



PLASTIC TAX AND CIRCULAR ECONOMY INCENTIVES TO TACKLE CLIMATE CHANGE (INDONESIAN CONTEXT)

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ABSTRACT

Penggunaan plastik dapat merugikan lingkungan dan berkontribusi pada perubahan iklim. Nantinya, perubahan iklim akan mengurangi kualitas ekosistem, kesehatan masyarakat, dan ekonomi suatu daerah. Penggunaan plastik perlu dikurangi, terutama untuk plastik sekali pakai atau hanya plastik dengan umur pakai yang singkat. Salah satu cara untuk mengendalikan penggunaan plastik adalah melalui pajak plastik, yang dalam penelitian ini dikategorikan sebagai cukai. Penelitian ini bertujuan untuk menentukan tarif yang sesuai untuk konteks Indonesia, yang akan segera memberlakukan cukai plastik. Penelitian ini juga memberikan gambaran tentang penerimaan negara dari cukai plastik terkait dan insentif yang dapat diberikan kepada pelaku usaha yang menerapkan ekonomi berputar. Selanjutnya, penelitian ini menggunakan metode penelitian deskriptif kualitatif. Penelitian ini memperkirakan jumlah penerimaan cukai dan pajak dari penerapan cukai plastik. Hasil penelitian menunjukkan potensi besar untuk penerimaan negara dari cukai plastik dan peningkatan pajak impor. Selanjutnya, kegiatan sinergis yang dilakukan oleh Kementerian Lingkungan Hidup dan Kehutanan (KLHK) dan Direktorat Jenderal Bea dan Cukai (DJBC) dapat berupa proses bisnis bersama dalam memantau daur ulang limbah plastik. Penelitian ini dapat memicu penelitian lebih lanjut mengenai cukai plastik dan dampaknya pada perusahaan ekonomi setelah pemerintah menetapkan cukai tersebut.

The use of plastic can harm the environment and contribute to climate change. Later, climate change will reduce the quality of ecosystems, public health and a region's economy. The use of plastic needs to be reduced, especially for single-use or only plastic with a short useful life. One way to control the use of plastic is through a plastic tax, which in this study is categorized as an excise. This research aims to determine what tariff is appropriate for the Indonesian context, which will soon impose an excise on plastic. This study also provides an overview of state revenues from related plastic excise and incentives that can be given to business actors implementing a circular economy. Next, this research uses a qualitative descriptive research method. This study estimates the amount of excise and tax revenue from implementing plastic excise. The study results show the enormous potential for state revenue from plastic excise and import tax increases. Furthermore, synergistic activities carried out by Ministry of Environment and Forestry (MEF) and Directorate General of Customs and Excise (DGCE) can take the form of joint business processes in monitoring plastic waste recycling. This research could trigger further research regarding plastic excise and the effects on economic companies after the government determines the excise.

1. INTRODUCTION

1.1. Background of Study

Business activities often have two sides, namely negative and positive.

The impacts that occur in business activities are known as externalities. Gans et al. (2017) state that externalities are the uncompensated impact of one party's actions on the welfare of people around them. Furthermore, Lazăr (2018) states that negative

externalities are economic and social damage caused by every economic actor or business actor. An example of a negative externality is pollution fog in a big city, which carries particles that threaten public health due to combustion products from factory chimneys.

Environmental damage in industrial area is major negative externality. The pollution damage the

planet and hit the human life directly and indirectly. In excess of worse air, water and environment conditions, the government should response with effective policy in handle degradation of life quality. There are several human activities which generate significant air pollution, such as vast amount burns of fossil fuel and coal. However, natural disaster such as bushes fire also decrease the air quality which also produce pollutant. In New South Wales, Australia, it was reported that power plants contribute to the release of nitrogen, sulfur and carbon dioxide into the surrounding environment (Department of Environment and Conservation NSW, 2017).

John Elkington (2013) states that sustainability development to maintaining our environment is very crucial. In the people, planet and profit concept, company performance is measured through three bottom lines: social, environmental, and economic. According to this concept, the company's final goal is a balance of three goals; people, planet, and profit.

The use of plastic harms the environment and contributes to climate change. Climate change will reduce the quality of ecosystems, public health and a region's economy. Here are some reasons why the life cycle of items made from plastic contributes to climate change. First, carbon emissions from plastic production activities to plastic waste processing can send carbon dioxide into the air. Second, deforestation increases because plastic raw materials from plants (oil palm) trigger the conversion of forest land to plantations. Deforestation reduces the ability of forests to absorb CO₂ from the atmosphere. Furthermore, the life cycle of plastic will increase energy consumption, which also increases greenhouse gas emissions.

Therefore, reducing the consumption of plastic goods is necessary to combat climate change and to protect the environment, human health and welfare. Life circle of plastic also gives a huge contribution to carbon emission. Research by Zheng and Suh (2019) calculates that in its entire life cycle, plastic contributes 3.8% of global greenhouse gas emissions. That's nearly double the emissions of the aviation sector. The analysis shows that conventional plastic (fossil fuel based) produced in 2015 emitted 1.8 GtCO₂e during its life cycle. This amount is equivalent to 3.8% of the 47 GtCO₂e emitted globally in that year. The government needs to regulate carbon emissions production because the policy will control industrial production. Furthermore, applying a plastic tax policy has become a big question in Indonesia. The government should immediately consider taxes on the use or production of goods from plastic. Taxes on plastic could be focused on plastic products that are used for a short period or are single-use only.

Some countries have implemented taxes on single-use plastic or plastic with short-term use. Several countries that have set plastic taxes include the United Kingdom, the European Union and Indonesia's neighbouring country, the Philippines. It

turns out there are several variations in rates charged by each country.

Table 1. Imposition of Plastic Taxes in Several Countries

Country	Year	Tariff (per kg)	Currency	Tariff IDR
Italy	2022	0,45	Euro	7.425
Spain	2022	0,45	Euro	7.425
UK	2022	0,2	Pounds	3.800
Portugal	2023	0,3	Euro	4.950
The European Union	2021	0,8	Euro	13.200
Philippines	2022	100	PHP	27.000

Source: processed from variuos sources

The 1945 Constitution of the Republic of Indonesia (article 28H) states that a good and healthy living environment is the right of every individual (Republik Indonesia, 1945). This article provides consequences for the government to preserve the environment and prevent waste pollution. From a legal aspect, the Indonesian government has the authority to regulate waste management but is also responsible for ensuring that the implementation of waste management runs well. In this case, the government can independently manage waste or involve third parties or partners from the private sector.

Tax authority or customs and excise authority has an obligation to levies the industry's taxes that produce plastics. This study has several research questions: What is the appropriate plastic excise rate in the Indonesian context? What incentives can be provided for economic actors who recycle plastic? How much is the potential for additional excise and tax revenue from implementing plastic excise?

2. LITERATURE REVIEW

2.1. Global Warming

Global warming threatens living creatures' natural life, prosperity and security (Mundial, 2018). Carbon emissions contribute up to two-thirds of the greenhouse gases that trigger climate change. The annual report of the "2019 Carbon Emissions Gap Report" released by the United Nations Environment Program (UNEP) stated that the Paris Agreement aims to limit temperatures within 1.5°C above pre-industrial levels so that global carbon emissions must be reduced. Carbon emissions are expected to decrease by 7.6% annually between 2020 and 2030 (Christiansen et al., 2018).

The Indonesian government has declared its intention to prevent climate change in its national

development plan. This intention is stated in the National Medium-Term Development Plan (RPJMN) 2020-2024. For the next five years, there are three environmental development priorities. The three priorities are improving environmental quality, resilience to disasters and climate change, and low-carbon development (Republik Indonesia, 2020).

In 2017, Indonesia released 1,150 million tons of CO₂e carbon emissions into the environment (BPS, 2019). The energy, and forestry and other land use (FOLU) sectors produce average carbon emissions of 500 million tons of CO₂e. Other facts show that the industrial process and product use (IPPU) sector contributes at a relatively low level, around 40 million CO₂e emissions. The average carbon emission in each sector each year is relatively stable, except for the number of carbon emissions from forest fires and FOLU. The level of carbon emissions in the range from 2013 to 2017 showed that in 2015 there was a significant increase in the two sectors, but decreased again in 2016.

Based on Nationally Determined Contribution (NDC), the government seeks to reduce carbon emissions by 29% with its efforts and 41% with international support by 2030 (KLHK, 2020b). Reducing carbon emissions mitigates the negative impacts of climate change, which can disrupt the sustainability of ecosystems and human life. Referring to the NDC document, the need for funds for climate change mitigation and adaptation in Indonesia is around IDR 3,776 trillion-IDR 3,779 trillion until 2030. This large value will burden state finances if we only use the State Revenue and Expenditure Budget.

2.2. Cost Of Reducing Climate Change Excess

In 2016, the Indonesian government started the Low Carbon Development Planning Program (PPRK) to deal with climate change. In the optimistic PPRK scenario, the total investment required is US\$446.5 billion (equivalent to 34.6% of GDP) for 2020-2024 or equal to US\$21.9 billion annually (BKF, 2020). However, the allocation of funds to deal with climate change every year issued by the Indonesian government is as follows.

Table II. Budget allocation for climate change (mitigation and adaptation)

No	Year	Value (trillion)
		IDR
1	2016	72,4
2	2017	77,6
3	2018	132,47
4	2019	97,66
5	2020	77,81
6	2021	112,74

Source: (BKF, 2020)

Referring to the NDC document, the need for funds for climate change mitigation and adaptation in Indonesia is around IDR 3.776 trillion-IDR 3.779 trillion until 2030. This significant value will burden state finances if we only use the APBN. A budget of IDR 72.4 trillion was allocated in 2016 and IDR 77.6 trillion in 2017. Furthermore, cumulatively, for 2018-2020, the Government has allocated a climate change budget of IDR 307.94 trillion. This means that every year, the Government gives an average climate change budget of IDR 95.11 trillion (4.3% in the APBN). In 2018, the Government issued a climate change budget of IDR 132.47 trillion, with a realized budget of IDR 126.04 trillion.

This study uses the average climate change budget the Indonesian government has issued to calculate the proposed plastic excise rates. The middle figure is IDR 95.11 trillion. This approach is a moderate one, taking into account the six years of budgeting for climate change.

2.3. Plastic As Large Proportion of Waste

By 2030, it is hoped that every country will reduce waste production significantly. Combating plastic waste is a target of the Sustainable Development Goals (SDGs) in the production and consumption chain. In Indonesia itself, the management of household waste (SRT) and similar household waste (SSRT) is regulated in the Presidential Regulation (Pepres) of the Republic of Indonesia Number 97 of 2017 concerning National Policy and Strategy for Management of SRT and SSRT. The estimated increase until 2025 will reach 4.3 billion. Furthermore, residents of large cities will produce 1.42 kg of municipal waste per person every day or 2.2 billion tons per year (BPS, 2018)

Plastic waste is a big challenge for Indonesia. Indonesia produces 6.8 million tons of plastic waste every year, which is expected to double to 13.6 million tons by 2040. In 2017, only 30 percent of Indonesia's plastic waste was managed (10 percent was recycled, and 20 percent was sent for managed disposal). The other 70 percent is openly burned, dumped on land, sent to official dumping sites, or leaks into the sea or waterways. It is estimated that 10 percent of global ocean plastic leaks come from Indonesia. The Indonesian Government has committed to reducing marine plastic waste by 70 percent by 2025. Therefore, the Indonesian Government is starting an initiative to reduce plastic waste and move from an end-of-pipe waste recycling approach to a circular economy model (Bappenas, 2021).

Indonesia is the second largest contributor of marine plastic waste in the sea (Jambeck et al., 2015). The rubbish that pollutes the sea is around 3.22 tons per year. Synthetic plastics constitute 90% of world production (A. L. Andrady & Neal, 2009). Polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), polystyrene (PS) and polyethylene terephthalate (PET), which have low and high densities, are the most widely used synthetic plastics and become pollutants

in coastal and marine environments (A. Andrady, 2011; Engler, 2012).

It is necessary to divide the types of plastic to determine which types will be subject to excise duty. The types of plastic that are recommended to be subject to excise will be discussed further in the findings section. Excise is expected only to be imposed on single-use plastic products or have a short usage period. Based on Cordova (2017), several categories of plastic are generally produced by manufacturers, namely:

- 1) PET (Polyethylene Terephthalate)
PET is a polyester resin that is durable, strong, light and easy to shape when hot. PET in the form of products such as water bottles, soda bottles, juice bottles, cooking oil bottles, containers, food packaging, and even famous coffee shop cups that are everywhere. PET can be coloured or colourless (transparent), depending on the additives used. The process that has been widely carried out for this type of PET is making crafts from plastic bottles or other bottles into flowers and other decorations, not a few of which are processed into plastic ore.
- 2) HDPE (High Density Polyethylene)
HDPE is a plastic material composed of ethylene polymer and other additives. HDPE is made in tough, intense, stiff, high-pressure and temperature conditions derived from petroleum,, often formed by blowing it or depending on the product to be made. In everyday use, HDPE can be found in the form of plastic baskets, pipes, children's toys, milk wrappers/bottles, milk kettles, detergent bottles, medicine bottles, machine oil bottles, shampoo bottles, juice packaging, liquid soap bottles, coffee packaging and bottles. Plastic with the HDPE label can be recycled into crude oil or plastic ore again.
- 3) PVC/V (Polyvinyl Chlorida)
PVC/V is the most difficult type of plastic to recycle. It can be found in plastic packaging (cling wrap), traffic signs, cooking oil bottles, electrical cables, glass cleaner bottles, toys, shampoo bottles, water pipes, wrinkle packaging, and fast food packaging. The reaction between PVC and food packaged in plastic is potentially dangerous for the kidneys, liver and body weight. This material contains chlorine and will release toxins if burned. PVC should not be used in food preparation or food packaging. Recycling can also reprocess this material into mudflaps, panels, mats, etc
- 4) LDPE (Low Density Polyethylene)
LDPE is a plastic easily formed when hot and made from petroleum. LDPE is a complex, strong resin that does not react to other chemicals. It is the highest quality plastic. They are usually used for food containers, plastic packaging, soft bottles, clothing, furniture, plastic bags, storage boxes, toys, computer equipment, printed containers, etc. The mechanical properties of this

type of LDPE are strong, transparent, flexible and have a slightly oily surface at a temperature of 60 degrees. It is very resistant to chemical reactions, has good protection against water vapour, can be recycled and is suitable for items that require flexibility but are strong.

- 5) PP (Polypropylene)
Polypropylene is more robust and lighter with low vapour permeability, good resistance to grease, stability to high temperatures and is quite shiny, flexible, rigid and resistant to oil. This type of PP (polypropylene) is the best choice of plastic material, especially for food and drink containers, medicine bottle caps, margarine tubes, other caps, straws, toys, ropes, clothing and various kinds of bottles. PP can be reprocessed into forks, brooms, trays, etc.
- 6) PS (Polystyrene)
Polystyrene is an aromatic polymer that can release styrene into food when the food comes into contact. It is usually used as material for Styrofoam food containers, disposable drinking containers, etc. Apart from food, styrene can be obtained from cigarette smoke, vehicle exhaust, and building construction materials. This material must be avoided because apart from being dangerous for brain health, it interferes with the estrogen hormone in women, which results in problems with reproduction, growth, and the nervous system, and also because this material is difficult to recycle. When recycled, this material requires a lengthy process. This material is reprocessed into insulation, packaging, bedding factories, etc.
- 7) Other
This type has four types: SAN styrene-acrylonitrile, ABS acrylonitrile-butadiene-styrene, PC polycarbonate, and Nylon. This type of plastic can be found in food and beverage containers such as sports drinking bottles, car parts, household appliances, computers, electronic equipment, and plastic packaging.

2.4. Circular Economy

To reduce environmental degradation, the Earth Summit (Summit) held on 20–22 June 2012 in Rio de Janeiro, Brazil, often referred to as the Rio+20 Summit, launched the concept of a green economy as a development paradigm. That is not only environmentally friendly but also socially inclusive. According to the United Nations Environment Program (UNEP), a green economy can improve human welfare and social equality while significantly reducing environmental risks and ecological scarcity. In other words, a green economy is an economy that is low carbon (produces less emissions and environmental pollution), saves natural resources, and is socially just (BPS, 2022).

February 22, 2021 was declared as National Waste Awareness Day 2021 by the Ministry of Environment and Forestry (MEF) of the Republic of

Indonesia. To make this program successful, the Ministry of Environment and Forestry has announced its commitment to reduce waste by 30% by 2025. The volume of plastic bottle packaging has reached 6.8 million tons annually, increasing by 5% per year (Dinisari, 2021). To reduce the amount of plastic waste, especially plastic packaging, it is necessary to apply the circular economy concept, namely using 100% plastic packaging that can be recycled (reused) or decompose quickly. Reprocessing used plastic can be done in two main ways, namely reuse and recycling. Reuse means using goods (plastic) economically, which can be reused without changing their function, for example used water bottles are used as water containers, syrup bottles are used again as honey containers. Recycle means recycling, changing the function of a product into a product that can be used longer or have another function, for example changing the function of a drinking water bottle into a broom. Changing plastic coffee packaging into bags, turning large bottles into decorative plant pots.

2.5. Excise

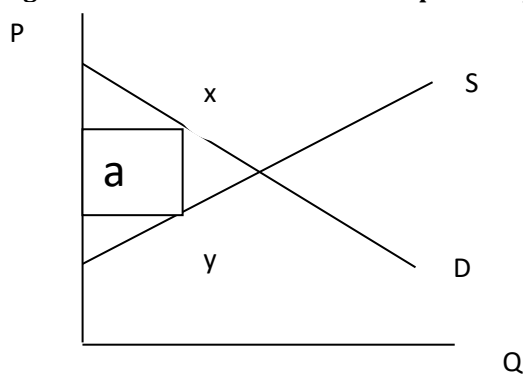
According to the Excise Law of the Republic of Indonesia, excise is a state levy imposed on certain goods (Republik Indonesia, 2007). This law regulates the characteristics of goods subject to excise duty. There are four characteristics mentioned in the law. First, goods whose consumption needs to be controlled. Second, supervision of its distribution is needed. Moreover, goods whose use can harm the community. Finally, goods whose use needs to be levied for the sake of the principles of justice and balance.

Godden & Allen (2017) stated that products subject to excise duty are goods with inelastic characteristics on the demand curve. It was explained that the increase in the price of these goods did not reduce demand proportionally. So, this characteristic will bring benefits to a country's revenue. Therefore, the government can impose high tariffs in line with increased state revenues. Excise duty is imposed on each product produced or imported into a country.

Excise rates can be imposed using two schemes, namely specific rates and ad valorem rates. Specific tariff means that excisable goods are determined at a consistent tariff level for each quantity, such as US\$1 per kilogram. On the other hand, ad valorem tariffs can be interpreted as tariffs in the form of a percentage of the value of a good so that the rise and fall of the value of imports or production affects the nominal excise tax imposed. For example, a tariff of 10 percent of the value of the goods. Excise tax is collected from producers within a certain period after the product is sent from the factory (World Bank, 2018). Based on the definition of excise, plastic taxes tend to meet these criteria. Plastic tax is an excise tax which is also a common practice internationally.

The effect of the plastic tax as excise can be seen in the image below:

Figure I. Effect of Plastic Excise on product prices



P : Price
Q : Quantity
S : Supply
D : Demand
a : Tax revenue
b : Deadweight loss

Source: (Gans et al., 2017)

Based on this graph, government revenue from the plastic tax is shown as a square. The company (producer) will receive at price y, and consumers must pay at price x. The difference between the two prices is a tax for the government, taxes can encourage higher prices paid by consumers and lower prices received by producers (Saputra, 2021).

In line with the spirit of green economic development in Indonesia, the government is currently considering implementing a plastic tax through the issuance of the Law on Harmonization of Tax Regulations. This law allows the government to add types of goods subject to excise duty. However, approval from the People's representative council is required for its determination in a draft state revenue and expenditure budget law. Therefore, there is an opportunity for the government to implement plastic taxes/excises immediately. The implementation of plastic excise will target parties who produce plastic. The imposition of plastic excise applies the polluter pays principle. Thus, it is hoped that its implementation can directly reduce plastic waste.

3. RESEARCH METHODOLOGY

This study puts forward a mix method as descriptive qualitative and quantitative approach. Qualitative research can be used to capture social phenomena that occur from an individual or community perspective (Cresswell & Creswell, 2009). Furthermore, qualitative research allows researchers to obtain detailed data through data collection methods such as in-depth interviews, focus group discussions, observation, content analysis, visual methods, and life histories (Hennink et al., 2011). So, qualitative research is exploratory and in-depth, using various methods deemed necessary by the researcher.

This research model can capture important variables that may not have been previously estimated.

This research presents facts based on developing beliefs and thoughts. It is possible that the subject of the study being researched cannot be captured by quantitative research, which prioritizes proving a hypothesis. Furthermore, data processed using a content analysis scheme from various sources strengthens assumptions in exploring a phenomenon.

This research focus on plastic production and its waste to calculate the proper tariff of excise. Finally, this study can estimate the amount of excise and tax revenue from implementing plastic excise. Meanwhile, the framework of this study can be seen in the following figure.

Figure II. Research Framework



Source: Processed

4. RESULTS AND FINDINGS

4.1. Findings

4.1.1. Total Demand of Plastic in Indonesia

Andrady (2011) states that Polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), polystyrene (PS) and polyethylene terephthalate (PET) have low and high densities are the most widely used synthetic plastics and become pollutants in coastal areas and marine environments. Based on data from the Ministry of Environment (KLHK, 2020a), it can be seen that the demand for plastic products (PP, PE, PS, PET and PVC) in Indonesia is 5,635,000 tons every year. This figure will be a reference for calculating products subject to plastic excise. These types of products commonly become plastic waste.

Table IV. Plastic Consumption and Production in Indonesia (PP, PE, PS, PET & PVC)

Item	Amount (tonnes/year)	Source
Production capacity	2.660.000	IOAPIA*/MOI**
Production	2.310.000	IOAPIA
Import	1.670.000	NSB***
Recycle	1.655.000	IWRA & IPRA****
Total National Demand	5.635.000	

Source: MEF, 2019

*Indonesian Olefin, Aromatic and Plastic Industry Association

**Ministry of Industry

***Badan Pusat Statistik (National Statistic Bureau)

****Indonesian Waste Recycler Association & Indonesian Plastic Recyclers Association

This study uses data on the proportion of product use in Indonesia to determine how many plastic products are short-term or single-use. Plastic products assumed only to have short-term benefits are used in the packaging sector, shopping bags, styrofoam packaging and others. The use of plastic in the household and building sectors is considered to have long-term use, so it has a relatively small potential for environmental pollution. The following is data on the percentage of plastic use per six main sectors.

Tabel V. Proportion of Plastic Product Use in Indonesia

No	Type of production	Percentage
1	Household	20,0%
2	Packaging	40,0%
3	Building	15,0%
4	Shopping bag	6,5%
5	Packaging Styrofoam	0,3%
6	Others	18,2%
Total Plastic Production		100%

Source: Ministry of Industry, 2019

Table V shows that the production of plastic used for short or single-use is around 65 percent. So, 65 percent of plastic demand in Indonesia will be subject to excise duty because it has the potential for more significant environmental pollution. Table IV shows that the total national demand for plastic is 5.635.000 tonnes, so the plastic products that will be subject to excise duty are around 3.984.029 tonnes.

4.1.2. Possibility Excise Imposed

The implementation of plastic bag excise is aimed at influencing people's behaviour to reduce the consumption of plastic bags. One of the critical factors in the success of implementing plastic bag excise is the public's willingness to pay excise taxes (Paroji, 2018). It is hoped that an appropriate excise tariff can be one of the acceptance factors.

Plastic tax, categorized as excise, can be imposed using two schemes: ad volarem rates and specific rates. This study provides specific tariff calculations that are appropriate in Indonesia, which is entering the initial period of implementing the plastic tax. Determination of excise rates takes into account the consumption of plastic goods and the costs of overcoming climate change as a result of carbon emissions from the life cycle of a plastic product. Over the past four decades, global plastic production has quadrupled. If this trend continues, greenhouse gases

emissions from plastic will reach 15% of the worldwide carbon budget by 2050 (Zheng & Suh, 2019). Based on Table II, the average budget for climate management in Indonesia each year is IDR 95.113 billion. The cost of controlling greenhouse gases from carbon emissions from plastic is IDR 14.276 billion. So, the calculation for the excise rate per kilogram of plastic production is as follows.

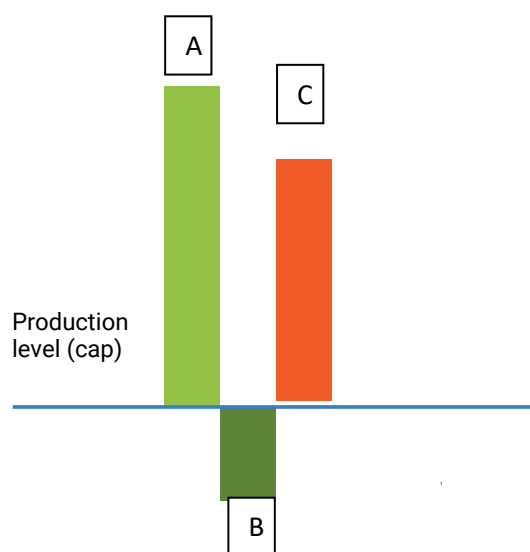
Total demand (PP, PE, PS, PET & PVC)	5.635.000	tonnes
Plastics are taxed (65 percent)	3.984.029	tonnes
Climate change budget (annually)	95.113.000.000.00	IDR
plastic contribution to carbon emission (15%)	14.267.000.000.00	IDR
Excise tariff [per tonne]	3.895.161	IDR
Excise tariff [per kg]	3.895	IDR
Rounding	3.900	IDR

From the calculations above, the plastic excise rate of 3.900 IDR is the option to be implemented in Indonesia. This tariff level is close to the plastic excise rate in the United Kingdom, which is 0.2 pounds or 3.800 IDR per kilogram. Therefore, in the following discussion, the excise rate used is 3.900 IDR per kilogram.

4.1.3. Scheme of incentives of Circular Economy

Table IV. Plastic consumption and production in Indonesia (PP, PE, PS, PET & PVC) shows that 1.655.000 tonnes of plastic goods are obtained from recycling. To support this circular economy, incentives can be provided as excise credits for each party carrying out plastic waste reuse and recycling activities. The incentive scheme in the form of excise credits can be seen in the following image.

Figure III. Incentive of Circular Economy



Source: adaptation from (Saputra et al., 2022)

The picture above shows that each entity has the opportunity to get incentives in the form of reducing excise payments using the excise credit approach. Excise credits can be obtained by calculating the amount of plastic waste successfully reprocessed multiplied by the applicable excise rate. In Figure III, the letter A represents the excise duty that must be paid. The letter B is the excise credit value resulting from recycling plastic waste. Finally, letter C describes each excise payer's final excise tax payable value.

Referring to Table IV, data on recycled plastic products is 1.655.000 tonnes. If the incentive rate is combined with the plastic excise rate of IDR 3.900 per kilogram, then incentives will be provided to parties carrying out recycling activities of IDR 4,220 billion. So, the final value of plastic excise that the government will obtain is around IDR 10,046 billion. The scheme for calculating total incentives and potential state revenue from excise is as follows.

Total demand (PP, PE, PS, PET & PVC)	5.635.000	tonnes
Plastics are taxed (65 percent)	3.984.029	tonnes
Total Recycling Plastic kuota for incentive (65 percent)	1.655.000	tonnes
	1.082.250	tonnes
Total excise from plastics production	14.267.000.000.000	IDR
Total incentives given	4.220.775.000.000	IDR
Total excise revenue	10.046.225.000.000	IDR

4.1.4. Additional Excise and Import Tax Revenues

In this section, the author presents a scheme for calculating import duty and tax revenues for imports using (Scheme I) and without (Scheme II) the imposition of plastic excise. In calculating the potential tax revenue in the context of imports, the author uses the basis of plastic goods imported annually by the National Statistics Bureau. The total import is around 1.670.000 tonnes. The percentage of plastic goods subject to excise duty is 65 percent of the real imported plastic goods. Further, Directorate for Downstream Chemical and Pharmaceutical Industry (2019) shows that the country is importing plastic goods to meet its internal demand annually around USD 2.283.028.000. This assumption is based on the percentages presented in Table V. The tax revenue is income from value-added tax and article 22 import income tax. So that the calculation is obtained as follows (Appendix 1).

From the calculations for Scheme I and Scheme II, it is known that there is a difference in state revenue figures of IDR 5.016.638.250.000. So, in reality, applying excise duty on imports of goods made from plastic that have a short useful life or are single-use

will provide additional state revenue. Ultimately, the increase in state revenue can be used as funds to overcome the negative effects of climate change due to carbon emissions resulting from the life cycle of plastic goods production. The government can implement earmarking policies with programs/activities to repair environmental damage, subsidies for environmentally friendly substitute products, and funding research into environmentally friendly products (Kallbekken & Aasen, 2010). The earmarking policy directs public attention to the aim of utilizing income from the implementation of plastic excise for certain purposes for the environment. This goal is realized by efforts to repair environmental damage, subsidies for environmentally friendly substitute products, and funding research into environmentally friendly products (Kallbekken et al., 2011).

5. CONCLUSIONS

The results of this study show that Indonesia, as a country that is moving towards implementing plastic excise, can determine tax excise with a specific tariff scheme of IDR 3.900. This amount is a reasonable rate considering the costs needed to overcome the negative effects of climate change. This figure is also almost the same as the plastic tax rate applied in the United Kingdom. Meanwhile, to incentivise business actors who recycle plastic waste, the government can give excise credits that will trigger a spirit of reducing plastic waste, which can pollute the surrounding environment. Finally, implementing plastic excise actually benefits state revenues, not only from excise revenues but also from import duties and taxes for imports of around IDR 5.016 billion. The additional state revenue can be used as funds to improve the environment or overcome the effects of climate change.

6. IMPLICATION AND LIMITATIONS

6.1. Limitations

This study uses secondary data without verifying the data using source triangulation. However, the data obtained is believed to be valid because it is in the form of documents or publications from credible agencies or articles from reputable journals. All assumptions in this study result from considerations from the sources cited by the author. Then, some sources are presented in Indonesian, but transcripts were prepared in English, so there may be slight differences in terminology in the translation process.

6.2. Recommendations

Based on Article 2 of Minister of Finance Regulation Number PMK-161 of 2022, the imposition of excise starts to apply to excisable goods made in Indonesia when finished. Therefore, the excise duty owed on plastic by the producer is when plastic goods are produced. However, producers can deposit excise duty and regularly report for the orderly administration and effectiveness of calculation and

supervision. The most reasonable estimate and reporting period is every month. Furthermore, the Minister of Finance Regulation stipulates that the notification of excisable goods that have been completed is submitted in writing on the form or in the form of electronic data (Republik Indonesia, 2022). Supervision for plastic excise is directed to use electronic mechanisms because there is a need for multi-stakeholder-based supervision. The Directorate General of Customs and Excise (DGCE), Ministry of Finance, needs to cooperate with the Ministry of Environment and Forestry (MEF) regarding the value of plastic producers produce.

DGCE itself has regulations regarding an integrated system for reporting excise by companies. Based on Perdirjen No 36/BC/2016, the Centralized Excise Application System, now called SAC-S, is an application system used in excise (Republik Indonesia, 2016). If the notification of excisable goods has been completed in electronic data form, the manufacturer will receive an automatic receipt response from SAC-S. Reporting on the production of carbon emissions and payment of tax payable can be done online so that the reporting can be processed quickly and precisely based on data input by the excise payer. Following is the flow of reporting data from the excise duty and external data (MEF) that can be processed in the Enterprise architecture owned by DGCE.

In the data matching flow (Appendix II), data flows online from stakeholders to the system owned by DGCE. The Customs Payer (WBC) inputs data on plastic production and duty payments payable. On the other hand, the Ministry of Environment and Forestry provides data on the amount of plastic that will enter the recycling process based on data owned by the government. Data from the WBC is then processed and compared with KHLK data to test the integrity of the reporting by the WBC. An integrated system will make monitoring and collecting underpaid excise tax easier if there is a data discrepancy between the authority (MEF) and the party producing plastic recycling. The database in enterprise architecture can be managed by the information data center owned by DGCE to maintain information reliability. At the same time, work units have dashboard access rights to obtain data-matching results.

Director General Regulation Number 36 (2016) has regulated the form and data that must be reported in the report on the completion of the production of excisable goods. Adapting from these regulations, the form that WBC must fill out meets at least several criteria, including Production Documents and calculation date, month of recycling, and assessment number from the authority (MEF) if such data is available.

The data in the form Appendix III (Table IV) must be entered into the online application connected to DGCE's SAC-S. Each data criterion entered into the system will be analyzed and matched with data from the Ministry of Environment and Forestry with the key criteria in column number 10, namely the

assessment number from the Ministry of Environment and Forestry. However, if there is no data on these criteria, then it can be triggering data for joint supervision with the Ministry of Environment and Forestry for a joint audit.

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APPENDIX I

Scheme I with plastic tax

Total import of plastic goods	: 1.670.000 tonnes
Total import of plastic goods	: US\$ 2.283.028.000
Total import of plastic goods	: IDR34.245.420.000.000
Total subject to excise	: 1.085.500 tonnes
Excise rate	: IDR 3.900

Taxable goods (IDR)		34.245.420.000.000
Import duty	(10% x IDR34.245.420.000.000)	3.424.542.000.000
Import excise	(IDR3.900 x 1.085.500 tonnes)	4.233.450.000.000
Baseline income tax and VAT		41.903.412.000.000
Potential Revenue from taxes	(7,5% x 41.903.412.000.000)	3.142.755.900.000
VAT potential revenue	(11% x 7.280.071.414.000)	4.609.375.320.000
Total Revenue import duty, excise and tax		15.410.123.220.000

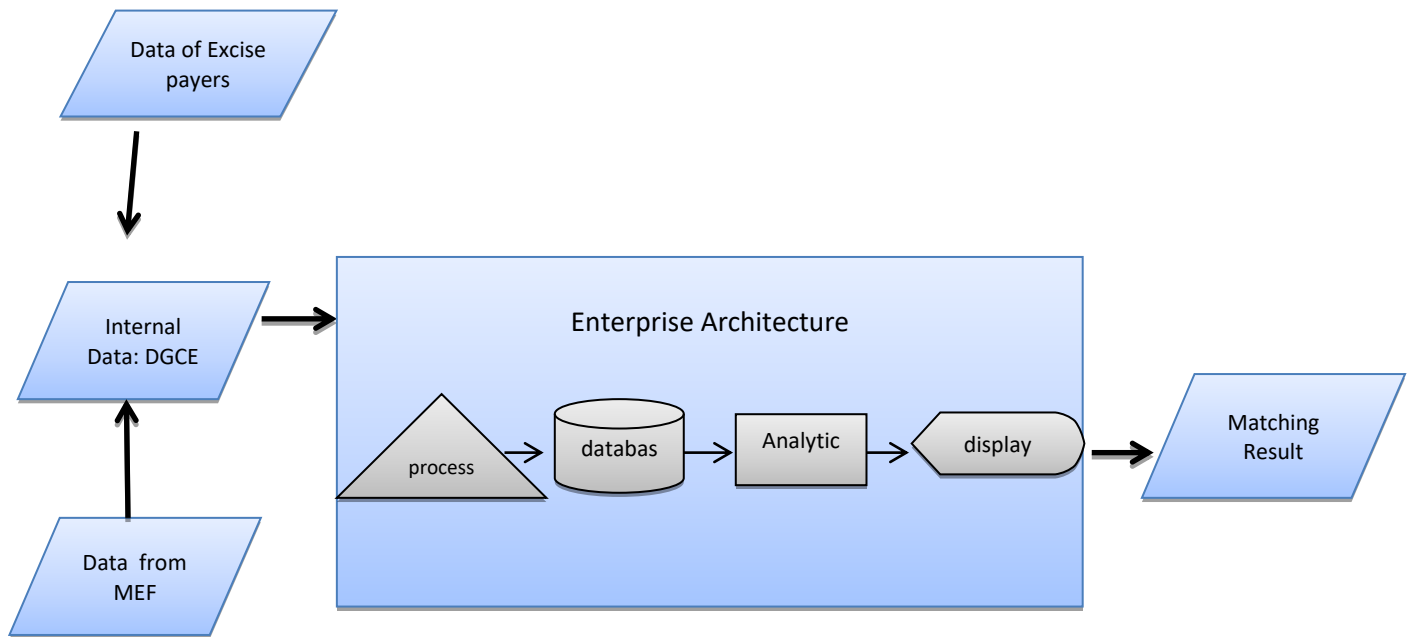
Scheme II without plastic tax

Total import of plastic goods	: 1.670.000 tonnes
Total import of plastic goods	: US\$ 2.283.028.000
Total import of plastic goods	: IDR34.245.420.000.000
Total subject to excise	: -
Excise rate	: -

goods taxable (IDR)		34.245.420.000.000
import duty	(10% x IDR34.245.420.000.000)	3.424.542.000.000
import excise		-
Baseline income tax and VAT		37.669.962.000.000
Potential Revenue from taxes	(7,5% x IDR 41.903.412.000.000)	2.825.247.150.000
VAT potential revenue	(11% x IDR 7.280.071.414.000)	4.143.695.820.000
import duty, excise and tax Revenue		10.393.484.970.000

APPENDIX II

Figure IV. Data matching processing flow



Source: adaptation from saputra, 2021

APPENDIX III

Tabel VI. Periodic Reporting Form for Mandatory Excise Payers

No	Production Document		Month of Production	Excise Owed	Number of recycling	Excise Credit	Excise Paid	Proof of payment and the date	Assessment Registry (MEF)
	No	Date							
1	2	3	4	5	6	7	8	9	10

Information:

1. Sequence Number
2. The document number for calculating the company's plastic production results
3. Document date
4. Months of plastic production
5. Calculation of excise owed
6. Number of plastic recycling
7. The value of plastic recycling as excise credit
8. Excise that has been paid in that month
9. Proof of payment and the date
10. Evidence of conformity assessment of recycling activities by the Ministry of Environment and Forestry

Source: adaptation from Saputra, 2022