

Name: Kirsten Barratt

Student Number: BRRKIR004

LLM Environmental

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Evaluating the Current and Potential Future Increased role of Market-Based Instruments in Promoting the Improved Recycling, Reuse and Reduction of Plastics in South Africa's Circular Waste Economy.

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Abstract

It is impossible to imagine life without plastic. Its properties, such as its durability, flexibility and cost-effectiveness have allowed it to dominate almost every industry worldwide. However, its successful properties are also its downfall and have caused them to become a major environmental and human health issue. Plastic waste production across the globe has reached approximately 6300 million metric tonnes, most of which has been disposed of to landfills or more widely into the surrounding environment. South Africa is currently ranked as the 11th worst contributor to mismanaged plastic waste in the oceans and, while its domestic legislation is good, it does not seem to be doing enough to keep plastic out of the environment. South Africa's virgin plastic consumption grew to around 1.544 million metric tonnes in 2018 and approximately 53% of that total consumption goes into the packaging sector. Most of this is used for single-use packaging applications, which is the largest component of plastic waste generated in South Africa. This valuable material needs to be kept in the circular economy where it can be reused and recycled. There are two main types of legal mechanisms to help curb environmental pollution and promote more sustainable approaches to management: command and control measures and market-based instruments (MBIs). South Africa has relied heavily on command-and-control measures. Command-and-control measures involve the direct regulation of activities or unwanted items through legislation, and MBIs aim to influence human behaviour through the use of economic incentives or disincentives. This dissertation focuses on the options that exist for South Africa to improve and expand the use of MBIs to promote better recycling, reuse, and reduction of plastics in its circular waste economy. It focuses on MBIs because South Africa is a developing country with limited resources and MBIs have been identified by commentators as more cost-effective than the traditional command-and-control approach. It focuses on an expansion of existing MBIs (as the current MBIs do not seem to be doing enough to keep plastic out of the environment), as well as looks towards new possible MBIs to implement in the future through the legal regime. It ultimately concludes that MBIs are a viable option for South Africa and that the Republic could do more to implement them into the regulatory regime to move from a linear economy to a circular economy.

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List of Acronyms and glossary

MBIs	Market Based Instruments
MARPOL	International Convention for the Prevention of Pollution from Ships
EPR	Extended Producer Responsibility
ARF	Advance Recycling Fee
DRS	Deposit Refund Schemes
RRRR	Reduction, reuse, recovery, and recycling
NWMS	National Waste Management Strategy
NPSWM	National Pricing Strategy for Waste Management
NEMA	National Environmental Management Act
SEMA	Specific Environmental Management Act
NEMWA	National Environmental Management: Waste Act
IWMP	Industry Waste Management Plan
CEGWS	Circular Economy Guidelines for the Waste Sector
MWSP	Municipal Waste Sector Plan
PRO	Producer Responsibility Organisation
ITA	Income Tax Act
R&D	Research and development
SWTSLA	Solid Waste Tariff Setting Guidelines for Local Authority

<i>Word</i>	<i>Explanation</i>
Biodegradable	Able to break down naturally.
Circular economy	The reuse of recycled materials in a circular loop.
Command-and-control regulation	A type of regulation that involves fines, imprisonment, and other penalties.
Deposit-refund schemes	A scheme which involves a surcharge being paid when a consumer purchases a product which is refunded to the consumer when the consumer returns the product to the producer.
Disposal taxes	A tax on landfilling or incineration.
Downstream instruments	MBIs that aim to target waste at the disposal stage of its journey through the economy.
Extended producer responsibility	The idea that the producer of a product remains responsible for the product throughout its lifecycle.
Input and material tax	A tax which increases the cost of specific raw materials, therefore encouraging producers to use fewer or alternative inputs.
Landfill	A method of waste disposal where an area is designated for waste to be discarded in a hole in the ground.
Linear economy	The process of extracting virgin resources and disposing of them
Macroplastic	Plastics larger than 5mm.
Market-based incentive regulation	The process of using the market to incentivise a positive behaviour.
MEC	Member of the executive council.
Microplastics	Plastics smaller than 5mm.
Minister	The Minister of the Department of Environment, Forestry, and Fisheries.
Monomer	A molecule that can be bonded to other identical molecules.
Polluter Pays Principle	The principle that the polluter must pay for the pollution which they create.
Polymer	A substance that is built up of identical molecules bonded together.
Product tax	A tax imposed on environmentally unfriendly products.
Recycling	Reuse of valuable material.
Single-use plastic	Plastics which are designed to be used only once before they are discarded.
Upstream instruments	MBIs than aim to target waste at the creation stage and aims to allow for less waste to be created.
Urbanisation	The process by which people move from rural areas to cities.
Volumetric tariff	Variable waste charges depending on how much a person wastes.
Weathering	The natural process of the environment breaking down substances.

1. Chapter 1: Introduction

1.1 The Plastics Problem

It is almost impossible to imagine a world without plastics. Plastics play an essential role in everyday life and have become more popular compared to other materials since their commercial development in the 1930s and 40s.¹ Plastics make life easier and are used for just about everything in every industry worldwide. Since people are drawn to a more convenient lifestyle, the lightweight, flexible, and durable properties of plastics make them ideal for everyday use.²

367 million metric tons of plastic were created worldwide in 2020.³ With plastic products becoming cheaper and easier to create, the cost-effectiveness of plastic means that most plastics are designed to be used only once before they are ‘thrown away’.⁴ It is relatively inexpensive and convenient for industries to simply produce more plastic as opposed to reusing existing plastic⁵ and, if current trends continue, it is estimated that the total global plastic production will reach 26 billion tons in the next 30 years.⁶

However, plastics cannot simply be “thrown away”. Whilst the durability of plastic is an enormous benefit when plastic goods are in use, it is this same durability that has proven to be its biggest drawback and danger.⁷

Single-use plastics, for example: plastic bags, plastic bottles, and plastic straws, account for an estimated half of the global plastic waste generation,⁸ and comprise a substantial proportion of global plastic pollution.⁹ This is why there is a significant global focus on minimizing plastic production and promoting reuse and recycling to mitigate the environmental impacts and costs associated with their disposal.¹⁰

¹ Jambeck *et al* 2015 *Science* 768.

² Van der Leeden and Frens 2002 *Advanced Engineering Materials* 280.

³ Statista: Global plastic production 1950 – 2020 available at:

<https://www.statista.com/statistics/282732/global-production-of-plastics-since-1950/>.

⁴ Madria and Tangsoc 2019 *IEEE 6th International Conference on Industrial Engineering and Applications (ICIEA)* 877.

⁵ Thompson 2006 *Marine Nature Conservation in Europe* 107.

⁶ OECD Environment Working Paper No. 182.

⁷ Rochman *et al* 2013 *Nature* 169.

⁸ 11

⁹ Schnurr *et al* 2018 *Marine Pollution Bulletin* 157.

¹⁰ OECD Environment Working Paper No. 182.

All plastics that have ever been created still exist today in various forms and are not biodegradable, which causes them to persist in environments where they do not belong.¹¹ Plastics are made up of cellular units called monomers¹² which repeat to form long chains called polymers.¹³ These synthetic chains cannot be broken down into the original components and instead, when weathered¹⁴ by the environment, simply break down into smaller chains. The indestructible nature of plastic and its permanence in one form or another poses as a major environmental threat and human health hazard.¹⁵ Due to these adverse effects, it is desirable that plastic pollution is addressed at the source before it enters the natural environment.¹⁶

Plastics are sorted into two groups: macropalstics and microplastics.¹⁷ Macropalstics are the visible plastic debris found on the surface of water, beaches, and littered around cities and the natural environment.¹⁸ These macropalstics have been receiving a significant amount of media attention an environmental hazard as they are a threat to many species, both terrestrial and marine.

Microplastics have also received significant attention as an environmental hazard and are a danger to both the environment and to human health. Microplastics are defined as plastics smaller than 5mm¹⁹ and comprise of 95 per cent of all plastics in the ocean.²⁰ Microplastics are eaten by sea animals, causing them to accumulate in their bodies,²¹ and can eventually get into the human body when the fish carrying the microplastics are ingested. The potential dangers of microplastics on the human body have only been identified recently, and there are few conclusive studies on the topic, although there is growing evidence showing that ingested microplastics can enter cells and tissues where they can "cause harm".²²

¹¹ Harding *et al* 2017 7 *Procedia Manufacturing* 106.

¹² Which comprise of a carbon atom bonded with another atom depending on the plastic type.

¹³ Kwan and Takada 2017 *The Handbook of Environmental Chemistry* 51.

¹⁴ Weathering is the natural processes where something is worn down due to exposure to the elements.

¹⁵ Kumar 2018 *The Indian Journal of Pediatrics* 384.

¹⁶ For more information on the science of plastics, visit <https://www.sciencehistory.org/science-of-plastics>.

¹⁷ Julienne *et al* 2019 *Chemosphere* 124409.

¹⁸ Karpova *et al* 2022 *Environmental Pollution* 119747.

¹⁹ Koelmans *et al* 2017 *Environment, Science, and Technology* 11513.

²⁰ The Declaration of The Global Plastics Associations for Solutions on Marine Litter, available at:

<http://www.marinedebrissolutions.com/Declaration>.

²¹ Gall & Thompson 2015 *Marine Pollution Bulletin* 170.

²² Rochman and Browne 2013 available at: <http://gpcpe.org/wp-content/uploads/2019/03/Plastic-and-Health-The-Hidden-Costs-of-a-Plastic-Planet-February-2019.pdf>.

Although it is mainly the microplastics in the ocean that receive media attention, it has been argued that they pose a larger threat to terrestrial life, including humans.²³ Most of the plastic discarded by humans as waste is not recycled and ends up in landfills.²⁴ In addition, weather acts on plastic in landfills and causes their chemicals to leach into the soil and groundwater.²⁵

Plastic pollution also has economic and societal implications.²⁶ The visual impacts of plastic pollution decrease recreational and tourism activities²⁷, as people do not enjoy spending time in a polluted environment. Furthermore, plastics can act as vectors for diseases to spread through a population, encouraging the spread of invasive species, and have a suspected implication of public health when ingested.²⁸ Overall, it is estimated that the global economic impact of plastic pollution on ecosystems costs approximately \$13 billion per year.²⁹

Plastic pollution is an issue both in South Africa and internationally. Globally, approximately 6-300 tons of plastic waste is generated annually and only 9 per cent is recycled.³⁰ It is estimated that, by 2025, an accumulative amount of 250 million tons of plastic waste would have been introduced into the natural environment worldwide.³¹ This valuable resource is becoming an increasing social, economic, and environmental threat when wasted.³²

Plastic pollution in South Africa is an escalating issue. According to a recent study done in the United States of America, South Africa is ranked as the 11th worst contributor of mismanaged plastic waste to the oceans.³³ South Africa has a relatively low coastal population compared to other countries,³⁴ which is why it is alarming that the Republic has ranked so high on the list. Using data on solid waste, population density, and economic status, the study ranked a total of 192 coastal

²³ For an example, see <https://www.unep.org/news-and-stories/story/plastic-planet-how-tiny-plastic-particles-are-polluting-our-soil>.

²⁴ Sharma *et al* 2019 *Waste Disposal & Sustainable Energy* 237.

²⁵ OECD Environment Working Paper No. 182.

²⁶ Rumble 2019 *SA Journal of Environmental Law and Policy* 102.

²⁷ Obersteiner *et al* 2021 *Environmental Development* 100617.

²⁸ Xanthos *et al* 2017 *Marine Pollution Bulletin* 17 at 18.

²⁹ Raynaud 2014 *United Nations Environmental Programme* available at: www.unep.org/pdf/ValuingPlastic.

³⁰ Roland *et al* 2017 *Science Advances* 7.

³¹ Roland *et al* 2017 *Science Advances* 7.

³² Rumble 2019 *SA Journal of Environmental Law and Policy* 102.

³³ Jambeck *et al* 2015 *Science* 768 at table 1.

³⁴ For population statistics, visit <https://www.grida.no/resources/7829>.

countries and estimated that, in 2010, these countries contributed a combined 4.8 – 12.7 million metric tons of plastic waste to the oceans.³⁵ Furthermore, they generated a combined total of 275 million of metric tons of plastic waste. By 2025, this total is expected to increase exponentially.³⁶ In addition to ocean pollution, South Africa's freshwater systems, including groundwater, are also contaminated.³⁷

South African waste management further exemplifies the problem. In 2017, it was estimated that South Africa generated 42 million tons of general waste and that only 4.9 million tones (11 per cent) were recycled during this period.³⁸ The current preference for waste management is landfilling and roughly 82 per cent of waste management facilities in South Africa are landfills.³⁹ Waste treatment facilities account for approximately 11 per cent of all licensed facilities and recycling and recovery facilities only account for 7 per cent of all licenses.⁴⁰ This is thought to be due to urbanisation, economic development, and improved lifestyle and life expectancy of people living in developed areas, as this adds to the increased amount and complex nature of solid waste.⁴¹ In particular, solid waste management is a challenge for local authorities, as they need to try and protect both the local environment and people's health.⁴²

Despite advances in reuse and recycling, landfilling is used for approximately 95 per cent of solid waste collected worldwide.⁴³ These sites are an area of land that is used to dispose rubbish, either directly on the ground (landraising) or in a hole in the ground (landfilling). Lack of government capacity, institutional preparedness, community consciousness and involvement, enhanced collection equipment, human resources, and land scarcity for landfills are just some of the issues faced in developing countries regarding landfills.⁴⁴ Unfortunately, this is where most plastics end their life.

³⁵ Jambeck *et al* 2015 *Science* 768.

³⁶ Jambeck *et al* 2015 *Science* 768.

³⁷ Tyree *et al* available at: <https://orbmedia.org/stories/plus-plastic/>.

³⁸ South Africa State of Waste Draft Zero Report at vi.

³⁹ Nahman 2011 *Waste Management* 2046.

⁴⁰ Trois *et al* 2007 *Waste Management* 1706.

⁴¹ Shams *et al* 2017 *Sustain Cities Soc.*

⁴² Younes *et al* 2015 *Waste Management*.

⁴³ KY Foo *et al* 2009 *J Hazard Mater*.

⁴⁴ E Santibanez-Aguilar *et al* 2017 *J. Clean. Prod.*

However, despite their dangers and drawbacks, plastics have a place in our economy. Some commentators explore the approach of not eliminating plastic from the economy, but rather reducing and eliminating the “leakage” of such plastics from the economy into the environment.⁴⁵ Plastics are an important part of the economy and cannot be eliminated completely. Instead, the concept of a circular economy should be adopted, in which plastics are reused and recycled in terms of market-based incentive regulation.

1.2 Market-based incentive regulation

Plastics are difficult to regulate. However, there are various measures that countries can adopt to regulate plastic production, manufacturing, importation, use, and disposal. Due to their constrained resources and serious pollution problems, developing nations are being asked more frequently to take into consideration and implement incentive-based regulations for managing the environment.⁴⁶ Undue dependence has been placed on command-and-control instruments⁴⁷ which have frequently been applied in inappropriate settings.⁴⁸ Market-based instruments (MBIs) have generally been under-utilised, largely owing to their uncertainty. However, South Africa’s law and policy framework does recognise MBIs as a useful tool in the context of environmental regulation.

MBIs aim, through the use of an assortment of market processes and instruments, to influence economic behaviour in order to achieve particular desired objectives.⁴⁹ MBIs were identified as “potentially powerful weapons in the defence of the environment” shortly after South Africa’s shift to a constitutional democracy.⁵⁰ Developing countries, such as South Africa, have implemented a variety of MBIs for managing the environment, such as tax benefits, deposit-refund schemes, direct subsidies, product taxes, emission charges, user fees, resource royalties, and performance bonds.⁵¹

⁴⁵ For an example, see Clift *et al* 2019 *Law, Environment & Development Journal* 93.

⁴⁶ Robert 2002 *Resources for the Future* 1.

⁴⁷ For information on this undue reliance, please see Paterson 2008 *Juta, Cape Town* 5.

⁴⁸ Paterson 2008 *Juta, Cape Town* 1.

⁴⁹ Wilke 2005 *South African Journal for Environmental Law and Policy* 49.

⁵⁰ Deloitte *et al* 1996 *Department of Environmental Affairs and Tourism*.

⁵¹ GN 56 of 2021.

The purpose of MBIs is to “cure market failure caused by externalities which occur when environmental costs are incurred without payment”.⁵² Markets provide an efficient mean of allocating scarce resources and prices that are determined in a competitive environment create incentives for participants to maximise the productive use of resources.⁵³

MBIs can be divided into two groups: downstream instruments and upstream instruments.⁵⁴ Downstream instruments aim to target waste at the disposal stage of its journey through the economy. On the other hand, upstream instruments aim to target waste at the creation stage and aim to have less waste created in the first place.

At this juncture, it is important to note that there are other regulatory approaches which deal with plastic waste and the history thereof. Despite the acceleration in plastic production, plastic regulation has been relatively stagnant.⁵⁵ The earliest type of regulatory approach is a ban or a restriction. This is one of the most common regulatory measures and aims to “curtain the availability in the market of products that are used once and then discarded by prohibiting their manufacture and production, importation, distribution, supply, sale and/or use.”⁵⁶ This type of regulation is most applied to plastic carrier bags and has been seen in a variety of countries.⁵⁷ A ban or restriction is an example of a command-and-control mechanism that is adopted through legislation. Other legislative approaches include phase-outs and penalties and, in each case, suitable alternatives to plastics should be available.

Self-regulation is another management approach.⁵⁸ This approach has become more popular with individuals who are becoming more environmentally conscious, is voluntary, and is mostly industry driven.⁵⁹ For example, Unilever has pledged that all its packaging will be reusable, recyclable, or compostable by 2025.⁶⁰

⁵² Kidd 2002 *South African Journal of Environmental Law and Policy* 21.

⁵³ Paterson 2008 *Juta, Cape Town* 5.

⁵⁴ National Pricing Strategy for Waste Management.

⁵⁵ Syberg *et al* 2021 *Current Opinion in Green and Sustainable Chemistry* 100462.

⁵⁶ United Nations Environment Programme ‘Tackling Plastic Pollution: Legislative Guide for the Regulation of Single-Use Plastic Products’ (2020).

⁵⁷ For example, Denmark, Bangladesh, Rwanda, and China.

⁵⁸ El-Jourbagy *et al* 2021 *Berkeley Bus LJ* 108.

⁵⁹ El-Jourbagy *et al* 2021 *Berkeley Bus LJ* 108.

⁶⁰ *Rethinking Plastic Packaging*, UNILEVER, <https://www.unilever.com/planet-and-society/wastefree-world/rethinking-plastic-packaging/>.

This pledge did not originate from a piece of legislation, but rather through the voluntary actions of an individual company.

In addition, there are also international frameworks which deal with the regulation of plastics. These mainly regulate the transport and disposal and waste materials, and often apply to single-use plastic waste.⁶¹ The International Convention for the Prevention of Pollution from Ships (MARPOL) is an example of one such framework. The history of plastic regulation is important to consider is South Africa is to adopt a circular economy approach to waste management.

1.3 The circular economy

The linear economy is the process of extracting virgin resources, using them, and then disposing of them.⁶² In contrast, the circular economy concept supports the notion of switching virgin resources to recycled materials where it is possible to do so.⁶³ It incorporates the idea of “life-cycle thinking”, which is the concept that the entire life cycle of a given material should be considered in an integrated way and it based on the idea that, because the use of materials cause a series of positive and negative environmental impacts during their lifecycles, it is important to look for prospects to improve these effects in the life cycle stages where it is best addressed.⁶⁴

The circular economy is not an entirely new concept but has recently been gaining global importance on the agendas of policy makers.⁶⁵ Many commentators attribute the concept to *Pearce and Turner*⁶⁶ and can be described as a “model of production and consumption, which involves the sharing, leasing, reusing, repairing, refurbishing, and recycling of existing materials and products for as long as possible”.⁶⁷ This thereby extends the life cycle of the product.

⁶¹ El-Jourbagy *et al* 2021 *Berkeley Bus LJ* 108.

⁶² Sariatli 2017 *Visegrad Journal on Bioeconomy and Sustainable Development* 31.

⁶³ Thomas *et al* 2018 *Rev Eur Comp & Int'l Envtl L* 267.

⁶⁴ 268.

⁶⁵ For examples see the European Circular Economy Package and the Chinese Circular Economy Promotion Law.

⁶⁶ Pearce and Turner 1989 *John Hopkins University Press, Baltimore*.

⁶⁷ European Parliament News: Circular Economy: definition, importance and benefits available at: <https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits>.

The circular economy aims to expand the useful life of products in circulation without the loss of their value and reduce waste where possible,⁶⁸ and presents a huge global opportunity of economic growth and propelling society towards a more sustainable future. The circular economy also presents a \$4.5 trillion opportunity which is not just reserved to developed economies.⁶⁹

There are two models of a circular economy: the model that fosters reuse and extends the service life of things through repair and manufacture, and the model that turns old goods into new goods through recycling.⁷⁰ Both models are people-centric, causing ownership to become stewardship and turning consumers into users and creators.⁷¹ In addition, skilled jobs are also created through circular economy infrastructure.

However, the idea of the circular economy is unfamiliar to many, which is why the movement towards it has been slow.⁷² People are also often uncomfortable with the idea of the unknown, thus switching to a new model which has never been used before might be a little daunting.

1.4 Purpose and scope

This dissertation is a critical analysis of the options that exist for South Africa to improve and expand the use of MBIs to promote better recycling, reuse, and reduction of plastic waste in the circular waste economy. Its purpose is to distil the theoretical possibilities that MBIs hold for South Africa and examines South Africa's current use of MBIs as well as future possibilities.

This dissertation only deals with plastic in the terrestrial context and not the disposal in the marine context. However, the disposal of plastics in the terrestrial context has a substantial impact on the marine environment, which is why it was discussed above. This dissertation also concedes that there are other avenues of compliance and enforcement measures, but chooses to focus on MBIs due to their growing global and domestic recognition as an important regulatory tool with certain

⁶⁸ Machado and Morioka 2021 *Journal of Building Engineering* 103322.

⁶⁹ Lacy *et al* and Jakob 2015 *Waste to Wealth: The Circular Economy Advantage*.

⁷⁰ Stahel 2016 *Comment* 435 available at: <https://www.nature.com/articles/531435a.pdf>.

⁷¹ Stahel in *The Circular Economy — A Wealth of Flows* (ed. Webster, K.) 86–103 (Ellen MacArthur Foundation, 2015).

⁷² Stahel 2016 *Comment* 435 available at: <https://www.nature.com/articles/531435a.pdf>.

benefits. This contrasts to command-and-control approaches in the context of promoting improved compliance and enforcement.

1.5 Methodology and structure

The aim of this dissertation is to examine South Africa's current use of MBIs and look towards future possibilities for the Republic to undertake in MBI regulation. To achieve this aim, this dissertation is undertaken through a desktop study and examines all relevant laws and policies to answer the question of whether options exist for South Africa to improve and expand the use of MBIs.

This dissertation is divided into four parts. After presenting an introduction, it creates a theoretical frame of reference against which to evaluate South Africa's relevant legal framework by providing an understanding of the types, potential, and value of MBIs for plastic regulation. It encompasses how MBIs link and support contemporary waste management approaches and principles, and potential MBIs in relation to plastic waste.

The current practice in relation to MBIs in South Africa is then reviewed and legislation, as well as specific components of the waste management regime potentially relevant to MBIs and plastics, are considered. The dissertation then moves onto a discussion of existing MBIs used in South Africa, namely, the Plastic Bag Regulations, tax deductions in respect of scientific and technological research and development, tax deductions in respect of environmental capital expenditure relating to environmental treatment and recycling assets, and non-residential tariffs.

Finally, this dissertation offers ideas to reform existing MBIs and ideas to introduce new MBIs into the circular economy. It does so by drawing on the theoretical frame established as well as the critical review of MBIs. It is important that the concept of the circular economy is kept in mind throughout the dissertation.

2. Chapter 2: Understanding the types, potential and, value of market-based instruments for plastic regulation

Countries, especially those with developing economies, have relied on the traditional command-and-control approach to environmental regulation for too long.⁷³ MBIs are a viable way to shift away from this old approach and it is, therefore, important to understand the various forms of MBIs so that they can effectively fit into the unique context of every country.

When considering MBIs, it is imperative that the concept of sustainable development⁷⁴ is taken into account. In 2015, the United Nations Member States compiled 17 sustainable development goals with 169 targets to reach by 2030.⁷⁵ The goals apply to all countries worldwide and are therefore universal goals. Included in the goals are goals that relate specifically to sustainable development in the context of MBIs, for example, goal number 12 ensures sustainable and responsible consumption and production patterns. Once such method that can be used to achieve this goal is the use of MBIs.

This chapter explores contemporary waste management approaches, such as the polluter pays principle, extended producer responsibility and product stewardship, and recycling and RRRR, which complement MBIs. Another important waste management approach is the circular economy model, which was discussed in the previous chapter. The circular economy model needs to be considered in the context of this chapter. Other contemporary waste management approaches exist, however, the ones discussed for the purpose of this research are linked to and support MBIs.

Various factors are considered when designing MBIs. This chapter considers certain factors, such as flexibility, simplicity, and transparency. The MBI also needs to fit into the broader institutional framework, be accepted by the public, and be able

⁷³ Paterson 2008 *Juta, Cape Town* 5.

⁷⁴ The International Institute for Sustainable development defines it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” More information on sustainable development can be found at <https://www.iisd.org/about-iisd/sustainable-development>.

⁷⁵ For information of the 17 sustainable development goals, visit: <https://sdgs.un.org/goals>.

to address the environmental objective it seeks to address. MBIs can be divided into two groups: downstream instruments and upstream instruments. Downstream instruments are MBIs that are implemented at the disposal stage of a product's life and include volumetric tariffs and disposal taxes. Upstream instruments are MBIs which are implemented at the production or consumption stage of a product's life and include input and material taxes, product taxes, and deposit-refund schemes. There is an array of MBIs available to combat various environmental issues, but the above five are chosen because of how they can relate specifically to plastic waste.

2.1 How market-based instruments link and support contemporary waste management approaches and principles

2.1.1 The polluter pays principle

The polluter pays principle was created as the result of many economic debates on the internalisation of pollution costs.⁷⁶ The principle aims to transfer the burden of those costs back to the person who caused them in the first place.⁷⁷ It is an environmental policy principle which requires that the cost of pollution be carried by those who cause it and is an extension of the principle of absolute liability.⁷⁸

To understand the polluter pays principle, one must first understand who the polluter is. A polluter can be defined as “an operator who has caused a certain environmental damage and who can be held accountable for the destructive consequences of his actions” and goes as far as to say that this category also includes “the operators whose activities pose a risk to the environment”.⁷⁹

The polluter pays principle carries normative authority as a legal principle, despite starting out as a principle of economics.⁸⁰ Therefore, there is an onus on the government to implement it wherever appropriate. Authorities should “endeavour to promote the internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest”.⁸¹ Legislation should

⁷⁶ Bleeker 2009 *European Energy and Environmental Law Review* 289.

⁷⁷ Doninga 2016 *Law Annals Titu Maiorescu* at 79.

⁷⁸ Paterson 2008 *Juta, Cape Town* at 11.

⁷⁹ Doninga 2016 *Law Annals Titu Maiorescu* at 81.

⁸⁰ Zahar 2018 *Rev Eur Comp & Int'l Env'tl L* 293.

⁸¹ Rio Declaration on Environment and Development in 'Report of the United Nations Conference on Environment and Development' UN Doc A/CONF.151/26 (vol 1) (12 August 1992) Principle 16.

be promulgated to adjust prices in such a way as to internalise the costs associated with harmful environmental practices.

Since the Rio Declaration was promulgated, the polluter pays principle has been adapted worldwide in various forms and is a recognised principle of law.⁸² The principle is often used to correct the ocean of inequity that is caused by the existence of an environmental problem, and does so by reducing the impact of that problem.⁸³ It demonstrates the equitable idea that polluting entities bear the cost of their pollution, as those who are polluting are the ones benefitting from their pollution. This is a way of achieving environmental justice. Consumers can also be included in the category of people who bear pollution costs, as the preventative measures of the manufacturer are included in the market price of the finished product.

However, there is sometimes a difficulty in identifying the person responsible for the pollution, especially when the pollution comes from a variety of stakeholders who interfere with the production process at some point.⁸⁴ These different stakeholders are all responsible for the pollution at different points of the production process, and therefore regulations regarding the polluter pays principle often incorporate the notion of joint liability.⁸⁵

The most important part of the polluter pays principle is the notion that the polluter must, in fact, pay for their pollution. There are two categories of payment measures: preventative measures (measures designed to avert the environmental damage and reduce the risk of potentially harmful activities) and remedial measures (measures that intend to eliminate the damage that has already taken place).⁸⁶ In certain instances, such as in the petrochemical industry, funds can be set up as a safeguard against environmental damage.

The polluter pays principle is a strong method to ensure environmental compliance and reparation for environmental damage. However, it needs to be implemented carefully so that it is not diverted from its original purpose.⁸⁷ It risks becoming an issue when polluters may be inclined to think that, if they can afford it,

⁸² Zahar 2018 *Rev Eur Comp & Int'l Env'tl L* 293 at 294.

⁸³ Woerdman 2008 *Climate Change and European Emissions Trading: Lessons for Theory and Practice* 42.

⁸⁴ A Doninga 2016 *Law Annals Titu Maiorescu*. at 82.

⁸⁵ Boyd and Ingberman 1996 *The Law and Economics of Insurance* 182.

⁸⁶ 88.

⁸⁷ 91.

they can simply pay for the pollution that they produce. That is not what the principle aims to achieve.

Downstream instruments are directly associated with the polluter pays principle, as households are taxed according to the amount of waste that they produce.⁸⁸ Households who produce more waste will be charged for this waste accordingly, ensuring that the polluter is, in fact, paying for the pollution that they have caused. Upstream instruments are also directly associated with the polluter pays principle. For example, input and material taxes charge the manufacturer for the harmful product that they are utilising. While this is a less direct relationship than a downstream instrument, the polluter is still being taxed down the line and there is a clear link to the polluter pays principle as a waste management approach.

The polluter pays principle can be used to combat plastic waste. If the principle is applied in this context, it would ensure that those responsible for creating plastic waste would be the ones paying for it. MBIs link and support the polluter pays principle by providing a mechanism for the principle to be used to combat plastic waste.

2.1.2 Extended producer responsibility and product stewardship

Extended producer responsibility (EPR) is an expansion of the polluter pays principle which extends the responsibility for a product throughout the products lifecycle instead of just up until the point of sale when the responsibility would usually transfer to the consumer.⁸⁹ The expansion means that the consumer of a product is not the only party responsible for its safe disposal. Liability is also given to parties such as the manufacturer and the retailer, and the responsibility is shared.⁹⁰

The OCED defines EPR as “an environmental policy approach in which a producer’s responsibility for a product is extended to the post-consumer stage of a product’s life cycle”,⁹¹ and note the defining features of an EPR policy. These features are: shifting the responsibility upstream to the producer and away from

⁸⁸ Ukkonen and Sahimaa 2021 *Waste Management* 372.

⁸⁹ Kibert 2004 *J Land Use & Envtl L* 503 at 510.

⁹⁰ Davis *et al* 1997 *Environment* 10.

⁹¹ Organisation for Economic Co-operation and Development, *Extended Producer Responsibility: A Guidance Manual for Governments* (Paris: OECD, 2001), 9. The report was the culmination of six years of work, including workshop hosted by Environment Canada in Ottawa in December 1997.

municipalities, and providing incentives to producers to integrate environmental factors into the designs of their products.⁹²

There are various examples of EPR seen worldwide and it is applied to many different product categories. Some examples involve mandatory regulations, while others are voluntary agreements between governments and targeted industries.⁹³ Irrespective of whether an EPR scheme is required by law, there are two main approaches to how the system operates. The first is a “collective producer responsibility system” and the second is an “individual producer responsibility system”.⁹⁴ Most EPR systems follow the collective producer responsibility approach and involve the producers sharing both the costs and the administrative responsibility. In an individual system, each producer self-enforces its own EPR program.

For an EPR program to be successful, it requires permanent monitoring and control by public authorities.⁹⁵ This may be difficult in a developing country, as resources may be limited and require allocation elsewhere.

EPR is an example of an upstream MBI because the producer is responsible for the safe disposal of the waste product which they created at the end of its life. Producers need to provide mechanisms to aid consumers in returning the product for safe disposal, such as an incentive such as a deposit-refund scheme or making returning the product an easy and accessible process. However, EPR does not have a direct link to downstream instruments because of how it shifts responsibility away from municipalities (downstream instruments are the responsibility of municipalities).

EPR can be used to combat plastic waste. Producers of plastic products can provide mechanisms for consumers to return the plastic product for recycling. For example, a deposit-refund scheme can be set up where consumers are paid a fee for every piece of plastic which they return to the producer.

⁹² 18.

⁹³ Eastwood *et al* 2020 *Envtl L Rep* 10976 at 10977.

⁹⁴ 10977.

⁹⁵ 10981.

2.1.3 Recycling and RRRR

Recycling is the conversion of waste to usable material. It essentially converts waste products into new materials and objects.⁹⁶ Recycling can prevent the wastage of potentially useful materials and reduce the consumption of raw materials, thereby reducing the harmful environmental impacts such as air pollution (caused by waste incineration) and water and land pollution (caused by landfills).⁹⁷

RRRR stands for reduce, reuse, recycle, and recover, and it seeks to reduce the amount of waste that ends up in landfills or gets sent to incineration. Its guiding principle is that one should aim to reduce their consumption first, before moving on to reusing, recycling, and finally, recovering.

Recycling is a compelling tool for resource conservation because it allows for energy to be captured and frees up space in landfills.⁹⁸ Plastic waste is inherently recyclable, but, unfortunately, is not regularly recycled.⁹⁹ Certain commentators believe that this is due to the lack of citizen participation in recycling programs,¹⁰⁰ although it could also be due to the inadequacies in the recycling process or the weak requirement for recycled products.¹⁰¹

Downstream instruments directly support recycling. Due to the fact that consumers would not want to pay an increased tariff on their waste disposal, they would be more inclined to separate their waste at the source and recycle what they can. This ensures that plastics are separated out of the general waste stream to be recycled. Certain upstream instruments also encourage recycling. Deposit-refund schemes are an example of this because waste products are returned to the producer for recycling.

2.2 Designing market-based instruments

There are various factors that influence the form, nature, and choice of MBIs. Governmental departments and stakeholders should take certain key criteria into account when considering or developing MBI proposals. Attention should be given to evaluating the environmental purpose and the problems this may cause for the MBI

⁹⁶ Baumgartel 1993 *Journal of Analytical and Applied Pyrolysis* 15.

⁹⁷ Hopewell *et al* 2009 *Phil. Trans. R. Soc. B* 2115.

⁹⁸ Moore 2008 *ENvTL. RES* 131.

⁹⁹ Andrady and Neal 2009 *Phil. Trans. R. Soc. B* 1977.

¹⁰⁰ Barnes *et al* 2009 *Phil. Trans. R. Soc. B* 1985.

¹⁰¹ Dye 2013 *Ocean & Coastal LJ* 117.

design before a conclusion is made regarding the choice of the instrument.¹⁰² In this regard, there are two important questions to ask: can a MBI be used to address the environmental issue, and is this MBI the best way of addressing the problem. Furthermore, policy makers face the challenge of choosing an MBI that will address the environmental problem at hand as well as fit the institutional capabilities of the country and its existing policies.¹⁰³

MBIs should be flexible enough to allow for a wide range of compliance alternatives.¹⁰⁴ This allows for the avoidance of technology standards, and flexible systems can therefore contribute to technological change.¹⁰⁵ MBIs should also be simple and transparent with clearly defined rules.¹⁰⁶ This would help to generate public support, especially in the case of environmental taxes, as it is easier to introduce a new tax (or reform an existing tax) if there is public support and acceptance. In addition, the public is more likely to support a tax if it goes to a good cause, such as funding environmental activities.¹⁰⁷

The main difference between downstream and upstream instruments in relation to the generation of public support is the element of choice. With regard to downstream instruments, households have no choice when subscribing to a volumetric tariff or disposal tax. These are automatically implemented by the State. In contrast, the public does have a choice to by-in regarding upstream instruments, and they can choose whether to buy a certain product that is taxed or return an item in a deposit-refund scheme. Downstream instruments are therefore more effective than upstream instruments in relation to public by-in, as public support is not needed. Regardless of whether it is a downstream or an upstream MBI, the MBI will be there regardless.

MBIs need to be well-targeted to the environmental issue which they set out to combat.¹⁰⁸ Where there is a clear environmental purpose, the MBI must be well-

¹⁰² Draft Policy Paper at 57.

¹⁰³ UNEP The use of economic instruments in environmental policy: opportunity and challenges 2004.

¹⁰⁴ Stavins 2003 *Handbook of Environmental Economics* 355.

¹⁰⁵ Burtraw 2996 *Contemporary Economic Policy* 79; Ellerman and Montero 1998 *Journal of Environmental Economics and Management* 26.

¹⁰⁶ Stavins 2003 *Handbook of Environmental Economics* 355.

¹⁰⁷ Haring and Jagers 2013 *Sustainability* 210.

¹⁰⁸ Environmental Taxation: a Guide for Policy Makers available at: <https://www.oecd.org/env/tools-evaluation/48164926.pdf>.

targeted to that purpose. In other words, there should be a clear link between the MBI and the environmental issue at hand. Periodic re-evaluation is also necessary.¹⁰⁹ Upstream instruments are more directly targeted to the environmental objective of reducing plastics waste than downstream instruments are, as the outcome of reducing plastic waste is seen more clearly through an instrument such as a product tax than it is through an instrument such as a volumetric tariff or a disposal tax. Downstream instruments take a less direct route at reducing plastic waste than upstream instruments do, as they aim to reduce general waste which indirectly impacts plastics. Upstream instruments have a direct link to plastic waste, as the producer or consumer can see that it directly links to the product sold.

It is important that MBIs fit into the broader policy and institutional environment. It is suggested that environmental issues should be mainstreamed into other policies to ensure a sufficiently balanced approach.¹¹⁰ In this sense, MBIs need to be able to assist in meeting other policy objectives. Furthermore, it is also important to note the wider social and economic effects.¹¹¹ MBIs, especially taxes, impact different income groups differently, and this depends on the way in which it is designed. A MBI needs to be designed in such a way as to not have a too-harsh effect on one group of people. Downstream instruments might have a harsher effect on poorer households than upstream instruments, as poorer households do not have a choice when it comes to paying for an MBI such as a volumetric tariff (while it is true that richer households also do not have a choice when it comes to paying for a volumetric tariff, richer households are more likely to be able to afford it). With upstream instruments, there is an element of choice in which poorer households are able to choose to buy the cheaper environmentally friendly alternative which is not being taxed. In addition, deposit-refund schemes can raise revenue for poorer households.

It should be noted that MBIs have the potential to raise a significant amount of tax. Taxes raise a strong incentive for producers and consumers to change their behaviour and, ideally, the revenue generated from the tax can be used to fund environmental activities such as recycling programs. However, the revenue raised

¹⁰⁹ UNEP The use of economic instruments in environmental policy: opportunity and challenges 2004.

¹¹⁰ 51.

¹¹¹ 51.

not does necessarily have to fund environmental programs and can be used by government for other mandates, such as housing projects.

There are also competitive impacts regarding MBIs.¹¹² Measures seeking to regulate behaviour will influence economics. It is important to understand the nature and extent of these effects, as well as who will bear the burden to minimise the adverse competitive effects. Competitive issues are most likely to arise when environmentally related taxes are implemented on products traded in international markets. This design factor only applies to upstream instruments and such products need to be priced accordingly so that the product is not outcompeted by a more environmentally unfriendly product on the international market.

2.3 Potential MBIs in relation to plastic waste

Depending on their ultimate aim, MBIs can take many forms. They can be divided into two main groups: downstream instruments and upstream instruments.

2.3.1 Downstream instruments

One approach to discourage the production of waste and factor in the environmental cost of dealing with its disposal is to charge a fee when collecting waste or to charge a fee when the waste is disposed of at a disposal facility.¹¹³ These fees can be manipulated to factor in the source of the waste, the type of waste, the type of entity producing the waste, and the volume of the waste.¹¹⁴ MBIs of this nature include volumetric tariffs and waste disposal charges.

2.3.1.1 Volumetric tariffs

In most countries, waste collection is charged at a fixed rate¹¹⁵ but, in terms of volumetric tariffs, variable rates would be charged to waste producers depending on the volume (or weight) of waste they produce¹¹⁶ (a proxy, such as number of bags of waste disposed of, can also be used). These tariffs are also known as “pay-as-you-throw” schemes and have shown to be relatively successful in countries such as the United States of America.¹¹⁷

¹¹² Grochulski and Zhang 2017 *International Economic Review* 331.

¹¹³ Calcott and Walls 2000 *American Economic Review* 233.

¹¹⁴ O’Callaghan and Davies 2005 *Environmental RTDI Programme 2000-2006*.

¹¹⁵ Dernbach 2012 *Widener LJ* 285.

¹¹⁶ Reichenbach 2008 *Waste Management* 2809.

¹¹⁷ Reschovsky and Stone 2017 *Journal of Policy Analysis and Management* 13.

Volumetric tariffs have the potential to create a behavioural change to positively influence the attitude of those who, previously, did not care about their waste habits or recycling.¹¹⁸ This encourages recycling as households do not want to pay an increased disposal fee.¹¹⁹ Volumetric Tariffs encourage households to separate their waste so that less “useful waste” is sent to landfill or incineration. This “useful” waste would then be recycled back into the circular economy. This is a huge advantage, and it is arguable that other MBIs will not have such a large effect on encouraging recycling.

In addition to the increased rates of recycling, cities that have implemented volumetric tariffs have also reported an increased economic stability.¹²⁰ This because such a program can subsidise the cost of waste disposal.¹²¹

One concern with requiring people to pay increased rates for waste disposal is that it might contribute towards illegal dumping in poorer households.¹²² In addition, considerations such as the attractiveness and convenience of a product might outweigh the consideration of the tariff in wealthier households.¹²³ Wealthier households might find it more convenient to simply pay the tariff than to recycle or change their consumption habits. The tariff would need to be set at a level that is not too high as to otherwise encourage illegal dumping, but high enough to persuade households to waste less.

Volumetric tariffs have a direct relationship to plastic pollution because of the way in which they influence recycling. Households are encouraged to separate their recyclable material out of their general waste so that the volume of waste that they produce is small and they therefore do not have to pay an increased fee. This allows for plastics to be separated from the waste stream and recycled. However, if illegal dumping is encouraged, plastics will end up in the natural environment. It is therefore important to set the tariff at the optimal rate to encourage recycling but discourage illegal dumping.

¹¹⁸ Everling 2018 *UIC J Marshall L Rev* 147.

¹¹⁹ Van Houtven and Morris 1999 *Land Economics* 515.

¹²⁰ Everling 2018 *UIC J Marshall L Rev* 147.

¹²¹ 182.

¹²² U.S. ENVTL. PROT. AGENCY, EPA530-F-96-028, PAY-As-You-THROW: THROW AWAY LESS AND SAVE 2 (1997).

¹²³ Rousakis and Weintraub 1994 *Ecology LQ* 947.

Australia has seen some success in applying variable user charges for domestic waste collection.¹²⁴ Variable user charges have the aims of reducing domestic waste (including plastic waste) that goes to landfills, improving the equity of domestic waste charges, and providing financial signals regarding the value of protecting the environment.¹²⁵

Pay-as-you throw initiatives are growing in popularity in the United States of America.¹²⁶ Residents in pay-as-you throw communities pay per pound or gallon of garbage disposed of, rather than one flat rate. This incentivises recycling and less wastage, and helps communities cover solid waste costs through precisely charging residents for solid waste services.¹²⁷ It also gives those who generate more power over their garbage bill by letting them pay for only the amount of waste that they have generated. This type of scheme may affect households purchasing decisions by influencing them to favour products that come with less, or recyclable, packaging. This is a similar method to Australia's charges for domestic waste collection as mentioned above.

In India, several municipalities have utilised user charges for waste collection from households.¹²⁸ They have transferred part of that fund to the recycling industry, which was established under a public-private partnership to reclaim recyclable materials and process them.¹²⁹

2.3.1.2 Disposal taxes

Disposal taxes are the second type of downstream MBI that can be used to address plastic waste and are addressed at the waste disposal stage.¹³⁰ This would include a tax on landfilling or incineration rather than a tax upon collection, like in the instance of volumetric tariffs. Raising these taxes incentivises waste collectors to seek alternative means of waste disposal and make other alternatives more

¹²⁴ This is an example of a volumetric tariff.

¹²⁵ Report to Environment Australia: The potential of Market Based Instruments to better manage Australia's waste streams. Available at: <http://www.bdagroup.net/wp-content/uploads/2010/05/EA-MBIs-for-waste-management-Jun-2003.pdf>.

¹²⁶ Market-based approaches for managing the Asian environment: a review. Available at: <https://www.adb.org/sites/default/files/publication/28374/economics-wp124.pdf>

¹²⁷ 27.

¹²⁸ C Grainger *et al* 'REG: Scaling Up Private Sector Participation and Use of Market-Based Approaches for Environmental Management' 2019 *Asian Development Bank*. Available at: <https://www.adb.org/sites/default/files/project-documents/49354/49354-001-tacr-en.pdf>

¹²⁹ 125.

¹³⁰ Palmer and Walls 1997 *Journal of Public Economics* 193.

financially viable. It also incentivises households to separate their waste for recycling so that they do not have to pay an increased price on waste disposal.

Regarding the advantages of disposal taxes, these are much the same as the advantages of volumetric tariffs. “Useful” waste is separated from households’ waste streams and recycled back into the circular economy. They also influence consumer behaviour by influencing consumers to buy products that cause less waste. Again, this is because consumers do not want to pay an increased disposal fee.

Disposal taxes relate to plastic waste in that households are likely to separate plastics out of their general waste to recycle them, so that they do not have to pay an increased disposal fee. On the other hand, an increased disposal fee might encourage illegal dumping and cause plastics to end up in the natural environment. The tax needs to be at the optimal rate as to encourage recycling but discourage illegal dumping.

Disposal taxes would only indirectly affect plastic packaging practices.¹³¹ There is little incentive on manufacturers to reduce their packaging inputs, besides the pressures from consumers and municipalities. This indirect mechanism means that the industry is not held directly accountable for plastic waste, and they might not change their practices. In other words, a disposal tax might be too far removed from the actual problem.

Australia applies disposal taxes in the form of landfill levies imposed at landfill gates. These are paid as part of landfill charges by the council or waste management contractor and are recovered through rates and waste management charges.¹³² This encourages less waste, which includes plastic waste, to be brought to landfills. Most states use part or the entire levy funds collected for waste production projects.¹³³

Environmental taxes and charges are the most widely used MBI in Europe.¹³⁴ These taxes and charges were introduced for a variety of reasons, such as reducing

¹³¹ J Rousakis and BA Weintraub 1994.

¹³² Report to Environment Australia: The potential of Market Based Instruments to better manage Australia’s waste streams. Available at: <http://www.bdagroup.net/wp-content/uploads/2010/05/EA-MBIs-for-waste-management-Jun-2003.pdf>.

¹³³ 27.

¹³⁴ Market-based Instruments for Environmental Policy in Europe available at: <https://www.cbd.int/financial/doc/eu-several.pdf>.

the use of polluting products and raising revenue, and are seen as the most cost-effective instrument for achieving the environmental objective that they set out to achieve. Countries such as the United Kingdom, Austria, Finland, Greece, Norway, Sweden, and Spain have all successfully introduced landfill taxes.¹³⁵

2.3.2 Upstream instruments

Sometimes, it is not practical to implement downstream MBIs for a variety of reasons.¹³⁶ In such situations, upstream MBIs are preferable as they provide incentives to those who waste to reduce their consumption of wasteful products. Here, taxes could be implemented on “environmentally significant materials” or ‘inputs’ (virgin materials) that are used in production processes to provide an incentive for the producers of such products to reduce their consumption of a specific material. This would incentivise producers to use recycled material, or a material that is more easily recycled, as an alternative. In general, upstream MBIs aim to reduce waste generation by “increasing the relative price of (and thus reducing demand for) specific products, inputs or materials the use of which (in production or consumption) generate waste”.¹³⁷

Upstream instruments also target consumers in that they influence their purchasing choices (in the case of product taxes) and their disposal choices (in the case of deposit-refund schemes).

2.3.2.1 *Input and material taxes*

Input taxes, or material taxes, increase the cost of specific raw material inputs (in this case, plastic) used in production, therefore persuading producers to use fewer or alternative inputs (or to reuse or recycle waste materials).

Input and material taxes are what some commentators call “dirty input limits” and are defined as “regulatory limits on the inputs that constitute the root causes of pollution”.¹³⁸ These limits can be in terms of a permit (tradable or not) and require that producers and importers keep their input pollution within a certain level. It is argued that this is more advantageous than an output tax as it tackles the source of the pollution before it becomes a problem, thus making it a preventative method.

¹³⁵ 40.

¹³⁶ GN 906 of 2016.

¹³⁷ 9.

¹³⁸ Driesen and Sinden 2009 *Harvard Environmental Law Review* 65.

Another advantage of an input tax is that it reduces the cost of the finished product, which incentivises consumers to purchase it. This is because manufacturers and importers would want to reduce their own costs, which they would do by being environmentally compliant. By the time the product makes its way down the supply chain to the consumer, its price would remain relatively low because of its low input price, encouraging consumers to buy it. Furthermore, this provides an advantage to the manufacturer, as their total product cost would be lower than other products, therefore influencing consumers to buy their products over others. This might influence other manufacturers to make their products in lieu of environmental taxes. In this way, input and material taxes influence both the manufacturer and the consumer.

However, implementing a system of input and material taxes might prove to be difficult, even though they would be an efficient way to reduce the environmental impacts of plastic packaging.¹³⁹ The implementation of new taxes is often met with “considerable hostility”,¹⁴⁰ even when the tax would have a positive effect in the long run. In addition, experts are required to set the tax rate, and this rate needs to be set at the correct amount. If it is too low, manufacturers might still find it cheaper to continue with their existing practices rather than to change them.¹⁴¹ A high tax would influence a change in behaviour, but it might come at a cost to industry.¹⁴² For this reason, flexible rates are necessary so that they can be adjusted in response to changes in the market dynamics.¹⁴³

An input or material tax can be put on plastic packaging. Manufacturers producing products with more plastic packaging would be taxed more, as opposed to their counterparts who would be taxed less for producing products with less plastic packaging (the same concept can be used for manufacturers creating packaging out of recycled or recyclable materials). In this way, an input or material tax can directly influence the amount of plastic that is being produced, therefore directly influencing the amount of plastic that can potentially end up in the environment.

¹³⁹ J Rousakis and BA Weintraub 1994.

¹⁴⁰ 970.

¹⁴¹ 970.

¹⁴² 970.

¹⁴³ 970.

2.3.2.2 Product taxes

Product taxes are in direct contrast to input and material taxes. Instead of applying the tax to the beginning (creation) stage of the product's lifecycle, the tax is applied at the point of selling to consumers and focuses on both demand and supply.¹⁴⁴ This tax aims to incentivise consumers to purchase products that generate less waste, as these would be cheaper. This can be done by either reducing consumption or seeking more environmentally friendly alternatives.

Product taxes can be applied to products which generate high levels of waste (or waste with a remarkably high environmental impact) or to products which cannot be recycled. This decreases the demand for such products and decreases the amount of waste that gets sent to landfill. This directly relates to plastic, as products with a lot of plastic packaging (or non-recyclable packaging) can be taxed at a higher rate compared to other products.

Product taxes are another upstream instrument that influences consumer behaviour. They are similar to input and material taxes, except that they are implemented once the product has reached the consumer stage of its life. A strength of product taxes is that they influence consumer behaviour by encouraging consumers to seek out products with a lower tax, and therefore products which are more environmentally friendly. In addition, the tax on less environmentally friendly products can be used to fund projects with environmentally friendly objectives. An example of such a tax is an advance recycling fee (ARF) which are "implemented primarily for the purpose of raising funds to cover the costs of downstream collection and recycling activities, rather than with the aim of internalising the externalities associated with disposal".¹⁴⁵ The main aim of an ARF is to cover the costs of recycling.

However, like an input or material tax, a product tax needs to be set at an optimal amount to discourage wealthier households from simply paying the tax out of convenience instead of being encouraged to switch to a new product. Product taxes can be applied to plastic products such as plastic bags, straws, cutlery, and packages to discourage consumers from buying them. An increased tax on plastic

¹⁴⁴ Devine 1976 *Envtl Aff* 669.

¹⁴⁵ National Pricing Strategy for Waste Management at 17.

products would hopefully incentivise consumers to make different purchasing decisions.

Product taxes are widely used in Europe.¹⁴⁶ These taxes increase the price of products to encourage consumers to buy more environmentally friendly substitutions.¹⁴⁷ However, the incentive function is not always the primary purpose of these taxes and, in many cases, the funds raised from these taxes are used to finance schemes to reduce the environmental impact of the taxed product.¹⁴⁸ These types of taxes are usually applied to packaging waste, and successful examples include the Irish Plastic Bag Levy,¹⁴⁹ the Danish Packaging Tax,¹⁵⁰ and the Norwegian Levy System of Beverage Containers.¹⁵¹

2.3.2.3 Deposit-refund systems

Deposit-refund schemes (DRS) involve a surcharge being paid when a consumer purchases a potentially polluting product and, when the consumer returns the product to the appropriate centre for recycling or disposal, this surcharge is refunded.¹⁵² This method can be used for various types of waste, including plastic, glass, batteries, and used oil. The object of DRS is to remove waste items from the general disposal stream by encouraging and facilitating the reuse and recycling of suitable products.¹⁵³ This creates the incentive for the consumer to bring the product or packaging back for recycling or reuse, rather than to throw them away.

The strength of DRS is that the product is returned to the creator, and this is a strength in two ways. First, in some cases, it allows for the creator of the product to reuse the used product to create a new product. Second, in other cases, the creator can reuse the product as it is. This system does not directly decrease waste, but it is

¹⁴⁶ Market-based Instruments for Environmental Policy in Europe available at:

<https://www.cbd.int/financial/doc/eu-several.pdf>.

¹⁴⁷ 65.

¹⁴⁸ 65.

¹⁴⁹ This levy was introduced in 2002 to encourage consumers to bring their own reusable shopping bags to stores to reduce the number of plastic bags littered into the environment. The revenue raised by the levy was assigned to a new environmental fund that was used for a number of environmental purposes.

¹⁵⁰ This tax was revised in 2001 with the aim of “fiscal equality”. This meant that the environmental impact of different packaging materials would be reflected in the tax rate, and this allowed for them to be differentiated on the basis on environmental impact, carbon emissions, primary energy use, fossil resource use and waste.

¹⁵¹ This tax was revised in 2001 with the aim of “fiscal equality”. This meant that the environmental impact of different packaging materials would be reflected in the tax rate, and this allowed for them to be differentiated on the basis on environmental impact, carbon emissions, primary energy use, fossil resource use and waste.

¹⁵² Robert and Starvins 1991 *Ecology* LQ 1.

¹⁵³ Paterson 2009 *Juta, Cape Town* 7.

able to increase recycling and decrease the amount of waste that gets sent to landfills. DRS also has three main advantages over other MBIs such as taxes.¹⁵⁴ First, it avoids illegal dumping by providing rebates when products are returned for recycling. Second, a tax has monitoring and enforcement issues, especially in developing countries. Third, there is not a problem with tax evasion in a DRS.¹⁵⁵

Beverage container DRS are the most common example of this type of systems and there are a few studies that demonstrate their success.¹⁵⁶ However, some studies have indicated that the “social desirability” of DRS depends on the amount of time that the consumer takes to return the empty containers and the willingness of the consumer to pay for reduced litter.¹⁵⁷ Consumers are required to separate containers and deliver them to collection sites, and this may result in a new welfare loss rather than a gain.¹⁵⁸

Unfortunately, DRS only applies to a small part of the waste stream and imposes costs on consumers and stakeholders, such as the costs of storage and transportation. These costs cause DRS to be expensive to comply with. There is therefore a risk that DRS could encourage illegal dumping, because the cost of legal disposal is increased.¹⁵⁹

DRS is largely voluntary and usually found in the private sector. There needs to be cooperation between producers, retailers, and consumers for the system to work. This makes it relatively difficult to regulate through law. To bring them into the public domain, government subsidies could be used to support these kinds of recycling activities, for example, by providing funds to build a recycling centre. Such funds could be raised through a tax-based instrument, such as an ARF or a product tax.

An example of successful DRS application is Australia’s National Packaging Covenant which has implemented a form of advance disposal fees within a broader

¹⁵⁴ Walls 2012 *Resources for the Future Discussion Paper No.11-17* 1.

¹⁵⁵ 1.

¹⁵⁶ For examples see Zhou *et al* 2020 *Journal of Cleaner Production* 119660; Numata (2010) *Journal of Material Cycles and Waste Management* 314.

¹⁵⁷ Robert and Starvins 1991 *Ecology LQ* 1.

¹⁵⁸ 11.

¹⁵⁹ 10.

context of EPR (which relates to DRS).¹⁶⁰ It aims to reduce the environmental impacts of waste throughout its lifecycle, as well as to develop economically viable and sustainable recycling systems.¹⁶¹ Australia also has a very effective DRS for collecting beverage containers, and what makes this so successful is their high level of public participation.¹⁶²

Voluntary DRS are relatively well developed in Latin America.¹⁶³ The informal collection of paper, plastic, and other materials is an important occupation for unskilled workers, who are known as waste pickers. The recycling of ferrous materials, paper, and plastic is a well-established business in the region, as wholesalers collect the materials from informal collectors and firms and sell it to recycling companies.¹⁶⁴ Collection is done mostly at dumping sites and the curb side. In Brazil, cooperatives of collectors (who are supported through municipal programs) are now common in major cities. This has helped to improve the health conditions and collection efficiency.¹⁶⁵ This type of MBI has low legal, institutional, and political barriers, which is another reason as to why it has been so successful in Latin America.¹⁶⁶

¹⁶⁰ Report to Environment Australia: The potential of Market Based Instruments to better manage Australia's waste streams. Available at: <http://www.bdagroup.net/wp-content/uploads/2010/05/EA-MBIs-for-waste-management-Jun-2003.pdf>.

¹⁶¹ 29.

¹⁶² 31.

¹⁶³ Market-based Instruments for Environmental Policymaking in Latin America and the Caribbean: Lessons from Eleven Countries. Available at: http://www.oas.org/en/sedi/dsd/Biodiversity/Sustainable_Cities/Sustainable_Communities/Events/SC%20Course%20Trinidad%202014/Module/MBIs%20in%20LAC%2011%20case%20studies.pdf.

¹⁶⁴ 27.

¹⁶⁵ 27.

¹⁶⁶ 28.

3. Chapter 3: Review of the current practice in South Africa

South Africa's environmental right is enshrined in its Constitution.¹⁶⁷ The Republic is a constitutional supremacy, meaning that the Constitution is paramount and trumps any other law. As such, the environmental right entrenched in the Constitution is arguably a strong one and it provides a mechanism to protect the environment for current and future generations. This right can be linked directly to waste management, as poor waste management would be averse to one's health and wellbeing,¹⁶⁸ as well as averse to the notion of environmental protection.

The Constitution makes provision for "reasonable legislative and other measures" to protect the environment. South Africa has several environmental pieces of environmental legislation, the two main pieces relating to waste management being the overarching framework of the National Environmental Management Act (NEMA)¹⁶⁹ and its "Specific Environmental Management Act" (SEMA), the National Environmental Management: Waste Act (NEMWA).¹⁷⁰

While the previous chapter focused on understanding the types, potential, and value of MBIs for plastic regulation, this chapter shifts the focus onto a review of the current practice in South Africa. It first concentrates on NEMA and NEMWA and provides a general overview of the statutory waste regime, centering on the regime's waste objectives and principles, waste management institutions, waste management planning, waste management measures, and offences and penalties.

¹⁶⁷ Constitution of the Republic of South Africa, 1996. Section 24 states –

"Everyone has the right –

- (a) To an environment that is not harmful to their health or well-being; and
- (b) To have the environmental protected, for the benefit of present and future generations, through reasonable and other measures that –
 - (i) Prevent pollution and ecological degradation;
 - (ii) Promote conservation; and
 - (iii) Secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development."

¹⁶⁸ The notion of "health" can be taken to have the common law meaning of the word health. For example, a person's environment might be harmful to their health in cases involving matters such as reliance on a polluted water supply or the exposure to air pollution. This includes both one's physical and mental health. The notion of "wellbeing" is more complicated, and it is stated in *HTF Developers (Pty) Ltd v Minister of Environmental Affairs and Tourism* 2004 (2) SA 393 (E) that the term is 'open-ended and manifestly incapable of a precise definition'.

¹⁶⁹ 107 of 1998.

¹⁷⁰ 59 of 2008.

The discussion then moves to a consideration of specific components of the waste management regime that are currently and potentially relevant to MBIs and plastic in. This section begins with the use of national strategies that can promote MBIs and encompasses the *National Waste Management Strategy*, the *Circular Economy Guidelines for the Waste Sector*, the *Municipal Waste Sector Plan*, and *Packaging Guideline: Recyclability by Design for Packaging and Paper in South Africa*. It then discusses industry waste management plans for plastic packaging (of which none exist) followed by a discussion on national, provincial, and local norms and standards (the *National Waste Collection Standards* being applicable). Priority wastes and the prohibition of certain products then discussed (there are currently no priority wastes declared in South Africa) followed by listed activities, of which two have been published (the *list of waste management activities that have, or are likely to have, a detrimental effect on the environment* and the amendment to that list). Lastly, regulations are discussed, and it is concluded that the Minister needs to promulgate further regulations that relate specifically to the recycling of plastic waste.

This chapter concludes with a section on the existing market-based instruments in South Africa, and encompasses the *Plastic Carrier Bags and Plastic Flat Bag Regulations*, deductions in respect of scientific or technological research and development, deductions in respect of environmental capital expenditure relating to environmental treatment and recycling assets, and non-residential tariffs.

3.1 Legislation

3.1.1 Waste objectives and principles

South Africa's waste management legislation has various objectives and principles. NEMA aims to provide for co-operative environmental governance, and does this by establishing principles for environmental decision-making, creating institutions to promote this co-operative governance, and coordinating environmental functions of organs of state. NEMWA, on the other hand, aims to reform laws that regulate waste management so that health and the environment can be protected by providing measures to prevent pollution and ecological degradation to secure sustainable development. Both pieces of legislation contain various principles to realise these objectives which can relate directly to the plastic waste problem.

NEMA contains the “NEMA principles”,¹⁷¹ which aim to guide decision-making throughout the Act. Only one principle relates to waste management, and it states that waste should be avoided and, when it cannot be avoided, be minimised, re-used, recycled, or, if that is not possible, be disposed of responsibly.¹⁷² The rest of the Act, as well as the other SEMAs, should be interpreted with this principle in mind. This principle can be applied to plastic waste regulation in that it provides for plastic avoidance and reduction. When used correctly, MBIs can be effective at reducing plastic waste.¹⁷³ The concept of recycling ties in with the circular economy model and allows for useful plastics to be reused so that leakage into the environment is minimised. This directly relates to the implementation of downstream MBIs, as they enable households to separate their waste at the source so that it does not end up in a landfill or the natural environment. This NEMA principle also relates to the implementation of upstream MBIs, as they allow for waste to be “avoided”.

NEMA also provides for the duty of care.¹⁷⁴ The duty of care implores of every person who causes, has caused, or may cause significant pollution or degradation of the environment to take reasonable measures to prevent such pollution or degradation from occurring, continuing, or recurring. If such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, the person must minimise and rectify such pollution or degradation of the environment. The duty of care gives effect to the polluter pays principle by ensuring that the polluter pays for the pollution that they caused or may cause in the future, thereby complimenting the implementation of MBIs as discussed in the previous chapter.

NEMWA was tabled to give effect to section 24 of the Constitution, and it is recognised as such in its preamble. It is a SEMA to NEMA and, as such, must be read with NEMA.¹⁷⁵ NEMWA therefore upholds the same principles as NEMA, such as the NEMA principles and the duty of care. Furthermore, NEMWA provides for certain institutional arrangements and planning matters, promotes the setting of national norms and standards for regulating waste management, provides for specific waste management measures, provides for the control and licensing of

¹⁷¹ NEMA section 2.

¹⁷² NEMA section 2(4)(a)(iv).

¹⁷³ This is discussed in Chapter 2.

¹⁷⁴ NEMA section 28.

¹⁷⁵ NEMWA section 5.

waste management activities, as well as compliance and enforcement. NEMWA compliments MBIs and the circular economy in the same way that NEMA does and goes further to even incorporate certain MBIs, such as EPR.¹⁷⁶

3.1.2 Waste management institutions

NEMA makes provision for the National Environmental Advisory Forum.¹⁷⁷ This forum has various objectives, which include informing the Minister¹⁷⁸ of stakeholder's views regarding the NEMA principles,¹⁷⁹ and, advising the Minister on environmental governance matters and appropriate methods to comply with the NEMA principles.¹⁸⁰ The forum comprises of 12 to 15 members who are appointed by the Minister¹⁸¹ after various requirements are met.¹⁸² The forum is not a "waste management institution" *per se*, but as stated above, the objective of the forum is to ensure that the NEMA principles are upheld. As established above, the NEMA principles complement MBIs and the circular economy model, which can be used for the effective management of plastic waste.

NEMA also establishes the Committee for Environmental Co-ordination.¹⁸³ This committee has the objective of promoting the integration and co-ordination of environmental functions by relevant organs of state, and promoting environmental implementation plans and environmental management plans.¹⁸⁴ Environmental implementation and management plans are created to co-ordinate environmental policies and decisions of various national departments that exercise functions that may affect the environment, give effect to co-operative governance, ensure the protection of the environment, prevent unreasonable actions in respect of the environment, and enable the Minister to monitor the environment.¹⁸⁵ As with the National Environmental Advisory Forum discussed above, this is not a strict classification of a "waste management institution". However, the committee still has

¹⁷⁶ NEMWA section 18.

¹⁷⁷ NEMA chapter 2, part 1.

¹⁷⁸ "Minister" is defined in NEMA to mean the Minister of Environmental Affairs and Tourism, now known as the Minister of the Department of Forestry, Fisheries, and the Environment.

¹⁷⁹ NEMA section 3(2)(a).

¹⁸⁰ NEMA section 3(2)(b).

¹⁸¹ NEMA section 4(1).

¹⁸² NEMA section 4(2) and (3).

¹⁸³ NEMA chapter 2, part 2.

¹⁸⁴ NEMA section 7(2). This section refers to section 12 (purpose and objects of environmental implementation plans and environmental management plans).

¹⁸⁵ NEMA section 12.

relevance to MBIs and the circular economy through its promotion of environmental implementation and management plans which can promote the improved recycling, reuse and, and reduction of plastics. Unfortunately, this committee has been disbanded.

NEMWA provides for the designation of Waste Management Officers who are responsible for co-ordinating matters related to waste management.¹⁸⁶ There are both national and provincial officers. These officers need to co-ordinate their activities with other waste management activities in the manner set out in the National Waste Management Strategy (discussed below). “Other waste management activities” could include MBIs and general plastic regulation, which means that the Waste Management Officers could potentially aid in the implementation of MBIs, thereby furthering the circular economy.

3.1.3 Waste management planning

The *National Pricing Strategy for Waste Management* (NPSWM)¹⁸⁷ states that NEMWA enables economic instruments to be targeted to specific waste streams and can serve as incentives to change behaviour relating to the generation of waste.¹⁸⁸ The NPSWM is a legislative requirement of the National Environmental Management: Waste Amendment Act¹⁸⁹ and gives effect to the *National Waste Management Strategy* (NWMS).¹⁹⁰ NEMWA was amended in section 13B, which calls for an Act of Parliament to give effect to the NPSWM. The NPSWM makes direct reference to the implementation of MBIs.¹⁹¹

NEMWA also puts into place various waste management tools. By notice in the *Gazette*, the Minister must set out national and provincial norms and standards.¹⁹² These norms and standards must be set for the classification of waste, the planning for and the provision of waste management services, and the storage, treatment, and disposal of waste. They may also be set for minimisation, reuse, recycling, and recovery of waste, EPR, regionalization of waste management services, and the remediation of contaminated land and soil quality. The Minister,

¹⁸⁶ NEMWA section 10.

¹⁸⁷ GN 904 of 2016.

¹⁸⁸ NPSWM section 1.

¹⁸⁹ 26 of 2014.

¹⁹⁰ GN 56 of 2021.

¹⁹¹ NPSWM sections 3 and 5.

¹⁹² NEMWA section 7 and 8.

with concurrence of the Minister of Finance, may set national standards in terms of the tariffs for waste services provided by municipalities. While norms and standards have been set in terms of this section,¹⁹³ no norms and standards have been set which make provision for any MBI.

Industry waste management plans (IWMP) are required where there is an activity that either results in the generation of waste that affects multiple provinces, or the waste generating activity itself occurs in multiple provinces.¹⁹⁴ There is currently no IWMP regarding plastic waste, despite it satisfying both above conditions.

3.1.4 Waste management measures

NEMWA regulates the storage, collection, and transportation of waste.¹⁹⁵ There have been norms and standards created around this topic, such as the *National Domestic Waste Collection Standards*,¹⁹⁶ which stipulate the minimum standards for domestic waste collection. These address certain aspects, which includes drop off centres for recyclables. Plastic waste can be recycled at these centres. Furthermore, there is space for norms and standards to be created that address volumetric tariffs or disposal taxes, as these relate to waste disposal.

The Minister or MEC may create listed waste management activities by publishing a list of processes which may have a detrimental effect on the environment.¹⁹⁷ There is a prohibition against undertaking any listed waste management activity without a license. These listed activities fall into different categories, and, over time, this list of activities has been amended (the latest being October 2017). The creation of virgin plastic is not a listed activity, and it is arguable that it should be due to its status as a pollution hazard.

NEMWA also regulates priority wastes.¹⁹⁸ The Minister may declare priority wastes when there are reasonable grounds to believe that the waste poses a threat to health, wellbeing, or the environment.¹⁹⁹ No priority wastes have been declared to

¹⁹³ For example, the norms and standards for Disposal of Waste to Landfill, 2013.

¹⁹⁴ NEMWA section 28.

¹⁹⁵ NEMWA sections 21 – 25.

¹⁹⁶ GN 21 of 2011.

¹⁹⁷ NEMWA section 19.

¹⁹⁸ NEMWA section 14.

¹⁹⁹ NEMWA section 14(1).

date. It is arguable that plastic should be declared a priority waste due to the threat it poses to health, wellbeing, and to the environment.

3.1.5 Offences and penalties

NEMA makes provision for certain offences²⁰⁰ and penalties.²⁰¹ The list of offenses is extensive and the penalties (which include fines of both R5 million and R10 million plus time in prison) rely heavily on the command-and-control style of regulation. NEMWA is much the same (except with less-harsh penalties) and provide for offences in section 67 and penalties in section 68.

MBIs are an alternative to this command-and-control style of regulation. Rather than punishing poor environmental choices, MBIs aim to incentivise good environmental behaviour. However, in certain instances, it might be appropriate to couple an MBI with a command-and-control regulation. For example, volumetric tariffs have the potential to encourage illegal dumping (as discussed in the previous chapter). If a command-and-control measure, such as a fine or imprisonment, was implemented against those who were caught dumping their waste illegally, a hybrid system would be created. Unfortunately, it is unlikely that South Africa would have the institutional capacity to institute such a system.

3.2 Consideration of specific components of the waste management regime currently and potentially relevant to MBIs and plastics

3.2.1 National strategies

National strategies can promote MBIs and identify activities that are linked to them. The NWMS (referenced above) is a statutory requirement of NEMWA and holds the idea of the circular economy at its centre.²⁰² Essentially, the NWMS provides a framework for the implementation of NEMWA and applies to all organs of state that have a responsibility for waste management.²⁰³ One of the strategy's "pillars" is "waste minimisation".²⁰⁴ As established above, MBIs can be used to minimise waste in various ways, and there is space to incorporate their use into the

²⁰⁰ NEMA section 49A.

²⁰¹ NEMA section 49B.

²⁰² NWMS at forward.

²⁰³ NWMS at 3.2

²⁰⁴ NWMS at 5.1.

implementation of the NWMS, despite the strategy not explicitly mentioning MBIs. Plastics would be included in the waste that is minimised.

The *Circular Economy Guidelines for the Waste Sector (CEGWS)*²⁰⁵ focus on the transition to a circular economy.²⁰⁶ It aims to provide for circularity in the waste sector by improving the reuse and redistribution of materials.²⁰⁷ The CEGWS makes specific mention of plastic waste, stating that South Africa needs to explore methods of recycling plastics within the Republic's borders because the rate of landfilling of plastics is expected to increase now that South Africa cannot export plastic waste to other markets.²⁰⁸ MBIs can assist South Africa in increasing its recycling rates. As discussed above, MBIs can assist with both recycling and waste minimisation, which would fit in with the circular economy model.

The *Municipal Waste Sector Plan (MWSP)*²⁰⁹ was promulgated in August of 2011. It aims to remedy the waste service backlogs in South Africa by developing, implementing, and maintaining an integrated waste management system which will contribute to practical and sustainable waste services and improve the quality of life of all people and the environment.²¹⁰ Moving towards a circular economy will aid South Africa in remedying the waste service backlogs by decreasing the amount of waste thrown away. MBIs are a tool which can do this, especially downstream MBIs which encourage separation of waste at the source.

The *Packaging Guideline: Recyclability by Design for Packaging and Paper in South Africa (Packaging Guidelines)*²¹¹ is currently out for public comment. The objective of the project is to be able to assist designers of paper and packaging by providing them with a better understanding of the environmental implications of their designs to reduce the volume of packaging sent to landfills.²¹² The Packaging Guidelines specifically mention plastics and gives guidance as to how certain plastics should be designed to reduce their environmental impacts.²¹³ Designing

²⁰⁵ *A Circular Economy Guideline for the Waste Sector.*

²⁰⁶ Above at executive summary.

²⁰⁷ Above at 3.2.2.

²⁰⁸ Above at 3.2.2. China used to accept exported plastic waste, but has since put a ban on it.

²⁰⁹ GN 270 of 2012.

²¹⁰ Above at 2.

²¹¹ GN 1005 of 2021.

²¹² Packaging Guidelines at introduction.

²¹³ Packaging Guidelines at section 7.

plastics that can be recycled more easily will favour the circular economy model, as this allows valuable material to be reused. However, the Packaging Guidelines do not make provision for recycling activities and choose to focus solely on plastic design as a method of reducing plastic waste.

3.2.2 Industry waste management plans for plastic packaging

Industry waste management plans (IWMPs) are submitted by an organ of state or an industry where a waste generation activity affects more than one province or is conducted in more than one province.²¹⁴ A notice was published in 2017 which called upon the paper and packaging industry to prepare and submit IWMPs to the Minister for approval.²¹⁵ The notice called for the development of Producer Responsibility Organisations (PROs),²¹⁶ had an extensive list of minimum requirements, and was intended to align with EPR (as contemplated in the NPSWM).²¹⁷ The notice applied to producers who were involved in industries which commercially manufacture, convert, and refurbish or imports paper and packaging materials.

In 2018, Packaging South Africa submitted a draft IWMP in accordance with EPR.²¹⁸ The plan made provision for the Minister to “foster meaningful work opportunities, encourage partnerships and provide a platform for transformation,”²¹⁹ and included a pricing model to be followed by an “industry led, industry funded” model.²²⁰ The plan also included various targets for each material stream in the waste sector. Regarding plastic waste, the collection target was set to increase to 55.4% by 2023, as opposed to the 48% which currently stands.²²¹

The IWMP faced various criticisms and the targets that were set were deemed “questionable”.²²² Commentators have suggested that the targets are “unambitious” and should be set by government²²³ while leaving the industry to

²¹⁴ NEMWA section 28(1).

²¹⁵ GN 1353 of 2017.

²¹⁶ PROs are non-profit companies established in a regulated sector to support the implementation of IWMPs as per regulation 4 of GN 1353 GG 41303 of 6 December 2017.

²¹⁷ Regulation 6(1)(m) of GN 1353 GG 41303 of 6 December 2017.

²¹⁸ Packaging SA *Extended Producer Responsibility Plan* vol 1 (draft) (2018).

²¹⁹ 17.

²²⁰ 22.

²²¹ 22.

²²² Rumble 2019 *SA Journal of Environmental Law and Policy* 102.

²²³ Government has not set long-term targets in relation to plastic waste and IWMPs will therefore play an important role in South Africa’s waste management system.

decide on how these targets should be achieved.²²⁴ The Minister is also able to set targets for waste reduction under the NWMS,²²⁵ but these targets have not been met.²²⁶ In December 2019, the Minister published a notice to withdraw the IWMP on the basis that it did not comply with the specified criteria.²²⁷

This IWMP should be reinstated. IWMPs, in general, have the potential to put forward a framework in which MBIs can exist and should be used to create incentives for the regulation of plastic waste. The above IWMP has the potential to do so by increasing recycling targets, thereby creating an enabling environment for plastics to be recycled.

3.2.3 Nations, provincial, and local norms and standards

The local government is responsible for waste management²²⁸ and provinces and municipalities are required to develop plans to set targets for the collection, reuse, and recycling of waste.²²⁹ Municipalities are required to make recycling assessable by providing containers for recycling for assessable recycling drop-off points.²³⁰ Municipalities are also required to take various actions in relation to recycling, such as including a goal that 25% of recyclables are directed away from landfills.²³¹

The *National Waste Collection Standards*²³² were published in 2011 by the Minister and aim to “ensure a basic level of service provision and equitable waste collection services”. Waste needs to be separated at the source and development in the waste management sector must be encouraged in line with the relevant IWMP.²³³ Municipalities need to make it accessible for households to recycle their

²²⁴ Comments made by stakeholders at the IUCN MARPLASTICCS Workshop held with stakeholders and the DEFF on 16 January 2019.

²²⁵ NEMWA section 6(2).

²²⁶ Comments made by stakeholders at the IUCN MARPLASTICCS Workshop held with stakeholders and the DEFF on 16 January 2019.

²²⁷ Withdrawal of section 28 Notice Calling for Paper and Packing Industry, Electrical and Electronic Industry, and Lighting Industry Waste Management Plans in terms of s 28 of the National Environmental Management: Waste Act 59 of 2008 in GN 1659 of 2019.

²²⁸ Schedule 5 of the Constitution of the Republic of South Africa, 1996.

²²⁹ NEMWA section 12.

²³⁰ NEMWA section 23.

²³¹ NWMS goal 1.

²³² GN 21 of 2011.

²³³ Above at paragraph 4.2.

waste, and there is an express provision in the standards that enable plastics to be collected from households to communal drop-off points.²³⁴

Unfortunately, the above is not the reality in South Africa. Municipalities have struggled to provide the minimum waste services in many jurisdictions²³⁵ and there is a serious shortage of landfill space.²³⁶ Many municipalities do not have bylaws that require households to separate their waste.²³⁷ There are various reasons for this, such as the lack of capacity, especially in rural areas, and the lower (and therefore more attractive) cost of landfilling.²³⁸ MBIs can assist with diverting waste away from landfills, as they encourage waste minimisation and recycling. This will create an enabling environment for the circular economy model.

3.2.4 Priority wastes and prohibition of products

The Minister can declare priority wastes²³⁹ and prohibit certain products.²⁴⁰ Unfortunately, she has yet to do so, and South Africa does not have any current bans on plastic products.²⁴¹ The DEFF have considered bans on items such as straws and plastic cutlery, as well as imposing a tax on single-use plastics.²⁴² However, this has been met with opposition from industry stakeholders who say that there is a lack of suitable plastic alternatives, even though it would still be an advantage to ban some of the more problematic plastic products.²⁴³

The NWMS defines priority waste as a category of waste that require special waste management measures, due to their risks to human health and the environment.²⁴⁴ Declaring priority wastes could limit or prohibit generation of that waste and require a detailed registration and reporting of that waste, limit its import and export, and result in a waste being completely phased-out.²⁴⁵ This means that

²³⁴ Above.

²³⁵ Rumble 2019 *SA Journal of Environmental Law and Policy* 102.

²³⁶ Godfrey and Oelofse 2017 *Resources* 5.

²³⁷ Packaging SA *Extended Producer Responsibility Plan* vol 1 (draft) (2018).

²³⁸ Rumble 2019 *SA Journal of Environmental Law and Policy* 102.

²³⁹ NEMWA section 14.

²⁴⁰ NEMA section 39A.

²⁴¹ Although one might see the ban on plastic bags below a minimum thickness to be a product ban.

²⁴² Donnelly *Mail and Guardian* available: at <https://mg.co.za/article/2019-04-18-00-death-ortaxes-for-polluting-plastic>.

²⁴³ See UNEP *The State of Plastics: World Environment Day Outlook* (2018).

²⁴⁴ NWMS at 8.

²⁴⁵ 50.

the declaration of a priority waste is considered very carefully, and it the most likely reason as to why none have been declared.

The NWMS also provides for the decision-making process for declaring priority wastes.²⁴⁶ Various factors need to be considered, such as the threat being considered harmful in its current quantity and composition, the availability of a suitable alternative, and the effect on the national economy. It is likely that plastic has not been declared a priority waste because it does not meet those thresholds. For example, while plastic is harmful to health and to the environment in its current quantity and composition, there are no suitable alternatives present and it will have a negative effect on the national economy.²⁴⁷ In addition, South Africa relies heavily on the import and export of certain products, and this would be negatively impacted should plastic be declared a priority waste as plastic is used in packaging.

There is the potential for certain plastic products to be declared priority wastes or to be banned. Government should consider the more problematic plastic products, such as single-use plastic packaging, for such bans. This would shift plastic design away from single-use into the direction of multi-use plastic that is able to be recycled back into the circular economy.

3.2.5 Listed activities

NEMWA makes provision for listed waste management activities.²⁴⁸ The Minister may publish a notice in the *Government Gazette* listing such activities that have, or are likely to have, a detrimental effect on the environment. Persons conducting listed activities are required a license to do so. Two such notices have been published, the first being the *List of Waste Management Activities that have, or are likely to have, a Detrimental Effect on the Environment*²⁴⁹ and the second being the amendment to this list.²⁵⁰

Neither of these lists mention plastic waste. Another amendment to the list should be promulgated requiring those that create virgin plastic to have a licence for such an activity. This more stringent requirement would reduce the number of people

²⁴⁶ 51.

²⁴⁷ While it is true that there are alternatives to plastic such as paper, it cannot be said that these alternatives are suitable because of their creation costs, both environmentally and economically.

²⁴⁸ NEMWA sections 19 and 20.

²⁴⁹ GN 921 of 2013.

²⁵⁰ GN 1094 of 2017.

creating virgin plastics and incentivise those who do not have a licence to reuse and recycle plastic to create their products. This keeps valuable plastic in the circular economy.

MBIs are a tool which can be used to incentivise such reuse and recycling. A combination of downstream and upstream instruments can do so. The downstream instrument would incentivise the valuable waste (such as plastic) to be separated out of the waste stream and set aside for recycling. The upstream instrument, for example, DRS, would provide the mechanism for the recycling of the plastic to take place.

3.2.6 Regulations

Various regulations pertaining to waste management have been promulgated in terms of NEMWA.²⁵¹ However, only two of these regulations specifically mention plastic waste (*Plastic Carrier Bags and Plastic Flat Bags Regulations*²⁵² and the *Extended Producer Responsibility Scheme for paper, packaging and some single use products*²⁵³). Missed opportunities include the *National Domestic Waste Collection Regulations*²⁵⁴ and the *NWSM*.²⁵⁵

The *Extended Producer Responsibility Regulations (EPR Regulations)*²⁵⁶ would provide the opportunity for plastic recycling by encouraging and enabling the implementation of the circular economy initiatives.²⁵⁷ The Minister needs to promulgate regulations that relate specifically to the recycling of plastic waste to work in conjunction with the *EPR regulations* above. The *EPR Regulations* already make provision for the circular economy, so new regulations regarding how plastics can be recycled using EPR to encourage and enable the circular economy would be advantageous. EPR is an MBI, but other MBIs can also be used to further the circular economy model, such as downstream MBIs that encourage the separation of waste at the source.

²⁵¹ NEMWA section 69.

²⁵² GNR 625 2003.

²⁵³ GN 1187 of 2020.

²⁵⁴ GN 21 of 2011.

²⁵⁵ GN 56 of 2021.

²⁵⁶ GN 1184 of 2020.

²⁵⁷ Regulation 2(3) of GN 1184 of 2020.

3.3 Existing market-based instruments in South Africa

This dissertation discusses four existing MBIs currently used in South Africa: the Plastic Bag Regulations, deductions in respect of scientific or technological research and development, deduction in respect of environmental capital expenditure, and non-residential tariffs.

3.3.1 The Plastic Bag Regulations

In many countries, policy makers have viewed the litter created from plastic bags as a major problem.²⁵⁸ To combat this problem, the *Plastic Carrier Bags and Plastic Flat Bags Regulations* (Plastic Bag Regulations)²⁵⁹ were published under the Environment Conservation Act²⁶⁰ by the then Minister of Environmental Affairs and Tourism. These regulations, revised a year later, sought to reduce the demand for plastic bags so that fewer of them would end up in the environment.²⁶¹

The Plastic Bag Regulations increased the minimum thickness of plastic shopping bags from 17 microns to 30 microns.²⁶² The increase made plastic bags more durable and aimed to incentivise consumers to reuse them.²⁶³ The Plastic Bag Regulations also charged a levy on new plastic bags to discourage people from purchasing them.²⁶⁴ This levy was imposed by the National Treasury and, to compensate, retailers imposed a relatively larger charge on plastic bags (as they did not want to absorb the cost of the National Treasury's levy). The combined levy was successful and there was an initial 80% reduction in the purchase of plastic bags after this levy was introduced.²⁶⁵

This type of regulation promotes the circular waste economy by allowing plastic bags to be reused. The regulation aligns with the NEMA principles in that it provides a mechanism for waste to be avoided and, where it cannot be avoided, minimised. It also aligns with NEMA's duty of care and gives effect to the polluter

²⁵⁸ Dikgang *et al* 2010 *University of Cape Town*.

²⁵⁹ Regulations under s 24(D) of the Environment Conservation Act 73 of 1989: Plastic Bag Regulations in GNR 543 of 2002.

²⁶⁰ 73 of 1989.

²⁶¹ Plastic bags were commonly referred to as the "national flower" at the time.

²⁶² GN 23393 of 2002. There was an original proposition for the minimum gauge to be 80 microns, but this was rejected due to push back from commerce and industry.

²⁶³ The thinner shopping bags are prone to breakage, so having one of thicker dimensions meant that it could be used more than once.

²⁶⁴ A nominal price of 46c per bag was set. This has since increased.

²⁶⁵ Rumble 2019 *SA Journal of Environmental Law and Policy* 125.

pays principle, as the one who buys the plastic bag bears the extra cost associated with pollution.

The Plastic Bag Regulations are a form of product ban, as they ban plastic bags with a thickness smaller than the minimum thickness provided. However, plastic bags are not banned outright and, in theory, bags with a thickness lower than the minimum thickness can still be created. The regulations are classified as an upstream MBI.

The original idea behind the plastic bag levy was to fund a recycling program set up by the non-profit company, Buyisa-e-Bag, which was wound up in 2011.²⁶⁶ Buyisa-e-Bag's functions were given to the DEFF who have confirmed that all monies from the levy are placed within the National Revenue Fund are collected by the National Treasury.²⁶⁷ However, only half of the collected amount has been used to fund the recycling industry to date.²⁶⁸ This underpins the first and possibly the primary criticism against the regulation. The regulation fails to adequately "recycle" the revenue in a fiscal sense and use it for dedicated environment purposes.²⁶⁹

The effectiveness of the quantum of the plastic bag levy is also called into issue.²⁷⁰ Plastic bag use is still widespread, despite the initial 80% reduction seen at the beginning of the levy.²⁷¹ Plastic bag consumption rose to 30% of the original production capacity in 2003 after a price reduction of the retail charge to consumers.²⁷² The department has failed to review the effectiveness of their policy, despite promising a revised policy in October 2018.

There are no suitable alternatives for plastic bags. Plastic bags are less environmentally severe than paper bags; their counterpart that is seen to be a more environmentally conscious choice. Many South African retailers do not stock plastic

²⁶⁶ Parliamentary Portfolio Committee on Environmental Affairs, Meeting Minutes, 16 June 2008 available at: <https://pmg.org.za/committee-meeting/13427/>.

²⁶⁷ Department of Environmental Affairs 'Department of Environmental Affairs strives to improve plastic bag recycling in South Africa' 12 April 2017, available at <https://www.environment.gov.za/mediarelease/deaonimproveplasticbagrecyclinginSA>.

²⁶⁸ According to media reports, approximately ZAR1.8bn has been raised as a result of the levy and ZAR919.6m has been allocated to recycling projects (Guy Rodgers 'Only Half of Plastic Bag Levy has Gone to Support Recycling' *Business Day* 19 March 2018).

²⁶⁹ Rumble 2019 *SA Journal of Environmental Law and Policy* 125.

²⁷⁰ 125.

²⁷¹ R Hasson *et al* 2017 *South African Journal of Economics* at 68.

²⁷² 68.

bags and instead, paper bags are sold as an alternative at a much higher cost. The advantage of this is that the bags are more durable and can be reused, and shoppers are encouraged to bring these types of bags with them when they are doing their shopping to avoid the extra cost. However, these more durable bags come at a cost to the environment, as paper bags do not biodegrade at a faster rate compared to plastic bags. They would in “ideal conditions”, but landfills (where they ultimately end up) are not said to be ideal conditions because the bags would not be exposed to the elements. This impedes their ability to break down.²⁷³ It takes 2.5 times as much energy to manufacture a paper bag than it does a plastic bag, and the raw materials to do so come from trees.²⁷⁴ Trees are important for carbon fixing, so manufacturing paper bags has a negative effect on the carbon in the atmosphere. In addition, paper bags create 70 times more air pollutants than plastic bags do and 50 times for water pollutants.²⁷⁵ People need to be discouraged from buying these bags new and instead bring reusable bags when shopping.

The Plastic Bag Regulations were amended in April 2021. The amendment included the introduction of “post-consumer recyclate” which is defined as “material generated by households of commercial, industrial or institutional facilities, in their role as end-users of the product, which can no longer be used for its intended purpose, and includes returns of material from the distribution chain, as well as inhouse scrap that already contains post-consumer recyclate content”.²⁷⁶ Goals were set for the minimum percentage of post-consumer recyclate that plastic bags should contain, set out at certain intervals until the goal of 100% post-consumer recyclate is achieved.

The amended regulations are arguably captured by the *EPR Regulations* mentioned above, which results in the potential for double taxation.²⁷⁷ Plastic bags falls into the definition of “packaging” under the *EPR Regulations* and, therefore, a producer of plastic bags is required to comply with the regulations should they place more than 10 tons of plastic bags into the market annually. They would then be required to pay the EPR fee, which raises the question of whether this fee would be

²⁷³ Mathu et al 2009 *Journal of Fiber Bioengineering and Informatics* 307.

²⁷⁴ Sevitz et al 2003 *South African Journal of Industrial Engineering* 67.

²⁷⁵ Ganesh 2015 *International Journal in Management and Social Science* 32.

²⁷⁶ Regulation 2 of GG 317 of 2021.

²⁷⁷ Rapson et al 2021 *Plastics* 30.

charged on top of the plastic bag levy.²⁷⁸ This would raise the cost of plastic bags sold to the public. However, this is not necessarily a bad thing, as a higher cost of plastic bags would incentivise consumers to re-use theirs and not buy new ones.

3.3.2 Deductions in respect of scientific or technological research and development

The Income Tax Act (ITA)²⁷⁹ makes provision for deductions in respect of scientific or technological research and development (R&D tax).²⁸⁰ It is important to note that this section only applies to a company that actually incurred expenditure on or after 1 January 2014 but before 1 October 2022. The company also needs to incur the expenditure directly and exclusively for the carrying out of research and development.²⁸¹

An operational (non-capital) deduction of 150% can be deducted when research and development is carried out in one of two scenarios: when the taxpayer performs approved research and development, or if the research and development is funded. Capital expenditure, excluding immovable property, machinery, plant implements, utensils, or articles also qualify for a 150% deduction.²⁸²

The R&D tax is an example of how an MBI can fit the broader policy and institutional environment, as discussed in the previous chapter. The National Treasury is using the ITA to incentivise scientific research and development, which would include environmentally sound behaviour. In addition, the ITA is the only place where this deduction appears. There are no guidelines or policy documents surrounding the deduction.

The definition of “research and development”²⁸³ is extensive. The R&D tax could potentially be applied to a person undertaking research and development in respect of plastic recycling, as such implement necessary for the plastic recycling would fall under the definition of an “invention”²⁸⁴ or a “functional design”.²⁸⁵ This would also include improving the function, performance, reliability, or quality of such

²⁷⁸ 31.

²⁷⁹ 58 of 1962.

²⁸⁰ ITA section 11D.

²⁸¹ Defined in ITA section 11D(1).

²⁸² ITA section 11D(2)(a).

²⁸³ ITA section 11D(1).

²⁸⁴ ITA section 11D(b)(i).

²⁸⁵ ITA section 11D(1)(b)(ii).

an invention or functional design,²⁸⁶ which would include an example such as improving the quality of plastic so that it can be recycled more easily.

The R&D tax incentivises companies to undertake technological research and development.²⁸⁷ People are incentivised to undertake such research and development because of the tax benefit that they receive when doing so. This makes scientific research more assessable and encourages growth in the field. The above definition as well as the 150% of actual expenditure on research and development is generous and, therefore, should have been a good incentive for scientific research and development in the field of plastics

However, the tax has a temporary nature. The tax deduction is only applicable for expenditure than occurred between 1 January 2014 and 1 October 2022. This is likely the reason why little success has been seen in such a tax, as it prevents the achievement of long-term goals.²⁸⁸ Taxpayers are more reluctant to make long-term research and development plans if their research and development is based on a temporary tax.²⁸⁹ Data suggests that taxpayers are deterred due to this lack of permanency.²⁹⁰ It should also be noted that the tax only applies to companies undertaking scientific and technological research and development.

3.3.3 Deductions in respect of environmental capital expenditure relating to environmental treatment and recycling assets

The ITA also makes provision for deductions for general capital environmental expenditure and post-trade environmental expenses.²⁹¹ These expenses are a legal precondition for operations in many instances and are applicable if a taxpayer uses either an environmental treatment and recycling asset, or an environmental waste disposal asset. These assets must be owned by that taxpayer during his trade, be in a supplementary process to a manufacturing or similar process, and be required by law for the purposes of complying with measures that protect the environment.²⁹²

²⁸⁶ ITA section 11D(1)(c).

²⁸⁷ Heath 2002 *Mich St U Det C LJ Int'l L* 351.

²⁸⁸ 354.

²⁸⁹ Jones 1989 *Tax Law* 1089.

²⁹⁰ Jones 1989 *Tax Law* 1089.

²⁹¹ ITA section 37B.

²⁹² ITA section 37B(1) and (2).

There are two types of environmental capital assets: new and unused environmental treatment and recycling assets, and new and unused environmental waste disposal assets. New and unused environmental treatment and recycling assets enable the taxpayer to claim an allowance of 40% on the cost of the asset in the year that the asset is first brought into use and 20% in each of the following three years of assessment. This is an accelerated allowance of 40/20/20/20, which means, for example, that if a factory spends R1 million on pollution monitoring equipment, it can be written off at R400 000 for the first year and at R200 000 a year over the next three years.

New and unused environmental waste disposal assets enable the taxpayer to claim an allowance of 5% per year on the cost of the asset. A deduction from the income of the taxpayer from the year of assessment that the asset is first brought into use will be allowed.²⁹³ The full allowance will be deductible, even if the asset was not used for the full year and the total deduction under this section can never exceed 100% of the cost.²⁹⁴

Environmental expenditure is also an example of how an MBI can fit the broader policy and institutional environment, as discussed in the previous chapter. This is another example of the National Treasury furthering environmental agendas.

This section of the ITA contains two definitions, the first for “environmental treatment and recycling assets”²⁹⁵ and the second for “environmental waste disposal assets”.²⁹⁶ Both definitions make provision for “solid waste”,²⁹⁷ thereby allowing plastic waste to be incorporated into the scope of the Act, as this is a form of solid waste.

Plastic waste can be incorporated in terms of the following example. A factory producing plastics can invest in a type of “monitoring equipment” to observe their

²⁹³ ITA section 37B(2).

²⁹⁴ ITA section 37B(9).

²⁹⁵ Air, water and solid waste treatment and recycling plant or pollution control, monitoring equipment and improvements to the plant and equipment used in the taxpayer’s trade in a process ancillary to a process of manufacture or similar process and which are required by South African law to comply with measures that protect the environment.

²⁹⁶ Air, water and solid waste disposal sites, dams, dumps, reservoirs or similar structures or improvements thereto, provided that the structures are of a permanent nature and utilised in the taxpayer’s trade in a process that is ancillary to a process of manufacture or similar process.

²⁹⁷ “Environmental treatment and recycling asset” makes provision for a “solid waste treatment and recycling plant” and “environmental waste disposal asset” makes provision for a “solid waste disposal site”.

plastic product over the course of the plastic product's life. The monitoring equipment can work in conjunction with EPR, providing a mechanism to keep track of a plastic product before the plastic product is brought back to the producer for recycling. Additionally, the factory can invest in recycling equipment for when the plastic product is returned. This ensures that the plastic product is recycled in line with the circular economy.

Both definitions refer to “new and unused” environmental treatment and recycling assets and environmental waste disposal assets.²⁹⁸ This means that the assets would not qualify for the allowance had they been previously used for any purpose. They need to be newly made, which means that even an asset that remained unused for some years (such as an asset in storage) and then used would not qualify. This is a possible shortcoming of this section. An asset might lie unused for various reasons, for example, one that was in storage and then sold to a new owner. Similarly, selling a used asset to a new owner would not qualify as ‘new and unused’ and the new owner would not qualify for the allowance. An owner would have to buy a brand-new asset to qualify, which might be above their budget. Additionally, manufacturers of such assets would have to sell them quickly for them to remain “new”. All assets naturally depreciate, and this depreciation has tax implications. This depreciation is likely why the asset must be “new and unused” to receive the tax allowance.

3.3.4 Non-residential tariffs

Non-residential tariffs are “loosely based” on the average volume of waste collected.²⁹⁹ The tariffs are charged per contained and/or according to the frequency on container disposed of and are therefore a form of volumetric tariff. Non-residential tariffs are a loose application of the polluter pays principle because the tariffs are applied to a category of consumer rather than individual households.³⁰⁰ Industry players are encouraged to produce less waste as the tariff means that they would be charged more money for waste disposal the more waste they produce.

²⁹⁸ ITA section 37B(2)(a) and (b).

²⁹⁹ *Municipal Solid Waste Tariff Strategy* at section 5.2

³⁰⁰ *Municipal Solid Waste Tariff Strategy* at section 5.2

The *Solid Waste Tariff Setting Guidelines for Local Authorities (SWTSLA)*³⁰¹ make mention of non-residential tariffs and provide guidelines which the local authorities should consider when implementing them. The SWTSLA are guidelines for the municipality and, therefore, the local authority has a choice of whether to heed the guidelines or not. The local authority can decide whether to implement their tariff setting in line with what the guidelines are saying, as it is merely suggestive. The SWTSLA provides a holistic overview of the tariff system and creates an enabling environment for municipalities to implement their tariffs. Regulations need to be promulgated for tariff setting. Regulations are stronger than guidelines and put the onus on the local authority to implement the tariff correctly.

It should be noted that the tariffs are not applied to individual households. This is likely due to the lack of institutional capacity in South Africa to enforce separate tariffs. Enforcing separate tariffs would place a large burden on the local government, as each tariff would have to be calculated individually for each household. This would require time and resources. However, one could also argue that having the need to enforce separate tariffs would create job opportunities, as someone would have to be employed to do the calculations.

The non-residential tariff is applied generally across all waste streams. This means that, while it can be used to combat plastic waste, it does not target this specific waste type. It aims to target the by-products of industrial processes, of which plastic is not (plastic creation is the desired outcome of an industrial process, and only becomes a waste product once its useful life has expired).

³⁰¹ *Municipal Solid Waste Tariff Strategy.*

4. Options for reform of South Africa's legal and policy framework relevant to promoting better recycling, reuse, and reduction of plastics in the circular waste economy.

There are options to reform existing MBIs in South Africa as well as to introduce new MBIs into the circular economy to promote the better recycling, reuse, and reduction of plastic waste. This chapter is divided into two sections: reforms to existing MBIs and the introduction of new MBIs. The Plastic Bag Regulations, R&D tax, deductions for environmental expenditure, and non-residential tariffs are discussed again, and ideas are put forward to improve upon these MBIs to further the circular economy.

Certain reforms can take place to both downstream and upstream instruments. The best way to reform a downstream instrument would be to couple the instrument with a command-and-control measure such as a fine for non-compliance. However, South Africa is unlikely to have the institutional capacity to enforce such a fine. The tariff or tax also needs to be set at the optimal amount so that it is not too high (so that illegal dumping is encouraged) or not too low (so that people are not inclined to simply just pay it).

It would be a better solution to investigate reforming upstream instruments over downstream instruments, as it is more likely that South Africa has the institutional capacity to implement them. There are legal mechanisms which can be used to introduce input and material taxes, products taxes, as well as new DRS, all of which are discussed in the chapter below.

4.1 Reforming existing market-based instruments

4.1.1 Plastic Bag Regulations

Despite the initial 80% reduction, the Plastic Bag Regulations have been largely unsuccessful as plastic bag use is still widespread.³⁰² It is likely that the tariff is not set at a high enough amount to discourage consumers from buying new plastic bags, because it is more convenient to buy a new plastic bag than it is to bring their

³⁰² R Hasson *et al* 2017 *South African Journal of Economics* 68.

own when shopping. To solve this problem, the Minister needs to increase the levy on plastic bags to an amount that effectively discourages consumers from buying new ones and incentivises consumers to reuse the (thicker) plastic bags which they already have. This can be done through publishing a notice in the *Government Gazette* to amend the Plastic Bag Regulations.

There needs to be effective alternatives to the plastic bags available. As discussed in the previous chapter, paper bags are also problematic and they are more difficult to reuse than their plastic and material counterparts, as they cannot be folded (and therefore transported) in the same way. Material bags are also problematic and must be used over one-hundred times to negate their carbon footprint.³⁰³

A solution to the above could be to increase the minimum thickness of plastic bags to make them even more durable and therefore encourage reuse. This would be a better alternative to paper and material bags, as plastic bags are more easily recycled and have a lower carbon footprint.³⁰⁴ The same logic can be used in an argument against banning plastic bags outright, as plastic bags are essentially more environmentally friendly than their alternatives. Plastic bags simply need to be made thicker so that they can be reused multiple times.

The current specifications for plastic bag thickness are published in the Plastic Bag Regulations. An amendment to these regulations was published in 2021 but was quiet on the minimum thickness of plastic bags. The Minister needs to publish another amendment in the *Government Gazette* to increase the minimum thickness of plastic bags.

There are compliance and enforcement implications regarding the increase to the minimum thickness of plastic bags. Law enforcement would need to ensure that plastic bags below the minimum thickness are not produced and distributed. The above might prove to be more difficult to enforce than an outright ban on plastic bags would be. However, given the environmental effects of plastic alternatives, it could

³⁰³Statistic available at: <https://www.omnicalculator.com/ecology/eco-friendly-bags#cotton-tote-bags-are-they-so-eco-friendly>

³⁰⁴Sevitz *et al* 2003 *South African Journal of Industrial Engineering* 67.

be said that the difficult compliance and enforcement implications are necessary to reach the environmental objective of the Plastic Bag Regulations.

Another area for reforming the plastic bag tariff is to use the levy raised on the sale of plastic bags to fund a recycling programme, as it was originally intended to. For example, funds can be directed to the local government to improve their recycling infrastructure. This could be done by bettering the roadside (household) collection of recyclables or creating more recycling drop-off points in municipalities.

It would not make sense to better the roadside collection of plastic waste only, as this would mean that households would have to find an alternative way of disposing of their other recyclables and would arguably be against the environmental objective of using the plastic bag levy to fund recycling programmes to better the environment. In an ideal system, households would be able to have all their recyclables collected from their houses. These recyclables would then be separated into their various materials (such as paper and plastic) once they reached the recycling plant. This has the advantage of recycling not only plastic waste, but other materials as well.

An alternative to funding a recycling programme could be to redistribute the funds to improve infrastructure and service delivery in the waste management industry, creating thousands of jobs (and safeguarding many more) in the process.³⁰⁵ The South African government would be able to do this by simply redirecting their funds.

The government also needs to do more in raising public support for the plastic bag tax. If the funds raised went towards a clear environmental objective, the public would be more likely to support it. Currently, it is unclear as to where the funds are going.

4.1.2 Tax deductions for research and development

As stated in the previous chapter, the definition for “research and development” is extensive and it can be accepted that the research and development that qualifies for the tax incentive must be scientific or technological. However, scientific or technological research and development does not necessarily

³⁰⁵ For more information, see: <https://www.plasticsinfo.co.za/2019/07/23/plastic-bag-levy-should-only-be-used-to-fight-pollution/>.

have to be environmental. It is arguable that further incentives should be applied to companies that undertake research and development that aids the environment.

The ITA can be amended to include “environmental research and development” to specifically incentivise the above. This further definition would include an additional tax benefit for environmental research and development. Alternatively, NEMA or NEMWA could be amended to include a provision on environmental research and development. This provision would work in hand with the ITA to further incentivise this MBI.

The R&D tax is only applicable to companies carrying out scientific or technological research and development. It should be noted that other institutions, such as tertiary education institutions also carry out this type of research and development. However, tertiary institutions do not qualify for the R&D tax deduction. The ITA should be extended to include tertiary institutions (and possible others) as institutions that can receive the R&D tax deduction, as this would incentivise these institutions to further undertake such research and development. If this extension is coupled with the amendment to the ITA, NEMA or NEMWA discussed above that would specifically provide for “environmental research and development”, environmental research and development would further be incentivised and undertaken more readily by tertiary institutions.

Research and development is expensive and time consuming. Time is taken through experimentation and such experiments need to be repeated to ensure the same result is obtained each time. In addition, many experiments fail, and one would need to go back and reassess their methods. This is why the temporary nature of the tax, as discussed in the previous chapter, is not ideal, as it discourages those wishing to undertake long-term experiments from doing so. An amendment should be made to the ITA to allow for an extension of the time period for when the deduction is allowed, or simply do away with the time period all together.

4.1.3 Tax deductions for environmental expenditure

The first opportunity for the reform of tax deductions for environmental expenditure comes in the definition of “environmental waste disposal asset”. This asset needs to be one of a ‘permanent nature’. Therefore, an asset created for the temporary disposal of waste with the intention to close it down after a set period will

not get the tax benefit, as it is not “permanent”. For example, “waste transfer stations”³⁰⁶ are described by the Government as a “temporary facility”. These stations are intended to keep waste before it gets transferred to a disposal or processing facility and can be classified as “environmental waste disposal assets” because they are involved in the waste disposal chain. They are temporary structures and would not receive the tax benefit. The definition of ‘waste disposal asset’ could be extended to include assets such as this one that are of a temporary nature, this making the tax benefit more accessible.

The phrase “new and unused” can be edited too. The phrase could be modified to include assets that are not new and have been used before. This would mean that purchasers who buy second-hand assets would qualify for the tax benefit. There is also the potential for the new owner to improve upon the asset, thus qualifying for the R&D tax deduction discussed in the previous chapter. This would further incentivise scientific research and development and encourage environmental expenditure. For example, an asset created for the purpose of recycling plastic (a possible “environmental treatment and recycling asset”) could be sold to a new owner and improved upon. This action should not negate the tax incentive.

The whole section could be extended to include other types of assets that do not strictly fall into the category of “environmental treatment and recycling asset” or “environmental waste disposal asset”. For example, an asset that is used to create a viable plastic alternative or a type of plastic that can be recycled more easily would not qualify for the tax deduction because it is not strictly an “environmental treatment or recycling asset” or an “environmental waste disposal asset”. The ITA can be extended to include such assets that create environmentally friendly products.

4.1.4 Non-residential tariffs

The biggest danger associated with non-residential tariffs is that there is a risk for the tariff to encourage illegal dumping of waste. Polluting entities, especially those that are relatively poor, who would not want to pay the increased tariff fee could collect their extra waste and dump it. This would increase the risk of plastics

³⁰⁶ For information on waste transfer stations, visit:
<https://www.dffe.gov.za/projectsprogrammes/workingonwaste>.

(as well as other kinds of harmful waste products) entering the natural environment. This would directly contradict the aim of the tariff.

A solution to this problem (and a possible way to reform this MBI) is to couple the tariff with a command-and-control measure such as a fine or imprisonment. People caught illegally dumping their waste would be punished accordingly. In the case of a fine, it should be heavy enough to discourage people from illegally dumping their waste and, in the case of imprisonment, it should be a hefty enough sentence for the same reason.

However, in a resource-strained country such as South Africa (and other third world countries like it), it is unlikely that such command-and-control measures would be effectively enforced. The South African crime rate is relatively high, and the government is more likely to put police resources into combatting crimes such as theft and murder. Illegal dumping would be seen as a “lessor” crime in comparison.

On the opposite end of the spectrum, richer entities may be inclined to simply pay the tariff. Therefore, a volumetric tariff needs to be high enough so that it encourages the richer entities to waste less and recycle more, but low enough as not to encourage illegal dumping. The most likely solution would be to have higher tariff combined with a fine as discussed above, but again, this is unlikely to work in South Africa due to low enforcement capacity.

A study which examined volumetric tariffs in Switzerland³⁰⁷ found that public opposition seemed to be the main obstacle to such tariffs. The study looked at a decision made by the Supreme Court of Switzerland that mandated all municipalities in the Canton of Vaud to “apply the polluter pays principal to household³⁰⁸ waste by January 1, 2013”.³⁰⁹ This involved the creation of volumetric tariffs.

The study found that using volumetric tariffs decreased garbage being sent to incineration by up to 40%³¹⁰ and that there was little to no evidence of “undesirable behaviour”³¹¹ (ie: leakage and illegal dumping). They found that the main obstacle of public opposition decreased as the tax was implemented, as people began to

³⁰⁷ S Carattini *et al* 2018 *Ecological Economics*.

³⁰⁸ The non-residential tariff does not apply to households, but the same principle applies in this study.

³⁰⁹ 132.

³¹⁰ 143.

³¹¹ 144.

understand how the tax worked and that implementation improved the program's effectiveness and fairness.³¹² The study found that volumetric tariffs in Switzerland were successful.

While this study is helpful, it is important to note that, unlike South Africa, Switzerland is a developed country with resources that South Africa does not have. Due to the high levels of poverty in South Africa, it is more likely that the country will experience higher levels of illegal dumping.

It should be noted non-residential tariffs are not implemented for individual households and rather apply to industry. It can be argued that they should be extended to include residential households. The tariffs would have to be implemented at local government level as this sphere of government is responsible for setting waste rates. This can be done through the setting of norms and standards or regulations by the Minister.

It should also be noted that non-residential tariffs do not apply specifically to plastic, but rather to general waste. However, they have the potential to combat plastic waste in the sense that they encourage the separation of general waste at the source.

4.2 Introduction of new market-based instruments

4.2.1 Downstream instruments

According to the NPSWM, South Africa does not have the correct infrastructure to implement downstream MBIs.³¹³ However, there are certain actions that the Minister can undertake to create an enabling environment for the future implementation of downstream MBIs.

The NEMA principles need to be taken into account when reading NEMA and creating new laws and policies in line with it. Therefore, when creating new laws and policies, the principle that waste should be minimised, reused, recycled, or, if that is not possible, be disposed of responsibly,³¹⁴ should be remembered. This principle helps to create the above enabling environment as it speaks to recycling and, if that is not possible, responsible deposition.

³¹² 144.

³¹³ MPSWM at 23.

³¹⁴ NEMA section 2(4)(a)(iv).

The principle of responsible deposition needs to be remembered when imposing MBIs such as disposal taxes. The NWSM makes provision for such taxes, but taxes are currently set at a flat rate by municipalities. The Minister needs to amend or promulgate regulations to enable municipalities to set variable rates of landfill taxes, such as disposal taxes that force households to pay an increased fee if they are wasting more. These disposal taxes should be in line with the relevant IWMP, which the relevant organ of state or industry needs to submit to the Minister.

To enable an environment in which to eventually introduce volumetric tariffs, the Minister can adopt norms and standards to aid in the collection of plastic packaging. If plastic packaging collection is specifically provided for, households would be incentivised to separate their waste so that plastics can be recycled. The Minister can start this process by providing for the collection of recyclable waste in general and then streamline it so that different recyclables are collected separately.

In South Africa, recycling is not an easy feat. While some municipalities (such as Pinelands in Cape Town) have infrastructure in place to collect household recycling each week, most municipalities do not. In some areas (such as Vredehoek in Cape Town), private companies are contracted to collect recycling. However, this is not the norm and most areas in South Africa do not have their recyclables collected. This means that recycling is not easy for most households, which is likely a reason as to why many households do not recycle in the first place.

Organisations such as *Oasis*³¹⁵ act as drop-off points for recyclables. However, due to transport constraints, many South African citizens are not able to deliver their recyclables to these places. For this reason, municipalities should be allocated the resources to allow for the collection of recyclables from South African homes. If recycling is made easy, more households are likely to do it.

An enabling environment needs to be created to foster a culture of recycling. The *National Domestic Waste Collection Standards*³¹⁶ create such an environment in sections 4 and 5. However, they are currently not being used in the correct manner to foster this culture of recycling. The standards may be amended to include a

³¹⁵ Information on Oasis can be found at: <https://oasis.org.za/>.

³¹⁶ GN 21 of 2011.

provision regarding volumetric tariffs as a way to incentive households to actually do what the standards employ.

4.2.2 Upstream instruments

Input and material taxes could be used in the packaging industry to decrease the amount of plastic waste sold to households. The tax places a burden on the producers of plastic products, thereby making a more obvious price difference between products that are environmentally friendly (ones with less or recyclable packaging) and products that are not. This would encourage consumers to make more environmentally friendly choices because it would be cheaper, and aid in keeping plastic out of the environment.

The easiest way to implement input and material taxes would be for the Minister to promulgate a new set of regulations in terms of NEMWA, similar to the Plastic Bag Regulations. For example, the regulations could impose a fee on producers using virgin plastic to create their products, thereby incentivising them to use recycled materials instead. Alternatively, the regulations could tax producers who create products out of plastic that cannot be recycled and therefore incentivise them to create recyclable products.

It is important to note that product taxes can be implemented in the same way through the use of regulations. New regulations can be promulgated to tax products that are not made out of recyclable or recycled material, thereby incentivising consumers to purchase the more environmentally friendly alternative. Single-use plastic products can be taxed in the same way.

Another way to implement input and material taxes would be for the Minister to promulgate new norms and standards. These norms and standards could provide for recycled material (ie: not virgin plastic) to be used by industry and therefore provide a mechanism for producers to stop using virgin plastic in their products. The same idea can be applied to products which are made out of recyclable material.

Priority waste and product bans can also be used in relation to input and material taxes. The Minister has not yet declared any priority wastes, nor has she banned certain products (except for plastic bags below a prescribed minimum thickness), and there is an opportunity for her to do so in relation to certain kinds of plastics. As mentioned in the previous chapter, the NWMS provides for the decision-

making process for declaring priority wastes.³¹⁷ Virgin plastic has the potential to be declared a priority waste because it is harmful to the environment, there's the suitable alternative of using recycled plastic in industry, and it would not have a huge effect on the national economy because plastic is still being used, albeit recycled plastic. In this way, virgin plastic would be banned, and the circular economy model would be enhanced because recycled plastic would be used instead.

The use of virgin plastic to create new products could also be listed by the Minister as a listed activity. The *List of Waste Management Activities that have, or are likely to have, a Detrimental Effect on the Environment* mentioned in the previous chapter could be amended again to include the use of virgin plastic as a listed activity, as this arguably has a detrimental effect on the environment. This would require those who use virgin plastic to have a licence to do so. If such licenses are difficult to obtain, producers of plastic products would be incentivised to use recycled plastic to create their products instead of virgin plastic.

“Eco-labelling” or “green labelling” is a type of information tool with the potential to help consumers make more environmentally friendly purchasing decisions. Labels on products are influential marketing tools that convey essential communication between consumers, businesses, and public authorities.³¹⁸ Not only do they benefit the consumer, but they also benefit the manufacturer and the environment.³¹⁹

Eco-labels are useful mechanisms in situations where environmentally friendly products are more expensive than products that are not. They make the consumer aware that the product they are buying is more expensive because the manufacturer employed a more environmentally friendly technique, and this would hopefully influence their decision to buy the product even though it is more expensive. However, this is more likely to be successful in wealthier households and might not be very successful in South Africa where most consumers live below the poverty line.

DRS is one method to target consumers living below the poverty line, as it provides a positive monetary incentive to recycle. This is often combined with EPR,

³¹⁷ Factors such as the threat to the environment in the material's current quality and composition, the availability of a suitable alternative, and the effect on the national economy are considered.

³¹⁸ M Struwig and C Adendorff 2018 *Athens Journal of Business and Economics* at 163.

³¹⁹ 166.

as EPR puts the onus on the producer to make sure that their product is returned to them. One successful method in doing this is through a DRS. South Africa has various EPR regulations including the *Extended Producer Responsibility Regulations*³²⁰ and the *Extended Producer Responsibility Scheme for some paper, packaging and some single use products*.³²¹ The latter of the regulations provides that a producer of any of the products listed in paragraph 4 of the notice must develop and submit an EPR plan to the Minister or establish a producer responsibility organisation which must prepare and submit an EPR plan to the Minister by 5 November 2021. Unfortunately, this has not been done yet. This timeline should be extended to allow industry more time to comply with the regulations, as the short timeline between the regulations promulgation and 5 November 2021 has proven to be too short.

DRS can be encouraged through a new national strategy that promote the MBI and identify activities linked to it. An example of an activity linked to DRS is waste picking. Waste-pickers are common in South Africa's informal economy.³²² They are defined as "small-scale, self-employed agents, characteristically encountered in the informal sector".³²³ Waste is either collected for personal use or to be returned for money in schemes such as DRS. Waste picking is generally seen as "dirty"³²⁴ and therefore looked down on, but, despite this, it forms an important part of South Africa's (any many other developing countries') recycling economy.

A study in Cairo showed that their official waste management system could not be effectively managed without the many waste-pickers who operate in the informal sector.³²⁵ They collect waste at no cost to the local municipality and often form the basis of waste collection services. However, South African municipal waste systems are not built to accommodate waste-pickers, despite there being some 37 000 present in the informal economy.³²⁶

³²⁰ GN 1184 of 2020.

³²¹ GN1187 of 2020

³²² R Schneck and PF Blaauw 2011 *Urban Forum*.

³²³ Y Hayami *et al* 2006 *Journal of Development Studies* at 42.

³²⁴ R Huber *et al* 1998 *World Bank Discussion Paper No WDP* at 431.

³²⁵ P Gerdes and E Gunsilius 2010 available at: <http://www2.gtz.de/dokumente/bib-2010/gtz2010-0137en-informal-sectorsolid-waste-management.pdf>.

³²⁶ R Huber *et al* 1998 *World Bank Discussion Paper No WDP* at 432.

South Africa has a lot to learn from the waste picking systems of many developing countries and waste picking in the informal sector should be encouraged to manage the large streams of potentially recyclable materials that go to waste. Waste picking should be encouraged.

Government subsidies could be used to encourage waste picking in the informal sector. This could be done by allocating money to commercial entities to grow their DRS or EPR scheme. These schemes could provide that more money is given back for a refund, which would encourage more waste-picking as the reward would be higher.

5. Conclusion

It is almost impossible to imagine life without plastics, as they play an essential role in everyday life. As harmful as plastics are to human health and to the environment, they are incredibly useful and have a place in our economy. This dissertation has explored various avenues of reusing, reducing, and recycling plastics in the circular economy, as it concedes that plastics cannot be eliminated completely.

Incentive-based regulation is an effective method of regulation that can be used by developing countries to manage the environment. MBIs use an array of market processes and instruments to influence economic behaviour to achieve certain desired objectives, and South Africa's law and policy framework recognises them as a useful tool. However, despite their usefulness, MBIs are underutilised in South Africa. South Africa still relies too heavily on waste disposal mechanisms such as landfilling and incineration, which has adverse environmental consequences. In addition, waste management in the Republic has been largely uncoordinated and underfunded, with key issues including inadequate waste collection services, illegal dumping, unlicensed waste management activities, insufficient waste minimisation and recycling initiatives, a lack of waste information, and a lack of regulation and enforcement of legislation.

There are unavoidable trade-offs between environmental, social, and economic objectives in developing countries, and this makes sustainable development difficult and complex.³²⁷ This is because there is a need for quick social and economic development to overcome poverty which causes decision makers to prioritise economic and social goals over environmental ones.³²⁸ Where environmental, social, and economic goals are unequal in developing countries, a more balanced approach is appropriate. MBIs are well-suited to address such challenges.³²⁹

Many economists have tried to transplant complex MBIs that have worked well in developed countries into developing countries that might not be ready for

³²⁷ A Nahman *et al* 2008 *WIT Environmental Transactions on Ecology and the Environment* at 137.

³²⁸ 137.

³²⁹ 137.

them.³³⁰ This has caused them to fail. Therefore, several preconditions have been identified that are recommended to be in place before MBIs can prosper in the developing country context.

MBIs require “reasonably well functioning markets with adequately defined property rights, the presence of private enterprise motivated to reduce costs, some degree of competition, a competent judicial system, and limited price distortions”.³³¹ Unfortunately, developing countries are characterised by weakly functioning markets or market failure, and therefore these conditions fail to hold.³³² On top of this, fragmentation (for example, institutional and legislative fragmentation and horizontal and vertical fragmentation) causes major problems for MBIs.³³³

MBIs are administratively taxing on all levels of government.³³⁴ They “require sufficient institutional capacity in terms of acquiring relevant management information, monitoring compliance and illegal activities, and enforcement”.³³⁵ Unfortunately, many developing countries lack such capacity. “Institutional sustainability” is also an important concept.³³⁶ This is the concept that institutions need to be sustainable themselves to support environmental, social, and economic goals. This is an important notion in South Africa when considering the success of MBIs, as the implementation of MBIs can be an administrative burden.

It is important that there is political will to overcome environmental problems.³³⁷ This needs to be a priority issue, especially considering that many MBIs, such as taxes and charges, will be politically unpopular.³³⁸

There are also potential problems for the creation of MBIs in South Africa which counteract a potential enabling environment. These include fragmentation of South African environmental laws,³³⁹ public perception, and financial capacity.

³³⁰ G Bell *et al* 2002 *Issues in Science and Technology*; D O’Conor 1998 *Environment and Development Economics*; E Ostrom *et al* 2007 *Proceedings of the National Academy of Sciences*.

³³¹ Inter-American Development Bank 2003 *Economic instruments for solid waste management: global review and applications for Latin America and the Caribbean*.

³³² Nahman *et al* 2008 *Environmental Transactions on Ecology and the Environment*.

³³³ R Peart and J Wilson 1998 *The South African Journal of Environmental Law and Policy*.

³³⁴ Nahman *et al* 2008 *WIT Environmental Transactions on Ecology and the Environment* at 140.

³³⁵ 140.

³³⁶ R Huber *et al* 1998 *World Bank Discussion Paper No WDP*.

³³⁷ Nahman *et al* 2008 *WIT Environmental Transactions on Ecology and the Environment* at 140

³³⁸ 140.

³³⁹ R Peart and J Wilson 1998 *The South African Journal of Environmental Law and Policy*.

This dissertation has explored various options that exist for South Africa to improve and expand the use of MBIs to promote the better recycling, reuse, and reduction of plastic waste in the circular waste economy. It has distilled various theoretical possibilities that MBIs hold for South Africa, as well as South Africa's current use of MBIs and future possibilities. It has discussed four of South Africa's current MBIs in use (the Plastic Bag Regulations, R&D tax, capital environmental expenditure, and non-residential tariffs) and offered ideas for reform. It has also looked towards future possibilities for implementing new MBIs into the circular economy and offered ideas of the legal framework which would be needed to do so.

There are options for South Africa to implement MBIs into the circular economy framework. The South African legal system creates an enabling environment to implement such MBIs. However, this system is not being used to its full potential and there are opportunities for reform and addition of new MBIs. It is likely that MBIs will become more prominent in South Africa as the economy shifts from a linear economy to a circular economy in the future.

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