



ANALYSIS OF THE IMPACT OF CARBON TAX AND GREEN PROPERTY TAX ON JAKARTA'S LOCAL REVENUE

Wirawan Firman Nurcahya^{*)}; Muhamad Afandi²⁾; Muhamad Faturrochman³⁾; Thoha Hanif Yaasiin⁴⁾

^{*)} wirawan@upnvi.ac.id, Univesitas Pembangunan Nasional “Veteran” Jakarta

²⁾ Mufandi304@gmail.com, Univesitas Pembangunan Nasional “Veteran” Jakarta

³⁾ m.faturrochman.3612@gmail.com, Univesitas Pembangunan Nasional “Veteran” Jakarta

⁴⁾ thohahanif14@gmail.com, Univesitas Pembangunan Nasional “Veteran” Jakarta

* Corresponding author

Abstract

Environmental issues are serious global challenges that must be addressed immediately. These issues require swift and appropriate action, including policies to support the transition to a greener economy. Carbon tax and green property tax are two fiscal instruments that the government can use to encourage environmentally friendly behavior and investment. This study aims to determine the effect of carbon tax and green property tax implementation on DKI Jakarta's regional income in an effort to implement the Green Economy in DKI Jakarta. The method used is descriptive qualitative with data collection techniques through literature studies. Data is sourced from the internet, including BPS, DKI Jakarta government website, and journals. The results showed that DKI Jakarta's regional income from carbon emission tax in 2023 reached Rp 837,210,000 with total gas emissions of 27,970 kiloton. The realization of green buildings in DKI Jakarta in 2023 exceeded the target, reaching 3.99 percent of the target of 2.5 percent, exceeding the target by 1.49 percent. Green property tax in the form of PBB deductions for green buildings is projected not to increase local revenue, but to reduce local revenue from taxes. However, this decrease in revenue is not significant, as the increase in green buildings will attract investors with a potential US\$30 billion green investment by 2030. This can be realized if buildings and companies in DKI Jakarta are green building certified. Reduced local revenue will be worth it if accompanied by reduced emissions from increased green buildings.

Keywords: Carbon tax, Green economy, Green property tax, Local revenue

INTRODUCTION

Environmental issues are an urgent global challenge that must be addressed immediately. The increase in temperature on the earth's surface will cause various disasters such as land fires, drought, and melting polar ice caps (Barus & Wijaya, 2022). This has been felt in almost all countries, such as increasing global temperatures, extreme weather, forest and wetland destruction, harmful air pollution, and various other environmental problems that affect human life and ecosystems. This environmental problem is also a concern in Indonesia, especially in DKI Jakarta. Recently, air quality in Jakarta has reached unhealthy levels, potentially endangering public health if not addressed immediately. Luckmi Purwandari, Director of Air Pollution Control at the Directorate General of Pollution Control and Environmental Damage (PPKL) of the Ministry of Environment and Forestry. On 7 June 2023 stated that air quality in Jakarta from May to August each year tends to deteriorate due to the influence of the seasonal cycle. The dry season from April to September brings dry winds that increase the amount of dust and harmful particles in the air. According to data from the IQAir website on Wednesday (07/06) at 08.00 am WIB, the air quality in Jakarta reached 155 AQI (Air Quality Index) from the air quality index safe limit of 100 AQI, an increase of 10 AQI from the previous day. An air quality of 155 AQI (red zone) signifies that the air quality is in the unhealthy category. This leads to increased heart and lung disorders and health impacts among the public, especially sensitive groups (Sabrina, 2023). At 10.00 a.m., Indonesia was included in the list of the 10 cities with the worst air pollution in the world, and became the country in Southeast Asia with the highest level of air pollution. On 30/09/2023, DKI Jakarta even ranked first as the most polluted city in the world with an AQI of 163, an unhealthy category due to the high amount of fine particles (PM2.5). According to Saputra (2021), air pollution adversely affects public health by reducing air quality through chemical reactions in



the atmosphere. Pollutants such as carbon monoxide, carbon dioxide, and sulphur are particularly harmful to the human respiratory system.

In a Limited Cabinet Meeting at the State Palace on Monday (14/8/2023), Minister of Environment and Forestry Siti Nurbaya stated that motorised vehicles are the main contributor to air pollution in Jakarta. Data shows the transport sector uses 44% of the total fuel in Jakarta, followed by the energy industry with 31%, the manufacturing industry 10%, the residential sector 14%, and the commercial sector 1%. Carbon monoxide (CO) emissions are dominated by the transport sector with 96.36% or 28,317 tonnes per year, followed by power plants with 1.76% or 5,252 tonnes per year, and industry with 1.25% or 3,738 tonnes per year. Motorcycles are the highest emission contributor per passenger compared to petrol private cars, diesel private cars, passenger cars, and buses. The motorcycle population reaches 78% of the total motorised vehicles in DKI Jakarta, totalling 24.5 million vehicles, with a growth of around 1,046,837 motorcycles per year. However, for Sulfur Dioxide (SO₂) emissions, the manufacturing industry is the main contributor with emissions of 2,631 tonnes per year or 61.9%. The energy industry contributed 1,071 tonnes per year or 25.17%, while motor vehicles only contributed 11% of the total SO₂ emissions, amounting to 493 tonnes per year. The high SO₂ emissions in the manufacturing industry were mainly due to the use of coal, which accounted for 64% of total SO₂ emissions.

Table 1. Greenhouse Gas Emissions Data by Sector Type

Year	Sector (thousands of tonnes CO ₂ e)						Total
	Energy	IPPU	Agriculture	FOLU	Forest Fire	Waste	
2015	536306	49297	117160	742843	822736	106061	2374403
2016	538025	55307	122185	417385	90267	112352	1335521
2017	562244	55395	127503	476005	12512	120191	1353850
2018	595665	59262	110055	602188	121322	127077	1615569
2019	638808	60175	108598	468425	456427	134119	1866552

Source: Ministry of Environment and Forestry (2020)

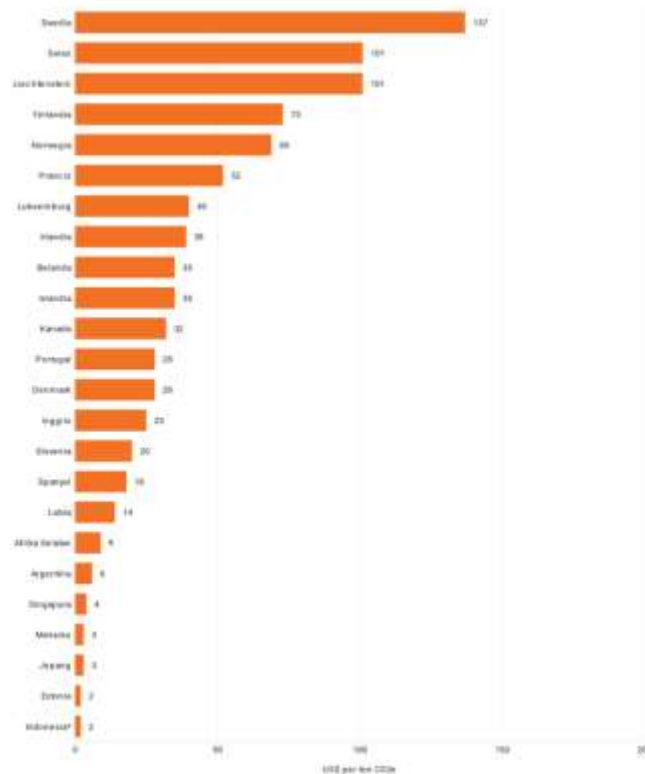
According to data from the Ministry of Environment and Forestry (2020), it is known that the energy sector contributes greatly to greenhouse gas emissions, which is the largest contributing sector almost every year. It is known that in 2019, the energy sector contributed to greenhouse gas emissions of 638,808,000 tonnes CO₂e and became the largest contributing sector in the year. This can be solved by switching to the use of environmentally friendly energy and implementing a carbon tax by taxing each emission produced. Another way to reduce environmental problems due to greenhouse gas emissions is by reducing the use of conventional buildings and structures. These efforts can be done by promoting and building green properties, by adopting best practices from countries that have implemented policies related to green properties, so that Indonesia can adapt appropriate policies. According to Safitra & Suheri (2022), conventional buildings often pay little attention to the effective use of space. As a result, it requires the use of additional electrical devices to improve comfort, such as daytime lights or air conditioning (AC). Therefore, strict regulations are needed to address this environmental issue, especially in the city of Jakarta.

This issue requires swift and appropriate action, including policies that support the transition to a greener economy. Appropriate fiscal policies can be key to fostering such a transition. Carbon tax and green property tax are two fiscal instruments that governments can



use to encourage environmentally friendly behaviour and investment. According to Selvi, Notika Rahmi (2020) in their research entitled "The Urgency of Carbon Tax Implementation in Indonesia", the results showed that carbon tax is very important to be implemented in Indonesia due to the worsening environmental situation and its impact on public health. Carbon tax not only has the potential to influence behaviour, but it can also be a new source of local revenue. A carbon tax would tax any activity that generates emissions to reduce fossil fuel use and environmental pollution, while a green property tax could encourage investment in environmentally friendly buildings and infrastructure.

Figure 1. Data on Carbon Tax Rates in World Countries in 2021



Source: databoks (2022)

In its implementation, the carbon tax in Indonesia has a relatively low rate compared to other countries. Indonesia provides a carbon tax rate of 2.1 USD per tonne of CO₂e. The tax will be imposed on coal-fired power plant companies, and the carbon tax rate is IDR 30,000 or around USD 2.1 per tonne of carbon dioxide equivalent emissions (tCO₂e). In Southeast Asia, the carbon tax rate set by the Indonesian government is also the lowest compared to countries that have set carbon tax rates in ASEAN. For example, the Vietnamese government has set a carbon tax rate of 15 USD per tonne and is expected to increase to 90 USD by 2040 (Carver, 2022). On the other hand, Thailand also plans to set a carbon tax rate of 200 baht or equivalent to 5.4 USD in 2025 (Turner, 2024). Singapore's carbon tax scheme also has a substantial rate, from 2019 to 2023, the carbon tax rate is set at 5 USD/tCO₂e. Then, in support of the zero carbon target, the Singapore government increased the carbon tax rate to 25 USD/tCO₂e in 2024 (Mohan & Ting, 2022). When compared to the rates imposed by ASEAN countries, Indonesia's carbon tax rate is very low.

The carbon tax essentially aims to help the Indonesian government to reduce the greenhouse gas effect that may occur in 2030 (Prastuti, 2023). It shows that the carbon tax can influence individuals and companies such as technology manufacturers, receiving intensive in making environmentally friendly products that are socially optimal. According to the Ministry of Energy and Mineral Resources (MEMR), taxes collected through carbon tax will serve as a



fund for development, green investment, social assistance, and climate change mitigation. If the carbon tax has a low rate, it will affect regional income, especially DKI Jakarta which is the capital of the country, therefore, the influence and potential of these two taxes on regional income needs to be carefully analysed to ensure its sustainability.

LITERATURE REVIEW

Carbon Tax

A carbon tax is a fee imposed due to human activities that produce carbon emissions and greenhouse gas emissions that harm the environment. The purpose of the carbon tax is to reduce greenhouse gas emissions and carbon emissions with the aim of creating a cleaner, healthier, and more sustainable future. According to Pigou, any activity that generates negative externalities should be taxed. According Kennedy et al. (2013) there are three basic options for imposing a carbon tax, namely Tax applied directly to measured GHG emissions (Tax to be paid on carbon emissions released but, the application of taxes on emissions output is very complex), Fossil fuel input tax on coal, crude oil, and natural gas, based on their carbon content (Tax to be paid on the use of fossil fuels, depending on the amount of carbon use, it shows that this alternative requires a chemical reaction manufacturing process in finding alternative power) and Tax levied on energy outputs (Tax imposed due to the use of energy produced such as electricity).

Green Property Tax

Green property tax, also known as green tax, is a form of tax designed to promote sustainable and environmentally friendly development. This tax not only aims to support the development of a country and its regions but also to protect the surrounding environment, harmonizing economic development with environmental protection. Green property tax is levied on properties that meet certain environmental standards, encouraging development and investment in more environmentally friendly properties through tax incentives. This includes the use of renewable energy, energy efficiency, and proper waste management (OECD, 2015). In Indonesia, tax incentives for property are expected to increase compliance among property managers. However, the literature on tax incentives for green buildings has not been fully disseminated to support the use of green buildings. Local governments have the responsibility to ensure that development permits qualify as sustainable development or meet green and environmentally friendly building requirements.

Local Revenues

Local revenues play an important role in supporting green economy initiatives, including the implementation of carbon tax and green property tax. Increased local revenue through these fiscal instruments is expected to support sustainable development and improve the quality of life for DKI Jakarta residents. The green economy concept leads to the creation of an economic system that considers environmental and social factors, which in turn can reduce inequality, improve quality of life, working conditions, and accessibility of social services (Kuznecov & Nebol'sina, 2022). Local revenue is a source of income generated by local governments from various sources, including taxes, levies, and other revenues. According to Law No. 32 of 2004, article 1 point 15 concerning regional government, Regional Revenue is all regional property rights that contribute to the addition of net worth within a certain period of the year.

METHODS

The research was conducted using the literature documentation method so that researchers could utilize a qualitative descriptive method. The qualitative descriptive method focuses on understanding phenomena or events in depth, involving non-numerical data



collection such as observations, interviews, and data analysis from various sources (Wijaya, 2018). This research aims to obtain systematic, objective, and accessible information and descriptions for researchers to conduct research through observation and literature, allowing them to conduct research in any location without being bound by a specific place. This research was conducted in DKI Jakarta Province from March to June 2024. The data source used in this research is secondary data. Researchers collected information from document sources, reports, and literature on the implementation and application of carbon tax and green property tax and their effect on increasing revenue in DKI Jakarta Province, as well as previous research on all types of carbon tax and green property tax applications and their impact on increasing revenue in DKI Jakarta Province. Furthermore, the data in the study were gathered from the internet, including sources from BPS, the DKI Jakarta government website, and journals discussing the application of carbon tax and green property tax and their impact in Indonesia on increasing state revenue in Jakarta.

The data collection techniques used in this study include observation methods and literature studies. Researchers used various kinds of literature to obtain information such as books, diaries, previous research, regulations, policies, and meeting minutes. Through the documentation method, researchers used various kinds of literature related to the implementation of Carbon Tax and Green Property Tax. The analysis technique involved describing text and images to provide clarity sourced from descriptive data and the reality of the implementation of carbon tax and green property tax in DKI Jakarta. The analysis techniques included data reduction, data presentation, and conclusion drawing. Data reduction is the process of reducing the volume of original data and presenting it in a much smaller volume while maintaining the integrity of the original data. According Sidik (2023), data reduction involves selecting, summarizing, and focusing on important elements, such as the results of problem-solving tests, interview results, and the categorization of problem-solving abilities into high, medium, and low abilities. The data reduction process has been carried out since the data collection process, starting with data collection, data cleaning, summarizing, dividing data, and strengthening data. Data presentation is an effort to display or describe data that has been collected, analyzed, and summarized in narrative form. Drawing conclusions is the final process of analyzing descriptive research data. In this process, the researcher must verify the data analysis and derive conclusions from the results in terms of meaning and alignment with the reality of the place under study.

RESULT AND DISCUSSION

The implementation of a carbon tax and a green property tax is based on several important reasons that aim to achieve economic, environmental, and social goals. A carbon tax is formulated to encourage individuals and companies to reduce greenhouse gas (GHG) emissions by taxing any activity that produces emissions to reduce the amount of these gasses produced by human activities. A carbon tax will generally be levied on any economic activity that generates carbon emissions, whether it is production or consumption (Barus & Wijaya, 2022). This contributes to global efforts to address the phenomenon of climate change. A carbon tax also aims to encourage the transition towards renewable and more efficient energy sources, by providing financial incentives to use green energy. In addition, the carbon tax can also serve as an additional source of revenue for the city, which can be allocated to fund various other green projects. Meanwhile, a green property tax is applied based on the energy efficiency level of a building or property, with the aim to encourage property owners to invest in more energy-efficient technologies and practices. This includes the increased use of more environmentally friendly materials and technologies, aiming to improve the quality of the living environment in Jakarta. In addition, this tax also serves to encourage investment in sustainable and future-



oriented projects, including the development of green infrastructure that not only improves the aesthetics of the city but also adds value to the property Carbon tax in Jakarta can be one of DKI Jakarta's local revenue sources. The implementation of a carbon tax of 30 thousand per Kton CO₂e has the potential to affect Jakarta's revenue level, considering that the city is one of the provinces with the largest contribution of carbon emissions in Indonesia (Pratama et al., 2022).

Table 2. Carbon Emissions Tax Data 2023

Category	Emissions (KTon Co ₂)	Rate	Revenue
Transportation Emissions	15.543	Rp. 30.000	Rp. 466.290.000
Electric Power Emissions	7.217	Rp. 30.000	Rp. 216.510.000
Manufacturing Industry Emissions	2.443	Rp. 30.000	Rp 73.290.000
Landfill Solid Waste Emissions	1.379	Rp. 30.000	Rp. 41.370.000
Residential Emissions	1.325	Rp. 30.000	RP. 39.750.000
Total	27.970	Rp. 30.000	Rp. 837.210.000

Source: Carbon Tax Implementation in Indonesia (2023)

According to the data above, it can be seen that there are 5 types of carbon tax categories that are subject to carbon tax in 2023. The five types of carbon tax consist of transportation emissions, electric power emissions, manufacturing industry emissions landfill solid waste emissions, and residential emissions. It can be seen in 2023 that the largest gas emitter in DKI Jakarta province comes from Transportation emissions of 15,543 kilotons and known tax costs of Rp. 466,290,000. The second largest carbon emitter can be seen to be electric power emissions of 7217 kilotons and a tax fee of Rp. 216,510,000. The third largest contributor to carbon emissions can be seen from solid waste emissions of 1,379 kilotons and is taxed at IDR 41,370,000. Furthermore, the second lowest contributor to carbon emissions in the data above can be seen coming from landfill solid waste emissions of 1,379 kilotons with a tax cost of Rp. 41,370,000. Finally, the lowest contributor to carbon tax emissions in the data above is residential emissions of 13.25 kilotons with a tax of 39,750,000. The average gas emissions in 2023 in DKI Jakarta amounted to 5,581.4 kilotons with an average tax of IDR 167,422,000. Then the total 2023 Carbon emission tax obtained by the government is Rp. 837,210,000 with total gas emissions of 27,970 kilotons, with emissions sourced from various sectors.

The economic impact of the carbon tax on DKI Jakarta's revenue, we need to consider various aspects, including the direct contribution to the city's revenue, the additional potential through innovation and investment, and the challenges and opportunities arising from the implementation of this tax. In 2023, the total carbon emission tax earned by the DKI Jakarta government amounted to IDR 837,210,000. This shows that the carbon tax has made a significant direct contribution to the city's revenue. Most of this revenue comes from sectors that produce the largest greenhouse gas emissions, such as transportation and electric power, indicating that this tax not only serves as a mechanism to reduce emissions but also as an important source of revenue for the city. In addition to direct contributions, carbon taxes can also have positive indirect economic impacts. By encouraging sectors that produce greenhouse gas emissions to reduce their emissions, this tax can encourage innovation and investment in greener technologies. This in turn can create new jobs and strengthen sustainable sectors of the economy, which can increase the city's overall revenue. According to Hasibuan (2023), green



investment can trigger the rapid growth of renewable energy that replaces fossil energy, not only reducing carbon emissions but also creating new jobs. However, the implementation of a carbon tax also poses challenges, such as resistance from certain businesses and socioeconomic impacts on certain groups of people. Therefore, it is important for the DKI Jakarta government to design and implement fair and inclusive policies, which ensure that the benefits of this tax are widespread and do not only negatively impact certain sectors. In addition, opportunities to use the revenue raised from the carbon tax for investment in green infrastructure and improvement of public services can also improve the quality of life of citizens and the economic competitiveness of the city.

Green property tax incentives for environmentally friendly buildings in Jakarta is one of the strategic measures to reduce environmental damage and suppress CO₂ emissions, which are the main cause of global warming that the city is now experiencing. This incentive is aimed at buildings that adopt the green building concept. In the 2030 Green Building Grand Design plan, Jakarta is committed to reducing energy consumption, water use, and CO₂ emissions by 30 percent each. However, in its implementation until 2023, there are only 60 buildings that have obtained Green Building certificates. These buildings include low rise, mid-rise, and high-rise categories.

Tabel 3. Green Building Realization in DKI Jakarta 2023-2025

Year	Green Building Realization %	Green Building Target %
2023	3,99	2,5
2024	*7,89	5
2025	*11,97	7,5

*(assumption if growth is stagnant)

Source: Final Report of DKI Jakarta Human Settlements, Spatial Planning, and Land Agency (2023)

Based on data from the performance report of the DKI Jakarta Human Settlements, Spatial Planning, and Land Agency in 2023, it is known that the realization of green development in DKI Jakarta in that year reached 3.99 percent, exceeding the set target of 2.5 percent, or 1.49 percent above the target. This is expected to be a trend in the following year. If the increase is assumed to be stagnant, then in 2024 it will be 7.98 percent with a target of 5 percent, and in 2025 it will be 11.97 percent with a target of 7.5 percent. The green building tax incentive set by the government in 2022 is considered to be one of the causes of the increase in the number of green buildings in Jakarta. The DKI Jakarta Provincial Government provides various incentives for the construction of green buildings in Jakarta, as regulated in DKI Jakarta Governor Regulation No. 60 of 2022. Green Buildings (BGH) with Green Building Council Indonesia (GBCI) certificates and Bronze certificates get a 30 percent PBB discount. Green buildings that are silver certified will get a PBB discount of 50 percent, and green buildings that are gold certified will get a PBB discount of 60 percent. With the realization of green buildings that continue to increase, it will be able to grow green investment that can increase DKI Jakarta's regional income. In the third quarter of 2022, investment in DKI Jakarta included the transportation, warehouse, and telecommunications sectors as the largest recipients of investment, at 27% (Rp29 trillion). Followed by the Other Services sector with 18% (IDR 19 trillion) and the Housing, Industrial Estate, and Office sector with 15% (IDR 16 trillion). The percentage of green investment in DKI Jakarta is still low, at around 4% of total investment. Sectors included in green investment include rail-based transportation, electricity installation and SPKLU, drinking water, electric vehicles, waste management, and waste, as well as green buildings and offices (Amelia, 2022). This means that green investment in Jakarta in 2022 reached Rp 4.3 trillion. The realization of this investment is highly dependent on the ability of buildings and companies in DKI Jakarta to obtain green building certification. Investors in the current era of globalization set high standards and criteria, especially related to reducing



greenhouse gas emissions and efforts to combat climate change. The more investment that enters DKI Jakarta, the more it will indirectly add to DKI Jakarta's regional income..

The results of the analysis of the effect of green property tax incentives on DKI Jakarta's revenue show that government measures to encourage the adoption of green buildings have been successful. Based on the 2023 performance report from the DKI Jakarta Human Settlements, Spatial Planning, and Land Agency, the realization of green development in the DKI Jakarta area has exceeded the set target. The achievement reached 3.99%, exceeding the initial target of 2.5% by a difference of 1.49%. This indicates a positive adoption of the green building concept in the region, with a projected significant increase going forward, reaching 7.98% in 2024 and 11.97% in 2025.

Tax incentives implemented by the DKI Jakarta government through Governor Regulation No. 60 Year 2022, including a 30% PBB rebate for green buildings with Bronze certificates, 50% for Silver, and 60% for Gold, appear to have played an important role in driving increased realization of green buildings. These incentives are not only beneficial for green building owners and developers but also contribute to the achievement of the government's goals of reducing environmental impact and promoting green investment. With increased realization of green buildings and tax incentives in place, there is potential to foster greater green investment in DKI Jakarta. The IFC's 2018 Climate Investment Opportunities in Cities report shows that Jakarta has the opportunity to secure US\$30 billion in green investments by 2030. This investment not only contributes to reducing greenhouse gas emissions and fighting climate change, but it can also increase local revenue.

The analysis conducted on the effect of carbon tax and green property tax on DKI Jakarta's local revenue shows interesting and complex results. First, the provision of land and building tax (PBB) rebates for buildings that meet green or environmentally friendly criteria is not projected to contribute to an increase in local revenue in the short term. In fact, this policy is likely to cause a decrease in local tax revenue. However, this decline is not expected to be significant on a large scale. Nonetheless, the benefits of this policy are expected to appear in another form, namely an increase in the number of green buildings that can attract investors, especially in the green investment sector. The potential investment that can be obtained from this policy is estimated to reach a value of US\$ 30 billion by 2030. This projection is based on the assumption that more buildings and companies in DKI Jakarta will be certified as green buildings, thus attracting more investors who focus on environmentally friendly projects. So while there is a decrease in local revenue due to the PBB rebate, the long-term positive impact of this policy should not be overlooked. Incoming green investments have great potential to support sustainable development and improve the quality of the environment in DKI Jakarta. In addition, the reduction in greenhouse gas emissions as a consequence of an increase in the number of green buildings will provide significant environmental benefits. Therefore, while there is a reduction in local revenue from the green property tax, this reduction can be considered commensurate with the environmental benefits and potential investment generated.

The Jakarta Provincial Government's effort to implement a carbon tax and a green building tax is a crucial step in reducing greenhouse gas emissions and realizing sustainable development. However, this implementation faces a number of complex challenges. One of the main challenges is resistance from industries and businesses that are concerned about the increased operational costs due to the carbon tax, which could reduce their profitability and competitiveness. According to Tjoanto & Tambunan (2022), one of the difficult challenges of implementing a carbon tax is resistance from entrepreneurs who have a conflict of interest in protecting their businesses from paying taxes. This can be overcome by having an open dialog with the industry and providing incentives, such as subsidies or tax rebates, for those who invest in green technologies. In addition, the limited availability of green infrastructure and



technology is also an obstacle. An effective solution to overcome this problem is to make massive investments in improving renewable energy infrastructure, such as solar and hydropower plants, and modernizing public transportation systems with electric vehicles and trains. Effective supervision and law enforcement are also needed to ensure that companies comply with carbon tax regulations. This can be improved by utilizing digital technology for real-time monitoring of emissions and imposing strict sanctions on violators. To overcome the weaknesses of the immature policy and regulatory framework, comprehensive policy development is needed and involves various parties, including the central government, local governments, and environmental organizations. On the other hand, intensive public education on the benefits of climate change and the importance of carbon tax and green building needs to be conducted to increase public support and understanding. The campaign should show the direct benefits that people can feel, such as better air quality and energy savings. This is based on the provisions of Law No. 7 of 2021. The scope of carbon tax subjects includes individuals and business entities involved in the purchase of goods containing carbon or activities that produce carbon emissions, so that people or entrepreneurs will prefer to buy products or goods that use environmentally friendly technology to avoid carbon tax, so that this can have a positive impact on efforts to realize the Green Economy in DKI Jakarta.

The implementation of carbon tax and green building tax in DKI Jakarta, while posing significant challenges, also offers the potential to increase local revenue through the regional budget, thus providing benefits for regional development. The main challenges in carbon tax implementation are determining the right carbon price and accurate emission monitoring. Pricing too low can reduce the effectiveness of the policy, while pricing too high can burden industries and communities, which can have a negative impact on the local economy. In addition, accurate and transparent emission monitoring and verification systems require expensive investments in infrastructure and technology as well as trained experts, which can be an additional burden on the local budget. Meanwhile, the implementation of the green building tax also faces challenges, especially in terms of the awareness and readiness of building owners and property developers. Many of them may not yet understand the long-term benefits of green building or be reluctant to bear the higher initial costs of sustainable development. According to Nugraha et al (2024), acceptance of green products depends on people's understanding of environmental issues, and green economy products have higher prices, resulting in people and companies not switching to green products. If managed well, the implementation of a carbon tax and a green building tax can significantly increase APBD revenue, which can then be used to fund environmental and green infrastructure projects in Jakarta. A carbon tax can encourage companies to reduce their emission levels and shift to renewable energy sources, which not only reduces pollution but also opens up new opportunities for green industries and employment. A green building tax, on the other hand, can improve property values and quality of life in Jakarta while reducing the burden on some energy sources, such as electricity. The DKI Jakarta government can overcome this challenge by adopting a phased approach, providing incentives for early switching, and increasing public awareness campaigns on the environmental and economic benefits of this policy. Thus, carbon taxes and green building taxes are not only tools for environmental control but also mechanisms for sustainable economic development and improved public welfare.

The implementation of a carbon tax and a green building tax in DKI Jakarta is a crucial step in reducing greenhouse gas emissions and realizing sustainable development. However, for this step to succeed, deep and comprehensive solutions are needed. One of the key solutions is technological innovation and research and development (R&D) in renewable energy and energy efficiency. The government can support this initiative by providing fiscal incentives such as tax exemptions or grants for projects that have a focus on developing more



environmentally friendly technologies. For example, support for research in the use of solar, wind, and biomass energy, as well as developing green building technologies that are more efficient in energy and water use. In addition, the government can form partnerships with academic institutions and research centers to encourage innovation.

Collaboration with the private sector through public-private partnerships is also a key strategy. Governments can work with private companies to fund and implement renewable energy and green building projects. For example, the government can offer incentives to companies that participate in the development of renewable energy infrastructure and implement green technologies in their buildings. These partnerships not only reduce the financial burden on the government but also increase private sector participation in climate change mitigation efforts. Projects such as the construction of solar power plants in government buildings or the implementation of renewable energy-based heating and cooling systems in commercial buildings can be concrete examples of this collaboration.

Training and empowering the workforce with green technologies is also very important. The government can organize training and certification programs for workers in the construction sector and energy industry so that they have the necessary skills to implement and manage green technologies. These training programs can cover topics such as solar panel installation and maintenance, energy management systems, and green building practices. Having a skilled workforce allows for more efficient and effective implementation of renewable energy and green building projects. The transition to low-carbon and sustainable development will trigger shifts in Indonesia's labor market, creating demand for new skilled workers, retraining programs, social protection, and financial assistance, especially for the most vulnerable workers and businesses (Jobs, 2021). Increased international cooperation is also an important element of this strategy. Learning from other countries that have successfully implemented carbon taxes and green building incentives can provide valuable insights for DKI Jakarta. The government can actively participate in international conferences on climate change and sustainability and establish partnerships with countries that have experience and expertise in this field. With this comprehensive and inclusive strategy, the implementation of the carbon tax and the green building tax in DKI Jakarta is expected to be successful. Technological innovation, collaboration with the private sector, workforce training, and international cooperation will form a strong foundation to overcome the challenges and realize long-term benefits for the environment and society. Improved air quality, reduced greenhouse gas emissions, energy efficiency, and sustainable economic growth are the expected benefits of implementing this policy.

CONCLUSION

Carbon tax and property tax have the potential to contribute greatly not only to the green economy but also to DKI Jakarta's local revenue. The carbon tax and green property tax have the same goal, which is to reduce carbon emissions from the property sector. The carbon tax disincentivises the use of fossil energy and encourages the transition to renewable energy, while the green property tax incentivises the development and use of environmentally friendly properties. In 2023, the carbon tax contributed to DKI Jakarta's total revenue of IDR 831,210,000 from the 5 types of carbon emissions taxed. Not unlike the carbon tax, the green property tax also experienced positive development in 2023. The realisation of green property tax managed to exceed the target set by the DKI Jakarta local government by 3.99% from the green property development target of only 2.5%. Positive development is also projected to increase in 2024 and 2025. Green property tax in the form of PBB deductions for green buildings is projected to not increase local revenue, but rather reduce local revenue from taxes. However, this decrease in revenue is not significant, as the increase in green buildings will



attract investors with a potential US\$30 billion green investment by 2030. This can be realised if buildings and companies in DKI Jakarta are green building certified. The reduction in local revenue will be worth it if accompanied by a reduction in emissions from increased green buildings

Sugesstions

Despite its positive revenue and environmental impacts, the implementation of carbon tax and green property tax has new challenges to overcome. One of the main challenges is resistance from industries and businesses that are concerned about the increased operational costs due to the carbon tax, which could reduce their profitability and competitiveness. Efforts can be made to address this issue by engaging in open dialogue with industry and providing incentives, such as subsidies or tax rebates, for those who invest in green technologies. With this comprehensive and inclusive strategy, the implementation of carbon tax and green building tax in DKI Jakarta is expected to be successful.

Efforts made to improve the performance of the carbon tax and green building tax require some improvements to achieve maximum results. The DKI Jakarta government needs to strengthen and expand the implementation of carbon tax and green property tax policies. This can be realized by providing more attractive incentives to individuals and companies that successfully reduce carbon emissions and adopt sustainable development practices, such as a reduction in tax rates like the Land and Building Tax (PBB), making it more appealing than the current policy. Conversely, the government should also apply tougher disincentives, such as fines or increased tax rates for those who do not comply with these policies. These efforts will not only make the tax policy more effective in reducing carbon emissions but also encourage the adoption of green technologies and the construction of more environmentally friendly properties.

To ensure the success of the carbon tax and green property tax policies, it is important for the DKI Jakarta Government to improve socialization and education for the general public and businesses. The socialization program should be designed comprehensively, covering various communication media and involving community leaders and influencers to disseminate information. Education on the importance of carbon emission reduction and the benefits of green property development should be conducted on an ongoing basis through seminars, workshops, and public campaigns. With a better understanding of the positive impact of these policies on the environment and long-term welfare, the public and businesses will be more motivated to actively participate and fully support their implementation. The DKI Jakarta government should work closely with the private sector to encourage investment in green projects. This cooperation can be realized through the provision of easy licensing, fiscal incentives, and technical support for the construction of certified green properties. Additionally, the government can facilitate collaboration forums between the private sector, financial institutions, and local communities to create innovative solutions for sustainable development. By creating a conducive environment for green investment, the private sector will be more encouraged to invest in green technology and green property projects, which in turn will help reduce carbon emissions and increase local revenue sustainably.

REFERENCES

- Amelia, M. (2022). Peluang Investasi Hijau di Indonesia. 1(September), 1–3. <https://katadata.co.id/timpublikasikatadata/berita/5e9a50d9e9c44/peluang-investasi-hijau-di-indonesia>
- Barus, E. B., & Wijaya, S. (2022). Penerapan Pajak Karbon Di Swedia Dan Finlandia Serta Perbandingannya Dengan Indonesia. JURNAL PAJAK INDONESIA (Indonesian Tax Review), 5(2), 256–279. <https://doi.org/10.31092/jpi.v5i2.1653>



- BBC News Indonesia. (2023, June 8). Polusi udara di Jakarta tertinggi se-Asia Tenggara, dua tahun setelah Presiden Jokowi dan Pemprov DKI kalah gugatan. BBC News Indonesia. <https://www.bbc.com/indonesia/articles/cjmy2nez84vo>
- Carver, R. (2022). Vietnam: Carbon Neutral by 2050? The Center for Energy Science & Policy (CESP). <https://cesp.gmu.edu/vietnam-carbon-neutral-by-2050/>
- Elsa, H. U., & Utomo, R. (2022). Menimbang Kesiapan Penerapan Carbon Pricing di Indonesia dengan Studi pada Kanada, Britania Raya, dan Australia. *JURNAL PAJAK INDONESIA (Indonesian Tax Review)*, 6(2), 410–435. <https://doi.org/10.31092/jpi.v6i2.1866>
- Hasibuan, J. (2023). Ekonomi Berkelanjutan di Tahun 2023: Investasi Hijau dan Transformasi Bisnis. *Circle Archive*, 1(2).
- INFOPublik - Pajak Karbon Mendorong ekonomi hijau Berkelanjutan. (2022). <https://infopublik.id/kategori/nasional-ekonomi-bisnis/642340/pajak-karbon-mendorong-ekonomi-hijau-berkelanjutan>
- Jobs, G. (2021). Lembar Fakta tentang Pekerjaan yang Layak Green jobs – Pekerjaan yang baik : 1. <https://www.ilo.org/media/336271/download>
- Kennedy, K., Obeiter, M., Kaufman, N., Atteridge, A., Siebert, C. K., Klein, R. J. T., Butler, C., & Tella, P. (2013). Carbon Tax Policy Paper. *Government Gazette*, May, 1–4. https://www.pwc.co.za/en_ZA/za/assets/pdf/cop17-a-review-of-strategies.pdf%5Cnwww.cer.org.za
- Kuznecov, S. A., & Nebol'sina, V. I. (2022). REEN ECONOMY AS A NEW COURSE OF MOVEMENT. *Materials of the International Scientific and Practical Conference "Green Economy: "Iforest,"* 48–51. https://doi.org/10.34220/ZEIF2022_48-51
- Mohan, M., & Ting, K. W. (2022). Singapore to raise carbon tax after Bill passed in Parliament, WP's proposals rejected. *Channel News Asia*. <https://www.channelnewsasia.com/singapore/singapore-raise-carbon-tax-after-bill-passed-parliament-wps-proposals-rejected-3053876>
- Nugraha, R., Cut Risya Varlitya, M., Loso Judijanto, Ms., Saputra Adiwijaya, Ms., & Irma Suryahani, Ms. (2024). *Green Economy (Teori, Konsep, Gagasan Penerapan Perekonomian Hijau Berbagai Bidang Di Masa Depan)* (Vol. 1, Issue January). www.buku.sonpedia.com
- OECD, O. for E. C. and D. (2015). *Creating Incentives for Greener Products: A Policy Manual for Eastern Partnerships Countries*, OECD Green Growth Studies. Paris: OECD Publishing.
- Prastuti, N. (2023). Peranan Pajak Sebagai Penerimaan Negara dalam APBN (Analisis pada Pajak Karbon di Indonesia). *Badamai Law Journal*, 8(1), 75–87. <http://dx.doi.org/10.32801/damai.v8i1.15832>
- Pratama, B. A., Ramadhani, M. A., Lubis, P. M., & Firmansyah, A. (2022). Implementasi Pajak Karbon Di Indonesia: Potensi Penerimaan Negara Dan Penurunan Jumlah Emisi Karbon. *JURNAL PAJAK INDONESIA (Indonesian Tax Review)*, 6(2), 368–374. <https://doi.org/10.31092/jpi.v6i2.1827>
- Sabrina, fia malika. (2023). Tetap Sehat Saat Polusi Udara Kurang Baik. *Kementerian Keuangan Republik Indonesia*. <https://www.djkn.kemenkeu.go.id/kpknl-jakarta1/baca-artikel/16457/Tetap-Sehat-Saat-Polusi-Udara-Kurang-Baik.html#:~:text=AQI berada di angka 0,dan tidak menimbulkan risiko kesehatan.>
- Safitra, D. A., & Suheri, A. (2022). Insentif Pajak Properti Atas Bangunan Hijau: Sebuah Studi Komparasi. *Jurnal Pajak Dan Keuangan Negara (PKN)*, 3(2), 331–342. <https://doi.org/10.31092/jpkn.v3i2.1488>
- Saputra, A. I. (2021). Pajak Karbon Sebagai Sumber Penerimaan Negara Dan Sistem Pemungutannya. *Jurnal Anggaran Dan Keuangan Negara Indonesia (AKURASI)*, 3(1),



- 56–71. <https://doi.org/10.33827/akurasi2021.vol3.iss1.art96>
- Selvi, Notika Rahmi, I. R. (2020). Urgensi Penerapan Pajak Karbon Di Indonesia. *Jurnal Reformasi Administrasi*, 7(1), 29–34.
- Sidik, mila karmila. (2023). MENYELESAIKAN SOAL ARITMATIKA SOSIAL PADA SISWA KELAS VII SMP 15 AMALATU. 4(Juli), 40–51.
- Tjoanto, A. K., & Tambunan, M. (2022). Tantangan dan Strategi dalam Proses Implementasi Kebijakan Pajak Karbon. *Jurnal Riset Akuntansi & Perpajakan (JRAP)*, 9(02), 237–248. <https://doi.org/10.35838/jrap.2022.009.02.20>
- Turner, R. (2024). Thailand to introduce carbon tax by 2025, oil tax burden unchanged. *Thethaiger*. <https://thethaiger.com/news/business/thailand-to-introduce-carbon-tax-by-2025-oil-tax-burden-unchanged>
- Wijaya, H. (2018). Analisis data kualitatif. Makassar: Sekolah Tinggi Theologia Jaffray.