

# Predicting Optimal Tariff of Indonesia's Carbon Tax: A Reflection on Japan and Singapore

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## ABSTRACT

This study aims to predict the optimal carbon tax rate in Indonesia through a reflection on the experiences of Singapore and Japan, so it does not cause carbon leakage. This study uses a qualitative descriptive approach to explain the mechanism of determining carbon tax policies in a country along with the amount of the rate. The quantitative and qualitative data involved in this study are collected from policy documents, official government reports, and scientific articles on carbon taxes in Japan, Singapore, and Indonesia. This study argues that the carbon tax rate in Indonesia is lower than Japan and Singapore. Japan applies a tax rate of USD 2.65/tCO<sub>2</sub>, Singapore sets a tax rate of USD 18/tCO<sub>2</sub>, while Indonesia applies a minimum of USD 1.88/tCO<sub>2</sub>. These differences can trigger carbon leakage in Indonesia. The analysis results the carbon tax tariff in Indonesia optimally is IDR 300,000/tCO<sub>2</sub>. This tariff provides a policy recommendations to overcome the limitations of carbon tax policies in Indonesia.

## 1. INTRODUCTION

Carbon tax is defined as a policy about mandatory and unrequited payment from taxpayers to the government for the amount of carbon emissions produced (Hájek et al., 2019; United Nations, 2021). This policy aims to reduce carbon emissions in a country to achieve net zero emissions (Elbaum, 2024; Meng & Li, 2023; Ratnawati, 2016; Sun et al., 2021). Carbon tax also has another goal, namely changing the behavior of fossil fuel users towards renewable energy (Arifia et al., 2024). Arimura and Matsumoto (2024) explain that carbon tax rates increase production costs using fossil fuels so that producers will replace them with other materials that tend to be cheaper. Revenue from this policy will be distributed to provide facilities that can increase sustainable economic growth and community welfare (Chang et al., 2023; Chng & Ong, 2021). Thus, carbon taxes are not only in line with the environmental principles but also highly correlated with the economic and social principles as described by Sustainability Theory (Elkington, 1999).

Carbon taxes have proven to be an effective protocol in reducing carbon emissions. Lin and Li (2011) proved that during the period 1981 to 2008, five countries from Northern Europe managed to reduce carbon emissions by 0.5% and 1.7% in Denmark, Sweden, the Netherlands, and Norway, and around 10% in Finland for the same period. Gokhale (2021) proved that this environmental policy has helped Japan reduce carbon emissions by 0.5% from 1990 to 2020. One study found that carbon policy support in the UK has resulted in a 49% reduction in emissions from the electricity sector over the past four years (Leroutier, 2022). Another finding showed that reducing the use of coal-fired electricity led to a 6.2% reduction in emissions between 2013 and 2016 (Cullenward & Victor, 2020). Green (2021) also said that carbon tax policies tend to result in more emission reductions than Emissions Trading Schemes (ETSs).

Carbon tax rates remain a concern in Indonesia. The Law on Harmonization of Tax Regulations sets a minimum rate for carbon tax of IDR 30,000/tCO<sub>2</sub>eq. This price tends to be lower compared to other countries, such as Japan, Singapore, Canada, and Finland (Gokhale, 2021; Green & Taylor, 2013; Lin & Li, 2011). Globally, the average carbon tax applied is USD 23/tCO<sub>2</sub>eq, and some developed countries, such as Uruguay, Liechtenstein, Switzerland, Sweden, and Norway, have set rates above USD 100/tCO<sub>2</sub>eq (Mardones & Andaur, 2024; World Bank Group, 2023). This inequality in carbon tax rates triggers a domino effect, one of which is carbon leakage (Ramadhani & Koo, 2022; Xie & Rousseau, 2024).

According to the European Commission (2021), carbon leakage is an increase in greenhouse gas emissions in a country due to the transfer of production from countries with high carbon tax rates to other

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countries with lower rates. This phenomenon is a serious problem because it can threaten people's welfare (Andrianus et al., 2024) and hinder the achievement of global low-carbon targets (Lin & Li, 2011; Rennert et al., 2022; Rokhmawati, 2023). Facing this problem, the International Monetary Fund (IMF) and the United Nations (UN) recommend that the minimum tariff that must be set in developing countries is USD 35/tCO<sub>2</sub>eq (United Nations, 2021)

The issue of carbon tax rates in Indonesia has not been widely studied. Ratnawati (2016) stated that the appropriate rate for Indonesia based on the IMF's suggestion is IDR 300,000.00/tCO<sub>2</sub>eq. This research is supported by Dewi and Dewi (2022) who added that Indonesia is the country with the highest emissions in the world, even higher than Singapore, so the rate in this country should be higher. Other researchers also stated that to achieve the emission target in Indonesia, the optimal carbon tax rate is between USD 36 - 40.35/tCO<sub>2</sub>eq (Dissanayake et al., 2020; Fachruddin et al., 2022). A different opinion was given by Ramadhani and Koo (2022), setting a tariff of USD 40/tCO<sub>2</sub>eq in Indonesia could have a negative impact on the economy and reduce the competitiveness of trade in domestically produced goods. However, there has been no previous research that determines tariffs based on reflection on other countries.

This study aims to determine the optimal carbon tax rate in Indonesia so that it can prevent carbon leakage in Indonesia. This study applies qualitative analysis to identify the limitations of carbon tax policy in Indonesia. More specifically, this study reflects on the carbon policies implemented in Japan and Singapore. These two countries were chosen because; 1) No other country in Asia implements a carbon tax policy (Rakhiemah et al., 2024); 2) Japan, Singapore, and Indonesia make carbon emission reduction a political priority (Gokhale, 2021; Mercer-Blackman et al., 2023); 3) All three countries place a strong emphasis on technology-driven economic growth and seek to achieve carbon emission reductions through investment in green technologies; and 4) Japan and Singapore were among the 15 countries with the highest carbon tax revenues in 2022 (World Bank Group, 2023). This reflection is needed because Indonesia has no experience in implementing carbon tax before (Barus & Wijaya, 2021; Putri & Hutapea, 2024). In addition, the United Nations also recommends developing countries to conduct a benchmarking approach with other countries that have implemented the policy (United Nations, 2021).

The results of this study can be summarized as follows. First, these three countries have different carbon tax systems. Japan implements this policy with an additional tax system. The carbon tax in Singapore is implemented with a cap-and-tax scheme. Meanwhile, Indonesia plans to implement a carbon tax with a cap-and-trade-and-tax scheme. Second, the carbon tax rate in Indonesia is lower than Japan and Singapore. Japan applies a tax rate of USD 2.65/tCO<sub>2</sub>, Singapore sets a tax rate of USD 18/tCO<sub>2</sub>, while Indonesia applies a minimum of USD 1.88/tCO<sub>2</sub>. This difference in rates can trigger carbon leakage in Indonesia. This study concludes that Indonesia needs to increase its carbon tax rate to reduce carbon emissions and prevent carbon leakage in Indonesia. The optimal carbon tax rate recommendation in Indonesia is IDR 300,000/tCO<sub>2</sub>. At the end, this study attaches recommendations for carbon tax policies in Indonesia.

Finally, the discussion in this study is organized into several sections. Section 2 presents the literature that serves as the theoretical basis. Section 3 introduces the reflection methodology involved in this study. Discussions on the mechanisms and rates of carbon taxes in Japan and Singapore, the design of carbon tax implementation in Indonesia, and their comparisons can be found in Section 4. This section also provides recommendations for an optimal carbon tax roadmap in Indonesia. Finally, Section 5 discusses the conclusions of the study results.

## 2. METHODS

This study uses a qualitative descriptive approach to determine the optimal carbon tax rate in Indonesia. The determination of this rate is carried out through reflection on the experience of carbon taxes implementation in Japan and Singapore. The data in this study were obtained through analysis of policy documents, official government reports, and scientific journals discussing the implementation of carbon taxes in Japan, Singapore, and Indonesia. The analysis process was carried out using a comparative or benchmarking approach as described in the United Nations Handbook on Carbon Taxes for Developing Countries. This approach includes reflection on the mechanism for determining carbon tax policies in one country along with the amount of the rate. The results of the analysis are explained descriptively to identify the optimal carbon tax rate for Indonesia. Thus, this study is expected to provide suggestion that can help Indonesia achieve its carbon emission reduction target without causing carbon leakage.

### 3. RESULTS AND DISCUSSIONS

#### Results

##### *Carbon Tax Rates and Mechanisms in Japan*

Japan is Asia's first nation to impose a carbon tax. In October 2012, this strategy was put into effect with the intention of reaching two objectives by 2050: 80% reduction in greenhouse gas emissions and the establishment of Zero Carbon Cities in Japan (Ministry of Environment, 2017). This policy is detailed in the Japanese Ministry of the Environment's report on the carbon price, often known as the tax for climate change mitigation.

The regulation states that the subject of carbon tax in Japan includes individuals and corporations, while the tax object is fossil fuels consisting of petroleum, natural gas, and coal. The tax system applied is an additional tax, meaning that petroleum and coal which are the tax objects have been taxed in advance (current tax rate) and carbon tax is only applied to emissions generated from the tax object (Extra tax rate). Currently, the rates applied are divided as follows; 1) Crude Oil and Petroleum Products are subject to a rate of JPY 779; 2) Gaseous Hydrocarbons are subject to a rate of JPY 400; and 3) Coal is subject to a rate of JPY 301. Meanwhile, the carbon tax rate applied has the same amount for each product, which is JPY 289. The purpose of determining this additional tax is as a special taxation for climate change mitigation. A more complete illustration can be seen in Figure 1.

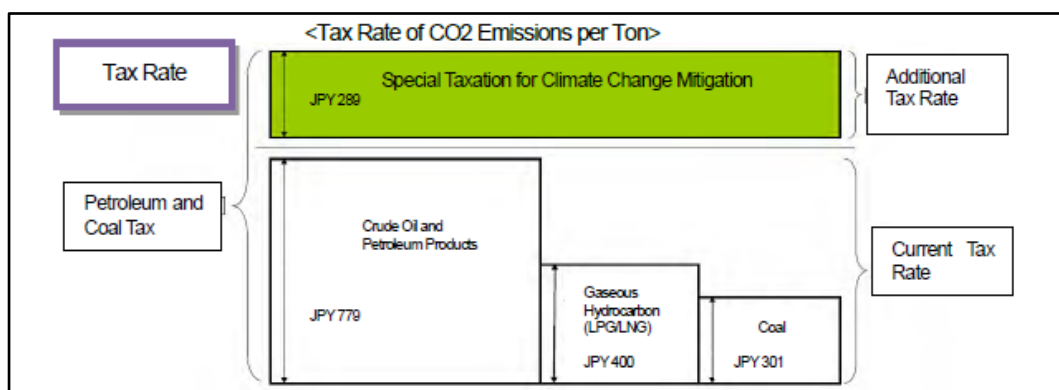


Figure 1. Carbon Tax Rates in Japan

The implementation of this policy may have an impact on the economy and people's lives in addition to raising the cost of taxable goods. The Japanese Ministry of the Environment has set up tax exemption facilities to prevent this policy from ruining the Japanese economy. Six taxable items are exempt from this policy, according to the details of the carbon tax. First, the manufacturing sector uses imported coal to generate energy for the production of caustic soda at home. Second, domestic passenger and cargo ships use both light and heavy oil. Third, trains run on light oil. Fourth, aviation fuel for domestic flights. Fifth, imported coal used for domestic electricity generation for salt production in the salt manufacturing industry using the ion exchange membrane method. Finally, light oil used for agriculture, forestry, and fisheries.

Various carbon emission control initiatives, including energy conservation, the development of renewable energy, and the clean and efficient use of fossil fuels, will be funded by the carbon tax income collected as part of the Japanese government's efforts to achieve net zero emissions. Phased implementation will be used for these activities. The following are some of the planned promotional actions: 1) promoting domestic business locations for cutting-edge low-carbon technology industries, such as lithium-ion battery factories; 2) encouraging small and medium-sized businesses to install energy-saving equipment; and 3) introducing financial aid for local governments to support energy conservation and renewable energy under the "Green New Deal Funds" based on regional characteristics. The GX Promotion Act, a carbon policy concept that combines the idea of trading, is one of the most recent initiatives of the Japanese government. Japan will be the first nation to issue internationally certified national transition bonds through this policy (The Government of Japan, 2023). The three goals of this program are economic growth, steady energy supply, and emission reduction in relation to global decarbonization.

### Carbon Tax Rates and Mechanisms in Singapore

Singapore is the first country to implement a carbon tax in Southeast Asia (Rakhiemah et al., 2024). This policy officially started on January 1, 2019 through the Singapore Green Plan 2030 scheme. In terms of regulations, the regulation on carbon tax is stated in the Carbon Pricing Act 2018 (CPA No. 23 of 2018). More precisely in section 5 on Carbon Pricing division 1—Carbon tax.

This policy's tax objects include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), nitrogen trifluoride (NF3), carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and sulfur hexafluoride (SF6) (National Environment Agency, 2024). The carbon tax in Singapore also targets corporate taxpayers, particularly those in the manufacturing, energy supply, and water and waste management industries. The carbon tax policy in Singapore also distinguishes between two categories of emissions: those that are calculable and those that are not. Table 1 shows the separation of the two emissions.

**Table 1.** Types of Emissions Covered in CPA

| Covered in the Carbon Pricing Act  |   | Emissions outside of the Carbon Pricing Act                               |
|--|---|---|
| Calculated Emissions   | Unaccounted Emissions   |   |
| All direct emissions of CO2, CH4, N2O, SF6, NF3, HFCs, and PFCs, from:<br>- Fuel combustion<br>- IPPU<br>Excluding emissions designated as non-accountable | SF6 emitted during the manufacturing, installation, use or disposal of any electrical equipment   | Indirect emissions (Scope 2 and Scope 3), such as electricity consumption |
| CH4 and N2O emissions from biofuel combustion  | CO2 emissions used and emitted during:<br>1. Cleaning<br>2. Explosion<br>3. Use of lubricants or paraffin wax<br>4. Burning of any of the following materials:<br>- Biodiesel<br>- Bio gasoline<br>- Charcoal<br>- Landfill Gas<br>- Sludge gas<br>- Sulfite Yes (black liquid)<br>- Wood or Wood Waste<br>- Others biogas<br>Other liquid biofuels                     | Emissions from land-based activities                                      |
| CO2, CH4, and N2O emissions from burning diesel with a sulfur content of more than 10 ppm  | HFCs and PFCs emitted during the use of refrigeration and air conditioning equipment for non-manufacturing purposes<br>Any GHG emitted during<br>- Using fire protection equipment<br>- Using fuel that is subject to excise duty, or that is exempt from paying excise duty, under the Customs Act<br>Emitted as fugitive emissions (excluding combustion and exhaust) | Emissions from transportation   |

Source: National Environment Agency (2024)

The carbon tax policy in Singapore uses a cap-and-tax scheme, meaning that tax will be imposed on taxable objects that exceed the emission limits set by the policy maker. In Article 80 of the second schedule entitled matters relating to emissions thresholds and reporting of GHG emission of the CPA Regulation 2018, there are two emission limits set. The first emission threshold is 2,000 tCO<sub>2</sub>e, while the second emission threshold is 25,000 tCO<sub>2</sub>e. These two limits have different obligations that must be carried out by taxpayers. The first threshold does not require tax payments, while the second threshold is only subject to carbon tax. Further information can be seen in table 2. The amount of tax that must be paid by the taxpayer is explained in Article 16 paragraph (3) which states the formula  $A \times B$ . With the following details; 1) A represents the carbon dioxide equivalent produced from the total amount of GHG that can be calculated, this figure has been rounded up to the nearest metric ton; and 2) B represents the carbon tax rate that has been imposed.

**Table 2.** Comparison of Facilities According to Threshold

| First Emission Threshold            | Second Emission Threshold  |
|-------------------------------------|--|
| Registered as a reportable facility | Registered as a taxable facility   |
| Submit annual Emissions Report      | Submit monitoring plan   |
| No carbon tax obligation            | Submit an annual Emissions Report verified by a third party                          |
|                                     | Responsible for carbon tax for calculated emissions verified in the Emissions Report |

Source: National Environment Agency

Singapore sets a progressive carbon tax rate based on the time that has already been determined. The initial carbon price that is set is \$5/tCO<sub>2</sub> for the years 2019 through 2023. This tariff's purpose is to provide businesses a transitional period so they may adjust to themselves. After the transition period is over, the carbon price will continue to rise, starting at \$25/tCO<sub>2</sub> in 2024–2025, rising to \$45/tCO<sub>2</sub> in 2026–2027, and reaching about \$50–\$80 per ton in 2030. Based on the aforementioned explanation, it may be concluded that Singapore has set a carbon price of \$25/tCO<sub>2</sub> for 2024.

Singapore has an independent body tasked with the administration and enforcement of laws ranging from emission measurement, emission reporting, verification of requirements, and accreditation. This body is known as the National Environment Agency or abbreviated as NEA. At the beginning of the reporting year, taxpayers must calculate the carbon emissions produced until the middle of the current year. The calculation system for these emissions must follow the Emissions Data Monitoring and Analysis System (EDMA) template provided by the NEA. The calculation results must be stated in a reporting scheme called Measurement, Reporting, and Verification (MRV). In this scheme, there are two reports that must be made by taxpayers, namely an emission report containing a report on the emissions produced and monitoring planning containing the methodology and procedures applied by the company to report GHG emissions accurately. This monitoring planning also functions as a basic document that must be included in the report.

After both reports are made, the document must be reported by a GHG manager certified by the Institution of Engineers Singapore or has at least 3 years of experience in ISO 14064/ISO 50001 standards to a third party in the form of an independent auditor. This third party is tasked with verifying the emission report made by the company so that the verifier is willing to sign the document with a reasonable level of certainty. Furthermore, NEA has provided templates for verification notification, summary of verification plan, and verification report that must be used by accredited verifiers to conduct verification and final verification reports. After going through the verification stage, the emission report must be re-submitted to NEA no later than June 30 after each reporting period.

The payment mechanism is explained in more detail in CPA Article 17. The payment date is divided into three according to the agency's assessment submitted in Article 21 paragraphs (1) and (2). The NEA that provides approval for the verified emission report, then in accordance with Article 17 paragraph (1) the registered person must pay tax no later than September 30 of the following year. The next scenario can be seen in paragraph (2), when the NEA is of the opinion that the registered person is required to pay tax for the reporting period, but the person has not submitted a verified emission report for the reporting period to obtain NEA approval as required by Article 11(1); or (b) the verified emission report submitted by the registered person is incomplete or inaccurate so that, or for other reasons, the NEA cannot approve it before August 15 of the following year after the end of the reporting period. Therefore, in accordance with

Article 17 paragraph (1) point (ii), the registered person must pay within 30 days after the date of delivery of the assessment notification to the registered person.

A taxpayer will be subject to penalties if they do not satisfy their tax duties as specified in paragraph (2). In addition to the unpaid tax, parties who breach their responsibilities shall be subject to a fine equal to 5% of the total amount of taxes due, as stated in CPA Article 17 paragraph (4). A request note must also be sent to the taxpayer by the NEA, and if payment is not received within 30 days of the request note's submission date, the NEA may impose payment of taxes and penalties in line with relevant laws and regulations. For each month that the tax debt is valid, taxpayers who have not paid their responsibilities up to 60 days after the punishment is imposed will be assessed an extra financial penalty equal to 1% of the unpaid tax. The fine associated with the note is limited to three times the total amount of unpaid taxes. On the other hand, if the NEA determines that it is reasonable and equitable to do so, the person who owes the tax may be eligible for a tax exemption, reduction, or refund. Thus, in accordance with Article 17 paragraph (4), the NEA and the Minister may make measures for each taxpayer to receive an exemption or reduction of the tax that has been imposed or monetary fines that are the registered person's duty. In general, Figure 2 below shows the tax period according to the CPA.

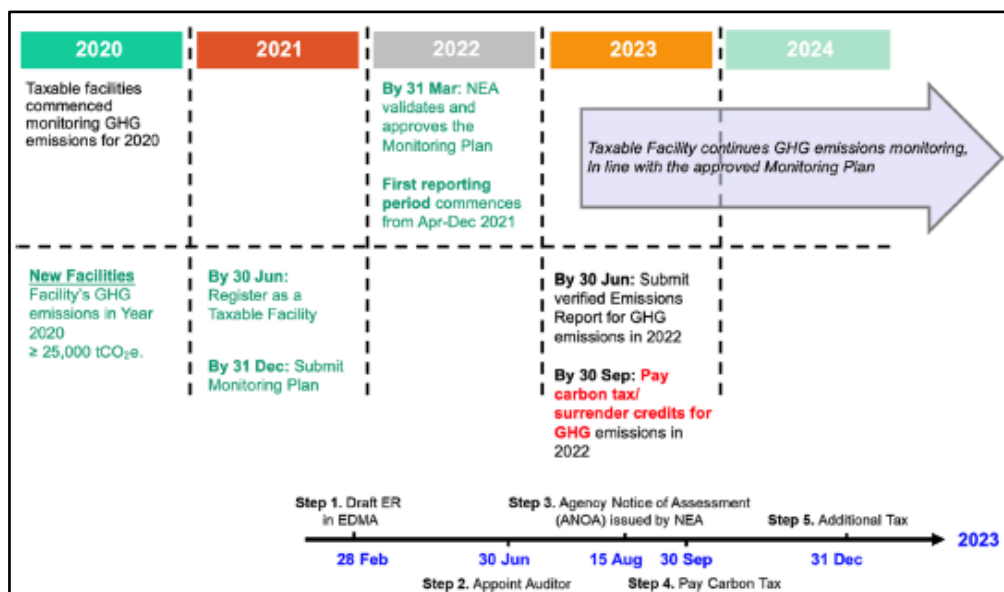


Figure 2. Taxable Facilities Timeline According to CPA for 2023 Period

### Draft of Indonesia's Carbon Tax

The carbon tax implementation scheme in Indonesia uses a hybrid mechanism called "cap-and-trade-and-tax". In this scheme, the government will determine the maximum limit of the amount of carbon emissions that can be produced by each company, known as the "cap". When a company produces emissions below the set cap, the company will receive an asset in the form of an Emission Permit Certificate (SIE). However, when the company fails to meet the given cap, a penalty in the form of a carbon tax will apply (Barus & Wijaya, 2021).

Regulations regarding carbon tax in Indonesia have been drafted in Law Number 7 of 2021 concerning Harmonization of Tax Regulations (UU HPP), specifically in Ch. VI Article 13 which consists of 16 paragraphs. In accordance with what is written in paragraphs (1) and (2), the object of the carbon tax is carbon emissions that have a negative impact on the environment by taking into account the carbon tax roadmap and/or carbon market roadmap. The carbon emissions in question refer to a combination of carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), and methane (CH<sub>4</sub>) compounds that form carbon dioxide equivalent (CO<sub>2</sub>e) (Pamungkas et al., 2022).

Article 13 paragraph (5) of the HPP Law states that the subject of carbon tax is an individual or entity that purchases goods containing carbon and/or carries out activities that produce carbon emissions. In the regulation, there are several meanings that can be described, namely goods, purchases, and activities. The goods focused on in the regulation are fossil fuels. However, this tax does not rule out the possibility of

being imposed on other goods that can produce carbon emissions. Meanwhile, the purchases written in the paragraph refer to domestic purchases and import purchases. Finally, the explanation regarding "activities that produce carbon emissions" is any activity that can pollute the environment through the production of CO<sub>2</sub>e, which includes activities in the energy, agriculture, IPPU, FOLU, forest fires, and waste sectors.

However, the Indonesian government has determined that the carbon tax will be applied first to the Steam Power Plant (PLTU) sector. According Deputy Minister of Finance, this sector was chosen because it is relatively easier to control, making it easier to implement the policy at the beginning (Kementerian Keuangan, 2021). In addition, there are several other considerations, such as Indonesia's dependence on fossil fuels which is still high, the Coal-fired Power Plant ecosystem which was built under the Ministry of Energy and Mineral Resources, and the Coal-fired Power Plant is the highest contributor to emissions (Arifia et al., 2024; Pamungkas et al., 2022).

Referring to the description above, the Tax Base (DPP) for carbon tax is determined based on the difference between the amount of carbon emissions and the cap of an item or activity that produces equivalent carbon dioxide. According to the Ministry of Energy and Mineral Resources, there are three groups of caps determined based on the capacity of the PLTU, including; 1) PLTU with a capacity of more than 400 MW is subject to a cap of 0.918 tons of CO<sub>2</sub> per Mega Watt-hour (MWh); 2) PLTU with a capacity of 100-400 MW is subject to a cap of 1.013 tons of CO<sub>2</sub> per MWh; and 3) PLTU with a mine mouth of 100-400 MW is subject to a cap of 1.94 tons of CO<sub>2</sub> per MWh. In Article 13 paragraph (9) of the HPP Law, the amount of the carbon tax rate to be imposed is IDR 30.00 (thirty rupiah) per kilogram of carbon dioxide equivalent (CO<sub>2</sub>e) or equivalent units. The amount of this rate is relatively small compared to other countries. However, the government and academics consider that the tariffs set are appropriate because they are seen as "introductory prices" and give companies time to shift to more environmentally friendly energy (Dewi & Dewi, 2022).

Furthermore, in accordance with paragraph (7), carbon tax will be owed when one of three conditions is met, namely; 1) at the time of purchase of goods containing carbon; 2) at the end of the calendar year period and activities that produce a certain amount of carbon emissions; or 3) other times regulated by or based on Government Regulation. Referring to these regulations, the determination of carbon tax rates in Indonesia is still uncertain. This is because the implementation scheme is cap-trade-and-tax so that the applicable rate is in accordance with the carbon price in the carbon market. Article 13 paragraph (10) also states that provisions regarding tax rates and others will be regulated by the Minister of Finance after consultation with the House of Representatives of the Republic of Indonesia.

Allocation of funds (earmarking) is a government policy in using the budget sourced from revenues and expenditure programs which will be specifically determined (Dewan Jendral Pajak, 2023). Basically, taxes received by the state will be allocated to government policies that can improve public welfare. In its discussion of carbon tax, Article 13 paragraph (12) only states that carbon tax revenues can be allocated to control climate change and will be included in the State Budget (APBN) in general. However, further regulations regarding earmarking related to climate change have not yet been made (Gunawan, 2023).

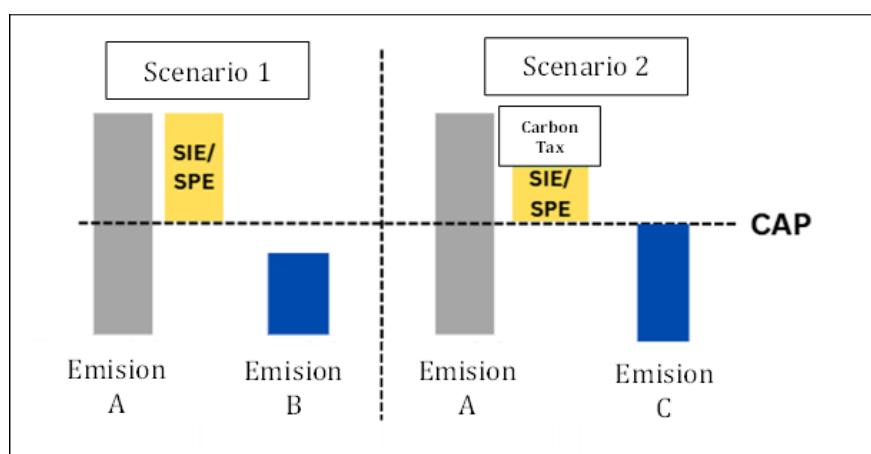


Figure 3. Implementation of the Cap-and-Trade-and-Tax Scheme

The design of the implementation of carbon tax with a cap-trade-and-tax scheme in Indonesia has been prepared by the Minister of Finance together with the Fiscal Policy Agency. Figure 3 shows an

illustration of the carbon tax design in Indonesia. When an entity produces emissions that exceed the cap (emission deficit), the entity must purchase an Emission Permit Certificate (SIE) or Emission Reduction Certificate (SPE/carbon offset) from another entity that produces emissions below the limit. In the illustration on the left, entity A is depicted as experiencing an emissions deficit so that it must purchase an SIE or SPE from entity B which has an emissions surplus, this scheme is a cap and trade. In addition, entities have another option by paying carbon tax. The illustration on the right shows that entity A is experiencing an emissions deficit so that it will purchase an SIE/SPE from entity C. This scheme illustrates the cap-and-tax that occurs between entities A and C.

Minister of Finance Regulation (PMK) Number 81 of 2024 introduces new provisions regarding the reporting of Tax Returns (SPT) for carbon tax. There are two types of SPTs regulated: Annual Carbon Tax SPT and Periodic Carbon Tax SPT. Annual SPT must be submitted by taxpayers no later than four months after the end of the calendar year, while Periodic SPT must be submitted by carbon tax collectors no later than 20 days after the end of the tax period. Both SPTs must be submitted in the form of electronic documents. In addition, PMK 81/2024 also regulates the procedure for extending the submission period for Annual Carbon Tax SPT, which must be submitted before the submission deadline ends and accompanied by supporting documents such as temporary calculations of tax payable and temporary carbon emission reports. This policy demonstrates the Indonesian government's commitment to integrating environmental aspects into the tax system, encouraging transparency and accountability in carbon emission reporting.

## Discussion

A summary of the tariffs and mechanisms of the three countries above can be seen in the following table. Indonesia plans to implement a carbon tax in 2025. Meanwhile, this table clearly shows that Indonesia's carbon tax rate is much lower than that of Japan and Singapore, only USD 1.88/tCO<sub>2</sub>. If this rate is really implemented, it is certain that there will be a carbon tax leakage.

According to the United Nations Handbook on Carbon Taxation for Developing Countries, a benchmarking approach that examines carbon tax rates and designs in different jurisdictions can be used to ascertain the carbon tax rate in a developing nation. The selection of comparative jurisdictions requires policymakers to take into account a number of aspects, including policy objectives, political and economic similarities, taxation systems, energy output, demography, geographic dispersion, and the possibility of cooperation. By examining nations that have already implemented carbon taxation, emerging countries can gain knowledge to create systems that suit their particular environmental and economic circumstances. Both Singapore and Japan, who have imposed carbon taxes using unique strategies catered to their own situations, are among the nations that can teach Indonesia a lot (United Nations, 2021).

Upon reflection, Japan and Singapore exhibit distinct legal frameworks and approaches to carbon taxation, shaped by their unique economic, geographical, and environmental contexts. Japan, with a land area of 377,835 km<sup>2</sup>, stands out as a significant global emitter, contributing 1,082,645,430 tons of CO<sub>2</sub> emissions in 2022. This figure underscores the urgency of addressing climate change in a nation that relies heavily on industrial production and fossil fuels for energy. Recognizing the environmental challenges posed by such emissions, Japan implemented a carbon pricing policy in 2012, marking an early step toward integrating environmental considerations into its fiscal and regulatory systems. Despite its early adoption of carbon pricing, Japan's policy outcomes have been relatively modest. Between 2022 and 2023, the country achieved only a 2.5% reduction in carbon emissions, highlighting the need for more robust measures to meet its climate goals (Gokhale, 2021). Japan's carbon tax rate, initially set at USD 2.96/tCO<sub>2</sub>eq, is supplemented by additional taxes tied to fossil fuel usage, resulting in effective rates of USD 6.80/tCO<sub>2</sub>eq for crude oil and petroleum products, USD 4.39/tCO<sub>2</sub>eq for gaseous hydrocarbons, and USD 3.76/tCO<sub>2</sub>eq for coal. This tiered structure reflects Japan's attempt to balance the economic impact of taxation with the need to incentivize cleaner energy sources. However, the relatively low tax rates compared to global benchmarks suggest that Japan may need to adopt more aggressive pricing to drive significant behavioural and technological changes across its industries. In response to these challenges, Japan has continued to refine its legislative framework to accelerate its transition to a low-carbon economy.

The enactment of the GX Promotion Act (Green Transformation Promotion Act) in 2023 represents a significant step in this direction. This legislation introduces a range of measures aimed at facilitating the adoption of green technologies, enhancing energy efficiency, and promoting renewable energy sources. By aligning its carbon pricing strategy with broader policy initiatives, Japan seeks to create a comprehensive approach to achieving its 2050 emission reduction targets. The GX Promotion Act also underscores the government's commitment to balancing economic growth with environmental sustainability, ensuring that climate action does not come at the expense of industrial competitiveness or social welfare. Moreover, Japan's experience illustrates the complexities of implementing effective carbon pricing in a developed



economy. The interplay between fiscal policies, industrial interests, and public acceptance poses significant challenges, requiring careful calibration of tax rates and complementary measures. As Japan continues to evolve its carbon tax framework, its efforts provide valuable lessons for other nations seeking to integrate environmental objectives into their economic systems. By leveraging legislative innovation and fostering collaboration among stakeholders, Japan demonstrates that even incremental progress can contribute to long-term sustainability goals ([The Government of Japan, 2023](#)).

**Table 3. Differences in Tariffs and Mechanisms of the Three Countries**

| Parameter                      | Japan  | Singapore  | Indonesia   |
|--------------------------------|--|--|---|
| Regulation                     | Details on the Carbon Tax  | Carbon Pricing Act 2018 (No. 23 of 2018)   | Law Number 7 of 2021  |
| Start Implementation           | October 2012   | January 2019   | Year 2025   |
| Target                         | Reducing 90% of greenhouse gases by 2050 and Net Zero Cities       | Achieving Singapore Green Plan and Net Zero 2050   | 29% Carbon Emission Reduction by 2030 and Achieving Net Zero Emission by 2060 |
| Implementation Scheme          | Additional Tax   | Cap and Tax  | Cap and trade and tax   |
| Area Distribution              | Net Zero Cities  | All over the Singapore Area  | There isn't any yet   |
| Tax Sector                     | Parties that use fossil fuels (petroleum, natural gas and coal)    | 1. Manufacturing and manufacturing related services;<br>2. Provision of electricity, gas, steam, compressed air and chilled water for air conditioning; and<br>3. Water supply and management of waste and sewage. | PLTU (trial)  |
| Tax Subject                    | Individuals and bodies   | Parties registered for carbon tax reporting  | Individuals and bodies that produce carbon emissions                          |
| Tax Object                     | Fossil Fuels Emissions   | Greenhouse Gas (GHG) Emissions   | Carbon emissions  |
| Basis of Imposition            | Use of fossil fuels  | Carbon emissions above threshold-2   | Carbon Emissions Exceeding the Cap  |
| Rates                          | JPY 289/tCO <sub>2</sub> (USD 2.65/tCO <sub>2</sub> )              | SGD 25/tCO <sub>2</sub> (USD 18.6/tCO <sub>2</sub> )   | IDR 30,000/tCO <sub>2</sub> (USD 1.88/tCO <sub>2</sub> )                      |
| Threshold/Cap                  | There isn't any  | ≥ 25,000 tCO <sub>2</sub> eq/year  | There isn't any yet   |
| Measurement Template           | Based on the Government Calculation                                | EDMA   | There isn't any yet   |
| Reporting Scheme               | Not mentioned  | MRV  | Annual Carbon Tax SPT and Periodic Carbon Tax SPT                             |
| Reported Parties               | The Tax Subjects   | ISO 14064/ISO 50001 certified Energy Manager   | The Tax Subjects  |
| Third Parties                  | None   | Independent Auditor  | There isn't any yet   |
| Ear marking Carbon Tax Revenue | Introducing renewable energy and increasing energy saving measures | Decarbonization, the transition to a green economy, and to mitigate the impact on businesses and households.   | There isn't any yet   |

Singapore, in contrast, has adopted a notably aggressive approach to carbon taxation, distinguishing itself as a leader in Southeast Asia. With a compact land area of 734.3 km<sup>2</sup>, Singapore is a densely populated nation where environmental sustainability is a critical component of its long-term economic strategy. In 2022, Singapore produced 53,439,690 tons of CO<sub>2</sub> emissions, marking a 2.96% reduction compared to the previous year. This achievement reflects the nation's ongoing efforts to curb emissions while maintaining economic growth. As one of the first countries in Southeast Asia to implement a carbon tax, Singapore introduced this policy in 2019 under a cap-and-tax system designed to balance environmental goals with industrial competitiveness. The cap-and-tax system sets two thresholds for emissions: a lower limit of 2,000 tCO<sub>2</sub> and an upper limit of 25,000 tCO<sub>2</sub>. Companies exceeding the second threshold are subject to the carbon tax, ensuring that the policy targets the largest emitters while minimizing the burden on smaller enterprises. This targeted approach incentivizes major industries to adopt cleaner technologies and more efficient practices.

To comply with the policy, taxpayers must calculate their emissions using the Emissions Data Management and Analysis (EDMA) system, a sophisticated tool that enables accurate monitoring of greenhouse gas outputs. Additionally, the Measurement, Reporting, and Verification (MRV) framework ensures transparency and accountability in emissions reporting, reinforcing the credibility of Singapore's carbon tax system. In 2024, Singapore's carbon tax rate reached USD 18.6/tCO<sub>2</sub>, a significant increase compared to its initial rate and notably higher than Japan's rate. This ambitious pricing reflects Singapore's commitment to achieving stringent emission reduction targets and transitioning toward a low-carbon economy. By setting a high carbon price, the government signals its determination to drive substantial behavioural and technological changes across industries. The revenue generated from the carbon tax is reinvested into initiatives that promote sustainability, such as renewable energy projects, green infrastructure, and support for businesses transitioning to low-carbon operations. Singapore's proactive stance underscores its leadership in integrating environmental policies into its economic framework. This approach not only positions the country as a regional pioneer in climate action but also serves as a model for other nations seeking to implement effective carbon taxation. By demonstrating that robust environmental policies can coexist with economic growth, Singapore provides valuable lessons on how strategic planning and strong governance can facilitate the transition to a sustainable future. Its experience highlights the importance of balancing environmental imperatives with economic realities, offering a blueprint for countries aiming to tackle climate change through innovative fiscal measures (Ahmad et al., 2024).

Indonesia is an Asian nation with 1,905,570 square kilometres. Indonesia produced 729,000,000 tons of CO<sub>2</sub> emissions in 2022. With these emissions, Indonesia is among the nations with the highest global emissions in 2023 (Kementerian Keuangan, 2021). The carbon tax has not yet been realized in this country because Indonesia is still in a state of economic recovery and the current political conditions are still tense due to the war between Russia and Ukraine (Gunawan, 2023). In this regard, the passing of PMK 81/2024 marks a significant turning point in Indonesia's move to impose a carbon tax. The purpose of this rule is to improve accountability and transparency by introducing guidelines for the submission of SPT Quarterly and SPT Annually for the carbon tax, which must be made electronically. The foundation for a strong carbon tax structure is laid by PMK 81/2024, which guarantees accurate tracking and reporting of emissions data by instituting transparent reporting procedures. Additionally, by lowering emissions and encouraging sustainable development, the rule supports Indonesia's larger objectives and represents a move toward incorporating environmental concerns into fiscal policy. Although obstacles still exist, the implementation of PMK 81/2024 shows that Indonesia is prepared to take significant action against climate change, opening the door to a more sustainable future.

Referring to suggestions from the United Nations, Indonesia can conduct a benchmarking approach with several other countries that have implemented carbon taxes. However, no country is 100% the same as Indonesia in terms of policy objectives, economic and political similarities, demographics, energy production, geographic distribution, and tax systems. Thus, the discussion of the research will attract two countries that are similar to Indonesia, namely Japan and Singapore. According to the benchmarking approach's findings, these three nations share the same political interests and policy goals, which include lowering carbon tax emissions in accordance with their individual aims (Gokhale, 2021; Mercer-Blackman et al., 2023). In addition, these three countries also have the same vision in the economy, namely emphasizing investment in low-carbon technology that can support economic growth (Arifia et al., 2024; Chng & Ong, 2021; Gokhale, 2021; Kementerian Keuangan, 2021; Zhiyang & Chia, 2017). Geographically, Japan and Singapore are smaller than Indonesia. However, the size of Japan's territory is more appropriate to reflect Indonesia than Singapore. Based on the number of emissions produced, the number of emissions in Indonesia is greater than Singapore, but still smaller when compared to Japan. Indonesia's carbon tax system is identical to Singapore's in terms of the emission reduction policy approach

that is employed. Last but not least, Indonesia has lower carbon tax rates than the other two nations. Furthermore, despite Japan's success in lowering carbon emissions since 1990, the World Bank has criticized the country's carbon tax rate as being too low (Gokhale, 2021; González & Hosoda, 2016). As a result, it would be more acceptable to compare Indonesia's carbon tax rates with those of Singapore rather than Japan.

#### *Optimal Carbon Tax Rates in Indonesia*

Based on Singapore's experience, Indonesia could consider adopting a carbon tax rate of IDR 300,000/tCO<sub>2</sub>eq, or approximately USD 18.94/tCO<sub>2</sub>eq, as a pragmatic starting point for its carbon pricing policy. This rate, while lower than the USD 35/tCO<sub>2</sub>eq recommended by the International Monetary Fund (IMF) for developing countries, strikes a balance between environmental ambition and economic feasibility. A key advantage of this rate is its potential to prevent carbon leakage—a critical issue in global climate policy. Carbon leakage occurs when businesses relocate their operations from countries with high carbon tax rates to those with lower or no carbon taxes, effectively shifting emissions rather than reducing them (European Comissions, 2023). Such a phenomenon not only undermines the effectiveness of domestic climate policies but also creates competitive disadvantages for industries operating in jurisdictions with stricter environmental regulations.

Indonesia can reduce the risk of carbon leakage and level the playing field for its industries in the international market by implementing a carbon tax rate that is equivalent to that of nations like Singapore. While promoting the use of cleaner technology and practices, this strategy guarantees that domestic companies maintain their competitiveness. Additionally, industries are given a clear economic signal to cut emissions without incurring an undue financial burden via a moderate tax rate such as IDR 300,000/tCO<sub>2</sub>eq. Maintaining employment and economic growth is just as vital as meeting environmental targets in a rising economy like Indonesia, so striking this balance is essential.

By legislating such a tax rate, Indonesia also demonstrates its commitment to joining the global community in the fight against climate change and promoting a sustainable future. With a rate that is neither too high to hinder industrial expansion nor too low to be ineffectual, Indonesia can progressively increase its climate policy as its political and economic conditions change. The nation's shift to a low-carbon economy can also be accelerated by carefully reinvesting the money raised by this carbon tax into energy efficiency plans, renewable energy projects, and other sustainable development projects. Within the framework of low-carbon development, implementing a competitive carbon tax rate encourages industry innovation. By offering a monetary reward for lowering emissions, companies are more inclined to spend money on the development of greener technology and manufacturing techniques. In addition to lessening the impact on the environment, this increases Indonesian industries' long-term competitiveness in the global market. In order to balance environmental goals with economic stability, a carbon tax rate of IDR 300,000/tCO<sub>2</sub>eq is a practical and effective policy tool that establishes Indonesia as a leading player in the worldwide battle against climate change.

Given that Indonesia has significantly greater emissions than Singapore, determining a suitable carbon tax rate for the nation necessitates careful analysis. The amount of CO<sub>2</sub> emissions that Indonesia produced in 2023 was 704.4 million tons, which is 8.52% more than Singapore's 60 million tons. Indonesia's substantial contribution to global emissions is highlighted by this glaring difference, which also emphasizes the urgent need for strong policies to alleviate its excessive reliance on fossil fuels. Since emissions are so high, a higher carbon tax rate would be an essential instrument to promote significant reductions. An economic signal of this kind might encourage companies and sectors to invest in cleaner production technologies, embrace energy-efficient procedures, and switch to renewable energy sources. Through implementing this proactive approach to reducing emissions, Indonesia can lessen the environmental effects of its current energy-intensive activities and provide the groundwork for sustainable economic growth.

Furthermore, raising the carbon tax rate will help Indonesia fulfil its international and local climate pledges. As a party to the Paris Agreement, Indonesia is required to drastically cut emissions by 2030. In addition to facilitating progress toward these goals, a strong carbon tax policy will strengthen Indonesia's reputation as a country dedicated to climate action and sustainable development worldwide. However, the current trends indicate a concerning increase in emissions, with Indonesia ranking among the top 10 worldwide emitters in 2022 and releasing 704.4 million tons of CO<sub>2</sub> in 2023. Along with endangering the nation's long-term economic and environmental viability, this trajectory puts its ability to reach the aims of the Paris Agreement in jeopardy.

Because Indonesia is a significant emitter, tying the carbon tax rate to emission levels promotes equity and efficacy while encouraging companies and individuals to embrace more environmentally friendly activities. The transition to a sustainable economy might be expedited by carefully reinvesting tax revenue in low-carbon technology development, research, and green infrastructure. Through decisive and

prompt measures, including enacting a high carbon tax rate, Indonesia can halt the trend of increasing emissions, show leadership in international climate initiatives, and ensure a sustainable future for its people. This strategy not only demonstrates Indonesia's dedication to tackling one of the century's most pressing issues, but it also reaffirms its obligation to support international efforts to reduce emissions.

Ratnawati (2016) and Dewi and Dewi (2022) are two of the several research that support the recommendation of a carbon tax rate of IDR 300,000/tCO<sub>2</sub>eq. According to these studies, this rate is not only practical but also efficient in tackling Indonesia's pollution problems. It also fits with the results of Ramadhani and Koo (2022), who indicate that emerging economies like Indonesia can benefit with a tariff of less than USD 40/tCO<sub>2</sub>eq. The suggested tax rate of IDR 300,000/tCO<sub>2</sub>eq, or USD 18.94/tCO<sub>2</sub>eq, at the current exchange rate, balances economic and environmental objectives and purposes. Without sacrificing industrial competitiveness or economic stability, it might avoid carbon leakage, aid in the shift to low-carbon growth, and help Indonesia meet its Nationally Determined Contributions (NDCs). Indonesia can preserve its place in the global market and pave the road for a sustainable future by implementing this rate, which will also provide a practical and significant basis for its carbon tax policy.

The carbon tax rate is Rp300,000/tCO<sub>2</sub>eq can prevent carbon leakage and reduce carbon emissions produced in Indonesia. However, policies in Indonesia require adjustments so that this rate can work optimally. Based on the experience of carbon tax policy in Singapore, the following are policy recommendations that the Indonesian government can consider:

- (1) **Increase in carbon tax rate.** The current carbon tax rate of IDR 30,000/tCO<sub>2</sub>eq in Indonesia is insufficient to drive significant changes in corporate behavior or encourage substantial reductions in carbon emissions. As it stands, this rate fails to provide a strong enough economic incentive for businesses to invest in cleaner technologies or adopt more sustainable practices. Therefore, it is imperative that the Indonesian government increases the carbon tax rate to effectively incentivize emission reductions and facilitate the transition to a low-carbon economy. This study recommends that the optimal carbon tax rate for Indonesia be set at IDR 300,000/tCO<sub>2</sub>eq. This figure is not only aligned with global standards but also provides a realistic starting point for Indonesia to achieve its climate targets while balancing economic growth. A gradual increase would allow businesses to adjust their strategies without facing undue financial burdens and provide a clear and predictable pathway for emission reductions. In addition to raising the carbon tax rate, the government must introduce a comprehensive carbon pricing policy that includes stable, long-term increases in the carbon tax rate. This would create a clear, long-term signal for businesses to align their operations with the country's climate goals. A predictable and steadily rising carbon tax rate would encourage companies to invest in cleaner technologies, adopt energy-efficient practices, and reduce their carbon footprints, knowing that the cost of emissions will continue to rise. By incorporating this policy into the broader framework of Indonesia's climate strategy, the government can ensure that the transition to a low-carbon economy is both feasible and sustainable. Ultimately, a well-structured and gradually increasing carbon tax policy will play a crucial role in helping Indonesia meet its carbon emission targets and contribute to global efforts to mitigate climate change.
- (2) **Expansion of the carbon tax sector.** Although the coal-fired power stations (PLTU) are the primary objective of Indonesia's carbon price policy, the country's short time frame until 2030 makes it difficult to reach the emission reduction targets set forth in the Paris Agreement. It is imperative that the carbon price be extended to other high-emission industries, especially the industrial sector, in order to solve this urgent problem. Manufacturing firms and factories that use a lot of energy and produce a lot of carbon emissions, such those in the steel, cement, and chemical sectors, should be the focus of this expansion. Instead of concentrating only on one industry, Indonesia may guarantee a more thorough approach to emission reductions across many economic sectors by expanding the carbon tax's application. In Singapore, where the carbon price was first imposed on significant energy sector emitters but has since spread to other industries, this tactic has been successfully applied, increasing the overall efficacy of the country's climate policy. In addition to accelerating the nation's emission reduction targets, Indonesia's carbon tax sector expansion would incentivise businesses to invest in cleaner technologies and embrace more sustainable practices. Additionally, it would produce extra income that could be used to fund innovative projects and green infrastructure, assisting in the shift to a low-carbon economy. By acting proactively, Indonesia can guarantee a more sustainable and fair route towards lowering emissions across the economy and better match its domestic policies with international climate commitments.

- (3) **Determination of emission limits for Indonesia.** One of the biggest gaps in Indonesia's carbon tax policy is the existing HPP Law's unclear definition of the emission limitations required to determine taxpayers' carbon tax liabilities. As a crucial benchmark for identifying which organisations are liable to carbon taxes, Singapore, on the other hand, has set a clear emission threshold of 25,000 tCO<sub>2</sub>eq. It is imperative that Indonesia set such emission restrictions for a number of reasons. First, businesses would be able to precisely calculate their carbon tax responsibilities and make compliance plans because to the clarity and openness it would give. More significantly, establishing precise emission limitations would improve Indonesia's capacity to fulfil its climate goals, especially the Paris Agreement's pledge to cut carbon emissions by 29% by 2030. In order to ensure that the tax system is equitable and efficient in promoting emission reductions, the government can identify high-emission industries and entities that must lower their carbon footprint by defining a defined emission threshold. Based on the quantity of emissions that must be reduced annually to reach the overall reduction goal, the establishment of these restrictions would also enable Indonesia to establish yearly emission reduction targets. A more stable and responsible carbon tax system that promotes sustainable development and climate action would result from this strategy, which would also assist Indonesia in meeting its domestic climate goals and bringing its policies into line with global best practices.
- (4) **Establishment of a qualified supervisory institution to ensure taxpayer compliance.** Indonesia could gain a lot from putting in place a system modelled after Singapore's successful implementation, where a specialised supervisory body, the National Environment Agency (NEA), together with greenhouse gas (GHG) managers and third-party auditors, monitors the progress of carbon tax reporting and guarantees compliance. To ensure efficient monitoring and enforcement of carbon tax laws in the nation, it would be imperative to establish a specialised carbon tax supervisory organisation within the *Direktorat Jenderal Pajak* (DJP). This organisation might be in charge of ensuring that companies report their emissions accurately, confirming that the carbon tax is being paid, and advising taxpayers on how to fulfil their environmental commitments. The HPP Law's current policy framework should also be improved by the Indonesian government by adding explicit penalties for non-compliance. This would guarantee that companies follow the set carbon tax regulations and act as a powerful deterrent against evasion. Financial penalties, limitations on company operations, or other actions that incentivise corporations to adhere to the rules are examples of these sanctions. Indonesia can construct a more accountable and transparent system that not only guarantees compliance but also fosters public and business trust in the carbon tax system by implementing stringent fines and a strong monitoring framework. This strategy will facilitate a smoother shift to a low-carbon economy and assist Indonesia in meeting its climate targets in accordance with international norms.
- (5) **Ear making from carbon tax can be allocated to government subsidies for industry.** The establishment of carbon tax changes the behavior of business actors from using fossil raw materials to renewable energy (Arimura & Hibiki, 2024). However, this energy transition is not easy for every company because production costs become more expensive (Dewi & Dewi, 2022). The increase in production prices will affect the price of products that will be sold to consumers. This incident can have an impact on decreasing consumer satisfaction and welfare which ends in a decrease in Indonesia's GDP. Seeing this problem, the government can provide assistance in the form of subsidies for companies that use renewable energy. In addition, West Kalimantan and Papua are provinces with the highest carbon emissions in Indonesia, but their incomes are not that high so that subsidies from the government will greatly assist the transition of the renewable energy sector in the region.
- (6) **Participate in the international carbon pricing committee to harmonize carbon pricing standards, carbon content calculations, and carbon treatment in trade in the Asian region.** Indonesia ought to take an active position in international carbon pricing committees in order to standardise carbon pricing, carbon content calculations, and how carbon emissions are handled in trade throughout Asia. Through this involvement, Indonesia would be able to bring its carbon tax laws into compliance with both regional and international norms, building a more stable and predictable environment for companies that trade internationally. Indonesia can limit the risk of carbon leakage—a scenario in which companies relocate their operations to nations with lower or no carbon tax obligations, thereby undermining the efficacy of emission reduction efforts—by working with neighbouring countries on these issues to ensure that carbon pricing mechanisms are applied equitably and consistently. Businesses would have a clear grasp of the carbon costs associated with their goods and services if carbon pricing and carbon content calculations were standardised throughout the region. This would also improve transparency and ease cross-border commerce. Through the creation

of fair competition, incentives for green technology investments, and new prospects for low-carbon goods and services, this collaboration may help improve the regional import-export market. In the end, Indonesia would be able to lower carbon emissions throughout the region and establish itself as a pioneer in advancing sustainable trade practices by joining such international initiatives. It would also shield its home industries from unfair competition and guarantee that its climate goals are reached without compromising economic growth.

#### 4. CONCLUSION

This analysis recommends that Indonesia's optimal carbon tax tariff be IDR 300,000.00/tCO<sub>2</sub>eq. The experiences of nations like Singapore and Japan, who have effectively put in place carbon tax schemes catered to their own national conditions, are used to calculate this rate. Preventing carbon leakage, which could jeopardise Indonesia's economic competitiveness, and drastically lowering carbon emissions to satisfy the country's sustainability targets are the two main objectives of this proposed tariff. The application of a cap-and-tax system in conjunction with a benchmarking strategy suggested by the UN provides a strong theoretical basis for this rate. Taking into account global best practices, this method offers a useful foundation for figuring out the right tax rates. The recommended rate is still theoretical, yet, and needs more research to take Indonesia's unique social, economic, and environmental circumstances into consideration. More thorough research is necessary to hone this advice given the complexity of Indonesia's economy, which includes a strong reliance on fossil fuels and a variety of industrial sectors. Alternative approaches, including localised data analysis or economic model simulations, should be investigated in future research to gain a better understanding of the possible effects of the carbon tax rate on different industries and the overall economy. Policymakers can make sure that the suggested rate is practical given Indonesia's particular circumstances and efficient in reaching emission reduction goals by combining these strategies.

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