



**ANALYZING THE POTENTIAL OF CARBON TAX IMPLEMENTATION IN INDONESIA:  
A COMPREHENSIVE EXAMINATION FOR MITIGATING AIR POLLUTION**

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***Abstract***

*Air pollution poses a significant threat to public health and the environment, particularly in densely populated urban areas and industrial centers. This paper explores the potential of implementing a carbon tax as a strategy to address both income generation and air pollution control in Indonesia. Drawing upon successful experiences in countries like Sweden, Finland, and Denmark, the study analyzes the potential impact of a carbon tax on carbon dioxide emissions in Indonesia. The research aims to assess the urgency of implementing a carbon tax in Indonesia, given its high carbon emissions and severe air pollution challenges. Based on a comprehensive literature review and analysis, this study explores the potential of a carbon tax in Indonesia as a means to generate revenue and control air pollution, providing valuable insights into the urgency and feasibility of such a policy intervention. The findings suggest that a well-designed carbon tax can serve as an effective tool for Indonesia to simultaneously address its economic and environmental challenges. The paper concludes by highlighting the importance of political will, stakeholder engagement, and careful policy design in implementing a carbon tax in Indonesia. The study's recommendations can inform policymakers and stakeholders in formulating effective strategies to combat air pollution, reduce carbon emissions, and generate sustainable revenue streams. By adopting a carbon tax, Indonesia can take significant steps towards a cleaner, healthier, and more prosperous future.*

**Keywords:** Carbon Tax, Air Pollution, Emission Reduction, Externalities, Indonesia, Policy Intervention, Revenue Generation.

**1. INTRODUCTION**

Air is a critical component of life. However, in the modern era, as cities and industrial centers develop physically and transportation expands, air quality will deteriorate due to factors such as air pollution. Under normal circumstances, air contains certain amounts of contaminants in the form of gases, small particles, or aerosols, which has the potential to negatively impact human health (Badan Pengelolaan Lingkungan Hidup Jakarta, 2013).

According to a World Health Organization (WHO) study, nine out of ten people breathe air that has a high concentration of pollutants on a daily basis (DW.com, 2018). As a result, the global health problem is worsening. At least 7 million people die each year as a result of air pollution (VOA Indonesia, 2019). WHO revealed that air pollution is a risk factor for deadly

diseases such as lung cancer, stroke, respiratory infections, and heart disease (Allianz Indonesia, 2021).

Air pollution is a negative externality, as air is necessary for living beings to survive (Gandhi & Cuervo, 1998). According to a 1996 UN Environment Program assessment, Jakarta's air pollution was ranked third in the world, behind Mexico City and Bangkok (Ratnawati, 2016). Indonesia is the sixth largest carbon producer in the world, according to the World Resources Institute. This is extremely ironic, given the critical role of air in supporting biological life.

Government involvement is necessary to address the occurrence of negative externalities. Indonesia committed to a 26% reduction in carbon dioxide emissions by 2020 at the Copenhagen Climate Change Conference (Jotzo, 2012). As a result, policies promoting carbon reduction targets are necessary. Carbon taxes are a cost-effective approach to make that

commitment a reality. Swedish, Finnish, and Danish carbon taxes have been enacted. This will result in a 7-15 percent reduction in negative externalities associated with carbon emissions (British Columbia Ministry of Finance, 2013).

Having observed various successful carbon tax implementations in other countries, this essay is interested in examining carbon taxes as a policy tool for mitigating negative externalities associated with carbon emissions. The primary goal of enacting a carbon price is to reduce carbon dioxide emissions. This was demonstrated by a study undertaken by (Lin & Li, 2011) which examined the effect of carbon taxes on the rise of carbon dioxide emissions in Denmark, Finland, Sweden, and the Netherlands. The findings indicate that Finland's carbon tax has a considerable negative effect on the growth of carbon dioxide emissions. Carbon taxes in Denmark, Sweden, and the Netherlands have a

negative but not significant effect on the growth of carbon dioxide emissions due to tax exemptions in specific energy businesses. Similarly, Bruvoll & Larsen (2004) demonstrate in their analysis that Norway's emissions have been decreased by 2.3 percent as a result of the adoption of a relatively high carbon tax. The purpose of this study is to determine the importance of adopting a carbon tax in Indonesia.

**Theoretical Review**

***Carbon Emission Concept***

Carbon emissions are quantified in terms of the total amount of greenhouse gases emitted by individuals or groups over a specified time period, expressed in tons of carbon dioxide equivalent (tCO<sub>2</sub>e) or kilograms of carbon dioxide equivalent (kgCO<sub>2</sub>e). There are numerous types of greenhouse gases; they are classified here by type and source.

Types of Greenhouse Gases	Source	Good Weighing Practice (GWP)
Carbon dioxide (CO <sub>2</sub> )	Combustion of hydrocarbon-containing fuels	1
Methane (CH <sub>4</sub> )	Decomposition of waste, natural gas system, and fermentation	21
Nitric oxide (N <sub>2</sub> O)	Agricultural land, fossil fuel combustion in mobile energy (transport)	296
Hydrofluorocarbons (HFCs)	Replacement emissions of ozone-depleting substances and HFC-23 emissions during the manufacturing of HFC-22	140-11.700
Fluorocarbons (PFCs)	Electricity transmission and distribution	6.500-9.200
Sulfur hexafluoride (SF <sub>6</sub> )	Semiconductors are a byproduct of aluminum production.	22:200

Source: U.S. Environmental Protection Agency, 1999

Each of the six types of Greenhouse Gases listed above, at varying concentrations, has the potential to cause global warming (Khoirul et al., 2019). While carbon dioxide has the highest quantity in the atmosphere, it is the least probable of the six gases to contribute to global warming. Carbon dioxide's global warming index is referred to as the Good Weighing Practice (GWP), with reference number 1. Methane gas has a global warming potential of 21, which indicates

that 1 tonne of methane can generate 21 times the global warming caused by 1 tonne of carbon dioxide.

**Carbon Tax**

Carbon tax is a tax on the use of hydrocarbon-based fuels (Hoeller & Wallin, 1991). Additionally, fossil fuels are referred to as hydrocarbon fuels (Ritchie & Roser, 2017). Coal, oil, and natural gas are examples of such fuels. Carbon taxes on hydrocarbon (fossil) fuels have the potential to increase the price of

hydrocarbon fuels. As economic fundamentals dictate that when the price of products increases, demand for them decreases, the carbon tax is analogous. (Lu et al., 2010a). Similarly, enacting a carbon tax will increase the cost of fossil fuels. This is projected to result in a decrease in the usage of carbon-based fuels. Reduced fuel use will have an effect on the amount of carbon dioxide discharged into the air. As a result, not imposing a carbon tax will result in excessive fuel consumption, and the carbon tax seeks to compensate for this market failure by including the social costs of negative externalities in the price of fuel (Owen, 2006). Including these societal costs in the price of fossil fuels will increase their price and is likely to decrease consumer demand for fossil fuels (Mundaca, 2017).

In comparison to different methods for reducing greenhouse gas emissions, the carbon price offers three significant advantages. To begin, a carbon tax is a comprehensive economic policy that may be used to cut emissions from all main sources, whereas other solutions often target individual sources of emissions, such as electricity, heating, or transportation. A carbon tax on all fossil fuels might be applied to cover all main sources of emissions. Second, carbon taxes give unambiguous price signals to businesses and consumers, enabling them to make more informed purchasing and investment decisions. Consumers and businesses with clear knowledge about carbon costs are more encouraged to take energy efficiency measures and invest more in energy efficiency technologies, according to research. As a result, a carbon tax can have a greater impact on consumer behavior when it uses clear pricing signals. Additional benefits of a carbon dioxide tax include administrative simplification and stratification. Carbon tax mechanisms could be similar to existing tax systems in order to avoid administrative complications associated with carbon taxation. This typically implies substantial administrative costs connected with establishing a new government agency. Finally, a carbon price has the potential to generate two economic benefits. Among the positives is the elimination of fossil fuels' negative externalities. Due to the absence of negative externalities in personal costs, marginal private costs excluding taxes are lower than marginal societal costs.

The equilibrium between marginal private cost and demand curve is in the individual optimal state in this scenario, but not yet in the societal ideal state. This can result in a loss of satisfaction as a result of excessive fossil fuel use, a condition called as weight death.

The prime objective of enacting a carbon price is to decrease carbon dioxide emissions. (Lin & Li, 2011) examined the influence of carbon taxes on the growth of carbon dioxide emissions in Denmark, Finland, Sweden, and the Netherlands. Emissions of carbon dioxide in Finland. Carbon taxes in Denmark, Sweden, and the Netherlands have a negative but non-significant effect on the rise of carbon dioxide emissions due to tax exemptions in specific energy businesses. Similarly, (Bruvoll & Larsen, 2004) demonstrated in their study that Norway's emissions were lowered by 2.3 percent as a result of imposing a relatively low carbon price.

### **Carbon Tax Design**

Carbon taxes have the potential to alter household and industrial behavior in order to decrease reliance on high-emission energy sources. According to (Sumner et al., 2013) what should be considered while designing a carbon tax is how to accomplish this goal. This pertains to the tax base, tax rates, income distribution, consumer impact, and achieving emission reductions. In its guidelines for environmental tax policymakers, Organisation for Economic Co-operation and Development (2001) outlines some critical factors that policymakers should consider when designing environmental taxes. The following are the key aspects to consider:

- a. The idea of calculating environmental taxes based on pollution or polluting behavior.
- b. Ideally, environmental taxes should cover the same ground as environmental damage.
- c. The expense of taxation is proportional to the environmental harm.
- d. Taxes must be dependable and predictable in order to foster environmental development.
- g. Environmental taxes can assist in financial consolidation or in the reduction of other taxes.
- f. Distributional effects can/should be addressed through further policies.

### **Carbon Taxed Countries**

Finland was the first country to impose a carbon price in 1990 (Sumner et al., 2013). Finland's carbon tax is currently US\$24.39 per tonne (Khastar et al., 2020). Furthermore, Finland surpassed Scandinavian nations such as Sweden and Norway in 1991 (Khastar et al., 2020). Additionally, additional countries, including Japan and Australia in 2012, the United Kingdom in 2013, and China in 2017 (Ekins, 1994; Lu et al., 2010b; Meng et al., 2013; Nakata & Lamont, 2001). Only Singapore enacted a carbon price scheme in Southeast Asia in 2019 (Pham et al., 2019). Carbon taxes have been shown to enhance national taxes while simultaneously cutting emissions in these countries.

## **2. RESEARCH METHODS**

This study is a library research project that will evaluate several carbon tax proposals and assess the feasibility of implementing a carbon tax in Indonesia. The data was compiled from domestic and foreign magazines, as well as news and articles on the Internet, in order to determine the criticality of imposing a carbon price in Indonesia.

## **3. DISCUSSION**

According to the World Health Organization (WHO), 9 out of 10 individuals today breathe air that contains significant levels of contaminants. As a result, the global health issue continues to worsen; around 7 million people die each year as a result of air pollution. According to the WHO, air pollution is a factor in the development of a variety of ailments, including stroke, lung cancer, heart disease, and respiratory infections.

According to Statista, China became the world's greatest emitter of carbon dioxide in 2017, accounting for 28.21 percent of global emissions. Following that is the United States, which ranks second in the world with 15.99 percent carbon dioxide emissions, and India, which is third with 6.24 percent (Statista, 2017).

The policy of a carbon tax is still being debated. According to the State Budget Bulletin issued on April 5, 2020 by the professional body of the People's Representative Council of the Republic of Indonesia,

the implementation of this fuel oil tax has a number of positive consequences, including a reduction in greenhouse gas emissions, an increase in government taxes, and an incentive for consumers and business actors (Lathifa, 2020). Increased efficiency and investment in energy-efficient technologies, as well as simplification of tax administration.

In Indonesia, poor air quality has an effect on natural circumstances that might alter over time. Increased activity that harms nature, such as mining minerals from the depths of the earth, and skies clogged with dangerous particles from factory combustion and industrial waste. On the basis of these several factors, it must be recognised that Indonesia is also a major source of carbon emissions.

Unknowingly, household rubbish contains hazardous material as well. Motor vehicle pollution, pesticide particles on agricultural land that end up on fruits and vegetables ingested, battery trash, industrial combustion waste, and even domestic appliances can all be classified as hazardous substances. On the other side, as production costs will rise, the implementation of this tax may result in higher price rises. With commodity prices remaining high and people's purchasing power eroding, entrepreneurs find it harder to compete on a global scale. This will also have an effect on the degree of communal welfare, whether directly or indirectly. Cost increases force entrepreneurs to cut back on business expenses, one of which is labor, which might result in job losses.

Increases in the price of hydrocarbon fuels also have an effect on the costs of production in numerous economic sectors that rely on these fuels. Commodity prices increase as a result of rising production costs. Inflation in certain economic sectors will eventually have a direct or indirect effect on community welfare, particularly for marginalized people. Zhang & Baranzini (2004) discovered that the carbon tax burden on the poor in the United Kingdom is greater than the carbon tax burden on the upper middle class, resulting in an increase in economic inequality. The investment industry would also be impacted by inflation. When the price of fossil fuels increases, production costs increase

and people's purchasing power dwindles, resulting in a decline in demand for the products produced.

Increased living costs (inflation) will have an effect on unemployment (Poterba, 1991). As demand for produced items declines and expenses rise, businesses tend to cut labor costs, resulting in job losses. Unemployment can result in a reduction in personal income, which has an impact on employment income taxes. In terms of competitiveness, both domestic and international firms' products are impacted by the increase in production costs (Zhang & Baranzini, 2004). The more a company's reliance on the usage of fossil fuels to generate products, the greater the carbon tax's impact.

Along with lowering greenhouse gas emissions, if Indonesia implements a carbon tax, the country's economy and social welfare will benefit. The government will get tax income if a carbon tax is enacted. However, in an ideal world, the revenue would be used or allocated for public health expenditures (earmarking tax) in industrial waste-affected areas. Earmarking Tax is the government's policy of allocating funds from the budget and other sources of income in a targeted manner (Smart & Bird, 2009).

The suggestion to introduce a carbon tax has revived during this pandemic. Because, in the aftermath of the Covid-19 outbreak, this fuel tax may provide the state with a fresh stream of revenue. Furthermore, the implementation of these limitations has the potential to facilitate reductions in carbon emissions, effectively addressing the urgent need to mitigate global warming. Moreover, the regulations surrounding fuel taxation are widely recognized as having the capacity to stimulate advancements in the field of new and renewable energy sources, thereby contributing to sustainable energy development.

#### 4. CONCLUSION

A carbon tax is a charge imposed on the use of hydrocarbon or fossil fuel-derived fuels. Certain governments have enacted carbon taxes in order to reduce fuel emissions while simultaneously increasing national income. The adoption of a carbon tax in Indonesia is still a topic of discussion and was revived

during the Covid-19 outbreak as a possible source of governmental funding. This issue emerges as a result of a number of factors, such as rising production costs and commodity prices, which affect people's well-being. On the other hand, given the detrimental effect that deteriorating environmental conditions will have on public health, it is critical that Indonesia establish a carbon tax immediately. Indonesia's aim to reduce emissions in compliance with its Copenhagen Conference commitments can be realized by the implementation of a carbon price. Additionally, the carbon tax pushes Indonesia to diversify its energy sources away from hydrocarbon-based energies. This should enable the transition to more environmentally friendly fuels and renewable energy sources. Carbon tax money must be redistributed to fund improvements to public health and the environment.

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