policies depends on coordinated efforts among stakeholders. The Ministry of Environment and Forestry must establish standardized emission calculation methodologies and ensure industry compliance. Effective enforcement mechanisms and transparent reporting systems are crucial for maintaining accountability and preventing regulatory loopholes. Public awareness campaigns are necessary to educate businesses and policymakers on the significance of carbon reduction initiatives. Without a comprehensive and well-structured strategy, carbon taxation may fail to achieve its intended environmental objectives. A multi-sectoral collaboration is vital to aligning Indonesia's sustainability goals with economic stability and industrial competitiveness. Through financial incentives, regulatory enforcement, and technological innovation, Indonesia can strengthen its commitment to carbon emission reduction and transition toward a resilient low-carbon economy.

Corporate Taxpayer Perspective of PLTU Batu Bara Barru on Carbon Tax

PLTU Batu Bara Barru supports the carbon tax as part of the government's broader strategy to reduce GHG emissions and promote environmental sustainability. The company acknowledges the importance of cleaner energy practices and compliance with global climate commitments. However, concerns remain regarding the financial implications, particularly the potential increase in electricity tariffs, which could impact consumers and the broader economy. Given Indonesia's heavy reliance on coal-fired power, carbon taxation is expected to increase production costs, which may be transferred to consumers. Electricity affordability is critical for economic stability, and any significant cost increase could affect business operations and household budgets. The financial resilience of PT PLN (Persero), Indonesia's state-owned electricity provider, must also be considered. PLN faces challenges, including fluctuating electricity demand, contractual obligations under take-or-pay agreements, supply chain volatility, and coal price instability. The inability to adjust electricity tariffs freely complicates PLN's financial sustainability. A carbon tax could exacerbate these economic pressures, necessitating government subsidies or alternative financial mechanisms to stabilize the energy sector. The transition to a low-carbon economy requires careful planning to ensure that energy security and economic competitiveness are not compromised. While carbon taxation incentivizes businesses to shift toward renewable energy, the limited availability of affordable and scalable alternatives presents a significant challenge. Power producers may struggle to comply with carbon tax regulations without sufficient incentives while maintaining operational efficiency. Government intervention through tax relief measures, investment incentives, and subsidies for renewable energy projects is essential to mitigate the economic impact. The PLTU Batu Bara Barru case illustrates the broader challenge of balancing environmental policies with financial realities. Policymakers must ensure that carbon tax revenues are reinvested in energy transition efforts, infrastructure upgrades, and support mechanisms for affected industries. Without a well-designed framework, carbon taxation could place undue financial strain on the electricity sector, reducing affordability and impacting economic stability. To achieve emission reduction goals while maintaining economic equilibrium, a coordinated approach among stakeholders, policymakers, and industry leaders is essential in addressing financial constraints and long-term sustainability objectives.

Conclusion

This study explores the economic and environmental implications of carbon taxation, particularly its impact on PLTU Batu Bara Barru. The research findings indicate that while implementing a carbon tax aims to reduce greenhouse gas emissions, it also presents financial challenges for businesses, especially those in the energy sector. The carbon tax is expected to influence commodity prices, encouraging industries to shift toward low-carbon alternatives while increasing the cost of production for sectors that rely heavily on electricity. This shift could lead to inflation, affecting both businesses and consumers. From an environmental perspective, the carbon tax is a critical regulatory tool that compels industries to adopt more responsible emission management practices. However, stakeholders emphasize the importance of a well-structured implementation process to ensure the tax achieves its intended goals without disproportionately burdening industries and consumers.

The study contributes to academic discourse and policy development by highlighting the dual impact of carbon taxation on economic and environmental sustainability. From a scientific standpoint, the study underscores the relationship between carbon taxation, industry behavior, and market adaptation, offering insights into how businesses respond to financial incentives for emission reduction. In practical terms, the findings provide valuable recommendations for policymakers, emphasizing the need for balanced regulatory frameworks that prevent excessive financial strain on industries while ensuring adequate environmental protection. Additionally, government collaboration with energy producers and stakeholders is essential to refine carbon tax policies, promote energy transition, and mitigate adverse socio-economic effects. The study suggests that carbon tax revenues should be reinvested in sustainable infrastructure, renewable energy projects, and industrial adaptation programs, ensuring a transition toward a low-carbon economy.

Despite its contributions, this study has limitations that should be addressed in future research. First, the study primarily focuses on PLTU Batu Bara Barru, limiting generalizability to other industrial

sectors or geographic regions. Future studies could expand the scope by including comparative analyses across multiple industries to examine how carbon tax policies affect different economic sectors. Second, this study relies on qualitative observations and interviews, which, while insightful, could be complemented by quantitative analyses to measure the long-term economic and environmental impact of carbon taxation. Future research should explore the financial resilience of industries under carbon tax regulations, assessing how companies adjust their business models to maintain competitiveness while reducing emissions. Moreover, further studies should examine the effectiveness of carbon offset mechanisms, such as Cap and Trade systems, in facilitating carbon tax compliance. By addressing these gaps, future research can provide a more comprehensive understanding of the long-term implications of carbon taxation, guiding policymakers in designing more effective and equitable environmental regulations.

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