

Carbon Tax Policy Analysis of Negative Emission Externalities in South Sulawesi (Case Study at PT. Makassar Industrial Estate)

Muh. Asrullah Arifin, Asriani Junaid, and Amiruddin
 Universitas Muslim Indonesia
 Email: asrullah41@gmail.com

Keywords:

Carbon Tax
 Policy and
 Negative
 Emission
 Externalities

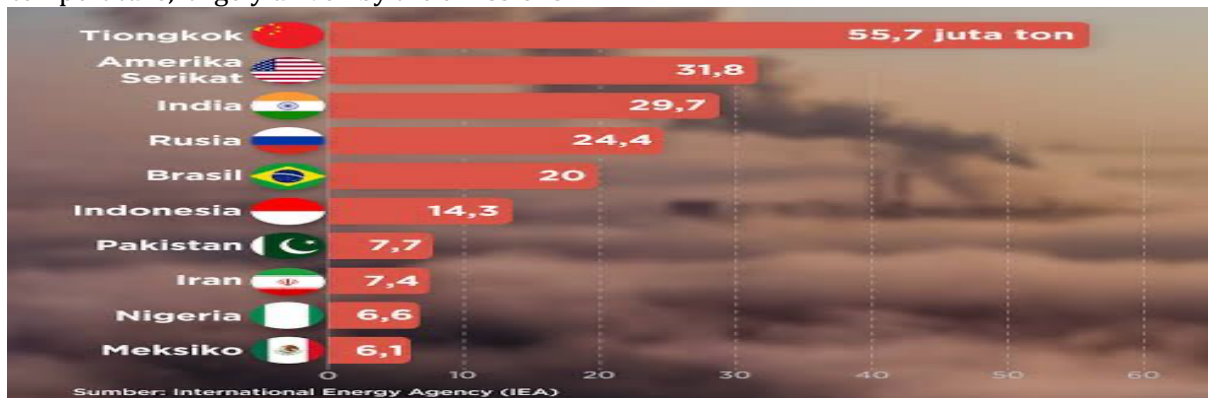
Abstract

This research aims to analyze the implementation of carbon tax policy on negative emission externalities in South Sulawesi, with a case study of PT. Kawasan Industri Makassar (PT. KIMA). This study employs a qualitative approach, based on the type of data collected. Informants include the Head of the Clean Water and Waste Department, staff from the Environmental Monitoring and Reporting Division, and the division's administrative personnel at PT. KIMA. The findings reveal that PT. KIMA, an industrial sector company responsible for managing industrial zones, contributes to carbon emissions through two main sources: incinerator operations and external industrial activities within the area. However, the company has not yet implemented any formal carbon tax mechanisms to mitigate emissions. This is primarily due to the absence of technical guidelines or regulatory directives related to carbon tax implementation for industrial area management companies. Despite the lack of a carbon tax policy, PT. KIMA has made environmental efforts by promoting green initiatives, such as developing green open spaces (Ruang Terbuka Hijau/RTH) and tree planting along industrial area roads to help absorb carbon emissions and reduce environmental impact.

1. Introduction

Global warming is no longer a new problem faced by society. Every individual contributes to a carbon footprint on Earth, and various human activities have increased the concentration of greenhouse gases (GHG) in the atmosphere. Global warming occurs due to the continuous rise in Earth's temperature, largely driven by the emissions

of greenhouse gases such as carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄). These gases trap solar heat in the atmosphere, and their accumulation is primarily the result of excessive human activities including vehicle emissions, fossil fuel combustion, industrial smoke, and deforestation.



Emission Diagram Methane Worldwide in 2022

Carbon emissions, especially from the energy sector resulting from the burning of oil, gas, and coal have continued to increase globally. The largest contributors to these

emissions are transportation, industrial operations, and electricity production. According to a 2019 United Nations report on climate change, that year was recorded as

the hottest in the past five-year period. The global average temperature increased by 1.1°C above pre-industrial levels (1859–1900), and by 0.2°C compared to the period from 2011–2015 (CNNIndonesia.com, December 6, 2019). Energy Institute data also reported that in 2022, the global energy sector emitted 34.47 billion tons of CO₂—the highest in history. Indonesia ranked sixth globally, contributing 691.97 million tons of CO₂ emissions from the energy sector (Databoks.katadata.co.id, August 11, 2023).

Recognizing the growing threat of global warming, the international community including developing countries has intensified efforts to reduce carbon emissions. Indonesia, along with 194 other United Nations member states, signed the Paris Agreement under the United Nations Framework Convention on Climate Change on December 12, 2015. The agreement obliges countries to commit to reducing the rate of global temperature increase through their respective Nationally Determined Contributions (NDCs). Indonesia ratified the agreement on April 22, 2016, through Law No. 16 of 2016.

Subsequently, the Indonesian government enacted regulations related to carbon taxation, including Presidential Decree No. 98 of 2021 on the Economic Value of Carbon, and Law No. 7 of 2022 on the Harmonization of Tax Regulations (HPP Law), which formally introduced a carbon tax. The carbon tax officially came into effect on April 1, 2022, and is levied on carbon emissions that negatively affect the environment. The objective is to support the achievement of Indonesia's NDC targets while also promoting public awareness of the environmental impact of carbon emissions.

From a fiscal policy perspective, the carbon tax is expected to encourage a shift toward clean energy and serves as an important step in demonstrating Indonesia's

commitment to achieving its climate targets. According to the HPP Law, carbon tax is imposed on the purchase of carbon-intensive goods or activities that generate carbon emissions (Government of Indonesia, 2021).

The carbon tax policy is intended to influence industry behavior and encourage a transition toward a greener economy. However, it is also recognized that carbon taxation may have negative economic impacts. For instance, imposing a carbon tax could lead to an increase in the cost of goods and services that rely on carbon-intensive inputs. There are concerns that such a tax may place an additional financial burden on industries and consumers, potentially leading to economic shocks, particularly in the manufacturing sector. Thus, the policy must be carefully designed and implemented to maintain industrial competitiveness while encouraging investment in renewable energy.

Furthermore, transparent management and effective governance are essential to ensure that carbon tax revenue is allocated for environmental recovery efforts. A successful carbon tax system should not only aim to increase government revenue but also support Indonesia's transition to a low-carbon economy.

This study focuses on the implementation of carbon tax policy in mitigating the negative externalities of carbon emissions. By analyzing carbon disclosures and emission calculations, this research evaluates the role of stakeholders particularly industries in supporting environmental sustainability in line with corporate social responsibility (CSR) frameworks.

Previous studies such as Dilasari et al. (2022) found that carbon tax policies are feasible in Indonesia, particularly when aligned with international recommendations such as those from the

IMF and OECD. Similarly, Ratnawati (2016) proposed an ideal carbon tax model for Indonesia, suggesting an initial rate of IDR 80,000 per ton of CO₂, increasing by 5% annually until reaching IDR 300,000, with revenues allocated to mitigation efforts.

Building on these findings, this research presents a case study of South Sulawesi, focusing on the carbon tax policy's role in addressing negative emission externalities. The study is titled: "Analysis of Carbon Tax Policy on Negative Emission Externalities in South Sulawesi."

2. Literature Review

2.1 Legitimacy Theory

According to Kurnianto et al. (2023), legitimacy theory explains that the survival of an organization depends on whether the surrounding community perceives that the organization operates in alignment with societal norms and values. This theory is grounded in the concept of a "social contract" between the organization and society, which implies that the organization is expected to respect the prevailing rules and norms to create harmony and protect its interests.

Amah et al. (2023) reinforce that legitimacy theory is based on public expectations regarding how an organization should operate, and these expectations evolve over time. Ghozali and Chariri (2007) argue that companies must interact with the surrounding social environment and be responsive to it. To increase profitability, firms often implement strategies such as zero-based budgeting, marketing cost reduction, and asset management. However, asset management alone does not determine profitability. The relationship between environmental, social, and economic dimensions is fundamental and interdependent.

2.2. Externalities

a. Definition of Externalities

Governments at both national and international levels have issued regulations aimed at minimizing the negative effects of externalities, including acid rain mitigation, toxic waste control, and the protection of endangered flora and fauna. Ratnawati (2016:54) defines externalities as situations where the actions of one party affect the welfare of another party—positively or negatively—without the former bearing the costs or receiving benefits from such impacts.

Externalities occur when an activity by one party affects the well-being of others outside the market mechanism, thus impacting economic efficiency. According to Baumol and Oates (1975), externalities can be categorized into two types:

1. **Excludable externalities**, where the good has private characteristics and is not shareable once consumed by an individual.
2. **Non-excludable externalities**, which have public good characteristics, meaning they can be consumed by many without reducing their availability to others.

The latter type, such as air, water, or noise pollution, poses greater challenges and necessitates economic instruments to internalize their impact (Ridwan & Nawir, 2021:149). These externalities often result from human activities that ignore environmentally sustainable economic principles. In economics, inefficiencies caused by externalities arise due to inefficient use of resources, which can harm the economy, particularly in the long term.

b. Types of Externalities

According to Ratnawati (2016:54), externalities can be divided into two types based on their impact:

1. **Positive Externalities** – Beneficial effects arising from one party's actions that positively impact others without compensation. These are not typically reflected in market prices.
2. **Negative Externalities** – Costs imposed on third parties outside the market system due to the productive activities of others. These are also not captured in market pricing.

2.3 Carbon Emission Concept

Carbon emissions refer to the release of carbon into the atmosphere within a specific area and time frame (Ministry of Energy and Mineral Resources, cited in Pamungkas & Haptari, 2022:371). These emissions originate mainly from fossil fuel combustion in sectors like industry, transportation, and manufacturing (Dilasari et al., 2023:185). Carbon emissions are major contributors to climate change and global warming. Therefore, emission reductions are essential, and one strategy adopted by governments is the implementation of a carbon tax.

Dilasari et al. (2022:186) define carbon emissions as the total greenhouse gas emissions produced by individuals or groups during activities over a given period, measured in CO₂-equivalent tons. Greenhouse gases (GHGs) include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆), each contributing differently to global warming.

2.4. Carbon Tax Concept

a. Definition of Carbon Tax

According to the General Tax Provisions and Procedures Law (KUP), tax is a mandatory contribution to the state by individuals or entities, enforced by law, without direct reward, and used for national development and public welfare.

Carbon tax is an environmental tax levied on fossil fuel consumption, such as coal, oil, and natural gas. Pamungkas and Haptari (2022:358) state that it is a pollution tax imposed on carbon emissions to address market failures caused by negative externalities. Essentially, it functions as a financial penalty for carbon emissions from fossil fuel use.

The Indonesian government introduced a carbon tax under Law No. 7 of 2021 on the Harmonization of Tax Regulations (HPP Law), particularly Article 13. The carbon tax implementation roadmap includes emission reduction strategies, priority sector targets, and integration with renewable energy development.

b. Advantages of Carbon Tax Policy

Ratnawati (2016:55) outlines three main advantages of carbon taxes over other greenhouse gas control policies:

1. **Broad Economic Reach** – Carbon taxes apply to all major emission sources, unlike targeted regulations.
2. **Clear Price Signals** – Carbon taxes send explicit cost signals to businesses and consumers, encouraging energy-saving behavior and investments in green technology.
3. **Dual Economic Benefit** – Besides reducing externalities, carbon taxes generate revenue that can be reinvested in climate initiatives.

c. Carbon Tax Rates

Article 13, Paragraph 8 of the HPP Law stipulates that carbon tax rates should be equal to or higher than carbon market prices. The minimum rate is set at IDR 30 per kilogram of CO₂ equivalent—one of the lowest globally. However, in Indonesia, the carbon tax is not solely revenue-driven but targets emission reduction goals.

According to Article 13, Paragraph 12 of the HPP Law, revenues from the carbon

tax are allocated for climate change mitigation, including social assistance for impacted households and subsidies for renewable energy.

d. Carbon Tax Implementation Design

Indonesia uses a **cap-and-tax** scheme, which sets emission limits for industries and taxes them based on excess emissions. This model blends features from both traditional carbon tax and cap-and-trade systems. The scheme was first applied to coal-fired power plants starting April 1, 2022. According to the Ministry of Energy and Mineral Resources (esdm.go.id), two options are considered:

- A flat carbon tax on all emissions.
- A cap-and-tax system targeting only emissions above a specified threshold.

Implementation designs and illustrations provided by the Fiscal Policy Agency, Ministry of Finance (2021), further detail these mechanisms, highlighting the regulatory framework and potential pathways for future carbon tax applications.

3. Research Methods

3.1 Type of Study

According to Hardani (2020:39), qualitative research adheres to a phenomenological approach, which emphasizes understanding and describing social phenomena through observation and data collection in as much depth as possible. This allows the researcher to comprehend the phenomenon holistically and in a complex manner.

This study employs a qualitative phenomenological method, which prioritizes the discovery, exploration, and interpretation of the meaning of phenomena and events as experienced by individuals in specific contexts. It is categorized as pure qualitative research because it is based on efforts to understand and describe the

intrinsic characteristics of the observed phenomena.

The qualitative approach was chosen because it allows for a detailed and comprehensive exploration of the issues under investigation. The research begins by gathering and filtering incoming information thoroughly and systematically to provide a clear and comprehensive picture. The qualitative data analysis method used involves collecting, organizing, and drawing conclusions from the analysis of the Carbon Tax Policy and Its Impact on Negative Externalities of Emissions at PT. Kawasan Industri Makassar (KIMA) in South Sulawesi.

3.2 Focus of the Study

To ensure the research is well-directed, the focus of the study is to explore and analyze the implementation of the carbon tax policy in an industrial company and its impact on negative externalities resulting from emissions.

3.3 Research Location and Period

This research was conducted at PT. Kawasan Industri Makassar (KIMA), located in Makassar, South Sulawesi, during the period of August to November 2023.

D. Types of Data Sources

Data is a crucial element of this study and was obtained from both primary and secondary sources.

- Primary data was gathered through semi-structured interviews, where the researcher prepared a list of themes and key questions to guide the discussion.
- Secondary data was obtained from government publications, news articles, academic journals, and other relevant sources. This data was then compiled, summarized, and presented as qualitative data.

The data analysis was conducted using thematic analysis, which involves

identifying, analyzing, and reporting patterns (themes) within the data.

3.4 Informants

The selected informants are individuals who are knowledgeable, understand, and are responsible for handling carbon-related issues at PT. KIMA. The informants are:

1. Head of the Clean Water and Waste Department
 - Mr. Achmad Hadiasyah: Provided information on carbon taxation and emission management at PT. KIMA, including relevant regulations.
2. Monitoring and Reporting Staff, Environmental Division
 - Mrs. Hasfiranti H.S.: Provided insights into environmental reporting mechanisms and procedures at PT. KIMA.
3. Admin Staff, Monitoring and Reporting Division, Environmental Division
 - Mr. Didik: Explained the requirements and procedures for companies entering the PT. KIMA industrial area.

This research utilized several data collection techniques, including observation, interviews, and documentation, as well as triangulation to strengthen the data's credibility.

1. Field Observation
According to Hardani (2020:124), observation is a systematic data collection method used to study phenomena. It must align with research objectives, be planned systematically, and be controllable.
2. Interviews
Conducted using a semi-structured format to allow direct and meaningful interaction between the researcher and the informants.
3. Documentation
This involved gathering relevant

documents, recordings, and data that support the research. These documents were reviewed to extract secondary data relevant to the study.

3.5 Data Analysis Techniques

Qualitative descriptive analysis, as explained by I Made Winartha (2006:155), involves describing and summarizing various conditions, situations, and data gathered from interviews and observations related to the studied problem. The analysis followed a descriptive and pragmatic approach to reflect real conditions in the field and to draw conclusions relevant to the research objectives.

Miles and Huberman (1994) describe three key steps in qualitative data analysis:

1. Data Reduction
This process involves selecting, focusing, and simplifying raw data to identify key themes and patterns. Data reduction helps provide a clear understanding and allows for further analysis.
2. Data Display
Data is presented in the form of narrative texts, charts, or flowcharts to facilitate understanding. In this study, the researcher used narrative descriptions to present findings on the implementation of carbon tax policy.
3. Drawing Conclusions and Verification
The researcher draws initial conclusions based on available evidence, which are then refined through continued data collection and validation. The conclusions may involve new findings, relationships, or theoretical developments.

3.6 Data Validation Techniques

To ensure the validity and credibility of the data, triangulation techniques were used, as proposed by Moleong (2004:330). Triangulation involves cross-checking information using multiple sources,

methods, and perspectives. The four types of triangulation applied were:

1. Data (Source) Triangulation
Comparing information obtained at different times and from various informants, including:
 - Observation results vs. interview responses.
 - Public statements vs. private conversations.
 - Statements vs. related documents.
2. Investigator Triangulation
Involving multiple researchers or observers to verify the data.
3. Methodological Triangulation
Using different data collection methods to examine the same phenomenon and comparing the findings.
4. Theoretical Triangulation
Applying different theoretical perspectives to interpret the same data or phenomenon.

4. Results and Discussion

4.1 Research Results (Data Presentation)

To achieve the objectives of this research, the researcher obtained information from four key informants using a qualitative method with direct interview techniques. This study explores and analyzes the implementation of carbon tax policy on negative emission externalities in South Sulawesi. Through these interviews, the researcher gained valuable insights and a deeper understanding of the subject matter from multiple perspectives. The diverse views of the informants served as a crucial foundation for the research findings.

Climate change has become a global challenge that requires collective action. As a country vulnerable to climate change threats, Indonesia ratified the Paris Agreement in 2016 and included the Nationally Determined Contribution (NDC) commitment. The Indonesian government prioritized climate change mitigation in its

2020–2024 national development plan. In the NDC document, Indonesia committed to reducing greenhouse gas (GHG) emissions by 29% through domestic efforts and up to 41% with international support by 2030.

The analysis was conducted at PT. KIMA (Makassar Industrial Estate), a company engaged in industrial area management. According to Mr. Ahmad Hadiasyah, Head of the Water and Wastewater Department:

“PT. Kawasan Industri Makassar operates in the field of industrial area management. PT. KIMA itself is the designated manager of the area.”

A similar explanation was provided by Ms. Hasfiranti, HS:

“PT. KIMA functions as the area manager, overseeing governance and operational activities within the industrial zone.”

PT. KIMA provides facilities and infrastructure, develops and manages the industrial estate, and supports businesses operating within the area. A number of companies are located within the PT. KIMA estate, having received approval to operate through a formal permit process.

The researcher concludes that PT. KIMA acts as both the manager of the industrial estate and the provider of land and infrastructure for companies that lack sufficient land to establish main or branch operations. PT. KIMA offers services such as land leasing, waste management facilities, concrete road access, and other infrastructure. These services become accessible once a company fulfills the administrative requirements to operate within PT. KIMA’s managed zone.

As an industrial area manager, PT. KIMA is also considered a contributor to industrial sector emissions. Mr. Ahmad Hadiasyah explained:

“Yes, emissions are produced here. Some emissions are fugitive, some come

from outside the chimney, and some from incinerators. In our case, there is an incinerator that emits emissions.”

Based on the findings, PT. KIMA is involved in a business sector that produces emissions. These emissions originate from companies that operate with incinerators (used to burn waste) as well as from those without incinerators operating within the industrial estate.

Additionally, the transportation and distribution processes within the estate, which still rely on fossil-fuel-based vehicles, contribute to emissions.

PT. KIMA acknowledges that its operational activities produce emissions that negatively impact the surrounding environment. These environmental concerns have drawn attention from multiple stakeholders, including the



Figure 9. PT. KIMA Incinerator

Based on the results of the analysis and information from key informants, it can be concluded that PT. KIMA is an emission-producing company in the industrial sector. Emissions at PT. KIMA originate from two main activities:

1. Emissions from Incinerator Activities

These emissions result from waste management activities conducted within PT. KIMA's industrial estate. The waste is burned in an incinerator as part of waste disposal practices.

2. Emissions from Non-Incinerator Activities

Emissions in this category originate from manufacturing processes carried out by factories within the PT. KIMA area that use machines emitting pollutants.

community, local government, and relevant agencies. Consequently, the government—as the policy-maker—has introduced measures to reduce the environmental impact of industrial activities, such as the carbon tax and carbon trading schemes, in line with national commitments to mitigating climate change.

Regarding this, Mr. Ahmad Hadith stated:

“We’ve heard about the carbon tax and carbon trading for a few years now, but the specific mechanisms or implementation guidelines are still not in place.”

Similarly, Ms. Hasfiranti noted:

“I’ve heard of carbon taxes, but not in detail—just from the media.”

The discussion above illustrates that while the concepts of carbon trading and carbon tax have been introduced publicly through media, their implementation—especially at PT. KIMA—has yet to take effect. From the analysis, it is evident that carbon tax and carbon trading are policy tools designed to reduce carbon emissions, particularly from fossil fuel combustion. However, PT. KIMA has not yet implemented these policies due to the absence of technical guidelines or formal regulations applicable to the industrial estate sector.

As Mr. Hadiyasa explained:

“We can’t say whether it’s effective or not because it hasn’t been implemented. So we can’t assess the effectiveness yet.”

This confirms that PT. KIMA is currently not subject to carbon taxation due to the lack of technical instructions from authorities for its specific industrial category. Therefore, evaluating the effectiveness of the carbon tax policy in this context is not yet feasible.

Before implementing such a policy, comprehensive socialization is required, particularly since carbon taxes may affect production processes and costs. Ms. Hasfiranti emphasized:

“There hasn’t been any socialization so far. As far as we know, carbon taxes are mainly directed at power plants like coal-fired electricity generators (PLTU), not companies like us.”

Mr. Ahmad Hadith added:

“Yes, as far as we know, carbon taxes are currently only applied to power plants and coal-related companies, not yet to industrial estates like ours.”

As a company operating under the framework of government-regulated zones, PT. KIMA supports environmental sustainability initiatives, including carbon taxation. However, at present, implementation of the carbon tax is still focused on coal-based industries such as PLTUs. To broaden the scope of the policy,

socialization efforts targeting other sectors, including industrial estates, are essential.

The researcher concludes that in order to implement carbon tax effectively across the industrial sector, particularly in industrial estates like PT. KIMA, extensive awareness campaigns and stakeholder engagement are necessary. This is crucial because the carbon tax imposes a financial obligation on emission-producing companies, which may affect productivity, production costs, and ultimately consumer prices.

In terms of environmental compliance, PT. KIMA requires companies operating within its estate to provide key environmental documents, including the **Environmental Impact Analysis (AMDAL)**, as a condition for operational approval. As stated by Ms. Hasfiranti:

“We require an AMDAL, and tenant companies must also provide detailed Environmental Management and Monitoring Plans (RKL-RPL). These documents guide emission control and compliance with environmental standards.”

Mr. Ahmad Hadith further elaborated:

“PT. KIMA is part of the Proper Program (Performance Rating Program in Environmental Management) and is assessed by the Ministry of Environment. We manage emissions by optimizing energy usage and ensuring that all processes follow established SOPs, so emissions remain below the allowable thresholds.”

PT. KIMA also works with the Ministry of Environment and Forestry (KLHK) to conduct routine air quality testing in and around its industrial estate, using randomized sampling methods and laboratory analysis to obtain factual environmental data. Based on the findings, it is evident that PT. KIMA requires companies operating within its area to comply with environmental regulations, including submitting AMDAL documentation. Regular emissions testing and environmental

monitoring are conducted in cooperation with relevant stakeholders to ensure sustainability.

Despite efforts to mitigate environmental damage, PT. KIMA's operations still have social impacts on surrounding communities. As stated by Mr. Hadiyasa:

“Our CSR programs are not limited to the immediate area—we have initiatives elsewhere too. But to reduce carbon impacts, we implement greening projects throughout the KIMA area, requiring each company to allocate at least 10% of its space as a green open area (RTH).”

He also mentioned:

“We've carried out tree planting along arterial roads and offer public health services like free check-ups. For areas farther from the estate, we conduct monitoring through activities like drainage cleanup.”

The interviews revealed the existence of a program known as “**Green KIMA**”, which includes tree planting, establishing green open spaces, providing community health services, and addressing emissions outside the industrial area through environmental sanitation efforts.

From the analysis, the researcher concludes that PT. KIMA's environmental and social initiatives align with four key pillars of sustainable development:

1. **Social Pillar** – including poverty alleviation, health and well-being, and access to quality education.
2. **Economic Pillar** – supporting decent work and economic growth.
3. **Environmental Pillar** – promoting sustainable cities, responsible consumption, and environmental stewardship.
4. **Law and Governance Pillar** – ensuring peace, justice, and strong institutions.



Source : PT. KIMA Annual Report 2023

Figure 10. CSR Pillars of PT. KIMA (Makassar Industrial Area)

4.2 Discussion

a. Analysis of Carbon Tax Policy on Negative Emission Externalities in South Sulawesi: A Case Study at PT. KIMA

The analysis of carbon tax policy on negative emission externalities in South Sulawesi was carried out at PT. KIMA. PT. KIMA is an industrial company that also serves as an area manager, producing carbon emissions from two main sources: incinerator activities and non-incinerator activities. This aligns with the opinion of Dilasari et al. (2023:185), who state that carbon emissions are gases released as a result of burning fossil-based materials in sectors such as industry, transportation, and manufacturing. Based on this, it can be concluded that PT. KIMA is an industrial entity whose operations generate carbon emissions from both incinerator and non-incinerator sources.

As a company operating in the industrial sector and directly emitting carbon into the atmosphere, PT. KIMA is a potential subject of carbon taxation. According to Pamungkas and Haptari (2022:358), a carbon tax is a type of pollution tax imposed on carbon emissions as a corrective measure for market failures caused by negative environmental externalities. This is regulated under the

2021 Law on the Harmonization of Tax Regulations (UU HPP), Article 13 Paragraph (1). Therefore, PT. KIMA, as an industrial entity and area manager producing emissions, qualifies as a carbon tax object.

However, the carbon tax policy has not yet been implemented at PT. KIMA. This is due to the absence of specific technical guidelines for companies operating in industrial zones, as well as a lack of socialization and instructions from authorized institutions regarding the mechanisms and tariff structures of the carbon tax. Although PT. KIMA meets the criteria for carbon tax imposition as regulated in the 2021 HPP Law, Article 13 Paragraph (1), the policy is still limited to categorizing tax objects. As noted by Pamungkas (2022:364), the carbon tax (cap-and-tax) policy is currently limited to coal-fired power plants, with a tariff of IDR 30,000 per ton of CO₂ equivalent, effective from April 1, 2022. This is in line with the statement from the Directorate General of Taxes (2021), accessed on January 28, 2024, which states that from 2022 to 2024, the carbon tax implementation mechanism will be applied based on emission limits (cap-and-tax) exclusively for coal-fired steam power plants (PLTU).

Thus, it can be concluded that PT. KIMA has not yet implemented the carbon tax policy as part of its emission reduction efforts. Nonetheless, in support of the government's environmental justice initiatives, PT. KIMA continues to strive to reduce emissions. Although the carbon tax policy has not been applied, the company has undertaken several environmental initiatives. In its 2023 Annual Report, under the environmental pillar, PT. KIMA outlines efforts such as industrial area greening, development of green open spaces (RTH), and compliance with emission limits set by the regional authority. These are regulated under Makassar Mayor Regulation No. 69 of

2016 concerning the utilization, arrangement, and management of green open spaces in Makassar City.

5. Conclusion

5.1 Conclusion

Based on the research findings, the following conclusions can be drawn:

The analysis conducted at PT. KIMA regarding the carbon tax policy on negative emission externalities reveals that PT. KIMA, which operates as an industrial area manager, has limited knowledge and understanding of the carbon tax policy. Furthermore, there are no specific technical guidelines or implementation mechanisms available for industrial sector companies. The carbon tax policy, which is regulated under Law Number 7 of 2021 concerning the Harmonization of Tax Regulations, is intended to impose taxes on carbon emissions that cause negative environmental impacts. However, due to the lack of government-led socialization and technical instructions for industries operating in industrial zones, the implementation of carbon tax policy as a means of reducing emissions has not yet been realized.

To mitigate the externalities of carbon emissions, PT. KIMA has initiated internal environmental efforts. One such initiative is the "KIMA GREEN" program, which involves greening the entire industrial area and conducting evaluations of emissions produced by tenant companies within the PT. KIMA industrial zone. These efforts are aligned with emission standards and limits established by the government.

Based on the research results, the following suggestions are proposed:

- 1. For the Government**
The government is encouraged to continue innovating and promoting environmentally friendly initiatives by formulating, socializing, and

implementing policies that prioritize environmental sustainability. This includes providing clear technical guidelines and support mechanisms for carbon tax implementation, especially in the industrial sector.

2. For PT. KIMA (Makassar Industrial Area)

PT. KIMA is expected to maintain its commitment to environmental conservation and to proactively adapt to regulations related to environmental protection. PT. KIMA should serve as a model for other industries by implementing green practices and complying with emission standards.

3. For Future Researchers

Future researchers are encouraged to conduct more in-depth studies on the implementation of carbon tax policies and their impact on reducing negative emission externalities, particularly within industrial areas in South Sulawesi.

Bibliography

- Arif, A., Junaid, A., & Lannai, D. (2023). Influence of Tax Sanctions, Taxpayer Motivation, and Tax Socialization on Taxpayer Compliance at the North Makassar Primary Tax Office. *Journal of Accounting & Systems Information (JASIN)*, 1(1), 163–172.
- Amah, N., Febrilyantri, C., & Lestari, N. D. (2023). Tax Incentives and Trust Level: Their Influence on Taxpayer Compliance. *Journal of Economics*, 2(1), 1–19. e-ISSN: 2580-4902, p-ISSN: 0854-9842.
- Ami, R. A., & Donoriyanti, D. S. (2023). Analysis of Policy Model Design in Reducing Carbon Emissions in Indonesia's Energy Sector Using the System Dynamics Approach. *Student Scientific Creativity Journal (SSCJ)*, 1(3), 120–130. e-ISSN: 2985-3753, p-ISSN: 2985-3761.
- Andri, I., & Noor, A. (2023). Externalities of Household Waste. *Innovation: Journal of Economics, Finance and Management*, 19(1), 73–81. ISSN: 0216-7786 (Print), 2528-1097 (Online).
- PT KIMA. (2023). *Annual Report*. Makassar.
- Apriliyanti, K., & Rizki, D. (2023). Renewable Energy Policy: A Case Study of Indonesia and Norway in Sustainable Energy Management. *Jurnal Ilmu Pemerintahan Widya Praja*, 49(2), 186–209. p-ISSN: 0216-4019, e-ISSN: 2614-025X.
- As'ad, A. D., Junaid, A., Nurfadila, N., & Muslim, M. (2023). How Carbon Tax Affects the Economy and Environment: A Corporate Taxpayer Perspective. *Advances in Taxation Research*, 1(2). <https://doi.org/10.60079/atrv.v1i2.101>
- Chariri, A., & Ghozali, I. (2007). *Teori Akuntansi*. Semarang: Badan Penerbit Universitas Diponegoro.
- CNN Indonesia. (2019, December 5). *Emisi Karbon Dioksida Global Capai Rekor Tertinggi Tahun 2019*. <https://www.cnnindonesia.com/teknologi/20191205191747-199-454565/emisi-karbon-dioxide-global-capai-rekor-tertinggi-tahun-2019>
- Dilasari, P. A., Ani, H. N., & Rizka, R. J. H. (2022). Analysis of Best Practices in Carbon Tax Policy to Address Negative Externalities of Carbon Emissions in Indonesia. *Research & Journal of Accounting*, 7(1), 184–194. e-ISSN: 2584-9224, p-ISSN: 2548-7507.
- Direktorat Jenderal Ketenagalistrikan. (2021). *Pajak Karbon di Indonesia*. <https://gatrik.esdm.go.id> (Accessed January 28, 2024).
- Dr. Ridwan & Nawir, I. S. (2021). *Buku Ekonomi Publik* (Ed. 1). Perpustakaan

- Mahasiswa: Yogyakarta. ISBN: 978-623-236-260-6.
- Hardani, et al. (2020). *Buku Metodologi Penelitian Kualitatif dan Kuantitatif*. Yogyakarta: CV Pustaka Ilmu.
- Kementerian ESDM. (2020). *Inventarisasi Emisi GRK Sektor Energi*. <https://www.esdm.go.id/assets/media/content/content-inventarisasi-emisi-gas-rumah-kacasektor-energi-tahun-2020.pdf> (Accessed January 12, 2024).
- Kementerian Keuangan RI. (2013). *UU KUP dan Peraturan Pelaksanaannya*. Direktorat Jenderal Pajak: Jakarta.
- Kurnianto, B., Abdusshomad, A., & Kalbuana, N. (2023). Factors Influencing Sustainability Report Disclosure. *Management Studies and Entrepreneurship Journal*, 4(4), 3628–3630. <https://doi.org/10.37385/msej.v4i4.1780>
- Moleong, L. J. (2004). *Metodologi Penelitian Kualitatif*. Bandung: PT Remaja Rosdakarya.
- Muhammad, N. (2023). Indonesia One of the Largest Carbon Emitters in the Energy Sector Globally in 2022. <https://databoks.katadata.co.id/data/publish/2023/08/11/indonesia-salah-satu-penghasil-emisi-karbon-sektor-energi-terbesar-global-pada-2022> (Accessed January 11, 2024).
- Norsyifa, D., Dondok, A. B. T., et al. (2023). Dynamic Analysis of Challenges and Opportunities of Carbon Trading in Reducing Global Carbon Emissions. *Prosiding Seminar Nasional Penelitian LPPM UMJ*. e-ISSN: 3745-6080.
- Pamungkas, B. N., & Haptari, V. D. (2022). Analysis of the Carbon Tax Scheme in Indonesia Based on the UN Handbook for Developing Countries. *Jurnal Pajak Indonesia*, 6(2), 357–367.
- Peraturan Wali Kota Makassar Nomor 69 Tahun 2016 tentang Izin Pemanfaatan, Penataan dan Pengelolaan Ruang Terbuka Hijau.
- Putri, C. A. (2023, February 1). *Pajak Karbon di RI 'Ngaret', Sri Mulyani: Ini Rumit!*. CNBC Indonesia. <https://www.cnbcindonesia.com/news/20230201192011-4-410188/pajak-karbon-di-ri-ngaret-sri-mulyani-ini-rumit> (Accessed January 14, 2024).
- Ramlawati, Junaid, A., Alattas, S. N., & Muslim, M. (2022). The Effect of Environmental Performance on Profitability with Environmental Disclosure as a Moderating Variable. *Jurnal Akuntansi*, 26(2), 306–323. <https://doi.org/10.24912/ja.v26i2.933>
- Ratnawati, D. (2016). Carbon Tax as an Alternative Policy to Overcome Negative Externalities of Carbon Emissions in Indonesia. *Indonesia Treasury Review*, 1(1), 53–67.
- Susanto, I., & Ulpa, R. (2023). Analysis of Readiness for Carbon Tax Implementation in Indonesia. *Transparansi: Jurnal Ilmiah Ilmu Administrasi*, 6(2), December 2023. e-ISSN: 2622-0253.
- Sulfiani, J., Junaid, A., & Nur, M. (2022). Analysis of the Imposition of Tax Incentives on MSMEs during the Covid-19 Pandemic in Makassar City. *Jurnal Ekonomi*, 5(3), 241–246. <https://doi.org/10.57178/paradoks.v5i3.417>
- Tao, T. O., Kamase, J., & Amiruddin. (2021). The Influence of Total Quality Management Implementation and Budget Participation on Managerial Performance with Organizational Commitment as a Moderating Variable at PT. Bank Sulselbar Makassar Branch. *Jurnal Ilmu Akuntansi*, 3(2),

249-333. i-ISSN: 2714-6359, e-ISSN:
2714-6340.

Undang-Undang Republik Indonesia Nomor
7 Tahun 2021 tentang Harmonisasi
Peraturan Perpajakan. Jakarta:
Pemerintah Republik Indonesia.

Lestari, R. (2021, October 14). *Penarikan
Pajak Karbon, Ekonom: Pemerintah
Perlu Pikirkan Daya Saing Industri*.
Bisnis.com.
<https://m.bisnis.com/amp/read/20211014/257/1454488/penarikan-pajak-karbon-ekonom-pemerintah-perlu-pikirkan-daya-saing-industri>
(Accessed January 12, 2024).