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The Role of Fiscal Incentives in Enhancing the Plastic Recycling Industry: Addressing Waste Generation in Indonesia

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ABSTRAK

Upaya untuk mengatasi permasalahan timbulan sampah di Indonesia diwujudkan melalui penerapan konsep ekonomi sirkular pada industri daur ulang plastik. Meski demikian, pertumbuhan industri ini menghadapi sejumlah kendala, seperti keterbatasan bahan baku dan teknologi daur ulang yang belum memadai. Oleh karena itu, dukungan pemerintah berupa insentif fiskal menjadi kebutuhan mendesak. Penelitian ini bertujuan untuk menganalisis urgensi pemberian insentif fiskal, tantangan dalam merumuskan kebijakan insentif pajak atas konsumsi, serta upaya optimalisasi pemanfaatan insentif tersebut oleh pelaku industri daur ulang plastik. Dengan pendekatan kualitatif dan jenis penelitian deskriptif, data dikumpulkan melalui studi kepustakaan dan studi lapangan. Hasil penelitian menunjukkan bahwa ketersediaan bahan baku dan teknologi yang memadai menjadi tantangan selain dukungan tambahan berupa insentif fiskal yang diperlukan untuk mengatasi keterbatasan bahan baku dan teknologi tersebut. Namun, terdapat tantangan dalam perumusan kebijakan insentif, terutama terkait dengan kesesuaian usulan kebijakan terhadap regulasi yang berlaku. Walaupun insentif fiskal seperti pengurangan biaya investasi mesin daur ulang sudah tersedia, pemanfaatannya masih belum optimal karena kurangnya sosialisasi dari pemerintah. Untuk mengatasi hal tersebut, diperlukan koordinasi antara pemangku kebijakan dari tahap perumusan hingga evaluasi kebijakan, serta peningkatan sosialisasi pemanfaatan insentif melalui kerja sama dengan pihak terkait di lapangan.

***Kata kunci*:** daur ulang plastik, Insentif fiskal, pembebasan PPN impor mesin, perumusan kebijakan insentif

ABSTRACT

Efforts to address the issue of waste generation in Indonesia are being realized through the application of the circular economy concept in the plastic recycling industry. However, the growth of this industry faces several challenges, such as limited raw material availability and inadequate recycling technology. Therefore, government support in the form of fiscal incentives has become an urgent necessity. This study aims to analyze the urgency of providing fiscal incentives, the challenges in formulating consumption tax incentive policies, and efforts to optimize the utilization of these incentives by plastic recycling industry players. Using a qualitative approach and descriptive research method, data were collected through literature reviews and field studies. The research findings indicate that adequate raw material availability and technology are critical challenges, aside from the need for additional fiscal incentives to overcome these limitations. However, there are also challenges in policy formulation, particularly regarding the alignment of proposed policies with existing regulations. Although fiscal incentives, such as cost reductions for recycling machinery investment, are already available, their utilization remains suboptimal due to insufficient socialization. To address this issue, coordination among policymakers from policy formulation to evaluation stages is necessary, as well as increased outreach efforts regarding the use of fiscal incentives through collaboration with relevant field stakeholders.

***Keywords*:** plastic recycling, fiscal incentive, VAT import exemption, incentive policy formulation

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1. INTRODUCTION

The issue of waste generation in Indonesia remains a significant concern, as the volume of waste will continue to increase in line with population growth. Data on waste generation indicates an increase from 29,532,676.90 tons in 2021 to 35,953,862.11 tons in 2022, representing a 22% rise in just one year (Kementerian Lingkungan Hidup dan Kehutanan, 2022). If not properly managed, waste accumulation can lead to environmental pollution, whether through soil, water, or air contamination, or through contact with other organisms, potentially resulting in the spread of diseases. To address this waste problem, the government, through the National

Policy and Strategy (Jakstranas) for Household Waste and Similar Waste Management, has set a target that by 2025, there will be a 30% reduction and 70% treatment of household and similar waste compared to the waste generation levels prior to the issuance of Jakstranas guidelines (Kementerian Lingkungan Hidup dan Kehutanan, 2023).

However, waste management in Indonesia is still predominantly carried out through open dumping and landfill methods, accounting for approximately 69%, which makes it appear challenging to achieve the targeted goals. It means that, Indonesia still extremly needs to make significant effort to address the issue of plastic waste management by implementing the reduce, reuse, and recycle concept (Setiabudi et al., 2022).

National waste management performance data indicates that from 2020 to 2022, the percentage of waste generation increased by 24%, while the performance in waste reduction and treatment declined annually (Kementerian Lingkungan Hidup dan Kehutanan, 2023). The average waste management capacity using open dumping and landfill methods in 514 regencies/cities in Indonesia remains below 50%, whereas in major cities, it reached between 70% and 80% in 2021 (Setiawan, 2021). This statement is consistent with the performance data of waste management across regencies/cities, where the highest waste reduction performance was recorded in Metro City, Lampung, and the highest waste treatment performance was recorded in West Jakarta, DKI Jakarta (Kementerian Lingkungan Hidup dan Kehutanan, 2022). The focus on waste management in major cities and reliance on open dumping and landfill methods hinder Indonesia's efforts to achieve the waste reduction and treatment targets (Harjanti & Anggraini, 2020); (Islami et al., 2023).

To achieve the waste reduction and treatment targets, Head of the Sub-Directorate for Goods and Packaging, Directorate of Waste Management at the Ministry of Environment and Forestry (KLHK), stated that the current waste management approach should stimulate the growth of the circular economy (Kementerian Lingkungan Hidup dan Kehutanan, 2022). The circular economy can be defined as an economic concept based on a spiral loop system, which minimizes the use of raw materials, energy flows, and environmental degradation without restricting economic growth or social and technological progress (Guman & Wegner-Kozlova, 2020); (Ikponmwosa Aiguobarueghian et al., 2024); (Fatmawati et al., 2024). The primary principle in applying the circular economy concept is to achieve optimal contributions from the use of natural resources by repairing and reusing discarded production materials for recycling, preserving and enhancing natural capital by controlling the use of natural resources and balancing it with the development of renewable resource flows, and increasing efficiency by identifying and addressing negative externalities, such as mitigating adverse impacts on air, water, and other environmental elements (Grdic et al., 2020).

In Indonesia, waste management using a circular economy model or recycling activities only accounted for 11% in 2021 (Setiawan, 2021). This is partly due to the limited number of industries engaged in waste recycling. According to data from the Ministry of Environment and Forestry (KLHK), it was recorded that in 2021 there were only around 1,300 domestic companies operating in the waste recycling industry, managing approximately 2 million tons of plastic waste. Among these, around 600 companies were classified as large-scale industries, while 700 were small-scale industries (Gareta, 2021); (CNN Indonesia, 2021). This number is relatively small compared to the total waste generation in 2021, which reached 29.6 million tons.

Although the recycling industry has the potential to grow in line with the increasing domestic demand for plastic consumption, it faces several challenges in the production process, including the quality of waste materials for production, declining demand for recycled plastic products, and the absence of incentives to enhance the performance and competitiveness of the recycling industry (Julia Lingga et al., 2024); (Romianingsih, 2023); (Kristina et al., 2018). Several studies show that fiscal incentive can improve the waste management performance, such as the reducing the cost of procuring technology functioning in separating waste collected (Di Matteo & Guadagno, 2024), reduce the financial barrier in investing technology for waste recycling (Sapar, 2025), investing in innovative technology tools (Shi & Ge, 2024).

Chairperson of the Indonesian Plastic Recycling Association (ADUPI) added that the implementation of tax incentive policies could improve the recycling industry's performance by at least 10% to 20% (Nurcaya, 2021a). The Ministry of Industrial Affair and the Ministry of Environment and Forestry (KLHK) have submitted a draft incentive policy in the form of a reduction in the Value Added Tax (VAT) rate for the plastic recycling industry in 2018 and 2021, although, to date, there has been no further information regarding the planned fiscal incentives (Nurcaya, 2021b).

Supporting the improvement of the recycling industry ecosystem and driving the circular economy can be achieved by providing incentives or facilitating ease of business (Kristanto et al., 2021); (Asare et al., 2022), particularly in the area of taxation (Fiorillo & Merkaj, 2024); (Nohong et al., 2024); . As stated by ADUPI, the imposition of taxes can influence the interest and competitiveness of business actors in entering the recycling industry (Gareta, 2019). In this regard, the plastic recycling industry is one of the sectors that needs to be promoted, as for the past three years, plastic waste has consistently ranked as the second most prevalent type of waste after food waste (Kementerian Lingkungan Hidup dan

Kehutanan, 2022). Moreover, plastic waste cannot decompose naturally due to the long carbon chains formed during the production process, which require significant energy to break down (Decy Arwini, 2022). Additionally, of the 37.18% of plastic waste managed annually, only 10% is recycled (The World Bank Indonesia, 2021).

According to the United Nations Conference on Trade and Development (UNCTAD), tax incentives refer to any type of incentive granted by the government aimed at reducing the tax burden on companies in order to encourage them to invest in specific projects or sectors (Sari et al., 2022). The definition of tax incentives as an instrument offered by the government to taxpayers to promote certain sectors aligns with the concept of tax incentives presented by Mankiw (2004), which states that taxpayers' behavior can change when incentives are provided. Therefore, by offering incentives to specific sectors, it is expected that the targeted sectors will have increased growth potential.

The types of incentives provided can vary. Tax incentives are classified into several forms, namely (Holland & Vann, 1998), consists of (a) tax holidays**,** this type of incentive offers a temporary exemption from income tax for a company for a predetermined period, (b) investment allowances and tax credits**;** this type of incentive is based on the amount spent on qualifying investments. If the investment meets the requirements, it will receive tax benefits beyond the standard depreciation allowed for assets. Investment allowances are used to reduce the company's taxable income, while tax credits reduce the amount of tax payable, (c) timing differences**;** this type of incentive involves timing differences through accelerated deductions or the deferral of income recognition. The most common form of this incentive is accelerated depreciation, which allows asset costs to be depreciated at a faster rate than the general economic depreciation rate, (d) reduced tax rates**;** this type of tax incentive involves reduced tax rates, which can be granted for income derived from specific sources or to companies meeting certain criteria.

Based on these four types of incentives, it is further emphasized that the provision of incentives should consider the type of company or activities performed, the expected benefits, the impact of each incentive on government revenue, administrative challenges, and the potential for tax avoidance. Given the various issues described, this study aims to analyze the urgency of providing fiscal incentives, the challenges in formulating tax incentive policies, and the optimization of fiscal incentive policies for the plastic recycling industry in Indonesia.

2. METHODOLOGY

This study employs a qualitative approach. It defines qualitative research as research aimed at understanding social problems or phenomena that do not require quantification because these phenomena cannot be accurately measured (Creswell & Creswell, 2018). Creswell & Creswell, (2018) also explain that research using a qualitative approach is scientific research with the objective of exploring and understanding concepts and meanings of a social problem originating from individuals or groups. In qualitative research, the research process involves procedures that include a series of steps starting from making assumptions to the development of methods for comprehensive data collection, analysis, and interpretation (Creswell & Creswell, 2018).

In this study, a qualitative approach is used because the research aims to discuss and analyze in depth the phenomena and social issues occurring in the field, specifically regarding incentive policies for the plastic recycling industry in Indonesia.

Qualitative data analysis in this study was conducted through a systematic and iterative process. The data were first transcribed and thoroughly read to ensure familiarity. Manual coding was then performed to identify meaningful units, which were grouped into categories and developed into broader themes. These themes were interpreted in relation to the research questions and theoretical framework, with attention to contextual meaning and participant perspectives. To enhance the credibility of the findings, validation techniques such as triangulation and reflexivity were employed, ensuring a transparent and rigorous analysis.

After conducting an analysis related to the research topic, the next step is for the researcher to conclude the findings and provide recommendations on the issue. The choice of a qualitative research approach is also in line with the final objective of the study, which is to analyze the urgency of providing incentives, the challenges in formulating incentive policies, and the appropriate form of fiscal incentive policies to be provided to plastic recycling industry players.

This research is descriptive in nature and, based on its utility, constitutes pure research. The data collection techniques employed include field studies and literature reviews, with data analysis techniques starting from selecting relevant data, interpreting and presenting the data, and drawing conclusions. The author conducted in-depth interviews with government agencies, including the Fiscal Policy Agency, Directorate General of Taxes, Ministry of Industry, and Ministry of Environment and Forestry. Additionally, the author carried out in-depth interviews with environmental and taxation academics, the Indonesian Plastic Recycling Association (ADUPI), and representatives from the plastic recycling industry in Indonesia.

3. RESULT AND DISCUSSION

In 2022, the population of plastic waste recycling industries in Indonesia comprised 129 large-scale industries and 578 small and medium enterprises (Kementerian Lingkungan Hidup dan Kehutanan,

2023). The Minister of Industry stated that there remains a 50% idle capacity in the plastic recycling industry (Kementerian Perindustrian, 2021). However, this production capacity has yet to be fully optimized due to the limited availability of raw materials derived from plastic waste. Approximately 4.3 million tons of waste per year remain unmanaged and are directly disposed of in landfills, resulting in raw plastic materials being mixed with other types of waste. This necessitates additional costs for processing unsorted plastic waste, prompting industry players to resort to importing plastic waste to meet production demands (Kementerian Lingkungan Hidup dan Kehutanan, 2023). It was reported that in 2021, the total raw material demand for the national plastic recycling industry was 2 million tons of plastic, of which 46% or 913 thousand tons were supplied domestically, while the remaining 54% or 1.08 million tons were sourced from imported plastic waste (Kementerian Perindustrian, 2021).

In the production process, several business chains are involved in the plastic recycling ecosystem in Indonesia, starting with: (1) collectors who gather plastic waste from landfills or household plastic waste collected by area managers, (2) sorters who conduct the initial sorting process (selecting plastic waste suitable for recycling), (3) grinders/processors who further sort the plastic based on shape, size, color, and material, (4) converters who shred and recycle the plastic using machines (into pellets, recycled plastic granules, or other forms according to molds), (5) manufacturers who produce finished recycled products (housewares, plastic bags, etc.) derived from recycled plastic granules, and finally (6) the consumers who consume these recycled products.

The government has issued several regulations serving as a legal framework for the reduction and management of plastic waste, including Law No. 18/2008, Government Regulation No. 81/2012, Presidential Regulation No. 97/2017, as well as implementing regulations such as Ministerial Regulation of Environment and Forestry No. 75/2019 and No. 14/2021. The implementation of these policies has not yet been fully optimized, as many producers have not adhered to the roadmap for waste reduction due to challenges posed by the COVID-19 pandemic, which led to a slowdown in economic activities. The Ministry of Environment and Forestry continues its efforts to encourage producers to comply with the roadmap by conducting policy monitoring and evaluation, which requires further adjustments.

3.1. The Urgency of Providing Fiscal Incentives for the Plastic Recycling Industry

The development of the plastic recycling industry sector has not progressed as rapidly as other industrial sectors due to several obstacles. Although the amount of plastic waste in Indonesia is relatively high, as much as 4.3 million tons of waste per year remain unmanaged and mixed with other types of waste, reducing the economic value of plastic waste that could potentially serve as raw material for the recycling industry (Kementerian Lingkungan Hidup dan Kehutanan, 2022). Furthermore, business is more inclined to process recyclable plastic waste (*Layak Daur Ulang*/LDU) made from single materials due to lower production costs, resulting in multi-material plastic waste that is still recyclable (*Bisa Daur Ulang*/BDU) In fact, the amount of multilayer plastic waste is considerable, yet it merely becomes residue with largely ending up in landfills. The limited supply of single-material plastics, combined with high demand, leads to price fluctuations in the local market. Therefore, the business resort to imports to meet production needs (Rahmadiani & Sari, 2021).

The importation of plastic waste has been regulated under Minister of Trade Regulation No. 25/2022, and it was recorded that in 2022, Indonesia imported plastic waste worth up to US$30.4 million, with a total volume of 53.76 million kilograms, mainly form The Netherland, Germany and Belgium (Rizaty, 2023). Despite the existing regulations on waste import activities, it cannot be denied that, in practice, non-compliance with the established provisions and requirements for waste importation still occurs. This is evidenced by findings from the Directorate General of Customs and Excise and the Ministry of Environment and Forestry (KLHK), which revealed the presence of hazardous and toxic waste (B3) contamination in imported waste containers. Moreover, the importation of plastic waste results in the transfer of negative externalities associated with plastic waste (HS Code import 39.15) from exporting countries to Indonesia and may increase the volume of waste in the country if the imported plastic scrap is mixed with other waste types, rendering it residual waste that cannot be further processed and will ultimately end up in landfills (interview with informants, 2024). This is certainly not a positive matter, as the plastic waste recycling industry, which should adhere to the core principles of the circular economy concept by addressing negative externalities such as mitigating the adverse impacts of plastic waste on environmental elements, instead has the potential to exacerbate negative impacts on the environment.

Nevertheless, efforts to address the issue of limited raw materials for production do not necessarily require fiscal incentives. This is because the main factor contributing to the scarcity of recyclable raw materials is the high volume of plastic waste mixed with other types of waste, resulting from the low awareness of waste segregation management at the community level. Most households in Indonesia still do not carry out waste segregation activities in their waste management (Dewi et al., 2022); (Humairo et al., 2022). Therefore, an alternative solution to this problem can be implemented through public education on waste segregation and the provision of waste bins categorized by organic, non-organic, hazardous and toxic (B3) waste, or other classifications (Wahyuningsih et al., 2023).

The second obstacle is the inadequacy of recycling technology in Indonesia. The recycling process for multilayer plastic waste differs from that of single-layer plastic, requiring higher production costs due to the need to separate the layers of plastic or the use of more advanced technology to process all layers simultaneously (Soares et al., 2022). In Indonesia, local manufacturers are not yet capable of producing such technology, forcing business operators to import machinery if they wish to recycle multilayer plastic waste (Kaiser et al., 2018). However, the issue arising from machinery imports is the high cost of the equipment, which depends on foreign exchange rates, in addition to import duties and taxes.

In essence, the government has provided fiscal incentives in the form of exemption from import duties and VAT on machinery imports through the issuance of Minister of Finance Regulation No. 176/2009 as amended by Minister of Finance Regulation No. 188/2015 and Government Regulation No. 49/2022. These tax incentives have an impact on the amount paid by business operators when investing in machinery, as illustrated in the following example.

Table 1. Illustration of the Utilization of Fiscal Incentives for Recycling Machinery Imports

Note	With Incentive (IDR)	Without Incentive (IDR)
Machinery import value	350,000,000	350,000,000
customs duty/ tariff (0%) and other import duty (VAT import 11%, Income tax tmport 2,5%)	8,750,000	47,250,000
Total payment	358,750,000	397,250,000

Source: Illustrated by the authors (2024)

Although the customs duty exemption incentive has no significant impact, as the import duty rate on plastic recycling machinery is 0%, the utilization of VAT incentives significantly affects the acquisition cost of the machinery, making the purchase price more economical. While the VAT charged on the purchase of machinery can eventually be credited, the imposition of an 11% VAT on machinery imports burdens the company's cash flow, as business operators cannot freely allocate their capital for purchasing other production inputs besides machinery, especially for purchasing other equipment supporting production needs, such as trucks for transporting raw materials or forklifts, which also have high purchase prices. However, the limited number of industry players who are aware of and utilize the tax incentives results in the additional import duty levy still increasing the purchase price of recycling machinery.

3.2. Challenges in Formulating Tax Incentive Policies on Consumption for the Plastic Recycling Industry

In the context of formulating fiscal incentive policies in Indonesia, the formulation process begins with industry associations coordinating with the relevant technical ministries to present the issues faced by business. The technical ministries then propose the provision of incentives for the specific sector by outlining their considerations, which are subsequently reviewed selectively by the Ministry of Finance in coordination with stakeholders regarding the proposed fiscal incentives. In reviewing the proposals submitted by the technical ministries, the Ministry of Finance evaluates the accuracy of the targeted policy, the ease of monitoring the utilization of the incentives, and the effectiveness of the policy's impact in alleviating the tax-related challenges faced by business operators.

In 2018 and 2021, the Ministry of Industrial Affair and the Ministry of Environment and Forestry proposed and submitted a draft incentive in the form of a reduction in the VAT rate to below the standard rate for the plastic recycling industry (Nurcaya, 2021a). The objective was to increase profit margins and make the selling price of recycled products more competitive compared to virgin plastic products. Furthermore, in 2021, during the formulation of tax law reforms, there was a joint review conducted by the Ministry of Finance and the relevant technical ministries regarding the implementation of a tiered VAT rate, also known as a multi-rate VAT, for the plastic recycling industry.

However, the latest discussion regarding the provision of fiscal incentives for the plastic recycling industry has not reached a final decision due to disagreements among parties. The technical ministries proposed the application of an alternative value-based taxable base (*Dasar Pengenaan Pajak Nilai Lain*) covering the entire recycling industry chain (converters), considering the reasons mentioned above. Meanwhile, the study conducted by the Indonesia Fiscal Policy Agency only approved its application up to the grinding/processing chain, where the material is still in the form of plastic scrap, taking into account the ease of monitoring. Therefore, it can be concluded that the proposed incentive policy in the form of a reduced VAT rate for the plastic recycling industry remains a proposal and has not yet been approved by the government.

An analysis of the potential implementation of a reduced VAT rate incentive indicates that, at present, it is less feasible to be implemented. This is because the current VAT regulation enforces a single rate of 11% rather than a multi-rate system. If a multi-rate VAT system were to be implemented in Indonesia, it would introduce new administrative challenges, as the application of a multi-rate VAT system would result in higher administrative and compliance costs compared to a single rate system. Additionally, a

multi-rate VAT system may lead to economic distortions and create difficulties in VAT transactions, which would adversely affect efficiency and neutrality within the VAT system (Aryani & Tambunan, 2022).

Furthermore, if the reduced VAT rate facility is granted using a specific rate mechanism, although the VAT Law accommodates the implementation of VAT imposition with a final rate mechanism, such an approach cannot be considered a tax incentive for business operators. This is because the imposition of VAT with a final rate does not reduce the tax burden on business operators but merely simplifies its administration.

Table 2. Illustration of Standard VAT Imposition and Specific Rate Mechanism

Standard VAT base mechanism	Specific Rate VAT base mechanism
Taxable goods = Rp10.000.000 VAT output = Rp1.100.000 (11%) VAT input = Rp880.000 VAT credit mechanism (VAT output – VAT Input) = 1.100.000-880.000 = Rp220.000 (VAT payable) VAT revenue transferred to the government. = 880.000+220.000 = Rp1.100.000	Taxable goods = Rp10.000.000 VAT output = Rp110.000 (assumption final VAT rate 1.1%) PM = Rp880.000 No VAT credit mechanism VAT revenue transferred to the government. = 880.000+110.000 = Rp990.000

Source: Illustrated by the authors (2024)

It can be seen from the illustration above that the amount of VAT remitted to the state under the normal mechanism and the specific rate mechanism does not differ significantly. This is because, under the normal mechanism, there is an input tax crediting mechanism, whereas under the specific rate mechanism, input tax cannot be credited. The input tax paid by business when acquiring taxable goods or services (*Barang Kena Pajak/Jasa Kena Pajak*) must instead be charged to their production costs, potentially affecting profit margins or product selling prices.

The imposition of VAT with a final rate on plastic recycling industry operators also presents challenges in terms of monitoring. This is because the output of both virgin plastic industries and recycled plastic industries is the same—plastic pellets. The difference between the two industries lies in the raw materials used, where virgin plastic pellets are produced using petroleum-based raw materials, while recycled plastic pellets are produced from post-consumer and post-production plastic waste. Therefore, policymakers need to revisit the process of finding solutions to address the real issues faced by industry operators in the field by ensuring that the proposed fiscal incentives align with their legal character and by considering the implementation mechanism of such incentive policies.

3.3. Optimization of the Utilization of Fiscal Incentive Policies by Plastic Recycling Industry Operators in Indonesia

Before proposing the provision of incentives for a specific industrial sector, it is necessary to first analyze the actual issues faced by business and optimize the utilization of existing fiscal incentives. Research findings indicate that the main problems encountered by plastic recycling industry/business operators are related to production input factors, namely the limited availability of plastic raw materials for production and the inadequacy of recycling technology available in Indonesia. Therefore, the proposal to provide fiscal incentives in the form of a reduced VAT rate below the standard rate for transactions within the recycling production chain is less relevant in addressing the issues that hinder the development of the plastic recycling industry.

Moreover, the fact that most business operators in the plastic recycling industry have not yet collected VAT on their transactions—either because they are not required to do so under Article 3A of the VAT Law or due to a lack of awareness of tax regulations, particularly small-scale operators involved in sorting and grinding/processing activities—makes the proposal for fiscal incentives on transactions within the recycling production chain less feasible. This is because, before incentives can be granted to a specific industrial sector, they must first fulfill their tax obligations, as tax incentives can only be provided if business operators feel burdened by the imposition of taxes.

In order to support the growth and development of the plastic recycling industry, the government may target fiscal incentives toward production input factors, namely plastic raw materials and recycling machinery used in production activities. However, providing government support in the form of fiscal incentives to address the issue of limited raw materials, which has led many plastic recycling businesses to import plastic waste, is also less feasible. This is because the importation of plastic waste would further increase the negative externalities of plastic waste from other countries on Indonesia's environment.

Therefore, efforts to address the issue of limited plastic raw materials can be carried out through public education on waste segregation at the community level, as the problem of unsegregated waste that ends up directly in landfills is the responsibility of all parties. This requires efforts, awareness, and concern from all stakeholders involved, including producers, consumers/the public, and the government. An alternative solution to address the issue of limited plastic raw materials for production is to utilize plastic waste categorized as BDU or multilayer plastics, which are currently less favored by business operators. In this case, the problem that arises when business operators use multilayer plastic waste as raw material is the

inadequacy of recycling technology in Indonesia, necessitating the importation of such technology.

Currently, there is a tax incentive policy in place that provides tax relief for business operators when importing machinery, namely the VAT exemption incentive for machinery imports. The procedure for applying for the utilization of this VAT exemption incentive has been clearly regulated in Minister of Finance Regulation No. 115/2021, which specifies the documents and information required for submission as well as the assurance of notification regarding the approval or rejection of the application. However, based on field findings, it has been revealed that business operators have never utilized this tax incentive in their machinery purchases. The lack of government socialization regarding this policy has resulted in plastic recycling business operators, most of whom are small and medium-sized enterprises, being unaware of the existence of this incentive.

Several studies show that both subsidy and tax incentives can effectively improve the economic benefit and producion of waste recycling enterprise (Xiang et al., 2022), and has been a strategy of the municipal government to co-produce the product from waste management (Fiorillo & Merkaj, 2024). Further, the availability of incentive may lead the business and the community to invest in waste management solution through public private partnership (Nohong et al., 2024). For the plastic waste recycling business, the incentives help to compete to petrochemical plastic producer.

Then, the OECD suggests that entities operating to reduce environmental externalities issue should be granted facilities such as fiscal incentives (Wirawan Setiabudi et al., 2023). The study conducted by Wirawan Setiabudi et al., 2023) suggests that granting fiscal incentives for producers is preferreable than “punish” the users by imposing types of tax penalty (Wirawan Setiabudi et al., 2023).

Another issue affecting business operators' investment decisions in recycling machinery is the high purchase cost of recycling machinery. According to a website selling various types of recycling machines with different production capacities, it is known that the price range for extrusion machines used to process multilayer plastics imported from abroad starts from USD 10,000 to USD 100,000, or approximately IDR 160 million to IDR 1.6 billion. Meanwhile, the price range for imported monolayer plastic pellet processing machines varies from USD 20,000 to USD 50,000, or approximately IDR 320 million to IDR 780 million (Zhangjiagang Polestar Machinery Co., Ltd, n.d.). Nevertheless, there are currently several local factories capable of assembling plastic pellet processing machines, although limited to monolayer plastics. The price of these locally assembled machines ranges from IDR 20 million to IDR 100 million, with varying production capacities.

In carrying out production activities, business operators require several machines to support their production needs. Given that most business operators are still small to medium-sized enterprises, the price of imported machines for processing multilayer plastic pellets poses a significant burden on them. This has become one of the factors causing business operators to prefer producing recycled plastic products made from single-material or monolayer plastics, as the locally manufactured processing machines are more economically priced, thereby reducing production costs. This condition has led business operators to seek additional support from the government in terms of machine purchases, not only regarding tax-related aspects of purchasing the machines.

Essentially, machines/capital goods, which are considered strategic items, are eligible to receive fiscal incentives in the form of subsidies. This is because the explanation in Minister of Finance Regulation No. 102/2018 does not specify the types of goods and/or services that may be subsidized, indicating that the budgeting of fiscal incentives in the form of subsidies within the State Budget (APBN) is open listed. Furthermore, providing subsidies for recycling machines to business operators can encourage them to process and recycle types of plastic waste categorized as BDU or multilayer plastics at lower costs. This, in turn, can indirectly assist the government in addressing the issue of multilayer plastic waste, which currently ends up directly in landfills.

Currently, there are no fiscal incentives in the form of subsidies targeted at business operators in the plastic recycling industry sector. This is because the allocation of subsidies within the State Budget (APBN) must consider funding sources due to the limited fiscal space in Indonesia’s APBN, which restricts the government’s ability to allocate its budget. Given this fiscal limitation, the government needs to optimize the utilization of existing fiscal incentives before introducing new fiscal incentives for the industry.

In this context, the government, through Minister of Industry Regulation No. 9 of 2022 concerning the Provision of Machinery and Equipment Assistance, has allocated the State Budget (APBN) to provide machinery and equipment assistance facilities (also known as the restructuring program) for small and medium-sized industries (IKM). The regulation stipulates that small and medium-sized industries can participate in the restructuring program and utilize these facilities in the form of discounts on the purchase of machinery and/or equipment. The procedures, requirements, and provisions for utilizing these facilities are comprehensively outlined in Minister of Industry Regulation No. 9/2022. Furthermore, the fact that most plastic recycling business operators are small and medium-sized enterprises indicates that those who meet these criteria are indeed eligible to benefit from these machinery and equipment assistance facilities.

If it is assumed that a business operator imports recycling machinery worth IDR 350 million, based on the provision of a facility that reimburses up to 25% of the purchase price for imported machinery and/or equipment, the reimbursement value that the business operator would receive can be illustrated as follows:

Machinery (imported) = IDR 350,000,000
Reimbursement Value = 25% x IDR 350,000,000 = IDR 87,500,000

By utilizing the machinery and equipment assistance facility, business operators receive a reimbursement of IDR 87,500,000 by submitting a disbursement realization request to the Director General of Small, Medium, and Various Industries. However, field findings through in-depth interviews with business representatives reveal that business operators have also never utilized fiscal incentives for purchasing recycling machinery. The lack of research findings related to the experiences of business operators in utilizing these facilities makes it uncertain whether one of the factors contributing to the limited use of these fiscal incentives by plastic recycling business operators is due to difficulties encountered during the application procedure for utilizing the facilities. Therefore, it is necessary to optimize the utilization of existing fiscal incentives first, as the illustration above demonstrates that such incentives can effectively alleviate the challenges faced by business operators in investing in recycling machinery.

In an effort to optimize the utilization of currently implemented fiscal incentives, particularly the VAT exemption incentive that requires business operators to be registered as taxable entrepreneurs, the government needs to conduct initial socialization to encourage compliance with tax obligations, followed by disseminating information on the procedures for utilizing such fiscal incentives to plastic recycling operators. However, due to the Directorate General of Taxes (DJP) being limited in its capacity to conduct extensive and uniform socialization for plastic recycling operators across Indonesia, this tax-related socialization can be carried out by the DJP in collaboration with associations. This approach is appropriate as associations are also key stakeholders in the implementation of fiscal incentive policies that support the sustainability of the plastic recycling industry in Indonesia.

Based on in-depth interviews with ADUPI, it is evident that the association also supports the government in providing incentives that help sustain businesses in the plastic recycling industry sector. The fact that ADUPI already has eight regional representatives (referred to as Regional Executive Councils (DPD)) and plans to expand to 19 DPDs across various regions in Indonesia can undoubtedly assist the government and the Directorate General of Taxes (DJP) in conducting outreach to plastic recycling business operators more evenly across Indonesia. Therefore, the government can collaborate with the association to conduct socialization on the utilization of fiscal incentives so that more business operators become aware of these incentives. This is particularly important as previous studies have shown that external environmental factors, such as business partners, association members, tax officials, and tax consultants, significantly influence business operators' decisions to utilize tax incentives (Noviari & Damayanthi, 2021); (Rossana & Sari, 2023).

In the future, the government needs to pay attention to several aspects, such as conducting evaluations and improvements in the waste management system to address the issue of limited raw materials, ensuring that plastic waste is not mixed with other types of waste, which reduces its potential for recycling. The government also needs to provide support to the industry in terms of fiscal and non-fiscal tax relief for investments in recycling technology to encourage industries to process unmanaged domestic plastic waste as raw materials for production.

Furthermore, to address the challenges faced in formulating fiscal incentive policies for the plastic recycling industry, a suggestion that the government and stakeholders can consider is that since the process of proposing incentives is entrusted to the technical ministries in collaboration with associations, the technical ministries, in addition to considering the challenges faced by the industry in the field, must also ensure that the proposed incentive policies align with the existing legal framework in Indonesia. This would make the proposed incentive policies more likely to be approved by the Ministry of Finance during the discussion and review process.

Since the current issue lies in the availability of fiscal incentives that could alleviate industry challenges but are underutilized, the government needs to expand the reach of these incentives by collaborating with other parties involved on the ground, such as conducting socialization efforts in partnership with technical ministries or associations. Additionally, business operators need to take a proactive approach in learning about the fiscal facilities available to them, for example, by engaging in discussions with fellow association members.

4. CONCLUSION

In summary, plastic recycling businesses in Indonesia face challenges in raw materials and technology. These stem from suboptimal waste management and limited capacity to process multi-material plastics, prompting reliance on imported waste. Fiscal incentives, while not the most vital contributor, are still needed to support production and reduce waste accumulation.

However, proposals like reduced VAT rates face legal hurdles due to Indonesia's single-rate VAT system, which complicates administration without truly easing the tax burden.

Current incentives—VAT and import duty exemptions and machinery cost reimbursements—can ease investment in recycling technology. Yet, their impact remains limited due to low awareness among business operators.

REFERENCES

Aryani, L., & Tambunan, M. R. U. D. (2022). CATATAN ATAS FORMULASI KEBIJAKAN PERUBAHAN TARIF PAJAK PERTAMBAHAN NILAI (PPN) DI INDONESIA. *Dialogue : Jurnal Ilmu Administrasi Publik; Vol 4, No 2 (2022)DO - 10.14710/Dialogue.V4i2.14893* . https://ejournal2.undip.ac.id/index.php/dialogue/article/view/14893

Asare, W., Oduro–Kwarteng, S., Donkor, E. A., & Rockson, M. A. D. (2022). Cost-effectiveness of incentive schemes for waste material resource recovery. *Cleaner Waste Systems*, *2*, 100019. https://doi.org/https://doi.org/10.1016/j.clwas.2022.100019

CNN Indonesia. (2021). *Menperin Resmikan Pabrik Daur Ulang Plastik Terbesar RI*. CNN News.

Creswell, J. W., & Creswell, J. D. (2018). Mixed Methods Procedures. In *Research Defign: Qualitative, Quantitative, and Mixed M ethods Approaches*.

Decy Arwini, N. P. (2022). Sampah Plastik Dan Upaya Pengurangan Timbulan Sampah Plastik. *Jurnal Ilmiah Vastuwidya*, *5*(1), 72–82. https://doi.org/10.47532/jiv.v5i1.412

Dewi, R. E., Setiyaningrum, N., Hapsari, A. S., & Pradana, F. G. (2022). Pemilahan Sampah dengan Cara Paksa Pilah Sampah dari Rumah. *Berdikari: Jurnal Inovasi Dan Penerapan Ipteks*, *10*(2), 225–235. https://doi.org/10.18196/berdikari.v10i2.15729

Di Matteo, D., & Guadagno, E. (2024). Tax incentives and environmental performance: The pay-as-you-throw policy in Emilia-Romagna, Italy. *Journal of Cleaner Production*, *475*, 143659. https://doi.org/https://doi.org/10.1016/j.jclepro.2024.143659

Fatmawati, F., Ilham, I., Saleh, S., & Razak, A. R. (2024). Waste Management System: A Case Study of Waste Bank Management Toward a Circular Economy in Maros Regency. *Jurnal Borneo Administrator*, *20*(1), 1–14. https://doi.org/10.24258/jba.v20i1.1206

Fiorillo, F., & Merkaj, E. (2024). Municipal strategies, fiscal incentives and co-production in urban waste management. *Socio-Economic Planning Sciences*, *92*, 101817. https://doi.org/https://doi.org/10.1016/j.seps.2024.101817

Gareta, S. P. (2019). *Asosiasi minta produk daur ulang plastik bebas PPN*. Antara News.

Gareta, S. P. (2021). *Kemenperin: Industri daur ulang kelola dua juta ton limbah plastik*. Antara News.

Grdic, Z. S., Nizic, M. K., & Rudan, E. (2020). Concepto de economía circular en el contexto del desarrollo económico en los países de latinoamerica. *Sustainability (Switzerland)*, *12*(7).

Guman, O., & Wegner-Kozlova, E. (2020). Waste management based on circular economy principles. *E3S Web of Conferences*, *177*, 1–10. https://doi.org/10.1051/e3sconf/202017704014

Harjanti, I. M., & Anggraini, P. (2020). Pengelolaan Sampah Di Tempat Pembuangan Akhir (TPA) Jatibarang, Kota Semarang. *Jurnal Planologi*, *17*(2), 185. https://doi.org/10.30659/jpsa.v17i2.9943

Holland, D., & Vann, R. J. (1998). Chapter 23, Income Tax Incentives for Investment Income Tax Incentives for Investment. *International Monetary Fund*, *2*(1984), 1–32. https://www.elibrary.imf.org/view/book/9781557756336/C23.xml

Humairo, M., Dwianggimawati, M. S., Silfiani, R., Anggraini, A. D., Nurhanifah, L., Ayunita, N., & Nashriyah, N. (2022). Pendampingan Pemilahan Sampah Rumah Tangga di Kelurahan Burengan, Kota Kediri. *ABDIKESMAS MULAWARMAN : Jurnal Pengabdian Kepada Masyarakat*, *2*(2), 51–57. https://doi.org/10.30872/abdikesmasmulawarman.v2i2.39

Ikponmwosa Aiguobarueghian, Uwaga Monica Adanma, Emmanuel Olurotimi Ogunbiyi, & Nko Okina Solomon. (2024). Waste management and circular economy: A review of sustainable practices and economic benefits. *World Journal of Advanced Research and Reviews*, *22*(2), 1708–1719. https://doi.org/10.30574/wjarr.2024.22.2.1517

Islami, R. R., Moelyaningrum, A. D., & Khoiron, K. (2023). Analisis Sistem Pengelolaan Sampah Di Tempat Pemrosesan Akhir (TPA) Di Kabupaten Lumajang. *Jurnal Kesehatan Lingkungan Indonesia*, *22*(2), 179–188. https://doi.org/10.14710/jkli.22.2.179-188

Julia Lingga, L., Yuana, M., Aulia Sari, N., Nur Syahida, H., & Sitorus, C. (2024). Sampah di Indonesia: Tantangan dan Solusi Menuju Perubahan Positif. *INNOVATIVE: Journal Of Social Science Research*, *4*, 12235–12247.

Kaiser, K., Schmid, M., & Schlummer, M. (2018). Recycling of Polymer-Based Multilayer Packaging: A Review. In *Recycling* (Vol. 3, Issue 1). https://doi.org/10.3390/recycling3010001

Kementerian Lingkungan Hidup dan Kehutanan. (2022). *Capaian Kinerja Pengelolaan Sampah*. Kemeterian Lingkungan Hidup Dan Kehutanan. https://sipsn.menlhk.go.id/sipsn/

Kementerian Lingkungan Hidup dan Kehutanan. (2023). *KOMPOSISI SAMPAH*. Kementerian Lingkungan Hidup Dan Kehutanan.

Kementerian Perindustrian. (2021). *Menperin Resmikan Pabrik Daur Ulang Plastik Terbesar di Indonesia*. Siaran Pers Kementerian Perindustrian.

Kristanto, G. A., Kemala, D., & Nandhita, P. A. C. (2021). Challenges confronting waste pickers in Indonesia: An on-field analysis. *Waste Management & Research*, *40*(9), 1381–1389. https://doi.org/10.1177/0734242X211029181

Kristina, H. J., Christiani, A., & Jobiliong, E. (2018). The prospects and challenges of plastic bottle waste recycling in Indonesia. *IOP Conference Series: Earth and Environmental Science*, *195*(1), 12027. https://doi.org/10.1088/1755-1315/195/1/012027

Nohong, M., Harsasi, M., Muharja, F., Samir, S., & Otoluwa, N. I. (2024). Formulate an incentive model to involve communities' industries in coastal waste management, Makassar, Indonesia. *Journal of Infrastructure, Policy and Development*, *8*(3), 1–22. https://doi.org/10.24294/jipd.v8i3.3102

Noviari, N., & Damayanthi, I. G. A. E. (2021). Faktor-Faktor yang Berpengaruh pada Niat Memanfaatkan Insentif Pajak pada Masa Pandemi Covid 19. *E-Jurnal Akuntansi*, *31*(11), 2936.

https://doi.org/10.24843/eja.2021.v31.i11.p20

Nurcaya. (2021a). *13 Tahun Menunggu, Industri Daur Ulang Minta Realisasi Insentif*. Bisnis.Com.

Nurcaya. (2021b). *KLHK Masih Perjuangkan Pengurangan PPN Industri Daur Ulang*. Bisnis.Com.

Rahmadiani, S., & Sari, W. K. (2021). *Determining Incentive in Support of Plastic Recycling Industry in Indonesia BT - Proceedings of the 3rd Annual International Conference on Public and Business Administration (AICoBPA 2020)*. 197–200. https://doi.org/10.2991/aebmr.k.210928.039

Rizaty, M. A. (2023). *Peta Perdagangan Sampah Plastik Indonesia 2022, Ke Mana Saja?* Data Indonesia.

Romianingsih, N. P. W. (2023). Waste to energy in Indonesia: opportunities and challenges. *Journal of Sustainability, Society, and Eco-Welfare*, *1*(1), 60–69. https://doi.org/10.61511/jssew.v1i1.2023.180

Rossana, E., & Sari, R. P. (2023). Faktor Penentu Minat Wajib Pajak Atas Insentif Perpajakan UMKM di Masa Pandemi COVID-19. *Ekonomis: Journal of Economics and Business*, *7*(1), 402. https://doi.org/10.33087/ekonomis.v7i1.831

Sapar, J. F. (2025). *Advances in Taxation Research Effectiveness of Tax Incentives in Increasing Investment in Green Technology and Green Energy*. *3*(1), 54–67.

Sari, E., Gunawan, Y., & Elvina, E. (2022). PENGARUH KEPERCAYAAN KEPADA PEMERINTAH, KEBIJAKAN INSENTIF DAN MANFAAT PAJAK TERHADAP KEPATUHAN WAJIB PAJAK. *Jurnal Ilmiah Manajemen, Ekonomi, & Akuntansi (MEA)*, *6*(3 SE-Articles). https://doi.org/10.31955/mea.v6i3.2269

Setiabudi, A. W., Gunadi, & Rosdiana, H. (2022). A Comparison Study of Fiscal Policy in Different Countries Regarding Plastic Waste Management in Supporting the Achievement of Sustainable Plastic Production and Consumption Patterns in Indonesia. *International Journal of Science and Society*, *4*(1), 1–10. https://doi.org/10.54783/ijsoc.v4i1.410

Setiawan, A. (2021). *Membenahi Tata Kelola Sampah Nasional*. Portal Informasi Indonesia.

Shi, Y., & Ge, J. (2024). The role of government fiscal and tax incentives in green technology innovation and enterprise development: implications for human health and hygiene. *Frontiers in Public Health*, *12*, 1502856. https://doi.org/10.3389/fpubh.2024.1502856

Soares, C. T. de M., Ek, M., Östmark, E., Gällstedt, M., & Karlsson, S. (2022). Recycling of multi-material multilayer plastic packaging: Current trends and future scenarios. *Resources, Conservation and Recycling*, *176*, 105905. https://doi.org/https://doi.org/10.1016/j.resconrec.2021.105905

The World Bank Indonesia. (2021). *Plastic Waste Discharges: FROM RIVERS AND COASTLINES IN INDONESIA.* https://www.worldbank.org/in/country/indonesia/publication/plastic-waste-discharges-from-rivers-and-coastlines-in-indonesia

Wahyuningsih, S., Widiati, B., Melinda, T., & Abdullah, T. (2023). Sosialisasi Pemilahan Sampah Organik dan Non-Organik Serta Pengadaan Tempat Sampah Organik dan Non-Organik . *DEDIKASI SAINTEK Jurnal Pengabdian Masyarakat*, *2*(1 SE-Articles), 7–15. https://doi.org/10.58545/djpm.v2i1.103

Wirawan Setiabudi, A., Margaretha Tarigan, T., & Yudi Prasetyo, C. (2023). Konstruksi Insentif Pajak Terhadap Industri Daur Ulang Plastik Dalam Rangka Penanganan Sampah Plastik di Indonesia. *Prosiding Working Papers Series In Management*, *15*(2), 338–355. https://doi.org/10.25170/wpm.v15i2.5038

Xiang, Q., Jing, Z., Ruwen, T., & Minjiu, Y. (2022). Incentive Regulation of Construction Waste Resource Recycling: Subsidy and Tax Incentive. *Mathematical Problems in Engineering*, *2022*. https://doi.org/10.1155/2022/8333438