



Applying Market-Based Instruments (MBIs) in Plastic Waste and Electronic Waste (E-Waste) Management in Vietnam

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Abstract

The Market Based Instruments (MBIs) in environmental management are economic instrument-involved policies that have been designed and used to influence cost-benefit in the activities of individual and economic entities. The use of MBIs in environmental management is aimed at (1) Creating the financial incentives to change behavior of manufacturers and consumers, in favour of more environmentally friendly and sustainable consumption and production patterns; and (2) Generating financial resources for national budget and/ or for providing environmental goods/ services.

In Vietnam, about 4 million tons of plastic waste and hundred thousands of electronic waste (e-waste) are generated every year. However, the management of plastic waste and e-waste mostly based on less effective command and control instruments.

This paper attempted to analyze pros and cons of MBIs applying in environmental management; assesse curent status of plastic waste and e-waste generation and management in Vietnam; assesse the advantages, barriers, and gaps in the management policies; proposed two possibilities of MBIs applying in plastic waste and e-waste management in Vietnam, namely: (1) a deposit-refund system to recover materials from PET bottles; and (2) an extended producer responsibility or deposit refund scheme for e-waste disposal at designated facilities.

The two proposal of MBIs applying in plastic waste and e-waste management then be discussed and consulted with experts, enterprises and the communities to evaluate the feasibility and figure out recommendations to complete policies and effectively implementation.

Key words: Market-based instruments, plastic waste and e-waste management, Vietnam



1. Introduction

1.1. Environmental management in general, waste management in particular, involves various approaches and policy instruments, such as:

- Command and Control (CAC) approach and policies involve the use of regulatory instruments such as emission standards, bans and quotas on products and inputs, etc... By CAC approach, decisions are made by regulators and polluters are forced to obey the regulations.
- Market Based policies involve the use of economic instruments/ market-based instruments (MBIs) such as pollution taxes and charges, subsidies, tradable permits, deposit - refund schemes, enforcement incentives. The common element of MBIs is that they operate on a decentralized level through their impact on market signals and trends. By using MBIs, all polluters or resource users are faced with the same price and must choose their degree of control. Thus MBIs provide market and financial incentives (and disincentives) for polluters to change their behaviour.
- Other Policies involve instruments such as Voluntary Agreement, Information and Education, Indirect Policy Levers (or integrated policy).

1.2. In Vietnam and many other countries over the world, the rapid growth of plastics and electronic production and use has generated a number of concerned issues to society and to the environment.

Plastics are a remarkable family of materials that have gathered attention recently due to their ubiquity in the global economy, the low material recovery rates that they currently achieve, and the environmental impacts associated with current disposal methods.

Electronic waste (e-waste) typically includes discarded computer monitors, motherboards, mobile phones and chargers, compact discs, headphones, television sets, air conditioners and refrigerators.

The fast-growing plastic and electronic pollution problems worldwide can severely contaminate the environment and threaten human health. International experience shows that, several instruments have been developed to manage plastic waste and e-waste, especially in developed countries. The key to success in terms of plastic waste and e-waste management is to reduce the production and consumption, properly collect waste, recover and recycle material by safe methods, dispose of waste by suitable techniques, forbid the transfer of used electronic devices, and raise awareness of the impact of plastic waste and e-waste.

1.3. Given the advantages of a latecomer country, Vietnam could learn from other countries' experience in using MBIs as a complement to CAC measures. We hope that MBIs can increase the cost of environmentally damaging goods and services, generate financial resources for preserving the environment, improve the efficiency and cost-effectiveness of environmental management, create financial incentives for investment in better plastic waste and e-waste management systems, facilitating higher waste collection and recycling rates that allow waste electronic and plastics to be captured before they begin creating problems in the natural environment.



2. Research Objectives

- Analyze international and national information on the orientation and policies in relation to the management of plastic and electronic pollution; assess the advantages, barriers, and gaps in these policies in order to aim at integrating mechanisms and management tools based on market mechanism into Vietnam's legal policy;
- Review market-based policy models related to plastic waste and e-waste management in Vietnam and other countries, thereby propose suitable and feasible models in Vietnam;
- Propose the necessary content in developing legal policies based on market mechanism for plastic waste and e-waste management, to promote enterprises and consumers to participate in sound environmental management at production facilities.

3. Research Methods

- Desk review, inherit research results and existing reports on management and disposal of plastic waste and e-waste in Vietnam;
- Review and assess policies on management and investment incentives of plastic waste and e-waste disposal in Vietnam;
- Review and synthesize secondary documents of national and international experiences in plastic waste and e-waste management;
- Survey and consult relevant experts and enterprises about the possibility of MBIs application in order to manage plastic waste and e-waste;
- Consult national management agencies about the status of collection and disposal of plastic waste and e-waste as well as related mechanisms and policies.

4. Research Results

4.1. Literature Review on MBIs Application In The Environmental Management

The Market Based Instruments (MBIs) in environmental management are economic instruments (EIs) related policies that have been designed and used to influence cost-benefit in the activities of individual and economic entities in order to regulate the behavior of these subjects, according to the required goals set by policy-makers (in the direction of environmental benefits).

There are many types of MBIs used in practice such as: environmental taxes/ fees, environmental fund, transferable pollution quotas, environmental deposit, deposit-refund systems, environmental subsidies, and other financial mechanisms.

The use of MBIs in environmental management is aimed at two main purposes:

- (1) Creating the financial incentives to change behavior of manufacturers and consumers, in favour of more environmentally friendly and sustainable consumption and production patterns; and
- (2) Generating financial resources for national budget and/ or for providing environmental goods/ services.

MBIs usually involve in:

- Financial flows between polluters and the community (e.g. taxes, fees, subsidies, and deposit, etc.); or



- Creating new markets (e.g. market for emission permits).

Thanks to the flexibility in deployment, operation on the basis of utilizing the power of market economy rules, implementation of *Polluter Pays Principle* (PPP) and *Beneficiary Pays Principle* (BPP), MBIs are capable of overcoming market failures, creating high efficiency in behavior change, and encouraging the dynamics and self-consciousness of polluters.

MBIs have been applied in many countries, targeted at promoting activities carried out in a sustainable way by the private sector, based on financial sources made available by the establishment and enforcement of proper regulations, to pursue an environmental objective.

Box 1: Reasons for a Growing Reliance on MBIs in Environmental Management

- ❖ Limited performance of direct regulations (eg, CAC instruments);
- ❖ The move toward “deregulation” or regulatory reform in various areas of public intervention;
- ❖ The search for economically more efficient policy instruments;
- ❖ The search for revenue either for the general government budget or financing specific environmental programs;
- ❖ The need for an effective “integration” between economic and environmental policies;
- ❖ MBIs are an essential condition for a sustainable development, especially related to fairness and inter-generational issues, due to Polluter Pays Principle (PPP): it is commonly accepted practice that those who produce pollution should bear the costs of managing it to prevent damage to the environment; and Beneficiary Pays Principle (BPP): users who benefit from the environment have to pay costs.

Many MBIs have been using over the world to tackle the waste management problems, such as belows:

- **Environmental Taxes:** Environmental taxes will increase the price of selected goods and services, leading to the change in the behavior of producers and consumers (the increase in price leads to reduce consumption that will decrease pollutant emissions) and increase in revenue.

Some examples related to plastic waste and e-waste management:

- Emission taxes/ charges;
- Low tax on products using inputs from recycled materials;
- Tax on plastic container. Revenue from tax can be used to encourage the use of alternative materials which are environmental friendly.
- **Product Fees/ Charges:** Product fees and charges can be levied on the products with potential negative environmental impacts. The revenue generated through such levies, taxes, and charges can be used to develop facilities for recycling, material recovery facilities for wastes generated out of such products.



- ***Deposit- Refund System:*** Deposit refund system requires payment of a deposit at the time of purchase of potentially polluting products (e.g. batteries, plastic bottles, cans). The deposit is refunded if the waste generated after the use of the product is collected for reuse (e.g. glass bottles), or recycling/ material recovery (e.g. PET bottles), or safe disposal (including material and energy recovery) at the designated facilities. Electronic products and household electrical appliances are products with sources of persistent organic pollutants (POPs) emissions that have potential to apply deposit – refund system.
- ***Charges for Collection and Treatment of Wastes***
Typical examples in this field as: Collection of spent PET bottles, spent electronic products and household electrical appliances and recovery of materials after use. Charges may be paid by the producers under extended product obligation; Collection and treatment of Municipal Solid Waste for producing compost. Charges paid by Municipalities/ large waste generators.
- ***Extended Producer Responsibility:*** The producer is responsible for collecting back products at the end of its life and disposing it in a safe manner either with or without the recovery of material for recycling. Typical examples of such products include electronic products, batteries, used packaging material, tires, etc. The producer may provide the cost of recycling/ disposal of waste in the price of the product being sold.
- ***Emissions Trading:*** This instrument requires setting the limits on the extent of pollutants which can be emitted. For any variation in the emissions levels, penalties can be imposed or different operators may trade the emission allowances among themselves.
- ***Circular Economy:*** The concept of circular economy is defined as a regenerative system in which resource input and waste generation, emissions, and energy leakage are minimized by slowing, closing, narrowing material, and energy loops. The concept of circular economy can be effectively used as a market-based policy by combining it with the concept of sustainability and environmental labeling (e.g. green power, green buildings, green products, etc.), along with purchase obligation imposed by the ways of regulations. One of the other ways to promote circular economy could be product standards, where in the permissible levels of resource inputs for given product/ service is specified. Over a period of time such standards can be improved upon to achieve higher level of recycling/ circulation.
- ***Recovery of Material and Energy out of Waste:*** Some types of waste are financially lucrative enough due to recovery of material/ energy out of them. Typical examples are recovery of copper out of the waste electrical wires; recovery of aluminum from scrap; recovery of lead out of spent lead acid batteries; recovery of plastic from injection molded plastic goods; recovery of precious metals (gold, platinum, etc.) and rare earth from waste electrical and electronic equipment (WEEE) or catalysts. However, regulations are still required to ensure the use of environmentally sound practices in the processes and technologies being used.
- ***Industrial Closed Systems:*** Policy makers can elaborate incentives to promote the development of industrial parks based on industrial symbiosis with a circular approach to production. The main principle is that a residue from one company becomes a resource at another, benefiting both the environment and the economy. Companies and municipal services within an industrial



park are connected with each other where the waste produced in one facility can be the resource for the others. The symbiosis creates the growth in the local area and supports the Corporate Social Responsibility of businesses and the climate change mitigation.

From the international experiences in applying MBIs, some statements can be given as follow:

- The MBIs or market-based policy measures have been applied in many countries around the world which are targeted at promoting activities carried out in a sustainable way by the private sector, based on a financial source made available by the establishment and enforcement of proper regulation, to pursue an environmental objective. However, in some cases, economic/financial resources may already exist such as recovery of materials, energy, and manure, but may not be sufficient to sustain at its own. In such cases, additional financial source as collection fees for the wastes needs to be made available by specific regulatory and policy measures.
- MBIs are expected to encourage change of behavior and perspective, or it can create an opportunity to increase revenue for an operator or a combination of the two. In case of an incentive effect, MBIs make the individual and/or firms choosing a less-polluting good, service or activity. MBIs can also provide a disincentive (by increasing the effective cost of good or service) towards the use of the goods and services or practices. Such disincentives are typically levied in the form of taxes and user charges. However, even in cases where the price goes up, there may not be an immediate behavior change, as there might not be adequate alternatives or substitutes or the ability to reduce consumption, especially essential goods. Thus, along with the introduction of this kind of measures, it is important to create the conducive conditions and facilities for the alternatives.

The application of MBIs always requires legal and policy measures, measurement, reporting, and verification (MRV) requirements to support the implementation.

- Many MBIs are being used in the world for the management of different types of wastes with the reduction in the emissions/ release of POPs as the co-benefit. While, presently many of the MBIs policies are being targeted at correct disposal of different types of wastes, there could be innovative uses of some MBIs that can aim at the reduction in the emission of plastic waste and e-waste as well.

It can be said that the use of MBIs to manage plastic waste and e-waste is a complex issue that many countries have to face with and needs to be addressed. Moreover, the monitoring and enforcement of this mechanism in POPs and Mercury management also face with difficulties while implementing. Therefore, the application of MBIs and measures to manage POPs and mercury emissions will basically require priority regulations as well as incentive policies to facilitate the participation of private sector.

4.2.The Status of Plastic Waste and E-Waste Generation and Management In Vietnam

In Vietnam, up to now, there are about 2,000 plastic enterprises in nationwide, mostly small medium enterprises (SMEs), and private enterprises (accounted for 90%). With a number of businesses and diverse product categories, the country's plastic production reached to 2,3 million tons in 2008. With the average growth rate of 15%/ year, currently about 4 million tons of plastic



are produced yearly. In particular, packaging plastic products (including plastic bags, plastic bottles, goods packaging, etc.) accounted for about 36%; plastic materials for construction, household appliances, and other types of different industries such as electronics, electricity, and transportation accounted for about 16%, 36%, and 12%, respectively.

Plastic waste is usually discarded with different types of organic and inorganic wastes which are not classified separately, thus causing many difficulties for authorities to handle and manage this type of waste. The Government has imposed environmental protection tax on plastic bags to improve and limit the use of non-biodegradable materials for producing plastic bags, however no specific regulation and policy is stipulated for PET bottles. Besides, the environmental protection taxes will be added to the budget line to balance national expenditure goals, not directly support production facilities of environmentally friendly plastic products, hence there is no motivation in direction change of production from businesses.

In recent years, the demand of electrical and electronic equipment (EEE) tends to increase with the economic growth and the improvement of people's living standards. In addition, the competitive pricing strategy of EEE and changes in design, type, and function that create the great demand in changing EEE. These causes lead to the generation of a large amount of EEE at a rapid rate.

Waste from Electrical and Electronic Equipment (WEEE) is a group of specific waste generated mainly from families and offices including broken equipment and appliances which are no longer recoverable or not used due to old-fashioned technology. WEEE is considered as hazardous waste stream with a relatively large growth rate, discharged with many toxic substances and compounds such as POPs, concurrently, there are also many kinds of precious metals that can be recovered.

Table 1: E-waste in Vietnam

Types	Quantity (Units)	Collection (%)	Removing (%)	Repair / refurbishment (%)	Recycling (%)	Disposal (%)
Televisions	364,684	100%	<20%	>80%	>8.5%	<5.5%
Computers	131,536	100%	<20%	>80%	>10%	<10%
Mobile phones	505,268	100%	>30%	<70%	<10%	>20%
Fridges	230,856	100%	<20%	>80%	>15%	<3%
Air conditioners	49,782	100%	<20%	>80%	>15%	<3%
Washing machines	327,649	100%	<10%	>90%	<10%	<5%

Source: International Finance Corporation (2010).

The recovery, dismantling, and disposal of WEEE are taking place in 30 craft villages out of 90 recycling villages from the Northern Vietnam where collection facilities are mainly private sector. At those villages, e-waste is dismantled, sort manually into resale materials such as



plastic, iron, and steel, copper, and aluminum; and separated valuable metals from complex compounds of WEEE by workers working at no or with a low level of protective equipment, outdated technology.

This method leads to the process of releasing hazardous waste in many ways, from the air such as mercury vapor, PBDE, PBDD to solid waste as lead glass, electrical components containing cadmium, selenium, chromium, and lead. One of the most dangerous activities is open burying to recover metal from electronic circuit boards, PUBs; burning PVC wires and cables to recover copper and pyrometallurgy/ hydrometallurgy to obtain gold and other precious metals, etc.

Table 2: Inventory of PBDE by Stages of the Life Cycle in Six Types of Electronic Devices in Vietnam

Unit: tons PBDE

Stage of life	Televisions	Computers	Mobile Phones	Refrigerators	Air conditioners	Washing machines	Total
Used	83.60	6.91	0.03	4.61	0.22	2.32	63.4
Produced	71.70	2.55	0.00	3.61	0.13	1.62	51.7
Imported	26.30	6.01	0.03	2.03	0.25	0.78	22.9
Exported	14.30	1.67	0.01	1.03	0.16	0.08	11.2
Discarded	8.45	1.53	0.005	1.08	0.04	0.82	7.74

Source: 10-year Report of Implementing Stockholm Convention on Persistent Organic Pollutants in Vietnam 2005-2015

In Vietnam, a large amount of EEE is being collected and recycled at informal facilities, not complying with state regulations. Therefore, it is difficult to estimate, monitor, and record how much e-waste is transported to and processed at craft village in Vietnam.

4.3. Regulations and Policies on MBIs in Plastic and E-Waste Management in Vietnam

The disposal of plastic and e-waste has been entitled to the following incentives:

- Directive No 25/ CT-TTg dated August 31st, 2016 of the Prime Minister about the several urgent mandates and solutions of environmental protection. In the content of capacity building in state management and resource mobilization for environmental protection, the Prime Minister requested the Ministry of Planning and Investment to consult and allocate investment capital for projects of hazardous waste treatment in the medium and long-term public investment plans.
- Decree No 19/2015/NĐ-CP dated February 14th, 2015, regulating a number of articles in Law on Environmental Protection 2014. Among the contents guided in this Decree are incentives and assistances for environmental protection activities as regulated in Article 42: Incentives for investment capital.



1. *Incentives from the Vietnam Environment Protection Fund*, the local environmental protection fund or other credit institutions: The project owners carrying out activities specified in Annex III of this Decree..... shall be entitled to loan at preferential interest rate no more than 50% of state interest rate of investment credit announced by the competent authorities at the time of lending; the total loan shall not exceed 70% of the total construction investment; entitled to prioritized assistance after investment or loan guarantee.
 2. *Incentive from Vietnam Development Bank*: The project owners carrying out activities specified in Annex III of this Decree shall be entitled to preferential investment credit like the projects on the list of investment credit loan under the current regulations of law.
- Decision No 66/2014/QĐ-TTg of the Prime Minister, dated November 25th, 2014 approving the list of high technologies prioritized for development investment and the list of hi-tech products eligible for development promotion. This is an opportunity for projects of plastic and e-waste recycling and reuse based on modern technology to access the State's preferential loans.
 - Circular No 212/2015/TT-BTC of the Minister of Finance provided guidelines of the corporate income tax policies for environmental protection activities and provisions on corporate income tax incentives when implementing solid waste treatment, producing environmentally friendly products with Vietnam Green Label attached by the Ministry of Natural Resource and Environment (MONRE); products from recycling and waste treatment activities certified by competent authorities.
 - In addition to incentives of loan capital for businesses, Circular No 212/2015/TT-BTC also provided specific guidelines on tax incentives including corporate income tax, preferential rates on taxation, and tax exemption for projects in construction of technical infrastructure for environmental protection in industrial parks and craft villages.
 - Circular No 121/2008/TT-BTC "Guidelines on incentive mechanisms and financial supports for investment activities in solid waste management" stipulates conditions of individuals and organizations enjoying incentives and assistance from the process of collection, transportation to solid waste treatment, including incentives of import taxes, corporate income taxes, and preferential policies from state budget sources.

Preferential policies and financial support are incentives of land use fee, land rent, and cost of site clearance. Besides, enterprises are also supported in investment by state budget, official development assistance (ODA) and preferential credit sources according to the forms of investment loans, interest rate support after investment, credit guarantee from Vietnam Development Bank, Vietnam Environment Protection Fund, or the provincial Environmental Protection Fund (if any).

- Resolution No 24-NQ/TW dated June 3rd, 2013 of the 7th Conference of the Central Committee of the Communist Party of Vietnam on "actively responding to climate change, strengthening the natural resource management and environmental protection" identified "Developing



environment economics based on environmental industry, environmental protection services and waste recycling. Promoting socialization of environmental protection activities...”

- Decision No 1393/QĐ-TTg issued on September 25th 2012 approving national strategy on green growth. Among the 17 solutions outlined in the Strategy to promote sustainable consumption and develop green lifestyle including: using economic and technical instruments to encourage enterprises to use resource-saving and limit the waste of energy and natural resources; developing certification and eco-green labeling system for green products; applying some economic instruments such as excise taxes, tax and environmental fees to adjust the irrational consumer behavior, first of all for the products that are harmful to health, culture, and environment.
- Decision No 1492/QĐ-BTNMT (August 13th, 2010) of the Ministry of Natural Resources and Environment decided on the establishment of Vietnam Green Label Program Consulting Council. The Council’s tasks are to approve and propose to the Ministry of Natural Resources and Environment for approval such as: The list of product and service groups is the subject participated in Eco-Label Programme, Vietnam Green Label Criteria for groups of products and services.
- Decision No 1493/QĐ-BTNMT (October 12th, 2010) of the Ministry of Natural Resource and Environment prescribed the order and procedures for the certification and the pilot issuance of “Vietnam Green Label” to eco-friendly products and services.
- Law on Environmental Protection Taxation (LEPT), No 57/2010/QH12 (November 15th, 2010) provided taxable subject, non-taxable subject, taxpayers, tax base, tax declaration, tax calculation, tax payment, and environmental protection tax refund. Taxable subject includes 8 groups of goods: gasoline, oil, grease, coal, HCFCs, plastic bag, restricted-use herbicides, restricted-use pesticides, restricted-use forest product preservative, restricted-use warehouse disinfectants.

4.4. Impacts of Preferential Policies Related to Finance in the Management of Environmental Protection Activities

It can be seen that in Vietnam, the policy and law on environmental protection taxation are applied by the State, expressing the view of tax use to regulate the polluting goods or behaviours, thereby to reduce the amount of pollutants released into the environment. This contributes to change social perception of environment and promote sustainable economic development, according to the global development trends.

However, from the perspective of society and enterprises, it is quite unclear about the role of tax policy in environmental protection, although aiming at this goal, the understanding and implementation of social community have not been thorough yet.

The financial incentives for disposal of plastic and e-waste have not been clearly specified in the Decrees and Circulars of the Ministry of Finance.

The incentives and loan activities of the Vietnam Environment Protection Fund (VEPF) for enterprises have been expanded and opened more, compared to several years ago. However,



approaching to such resources is still difficult due to tight conditions as well as the time for the appraisal of financial documents and disbursement usually takes longer than commercial loans. Besides, loans from the VEPF require relatively large value of collateral. Hence, investment in loans for environmental projects in general and plastic and e-waste treatment projects in particular from enterprises is still at low level.

Corporate tax exemption/ preferential policies are not implemented consistently with localities, and administrative procedures are complicated and time-wasting that cause many difficulties for businesses. Accordingly, it is necessary to increase the resources for developing environmental services such as waste collection, transportation, and treatment, especially corporate tax incentives. In order to facilitate for business to approach such incentives, the mechanisms of incentives, promotion, and competition need to continue to improve effectively.

Activities related to green consumption have been formed with the appearance of some products labeled Green Label, Eco-Label, environmentally friendly Label. Despite of that, these policies have not been effective due to no specific support for businesses and related activities are small, lack of synchronization.

Although the Prime Minister' Decision No 16/2015/QĐ-TTg (May 22nd, 2015) provided regulations on collection and treatment of discarded products including WEEE and Circular No 34/2017/TT-BTNMT of the Ministry of Natural Resources and Environment stipulated detailed provisions of Decision No16/2015/QĐ-TTg on the responsibilities of producers, consumers, organizations, and stakeholders for recovery and disposal of discarded products, in fact, the collection and disposal activities are at small level, inconsistent, and do not meet the environmental standards due to lack of an appropriate management system and preferential mechanism, that's why this waste stream is still not under the control of state management agencies. To formalize guideline documents, "deposit- refund system" or "extended producer responsibility" mechanism is necessary to promote development of collection points, treatment and recycling facilities in a responsible and effective way from private sector.

4.5. Assessing the Possibility of Market-based Instruments for Plastic Waste and E-waste Management

To select market-based policy instruments in plastic and e-waste management, six basic criteria for selecting environmental management instruments were reviewed and considered to: (1) Ensure the environmental efficiency; (2) Ensure the economic efficiency; (3) Ensure the equality; (4) Ensure the flexibility; (5) Ensure the management feasibility; (6) Ensure the acceptability. Practical experience shows that it is impossible to select an instrument that satisfies all the above criteria at the highest level. Therefore, in each case, there should have comparison, consideration to make decision, and steps to be implemented according to specific conditions and circumstances.

Based on international and practical experience in Vietnam, 2 possibilities have been proposed to apply market-based mechanism (*with relevant conditions*) in the management of plastic and e-waste as described in Table 3.

Table 3: Possibilities to Apply MBIs and Related Conditions/ Requirements



No	Possibility Description	Conditions/ requirements
1	Private sector facilities for recovery of materials out of PET bottles. For this a tipping fee may be imposed on bottles. This tipping fee would be collected upfront from the seller / buyer of a contents packed in a PET bottle and deposited in an account managed by an independent agency. Once a type is brought to a designated material recovery facility a part of the tipping fee would be refunded to the person who brings the empty PET bottles and balance will be utilized by the material recovery facility to part meet the cost of operations. The recovered PET chips can be used for making fibers, ropes, strappings etc.	Set up a deposit-refund mechanism and determine effective deposit rates
2	Processing of electronic waste at the designated processing facilities using either the extended producer responsibility or under a deposit refund scheme	Requirements/ standards for e-waste management Encouragement/ extended producer responsibility mechanism Set up a deposit-refund mechanism and determine effective deposit rates

Source: Authors' proposal

In short, two market-based possibilities in waste management to reduce plastic and e-waste were proposed:

Possibility No 1: Apply a deposit-refund system to recover materials from PET bottles.

Possibility No 2: Apply extended producer responsibility or deposit refund scheme for e-waste disposal at designated facilities.

The consultant team then used the “Scorecard” method to mark and assess the feasibility of the 2 possibilities with 7 criteria given on the scale of 0 to 5 (5 for high relevance and 0 for not relevance). The list of 7 evaluation criteria is given as shown in Table 4.

Table 4. Criteria to Evaluate the Feasibility of MBIs Possibilities

No	Evaluation Criteria
1	Potential size of the market for private sector operators
2	Scale of environmental problem (now and future) due to the waste being targeted
3	Implementation capacity in the view of existing legislative and regulatory framework
4	Environmental benefits when implementing each possibility
5	Perceived reduction in the emission of plastic and e-waste
6	Perception regarding initiative being in line with Government policies

7	Acceptability of the concept by the stakeholders
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Source: Authors' proposal

The national and international consultant team have discussed, on that basis, agreed to give points according to each criterion and possibility. Result in evaluation and selection following the Scorecard method is shown in Table 5.

Table 5: Result in Evaluation and Selection of Each Possibility from Consultant Team

No	Possibility	Scores for Evaluation Criteria (Min = 0; Max = 5)							Total
		EC 1	EC 2	EC 3	EC 4	EC 5	EC 6	EC 7	
1	Apply a deposit-refund system to recover materials from PET bottles	4	5	4	4	3	4	4	28
2	Apply extended producer responsibility or deposit refund scheme for e-waste disposal at designated facilities	4	4	2	4	4	2	4	24

Source: Result in the discussion and evaluation of consultant teams

The evaluation and selection of market-based initiatives from national experts

In order to ensure the objectivity and expectedly receive comments and contribution from stakeholders during the process of research and assessment, Scorecards were one more time sent to 12 groups of environmental and economic experts in the Ministry of Industry and Trade, the Ministry of Construction, and the Ministry of Natural Resources and Environment to consult on the feasibility as well as criteria to select market-based initiatives with the aim at reducing plastic and e-waste in Vietnam. There were 7 groups of experts sent Scorecard and feedback back. Result of consultation and evaluation is summarized in Table 6.

Table 6: Result in Evaluation and Selection of Each Possibility from National Experts

No	Possibility	Scores by National Experts (Min = 0; Max = 5*7)							Total
		NE 1	NE 2	NE 3	NE 4	NE 5	NE 6	NE 7	
1	Apply a deposit-refund system to recover materials from PET bottles	26	27	32	27	29	28	31	200
2	Apply extended producer responsibility or deposit refund scheme for e-waste disposal at designated facilities	29	23	23	16	29	28	28	176

Source: Result in the discussion and evaluation of national experts



Result from Table 4 illustrates that the 2 market-based initiatives are highly appreciated by national experts with the score of 200/245 (81%) and 176/245 (71%), respectively

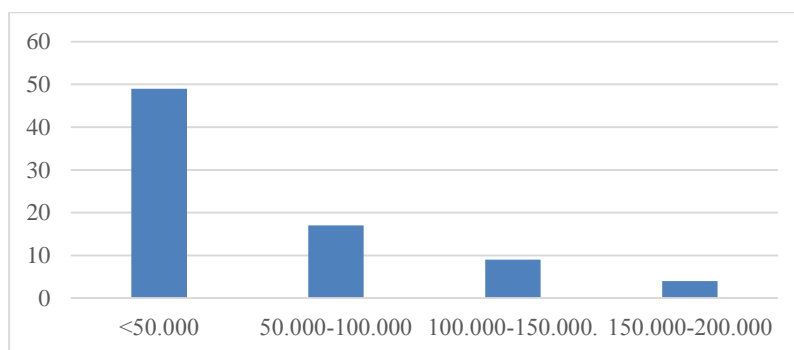
4.6. Survey Result of Consumers and Enterprises on The Possibility of Applying Deposit-Refund Mechanism and Green Label

In order to assess the acceptability of stakeholders, the research team conducted a consumer and enterprise survey about the possibility of applying deposit-refund mechanism and green label.

Consumer survey was designed online using Microsoft Forms tool. The result collected from 110 responses, including 32% of men and 68% of women. The average age of respondents is 32 years old and education level is undergraduate. Survey result shown that 90% of respondents agreed that the generation of plastic and electronic waste is a critical problem and waste treatment should be managed appropriately to minimize the negative impacts on environment. In term of applying MBIs in managing and reducing domestic waste, the percentage of respondents supported the application was 75%. Particularly, as for figure of those who support the application of a deposit-refund in plastic bottles collection, it was 78%. Respondents accepted producers to increase product prices in order to implement the collection and disposal of discarded products accounted for 43%; and the maximum acceptable price is estimated at VND 63,000. Figure 2 illustrates a bar-chart of people who accept the increase in price level, of which 49 respondents concurred the maximum price increase at VND 50,000. Surprisingly, price increase in the range from VND 150,000 to VND 200,000 was accepted by only 4 respondents. This result is consistent with the law of demand as the prices tend to rise- there is a decrease in supply.

According to the data provided, the percentage of respondents having knowledge of eco-label types in the market was 18% and 12% of respondents understand about Vietnam Green Label (certified by the MONRE). For the application of green labels, 52% of respondents always prioritize the selection of products with green label certification when purchasing goods. Survey result also denotes that due to lack of information of green labels, Vietnamese consumers have not really given high priority to certified green products.

Figure 1. Number of People Accepting the Increase in Price Levels



Source: Survey's results

Field survey at enterprises: the research team also conducted a field survey at 86 enterprises located in Hanoi, Hochiminh, Bac Ninh and Dong Nai Province. Out of 86 enterprises, 67 enterprises (78%) are operating units in the industrial production sectors, and the remaining



enterprises are operating in construction and management of industrial parks. Most businesses surveyed have to implement environmental protection activities, for example, 87% of enterprises completed Environmental Impact Assessment (EIA) report, 70% of enterprises having waste treatment systems, 100% of companies signed solid waste treatment contracts with collection units.

Survey result on the costs of investment and waste treatment shows that the investment rate on environmental pollution accounted for about 8,5% of the total corporate capital investment and annual waste treatment costs accounted for about 4,9% of annual business expenses. The highest rate of investment in environmental protection is about 25% of total capital investment belonging to chemical and tanning manufacturers.

For Vietnam Green Label instrument, 61% of enterprises having knowledge of Vietnam Green Label certified by the Ministry of Natural Resources and Environment. To assess the possibility of business acceptance of green label, businesses are requested to answer the following questions: *“The possibility of enterprises to make investment in order to meet criteria of Green Label for products: (Cross X in the corresponding box)”*.

Too low	Low	Neutral	High	Very high
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

The survey result has an average score of 2.9, equivalent to level 3 (Neutral); 22% of enterprises surveyed said that they will likely make investment in products to meet Vietnam Green Label Standards, while the percentage of those assessed Green Label is not appropriate in Vietnam market, was 25%, and the 53% of the remaining enterprises had assessment at neutral level. Based on this survey result, it is clear to know that they will need more information to determined whether investment in Vietnam Green Label or not.

5. Conclusion and Recommendations

5.1. MBIs influence the cost and benefit to change the behaviour of market actors managed, thereby promoting activities implemented in a sustainable way by the private sector towards environmental goals. In Vietnam currently, there are not enough regulations and priorities on policies to use MBIs for sound plastic and e-waste management. The effectiveness of government spending tasks on environmental protection for plastic and e-waste management in some localities has not satisfied the environmental protection requirements. The environmental protection tax rate is not really reasonable, not enough financial resources to promote green production and green consumption. There has not been a thorough implementation of the deposit-refund system or environmental insurance in areas needed to apply, such as in industrial production.

5.2. Some advantages of MBIs application in the environmental management and plastic and e-waste management in Vietnam, includes:



- Views and guidelines of the Government;
- The transition to market economy has the adjustment of the State;
- Public administration reform;
- The growth in awareness of community and enterprises;
- The advantages of the latter, learning from international experiences.

5.3. Besides, some limitations and challenges need to be settled, including:

- Legal regulations are incomplete and unspecific in the direction of applying MBIs;
- The documents of professional guidance are incomplete and inconsistent;
- Lack of experiences from functional authorities, lack of data as a basis for planning MBI policy;
- Lack of capacity to manage, supervise, and handle polluters – which is necessary conditions when applying MBIs;
- Lack of proper assignment and coordination among functional agencies;
- Have not grasped and promptly taken advantage of actual opportunities;
- A large number of economic entities are still unfamiliar, lack of understanding of the importance in plastic and e-waste management and MBI's role.

5.4. A number of MBIs mechanisms can be applied in Vietnam to reduce the risk of plastic and e-waste in the future:

- Deposit-refund system to collect PET plastic bottles. The fee may be imposed on bottles, that would be collected upfront from the seller/ buyer of a contents packed in a PET bottle and deposited in an account managed by an independent agency. A part of the fee would be refund to the person who brings the empty bottles and the balance will be utilized by material recovery facility to cover the operation cost. The recovered PET chips can be used for making fibers, ropes, strappings, etc.
- Applying extended producer responsibility or deposit-refund scheme to promote e-waste collection and treatment at designated facilities (ensure environmental standards).

5.5. Recommendations to Complete Policies

In order to properly treat and dispose of plastic and e-waste, and bring the benefit of public health, environment, and the economy, it is necessary to establish a market-based system/ mechanism in which discarded products are managed in an environmentally sound manner.

- Propose the provisions to use MBIs into Laws, Decrees on plastic and e-waste pollution management as soon as possible, in order to facilitate businesses to reinvest in models, projects for the waste control and treatment at production facilities;
- Enhance the efficiency of government budget spending for plastic and e-waste management from budget sources of environmental protection. The State budget spending policy for environmental protection only comes into effective when the process of implementing budget spending tasks complies with legal regulations and meets practical requirements in each locality and nationwide;
- Carry out the inventory, calculation, and assessment on pollution levels of products containing hazardous imposed environmental protection in order to develop appropriate tariffs for each



product to ensure environmental protection taxes corresponding to the pollution level of products.

- Improve deposit-refund system and environmental insurance for plastic and e-waste which are appropriate mechanisms to bind the producer responsibility for environmental protection. In order to enhance the producer responsibility and ensure timely financial resources to overcome the consequences of environmental pollution, environmental deposit should also be implemented for projects in high-risk list of environmental pollution.

5.6. In order to effectively implement the application of MBIs in environmental management in general, plastic and e-waste management in particular, the following issues should be noted:

- MBIs should not be considered as a way to get “pollution certificate” that means focus only on the purpose of revenue growth, led to psychology of people and businesses: once already paid fees, they have the right to pollute. In contrast, MBIs should create incentives for businesses to change their behaviour towards “reducing pollution to save money”;
- To promote the advantages and effectiveness of MBIs, these mechanisms need to be applied in combination with command and control instruments (legal regulations, prohibition...), MRV requirements, and other tools (techniques, education, and communication, etc.) to raise awareness of management agencies, enterprises, and community. Providing information to environmental agencies and polluters as well as raising environmental awareness are important in order to create political determination and support;
- The development and implementation of pilot MBIs should be flexibly adjusted according to various economic activities, different types of wastes, and geographical areas;
- Reserve revenue from the MBIs application for environmental activities (investment in the environment and recycling establishments, capacity building of environmental agencies);
- MBI structures should simply and easily implement;
- The first step of testing should initially focus on sources of serious pollution;
- Clear and transparent procedures;
- Learn from experiences and regular adjustment during the implementation process.

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