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KEY POINTS

- Six potential economic instruments that can reduce plastic pollution in Thailand were studied: taxes on virgin plastics, tax incentives for recycling investment, green public procurement, single-use plastics levies, advanced recycling fees, and deposit-refund systems.
- The economic instruments differ in their effectiveness, efficiency, equity, and enforceability, and can be implemented to create synergistic effects.
- Governments can use economic instruments and regulations to accelerate plastic circularity and address plastic pollution.
- The assessment of the Thai context presented in this brief can offer insights for policymakers in Southeast Asia and beyond when considering implementation of economic instruments.
- The Government of Thailand, under its Plastic Waste Roadmap (2018–2030), is promulgating a legal framework for sustainable management of packaging that will enable the introduction of economic instruments and extended producer responsibility.

How Thailand Can Apply Economic Instruments to Accelerate Plastic Packaging Circularity

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INTRODUCTION

Plastic production in Thailand is an integral part of the petrochemicals sector and contributed to almost 8% of the country's gross domestic product in 2021. Every year, almost 3 million metric tons of mainly virgin plastics are turned into single-use plastics (SUPs). The top three applications that account for 80% of all plastic packaging are monolayer bags (e.g., carrying bags), multilayer pouches (e.g., snack bags), and bottles. This high throughput of plastics coupled with the leakage in waste management systems[1] has resulted in the country being one of the largest sources of marine plastic pollution worldwide. The Thai experience is a classic example of the negative externalities of production and consumption that can be the target of economic instruments.[2]

Notes:
In this report, "$" refers to United States dollars, "A$" to Australian dollars, "£" to British pounds, "¥" to Japanese yen, "B" to Thai baht, and "€" to euros.

ADB recognizes "China" as the People's Republic of China.

[1] WWF Thailand. 2020. *Scaling Up Circular Strategies to Achieve Zero Plastic Waste in Thailand*.
[2] J. Jambeck et al. 2015. Plastic Waste Inputs from Land into the Ocean. *Science*. 347 (6223). pp. 768–771.

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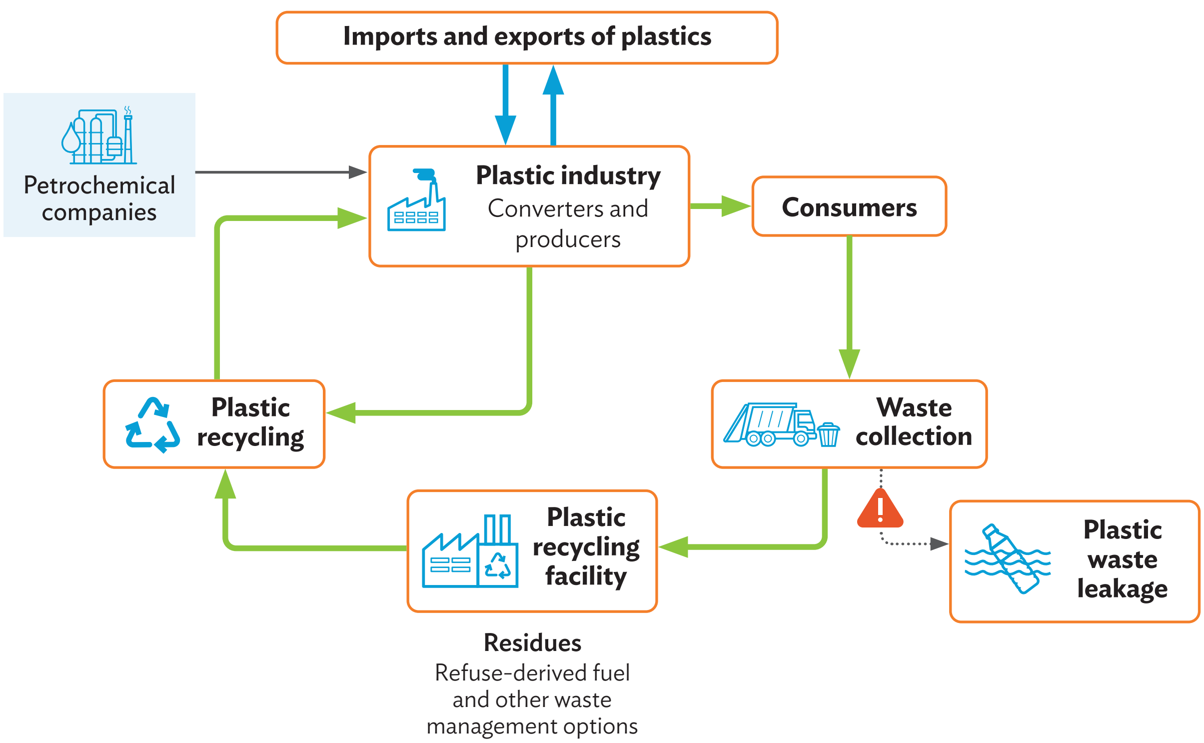
Thailand is working on accelerating plastic circularity as part of efforts to address plastic pollution. Toward this end, the Pollution Control Department (PCD) under the Ministry of Natural Resources and Environment (MONRE) is proposing the draft Sustainable Packaging Management Act. In support of the PCD's efforts toward the identification and implementation of suitable economic instruments to accelerate plastic circularity, the Asian Development Bank (ADB) conducted a study under the regional technical assistance (TA) project Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific.[3] The study aimed to provide insights that could encourage the introduction of appropriate economic instruments to stimulate a circular economy. This brief presents the results of the study with a view to offering market-based economic instruments to address plastic pollution in Thailand.

BACKGROUND

Economic instruments are market-based policy tools designed to influence producer and consumer behavior through the forces of supply and demand to achieve desired outcomes. Unlike command-and-control approaches, which dictate specific actions or outcomes (e.g., banning of certain SUPs or adhering to specific standards), economic instruments allow for flexibility by letting companies and individuals make decisions based on their unique cost structures. This adaptability is key to their effectiveness and efficiency. Market actors can alter their behaviors in response to these economic instruments, which in turn can result in reduction of pollution. Incentives can also be offered for future investment in plastic circularity that can lead to the development of downstream industries, as shown in Figure 1.

Figure 1: Overview of the Plastic Value Chain



Source: Authors.

3 ADB. 2019. Regional: Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific.

MARKET-BASED SOLUTIONS TO THE PLASTIC POLLUTION PROBLEM

In consultation with the PCD, the TA project team shortlisted six economic instruments identified in a previous study[4] for in-depth analysis:

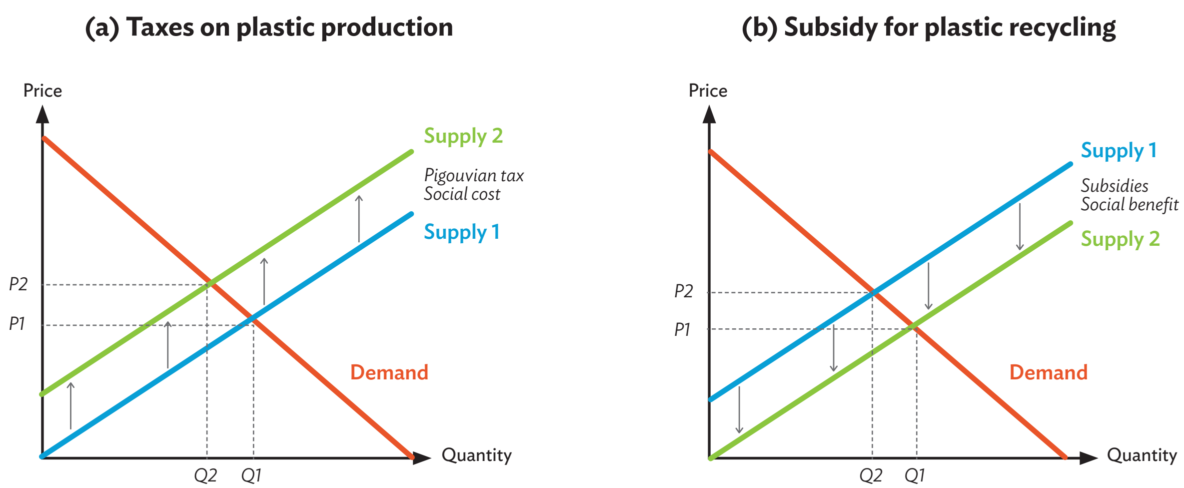
(i) taxes on virgin plastics and exemptions for recycled plastics,
(ii) tax incentives for recycling investments,
(iii) green public procurement (GPP),
(iv) single-use plastic packaging levies and rebates for reusable containers,
(v) advanced recycling fees (ARFs), and
(vi) deposit-refund system (DRS).

Economic instruments offer a market-based approach to address plastic pollution. From an economic point of view, pollution is a negative externality of the existing plastic production and consumption system. Economic instruments can help to internalize this external cost to society. Implementing economic instruments allows the negative environmental cost to society to be borne by the actors of the plastic value chain.

Imposing a Pigouvian tax can be seen as internalizing this negative environmental cost, as demonstrated in Figure 2a. Considering the positive externalities of recycling, the system in Figure 2b is optimized by considering this benefit and providing a subsidy to reduce recycling costs.

Appropriate economic instruments can be applied at different points of the plastic value chain (Box 1). Taxes can be placed on virgin materials, fees can be levied on SUPs, and deposits can be charged on plastic packaging to be refunded upon the return of used containers. Subsidies can be given for recycling. The advantage of economic instruments is that they allow actors in the plastic value chain to determine their own strategy and actions to meet their abatement costs. Some actors may respond to the tax by shifting to substitutes and replacement products, while those with no short-term viable options for such a shift may choose to pay the tax instead of exploring other possible options. With the right policy and regulatory conditions, the revenues from economic instruments can be earmarked for supporting activities that can encourage the shift to plastic circularity.

Figure 2: The Effects of Pigouvian Taxes and Subsidies on Plastic Production and Recycling



Source: Authors.

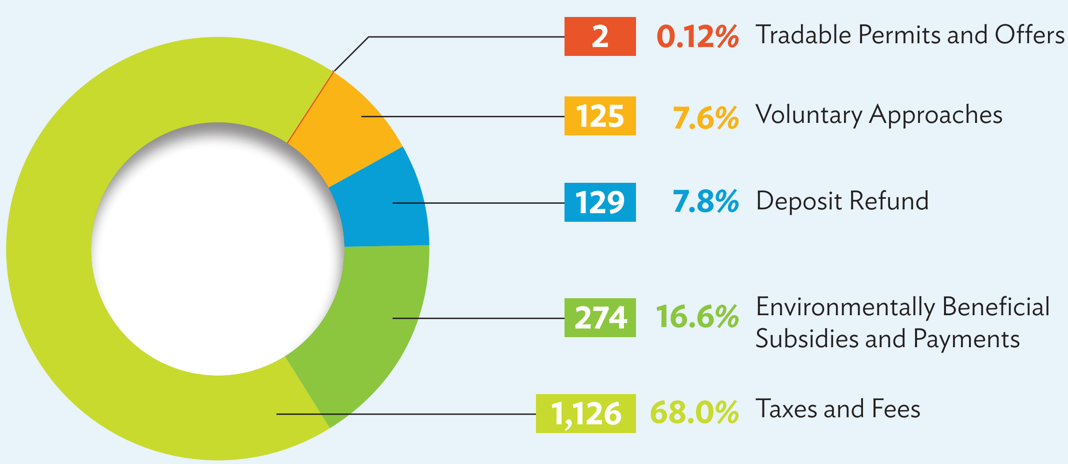
[4] S. Srisawaskraisorn. 2022. *Feasibility Study on Implementing the Economic and Fiscal Measures for the Prevention and Reduction of Plastic Packaging Waste in Thailand*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Box 1: International Experiences with Economic Instruments

A review of the Organisation for Economic Co-operation and Development (OECD) Policy Instruments for the Environment (PINE) Database, which encompasses over 3,900 policy instruments across OECD and select non-OECD countries, revealed that taxes and fees are the most used economic instruments in the policy domains of the circular economy and solid waste management (box figure).[a] This may be because overconsumption is an overarching problem in these domains and should be discouraged with disincentives. Incentives such as subsidies and payments for recycling are provided to a much lesser extent. The various forms of the deposit-refund scheme are a unique policy instrument widely applied in this domain, and it is closely related to solid waste management and the circular economy.

The "latte levy" in Ireland, introduced in 2024 by the country's circular economy bill, is a classic example of taxes and fees aiming to phase out single-use plastics (SUPs). In addition to the €0.20 added on single-use coffee cups, shops are also required to clearly state prices of coffee in reusable cups separately from those of single-use cups. Similarly, Germany plans to introduce a levy on SUPs under the Single-Use Plastics Fund Act. The revenues from the levy will be earmarked to support the costs of public waste management authorities and other public sector entities that carry out activities such as waste management, cleaning, and awareness building. In non-OECD countries, an outright ban is sometimes used to achieve similar behavioral changes, such as the ban on thin plastic bags and other SUPs in Bangladesh,[b] the People's Republic of China,[c] India,[d] and Kenya.[e]

Policy Instruments by Type in Solid Waste and Circular Economy Domains



[a] OECD. Policy Instruments for the Environment (PINE) Database (accessed 10 December 2024).
[b] W.B. Habib. 2022. Cheaper Polythene Bags Spell Disaster for the Environment. *The Daily Star*. 15 June.
[c] Library of Congress. 2021. China: Single-Use Plastic Straw and Bag Ban Takes Effect. 23 March.
[d] I. Ara. 2022. This Is What a Radical Plastic Ban Looks Like. *Time*. 30 June.
[e] United Nations Environment Programme. 2021. Kenya Emerges as Leader in Fight Against Plastic Pollution. 18 February.

Source: OECD. 2024. Policy Instruments for the Environment (PINE) Database (accessed July 2024).

INTRODUCING POLICY INSTRUMENTS IN THAILAND

Like other countries in Southeast Asia, Thailand is striving to increase plastic circularity to help reduce plastic pollution (Box 2). The Sustainable Packaging Management Act proposed by the PCD is guided by the Extended Producer Responsibility (EPR) principle and will provide a legal framework for the government to introduce policy instruments to promote a circular economy throughout the life cycle of plastic packaging. Several economic instruments such as ARFs, environmental damage fees, GPP, and DRS have been mentioned in the early draft versions of the Sustainable Packaging Management Act.

Box 2: National Plans and Voluntary Initiatives on Plastic Circularity in Thailand

Thailand's 20-year National Strategy (2018–2037) contains the vision to turn Thailand into a developed country with security, prosperity, and sustainability, following the Sufficiency Economy Philosophy. Green growth to enhance quality of life was identified as one of the six strategic pathways for industry development under the country's Industry 4.0 initiative, also called Thailand 4.0. It mentions green growth as one of the main engines to power the economy and minimize environmental impacts. The strategy for pollution management is complemented with a vision to create a low-carbon, zero-waste society.

The Action Plan to Drive the Development of Thailand by the Bio-Circular-Green Economy Model (2021–2027), or the BCG Action Plan, was developed to implement the first phase of the 20-year policies. The Plastic Waste Roadmap (2019–2030) sets the timeline to ban selected single-use plastics and packaging materials such as bottle cap seals, shopping bags, Styrofoam boxes, cups, and straws. The road map specifies the recycling targets to be achieved. The Action Plan for Plastic Waste Management, Phase 2 (2023–2027) outlines measures for waste prevention, waste reduction, and waste utilization.

In parallel, the increasing awareness on plastic pollution has led to many initiatives by businesses and authorities to address the problem:

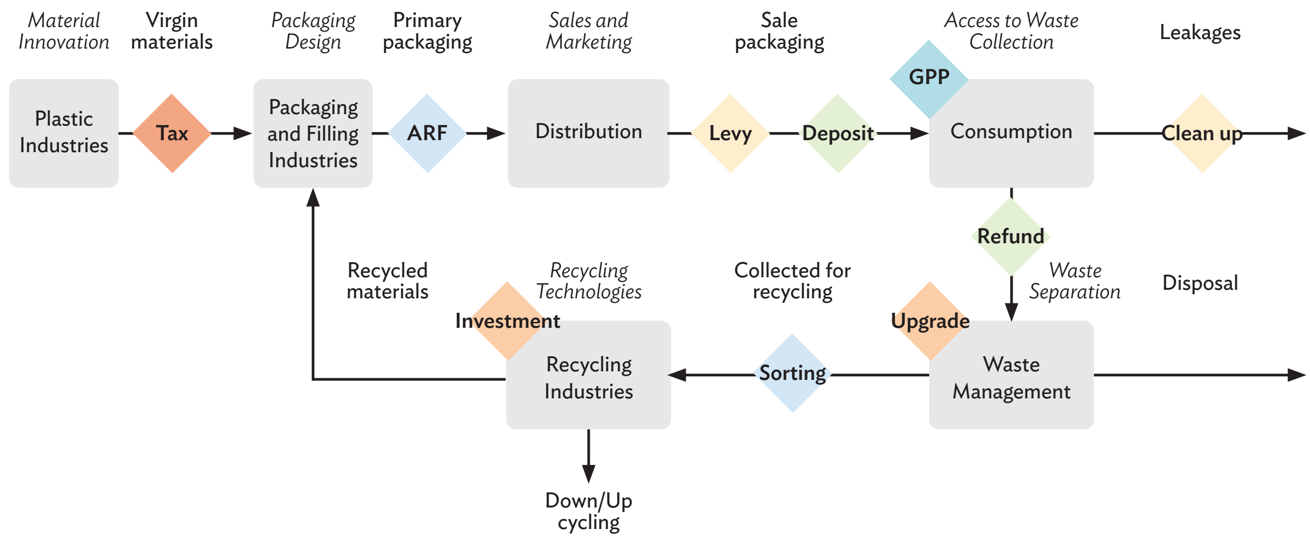
- **PPP Plastics (established 2018).** The Public Private Partnership for Sustainable Plastic and Waste Management or PPP Plastics was formed by the Federation of Thai Industries, Thailand Business Council for Sustainable Development, Alliance to End Plastic Waste, and other leading players in the plastic industry such as PTT Global Chemical, Dow Thailand Group, SCG Chemical, IRPC, HMC Polymers, Indorama Ventures, and BASF. Its first pilot project was established in Rayong Province and now there are plastic collection and recycling operations in several locations, including Bangkok.
- **Voluntary action on plastic bags.** In 2019, Mariam, the orphaned baby dugong, died from an infection exacerbated by bits of plastic lining its stomach. This sad news brought nationwide attention to the plastic pollution problem, which led to a strong movement against plastic bags. Major department stores, supermarkets, wholesalers, retailers, and convenience stores collectively supported the call of the Ministry of Natural Resources and Environment to ditch free plastic shopping bags. The start of the "ban" was set on 1 January 2020. Despite the early enthusiasm that saw a reduction of 3.7 billion bags in the first month of the initiative, the effort gradually lost traction as the coronavirus disease (COVID-19) pandemic forced businesses to go back to offering single-use plastics, as concern for hygiene became critical. Nowadays, retailers offer plain paper or plastic bags for a small fee, while also providing more durable, reusable plastic bags at a higher price for customers who need longer-lasting options.
- **PackBack (established 2020).** This is another initiative of the Federation of Thai Industries, which was operationalized by the Thailand Institute of Packaging and Recycling Management for Sustainable Environment. The initiative was backed by 70 organizations at the 2021 launch and has now expanded to cover many parts of Chonburi Province to test the effectiveness of three collection models: (i) a purchase assistance fee for low-value packaging materials (Category A); (ii) infrastructure support (Category B); and (iii) consumer awareness, education, and media outreach (Category C).
- **PRO-Thailand Network (established 2019).** The Packaging Recovery Organization Thailand Network or PRO-Thailand Network is a prototype of a producer responsibility organization, established by a group of private sector actors to collect, process, recycle, and properly manage plastic packaging waste. It has been working on cost sharing for the implementation of a three-pronged approach similar to PackBack at a national scale. In its official announcement on 28 June 2023, it reported to the public that the initiative had supported the recovery of 25,134 tons of PET bottles, 180 tons of beverage cartons, and 29 tons of multi-layered plastics.

Source: Government of Thailand, Pollution Control Department. 2021. *Thailand's Roadmap on Plastic Waste Management 2018–2030*.

Economic instruments can be applied at various points along the plastic value chain. Figure 3 shows the points of interventions of the six economic instruments that target different actors offering both incentives and disincentives.

The new incentive structure is expected to discourage activities with negative externalities, such as the overconsumption of SUPs and the disposal of mixed waste, while promoting activities with positive externalities; for instance, encouraging reduction, reuse, and recycling of plastics.

Figure 3: Targeted Economic Instruments in the Plastic Value Chain



ARF = advanced recycling fee, GPP = green public procurement.

Source: Authors.

EXAMINATION OF THE ECONOMIC INSTRUMENTS

Taxes on Virgin Plastics and Exemptions for Recycled Plastics

Taxes can be imposed on virgin plastics to internalize the environmental costs associated with plastic production and disposal. This can include the costs associated with plastic pollution, greenhouse gas emissions, and various other environmental impacts. Imposing taxes will increase the price of virgin plastics and can encourage packaging producers and companies providing packaging and filling services to reduce the use of virgin plastics. The increased price of virgin plastics may in turn make substitutes and replacements, including recycled plastics, more attractive.

Many countries in the European Union (EU) and some states in the United States (US) have introduced or proposed taxes on virgin plastics. In Italy, for example, virgin plastics are taxed at €0.45 per kilogram (kg), or about B17.42 per kg.[5] In the United Kingdom, the tax was set initially at £200 per ton (about B8.99/kg) when it first came to effect in 2022, before rising to £210.82 (B9.48/kg) in 2023.[6]

The proposal in the US under the REDUCE Bill is to apply a plastic tax of $0.20 per pound of virgin plastic (estimated at B15.80/kg).[7] Although the tax can be passed on to consumers, the rates as seen in these countries are considerably low and are unlikely to affect most final consumers. The revenues can be earmarked to support circular economy initiatives, as proposed under the REDUCE Bill; however, most of the tax revenues will more likely go to the Treasury and not be used for more targeted efforts to accelerate a circular economy.

This economic instrument can be introduced under Thailand's existing laws. For example, the Revenue Department issued Decree No. 749 under the Revenue Code in 2022 to allow companies purchasing certified biodegradable plastics to get a tax credit of 125% off the purchase. This temporary measure was successful and was renewed to the end of 2024. The Excise Department is now studying the feasibility of imposing excise taxes on plastics. It is expected that the excise tax will be set at a low rate to ease its acceptance. Assuming every kilogram of virgin plastics will be subject to $0.20, which is the lowest rate among the countries that have imposed plastic taxes, this could result in tax revenues of $414 million per year. However, the small price signal might not be enough to create any ripple effects in the value chain and the impacts on plastic pollution is likely to be insignificant.

[5] J. Krahl. 2024. Plastic Tax in Italy July 2026. *Ecosistant*. 29 May.
[6] Government of the United Kingdom. 2021. Plastic Packaging Tax: Steps to Take.
[7] C. Goldsberry. 2021. Proposal Wants to Tax Virgin Plastics to Death. *Plastics Today*. 13 August.

Tax Incentives for Recycling Investments

Tax incentives for recycling investments refer to tax exemptions and tax breaks offered by a government to businesses investing in equipment and infrastructure for recycling operations. The tax savings are designed to draw more capital into the recycling industries. More plastic waste is expected to be diverted to this sector to meet the added capacity. This can increase the supply of recycled plastics and improve their competitiveness in relation to virgin plastics in the longer term.

The benefits of tax incentives can come in many forms. In the Republic of Korea, recycling plants are entitled to several benefits, including soft loans under the Act on the Promotion of Savings and Recycling of Resources (1994, Article 26); tax credit for investments in environmental facilities and equipment under the Customs Act (1998, Article 28-7); and subsidies for research and development from the fund under the Development of and Support for Environmental Technology Act (2001, Article 5).[8] In Indonesia, there is an initiative to provide incentives for recycling by lowering the value-added tax from 10% to 5% for recycling businesses.[9]

In Thailand, the Board of Investment has already offered various levels of exemption from corporate income tax to circular economy businesses (Figure 4). In the future, more benefits can be given to critical technologies such as material recovery facilities, industrial composters, and chemical recycling. The nonpolluting and fit-for-purpose material recovery facilities able to handle relatively clean and dry pre-segregated plastic waste are particularly interesting and can mainstream the recovery of low-value plastic waste. However, there are concerns over the issues of imported scrap and residues from the recycling sector that are being mismanaged and which is said to be turning Thailand into a pollution haven for recycling industries.

Figure 4: Tax Incentives for Circular Economy in Thailand

TAX BENEFIT LEVEL	DESCRIPTION OF TAX BENEFIT	CIRCULAR ECONOMY BUSINESS
A1	8-year CIT exemption (with no cap)	**CIRCULAR ENERGY AND FUELS** • Energy from garbage or refuse derived fuel
A2	8-year CIT exemption	**CIRCULAR ENERGY AND FUELS** • Fuel from agricultural scrap or waste **WASTE AND RECYCLING** • Fuel from agricultural scrap or waste • Waste treatment or disposal • Recycling and reuse of unwanted materials • Recycled plastic pellets as a new resin and products from recycled plastics • Recycled pulp manufacture with R&D activities
A3	5-year CIT exemption	**WASTE AND RECYCLING MANAGEMENT** • Industrial zone for environmental protection
A4	3-year CIT exemption	**PRODUCTS FROM CIRCULAR PROCESS** • Agricultural by-products or waste products • Recycled plastic pellets • Recycled fiber • Products from recycled pulp

CIT = corporate income tax, R&D = research and development.
Source: Government of Thailand, Board of Investment. 2024. *BOI Go Green with the BCG Concept*.

[8] OECD. Policy Instruments for the Environment (PINE) Database.
[9] R. O. Novastria. 2019. A Green Fiscal Policy for Recycling Industry. *The Jakarta Post*. 6 February.

Green Public Procurement

This economic instrument focuses on purchasing environment-friendly goods and services with minimal impact on the environment. GPP includes considering the entire life cycle of a product or service, from the procurement of raw materials to production, energy usage, packaging, transportation, and its use and disposal. GPP is particularly relevant to the plastic packaging industries since it promotes energy- and resource-saving products, low emissions and waste, and the use of recycled or processed raw materials. With this instrument, the government can use its purchasing power to popularize environment-friendly products. Other institutional users may likewise adopt similar procurement policies, creating more demand in the market.

In the EU, public procurement directives have criteria, regulations, and rules concerning GPP that allow public agencies to assess the procurement of environment-friendly goods and services.[10] In Spain, Mutualia, a mutual insurance company that provides workplace accident insurance, health care, and rehabilitation services, implemented corporate-level GPP measures at 17 of its service centers. These measures tackled plastic waste and reduced expenses related to bottled water consumption by installing water fountains. In total, 147,000 plastic cups; 4,000 large plastic water cooler bottles; and 7,000 small plastic bottles were avoided. These resulted in an estimated savings of €17,000 per year on drinking water expenses for patients, employees, and visitors.[11]

In the past, the PCD issued a guideline for GPP and worked with the Comptroller General's Department to promote the practice among government agencies at national and local levels. However, there is still more to be done on plastic packaging, particularly using packaging with recycled content and/or ecolabels. In addition, there is a suggestion that GPP can be adopted by private sector institutions, such as those in the networks of green hotels and offices, to increase economies of scope and effectiveness.

Single-Use Plastic Packaging Levies

Levies on SUPs, such as the "latte levy," are designed to discourage the use of SUPs and promote environment-friendly packaging alternatives. These types of measures can help reduce plastic waste and encourage businesses and consumers to adopt more sustainable packaging solutions. Funds generated from taxation can be used in many ways, such as supporting waste management initiatives, developing recycling infrastructure, conducting educational campaigns, and undertaking research for sustainable alternatives.

In Japan, the government has imposed a mandatory charge on single-use plastic bags since 2020. The levies are between ¥3 and ¥5 ($0.02–$0.03) for each plastic bag, which has reportedly led to an 80% reduction in the use of plastic bags. A study shows that the charge can raise interest in environmental issues and foster pro-environment behavior among certain groups of consumers.[12] In parallel, a rebate can be offered to customers who bring reusable containers, which has already become common practice in Japan. Similarly, departmental and chain stores in Thailand charge for plastic bags, while discounts or points are offered to customers who bring their own reusable bags.

In the future, the Government of Thailand could impose a standardized levy on SUPs under the Sustainable Packaging Management Act. The revenues raised could be allotted for the National Environment Fund to support cleanup projects that remove plastic pollution from the environment. However, it should be considered whether the intervention at the point of sale would be too difficult to enforce, as it is highly likely that micro and small vendors that supply almost 70% of SUPs might not be able to easily offer viable and affordable alternatives to plastics. Despite this, even with this levy collection challenge, the revenues from the levies in the range of B0.7–B1.0 per piece of SUP could be used to prevent and remove a sizeable portion of plastic pollution. As for economic incentives offered directly to consumers, it is important to consider the living conditions and lifestyles in the local context (Box 3).

Box 3: Gender and Plastics

As part of activities delivered under the Asian Development Bank (ADB) regional technical assistance Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific, a survey was conducted among Thai consumers to assess their responses to levies, rebates, and refunds. The questionnaire was designed in accordance with the contingent valuation method. A total of 495 respondents were drawn from different areas in Bangkok, Samut Prakan, Pathum Thani, Nonthaburi, Nakhon Pathom, Chiang Mai, and Chiang Rai during March–May 2024. This represented a near 58% response rate based on the 857 samples of purposive sampling. Out of the total respondents, 299 or about 61% were women.

Based on the survey results, more than 70% of women respondents were responsible for buying groceries and household items and over 60% also handled household waste management, including household-level separation of waste. In comparison, the proportion of male respondents responsible for shopping was only 40% and almost 50% for waste handling. Although the findings show that other factors (such as urban/rural split, income level, and economic class) influenced the willingness to pay or to accept financial disincentives and incentives, the lesson here is that economic instruments should be designed to be gender-sensitive, especially when they are directed at final consumers.

Source: Authors.

[10] EU Monitor. 2014. Directive 2014/24 – Public Procurement.

[11] M. Jones and Rijkswaterstaat. 2021. *Sustainable Public Procurement of Plastics*. Government of the Netherlands, Ministry of Infrastructure and Water Management.

[12] Y. Seo and Y. Kudo. 2022. Charging Plastic Bags: Perceptions from Japan. *PLOS Sustain Transform*. 1 (5). e0000011.

Advanced Recycling Fees

ARFs or EPR fees can be introduced under the draft Sustainable Packaging Management Act. This will constitute a financial obligation where the revenues from ARFs would be managed by a producer responsibility organization (PRO) to finance the collection, transportation, processing, recycling, and disposal of packaging waste. This extended responsibility fee may trigger design changes that reduce the use of packaging, as seen in some industrialized economies. In addition, the earmarked revenues can boost the collection and recycling of targeted materials as well as support cleanup activities.

Taipei,China has implemented an extensive recycling program, called the 4-in-1 Recycling Program, since 1997.[13] Manufacturers and importers of designated products and packaging are obliged to pay ARFs into a government fund. The fund then pays subsidies for the recycling of these materials. The program also supports educational campaigns and the development of innovative recycling technologies and practices. Currently, the program includes 33 items including major packaging materials, such as aluminum, glass, and various metals and plastic containers.

The Federation of Thai Industries is currently testing the mechanisms of a PRO under the Producer Responsibility Organisation Voluntary Effort or PROVE project of the Thailand Institute of Packaging and Recycling Management for Sustainable Environment, which is consolidating existing initiatives: PPP Plastics, PRO-Thailand Network, and Aluminium Loop (Box 2). Member companies contribute financially to the project, which provides support to infrastructure development and purchase assistance subsidies for targeted materials. However, industries need legal backing to gain greater participation from the producers and to prevent free riders so as to create a level playing field.

It is estimated that if ARFs could be charged on various types of plastic packaging at between $0.10/kg and $1/kg depending on their recyclability, the program could raise sufficient funding for the removal of 56,498 tons of plastic litter. The intervention could also make the producers rationalize their use of plastics through dematerialization or switch to other materials resulting in 10% reduction in the volume of plastic packaging put on the market. In addition, this approach can be more accommodating to smaller producers than levying fees at the point of sale since they can be gradually brought into the PRO at a later stage.

Deposit-Refund System

The deposit-refund system (DRS) is an economic instrument designed to use the deposit paid by consumers at the point of sale as an incentive in the form of a refund when they bring packaging back after use for refilling or recycling. Specifically, the DRS leverages the deposit payment for products that contribute to pollution. The deposit is often included in the price of the product. Consumers then receive a refund when they return the product to designated locations after use or after completing the production process. This intervention can increase the collection rate of plastic packaging as seen in the implementation of such systems in other countries.

Israel, for example, has implemented a deposit-refund law that requires a deposit of 0.25 Israeli new shekel on small plastic or glass containers (less than 1.5 liters). This DRS has effectively incentivized recycling, leading to higher rates of bottle returns and reduced littering. The intervention not only encourages the return of used products to the value chain, but it also instills environment-friendly behavior and generates positive economic effects related to environmental conservation. In Perth, Australia, a container deposit program, implemented since October 2020, has consumers paying a nominal deposit for beverage containers during the time of purchase, usually around A$0.10 per container. This deposit is subsequently reimbursed when the containers are returned for recycling. Research indicates a high level of awareness regarding the scheme, as 98% of survey participants were already familiar with the program.

In Thailand, there is a DRS for refillable containers, such as glass bottles, which works because of the value of the reusable packaging. Instituting a similar mechanism for one-way packaging that has significantly lower value will require policy intervention and a new law. However, DRS can be a costly option when considering the operational cost of installing and maintaining the physical infrastructure (e.g., reverse vending machines) to support it. As seen in other countries, there may be limited applications for DRS unless convenience stores and junk shops can be included in the system. Nevertheless, DRS has a unique advantage in that it can have a green income distributional effect as the poor and informal waste pickers can help clean up the environment while receiving unclaimed refunds from the system.

[13] Ministry of Environment, Resource Circulation Administration. 2024. 4-in-1 Recycling Program.

THE "4Es" OF ECONOMIC INSTRUMENTS

The study assessed the six economic instruments in terms of the "4Es" aspects: effectiveness, efficiency, equity, and enforceability. The first three criteria are common within the "3Es" framework for the evaluation of public policies. Effectiveness measures the size of desirable outcomes that the economic instruments deliver, defined in this study as the reduction in plastic pollution. Efficiency measures the ratio between the outputs generated and the resources spent to produce such an outcome. Meanwhile, equity measures the distribution of the impact among stakeholders and society at large.

The fourth E, enforceability, was added to help assess and measure the practicality and complexity of implementing the economic instruments in Thailand. The study evaluated various factors that could influence the feasibility of enforcement, including whether a new legal framework or additional regulatory adjustments would be required before introducing an economic instrument. By examining enforceability, the study aimed to identify potential legal, administrative, and operational challenges that could impact the successful implementation of each instrument. This includes the consideration of enforcement agencies having the resources and capacity to monitor compliance effectively, which is critical for ensuring the instrument achieves its intended outcomes. Figure 5 shows examples of the results for two of the instruments.

Figure 5: Assessment of the Plastic Tax and Advanced Recycling Fee Economic Instruments

Source: Authors.

The assessment shows that the six economic instruments vary in their impacts, as presented in the following table. The most effective and efficient economic instruments—SUP levies and ARFs—are instruments with an ability to raise funds that can be allocated for supporting recycling and cleanup actions. On the other hand, tax on virgin plastics, despite its revenue-raising ability, may not be very efficient as it can only achieve a moderate reduction in plastic pollution for such a broad implication on plastic production. In contrast, tax incentives for recycling investments are more targeted and focus on financing critical components in the recycling industry. These could be for acquiring new technologies and increasing capacity of production, although such incentives may be less accessible for small and medium-sized enterprises. Meanwhile, GPP may have limited effects if implemented just among government agencies. On the other hand, DRS is an instrument that can have a positive social impact benefiting low-income populations and waste pickers, although it is costly to implement and may be applied mainly to plastic bottles.

Table: Results of the Assessment of the Economic Instruments

Economic Instrument	Effectiveness[a]	Efficiency[b]	Equity	Enforcement
1. Tax on virgin plastics and exemption for recycled plastics	Medium	Medium	Medium	Could be implemented under existing laws
2. Tax incentive for recycling investment	Medium	Good	Poor	
3. Green public procurement	Poor	Medium	Medium	
4. Single-use plastic packaging levy and rebate for reusable containers	Good	Good	Poor	Would require a new legal framework
5. Advanced recycling fee	Good	Good	Medium	
6. Deposit-refund system	Poor	Poor	Good	

[a] Measured in terms of estimated reduction of pollution (in tons/year).
[b] Measured by the value of resource allocation required per unit of change (in $/ton).
Source: Authors.

CONCLUSION AND RECOMMENDATIONS

The aim of the study conducted under the TA project Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific is to provide insights that could encourage the introduction of appropriate economic instruments to stimulate a circular economy and reduce plastic waste pollution in Thailand. The study recommended the following phased implementation of the economic instruments:

- **Short-term measures.** Under existing laws, the government, through the Excise Department, could place a tax on virgin plastics. However, the tax alone may not have much effect on the prevention of plastic pollution unless (part of) the revenues can be earmarked to promote material circularity. Further tax incentives could be considered for the contributions to voluntary EPR initiatives by companies that establish a PRO to collect and recycle packaging waste, as well as actions supporting capacity building, communication campaigns, and cleanup actions. Such activities can lead to significant long-term results in preventing plastic pollution.
- **Midterm measures.** The PCD aims to pass the Sustainable Packaging Management Act by 2027. This new law will provide a legal framework to introduce other effective instruments such as SUP levies and ARFs through a mandatory EPR program. Each of these instruments can prevent a significant amount of plastic waste from leaking to the ocean. Their combined effects would be even greater when the revenues collected are channeled to the waste management sector, improving its service coverage, collection, and treatment to achieve greater plastic circularity. By enabling the economic instruments, this new law could also support the implementation of specific recycled content in packaging and design standards to further encourage material circularity.

The Government of Thailand should consider the timing and the synergistic effects of implementing these economic instruments as a blended policy strategy. Development institutions can also support the implementation of market-based policy reform by promoting policy learning through knowledge sharing, capacity building, and evidence-based decision-making. By facilitating dialogue, research studies, and pilot projects, these organizations can assist policymakers in testing the feasibility of economic instruments in local contexts. Capacity-building initiatives strengthen technical skills in economic analysis and policy assessment to ensure that policies are designed effectively. Support from development organizations, such as the assistance from ADB for this project, can lead to informed and appropriate policy reforms.

Like Thailand, other Southeast Asian countries can utilize economic instruments to promote plastic circularity and reduce plastic pollution. For instance, the Philippines and Viet Nam have already enacted EPR laws for plastic packaging, and other countries are working on establishing similar legal frameworks that could enable the implementation of such instruments. This brief demonstrates that economic instruments offer flexibility and can be applied at various stages along the plastic value chain. When thoughtfully designed, these interventions can reinforce each other for a stronger overall impact. For example, taxes on virgin plastics could generate revenue that, when earmarked, subsidizes advancements in plastic recycling infrastructure and technology. This approach not only enhances effectiveness but also illustrates the “double dividend” of green tax reform, which can potentially balance environmental and economic gains.

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