# AN ANALYSIS OF CARBON TAX AND OTHER ENVIRONMENTAL LEVIES: A SOUTH AFRICAN AND INTERNATIONAL PERSPECTIVE

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**MASTER OF COMMERCE (ACCOUNTING)**

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**by**

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I, Rolihlahla Vuzane declare, that:

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## ABSTRACT

As a "Non-Annex 1" country, there was no obligation for South Africa to reduce its carbon emissions. South Africa undertook, of its own volition, to take measures to reduce 34% of the carbon monoxide emissions by 2020 and 42% by 2025 respectively. In response, South Africa promulgated the Carbon Tax Act, No. 15 of 2019. This study seeks to answer the question: After analysing the range of environmental taxes levied in the Scandinavian countries (Denmark, Finland, Norway and Sweden) and in South Africa, are there lessons that can be learnt for South Africa? In answering this question, the carbon tax structure in South Africa and in selected Scandinavian countries is analysed, together with existing environmental taxes and the related policies, using a literature study. What is evident from the Scandinavian countries studied, is that environmental taxes have distributional effects and are effective in reducing carbon emissions. The major result of the study was that the real weakness of the newly introduced Carbon Tax Act is that in both in the first and second phase of its implementation, the carbon tax rate is too low to send an appropriate signal to the market and would not have the desired outcome. In addition, there are currently no guidelines that inform the revenue recycling technique to ensure transparency of revenue usage, improved energy management, or how the Carbon Tax Act will promote environmental quality. A major concern is that carbon tax revenue will not be ring-fenced. Given that South Africa is a developing country and depends mainly on non-renewable energy, it is inevitable that most of its sectors will be subject to the carbon tax. A plausible approach is the one that promotes the idea of taxing those more heavily that contribute most to environmental degradation and are highly energy concentrated, to promote parity between the harm to the environment and the taxes levied to redress the harm.



**Key words:** South Africa, Scandinavia, greenhouse gases, carbon emissions, carbon taxes, carbon leakages, Pigouvian taxes, externalities, environmental taxes, climate change and climate policy.

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**To my mother:**

*Patricia Nophakamisile Mbethe*

*Poor as you are, you are blessed, and who has ever thought that your only son can reach this educational height!!!*

*Enkosi Mama ngengqeqesho yakho nangothando lwakho endiluva ndilukhumbule yonke imihla!*

## ABBREVIATIONS

| | |
|---|---|
| **CO** | [Carbon monoxide] |
| **$CO_2$** | [Carbon dioxide] |
| **€** | **[**European Union Euro] |
| **EY** | [Ernst & Young] |
| **EU** | [European Union] |
| **GHG** | [Greenhouse gas] |
| **GWh** | [Gigawatt hours] |
| **Mt** | [Million tonnes] |
| **$NO_x$** | [Nitrogen Oxides] |
| **OECD** | [Organisation for Economic and Co-operation Development] |
| **OUTA** | [Organisation Undoing Tax Abuse] |
| **SADC** | [South African Developmental Countries' region] |
| **SARS** | [South African Revenue Service] |
| **$tCO_2e$** | [1 tonne of Carbon dioxide equivalent] |
| **UCT** | [University of Cape Town] |
| **USA** | [United States of America] |
| **US$** | [United States of America's Dollar] |
| **ZAR** | [South African currency, also denoted as "R" which is known as a Rand] |

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# CHAPTER 1
# INTRODUCTION

## 1.1 Research context

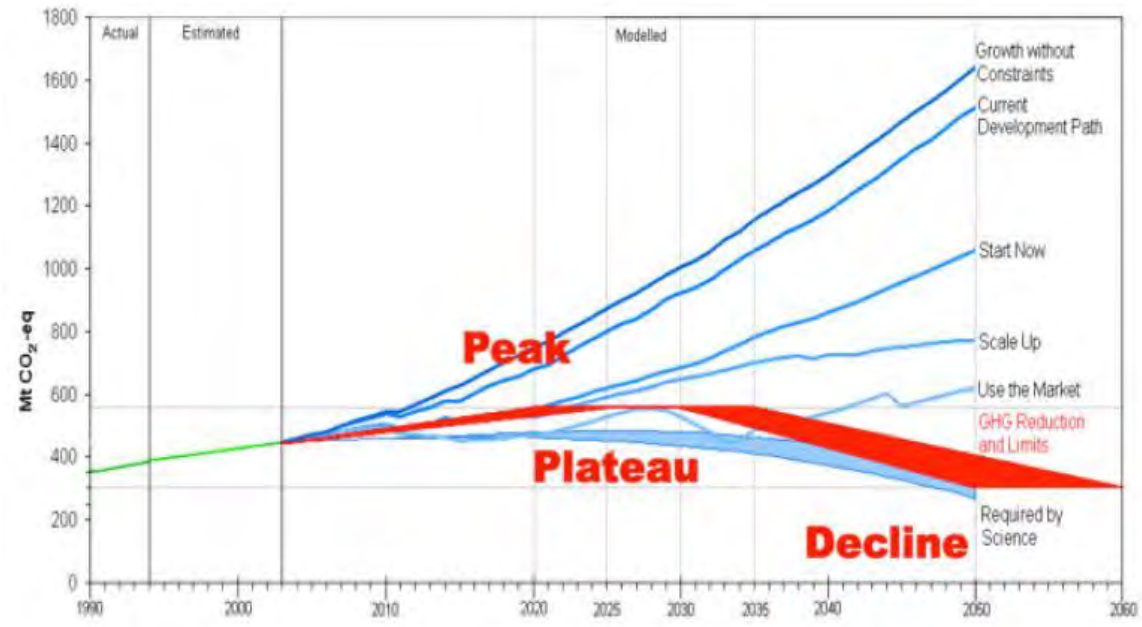
Air products (2014:1) states that:

> Carbon monoxide is a colourless, odourless, flammable, toxic gas. High-purity carbon monoxide that is dry and free of sulphur compounds is normally non-corrosive to metals at atmospheric pressure. Lower-purity grades containing moisture, sulphur compounds and other impurities can form toxic metal carbonyls and can cause stress corrosion cracking in carbon steels at elevated pressures. Chemically, carbon monoxide is stable but can act as a strong reducing agent at elevated temperatures.

The existence of carbon monoxide in the atmosphere creates adverse consequences for the environment. This is likely to affect the health adversely of human beings, animals and even plants, now and in the future. Weaver (1999) states that carbon monoxide poisoning is common but frequently unrecognised, since its signs and symptoms are relatively non-specific. This has resulted in deaths due to exposure to high levels of carbon monoxide (Chiew & Buckley, 2014).

South Africa is one of the most carbon-intensive countries in the world (Department of Environmental Affairs, 2014). About 80% of South Africa's carbon monoxide emissions are produced by the transport and electricity sectors and the metals industry (National Treasury, 2010a). The peak, plateau and decline trajectory (in Figure 1 below) illustrates the broad current climate policy and canvasses for a shift "from an energy intensive society to a more climate-friendly society as part of a pro-growth, pro-development and pro-jobs strategy" (Van Schalkwyk, 2008: Online).

***Figure 1: Peak-Plateau-Decline trajectory graph***




***Source*:** Putting a price on carbon. Proceedings of the conference held at the UCT (2010)

The line highlighted in red above, shows increased emissions in the years 2010-25, then a plateau until 2035 and a decline from 2035 to meet the required-by-science reduction target identified in the Long-Term Mitigating Scenario of between 30% and 40% by 2050 (Tyler, 2010). This trajectory was confirmed on the international stage in 2009 at the Copenhagen COP Summit at which South Africa voluntarily undertook to reduce 34% of its carbon monoxide emissions by 2020. Indeed, South Africa undertook to decrease a further 42% by 2025 (National Treasury, 2010a; Tyler, 2010; United Nations Framework Convention on Climate Change, 2015). In so doing South Africa intended to meet its reduction targets through the application of market-based instruments, in particular the introduction of carbon taxes (National Treasury, 2010a).

To start the process, the National Climate Change Response Green Paper was issued by the Department of Environmental Affairs (2010b) to embody the South African Government's commitment to a fair contribution to the stabilisation of global greenhouse gas concentrations in the atmosphere. "Greenhouse gas (GHG)" as defined by the Carbon Tax Act, No.15 of 2019 , "means gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation, and includes carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride ($SF_6$)", and the "carbon dioxide ($CO_2$) equivalent" means "the concentration of carbon dioxide that would cause the same amount of radiative forcing (the difference of sunlight absorbed by

the Earth and energy radiated back to space) as a given mixture of carbon dioxide and other greenhouse gases".

PricewaterhouseCoopers (2019:1) states that:

> GHG Emissions are determined by way of direct observation or by way of estimation. The methods that allow for direct emissions monitoring and the estimation of emissions are set out in the National Environmental Management Air Quality Act, No. 39 of 2004 (Act No. 39 of 2004), read with the National Greenhouse and Energy Reporting ("NGER") Regulations and the Technical Guidelines for Monitoring, Reporting and Verification of GHG emissions by industry and is based on the 2006 Intergovernmental Panel on Climate Change ("IPCC") Guidelines (the "Regulations")

Further, PricewaterhouseCoopers (2019:1) states that: "The Regulations came into effect on 3 April 2017. Under the Regulations, a person conducting an activity above the specified threshold must report the GHG emissions and activity data for all the facilities in the prescribed format for the preceding calendar year by 31 March each year…."

The Green Paper also aimed to protect the country and its people from the impact of unavoidable climate change (Department of Environmental Affairs, 2010b). The Green Paper asserts that climate change is the responsibility of the Department of Environmental Affairs. The National Climate Change Response Green Paper was issued on 25 November 2010 by the Department of Environmental Affairs inviting members of the public to submit written comments on the National Climate Change Response Green Paper 2010 (Department of Environment Affairs, 2010b). The Government's vision for an effective climate change response and the long-term transition to a resilient climate and low-carbon economy and society is premised on Government's commitment to sustainable development and a better life for all. The National Treasury (2010a) reviewed estimates of the social costs of carbon, the role of environmental taxes and regulations, the principles of a Pigouvian tax and the application of carbon taxes internationally and focuses on aspects of instrument design with the intention of informing policy options for South Africa. Pigouvian tax is levied on an agent causing an environmental externality (environmental damage) as an incentive to avert or mitigate such damage.

In responding to carbon emissions, South Africa has decided, among other things, to use market-based policy measures, such as an escalating carbon tax to price carbon and to internalise the external costs of climate change (National Treasury, 2014). National Treasury

(2014) confirmed that a mix of economic instruments, complemented by appropriate regulatory policy measures, are essential to driving and facilitating mitigation efforts across a wide range of key economic sectors. Just before the introduction of a carbon tax, the electricity levy served both to promote energy efficiency and to encourage lower greenhouse gas emissions (National Treasury, 2013). Carbon tax was meant to be introduced in 2016 to provide an additional tool for dealing sustainably with the current electricity shortages while, at the same time, lowering the electricity levy as the carbon tax is phased in gradually (National Treasury, 2015). Electricity shortages mean that the price of units of electricity is high and unattainable for the poor. One of the ways to address this difficulty is to use the proceeds from carbon taxes to lower the price of energy thereby stimulating access to energy for all.

South Africa's Department of Finance (National Treasury) gazetted the first Carbon Tax Act, No. 15 of 2019 (the "Carbon Tax Act") following the announcement by the Minister of Finance, the Honourable Tito Mboweni, in the 2019 Budget Speech. Section 2 of the Carbon Tax Act requires the South African Revenue Service to levy and collect for the benefit of the National Revenue Fund a tax to be known as the Carbon Tax, which is designed as a charge on emissions arising from the combustion of fossil fuels[1] fugitive emissions in respect of commodities, fuel or technology, and industrial processes and product use (National Treasury, 2010a).

Section 5 of the Carbon Tax Act provides for the rate of tax as follows:

- R120 per ton carbon dioxide equivalent of the greenhouse gas emissions of a taxpayer;
- increased by the consumer price inflation (as determined by Statistics SA) plus two percent for the preceding tax period; and
- after 31 December 2022, increased by the consumer price inflation for the preceding tax year.

The tax applies to every person as defined in section 1 of the Carbon Tax Act. This section states that a "person" includes a partnership, trust, municipal entity (defined in section 1 of the

[1] *Emissions* means the release of greenhouse gases or their precursors and aerosols into the atmosphere over a specified area and period of time.
*Fossil fuels* are coal, oil and natural gases derived from the remains of ancient plants and animal life.
*Fugitive emissions* are emissions that occur from the release of greenhouse gases during the extraction, processing and delivery of fossil fuels.

Local Government: Municipal Systems Act, 32 of 2000) and a public entity (as listed in Schedules 2, 3A, 3B, 3C and 3D to the Public Finance Management Act, 1 of 1999).

A "taxpayer" is defined as the person liable for the carbon tax in terms of section 3, and the persons subject to the tax are those conducting "an activity in the Republic resulting in greenhouse gas emissions above the threshold determined by matching the activity listed in the column 'Activity/Sector' in Schedule 2 with the number in the corresponding line of the column 'Threshold' of that table." This will require the taxpayers to measure their greenhouse gas emissions for the purpose of the comparison.

For purposes of section 54E "Licensing" of the Customs and Excise Act, No. 91 of 1964, the licensing and registration requirements are applicable to any person who operates emission generation facilities that are dependent, firstly, on whether a Carbon Tax threshold applies to the emission generation facility; secondly, on whether an allowance for fossil fuel combustion applies; and thirdly, on whether the person operates emissions generation facilities at a combined capacity equal to or above the carbon tax threshold.

"An emissions generation facility is one or more emissions generation points where the source category activity of the same Intergovernmental Panel on Climate Change code occurs. An emissions generation point is the place where emissions liable to environmental levy are generated" (Ernst & Young, 2019: Online).

Ernst and Young (2019: Online) further states that, "in cases where a person's emission generating activity falls within a category where a carbon tax threshold is not applicable, the person must not license the facility and should also not register. Similarly, where the Carbon Tax Act provides for a 100% allowance for fossil fuel combustion, the facility will not be licensed and the person will not register."

In addition, section 6 of the Carbon Tax Act determines the amount payable to the National Revenue Fund (Carbon Tax Act, 2019). The first formula calculates the amount of tax payable, taking account of the greenhouse gas emissions calculated in terms of section 4 and determines that the result cannot be less than zero. The formula also takes account of greenhouse gas emissions that were sequestrated (as verified and certified by the Department of Environmental Affairs (DEA)), the allowances provided for in section 7 to 14 (as reflected in Schedule 2), as well as the rate of tax. The second formula deals with the generation of electricity and is calculated by deducting from the amount determined in terms of the first formula, a renewable energy premium in Rand determined by the Minister of Finance by notice in the *Gazette*

(applying until 31 December 2022) and an amount equal to the environmental levy in respect of electricity generated in the Republic paid in the tax year (until 31 December 2022).

There is, however, no explicit commitment as to the use to which these revenues will be put, beyond a range of possible recycling measures (National Treasury, 2010a). Some respondents proposed that this revenue can be used to fund the electrification of un-electrified households, an endeavour towards meeting South Africa‘s developmental goals; to use the money to provide for financial support for the provision of smart metering; to include the modal shift of freight from road to rail and pipeline in the revenue pool from revenue recycling; and, in the absence of guidelines, to reward tax credits for each tonne of carbon abated by shifting freight from road to rail and pipeline (National Treasury, 2015).

Roger Baxter, however, a representative of the Chamber of Mines, indicates (Polity, 2015) that there is no need for the introduction of the Carbon Tax Act because South Africa was already operating below the peak-plateau-decline and had already achieved the peak-plateau-decline targets. Because of this, Baxter argues that the Chamber of Mines is of the view that the carbon tax would have no material effect on South Africa.

In addition, the Davis Tax Committee (2015) was concerned that the announcement by National Treasury constituted an almost insurmountable challenge. This is possibly due to a historical reliance on cheap coal-fired electricity and energy-intensive industries. To the contrary, Van Heerden, Blignaut, Bohlmann, Cartwright, Diederichs and Mander (2016) argued that the carbon tax is necessary and would ensure the formulation of appropriate policies and price signals to be transmitted to all stakeholders. National Treasury (2010a) seemed to support this view. For example, it confirmed that carbon taxes seek correctly to reflect the value of the external costs of greenhouse gas emissions that cause climate change and it aimed to formulate the “even or level playing field” between high-and low-carbon emitting sectors in South Africa. Prior to the carbon tax initiatives, the government had several environmental taxes in place and a few mechanisms dealing with related issues that are included in the Income Tax Act, No.58 of 1962, as amended (the “Income Tax Act”). The Davis Tax Committee (2015) stated, however, that the carbon tax is not integrated and would need to be implemented together with complementary measures to ensure its success. Whether the initial South African carbon emission reduction commitments are met and given that the Carbon Tax Act is now effective from 1 June 2019 (National Treasury, 2018a), South Africa has lost a considerable amount of time in achieving its originally stated targets.

In order to minimise the effect of the carbon tax application, Part II of the Carbon Tax Act details those carbon tax allowances available to different sectors of the South African economy. Ernst & Young (2015) lists the allowances to be applied in the table below.

***Table 1: The total allowances permitted for each selected sector***

| Sector | Basic tax-free threshold (%) | Maximum additional allowance for trade-exposure (%) | Additional allowance for process emissions (%) | Total (%) | Maximum offset (%) |
|---|---|---|---|---|---|
| Electricity | 60 | – | – | 60 | 10 |
| Petroleum (coal to liquid; gas to liquid) | 60 | 10 | – | 70 | 10 |
| Petroleum – oil refinery | 60 | 10 | – | 70 | 10 |
| Iron and steel | 60 | 10 | 10 | 80 | 5 |
| Cement | 60 | 10 | 10 | 80 | 5 |
| Glass and ceramics | 60 | 10 | 10 | 80 | 5 |
| Chemicals | 60 | 10 | 10 | 80 | 5 |
| Pulp and paper | 60 | 10 | – | 70 | 10 |
| Sugar | 60 | 10 | – | 70 | 10 |
| Agriculture, forestry and land use | 60 | – | 40 | 100 | 0 |
| Waste | 60 | – | 40 | 100 | 0 |
| Fugitive emissions from coal mining | 60 | 10 | 10 | 80 | 5 |
| Other | 60 | 10 | – | 70 | 10 |

***Source***: Ernst & Young (2015)

Table 1 above illustrates that a basic 60% tax-free threshold for all the identified[2] and affected sectors are exempt in the first phase of introducing carbon taxes. From this point, only 40% of the emissions will be taxed before additional allowances are permitted. In addition to basic tax-free allowances, a 10% tax-free allowance is provided for sectors that involve process emissions. Process emissions are greenhouse gas emissions other than combustion emissions occurring as a result of intentional or unintentional reactions between substances or their transformation, including the chemical or electrolytic reduction of metal ores, the thermal decomposition of substances and the formation of substances for use as product or feedstock. That would mean that the remaining portion to be taxed would yield only 30% since both the basic and process emission allowances add up to 70%. Further, a variable tax-free allowance of up to 10% will be granted to identified sectors exposed to trade. Sectors that take early action

[2] Sasol, ArcelorMittal, Eskom, Mining, Manufacturing and Agri-processing companies

or who strive to reduce emissions are entitled to a further tax-free allowance of 5%. Where a company participates in phase 1 (up to 2022) of the carbon budgeting system, an additional 5% tax-free allowance is granted. A "carbon budget" is defined in section 1 of the Carbon Tax Act as an amount of greenhouse gas emissions permitted, against which direct emissions arising from the operations of a person during a defined time period will be accounted for. The carbon budget allowance is dependent on confirmation in writing by the Department of Environmental Affairs that the taxpayer is participating in the carbon budget system. The budget needs to be in line with what is scientifically required to keep global warming and thus climate change tolerable.

National Treasury (2014:6) states that:

> Carbon offsets are a measurable avoidance, reduction or sequestration of carbon dioxide ($CO_2$) or other greenhouse gas emissions. It is an (external) investment that allows a firm to access greenhouse mitigation options more cheaply than investment in its own operations. Carbon offsets typically involve investment in specific projects or activities that reduce, avoid, or sequester emissions.

These projects are developed and evaluated under specific methodologies and standards, thereby allowing carbon credits to be issued. Carbon offsets are also guided by principles that need to be fulfilled for a project to be awarded carbon credits under a specific standard of either 5% or 10%, which are granted to the affected sectors as identified in Table 1 above. The Davis Tax Committee (2015) further stated that, overall, the combined effect of the above tax-free thresholds is capped at 95%, except for residential, agriculture, forestry and land use and waste sectors, which is exempted. Taking the tax-free thresholds into account, the effective carbon tax rate varies between R6 and R48 per $tCO_2e$ in the first phase between 2019 and 2022. In South Africa, lower rates for certain sectors are justified in order to address concerns about competitiveness in the absence of internationally harmonised carbon taxes. The underlying regulations for the trade-exposed allowance, the performance allowance and the carbon offset allowance have not yet been finalised (PricewaterhouseCoopers, 2019).

There are a number of concerns that cast significant doubts on the new carbon tax in South Africa.

- Although Schedule 1 provides emission factors for the various categories of emitters of greenhouse gases, measuring outputs to which these factors apply requires extensive expertise and sophisticated systems within organisations to comply with the legislation.

Introducing the Carbon Tax Act is not the only concern for the business community as it attracts additional operational costs as well as the cost of auditing, the carbon emission verification process and administrative sophistication (Organisation Undoing Tax Abuse, 2016; Deloitte South Africa, 2018). Auditors have to be accredited by various bodies, such as the United Nations Framework Convention on Climate Change, the South African National Accreditation System and ISO 14064:2 (Climate Neutral Group, 2017).

- Just as the organisations require expertise to deal with their obligations under the Act, SARS, in dealing with the administration of the Act, requires additional and expert staff. Where it becomes necessary to audit organisations suspected of non-compliance, this also needs staff with specialised expertise. Under the present circumstances, where SARS is under severe pressure, this may be a problem.
- The Department of Environmental Affairs also requires expertise to administer the carbon budget allowance and certify the sequestrated greenhouse gases.
- A renewable energy premium in Rand determined by the Minister of Finance by notice in the *Gazette* (applying until 31 December 2022) and an amount equal to the environmental levy in respect of electricity generated in the Republic paid in the tax year, is deductible from the tax base until 31 December 2022. A commitment was made by National Treasury that the Electricity Levy would fall away once the carbon tax was introduced, but this appears to apply only for a limited period.
- As the allowances granted in terms of the Act could amount to up to 95% (100% for households, constructing residential property, all forms of farming, and industrial waste water and discharge), the tax collections from the carbon tax are likely to be small and the rate may not be high enough to provide an incentive to cut greenhouse gas emissions.
- The decision by National Treasury not to earmark the revenue from the tax in order to promote environmental initiatives is a policy decision that can rightly be criticised. National Treasury (2015) stated that carbon tax revenues would be recycled through mechanisms such as the reduction of the electricity generation levy, the reduction of the credit rebate for the Renewable Energy Premium, and energy efficiency savings tax incentives. This undertaking may not, it is submitted, be adhered to in full.
- The introduction of the carbon tax was delayed repeatedly from 2015 until it was finally implemented on 1 June 2019. One concern has been whether the time at which the Carbon Tax Act was introduced will make it possible for South Africa to meet its nationally-determined contribution commitments in compliance with the 2015 Paris Agreement on

Climate Change and to minimise the country's greenhouse gas emissions in line with the National Climate Change Response Policy and the National Development Plan (National Treasury, 2018b).

- Carbon taxes are a unilateral approach to reducing carbon emissions and may have serious economic effects if broad adjustments are not undertaken to avoid the harm it could do to the country's competitiveness and consequently its growth prospects. However, at the low rate at which it is currently levied, this harm will be limited in the short term.
- The capacity of South Africa's industries to absorb the additional fiscal cost and transition to lower-carbon practices is also a matter of concern (Davis Tax Committee, 2015). Eskom and Sasol, companies that will be harmed by the tax, have warned that the introduction of carbon tax will take away billions of their profits every year, rendering job losses inevitable. There is no doubt that Eskom is South Africa's biggest emitter, having pumped 220-million tonnes of $CO_2$ into the atmosphere in 2011 alone, while Sasol's South African operations were responsible for 70-million tonnes of $CO_2$ in the same year; undoubtedly the introduction of these taxes will have a negative impact in their operations (Mail & Guardian, 2011).
- So far, in South Africa, the only integration between the various environmental taxes and levies is that between the electricity generation levy and the carbon tax. Carbon taxes form part of the operating costs of a business because they tax emissions and emissions arise because of the production of income. Accordingly, it is submitted that they should qualify as a deduction in determining the taxable income. Unfortunately, section 23(d) of the Income Tax Act precludes that from happening. The preamble to section 23 states that: "No deduction shall in any case be made in respect of the following matters, namely-
  (d)any tax imposed under this Act or interest or penalty under any other Act administered by the Commissioner".

In the Kyoto Protocol negotiations, the European Union was a strong proponent of harmonised carbon tax across the globe (Winkler & Marquard, 2011). Although National Treasury delayed the introduction of the Carbon Tax Act to conduct a technical analysis of the design of the Carbon Tax Act and an assessment of its potential impact, the concerns referred to above remain unaddressed. The design of the interventions should not compromise the competitiveness of the country's economy and should minimise potential negative impacts on households (World Bank, 2015).

The Scandinavian countries selected for comparison purposes for the present research were the first to introduce a carbon emissions tax: Finland in 1990; Sweden and Norway in 1991; and Denmark in 1992 (Winkler & Marquard, 2011). These countries led the way on the implementation of carbon taxes and are a fitting basis of comparison for the purposes of this study.

### 1.2 Research question

The purpose of this thesis is to answer the question: After analysing the range of environmental taxes levied in the selected Scandinavian countries and in South Africa, are there lessons that can be learnt for South Africa?

### 1.3 Goals of the research

The goals of this research are to present a comparative analysis of the application and success of carbon tax and other environmental levies in selected foreign jurisdictions and to apply those lessons, by analysis, to evaluate the extent to which the South African Carbon Tax Act and other environmental levies are likely to respond to South Africa's commitment to reduce carbon emission.

### 1.4 The research sub-goals

The research sets out to address the following sub-goals:

- to analyse the newly introduced Carbon Tax Act in South Africa;
- to discuss other environmental taxes levied in South Africa;
- to discuss the implementation of Carbon Tax and environmental taxes in Finland; Sweden; Norway and Denmark, highlighting potential problems;
- to form an opinion on whether South Africa has any lessons to learn from the selected Scandinavian countries on the implementation of the Carbon Tax Act, combined with other environmental taxes.

### 1.5 Methods, procedures and techniques

As a comparative analysis of the introduction of carbon taxes in selected jurisdictions and the Carbon Tax Act in South Africa is being undertaken, a non-empirical interpretive research approach was adopted, because this method seeks both to understand and describe the situation (Babbie & Mouton, 2009). This thesis applies a literature study. "The purpose of a literature

study is to analyze critically a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles" (Jørgensen, Online).

The documentary data that has been used for this research consists of:

- legislation [the South African Customs and Excise Tax Act, No. 91 of 1964 and the Carbon Tax Act No. 15 of 2019];
- policy papers;
- Ministry of Finance budget speeches;
- reports by the Davis Tax Committee;
- National Treasury reports;
- the National Development Plan;
- Carbon Tax and other environmental legislation in the countries included in the research;
- explanatory memoranda, regulations and similar pronouncements relating to carbon emissions issued by the Revenue Services of the countries included in the research; and
- textbooks, journal articles and other available literature.

The research was conducted in the form of an extended argument supported by documentary evidence. The validity and reliability of the research and the conclusions was ensured by:

- placing greater evidential weight on legislation (primary data) and writings of acknowledged experts (secondary data) in the field;
- discussing opposing viewpoints and conclusions based on credible evidence; and,
- presenting substantiated conclusions.

### 1.6 Ethics

This research only involved the analysis of documentary data. As all data used for this research are publicly available, no ethical considerations arise in relation to their use.

### 1.7 Arrangement of chapters

**Chapter 2:** This chapter reviewed current literature. The problems of climate change and the role played by carbon emissions in general were described. The impact on the environment and living organisms was discussed. Efforts made by various organisations to combat climate change are dealt with and various measures that could be used to combat climate carbon emissions were debated. Policies adopted by international countries on the issue of climate

change and carbon emissions were considered along with various South African policy documents and the Carbon Tax Act, including criticism of those policies and the carbon tax legislation.

**Chapter 3:** This chapter described the characteristics of formal academic research with its purpose to provide a concise justification for its research design and methods. In the research design, the way data is collected, analysed, interpreted or observed was described and justified, as was the research method.

**Chapter 4:** This chapter analysed the first goal by looking purely at the readiness of the Carbon Tax Act as new legislation to respond to its intended purpose, "the reduction of carbon emissions". Although carbon taxes are also environmental taxes by design, this tax was discussed separately as it was newly implemented legislation.

**Chapter 5**: This chapter discussed the second sub-goal by examining in detail current South African environmental taxes (the Plastic Bags levy, Electricity Generation levy, Electric Filament Lamp levy, Motor Vehicle $CO_2$ Emission levy and Tyre levy) with a view to formulating a constructive argument about the application of carbon taxes. This was done by explaining the role and basis of environmental taxes in the context of South Africa. Similarities and differences in all these tax types were analysed to derive lessons, if any, that South Africa can learn from applying these environmental taxes. The elements of awareness, imposition, administration, shifting of tax weight onto final consumers and double dividend, tax structure and implementation were discussed in detail.

**Chapter 6:** The third sub-goal was addressed by discussing the implementation of the carbon tax and other environmental taxes in the selected foreign jurisdictions. The discussion took critical themes into account, including each country's summarised economic background, the origins of Carbon Tax policies, reduction targets, final imposed tax rate, applicable exemptions, the implementation plan, recycling measures, sector coverage, economic effects of introducing Carbon Taxes and an evaluation of how Carbon Taxes and the electricity generation levy had performed.

**Chapter 7**: This chapter responded to the fourth and last goal by providing the main findings of the research. Problems encountered during the research process were discussed as well as recommendations and possible areas of further study. This was done by taking important aspects of the main thesis and converting them into answers to the research question posed in

chapter one. Finally, an opinion on the potential success of the carbon tax in South Africa is expressed.

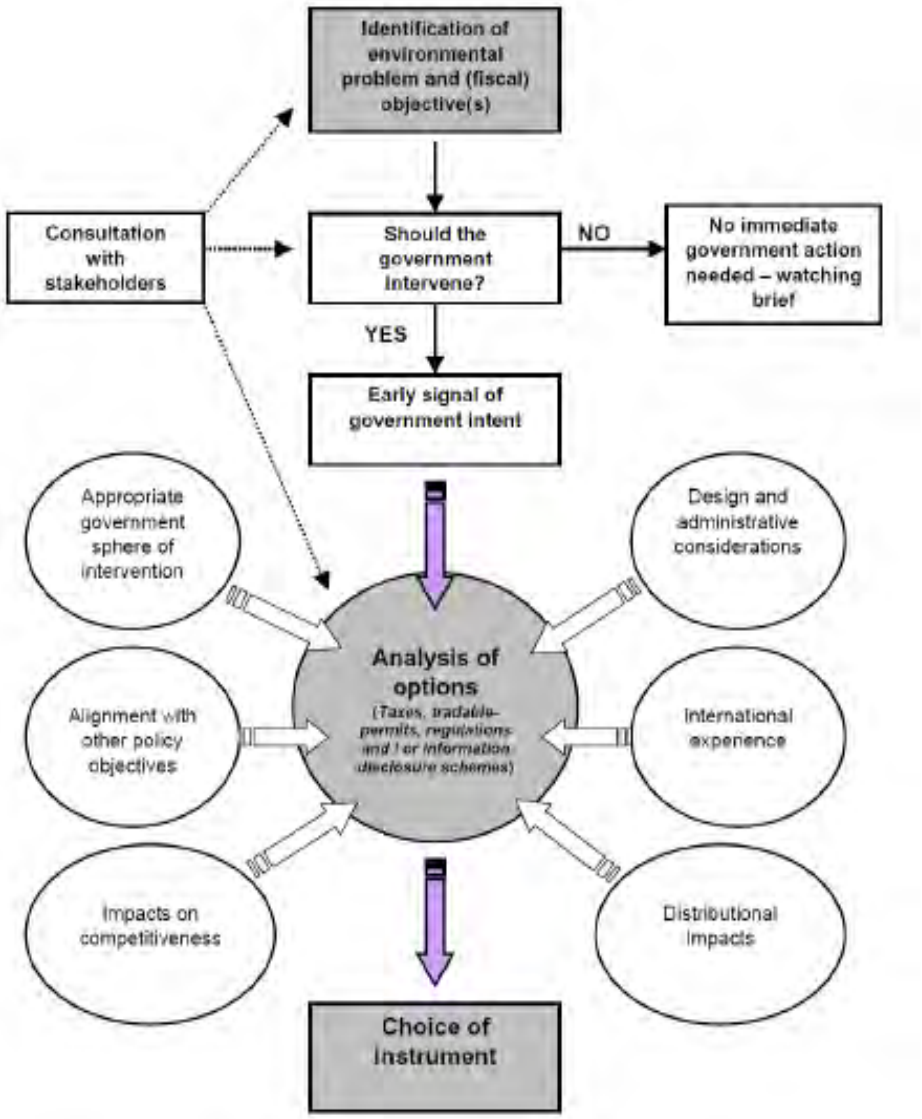
# CHAPTER 2
# LITERATURE REVIEW

## 2.1 Introduction

This chapter reviews current literature on the topic of this research. It starts from a broader perspective and narrows down to issues pertaining to the South African environment. It describes the challenges or problems of climate change and the role played by carbon emissions in general. The impact on the environment and living organisms follows. Efforts made by various organisations to combat climate change are also discussed. Various measures that could be used to combat climate carbon emissions are debated. Policies adopted by international countries on the issue of climate change and carbon emissions are discussed. Finally, various South African policy documents and the Carbon Tax Act are reviewed, including criticisms of the proposals.

South Africa has introduced carbon taxes as an alternative instrument to be used to curb greenhouse gases. The process followed by the government in considering the nature of interventions designed to combat climate change is illustrated in Figure 2 below:

***Figure 2: A process for considering different government interventions***




***Source***: National Treasury, 2006.

The discussion that follows incorporates these considerations.

### 2.2 Climate change and its effects

The greenhouse gases in the atmosphere help to keep the earth at an average of 15°C without which the world's average temperature would be minus 18°C (Intergovernmental Panel on Climate Change, 2007; United Nations Environment Programme, 2004). WeatherSA (2018) explains that there is no general difference between climate change and global warming; there can be confusion, however, between weather patterns and climate change. Global warming, as explained by Weather SA, is an increase in the greenhouse gases that contribute to an overall warming of the earth's climate; some regions may experience cooling, or wetter weather than

normal, while the temperature of the planet on average rises. Weather SA explains further that a warming planet leads to changes which can affect weather in various ways with "weather" describing a short-term period of weather events, while "climate change" describes a longer process that affects the weather in the short- medium- or long-term. The Intergovernmental Panel on Climate Change (2007 & 2013) and United Nations Environment Programme (2004) agree that it is expected that the natural global climate patterns will change in each decade and these should be monitored and controlled. The United Nations Environment Programme (2004) further explains that uncontrolled climate changes have significant side effects. These include a warming planet that actually causes increasing cold, significant increases of rain and other extreme weather (Intergovernmental Panel on Climate Change, 2013). Climate change does not have the same effect in all areas of the world because of differences in geography that respond differently to climate change. Floods and drought occur mostly in Africa in known areas within a short period of time (United Nations Framework Convention on Climate Change, 2007; Cruz, Harasawa, Lal, Wu, Anokhin, Punsalmaa, Honda, Jafari, L & Huu, 2007). Regardless of how climate change is explained, science confirms that it is a real concern.

Nature is not the only cause of climate change: human activities cause climate change (Intergovernmental Panel on Climate Change, 2001; United Nations Framework Convention on Climate Change, 2007; United States Environmental Protection Agency, 2016; Arctic News, 2017; Henderson, Reinert, Dekhtyar & Migdal, 2017; Royal Society, 2011; Vivant, Online; WeatherSA, 2018). The Intergovernmental Panel on Climate Change (2001) and Henderson et al. (2017) state that the combustion (the exothermic reaction of a fuel with oxygen) of fossil fuel has caused greenhouse gases such as carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$) hydrofluorocarbons (HFCs), per fluorocarbons (PFCs), sulphur hexafluoride ($SF_6$) and water vapour to increase over a number of years. Supporting this view is Shah (2015) who states that carbon dioxide ($CO_2$) is increasing faster than other greenhouse gases and has been the major accelerator of climate change.

Insufficient resources to deal with climate change, such as the ability to adapt socially, technologically and financially, makes developing countries more susceptible to its effects (United Nations, 2007; United Nations Framework Convention on Climate Change, 2007).

### 2.3 United Nations Framework Convention on Climate Change - 1997

The signs were becoming more noticeable and the world was increasingly concerned about the impending effects and consequences of global warming. This resulted in the G7 states

proposing the introduction of an Intergovernmental Panel on Climate Change in 1988 (Ercin & Hoekstra, 2012). This Panel would be instrumental in establishing the United Nations Framework Convention on Climate Change, which is the key international treaty for the reduction and development of strategies to accommodate the effects of climate change. Since its inception, and on a frequent basis, the Intergovernmental Panel on Climate Change has provided the most detailed scientific reports about climate change worldwide, namely Assessment Reports (Intergovernmental Panel on Climate Change, 2007).

The Kyoto Protocol is one of the main legal instruments and is separate from, but related to, the Climate Change Convention (WeatherSA, 2018). Although the Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997, it finally came into force on 16 February 2005. The detailed rules pertaining to the implementation of the Protocol were, however, only adopted at Conference of Parties 7 (COP 7) in Marrakesh (Marrakesh Accords, Morocco, 2001). Upon its formation under the United Nations Framework Convention on Climate Change, the Kyoto Protocol recognised that it is primarily the developed states that have been responsible for the present levels of climate change after more than 150 years of industrial activity. It therefore placed a heavy burden on developed states under the principle of "common but differentiated responsibilities". In its first commitment goal from 2008, the United Nations Framework Convention on Climate Change required 37 industrialised countries to reduce emissions of all six[3] greenhouse gases by 5.2% in the period 2013 to 2020 from the 1990 levels. As a result, an international carbon market was formed to help achieve this goal.

### 2.4 Actions by various organisations to combat climate change

***Intergovernmental Panel on Climate Change***

Levels of carbon emissions in the atmosphere confirmed that climate change is an international challenge and national and international intervention was unequivocal, required and urgent (Intergovernmental Panel on Climate Change, 2007). From the creation of the Intergovernmental Panel on Climate Change in 1988, major progress has been made towards finding solutions for lowering levels of greenhouse gases. As many have often confused weather with climate change, the Intergovernmental Panel on Climate Change's mandate is to make available reports that provide a clear and updated picture detailing the current state of scientific knowledge on climate change.

[3] Carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$) hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride ($SF_6$) and water vapour

As indicated in Table 2 below, until 2014, the Intergovernmental Panel on Climate Change has issued five Assessment Reports and the sixth Assessment Report is due to be made available towards the end of 2022. Each Assessment Report addresses a unique and important theme. Table 2 below summarises the characteristics of essential themes:

***Table 2: Summary of work completed by the Intergovernmental Panel on Climate Change***

| Name of the report | Essential theme | Published date |
|---|---|---|
| **First Assessment Report** | To underline not only the importance of climate change as a global challenge but a difficulty that requires international cooperation to tackle its consequences | 1990 |
| **Second Assessment Report** | To provide precautionary measures needed to anticipate, mitigate or lower the causes of climate change and mitigate its adverse effects. Further, in this document governments are cautioned that where there are threats of serious or irreversible damage, the lack of complete scientific certainty should not be used as a reason for deferring such measures but must consider the policies and measures to deal with climate change which should be cost-effective so as to ensure global benefits at the lowest possible cost. | 1995 |
| **Third Assessment Report** | To analyse the major body of observations of all parts of the climate system, concluding that this body of observations gave a collective picture of a warming world. The report assessed the understanding of the processes that govern the climate system and by studying how well the new generation of climate models represented these processes, assesses the suitability of the models for projecting climate change into the future. | 2001 |
| **Fourth Assessment Report** | Confirmed that climate change is occurring now, mostly, as a result of human activities; it illustrated the impacts of global warming already under way and to be expected now and in future. It describes the potential for adaptation of society to reduce its vulnerability; finally, it presented an analysis of costs, policies and technologies intended to limit the extent of future changes in the climate system. | 2007 |
| **Fifth Assessment Report** | To provide a detailed and comprehensive assessment of the physical science basis of climate change. | 2014 |
| **Sixth Assessment Report** | Not yet published but much anticipated around 2022 | 2022 |

***Source*:** Intergovernmental Panel on Climate Change (2013)

***The Rio Earth Summit - June 1992***

Besides the commitment by the Intergovernmental Panel on Climate Change, there have been other groups that have emphasised the importance of environmental protection and preservation as illustrated, for example, by the large gathering of leaders from 105 countries in 1992 in Rio de Janeiro, Brazil, for a United Nations Conference on Environment and Development (Meakin, 1992). Although there were no resolutions made at this conference, it is generally considered a success, particularly for developing countries, where finance is a major constraint in sustainable development, and the Conference concluded that environmental sustainability in those countries was an option, but emphasised that they would need to reduce industrialisation, something that they were not ready to do (Meakin, 1992; Intergovernmental Panel on Climate Change, 2007).

***The launch of the European Union Emissions Trading System - January 2005***

In January 2005, the European Union, through the European Commission, formulated its own Emissions Trading Scheme which is the largest currently of its kind. It covers almost 50% of European Union emissions, involves 31 participating countries and includes 16 400 of the most polluting energy and industrial facilities (Deme, 2015; European Commission, 2008). This was followed by the adoption of legislative measures to be known as the Energy and Climate Package, which had three targets "3 X 20 objective" to be achieved by 2020 (Intergovernmental Panel on Climate Change, 2013). The objectives were to:

1. reduce greenhouse emissions by 20%;
2. increase the share of renewable energies in the energy mix to 20%; and
3. improve energy efficiency by 20%.

The multi-carbon state market was then developed for the scheme to operate (Deme, 2015). The European Commission started by defining emissions reductions for a certain period, which were then divided and shared between different marketplaces in the form of tradeable allowances. Each allowance represents a right for an industrial plant to emit 1 tonne of carbon dioxide equivalent.

At the end of the prescribed period, plants would have to demonstrate to the regulator the balance of their emissions and allowances. Where the plant has emitted more tonnes of carbon dioxide equivalent than permitted, it will have four months to acquire the excess allowances from the market, failing which a fine would be imposed, or offset credits would need to be purchased. Conversely, if this company uses fewer tonnes of carbon dioxide equivalent, it can either bank these allowances for future purposes or sell them on the market to those who might

have exceeded their emissions (Deme, 2015). At the end of 2020, the European Commission aims to have reduced emissions by 21% and by 43% at the end of 2030. To achieve this, an emissions cap, which is lowered every year, had to be set (Deme, 2015).

***Copenhagen Climate Change Conference - December 2009***

In December 2009, parties subscribing to the United Nations Framework Convention on Climate Change met in Copenhagen to conclude a new agreement intended to succeed the Kyoto Protocol (Intergovernmental Panel on Climate Change, 2013). A binding agreement on emission reduction targets to keep global warming below 2°C could not be agreed upon. Moreover, the conference was faced with differences between developed and emerging economies such as China, India and Brazil. These countries believed that the measures to reduce greenhouse gas emissions intend to impede their economic development (Intergovernmental Panel on Climate Change, 2013). The majority of participants agreed that the industrialised economies, which were responsible for the current environmental damage, should provide financial assistance to less-developed economies to carry out their emission reduction (Intergovernmental Panel on Climate Change, 2013).

***Cancun Climate Change Conference - December 2010***

Following the Copenhagen conference, a Cancun Climate Change Conference was held in December 2010, which was also a major success. It produced, on the one hand, the foundation for a detailed, comprehensive and far-reaching international response to climate change to reduce carbon emissions. On the other hand, it created a system which required participating countries to be accountable to each other for those reductions. The Conference agreed to:

1. commit to a maximum temperature rise of 2°C above pre-industrial levels and to consider lowering that maximum to 1,5°C in the near future;
2. make fully operational by 2012 a technology mechanism to boost the innovation, development and spread of new climate-friendly technologies; and
3. establish a Green Climate Fund to provide finance for projects, programmes, policies and other activities in developing countries via thematic funding windows.

The Cancun Adaptation Framework included formulating an Adaptation Committee to promote the implementation of stronger, cohesive action on adaptation (Intergovernmental Panel on Climate Change, 2013).

***Doha Amendment to the Kyoto Protocol - 2012***

In Doha, Qatar, on 8 December 2012, the members of the Kyoto Protocol adopted a "Doha Amendment to The Kyoto Protocol", which is also termed a “second commitment period”, at which parties committed to reduce greenhouse gas emissions by at least 18% below 1990 levels between 2013 and 2020. Importantly the composition of parties in the second commitment period was different from that of the first commitment period. As a result, the Kyoto Protocol is seen as an important first step towards a global emission reduction regime that will stabilise greenhouse gas emissions and provide the architecture for future international agreements on climate change (Intergovernmental Panel on Climate Change, 2013).

## 2.5 South African Income Tax environmental incentives

Most of the sections in the Income Tax Act that are discussed below were not intended specifically to assist in responding to curbing carbon emissions. Careful analysis, however, demonstrates that they can play a significant role in alleviating the tax burden associated with initiatives towards reducing carbon emissions. This is consistent with the claim by the Davis Tax Committee (2015) that the carbon tax mechanism will need to be implemented with complementary measures to ensure its success.

The sections below are examined to find out how each section contributes to alleviating or curbing emissions. The following overview highlights only the role of the sections by including some level of detail on how these sections work. Accordingly, the workings have been included for clarity and illustration to accommodate technicalities involved.

***Section 11D: Deduction in respect of scientific or technological research and development***

Section 11D, read with section 11(a) (the so-called general deduction formula) of the Income Tax Act provides relief to taxpayers engaged in scientific or technological research and development. The South African government introduced section 11D in 2006 to encourage and incentivise private sector investment to undertake research and development in scientific and/or technological activities. With investment in new clean and green technologies being an additional requirement for the reduction in emissions, manufacturing companies can qualify for a substantial reduction in their taxable income for expenses relating to scientific or technological research and development in the field of carbon emissions. The Department of Science and Technology does have particular and firm requirements for this section of the Income Tax Act to apply. The following example shows how section 11D works in practice:

***Example 1: Example of how section 11D of the Income Tax Act works***

| **R&DDDD (Pty) Ltd incurred the following research and development expenditure for the year ended 28 February 2019:** | **R** |
|---|---|
| - Salaries for research personnel | 450 000 |
| - Rental for hire of laboratory | 240 000 |
| - Purchase of new machine for the purpose of Research and Development | 500 000 |
| - Interest on the bank loan to finance the purchase of the machine | 45 000 |
| **Total expenditure** | **1 235 000** |
| Prior to incurring expenditure, R&DDDD made application to the Minister of Science and Technology to approve the Research and Development, having regard to the innovative nature of Research and Development, and the extent to which it requires specialised skills. The Research and Development was undertaken by the company for the purpose of creating an invention that would be used by it to produce trade income. The bank loan was a fixed period loan for 5 years. | |
| **Suggested Solution:** | |
| Taxable income effect of the company for the year is as follows | **R** |
| - Salaries for research personnel – section 11D(2) R450 000*150% | 675 000 |
| - Rental for hire of laboratory – section 11D(2) R240 000*150% | 360 000 |
| Add: Expenses directly incurred for research | |
| - Depreciation allowance on machine (50% per section 12C) | 250 000 |
| - Interest on bank loan to finance the purchase of Research and Development Equipment (100%)- s24J | 45 000 |
| **Total section 11D allowance** | **1 330 000** |
| - It is submitted that, although the interest is incurred in respect of the Research and Development carried on by the company, it is not directly incurred in respect of the Research and Development, but is indirectly incurred as a loan used to acquire an asset that is directly in the Research and Development process, and so does not satisfy the Section 11D(2) requirement. | |

***Source*:** Haupt, P. 2018: Section 11D example

***Section 11(gB): Registration of intellectual property***

Climate change involves new and creative innovations in the search for the means of reducing emissions which will result in taxpayers having to develop or use intellectual property (such as patents and trademarks) for aspects of scientific research. The cost of registering these patents and trademarks qualifies for deduction in terms of section 11(gB) of the Income Tax Act. Costs would include legal fees and Companies and Intellectual Property Commission registration costs.

***Section 11(gC): Acquisition/purchase of intellectual property***

Section 11(gC) of the Income Tax Act provides for a depreciation allowance in respect of expenditure actually incurred during any year of assessment commencing on or after 1 January 2004 to acquire (other than by way of devising, developing, or creating) certain intellectual property, excluding trademarks. Intellectual property used in curbing emissions will also be entitled to this deduction. Example 2 below shows how section 11(gB) and 11(gC) work in practice:

***Example 2: Example of how section 11(gB) and section 11(gC) of the Income Tax Act works***

| **The following information relates to Ambrose (Pty) Ltd for the year of assessment ended 31 March 2019**<br>On 1 August 2018 Ambrose purchased a patent from its holding company in the United Kingdom for R3 million (excluding VAT). The holding company holds 60% of the shares in Ambrose and is not subject to tax in South Africa. The development of this patent cost the holding company the equivalent of R250 000. The market value on 1 August 2018 was R3.5 million. Ambrose had to register the patent in South Africa at a cost of R20 000 for use in its business operations. The registering authority determined that the patent had a remaining useful life (from 1 August 2018) of seven years. | |
|---|---|
| **Required:**<br>Determine the calculation of all income tax implications for the above transaction on the taxable income of Ambrose (Pty) Ltd (ignore VAT). | |
| **Suggested Solution** | **R** |
| Cost of patent for the purposes of s11(gC) | 3 000 000 |
| That the patent was purchased at below market value and from a connected person has no bearing on the s11(gC) deduction, which refers on to "expenditure incurred". | |
| **Acquisition cost:** | |
| S 11 (gC) R3 000 000*5% | (150 000) |
| S 11 (gB) Registration costs (given) | (20 000) |

***Source*:** Own example

***Section 12B: Deduction in respect of certain machinery, plant, implements, utensils and articles used in farming or production of renewable energy***

Troy (2012) and Sithole (2017) argue that renewable energy is safer and cleaner than non-renewable energy and that anything that promotes a clean and green economy must be encouraged. In this regard, section 12B(1)(h) of the Income Tax Act provides for a deduction in respect of the cost of machinery, plant, implement, utensil or article (referred to as a qualifying asset) owned by the taxpayer and brought into use for the first time for the purpose of trade by that taxpayer in the generation of electricity from renewable energy (i.e. wind

power, solar energy, hydropower, and biomass). Section 12B(2) states that the deduction contemplated in subsection (1) shall be calculated on the cost to the taxpayer of the asset, and the rate of the allowance shall be:

(a) in the case of an asset other than an asset contemplated in paragraph (b)-

(i) in respect of the year of assessment during which the asset is so brought into use, 50% of such cost;

(ii) in respect of the second year, 30% of such cost; and

(iii) in respect of the third year, 20% of such cost

(b) in the case of an asset contemplated in subsection (1)(h)(ii)(bb) (photovoltaic solar energy not exceeding one megawatt), 100% of such cost.

The following example shows how section 12B works in practice:

***Example 3: Example of how section 12B of the Income Tax Act works***

| WW (Pty) Ltd has a 28 February year of assessment. WW (Pty) Ltd acquired a Windmill power plant with a purchase price of R3 million in 10 December 2018 for purposes of generating electricity for the company's farm. | |
|---|---|
| **Required:**<br><br>Calculate the effect the cost price will have on the determination of taxable income up to the 2021 year of assessment. | |
| **Suggested Solution** | **R** |
| **2019:**Allowance(R3000 000*50%) | 1 500 000 |
| **2020:**Allowance (R3 000 000*30%) | 900 000 |
| **2021:**Allowance (R3 000 000*20%) | 600 000 |

***Source***: Own example

***Section 12C(gA): Deduction for machinery used for research and development***

The Income Tax Act also provides that depreciation allowances may be claimed in respect of certain research and development assets. In terms of section 12C(gA) of the Income Tax Act, a taxpayer will be entitled to an accelerated write-off of 40/20/20/20 over four years for new and unused research and development machinery or plant (or improvements thereto) owned by the taxpayer. The following example shows how section 12C(gA) works in practice:

***Example 4: Example of how section 12C(gA) of the Income Tax Act works***

| Merve (Pty) Ltd, a resident company with a year of assessment ending 28 February 2019 bought a dockD machine for R1 500 000 on 23 March 2018. This machine is used in water related research projects in search of the most cost-effective way to purify sea water. | |
|---|---|
| **Required:**<br>Calculate the effect the cost price will have on the determination of taxable income up to the 2022 year of assessment. | |
| **Suggested Solution** | **R** |
| **2019:** Allowance (R1500 000*40%) | 600 000 |
| **2020:** Allowance (R1 500 000*20%) | 300 000 |
| **2021:** Allowance (R1 500 000*20%) | 300 000 |
| **2022:**Allowance (R1 500 000*20%) | 300 000 |

***Source***: Own example

***Section 12K: Exemption of certified emission reductions***

Section 12K of the Income Tax Act exempts any amount received by or accrued to a person for the disposing of any certified emission reductions by that person in the furtherance of a qualifying Clean Development Mechanism project carried on by that person. Furthermore, no capital gain arises for proceeds from such disposal in term of para 64(b) of the Eighth Schedule to the Income Tax Act. Example 5 below shows how section 12K works in practice:

***Example 5: Example of how section 12K of the Income Tax Act works***

| Esteen Macorin (Pty) Ltd is a company operating in Somerset West which undertakes innovative research in that area. The company sold R6 440 889 worth of research equipment classified as trading stock in their records. They also sell certified emissions reductions ("CER") as part of their trading stock. For the 2019 year of assessment Esteem Macorin had sold R2 400 000 worth of CERs. | |
|---|---|
| **Required:**<br>Calculate the company's income for the 2019 year of assessment. | |
| **Suggested Solution** | **R** |
| **Gross income (s1)** | |
| - Research equipment | 6 440 889 |
| - Certified emissions reductions | 2 400 000 |
| **Less: Exemptions** | |
| - Section 12K exemption | (2 400 000) |
| **Income** | **6 440 889** |

***Source*:** Own example

***Section 12L: Deduction in respect of energy efficient savings***

Section 12L of the Income Tax Act allows taxpayers to claim a deduction for most forms of energy-efficiency savings that result from trade or any production of income. When it was first introduced in 2013, this deduction was calculated at 45 cents per kilowatt-hour or kilowatt-hour equivalent of energy-efficiency savings. For years of assessment commencing on or after 1 March 2015, the deduction is calculated at 95 cents per kilowatt-hour or kilowatt-hour equivalent of energy-efficiency saving. How section 12L works in practice is discussed below:

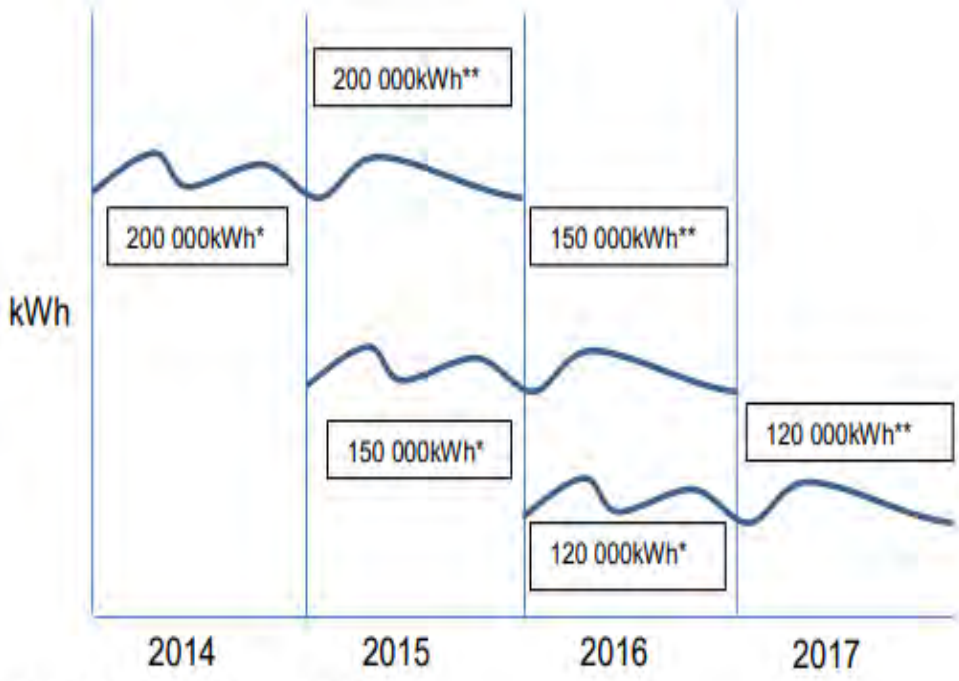
***Example 6: Example of how section 12L (baseline calculation) of the Income Tax Act works***

During 2014 Global W Incorporated's energy consumption amounted to 200 000 kWh after implementing new technology that allowed for energy-efficiency savings. Energy consumption for 2015 was reduced to 150 000 kWh. The energy consumption for 2016 was 120 000 kWh.

**Required:**
Discuss how Global W Incorporated needs to account for the above-mentioned developments in their tax records.

**Suggested solution**

The baseline is calculated by determining the sum of monthly energy usage over a 12-month period. The actual consumption during 2014 is thus the baseline for 2015 and has to be compared against the actual consumption at the end of that year to arrive at the energy savings obtained. The energy consumption for 2015, that is, 150 000 kWh, is the new baseline for 2016. This method of calculation must be followed for every subsequent year of assessment in which the allowance is claimed.




* = actual energy consumption

** = baseline for the current year of assessment against which the actual consumption must be compared to arrive at the energy-efficiency savings. Note that the baseline must always be in line with the standard.

***Source*:** Own Example

***Example 7: Example of how section 12L (exempt income) of the Income Tax Act works***

Body Corporate ABC was incorporated to take responsibility for the enforcement of the rules and control, administration and management of the common property for the benefit of all owners in Greenhouse Estate, a residential development scheme. The body corporate carries on a trade and earns income in the form of levies, fees charged for the use of facilities and equipment such as squash courts, tennis courts and washing machines, and rental income from the letting of immovable property such as parking bays, servants' quarters and a demarcated area for a cell phone mast. For the 2016 year of assessment, the body corporate received levies amounting to R600 000. It also received R900 000 which related to fees charged for the use of facilities and equipment as well as rental income. In an effort to make the Estate more energy efficient, the body corporate removed all electric geysers from the common property and replaced them with solar geysers in the 2016 year of assessment. Body Corporate ABC wants to claim a section 12L deduction for the energy-efficiency savings resulting from the conversion of the geysers.

**Required:**

Discuss how the Body Corporate ABC needs to account for the above-mentioned developments in their tax records.

**Suggested Solution**

The first aspect that has to be determined before a deduction can be granted under section 12L is whether the body corporate is carrying on a trade. In this regard its specific activities have to be evaluated. If it is established that the body corporate is carrying on a trade, the exemptions provided for in section 10 have to be taken into consideration. Section 10(1)(e)(i)(aa) states that a body corporate shall be exempt from normal tax on any levies received by or accrued to it. Therefore, the amount received for all levies, that is, R600 000, will be exempt from normal tax. Section 10(1)(e)(ii) further states that any other receipts and accruals derived by a body corporate shall also be exempt, but up to a maximum of R50 000. In other words, if the receipts and accruals exceed this amount, R50 000 will be exempt and the remainder will be subject to normal tax. For the 2016 year of assessment, the body corporate received R900 000 in consequence of fees and rental income. Of this amount, R50 000 will be exempt. The balance of R850 000 (R900 000 - R50 000) constitutes "income" as defined and will be subject to normal tax. Consequently, provided that Body Corporate ABC complies with all the requirements of section 12L, it will be allowed to claim a portion of the energy savings determined under section 12L in accordance with the percentage of income divided by gross income for the particular year of assessment (R850 000 / R1 500 000 = 56,67%). In the event that only exempt income is generated, Body Corporate ABC will not be allowed to claim any section 12L deduction.

***Source*:** Own example

***Example 8: Example of how section 12L (year of assessment, the project cycle and the calculation of the deduction) of the Income Tax Act works***

Hot-House Ltd owns an industrial plant and has a financial year-end of 28 February. From 1 August 2015, Hot-House reduced its energy usage from 1 million kWh to 500 000 kWh per month through the use of more efficient technologies. In consequence of these savings, Hot-House wanted to claim a deduction under section 12L. As part of the requirements of this section, Hot-House had to calculate baselines for the relevant years of assessment and submit it to South African National Energy Development Institute ("SANEDI"). Thereafter, the energy efficiency savings had to be calculated by SANEDI so that the deductible amount could be determined.

**Required Part 1**

Perform the Baseline calculations for the relevant years of assessment.

**Suggested Solution**

For the 2015 year of assessment, the energy usage was 12 million kWh (1 million kWh × 12 months). This was also the baseline for the 2016 year of assessment. The energy usage for the 2016 year of assessment was 8,5 million kWh. This was also the new baseline at the beginning of the 2017 year of assessment. This figure was calculated as follows:

- 1 000 000 kWh × 5 months = 5 000 000 kWh (energy usage before implementation, that is, 1 March to 31 July 2015)
- 500 000 kWh × 7 months = 3 500 000 kWh (energy usage after implementation, that is, 1 August to 28 February 2015)
- 5 000 000 kWh + 3 500 000 kWh = 8 500 000 kWh (energy usage for 2016 and new baseline for 2017).
- The energy usage for the 2017 year of assessment was 6 million kWh (500 000 kWh × 12 months).

**Required Part 2**

Discuss with a calculation how the energy efficiency savings and the deductible amount for the relevant years of assessments will be determined.

**Suggested Solution**

For the period March 2015 to February 2016, Hot-House Ltd's savings were calculated by determining the difference between the baseline at the beginning of the 2016 year of assessment and the usage at the end of that year. Thus, the savings are 3,5 million kWh (12 million kWh – 8,5 million kWh). For each year of assessment Hot-House's energy-efficiency savings must be multiplied by 95 cents per kilowatt hour. The amount allowed to be deducted from the income of Hot-House Ltd for the 2016 year of assessment is R3 325 000 (3,5 million kWh × R0,95). For the period March 2016 to February 2017 the savings are calculated by determining the difference between the baseline at the beginning of the 2017 year of assessment and the usage at the end of that year. Therefore, the savings are 2,5 million kWh (8,5 million kWh – 6 million kWh). The amount permitted for deduction from the income of

Hot-House Ltd for the 2017 year of assessment will be R2 375 000 (2,5 million kWh × R0,95). If a project had been implemented by Hot-House Ltd during the 2014 year of assessment, only the savings generated during November 2013 to February 2014 would be relevant because section 12L came into operation only on 1 November 2013. Furthermore, a rate of 45 cents would have had to have been applied when calculating the deductible amounts for the 2014 and 2015 years of assessment as the 95-cent rate was applicable only from years of assessment commencing on or after 1 March 2015.

***Source*:** Own Example

***Section 13(dA): Deduction for buildings used to carry on research and development***

In terms of section 13(dA) of the Income Tax Act, a taxpayer is entitled to a 5% allowance in respect of buildings (or improvements thereto) used by the taxpayer for carrying out research and development. The following is an example of how section 13(dA) works in practice:

***Example 9: Example of how section 13(dA) of the Income Tax Act works***

Joubertina Ltd is a company that won a one-year tender of R15 000 000 on 12 April 2019 from the Eastern Cape Government to investigate the death of children between the age 6 and 12 years in the Kalamazoo region. On 13 July 2019 they bought a building in Duncan village, to be used for laboratory work for R6 500 000. The size, structure and convenience of the building makes possible all forms of related research.

**Required:**

Calculate the allowance to be deducted for the purpose of determining the 2019 year of assessment's taxable income.

**Suggested Solution:**

| | **R** |
|---|---|
| **2019 Gross Income:** Tender amount | 15 000 000 |
| **2019 Building allowance:** (R6 500 000*5%) | (325 000) |
| **Taxable income** | **14 675 000** |

***Source*:** Own example

***Section 22: Amounts to be taken into account in respect of values of trading stock***

For the purposes of section 12K, the Explanatory Memorandum to the Taxation Laws Amendment Bill of 2009 argues that the value of Certified Emission Reductions held by a South African company will not be taken into account under section 22 of the Income Tax Act as closing or opening stock; there will be no taxable income implications. Example 10 below is an example of how section 22 works in practice:

***Example 10: Example of how section 22 combined with section 12K of the Income Tax Act works***

| | |
|---|---|
| Grible Dollar (Pty) Ltd, with a 28 February year of assessment, purchased for re-sale on 15 March 2017 the following: | **R** |
| - 355 Laboratory elements at a total cost of | 674 145 |
| - 177 Certified Emission Reductions at a total cost of | 218 241 |
| The company has made the following sales in 2018: | |
| - 50 Laboratory elements at a total cost of | 151 920 |
| - 17 Certified Emission Reductions at a total cost of | 33 537 |
| The company has made the following sales in 2019: | |
| - 190 Laboratory elements at a total cost of | 577 296 |
| - 117 Certified Emission Reductions at a total cost of | 230 817 |
| **Required:** Determine Grible Dollar (Pty) Ltd's 2018 taxable income. | |
| **Suggested Solution:** | |
| **Gross Income (2018):** | **R** |
| - 50 Laboratory elements | 151 920 |
| - 17 Certified Emission Reductions | 33 537 |
| **Less: Allowable deductions: section 11(a)** | |
| - 355 Laboratory elements at a total cost of | (674 145) |
| - 177 Certified Emission Reductions at a total cost of | (218 241) |
| **Adjust for other taxable income effects:** | |
| **Add: Closing stock (2018):** | |
| - 305 Laboratory elements at a total cost of | 580 066 |
| - 160 Certified Emission Reductions at a total cost of (s12K) | 0 |
| **Less: Opening stock (2018):** | |
| - 0 Laboratory elements at a total cost of | 0 |
| - 0 Certified Emission Reductions at a total cost of (s12K) | 0 |
| **2018 Taxable income / *(Assessed loss)*** | **(126 863)** |
| **Required:** Determine Grible Dollar (Pty) Ltd's 2019 taxable income. | |
| **Suggested Solution** | |
| **Gross Income (2019):** | **R** |
| - 190 Laboratory elements | 577 296 |
| - 117 Certified Emission Reductions | 230 818 |
| **Add: Closing stock (2019):** | |
| - 115 Laboratory elements at a total cost of | 349 416 |
| - 43 Certified Emission Reductions at a total cost of (s12K) | 0 |
| **Less: Opening stock (2019):** | |
| - 305 Laboratory elements at a total cost of | (580 066) |
| - 160 Certified Emission Reductions at a total cost of (s12K) | (0) |
| **2019 Taxable Income** (before deducting the 2018 assessed loss) | **577 464** |

***Source*:** Own example

***Section 37B: Deduction in respect of environmental expenditure***

South African Government (Online) states that, in the past there were certain historic obstacles to the deduction of environmental expenditure incurred by taxpayers. Most of this expenditure could not be deducted because the South African Revenue Service claimed that:

1. The expenditure was capital in nature for which there was no allowance.
2. The expenditure is only incurred after the process of production has ceased, that is, it is not incurred in the production of income.

Section 37B of the Income Tax Act was then introduced to encourage environmental expenditure as a matter of sound government policy. As a result, the deduction under this section has three components as follows:

*(i) Environmental treatment and recycling asset*

The environmental treatment and recycling assets include any air, water and solid waste treatment and recycling plant or pollution control and monitoring equipment (and improvements to the plant or equipment). An allowance according to section 37B(2)(a) will be granted, equal to –

- 40% of the cost to the taxpayer to acquire the asset in the tax year (first tax year) in which the asset is brought into use; and

- 20% of such cost in each of the subsequent three tax years.

This is illustrated by an example in example 11.

***Example 11: Example of how section 37(B)(2)(a) of the Income Tax Act works***

| Great Masks (Pty) Ltd, a resident company with a year of assessment ending 28 February 2019 bought a Nuwe machine for R1 500 000 on 23 March 2018. This machine is used for environmental treatment and water recycling for the preservation of water in the Makana Municipality. The aim is to assist with the production of water in that area. | |
|---|---|
| **Required:**<br>Calculate the effect the cost price will have on the determination of taxable income up to the 2022 year of assessment. | |
| **Suggested Solution** | **R** |
| **2019:** Allowance (R1 500 000*40%) | 600 000 |
| **2020:** Allowance (R1 500 000*20%) | 300 000 |
| **2021:** Allowance (R1 500 000*20%) | 300 000 |
| **2022:** Allowance (R1 500 000*20%) | 300 000 |

***Source*:** Own example

*(ii) Environmental waste disposal asset*

The environmental waste disposal asset includes any air, water and solid waste disposal site, dam, dump, reservoir, or other structure of a similar nature, or any improvement thereto. An allowance according to section 37B(2)(b) equal to 5% (20-year straight-line basis) of the cost to a taxpayer to acquire the asset will be granted. Additionally, the examples that follows indicates how section 37B(2)(b) works in practice:

***Example 12: Example of how section 37B(2)(b) of the Income Tax Act works***

| Hozani (Pty) Ltd built a reservoir which qualifies as an environmental waste disposal asset for R6 500 000 on 3 September 2018. For the 2019 year of assessment, the company had made sales of R15 000 000. | |
|---|---|
| **Required:**<br>Calculate the allowance to be deducted for the purpose of determining 2019 year of assessment's taxable income. | |
| **Suggested Solution:** | |
| | **R** |
| **2019 Gross Income:** Sales | 15 000 000 |
| **2019 Allowance:** (R6 500 000*5%) | (325 000) |
| **Taxable income** | **14 675 000** |

***Source*:** Own example

*(iii) Post-trade environmental expenses*

A deduction equal to 100% of the expenditure or loss incurred will be allowed in respect of certain decommissioning, remediation, or restoration that arises from any trade previously carried on by that taxpayer to the extent that such expenditure or loss is incurred for purposes of complying with any law of the Republic that provides for the protection of the environment upon cessation trade and:

(a) would otherwise have been allowed as a deduction in terms of section 11 had that taxpayer still been carrying on that trade;
(b) is not otherwise allowed as a deduction.

Accordingly, the example that follows indicates how section 37B(6) works in practice:

***Example 13: Example of how section 37B(6) of the Income Tax Act works***

| Following the completion of the research project Hozani (Pty) Ltd had to decommission a reservoir they bought for R6 500 000 which qualified as an environmental waste disposal asset. The decommissioning costs amounted to R5 600 000. For the 2019 year of assessment, the company had made sales of R15 000 000. | |
|---|---|
| **Required:**<br>Calculate the allowance to be deducted for the purpose of determining Hozani's 2019 year of assessment taxable income. The same details apply as in example 12. | |
| **Suggested Solution for 2019** | |
| | **R** |
| **Gross Income:** Sales | 15 000 000 |
| **Allowance:** Section 37B(6) | (5 600 000) |
| **Allowance:** (R6 500 000*5%) | (325 000) |
| **Taxable income** | **9 075 000** |

***Source*:** Own example

## 2.6 Generally accepted policies adopted by international countries to combat carbon *emissions*

Although South Africa has applied a market instrument in curbing greenhouse gases, common economic maxims, however, acknowledge that governments should not intervene in the market. As a result, markets should, by themselves, provide an efficient means of allocating scarce resources (Parkin, Powell & Matthews, 2008). Unfortunately, this maxim does not hold true with regard to environmental goods (Parkin et al., 2008). This is because the costs and benefits associated with the environment are not usually shown in the prices of goods and services in the market and markets cannot, therefore, be relied on efficiently to allocate these resources (Parkin et al., 2008). As a result, it becomes justifiable for government to intervene in the market for the purpose of control and guidance.

For the intervention to yield the most desired outcome, however, it is crucial that a clear objective for government intervention and an appropriate course of action are identified to achieve the objective (Parkin et al., 2008). As a result, where the intervention is well-defined and planned, it can play a vital role in motivating an efficient use of scarce resources. Further, where government sees the need to intervene, it must be certain that the benefit of intervention will outweigh its costs (Parkin et al., 2008). Finally, once governments have become aware that

there is a need for intervention, they must decide on the method of intervention. They could introduce environmental taxes, user charges, subsidies, or the elimination of perverse subsidies.

There are two main identifiable categories of policy instruments used for global climate change. The first is a domestic (unilateral) policy instrument that seeks to enable individual nations to set and achieve specific objectives. South Africa adopts carbon taxes in its unilateral approach. The second is the international (bilateral, multilateral, or global) instruments that can be employed jointly by multiple nations (Stavins, 1997).

There are two globally accepted policies or instruments used to curb emission, which are command and control regulations and market-based instruments (National Treasury, 2010a). There are mainly two economic strategies to curb carbon dioxide $CO_2$ emissions: carbon taxes and Emission Trading Schemes (National Treasury, 2010a). The world is also conflicted as to the best means to put a price on carbon, whether an Emissions Trading Scheme or carbon tax (Intergovernmental Panel on Climate Change, 2007). Other economic instruments could contribute indirectly to mitigate greenhouse gas emissions, including tradable certificates for renewable energy, energy efficiency, or fuel taxes (Winkler, Jooste & Marquard, 2010a; 2010b).

The difficulty in choosing the most appropriate policy to use also plays a major role in the way in which the instrument is used, but because there are no binding agreements that force countries to adopt a specific response strategy, a careful selection will have to be made. The Asian Development Bank (2016) states that the choice and design of instruments for any specific jurisdiction depends on many factors including the economy, energy mix, the county's most effective greenhouse gas response, social and environmental objectives, political circumstances and the capacities of the parties that would be involved in developing and implementing the system.

### *2.6.1 Market-based instruments*

Over time, there has been significant debate on the application and success of economic instruments to combat pollution and the relative merits of price (tax) versus quantity (tradable permits) schemes (Baumol & Oates, 1988). The National Treasury (2010a) states that, across the world, the feasibility of these policies has been tested by European countries. Notably, a uniform application of carbon taxes tends to be regressive because the disproportionate share of the tax weight falls on the poor. In a South African context, the government would need to approach this by counteracting other economic development imperatives such as poverty and

unemployment alleviation, economic inequality, and improving access to basic and affordable energy services for low-income households. The design of a carbon tax must strive to include compensating measures to minimise adverse impacts on low-income households (National Treasury, 2010a).

***Emission Trading Schemes/ Cap and Trade Instruments***

Many countries do not favour Emission Trading Schemes (Intergovernmental Panel on Climate Change, 2013). The National Treasury (2014) argued that the European Union Emission Trading Scheme has shown that trading schemes provide certainty with respect to the required levels of emission reductions. In the South African context, the choice between the application of an Emission Trading Scheme and a carbon tax was made in favour of the carbon tax (National Treasury, 2014) because setting a fixed target or emissions cap relative to a specific base year for the South African government would require rapid reductions in greenhouse gas emissions over a relatively short time. This might have serious cost implications and unintended inefficiencies. The National Treasury (2014) argued that, in order to work effectively, Emission Trading Schemes would need an adequate number of participants in the scheme. Adequate trading volumes will also be needed to generate an appropriate carbon price and, should allowances be inappropriately allocated, as in the European Union Emission Trading Schemes case during their first period of operations, it would normally drive down permit prices and create longer-term market distortions. Furthermore, the oligopolistic South African energy sector may fail to meet these requirements (National Treasury, 2014).

***Tradable Certificates for Renewable Energy or Energy Efficiency***

Electricity from wind power plants is domestically produced and easy to alter and control; it is sustainable because there are no hazardous effects; and it is clean. Coal power plants, on the other hand, are coupled with acid rain, particulate pollution, carbon dioxide, and heavy metals, among other things (Troy, 2012). Tradable green certificate schemes have been in existence for many years and have been tried in most European countries to create market-driven penetration of renewables (Bertoldi, Persson & Rezessy, 2014). Tradable green certificates are meant to guarantee that a specific volume of electricity is generated from renewable-energy sources. The Official Journal of the European Union (2018) states that, in 2001, the European Union adopted a directive (2001/77/EC) with the main purpose of increasing the share of green electricity from 14% to 22% of European Union gross electricity consumption by 2010. With

this directive the share of electricity demand met by renewable-energy sources would double from 6% to 12% of gross energy consumption in Europe by 2010 (Berrutto & Bertoldi, 2002).

As countries become aware that green energy is the future for electrification, they need to be provided with more options on how to choose which type of electricity they should buy. Even if a household wished to install green electricity wind-power, the size and cost of these renewable wind-power turbines is prohibitive and therefore access is limited (Troy, 2012).

Tradable renewable power certificates, however, would allow households to enjoy the benefits of using electricity that comes from renewable energy without having to own their own renewable wind-power turbines (Troy, 2012). The description that follows shows how electricity is delivered to each household under the benefit of tradable renewable power certificates.

The provision of electricity begins by having the necessary hardware such as power plants, transmission lines and the grid, all of which transmit electricity from power plants to grid and from grid to households. As much as the world would want to use green electricity, it has also been impossible for users to understand the types of electricity captured and stored by the grid (Troy, 2012). Each time a wind power producer installs a plant, and has it approved, a renewable power certificate is produced asserting that the electricity comes from a clean renewable source (Troy, 2012). Such certificates are sold separately from the sale of the electricity itself and, as the household purchases them, so the household gradually has its standard electricity converted into green electricity. Troy (2012) states that, eventually, there will be a premium for the sale of certificates of approval and an increase in demand for alternative means of electricity generation, thereby driving the demand for faster fuel supply.

### *2.6.2 Command and control regulations*

#### *Fuel tax*

Normally, the design of taxes on fossil fuels would be to discourage the purchase and use of certain fuels because they contain a fossil content. There is a difference between fuel tax and emissions tax. By design, emissions tax often does not allow for the carbon content of the fuel. Any country that seeks to introduce a fuel tax must carefully align it with other energy policies to achieve the same purpose of sending a carbon price signal.

#### *Regulation*

There is not much difference between carbon taxes and regulations. Environmental policy relies on regulation such as permission, prohibition, standard setting, legislation, and

enforcement, as opposed to financial incentives, i.e. economic instruments of cost internalisation (Economic Cooperation and Development (OECD) Glossary of Statistical Terms: 590). On the other hand the introduction of carbon tax to curb emissions takes the form of an economic instrument. While South Africa wants to move away from regulation, this would not be efficient because economic instruments cannot be entirely governed without regulation. In this regard, Robb, Tyler and Cloete (2010) confirm that the sub-prime crisis of 2008 could provide an example of how unexpected events in the underlying market can have serious consequences for financial markets when they allow "highly leveraged derivative products" to flourish. Therefore, no derivatives should exist without well-justified regulation control.

The National Treasury (2010a) states that command-and-control instruments would require participating firms to comply with a specific regulation, regardless of the costs to individual firms to reduce pollution. As a result, market instruments cannot work without the support of command-and-control policies. The National Treasury (2010a) also admits that the combination of these instruments provides greater flexibility in emissions reduction. Jaffe, Newell and Stavins (2004) found that the cost of abatement using regulation can be several times the minimum cost achieved by using a carbon tax. The National Treasury (2010a) states that policy instruments cannot fully differentiate between polluters with different marginal costs of abatement and may force some to undertake high abatement costs that are inefficient, thereby making regulation unattractive.

Regulatory measures could include emissions standards and the banning of certain goods and services. The National Treasury (2014) states that, in order for them to work effectively, regulatory command-and-control policies require quantitative restrictions on permitted levels of pollution. The disadvantage of this is that the outcomes of command-and-control measures are often not economically efficient because all firms need to comply with specific restrictions, regardless of the costs of compliance or mitigation to individual firms; this means they may not achieve the desired goal which would be to price externalities (National Treasury, 2013).

### 2.7 Was it necessary for South Africa to respond to climate change mitigation schemes?

Under the Kyoto Protocol developed countries that ratified the latter Protocol are expected to:

- ensure that their greenhouse gas emissions fall below the amount of emissions assigned to them;

- implement climate change policies;
- enhance energy efficiency measures;
- ensure that emissions in the waste and transport sectors are limited;
- protect carbon sinks for greenhouse gases;
- ensure market instruments that are not active in reducing climate change are removed; and,
- promote sustainable methods of agriculture and relevant research.

South Africa is not a developed country and is not obliged to adopt the Kyoto Protocol. Unfortunately, current ecological degradations are not strictly confined to geographical borders and a global response is needed to address climate change (Polity, 2015). The United States Environmental Protection Agency (2016) lists South Africa as the 12th largest emitter of $CO_2$ in the world. It is in the top 20 highest greenhouse gas emitters internationally and is considered to be the largest emission distributer of greenhouse gases on the African continent, accounting for 42% of the continent's carbon emissions (Van Aarle, Online). In 2004, the country emitted about 387 million metric tons of $CO_2$, just under half of $CO_2$ emissions for Africa, and about 1.6 per cent of global emissions, which means that the Organisation for Economic Cooperation and Development puts South Africa 11$^{th}$ on the list of fuel emitters (see Table 3 below).

***Table 3: South Africa's emissions ranking***

| Country | Total, million tonnes of $CO_2$ | Change 1990 to 2005 (%) | By type of fuel | | | | By sector | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Million tonnes of $CO_2$ | | | | Million tonnes of $CO_2$ | | | | |
| | | | Coal | Oil | Gas | Others[1] | Electricity and heat | Industry | Transport | Residential | Other |
| South Africa | 330 | 29.7 | 271 | 59 | 0 | 0 | 206 | 51 | 42 | 14 | 15 |
| United States | 5 817 | 19.9 | 2 130 | 2 456 | 1 201 | 27 | 2 485 | 636 | 1 813 | 347 | 535 |
| Japan | 1 214 | 14.8 | 418 | 620 | 171 | 3 | 472 | 268 | 249 | 67 | 157 |
| EU27 | 3 884 | -1.3 | 1 190 | 1 678 | 984 | 31 | 1 396 | 640 | 941 | 479 | 427 |
| United Kingdom | 529 | -5.0 | 138 | 191 | 195 | 4 | 195 | 63 | 129 | 79 | 62 |
| Brazil | 339 | 75.9 | 50 | 241 | 47 | 0 | 36 | 104 | 138 | 15 | 45 |
| China | 5 059 | 128.9 | 4 171 | 802 | 85 | 0 | 2 468 | 1 592 | 332 | 243 | 423 |
| India | 1 135 | 93.5 | 773 | 311 | 50 | 0 | 660 | 232 | 95 | 98 | 48 |
| Ireland | 43 | 41.5 | 10 | 25 | 7 | 0 | 15 | 5 | 12 | 6 | 4 |
| Italy | 454 | 14.0 | 63 | 224 | 163 | 3 | 141 | 84 | 119 | 61 | 47 |
| Korea | 448 | 97.6 | 180 | 198 | 63 | 6 | 184 | 93 | 86 | 32 | 50 |
| Luxembourg | 11 | 7.7 | 0 | 8 | 2 | 0.1 | 1 | 1 | 7 | 1 | 0.1 |
| Russian Federation | 1 543 | -29.5 | 429 | 315 | 783 | 15 | 872 | 221 | 206 | 116 | 128 |

[1] Includes industrial waste and non-renewable municipal waste.

***Source:*** Organisation for Economic Cooperation and Development (2007)

Not all Annex 1 countries have accepted the Kyoto Protocol. South Africa, a developing country and the only African country in this grouping, is ranked among the top 20 countries measured by absolute $CO_2$ emissions (National Treasury, 2010a; Polity, 2015). The South African economy is energy-intensive and depends on its primary sectors of the economy, namely agriculture, fisheries and mining. The country's National Treasury (2010a) confirms that about 64% of the people in South Africa are employed in the primary sectors. For this reason, South Africa, as a responsible country, needs to curb the effects of climate change.

***Reasons why South Africa had to respond to international pressures***

South Africa currently experiences a gradual yet steady climate change (Griffin, 2012): temperatures have risen significantly over the past sixty years and this trend is predicted to continue, with a rise in temperature of 1° to 2° Centigrade expected in coastal regions and 3° to 4°C anticipated in interior regions by 2050 (Griffin, 2012). Increases of between 3° to 4°C in coastal regions and 6° to 7°C in interior regions are predicted by 2100 (Griffin, 2012). Sokolov, Stone, Forest, Prinn, Sarofim, Webster, Paltsev, Schlosser, Kicklighter, Dutkiewicz, Reilly, Wang, Felzer, Melillo and Jacoby (2009) estimate that without global mitigation there is a 50% chance that global temperatures will rise by five degrees or more by 2100. The chance of a rise of less than two degrees is nil. It has become clear that changes in temperature inevitably influence rainfall. Unfortunately, human intervention is currently causing the climate to react too fast and plants and animals are not able to adapt as quickly to this rapid climate change as humans can and therefore the eco-system cannot save itself from this danger. Rainfall patterns also keep shifting and have devastating effects on the environment (Griffin, 2012; Midgley, Spalding-Fecher, Turpie, & Winkler, 2002). As Weitzman (2011) notes, the consequences of such extreme global warming are uncertain and may be profoundly negative. Despite this uncertainty, there is broad consensus that low-income countries will be affected first. Africa is vulnerable, given its underdevelopment and located in the warmer part of the globe (National Treasury, 2010a). South Africa is better equipped to adapt to climate change than its neighbouring states, which are less robust. Overall, there are strong reasons to believe that Africa's long-term interests, including those of South Africa, favour effective global mitigation.

*The global marketplace*

A second reason for introducing a carbon tax is that other nations, notably Australia, China and regional areas such as the European Union, are taking climate change seriously (National

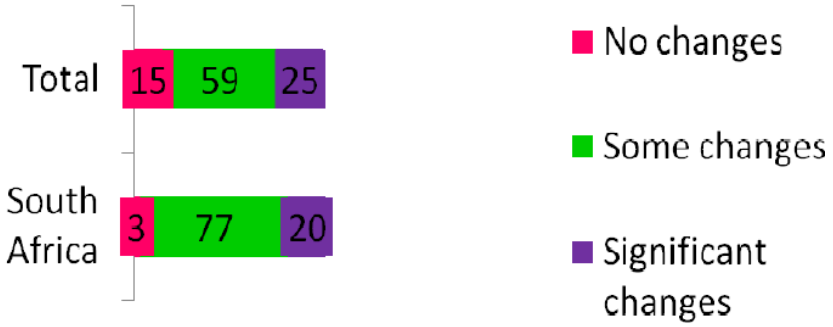
Treasury, 2010a). Even the United States has shown some willingness to enact mitigation policies. South Africa therefore has a long-term incentive to support global mitigation and a short-term incentive to be part of the coalition of mitigating countries. Pre-emptive mitigation policies, such as the introduction of carbon tax, would also allow South Africa to avoid being at a disadvantage in global markets.

Recognising the adverse effects of the transport sector, South Africa was the first developing country to introduce a carbon tax on the sale of motor vehicles. Also, "in a first for an African country, the coal-heavy economy will put a price on pollution" (Climate Change News: 2019). Van Heerden et al., (2016) explain that the purpose of the Carbon Tax Act is to send price signals to the manufacturers. Sweden has introduced carbon taxes for the same reason (Akerfeldt & Hammar, 2015). The implications of these are two-fold: to affect the final consumer buying preferences, or to force manufacturers to invest in green technologies.

*Changing business perspectives*

From the literature available, it becomes apparent that environmental issues have become of great concern to the business world which is fearful that the environment will not be sustainable in future unless remedial action is taken (Van Aarle, Online). A survey by PricewaterhouseCoopers (2011), in which about 84% of the business executives from South Africa and around the world were interviewed about the effects of climate change on their businesses, acknowledges that climate change will have an impact on the way business is currently conducted (see Figure 3 below).

***Figure 3: Changing business perspectives (percentages)***




***Source*:** Van Aarle (Online)

## 2.8 South Africa prepares to combat carbon emissions

In deciding whether and to what extent measures should be taken to combat carbon emissions, the South African government needed to take a number of factors into consideration. Various strategies and discussion and policy documents were developed in the run-up to the introduction of a carbon tax.

### *2.8.1 Concerns accompanying climate mitigation measures*

#### *Economic sustainability*

The question to be asked is whether South Africa, which depends on agriculture and mining, has a sustainable economy (Van Aarle, Online). Another question is what must be done to ensure that the environment is sufficiently preserved to continue supporting the level of growth required by the South African economy (Rego, 2009). The *Budget Tax Proposals 2008/9* confirm that environmental challenges are likely to affect the strength of future sustainable economic growth (South African Revenue Service, 2008). As a result, Van Aarle (Online) argues that it becomes important to protect and effectively manage the environment.

#### *International competitiveness*

Literature reviews – both local and international – acknowledge that one of the main impediments to the introduction of environmentally related taxes is the fear they might negatively affect and subsequently decrease international competitiveness (Organisation for Economic Cooperation and Development, 2001). Van Aarle (Online), however, does not find this to be true because countries applying environmental taxes either provide for entire exemption or partially apply exemption for energy intensive industries. As a consequence, environmental taxes are passed on to the final consumer and mostly the transport sector (Van Aarle, Online). This strategy too has its flaws: when applying those exemptions, the effectiveness of environmental taxes is significantly reduced (Van Aarle, Online). Where the country applying environmental taxes has established international trade preferences, imposing environmental taxes will not affect its economic attractiveness as it will be consistent with other international market participants. In that case it becomes possible to advance a more effective and well-supported environmental policy by simply removing the applicable carbon tax effects.

South Africa proposed the introduction of a carbon tax on a gradual basis by allowing almost up to 95% exemptions in its first phase. Gradual phasing in of environmental taxes would mean, from a South African point of view, that, in the first phase, the exemptions are gradually

reduced, and the applicable rate of tax is slightly increased. A disadvantage of that would be a meaningless imposition of taxes (Van Aarle, Online); for the same reasons, reducing environmental tax rates for more internationally exposed sectors is not a solution (Van Aarle, Online).

The application of environmental taxes could yield positive effects for the international competitiveness of the country (Van Aarle, Online). This is because there might be incentives to expand less environmentally damaging industries (Van Aarle, Online). The other advantage is that new industries may also emerge, for example those selling solar products (Van Aarle, Online). As a consequence, the income taxes paid by these industries might help to compensate for any loss of tax revenue caused by the application of environmental taxes (Van Aarle, Online). An additional incentive is that there may be further opportunities for companies to produce more labour-intensive goods as a substitute for expensive energy. Another advantage that follows this approach is that it could lead to an increase in employment.

***Income distribution***

Van Aarle (Online) confirms that environmental degradation may have a disproportionate impact on the South African low-income groups. Care should be taken when deciding on what environmental taxes are to be introduced, by ensuring that environmental taxes do not become a disproportionate burden for low-income groups who might have suffered already as a result of environmental damage (Van Aarle, Online). This is important because the taxed product inevitably will become more expensive due to the introduction of environmental taxes (Van Aarle, Online). For example, if government imposes a tax on a certain type of fuel, it will be more expensive than others and any goods or services subject to the fuel tax will become more expensive (Van Aarle, Online). Consequently, the poor would be most affected since they do not have access to alternative sources of energy (Van Aarle, Online).

***Earmarking, tax shifting and recycling***

Van Aarle (Online) suggests that tax shifting could be one of the ways to mitigate the challenge of the financial burden on low-income groups. Tax shifting involves minimising income or personal taxes while increasing taxes from environmentally destructive activities (Oates, 1995). The aim of tax shifting is not to change the level of taxes, but to restructure it. Denmark, for instance, has been using tax shifting successfully (Organisation for Economic Cooperation and Development, 2000). The major advantage of tax shifting is that it would allow the South African government to achieve environmental protection without negatively affecting the

economy (Van Aarle, Online). An opportunity could arise for South Africa to achieve clean air and water while simultaneously minimising the tax weight on the working class (Van Aarle, Online). Tax shifting becomes one way to mitigate the consequences and distributional effects through introducing carbon taxes and yet still protecting its environment (Van Aarle, Online).

***Effective administration of carbon taxes***

All South African tax affairs are administered by the South African Revenue Service (SARS). Carbon taxes are also administered by SARS together with the Department of Environmental Affairs and the Department of Energy, with the aim of establishing mechanisms to monitor, report, and verify emissions (South African Tax Guide, 2015). The system also follows a self-assessment process under which taxpayers are responsible for measuring their own emissions and calculating their tax liability. The calculation of the tax base is linked to the Department of Environmental Affairs' mandatory reporting requirements of emissions for all economic sectors in South Africa (Deloitte, 2015). The reporting system of the Department of Environmental Affairs, in turn, is aligned to the Intergovernmental Panel for Climate Change Guidelines for National Greenhouse Gas Inventories (Deloitte, 2015).

BusinessLive (2018) states that the customs and excise processes at OR Tambo International Airport, Beit Bridge and Durban Harbour suffer substantial losses because of inefficiencies (Pressreader, 2018). The current operating systems at SARS are also outdated (Pressreader, 2018) which is a concern because South Africa has just implemented its carbon tax policy, and the fact that its most senior executives have resigned, and it is operating with a new Commissioner. It is not clear whether SARS is ready to implement the Carbon Tax Act (effective from 1 June 2019), in the face of its loss of significant skills.

### *2.8.2 Steps along the way*

***National Development Plan***

About 79% of South Africa's climate change is attributable to how energy is supplied and used (Department of Environmental Affairs, 2009). The 2012 National Development Plan provided a long-term perspective to eliminate poverty and reduce inequality by 2030. It also notes how crucial it is to create a framework for the transition to an environmentally sustainable low-carbon economy (Department of the Presidency, 2012). The area that warrants attention for the achievement of the national development and climate change mitigation goals is therefore South Africa's energy system (Department of Environmental Affairs, 2011).

***White Paper on Energy - 2003***

The 1998 Energy White Paper defined the major objectives of South Africa's government energy policy to include: increasing access to affordable energy services; improving energy governance; stimulating economic development; managing energy-related environmental impacts; and securing supply through diversity. These goals are interlinked and may conflict with each other. Managing energy-related environmental impacts calls for a mitigation element: mitigation means South Africa has to abandon the business-as-usual development path (Department of Environmental Affairs, 2011).

The preamble to the 2003 White Paper on Renewable Energy states:

> Notwithstanding the successes of our electrification campaign, renewable energy for such applications as solar hot water heating, wind generated electricity shall also be addressed. Energy efficiency needs to be promoted, especially in households where such measures will increase disposable income. These issues are important not only from a financially viable energy supply aspect but also from an environmental aspect. (The Department of Minerals and Energy, 1998:10)

The 2003 White paper on renewable energy set a target of a contribution of 10 000 Gigawatt hours from new renewable energy sources in 2013 (Department of Environmental Affairs, 2009). As envisaged from the 1998 White Paper, more ways to mix the energy supply is another measure to ensure a reduction of emissions.

***National Energy Efficiency Strategy - 2005***

In 2005, the South African government published a National Energy Efficiency Strategy document to set out an objective of achieving energy savings of 12% by 2015 relative to a baseline. Furthermore, Eskom has undertaken a series of demand-side management projects since 2004 (Department of Minerals and Energy, 2009).

***A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa – 2006***

The purpose of this policy paper was to articulate the role that market-based instruments, in particular environmentally related taxes, could play in supporting sustainable development in South Africa. It also outlined a framework for considering their potential application (National Treasury, 2006). The paper had two focal points: it looked at how a double dividend, if any, would be created in a most cost-effective and efficient manner. Secondly, no specific

instrument was being targeted so a guiding framework was developed for considering the use and development of different market-based instruments in the South African economy.

***Long Term Mitigation Scenarios - Strategic Options for South Africa - 2007***

This is a fundamental document that responded to four questions:

- Why should South Africa be concerned with the mitigation of greenhouse gases?
- What options for mitigation are available?
- How much can each option reduce emissions? and,
- At what cost? (Scenario Building Team, 2007).

This policy document resulted in the provision for South African negotiators under the United Nations Framework Convention for Climate Change clear and mandated positions for their negotiations on the way in which South Africa arrived at its mitigating strategy (Scenario Building Team, 2007). It would also ensure that South African stakeholders could understand and commit to a range of realistic strategies for future climate action.

***National Industrial Biofuels Strategy - 2007***

The strategy was formulated to achieve a 2% penetration level of biofuels in the national liquid fuel supply, or 400 million litres per annum (Department of Minerals and Energy, 2009). Although there could be a greenhouse gas reduction from this incentive, there is no indication from the document that it was designed to reduce greenhouse gases and, what is apparent, is that it was created to be a link between the country's first and second economies (Letete & von Blottnitz, 2012).

***Ruling party policy adoption – Polokwane 2007***

At the 2007 African National Congress's (ANC's) National Conference at Polokwane, the ruling party's climate change resolution was adopted: it declared a strong intention to mitigate greenhouse gas emissions and to adopt a low carbon growth path. This was not a new concept for the delegates as it existed in the National Development Plan, but it was the right time to adopt it. As expected, the ANC acknowledged the role played by South Africa and the impact the country has on climate change (South African History, 2007). To set a price on carbon emissions was discussed as the main response mechanism to climate change.

***Copenhagen Climate Change Conference – 2009***

Following the 2009 Copenhagen Climate Change Conference, South Africa committed to reducing its greenhouse gas emissions by 34% below current levels by 2020 and by 42% in 2025 (National Treasury, 2010a; Goitom, 2015).

***National Climate Change Response Green Paper – 2010***

This document asserts that climate change is the responsibility of the Department of Environmental Affairs. The National Climate Change Response Green Paper was issued on 25 November 2010 by the Department of Environmental Affairs inviting members of the public to submit written comments on the National Climate Change Response Green Paper 2010 (Department of Environment Affairs, 2010b). This document, *"*The National Climate Change Response Green Paper 2010*",* stated that Government regards climate change as one of the greatest threats to sustainable development. It stated further that Government believes that climate change, if unmitigated, also has the potential to undo or undermine many of the positive advances made in meeting South Africa's own development goals and the Millennium Development Goals, and therefore steps towards mitigation are necessary.

***Discussion paper for public comment – Reducing greenhouse gas Emissions: The Carbon Tax Option – 2010***

The Carbon Tax option to mitigate greenhouse gases required the development of a legal and institutional framework, hence it had to be housed under a designated Act, the "Carbon Tax Act" (Goitom, 2015; Climate Neutral Group, 2017). As a result, the National Treasury issued a carbon tax discussion paper for public comment in 2010 to make the case for the gradual introduction of a carbon-tax system as the best way to reduce the country's greenhouse gas emissions. Baumol and Oates (1988) state that economic instruments are proving to be the mainstay of carbon mitigation policy globally. South Africa's position is consistent with this and the government has indicated its intention to move away from regulation as an emissions reduction tool (Robb et al*.,* 2010). The National Treasury (2010a) stated that the "Discussion Paper for Public Comments - Reducing Greenhouse Gas Emissions: The Carbon Tax Option*"* attempts to build on the work detailed in the 2006 Environmental Fiscal Reform Policy Paper and considers the economic rationale for introducing a carbon tax.

***Draft National Strategy on Sustainable Development and Action Plan 2010 – 2014***

The importance of sustainable development has received recognition across the world as it considers the interdependencies between its three pillars of economic growth, social equity and environmental integrity (Department of Environmental Affairs, 2010a). Sustainable development is essential in the South African context because of its experience in having sustained strong economic growth over the past fifteen years (Morden & Hemraj, Online). This was achieved, however, without much care for the environment (Morden & Hemraj, Online)

and it has seen major challenges regarding environmental degradation requiring serious intervention as South Africa strives to grow its economy (Morden & Hemraj, Online).

To counter this challenge, the Department of Environmental Affairs released a "Draft National Strategy on Sustainable Development and Action Plan 2010*"* in May 2010 to acknowledged that South Africa's natural resource base is under severe and constant pressure (Department of Environmental Affairs, 2010a). Also, the *"*Draft National Strategy on Sustainable Development and Action Plan 2010" recognises that most ecosystems are already degraded and that the effects of climate change are likely to be a burden on South African sustainable development. As a result, a strategy had to be developed to promote sustainable development incorporating the following three pillars (Department of Environmental Affairs, 2010a):

- directing the development path towards sustainability;
- changing behaviour, values and attitudes; and
- restructuring the governance system and building capacity.

It became clear that South Africa has to prioritise sustained economic growth and, to give effect to this goal, to introduce and put in place several specific Acts dealing with environmental protection and preservation (Department of Environmental Affairs, 2010a).

***National Climate Change Response White Paper – 2011***

The "Discussion Paper for Public Comments - Reducing Greenhouse Gas Emissions: The Carbon Tax Option*"* was followed by the National Climate Change Response White Paper which was issued in 2011 (National Treasury, 2014) to explain the South African Government's vision for an effective climate change response. This would result in sustained management of climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity. As a responsible country, a fair contribution to the global effort to stabilise greenhouse gases, establishing the carbon tax option was the best way to achieve these two objectives.

***Carbon Tax Policy Paper: Reducing Greenhouse Gas Emissions and Facilitating the Transition to a Green Economy – 2013***

The carbon tax must be well designed and administered for it to be an efficient mechanism to implement a carbon price and achieve a significant amount of emission reductions (Winkler, 2007). National Treasury issued an update to the 2010 discussion paper that discussed in detail the reasons why cap-and-trade was not a desirable vehicle to place a price on carbon for the

South African environment and it outlined key features of the Carbon-Tax system (National Treasury, 2014; Goitom, 2015).

Despite many criticisms of carbon tax, the major reason advanced in its favour by the South African government is that a carbon tax is more appropriate than a cap-and-trade scheme in the short-to-medium-term because of the oligopolistic nature of the energy sector (National Treasury, 2014). There were future possibilities that carbon tax could be complemented, or replaced by, an Emission Trading Scheme (National Treasury, 2014). This was ideal as the European Union Emission Trading Scheme covers about 45% of greenhouse gas emissions. With these results it was optimal to combine carbon taxes and Emission Trading Schemes to reduce carbon emissions.

***Carbon Offsets Paper - 2014***

The National Treasury noted that a carbon tax might not achieve its intended object without the introduction of other incentives, so a Carbon Offset Scheme was proposed with the aim of supplementing the carbon tax policy package to address climate change and protect households and businesses (National Treasury, 2014). The role of the Carbon Offsets paper was to outline the manner in which firms would be able to reduce their carbon tax liability by up to 10% of their actual emissions. As a result, employing Carbon Offsets as a flexible mechanism to alleviate the effects of the carbon tax liability would achieve consistency with global trends. The Carbon Offsets were scheduled to apply from June 2018 (Climate Neutral Group, 2017), but at the writing of this thesis were not yet in effect.

It is argued that the Carbon Tax Act might be strengthened than if it had been introduced in earlier years. Infrastructure News (2017) confirmed this by stating that comments on the first draft of the Carbon Tax Bill, released in November 2015, led to revisions relating to carbon offset and performance allowances as well as electricity prices, the electricity generation levy and a renewable energy premium. These comments prepared for a better crafting of the Carbon Tax Act and the projects for which the carbon credits will be sold must be allocated in South Africa (National Treasury, 2014; Climate Neutral Group, 2017). The draft regulations list all the requirements for an entity to qualify for the allowance plus the documentation that needs to be submitted to the South African Revenue Service to achieve this purpose.

## 2.9 Conclusion

While greenhouse gases in the atmosphere help to keep the earth at an average of 15°C an increase in greenhouse gases will contribute to an overall warming of the earth's climate; causing some regions to experience cooling, or wetter weather than normal, while the average temperature of the planet rises. The rise in global temperatures is due mainly to the increasing concentrations of greenhouse gases in the atmosphere. Greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range. Accumulation in the atmosphere of greenhouse gases, especially those resulting from the burning of fossil fuels, has been found to be the predominant cause of global warming and climate change.

As controversial as climate change is, scientists have determined that the major factors causing the current climate change are greenhouse gases, land use changes, and aerosols and soot. Climate change is any significant long-term change in the expected patterns of average weather of a region over a significant period of time and any abnormal variations to the climate, and the effects of these variations on other parts of the Earth.

The vulnerability of Africa to climate change is driven by a range of factors that includes weak adaptive capacity, high dependence on ecosystem goods for livelihoods, and crude agricultural production system.

The search for solutions has been an ongoing process. The Rio Earth Summit, however, cited finance as a major constraint in sustainable development. In 2005 the European Union Emissions Trading System was launched and formulated its own Emissions Trading Scheme – currently the largest of its kind. This was followed by the adoption of legislative measures in the Energy and Climate Package which had three targets, the "3 X 20 objective", to be achieved by 2020 requiring a multi-carbon state market to be developed for the scheme to operate. The Emissions Trading Scheme is not an option for South Africa.

The *Copenhagen Climate Change* could not reach a binding agreement on emission reduction targets to keep global warming below 2°C. China, India, and Brazil insisted that the Copenhagen measures to reduce greenhouse gas emissions were designed to impede their economic development. It was agreed that the industrialised economies, which were largely responsible for environmental damage, should provide financial assistance to less-developed economies to support emission reduction. Finally, in December 2010, at the Cancun Conference, a comprehensive, far-reaching international response provided an arrangement

requiring participating countries to be mutually accountable for the reduction of carbon emissions.

A number of measures in the South African Income Tax Act can indirectly promote climate change. These include various sections of the Act which will provide tax relief to businesses, enterprises and industries who qualify by complying with certain criteria to reduce and mitigate the effects of carbon emissions, promote the use of reusable energy and provide environmental conservation as laid down in the Act.

South Africa has applied a market instrument to curb greenhouse gases. However, economic arguments against this maintain that government should not intervene as the market alone should provide efficient means in allocating scarce resources. A counter argument is that it does not hold true for environmental goods because the costs and benefits associated with the environment are not usually reflected in the price of goods and services in the markets and cannot be relied upon to efficiently allocate these resources. Government is thus justified in intervening in the market for the purpose of control and guidance.

The two main identifiable categories of policy instruments used for global climate change are unilateral policy instruments and bilateral, multilateral, or global instruments that can be employed jointly by multiple nations. Additionally, two globally accepted policies or instruments can be used to curb emissions – command and control regulations and market-based instruments. Furthermore, two separate economic strategies exist to curb carbon emissions, namely, carbon taxes and Emission Trading Schemes. Unfortunately, choosing between these two instruments is not easy as world opinion differs about the best way to put a price on carbon, whether via an Emissions Trading Scheme or the taxation of emissions.

Other economic instruments such as tradable certificates for renewable energy, energy efficiency, and/or fuel taxes, could contribute indirectly to mitigate greenhouse gas emissions. Again, the difficulty in choosing the most appropriate policy plays a major role in how each instrument is used, but as no binding agreements exist to force countries to adopt specific response strategies, a careful selection has to be made by each country. This choice depends on many factors including the economy, the energy mix, the county's most effective greenhouse gas response, social and environmental objectives, the political circumstances, and the capacities of the parties that would be involved in developing and implementing the system. For the intervention to yield the most desirable outcome, however, it is crucial that a clear objective be identified and an appropriate course of action for government intervention must

be adopted in order to achieve the objective. Where the intervention is well-defined and planned, it can play a vital role in motivating efficient use of scarce resources.

Environmental taxes should be used to supplement economic and environmental policies. The logic of carbon tax is that it assumes that the cost of climate change can be reflected in the final price of goods and services. Carbon tax creates a stable price signal for investment in emissions abatement but only insofar as the tax rate is known and can be relied upon not to fluctuate. A major shortfall of carbon tax is that it allows regulators to control the price of carbon emissions while having less direct control over the environmental outcome, that is, the emissions reductions that are actually achieved.

There is a strong debate about whether South Africa should have responded to climate change. South Africa, as developing country, recognises that ecological degradation is not limited within national or geographic borders and that global responses are needed to address climate change. Apart from international concerns, two-thirds of the South African population are employed in primary sectors and are therefore most vulnerable to the effects of climate change, as are the rest of Africa.

South Africa is better equipped to adapt to climate change than its less robust neighbouring states. It has, therefore, a long-term incentive to support global mitigation and a short-term incentive to be part of the coalition of mitigating countries.

South African carbon taxation is designed based on the need for major steps to be taken to prepare for the mitigation of the effects of global warming. Major concerns include:

- economic sustainability;
- international competitiveness;
- income distribution;
- earmarking, tax shifting, and recycling; and
- the effective administration of carbon taxes.

Notwithstanding the concerns surrounding the lack of skills in SARS and the Departments of the Environment and Energy, positive steps have already been taken, from formulation to implementation, which suggests that South Africa is well prepared to confront the challenges that accompany these taxes. They include:

- the National Development Plan;
- the White Paper on Renewable Energy;
- the Long-Term Mitigation Circumstances - Strategic Options for South Africa;
- the National Industrial Biofuels Strategy;
- the Ruling Party Policy Adoption – Polokwane;
- the Copenhagen Climate Change Conference: **(**South Africa is committed to reducing its greenhouse gas emissions by 34% below current levels by 2020, and by 42% in 2025);
- the National Climate Change Response Green Paper;
- the Discussion Paper for Public Comment – Reducing Greenhouse Gas Emissions - The Carbon Tax Option
- the Draft National Strategy on Sustainable Development and Action Plan;
- the National Climate Change Response White Paper, and
- the Carbon Offsets Paper.

An interesting development relating to environmental concerns in South Africa was the case between: *Earth Life Africa Johannesburg v Minister of Environmental Affairs and Others* (65662/16) [2017] ZAGPPHC 58; [2017] 2 All SA 519 (GP) (8 March 2017); the first case of its kind to deal with environmental reforms in South Africa that might provide a precedent for the future. In February 2015 the Department of Environmental Affairs granted environmental authorisation to Exxaro's Thabametsi power project to construct a 1,200 MW power plant near Lephalale in Limpopo. Earth Life Africa initially appealed to the Minister to reconsider the authorisation because a climate change impact assessment had not been conducted. When the Department of Environmental Affairs upheld the authorisation Earth Life's case rested on two things:

- First, that section 24 of the Constitution guarantees people access to a healthy environment; and
- Second, that South Africa is party to the Paris Agreement on Climate Change and must do its part in ensuring that average global temperatures do not increase by more than 2°C.

Earth Life Africa stated that Thabametsi's own experts had concluded that its power station will have "very large" greenhouse gas emissions. They concluded that the power station will generate approximately 8.2 Million tonnes (Mt) of $CO_2$ each year and more than 246Mt of $CO_2$ in its lifetime. South Africa's Medupi and Kusile power stations have the technology to remove

$SO_2$ emissions, as well as for carbon capture and storage. Even then, they will produce more than 30Mt of $CO_2$ each year, but they are also four times the size of the proposed Thabametsi plant.

The following chapter describes the research methodology adopted for the thesis.

# CHAPTER 3
# RESEARCH METHODOLOGY AND DESIGN

## 3.1 Introduction

The previous chapter presented a literature review that "develops an understanding of and insight into relevant earlier studies and various trends that have emerged in this field of study" (Lewis, Saunders, & Thornhill, 2007: 57). For example, Lewis et al. (2007: 57) state that: "a review of the literature provides the foundation on which to build the research." This chapter discusses the research methodology for the collection, organisation and analysis of research data.

## 3.2 Research design

Bless, Kagee and Smith (1995) state that a research design guides the collection, analysis, and interpretation of data and/or observed facts; it is a plan or a blueprint of how one intends to conduct research. Babbie and Mouton (2009) indicate that a design points to the kind of study being planned and to the kind of results that are expected. Research in the present study follows a non-empirical method and has selected a predominantly interpretative structure as one that best understands and describes the situation (Babbie & Mouton, 2009). Interpretivism involves researchers interpreting elements of the study; thus, interpretivism integrates human interest into a study (Pham, 2018). Interpretivists adapt a relativist ontology in which a single phenomenon may have multiple interpretations rather than a truth that can be determined by a process of measurement (Pham, 2018). With an interpretivism perspective, researchers tend to gain a deeper understanding of the phenomenon and its complexity in its unique context instead of trying to generalise the base of understanding for the whole population (Pham, 2018).

A comparative analysis of the introduction of carbon taxes and other environmental taxes in selected jurisdictions and the introduction of these tax measures in South Africa is carried out. Stack (2013:34) states that:

- the field of legal research can be divided into two main categories:
- Doctrinal research; and
- Fundamental research which is research designed to secure a deep understanding of law as a social phenomenon, including research on the historical, linguistic, economic, social, and/or political implications of the law.

The research methodology applied in the analysis of the Income Tax Act, the Carbon Tax Act and other related legislation, can be described as a *doctrinal* research methodology. This

methodology provides a systematic exposition of the rules governing a particular legal category (in the present case the legal rules relating to various legislation dealing with environmental matters), analyses the relationships between the rules, explains areas of difficulty and is based purely on documentary data (McKerchar, 2008). A fundamental research approach, by way of a literature study, is applied for the purpose of comparing environmental taxes in the countries involved in this research, with a view to understanding the economic, social and political implications of these environmental taxes and the effect of these on the success or failure of the taxes. "The purpose of a literature study is to analyze critically a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles" (Jørgensen, Online). According to Creswell (2014), a literature review is described as locating and summarising the previous studies about a topic of interest. Further he states that there is no one way of conducting a literature review, nevertheless, many scholars do it systematically to capture, evaluate, and summarise the literature.

### 3.3 Data and data analysis

The sources of data for the present research are both primary and secondary and caution is to be used in relying on secondary data (Stack, 2013). As demonstrated in Table 4 below, this thesis depends mostly on primary data to ensure that its conclusions are valid. The use of limited secondary data sources means that data is available in a form that may be easily verified and always available for public scrutiny (Denscombe, 2007; Saunders, Lewis & Thornhill, 2009).

***Table 4: Categorisation of sources***

| Primary Sources of documentary data | Secondary Sources of documentary data |
|---|---|
| • Legislation [The Customs and Excise Tax Act, No. 91 of 1964, the draft Carbon Tax Bill (2015, 2017 and 2018), the Income Tax Act No. 58 of 1962, the Carbon Tax Act No.15 of 2019 and the Excise Amendment Act, No. 13 of 2019]<br>• Carbon tax and other environmental legislation in the countries included in the research;<br>• National Treasury reports;<br>• the National Development Plan;<br>• Ministry of Finance budget speeches;<br>• explanatory memoranda on the environmental levy on carbon emissions, regulations and similar pronouncements issued by SARS and the Revenue Services of the countries included in the research relating to carbon emissions;<br>• the motor vehicle $CO_2$ emission levy, plastic bag levy, electric filament lamp levy, tyre levy and electricity generation levy;<br>• Policy papers;<br>• Reports by the Davis Tax Committee. | • Publications by various globally recognised institutions; and<br>• Journal articles and other available literature. |

***Source*:** Own design

The study adopts documentary analysis in undertaking the research. The application and success of carbon taxes and other environmental taxes in the countries participating in the research are analysed against the following themes, as envisaged and explored in chapter six:

- economic background;
- tax policy origins;
- reduction targets;
- final rate;
- exemptions and allowances;
- implementation plan;
- revenue recycling, tax shifting and earmarking;
- sector coverage;
- economic effects of the tax policy;
- performance; and
- other contributing factors.

The above themes are carefully selected not to determine what the law is, but to use them to understand the application of these themes in formulating and applying successful laws and in particular to compare South Africa to selected jurisdictions to determine if there are any lessons to be learnt on the implementation of the carbon taxes together with environmental taxes. As this is a comparative study of countries that have applied carbon taxes for decades, the objective is to evaluate the effectiveness of newly introduced carbon taxes in achieving social goals and the extent to which social goals have been addressed.

The nature of this study requires that the data are analysed using logic and natural language arguments.

The validity and reliability of the research and its conclusions has been ensured by:

- placing greater evidential weight on legislation and policy documents (primary data) and the writings of acknowledged experts in the field (secondary data);
- discussing opposing viewpoints and arriving at a conclusion, based on credible evidence;
- presenting substantiated conclusions.

### 3.4 Ethical considerations

This research will only involve the analysis of documentary data. As all data is publicly available, no ethical considerations arise in relation to their use.

### 3.5 Conclusion

A comparative analysis is undertaken of the introduction of carbon taxes in selected jurisdictions to compare their experience with the newly introduced carbon tax in South Africa. An interpretive approach was adopted both to understand and to describe the data (Babbie & Mouton, 2009). The data and the analysis are discussed in this chapter, together with the measures taken to ensure the validity and reliability of the research. It is noted that there are no ethical implications involved in carrying out the research.

Chapter four analyses the newly introduced Carbon Tax Act in South Africa in order to examine the readiness of the Carbon Tax Act to respond to its intended purpose which is “the reduction of carbon emissions”. Although carbon taxes are also environmental taxes by design, this tax is discussed separately because it is newly introduced to deal specifically with the reduction of carbon emissions in line with international standards.

# CHAPTER 4
# ANALYSING THE NEWLY INTRODUCED CARBON TAX ACT IN SOUTH AFRICA

## 4.1 Introduction

Carbon tax is a form of environmental tax. Environmental taxes can be used to address economic and environmental policies. The logic of carbon tax is that it assumes that the cost of climate change can be reflected easily in the final price of goods and services (National Treasury, 2010a). The strength of an environmental tax rests heavily on the careful design of economic and environmental policies. Environmental taxes, also classified as Pigouvian taxes, became an orthodox approach to internalise negative externalities into the price system (Herber & Raga, 1995). South Africa's environmental taxes are based on the "polluter pays" principle and they seek to influence and change consumer behaviour patterns.

Carbon tax creates a stable price signal for investment in emissions abatement insofar as the tax rate is known and can be relied upon not to fluctuate in the short term. The major shortfall of a carbon tax is that it allows regulators to control the price of carbon emissions while having less direct control over the environmental outcome, that is, the emissions reductions that are actually achieved (National Treasury, 2014). The tax creates a fiscal liability for greenhouse gas emissions so that taxed entities may either incur liability or reduce it by investing in abatement measures (Asian Development Bank, 2016).

The National Treasury (2010a) states that a carbon tax is the best instrument to internalise a negative externality, in other words, the external costs are integrated into the producers' costs and consumer prices thereby creating incentives for changes in behaviour. Externality is a side effect or consequence of an industrial or commercial activity that affects other parties without this being reflected in the cost of the goods or services involved.

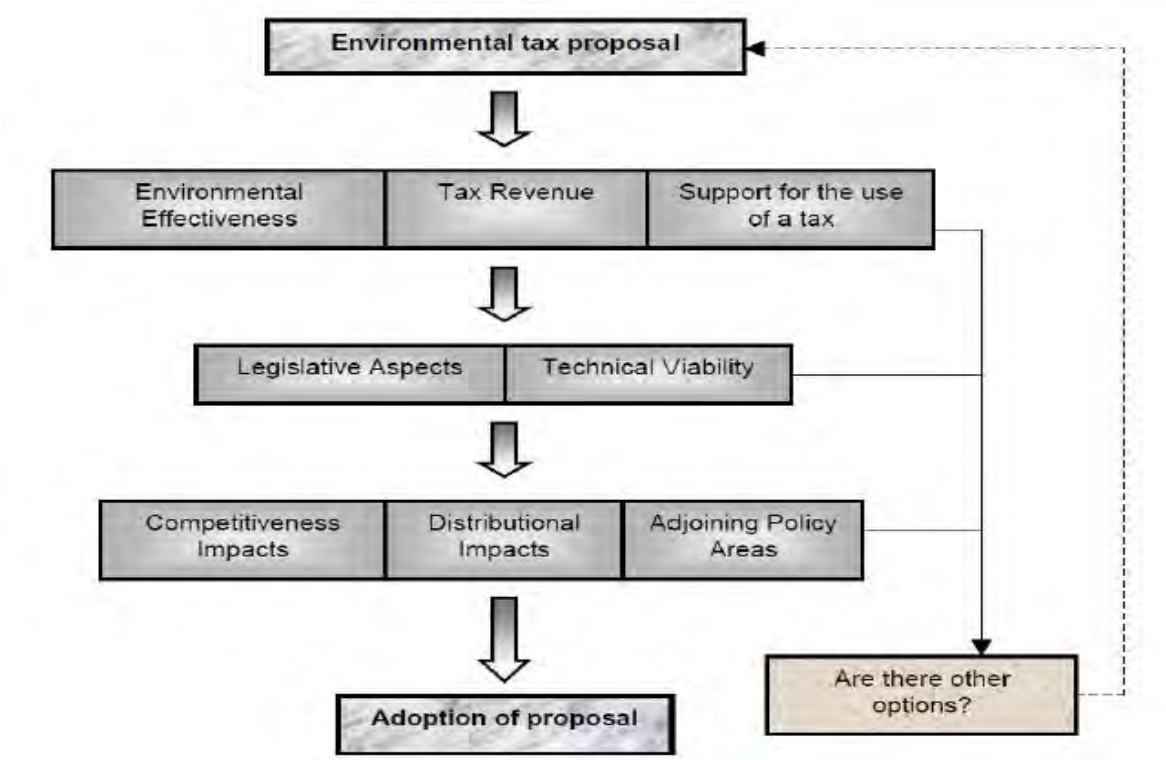
This chapter sets out to address the first sub-goal of the research – to analyse the newly introduced Carbon Tax Act in South Africa.

## 4.2 Design of the carbon tax

There are mixed views about the introduction of the Carbon Tax Act as a tool to reduce greenhouse gases. According to New Southern Energy (Online), South Africa was supposed to have reduced greenhouse gas (GHG) emissions by as much as 13% to 14.5% by the year 2015 and by 26% to 33% by 2035. New Southern Energy (Online) does not believe that carbon

emissions can be reduced by introducing economic instruments and, as a result, there was no reason to introduce the Carbon Tax Act on the 1 June 2019. Figure 4 below, however, reflects the criteria National Treasury applied in designing the tax, which gives some level of assurance that introducing the carbon tax would have taken account of these important criteria.

***Figure 4: Criteria to assess environmental taxes***




***Source*: National Treasury. 2006.**

### 4.3 Carbon Tax Act as an addition to current legislation

The introduction of Carbon Tax Act is an indication that South Africa's existing environmental legislation is ineffectual in preventing the degradation of the environment and therefore an alternative approach is required (Van Aarle, Online). During the drafting phases of the Carbon Tax Act, three carbon emissions tax options were available for consideration in the context of South Africa. These are a direct tax on actual measured emissions, fossil fuel input tax based on the carbon content of fuels (also known as upstream tax on fossil fuel inputs), and fossil fuel output tax (also known as downstream tax on products derived from fossil fuels) (Sabinet, 2010a). The most important advantage of an upstream tax is that it could rely on the existing tax administration system without having to bear extra start-up costs to establish the infrastructure in order to administer the taxes (Sabinet, 2010b). The first option, "emissions tax option", was selected as the most suitable.

The introduction of the Carbon Tax Act marks a significant milestone for the South African Government, which is now partly following the Scandinavian countries' approach to curbing emissions, making South Africa part of the global community and the first African country to embark on the battle to curb emissions. There is also enough research to support the view that carbon taxes would be the best option in South Africa's environment. While research has clarified the need to curb emissions, the effect on the South African economic environment and the choice between available instruments to curb emissions and having to choose which regulatory and trading schemes to use, are unclear. National Treasury (2010a) had indicated that the mix of measures for mitigation would include both economic and regulatory instruments, but with a preference for a carbon tax approach, rather than an Emissions Trading Scheme (National Treasury 2006; 2010a; 2014).

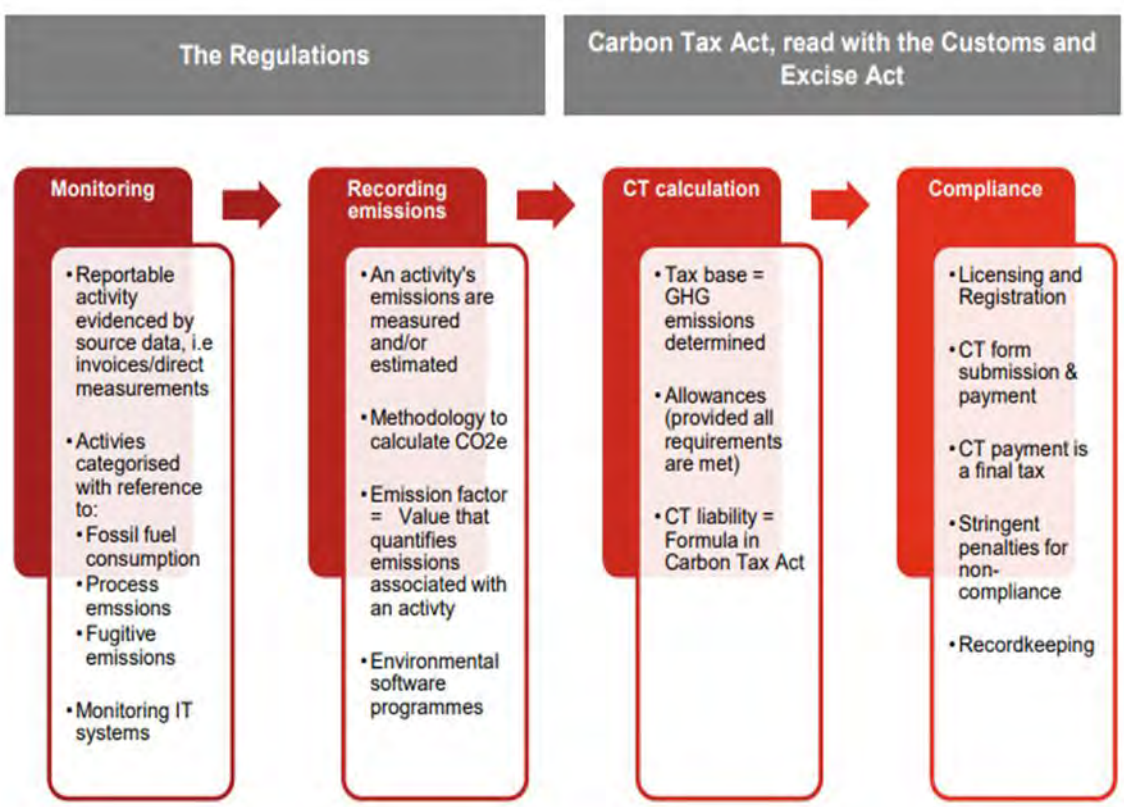
The preamble to the Carbon Tax Act confirms that, since:

- the causality of the increasing of anthropogenic greenhouse gas emissions in the atmosphere and the global climate change has been scientifically confirmed;
- it has consequently become necessary to manage the inevitable climate change impact through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity;
- it has also become necessary to make a contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner;
- the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment (the polluter pays principle);

Government is desirous to utilise a package of measures in an effort to address the challenges posed by climate change.

Figure 5 below provides a short summary of how the regulations from the Department of Environmental Affairs and the three Acts (Carbon Tax Act, No. 15 of 2019, Customs and Excise Amendment Act, No. 13 of 2019 and the Customs and Excise Act, No. 91 of 1964) are expected to work.

*Figure 5: Summary of how the regulations and the affected Acts work together*




***Source:*** PricewaterhouseCoopers (2019)

### 4.4 The Carbon Tax Act, No. 15 of 2019

The Carbon Tax Act, No. 15 of 2019, was promulgated on 23 May 2019 in *Government Gazette* No. 42483, and came into operation on 1 June 2019.

**Structure of the Act**

The Carbon Tax Act consists of five parts and three schedules as follows:

- Part I – Definitions and general provisions relating to imposition of carbon tax
- Part II – Allowances
- Part III – Limitation of allowances
- Part IV – Administration, tax period and payment of tax
- Part V – Miscellaneous
- Schedule 1 – provides for the various factors in three tables:
  - Table 1: Fuel combustion emission factors for the stationary source and non-stationary/mobile source categories, under the headings: fuel type, $CO_2$ ($KgCO_2/TJ$); $CH_4$ ($KgCH_4/TJ$); $N_2O$ ($KgN_2O/TJ$: and Default calorific value (TJ/Tonne);

- Table 2: Fugitive emission factors for solid fuels ($M^3$/Tonne) and oil and natural gas ($Gg/10^3M^3$ total oil production), under the headings: IPCC Code; Source category activity; $CO_2$; $CH_4$; $N_2O$;
- Table 3: Industrial processes and product use (IPPU) emission factors, under the headings: IPCC Code; Source category activity/raw material/product; Tonne $CO_2$/tonne product; Tonne $CH_4$/tonne product; Tonne $N_2O$/tonne product; Tonne $C_2F_6$/tonne product; Tonne $CF_4$/tonne product; and Tonne $SF_6$/tonne product

- Schedule 2 – provides for allowances under the following headings:
  - IPCC Code
  - Activity/sector threshold basic tax-free allowance for fossil fuel combustion emissions
  - Basic tax-free allowance for process emissions
  - Fugitive emissions allowance
  - Trade exposure allowance
  - Performance allowance
  - Carbon budget allowance
  - Offsets allowance
  - Maximum allowance

- Schedule 3 (section 20) – incorporates the carbon tax within the Customs and Excise Act, 1964 as follows:

**1.** Section 1 of the Customs and Excise Act, 1964, is hereby amended by the insertion in subsection (1) after the definition of ‘‘bulk goods terminal operator’’ of the following definition:

“ **‘Carbon Tax Act’** means an Act of Parliament that makes provision for a carbon tax;”.

**2.** The following section is hereby substituted for section 54A of the Customs and Excise Act, 1964:

**“Imposition of environmental levy**
**54A.** A levy known as the environmental levy shall be—
*(a)* leviable on such imported goods and goods manufactured in the Republic as may be specified in any item of Part 3 of Schedule No.1; and
*(b)* collected and paid in respect of carbon tax imposed in terms of the Carbon Tax Act, 2019.”

**Provisions of the Carbon Tax Act**

Section 1 contains certain definitions that are important for the understanding of the provisions of the Carbon Tax Act. Certain of these definitions are discussed below, where relevant, under the sections to which they apply. Other definitions are:

"Emission factor"' means the average emission rate of a given greenhouse gas for a given source, relative to the activity data of a source stream assuming complete oxidation for combustion and complete conversion for all other chemical reactions. The tables in Schedule 1 provide standard IPCC emission factors for fuel combustion emissions, fugitive emissions and industrial process and product use emissions. "Combustion'' means the exothermic reaction of a fuel with oxygen, and "emissions" means— *(a)* the release of greenhouse gases or their precursors; or *(b)* the release of greenhouse gases and their precursors, into the atmosphere, over a specified area and period of time.

"Emissions intensity" is an indicator of the result of the measurement of the quantity of greenhouse gas emissions in relation to an activity, and an "emissions intensity benchmark" means the result of the measurement in respect of an activity that creates greenhouse gas emissions— *(a)* expressed as a predetermined value of the quantity of specified greenhouse gas emissions; *(b)* in relation to an activity that is differentiated from other activities by means of a product, a type of fuel or a technology; and *(c)* compared against the quantity of greenhouse gas emissions, in relation to an identical activity undertaken by another person;

"Fugitive emissions" means emissions that are released into the atmosphere by any other means than through an intentional release through stack or vent including extraction, processing, delivery and burning for energy production of fossil fuels, including leaks from industrial plant and pipelines. An "industrial process" is a manufacturing process that chemically or physically transforms materials.

The "IPCC" means the Intergovernmental Panel on Climate Change, and the "IPCC code" means the source code in respect of an activity resulting in the emission of a greenhouse gas as stipulated in the ''Guidelines for National Greenhouse Gas Inventories'' (2006) issued by the IPCC. Both Schedules 1 and 2 of the Carbon Tax Act incorporate standard classifications and values in terms of the IPCC code. These classifications and values are used in the calculation of the tax base and the allowances (see below).

Section 2 of the Carbon Tax Act provides for the levy of the carbon tax for the benefit of the National Revenue Fund and section 3 deals with the persons that are subject to the tax. A "person" as defined in section 1 includes a partnership, trust, municipal entity (defined in section 1 of the Local Government: Municipal Systems Act, 32 of 2000) and a public entity (as listed in Schedules 2, 3A, 3B, 3C and 3D to the Public Finance Management Act, 1 of 1999). A "taxpayer" is defines as the person liable for the carbon tax in terms of section 3, and the persons subject to the tax are those conducting "an activity in the Republic resulting in greenhouse gas emissions above the threshold determined by matching the activity listed in the column 'Activity/Sector' in Schedule 2 with the number in the corresponding line of the column 'Threshold' of that table." This will require the taxpayers to measure their greenhouse gas emissions for the purpose of the comparison.

Section 4 of the Carbon Tax Act describes the "tax base" on which the tax will be levied as "the sum of the greenhouse gas emissions of a taxpayer in respect of a tax period expressed as the carbon dioxide equivalent of those greenhouse gas emissions resulting from fuel combustion and industrial processes, and fugitive emissions in accordance with emission factors determined in accordance with a reporting methodology approved by the Department of Environmental Affairs." If this reporting methodology does not exist, the section prescribes complex formulae for calculating the sum of greenhouse gas emissions from:

- fuel combustion (Table 1, Schedule 1);
- fugitive emissions (Table 2, Schedule 1); and
- industrial processes (Table 3, Schedule 1).

Section 5 of the Carbon Tax Act provides for the rate of tax as follows:

- R120 per ton carbon dioxide equivalent of the greenhouse gas emissions of a taxpayer;
- increased by the consumer price inflation (as determined by Statistics SA) plus two percent for the preceding tax period; and
- after 31 December 2022, increased by the consumer price inflation for the preceding tax year.

The amount of tax payable is provided for in section 6, again in terms of complex formulae.

- The first formula calculates the amount of tax payable, taking account of the greenhouse gas emissions calculated in terms of section 4 and determines that the result cannot be less than zero. The formula also takes account of greenhouse gas emissions that were

sequestrated (as verified and certified by the Department of Environmental Affairs (DEA)), the allowances provided for in section 7 to 14 (as reflected in Schedule 2), as well as the rate of tax.

The second formula deals with the generation of electricity and is calculated by deducting from the amount determined in terms of the first formula, a renewable energy premium in Rand determined by the Minister of Finance by notice in the *Gazette* (applying until 31 December 2022) and an amount equal to the environmental levy in respect of electricity generated in the Republic paid in the tax year (until 31 December 2022).

Sections 7 to 13 of the Carbon Tax Act provide for the allowances that are deductible from the tax base as calculated and are set out in detail in Schedule 2. Section 14 limits the allowances (other than for taxpayers qualifying for a 100% allowance) to 95% of the total greenhouse gas emissions. One of these allowances (section 12) is the "carbon budget allowance" of 5%, deductible by a taxpayer participating in the "carbon budget system".

The "tax period" (section 16) starts on 1 June 2019 and ends on 31 December 2019 and thereafter starts on 1 January each year and ends on 31 December that year.

A taxpayer must submit yearly environmental levy accounts and payments for every tax period, in terms of the rules under the Customs and Excise Act (section 17). The first environmental levy account and first provisional payment is due in July 2020. Additionally, the Carbon Tax Act makes a provision for an adjustment period, which permits taxpayers to adjust their environmental levy accounts and payments for a tax period in the subsequent environmental levy account and payment of the period commencing on 1 January and ending on 30 June in the following tax period. Therefore, the payment of carbon tax can be split into two amounts PricewaterhouseCoopers, 2019).

Ernst & Young (2019: Online) state that:

> The licensee must, for each tax period, submit an annual account on a DA 180 form in respect of each emission generating facility of the licensee (The DA 180, payment of the environmental levy and any supporting documents that the Commissioner may require must submitted on or before the penultimate working day of July of the year following the tax period). The account for the 2019 tax period (June to December 2019) must therefore be submitted on or before 30 July 2020.

The rest of the sections in the Carbon Tax Act relate to administrative provisions and regulations to be made by the Minister of Finance. Section 20 of the Carbon Tax Act makes an amendment to the Customs and Excise Act, No. 91 of 1964.

**Comments on the Carbon Tax Act**

As a new piece of legislation, the effect of the Carbon Tax Act has yet to be established. From a reading of the Act, it is submitted that certain concerns arise.

- Although Schedule 1 provides emission factors for the various categories of emitters of greenhouse gases, measuring outputs to which these factors apply require extensive expertise and sophisticated systems within organisations to comply with the legislation. Introducing the Carbon Tax Act is not the only concern for the business community as it attracts additional operational costs as well as the cost of auditing, the carbon emission verification process and administrative sophistication (Organisation Undoing Tax Abuse, 2016; Deloitte South Africa, 2018). Auditors have to be accredited by various bodies, such as the United Nations Framework Convention on Climate Change, the South African National Accreditation System and ISO 14064:2 (Climate Neutral Group, 2017).
- Just as the organisations require expertise to deal with their obligations under the Act, SARS, in dealing with the administration of the Act, require additional and expert staff. Where it becomes necessary to audit organisations suspected of non-compliance, this also need staff with specialised expertise. Under the present circumstances, where SARS is under severe pressure, this may be a problem.
- The Department of Environmental Affairs also require expertise to administer the carbon budget allowance and certify the sequestrated greenhouse gases.
- A renewable energy premium in Rand determined by the Minister of Finance by notice in the *Gazette* (applying until 31 December 2022) and an amount equal to the environmental levy in respect of electricity generated in the Republic paid in the tax year, is deductible from the tax base until 31 December 2022. A commitment was made by National Treasury that the Electricity Levy would fall away once the carbon tax was introduced, but this appears to apply only for a limited period.
- As the allowances granted in terms of the Act could amount to up to 95% (100% for households, constructing residential property, all forms of farming, and industrial waste water and discharge), the tax collections from the carbon tax are likely to be small and the rate may not be high enough to provide an incentive to cut greenhouse gas emissions.

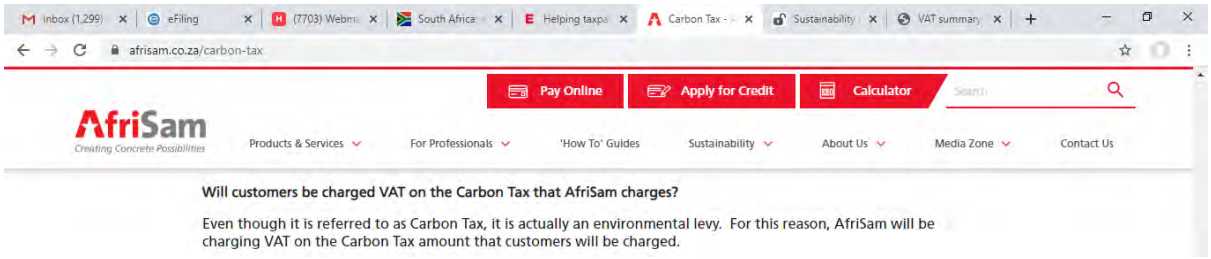
- The decision by National Treasury not to earmark the revenue from the tax in order to promote environmental initiatives is a policy decision that can rightly be criticised. National Treasury (2015) stated that carbon tax revenues would be recycled through mechanisms such as the reduction of the electricity generation levy, the reduction of the credit rebate for the Renewable Energy Premium, and energy efficiency savings tax incentives. This undertaking may not, it is submitted, be adhered to in full.
- The introduction of the carbon tax was delayed repeatedly from 2015 until it was finally implemented on 1 June 2019. One concern has been whether the time at which the Carbon Tax Act was introduced will make it possible for South Africa to meet its nationally-determined contribution commitments in compliance with the 2015 Paris Agreement on Climate Change and to minimise the country's greenhouse gas emissions in line with the National Climate Change Response Policy and the National Development Plan (National Treasury, 2018b).
- Carbon taxes are a unilateral approach to reducing carbon emissions and may have serious economic effects if broad adjustments are not undertaken to avoid the harm it could do to the country's competitiveness and consequently its growth prospects. However, at the low rate at which it is currently levied, this harm will be limited in the short term.
- The capacity of South Africa's industries to absorb the additional fiscal cost and transition to lower-carbon practices is also a matter of concern (Davis Tax Committee, 2015). Eskom and Sasol, companies that will be harmed by the tax, have warned that the introduction of carbon tax will take away billions of their profits every year, rendering job losses inevitable. There is no doubt that Eskom is South Africa's biggest emitter, having pumped 220-million tonnes of $CO_2$ into the atmosphere in 2011 alone, while Sasol's South African operations were responsible for 70-million tonnes of $CO_2$ in the same year; undoubtedly the introduction of these taxes will have a negative impact in their operations (Mail & Guardian, 2011).
- So far, in South Africa, the only integration between the various environmental taxes and levies is that between the electricity generation levy and the carbon tax. Carbon taxes form part of the operating costs of a business because they tax emissions and emissions arise because of the production of income. Accordingly, it is submitted that they should qualify as a deduction in determining the taxable income. Unfortunately, section 23(d) of the Income Tax Act precludes that from happening. The preamble to section 23 states that No deduction shall in any case be made in respect of the following matters, namely-

(c) any tax imposed under this Act or interest or penalty under any other Act administered by the Commissioner

### 4.6 Carbon Tax and Value Added Tax (VAT)

It is still not clear whether the Carbon Tax is a taxable supply for Value Added Tax Purposes. Section 1(1) "supply" includes performance in terms of a sale, rental agreement, instalment credit agreement and all other forms of supply, whether voluntary, compulsory or by operation of law, irrespective of where the supply is effected, and any derivative of "supply" shall be construed accordingly. VAT is imposed on the supply by a vendor of goods / services in the course or furtherance of an enterprise carried on by him (s 7(1)(a)). Figure 21 below illustrates this doubt as it is from AfriSam's website:

***Figure 6: AfriSam responds on how Carbon Taxes will affect them***




***Source:*** AfriSam's website

### 4.5 Carbon tax and the economy

The National Treasury (2010a) admits that, across the world, the feasibility of carbon tax policies has been tested only by European countries, which are developed, whereas South Africa is a developing country. Aside from basic tax-free allowances, South Africa has gone ahead with a carbon tax rate of R120 per tonne of carbon dioxide equivalent which will be charged from inception and will escalate over the years (National Treasury, 2010a; Polity, 2015). This approach is not desirable because it has serious side effects for the poor due to the disproportionate share of the tax burden that will affect them (National Treasury, 2010a). Furthermore, South Africans are currently over-taxed and can ill-afford to pay more because of a new tax, which may not even achieve its goal of reducing greenhouse gas emissions (Organisation Undoing Tax Abuse, 2016). The South African situation is different from that of Scandinavian countries, thus the government should have approached the introduction of carbon taxes carefully, and would need to address other economic development imperatives, such as poverty, population planning and a skills development programme to assist businesses to adopt unemployment alleviation initiatives that are not government-dependent, by finding

alternative and sustainable ways to reduce economic inequality and by improving access to basic and affordable energy services for low-income households (National Treasury, 2010a). There is more to be done than the simple imposition of a carbon tax; its application and design should include other compensating bases to reduce adverse impacts on low-income households (National Treasury, 2010a).

### 4.6 Need to implement the Carbon Tax Act

South Africa is a non-Annex 1 country and is not obliged to reduce carbon emissions. It was submitted that it should have postponed the implementation of the Carbon Tax Act until the rest of the world acts to reduce carbon emissions, because South Africa is in danger of leading this initiative at substantial economic cost (Sabinet, 2010a) and with limited or no success. Another factor to be considered is that South Africa falls outside Annex 1 countries and there was therefore no imperative to introduce a carbon tax. Carbon taxes also have a negative effect on the cost of living. Relying on non-renewable energy sources has been the norm for South Africa for decades and to put a price on it without providing for possible substitutions for most basic industries will undoubtedly harm the economy.

IOL (2015) indicated prior to its introduction that if the carbon tax is introduced it would slow gross domestic product growth by 0.4% each year resulting in a 6.5% reduction in gross domestic product by 2030, or a reduction of at least R350 billion. This would translate into a reduction of close to 1 400 000 jobs (IOL, 2015). As a consequence, the estimated number of dependants to be affected by the implementation of the carbon tax would be close to 5 000 000 (IOL, 2015). Another crucial factor is that the decrease in gross domestic product, together with estimated job losses, would therefore result in National Treasury collecting a significantly reduced amount of tax by at least R750 billion by the year 2030 as a result of slow-moving growth (IOL, 2015).

Moneyweb (2015) raised yet another interesting point on carbon taxes. They questioned whether South Africa needs extra money to finance its inefficiencies or wishes to contribute towards reducing carbon emissions. Moneyweb (2015) claimed that the question is asked because there is nothing, in fact, that South Africa can do to alter current and future carbon emissions in its current state of coal abundance and therefore the imposition of carbon taxes will be meaningless, a view supported by the Organisation Undoing Tax Abuse (2016). Moneyweb (2015) also questioned what, realistically, could be changed by R120 per tonne? Both Moneyweb (2015) and Troy (2012) argued that if government really wanted to change, it

should make available alternative energy sources from which stakeholders can choose so that those that opt for non-renewable energy sources would thereby opt to pay carbon tax. This means that no behavioural patterns can be changed, and this would be unfair to citizens who would be penalised for something over which they have no choice (Moneyweb, 2015).

### 4.7 Conclusion

Although South Africa signed the 2002 Kyoto Protocol, the Carbon Tax Act only became effective on 1 June 2019 and it is clear that binding targets for the 2002 commitment were not met. Also, the intention that the South African government would reduce greenhouse gases is overshadowed by numerous factors that cast significant doubts over whether South Africa should spend its limited resources on climate change. Since the Kyoto Protocol agreement was designed to be binding only on developed countries, South Africa would not be able to use any of the flexible mechanisms set out in the Kyoto Protocol, and therefore South Africa has to apply domestic policies to reduce its greenhouse gases by implementing domestic responses. Whether the application of domestic policies without these flexible mechanisms will be effective or not remains to be seen. The effectiveness of environmental levies depends on the target group and the extent of the cost of applying them. A strong signal can be sent only when the cost is high enough to deter a certain behaviour. This, however, cannot be achieved because the first phase targets as set by the National Treasury appear to be over optimistic and yet the carbon tax rate is also very low. The real weakness of the newly introduced Carbon Tax Act is that in both in the first and second phase of its implementation, the carbon tax rate is too low to send an appropriate signal to the market and would not have the desired outcome. In addition, there are currently no guidelines that inform the revenue recycling technique to ensure transparency of revenue usage, improved energy management, or how the Carbon Tax Act will promote environmental quality. What hampers the first phase more is that while all shale gas development, together with coal-bed methane, seem to be exempt, there is no specific reason for this exemption; the number of exemptions and allowances should be monitored to ease the constraints on administrative capacity.

Although South Africa has followed the example of selected Scandinavian countries in the application of carbon taxes, South Africa suffers from a wide range of limitations compared to these countries. Within the Kyoto Protocol, developed countries were allowed to use flexible mechanisms in addition to other economic instruments when responding to greenhouse gases and have more instruments available than South Africa.

The Carbon Tax Act will attract operational costs, as well as the cost of auditing the carbon emission verification process and require administrative sophistication. Auditors will have to be accredited to be able to carry their mandate. The overall challenge South Africa faces cannot be limited to the design and implementation of an effective carbon tax and carbon offset regulation, rather it is to a large extent the careful balancing of the country's energy needs and mix, and re-prioritisations and environmental objectives. Failing to promulgate the Carbon Tax Act on various occasions casts doubt on South Africa's potential to achieve its commitments in terms of the Kyoto Protocol. To what extent the implementation of the Carbon Tax Act will achieve its purpose is yet to be seen, especially as some have argued that carbon taxes do not guarantee the reduction of emissions. The VAT implications of the introduction of the Carbon Tax is also still uncertain.

The lack of detail about recycling measures and the possibility of double taxation have been highlighted as a risk to the South African economy by the Davis Tax Committee (2015). National Treasury (2013) states that given the regulatory structure governing the electricity sector and liquid fuels sector, consideration would need to be given to how carbon taxes are passed on to the consumer as well as to issues such as double taxation. The electricity sector is currently able to pass a carbon tax onto the customer. Given the initial low rate for a carbon tax, National Treasury predicts that double taxation would be small.

It is submitted that the overall challenge that the South African government faces cannot be limited to the design and implementation of an effective carbon tax and carbon offset regulation but is to a large extent to carefully balance the country's mix of energy needs, re-prioritisations and environmental objectives.

The following chapter discusses the second sub-goal by examining in detail current South African environmental taxes (the Plastic Bags levy, Electricity Generation levy, Electric Filament Lamp levy, Motor Vehicle $CO_2$ Emission levy and Tyre levy).

# CHAPTER 5
# ANALYSIS OF OTHER ENVIRONMENTAL TAXES LEVIED IN SOUTH AFRICA

## 5.1 Introduction

Environmental levies result from section 24 of the Constitution of the Republic of South Africa, 1996 ("the Constitution"). This section makes specific demands on government to provide every South African citizen with an environment that is protected, free from pollution and conducive to good health. Environmental challenges are increasing the pressure on all governments to find ways to reduce environmental damage while minimising harm to economic growth (Organisation for Economic Cooperation and Development, 2011). Section 146 of the Constitution requires the promulgation of national legislation for the protection of the environment, which has been an important influence on South Africa's having introduced various environmental levies. The Organisation for Economic Cooperation and Development (2011) states that governments have a range of tools at their disposal, including regulations, information programmes, innovation policies, environmental subsidies and environmental taxes. The South African Customs and Excise Act, No. 91 of 1964 imposes five environmental levies that are administered by SARS in order to protect the environment: the plastic bag levy; the electricity generation levy; the electric filament lamps levy; the motor vehicle $CO_2$ emission levy; and the tyre levy (South African Revenue Service, 2017). Table 4 below describes various Acts currently dealing with environmental issues in South Africa.

***Table 5: Acts dealing with environmental issues in South Africa***

| No. | Name of the Act | Reason for its existence |
|---|---|---|
| 1. | National Energy Act, No. 34 of 2008<br>"National Energy Act" | To ensure that:<br>▪ there is diverse availability of energy resources;<br>▪ in sustainable quantities; and<br>▪ inexpensive prices.<br>For the South African economy to support economic growth and poverty alleviation by considering environmental management requirements and interactions amongst economic sectors. |
| 2. | Atmospheric Pollution Prevention Act, No. 45 of 1965<br>"Atmospheric Pollution Prevention Act" | To prevent the pollution of the atmosphere by giving the Minister of Environmental Affairs the rights and powers to declare certain areas of the country restricted areas in terms of which gases may be emitted as well as enabling him/her to control the emission of greenhouse gases through penalties levied when excessive amounts of dangerous gases are emitted. |
| 3. | Air Quality Act, No. 39 of 2004<br>"Air Quality Act" | This Act provides for the regulation of the quality of air, including standards regulating air quality monitoring, in order to protect the environment and ensure sustainable development. |
| 4. | National Water Act, No. 36 of 1998<br>"National Water Act" | It recognises that water is a scarce resource and therefore acknowledges government's responsibility for protecting water quality and ensuring that water is used sustainably. |

***Source:*** Own summary

The National Environmental Laws Amendment Act, No.14 of 2009, is the primary instrument used to amend the Acts referred to above. Notably, a significant amendment in terms of the above Acts is the penalties they impose. These have been adjusted to R5 million and up to five years' imprisonment for a first-time offence under the Atmospheric Pollution Prevention Act, and up to R10 million, and 10 years' imprisonment for any subsequent offence. The amendments to the other Acts are similar. From the Acts listed in Table 4 above and the substantial penalties, there is no doubt that South Africa has a range of environmental legislation in place to mitigate climate change, but the environmental crisis persists (Van Aarle,

Online). This is because, although current legislation is adequate in itself, the cost of strictly imposing laws is high and requires skilled personnel with the knowledge to execute the required significant administration (Van Aarle, Online).

South Africa signed the 2002 Kyoto Protocol with binding targets for developed countries to reduce their greenhouse gases by 5% between 2008 and 2012, but this did not happen. Because this agreement was designed to be binding only on developed countries, South Africa may not use the flexible mechanisms set out in the Kyoto Protocol (Van Aarle, Online). This limitation and that South Africa is a volunteer to this agreement, means it must apply domestic policies to reduce its greenhouse gases by implementing environmental taxes.

This chapter analyses the provisions in South African legislation that seek to protect the domestic environment. This chapter also analyses the implementation, challenges and successes of the existing environmental levies in South Africa, which were introduced with the intention of penalising polluters while simultaneously generating revenue for the fiscus. Environmental taxes, as a financial instrument, must be well-designed. Crucial aspects that can affect the design of these taxes include the type of tax being suggested, the persons targeted to pay taxes, how these taxes will be interlinked with other taxes and how they are phased in throughout their operating lifetime.

This chapter uses the outcomes obtained from analysing the above-mentioned five environmental levies in order to evaluate the extent to which the Carbon Tax Act and other environmental levies are likely to respond to South Africa's commitment to reduce carbon emissions. Also, it aims to establish similarities between carbon taxes and other environmental levies because the carbon tax instrument is meant to play a vital role in achieving the goals set out in the National Climate Change Response Policy of 2011 and to make a meaningful contribution towards meeting South Africa's 2009 Copenhagen commitment to reduce current greenhouse gas emissions.

Steinbach, Palm, Cederlund, Georgescu and Hass (2008:55) state that: "Environmental taxes are those whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment." Pigou (1920) argues that environmental taxes are punitive measures to enforce and correct consumer behaviour and Arendse (2007) claims that environmental tax incentives facilitate a positive change in consumer behaviour, especially regarding the environment.

Environmental taxes could, therefore, play a significant role both in sending warning signals to consumers with a view to discouraging them from damaging the environment in the future and ensuring that current resources are conserved. In addition, the carbon tax redefines environmental security by placing appropriate price indicators on globally used resources (Ellis, 2004). The introduction of a carbon tax is necessary because, as Courtelis (2012) points out, South Africa has very few environmental tax policies and its existing policies are insufficient to ensure the effective reduction and management of its emissions.

### 5.2 Motor Vehicle $CO_2$ Emission Levy

Nitrous oxides are yet another important greenhouse gas emitted in South Africa from sources such as agriculture, industry, and transport (National Treasury 2010a). To curb the emission of this oxide, South Africa has made progressive policy steps by implementing an important national fiscal policy in the emissions-based purchase tax for private passenger vehicles (Balkaran & Vuzane, 2017; National Treasury, 2010b). This tax on new vehicles was introduced in September 2010 (AutoTrader, 2014). While Vosper and Mercure (2016) found that the emissions reduction achieved by the tax was negligible, the South African Revenue Service is convinced that the new levy will persuade South Africa's vehicle industry to become more energy efficient and environmentally friendly (South African Revenue Service, 2016; AutoTrader, 2014).

South Africa, where one out of every five people owns a vehicle, registered the highest number of cars per capita in Africa during the 2012 financial year; in 2012 alone more than 250,000 units were sold (Be forward, 2018). As Lester (2013) and National Treasury (2018b) put it, the aim of the carbon tax is to punish polluters in the interest of the planet. The Mail & Guardian (2010) states that South Africa's struggling motor industry was dealt a blow on 1 September 2010 when the new $CO_2$ vehicle emissions tax came into effect. The consumer would have to absorb the costs (Mail & Guardian, 2011).

The increase in customs and excise duties is highlighted in the 2006 discussion paper, "A Framework for Considering Market-Based instruments to Support Environmental Fiscal Reform in South Africa"; it points out that the $CO_2$ emissions tax extends current ad valorem taxes. The carbon levy on new vehicles is calculated according to the carbon content in a litre of petrol or diesel divided by each vehicle's fuel economy (Nissan, Online). The market, reassured by a sympathetic National Treasury, is hopeful of a separation between ad valorem taxes applied to petrol and diesel cars at some date (Nel, 2009).

There were no specific targets linked to the Motor Vehicle $CO_2$ emissions tax. This is a problem as transport has its emission contributions. If the Motor Vehicle $CO_2$ emissions tax is meant to curb transport emissions, why are there no guidelines that state what the current situation is, what has to be capped and what reduction targets are? (All Africa, 2010). Another anomaly is that, although the tax was extended to incorporate light commercial vehicles, it excluded minibus taxis (Mail & Guardian, 2011).

Currently, the price of all new vehicles (passenger and light commercial) in South Africa includes ad valorem excise duties. National Treasury (2010b) proposed that an adjustment be made to existing ad valorem excise duties to include $CO_2$ as an environmental criterion as from 1 March 2010. The major issues raised by other authors regarding the implementation of carbon levies are:

- Because South Africa is the first country in the world to impose carbon levies on light commercial vehicles, there was no available data with which the $CO_2$ emissions could be calculated; therefore it was difficult to explain to the final consumer how the figures were derived (Mail & Guardian, 2011).
- The type of vehicle subject to carbon taxes and the point at which such tax is to be paid should be known in advance (Nel, 2009). This information is important for adherence to the general principles of a good taxation system such as administrative efficiency, equity, neutrality, certainty and simplicity.
- There is general view that for the carbon levy to achieve its purpose, the Income Tax legislation, more particularly section 23(d), should be amended to allow for the deduction of the carbon tax levy.
- The relevant amount for inclusion in the purchase price of a vehicle is negligible and is not even noticeable by the end-consumer, and concerns exist as to whether the levy will have any effect on customer buying patterns or whether it is simply a way of increasing government revenues (Mail & Guardian, 2011; Moore-Stephens, 2010).
- It is not stated why the South African Government would want to introduce a carbon levy tax rather than making the supply of cleaner fuels available (Moore-Stephens, 2010).
- It is believed that the government ignores issues relating to the design of the taxes and has introduced carbon levies only to demonstrate the country's compliance with green legislation to render South Africa an attractive destination for climate-change events (Mail & Guardian, 2011).

Passenger cars are taxed from 121g/km upwards, at R90 per gram plus 14% VAT: a car of 130g/km $CO_2$ are liable for 10 times R90, or R900, plus 15% VAT, in addition to the VAT already paid on the base price of the vehicle, thus a tax on top of a tax (AutoTrader, 2014)); this amounts to R1 035.00 in emissions tax alone. Double cabs are liable for R125 per gram over 175g/km, so that a double cab with 212g/km $CO_2$ will have to pay an amount of R3 847.50 emissions tax. In addition, National Treasury (2018b) stated that as from 1st April 2018, the carbon-dioxide emissions tax will be R110 for every gram above 120g of carbon dioxide per kilometre for passenger vehicles and R150 for every gram above 175g of carbon dioxide per kilometre for double cabs.

The South African government has collected almost R180 000 000 as at the end of 2014 from the vehicle emissions tax, but it is still not clear where this money goes or to what extent it supports its intended purpose "to help to reduce emissions" (AutoTrader, 2014). In some countries in Europe, emissions tax is recycled into affected manufacturers for the development of environmentally efficient reduced-emission cars (AutoTrader, 2014). In the United States of America vehicles attract a "Gas Guzzler Tax" based on fuel consumption – dollars received from this tax are directed back into organisations to encourage them financially to put something green back into the eco-system and for the reduction of their carbon footprint. In South Africa the monies received will merely become additional government revenue. It would have been preferable for these taxes to have been earmarked for green technology investments or ring-fenced for projects like subsidising filters and scrubbers, or windfarms, or something of which consumers in general would approve (Mail & Guardian, 2011). The effectiveness of the vehicle emissions tax in South Africa is not clear if the monies involved are, firstly, negligible and, secondly, if not used for the purposed of combating emissions.

### 5.3 Plastic bag levy

There are worldwide initiatives to eliminate plastic shopping bags. In South Africa, the plastic bag levy seeks to encourage consumers to replace plastic shopping bags with paper or cotton bags. The obvious reason is the reduction of litter and to save the planet from plastic waste, but this too has had economic implications (Daily Maverick, 2018). The legislation was introduced on 7 May 2003, the economic effect of which was that the thickness of the plastic bag had to be increased and a small levy charged, requiring bags to be sold instead of being provided free of charge (Dikgang, Leiman & Visser, 2010; Hasson, Leiman, & Visser, 2007).

In 2002, the government, labour representatives, and industry signed a Memorandum of Agreement concerning the use of disposable polythene shopping bags. The levy was introduced in 2004 to manage the problem of plastic bags ending up as wind-blown litter on fences, trees, in open spaces and in landfill. The legislation is intended not only to lessen the negative impact of plastic bags on the environment, but to reduce the use of bags by 50% by making consumers either buy new bags or repeatedly to reuse stronger bags (Dikgang et al., 2010; Hasson et al., 2007) and, ultimately, to discourage the use of plastic bags completely (Edward Nathan Sonnenbergs, 2018).

The levy was introduced at R0.03 cents a bag in 2004, payable by plastic bag manufacturers and importers. It increased to R0.04 per bag in 2009 and subsequently to R0.06 from the beginning of 2013 (Fin24, 2014; Green Home, 2013). National Treasury (2018b) announced that the plastic bag environmental levy would be R0.12 per bag from 1 April 2018. SARS requires that that the polluter pays the levy. It is not clear why a levy is not imposed on plastic polymer (polyethylene) or polypropylene, which accounts for all types of goods made from this material (Engineering News, 2015).

1. On introduction of the levy, a non-profit company "Buyisa-e-Bag", was formed to promote plastic bag recycling. This company was wound up in 2010/11 with its functions being absorbed by the Department of Environmental Affairs (Fin24, 2014). There are concerns associated with the plastic bag levy: The plastic bag consumption drop was short-lived (Dikgang et al., 2010; Hasson et al., 2007; Engineering News, 2015).
2. The country had become used to paying for plastic bags and demand began to increase.
3. The tax did not change consumer behaviour (Green Home, 2013).
4. The price of a plastic bag is not high enough to dissuade purchasers (Green Home, 2013). The levy, however, seems to benefit intermediaries more than it does the government, which was meant collect most of the money for the National Revenue Fund. Because R0.06 is added onto the price of each plastic bag, together with the 15% ordinary ad valorem customs duty, depending on the design of the plastic a (white plastic carrier bag (vest style) as opposed to a printed plastic carrier bag), the cost was estimated at R0.14. Currently, the consumer pays anything between R0.40 and R0.75, before VAT, for a plastic bag and intermediaries can possibly earn a profit of at least R0.35 per plastic bag more than the government (Engineering News, 2015).

5. VAT plays an important part in the cost of a plastic bag so more money could be attracted to VAT than the levy itself (Engineering News, 2015).
6. Although the levy was imposed in 2004 to fund a national recycling programme, to this date there is not a single bag that has been recycled from this lucrative fund (IOL, 2006).
7. The steady increase in the use of plastic bags means it is reasonable to expect that the plastic littering problem will persist. Also, the inelasticity of bag consumption suggests that consumer behaviour has not changed (Dikgang et al., 2010).
8. The levy has not fully achieved its purpose but has been successful in raising money for the fiscus (Dikgang et al., 2010).

Monies collected are not yet earmarked. All the money received by government from the plastic bag levy must be deposited into the National Revenue Fund, as required by the Constitution (Fin24, 2014). The former Finance Minister, Nhlanhla Nene, acknowledged that only a small percentage of the R215 million raised, had gone to the Department of Environmental Affairs over the previous ten years (Fin24, 2014; IOL, 2006). Also, there are a number of waste items that could, and perhaps should, be included in the levy.

Up to 2006, the former Finance Minister, Nhlanhla Nene, told Parliament that the total funds received from the introduction of the plastic bag levy scheme in 2003 amounted to R1.1 billion (Fin24, 2014; IOL, 2006). This amount, coupled with the reduction of plastic bag usage from 10 billion down to 4 billion shopping bags per year, equates to a reduction by 60% of plastic bags used per year, which itself contradicts what Dikgang et al. (2010) have suggested that the levy has not fully achieved its purpose. It is argued that a yearly reduction of 60% is quite an achievement.

### 5.4 Electricity Generation Levy

The availability of electricity is essential for the advancement and improvement of the lifestyles of all South Africans and, besides such social benefits it provides, electricity is the main driving factor in the South African economy (National Treasury, 2008). There are three stages of electricity provision: generation; transmission; and distribution. The process by which electricity is produced is “electricity generation”. “Transmission” involves the transportation of electricity generated from power stations to local networks for distribution via high voltage, along long-distance power lines, to the load centres. The distribution phase is the actual delivery of electricity to end consumers. Electricity production and transportation constitutes

the electricity supply, and, in South Africa, this is largely the function of Eskom, the South African electricity public utility (National Treasury, 2008).

An electricity generation levy was introduced as a temporary measure to manage the current coal demand. The anticipated introduction of a carbon tax (originally in 2016) was as an instrument with which to deal sustainably with the electricity demand at the time (Fin24, 2014). The electricity levy was first introduced by government for three reasons:

- as a demand management tool to reduce the use of non-renewable sources and to be applied as an energy saving measure;
- to fund the solar water-heater programme and the rehabilitation of roads that had been damaged because of the haulage of large volumes of coal by means of trucks in the Mpumalanga Province; and
- to provide signals in advance as a warning for the anticipated carbon taxation (National Treasury, 2015; Promethium Carbon, 2015; The SAIT, 2008).

National Treasury (2015) also stated that until the carbon taxes take effect, the electricity levy served, in the meantime, to encourage energy efficiency, while at the same time there will be an attempt to put a price on greenhouse gas emissions. At the time it was introduced in 2009 the tax was just a R0.02 per kWh as a roads charge and was included in the electricity tariff (Promethium Carbon, 2015; The SAIT, 2008). This levy has been increasing over time and in the 2018 budget speech, Finance Minister Nene said that an increase in the electricity levy from 3.5c/kWh to 5.5c/kWh was being considered to assist in the demand management of coal. The additional 2c/kWh would be dropped when the electricity shortage is over; unfortunately, there was no mention of when the shortage was expected to be over (Fin24, 2014).

Edward Nathan Sonnenbergs (2008) state that, under certain circumstances, the levy did not have to apply, for instance, where electricity is produced by electricity generation plants with an installed capacity of just under five megawatts; where electricity is generated from renewable energy resources; and where electricity is generated from co-generation of any form.

There are other concerns associated with the implementation of the levy. When the increase to R0.055 per KWh additional revenue was proposed, the then Minister of Finance, Pravin Gordhan, stated that it would be used to broaden the energy-efficiency savings tax incentive and that the increase was a temporary measure that would be withdrawn when carbon tax is introduced. The introduction of the Carbon Tax Act has failed to benefit consumers against the rising prices of the electricity levy (Fin24, 2014) nor does the Carbon Tax Act seem to have

responded to most of the respondents' recommendations stated in relation to the Draft Bill that the electricity sector should be allowed a much higher tax-free threshold in order to achieve the desired neutrality between the demand for coal and the rising prices of electricity (National Treasury, 2018b). Respondents also suggested that the electricity generation levy and the Renewable Energy Independent Power Producer Procurement Programme, a programme developed to encourage private investment to help further develop the renewable energy sector within South Africa, are comparable to carbon taxes. Their suggestion was that either of these interventions be removed or that only the carbon tax be implemented.

In addition to the above reasons, the levy was introduced, *inter alia*, to fund the maintenance and repairs of roads in Mpumalanga (Promethium Carbon, 2015; The SAIT, 2008). When the government increased the price again in 2012 to R0.055, it was with the objective of earmarking the increased revenues received for the funding of energy-efficiency initiatives such as the South African solar-water-heater programme (The SAIT, 2008).

Because the introduction of the electricity levy is intended for the support of energy efficiency (National Treasury, 2008), it was proposed initially by government that the tax be imposed on the sale of electricity generated from non-renewable sources by electricity generators and would be expected to be collected at source (National Treasury, 2008). As with the features of the carbon tax design, the electricity generation levy would serve the dual goal of helping to manage the current supply shortages and at the same time would help to protect the environment.

National Treasury expected to raise up to R4 billion annually on the electricity levy and that the introduction of this electricity generation levy would be complemented by incentives designed to encourage firms to behave in a more environmentally responsible manner (National Treasury, 2008). The tax incentives meant to encourage relevant companies engaging in the development of renewable energy, include accelerated depreciation allowances which are already in place and might only need minor amendments to become effective (National Treasury, 2008).

There could also be an existing conflict over the design of the electricity generation levy and the Renewable Energy Independent Power Producer Procurement Programme as these are comparable to the newly introduced carbon taxes (National Treasury, 2015). This conflict can

result in double taxation if all these schemes[4] are applied at the same time. One remedy would be to remove the electricity generation levy and the Renewable Energy Independent Power Producer Procurement Programme, another would be to implement only the carbon tax. National Treasury (2015), however, disputed this finding by stating that electricity tariffs in South Africa in real terms had remained unchanged between the late 1980s and 2007. Because of this, inefficient use of electricity was promoted, following significantly low electricity prices that provided limited or no benefits for the improvement of the efficiency of energy use that, in turn, has placed the economy on a more energy and carbon intensive growth path over the years. National Treasury (2015) insists that over the decades, the relatively low electricity prices, if the perspective of a full financial view is taken, means that no consideration has been given to the entire economic cost of producing electricity and that the calculations thereof should include the costs of environmental damage linked with local air pollution and greenhouse gas emissions.

Since the beginning of 2008 it has become clear that the demand and supply balance has shifted and that the need for additional and cleaner electricity generation capacity has become essential.

### 5.5 Electric Filament Lamps Levy

The electric filament lamps "tungsten halogen and incandescent" are now subject to an environmental levy (South African Revenue Service, 2017; Engineering News, 2015).

The main purpose of this tax is to increase the price of electric filament lamps, the so called "old light bulbs" in order to create a preference for fluorescent bulbs which are durable and affordable. The levy attached to the electric filament lamps makes them expensive.

Although it would have been expected that the proceeds from the electric filament lamp levy would be used for the disposal and recycling of these lamps, it seems to have become the South African practice to collect such levies for the benefit only of the National Revenue Fund (Engineering News, 2015).

The levy was introduced at a rate of R4.00 per lamp, with the electric filament lamps levy being increased to R8.00 per globe as from 1 April 2018 in order to incentivise more energy-efficient

[4]Electricity generation levy, the Renewable Energy Independent Power Producer Procurement Programme, and the Carbon Tax Act.

behaviour (National Association of Automotive Component and Allied Manufacturers, 2018; Edward Nathan Sonnenbergs, 2018).

### 5.6 Tyre levy

The 2015 Budget proposals indicated that the South African Government intended to introduce an environmental tyre levy in addition to the other environmental levies already in place. The purpose of this levy was to encourage waste reduction, reuse, treatment and recycling and to reduce the disposal of tyres into landfills (IOL, 2016). One of the main reasons is that South Africa generates an estimated 108 million tonnes of waste each year (IOL, 2016). The tyre levy was to be implemented to take effect in October 2016, but this date was postponed to the 1st of February 2017 (Truck & Bus, 2016; PricewaterhouseCoopers, 2016).

This levy was designed to assist government's broader attempts at promoting increased levels of transparency and accountability (Truck & Bus, 2016); it replaced the charge that was administered by the Department of Environmental Affairs under the scheme called *"*Recycling and Economic Development Initiative of SA*"* and is now administered by the South African Revenue Service Customs and Excise as an environmental levy (PricewaterhouseCoopers, 2016).

The draft legislation stated that the tyre levy would be applied at a rate of R2.30 per kg of tyre and implemented through the Customs and Excise Act (PricewaterhouseCoopers, 2016; IOL, 2016). As a result, this charge has been inserted as Part 3E to Schedule No. 1 of the Customs and Excise Act (Shepstone & Wylie Attorneys, 2016). The levy is payable in addition to any existing customs and excise duty allocated to the import/export of such tyres. In addition to this levy and the customs and excise duty, VAT is payable as well.

Revenue from the levy, as with all other environmental taxes, is to be deposited into the country's National Revenue Fund and an on-budget allocation will be made to the account of the Department of Environmental Affairs through the National Budget. Tyre producers and importers are required fully to participate in the implementation process (Truck & Bus, 2016). The tyre levy applies to all new and re-treaded pneumatic tyres (PricewaterhouseCoopers, 2016; Truck and Bus, 2016; Shepstone & Wylie Attorneys, 2016).

In 2016 the IOL reported that from the inception of the tyre levy the total industry levy contribution was more than R2 billion or between R500 and R600 million each year.

## 5.7 Other proposed environmental levies

National Treasury (2018b) proposed further environmental levies to be introduced, one of these, the Acid Mine Drainage Levy, is designed to charge polluters for the cost of environmental damage and to help fund the treatment of acid mine water in those areas so affected. Government has still not published a discussion document outlining design options for the proposed acid mine drainage levy.

In addition, the environmental fiscal reform policy is under consideration, the purpose of which is for the government to examine fiscal and regulatory options that ultimately will improve water resource management, reduce the emission of pollutants and reduce waste.

## 5.8 Conclusion

The intention of section 24 of the Constitution is clear, but its objectives rely on the support of other environmental legislation. It is also clear that where the legislation is used effectively and collectively, there will be an adequate and guaranteed response to South Africa's environmental threats. Currently, available instruments that are not managed by SARS include the National Energy Act, the Atmospheric Pollution Prevention Act, the Air Quality Act and the National Water Act. These Acts have laid a strong foundation upon which the environmental levies operated by SARS build. It was expected that the combination of environmental legislation together with environmental levies would lead to a strong environmental response. Unfortunately, South Africa still faces an environmental dilemma because the above-mentioned legislation is not strictly imposed due to the fact that the costs of strictly imposing the law are high, require significant administrative backing and personnel with the appropriate knowledge to correctly execute what is required.

While it is argued that emission reductions as a result of introducing taxes is negligible, South Africa was the first country to introduce the Motor Vehicle $CO_2$ emission levy. The criticisms of the Motor Vehicle $CO_2$ emission levy and the Carbon Tax Act are similar, the major criticism of the Motor Vehicle $CO_2$ emission levy is that there are no specific targets linked to it. The design of the Motor Vehicle $CO_2$ emission levy targets passenger vehicles, but excludes minibus taxis, which is a serious defect of the design. There are also still doubts as to why government would want to introduce a Motor Vehicle $CO_2$ emission levy over and above the current ad valorem excise duties. It is submitted that an amendment of the ad valorem excise duties would have achieved precisely the same purpose as introducing a Motor Vehicle $CO_2$ emission levy. Another concern is the integrity of information used to determine the liability

for Motor Vehicle $CO_2$ emission levy because no data was available with which the $CO_2$ emissions could be calculated. This made it difficult for the National Treasury to explain to the final consumer how the figures were to be arrived at. Complicating this further is that the type of vehicles on which the Motor Vehicle $CO_2$ emission levy has to be charged, and the stage at which such tax is required to be paid, is not clearly defined. In this regard, the design of the Motor Vehicle $CO_2$ emission levy does not adhere to the general principles of a good taxation system such as administrative efficiency, equity, neutrality, certainty, simplicity and cost effectiveness. A further concern relates to the manner in which the emissions tax on Motor Vehicle $CO_2$ seems to be calculated, as the design of this levy requires that it is calculated in addition to VAT, which results is double taxation as it is tax on tax.

The plastic bag levy seems not to have had any significant impact on the environment either. Plastic bags are still in common use, despite the fact that the introduction of this legislation had as its main objective the reduction of the negative impact that plastic bags have on the environment, the specific objective being to reduce bag use in the country by 50%. There was no indication of by what date the 50% target was to be achieved. In addition, it is not clear why a levy is not imposed on plastic polymer (polyethylene) or polypropylene, which accounts for all types of goods made from this material. Although there was a short-lived drop in the use of plastic bags when the levy was first introduced, all indications are that the price of the levy did not send the required signal for the appropriate change in consumer behaviour. This, in combination with the fact that the revenues from this are not ring-fenced, has led to the prospect of these taxes not achieving their intended objectives. There is, moreover, a lack of statistics to demonstrate the actual amount of plastic that is used by customers, so it is difficult to substantiate the government's claim that the use of plastic decreases by 30% a year.

The electricity generation levy was introduced as a proxy for the Carbon Tax Act and was designed to control electricity prices while the Carbon Tax Act was being introduced. It was expected that the electricity generation levy would be discontinued when the Carbon Tax Act was introduced, but that has not happened. The intended plan was that when the Carbon Tax Act was introduced, an account would be provided by National Treasury detailing progress on how the levy had performed. This account would first allow National Treasury to evaluate the milestones achieved by the electricity generation levy. Such evaluation would, as a second step determine major amendments that needed to be made to the Carbon Tax Bill, thereby deriving lessons from the electricity generation levy. A reconciliation between these two (the electric

generation levy and the Carbon Tax Bill) was necessary to understand the role of the new Carbon Tax Act, but this did not happen.

When the electric filament lamp levy was introduced it was expected that the proceeds from the levy would be used for the disposal and recycling of those light bulbs but again, unfortunately, nothing has happened.

Based on the evidence provided above it is argued that all the existing environmental levies (including the newly introduced Carbon Tax Act) have been and will be less than fully effective. The danger of designing environmental taxes in this way is that they may not achieve their purpose and the government will be obliged to continue to add new ones which will be no more effective than those already in existence.

The third sub-goal is addressed in the following chapter by discussing the implementation of the carbon tax and other environmental taxes in the selected foreign jurisdictions. The discussion takes critical themes into account, including each country's summarised economic background, the origins of Carbon Tax policies, reduction targets, final imposed tax rate, applicable exemptions, the implementation plan, recycling measures, sector coverage, and the economic effects of introducing Carbon Taxes.

# CHAPTER 6
# DISCUSSING CARBON TAX AND ENVIRONMENTAL TAXES IN SELECTED JURISDICTIONS

## 6.1 Introduction

This chapter explains how the selected Scandinavian jurisdictions have introduced and implemented their environmental and carbon taxes. This is achieved by, inter-alia, discussing similarities and differences between South Africa and the selected countries by focusing on their successful, or unsuccessful, implementation of environmental taxes. In the second part of the chapter, the same discussion is presented with regard to carbon taxes by considering the themes referred to in chapter 3. The theory that carbon tax is the best financial instrument to reduce carbon emissions will also be discussed in this chapter. Successful environmental tax policies are those that are economically viable and easy to implement (Courtelis, 2012) and are achieved by means of successful implementation by tax authorities and the taxpayers' cooperation and acceptance of these policies. Environmental taxes are excise taxes payable by the producer or the end-user of environmental pollutants or on goods that emit pollutants (Levinson, 2007) and they are therefore punitive in nature.

Various studies have shown that environmental taxes may have some negative consequences (Miller & Vela, 2013). Wier, Birr-Pedersen, Henrik and Klok (2005), for example, conclude that environmental taxes in Denmark have undesirable consequences in terms of distributional effects because those taxes have been demonstrated to be regressive. Despite this, Milne (2007) believes that it would be plausible to expect that the countries that have been implementing environmental taxes have managed to reduce $CO_2$ emissions and the consumption of natural resources. Courtelis (2012) supports this view and states that environmental taxes are essentially different from traditional taxes as they are not merely designed to raise revenues but that the reason for introducing environmental taxes is to create a tax system that stimulates ecological and economic awareness in individuals as well as in corporations.

Fullerton and Metcalf (1997) state that, when imposing environmental taxes, the concept of a double dividend arises. The double dividend results from the improvement of the environmental system and, in addition, the generation of revenues from these taxes can then be used to address environmental as well as, for example, employment concerns. Fullerton and Metcalf (1997), moreover, state that an effective environmental tax framework therefore involves an income tax exemption on personal or corporate taxes when the environment has

been improved or sustained by way of an effective scheme. This is beneficial in so far as it sustains the environment and generates revenue (Fullerton & Metcalf, 1997). Contrary to this claim, however, is the statement from the OECD (2010) that most environmental taxes generate very little revenue because they are relatively small. As a result, additional revenues from carbon taxes, small as they are may increase the role of environmentally related taxation in government budgets.

The European Environmental Agency (2013) states that environmental taxes can be separated into three categories:

- cost-covering charges - used to cover the costs relating to environmental facilities such as water purification (user charge) which can be used for similar environmental costs (earmarked charges);
- incentive taxes - used to influence the actions of consumers and producers; and
- fiscal environmental taxes - used principally to generate revenue.

The OECD (2001) confirms that over the past several years environmental taxes have been effective and efficient in supporting environmental policies in OECD countries. It also appears that environmental taxes are used for various reasons and that they partially reduce the burden of other taxes in order to improve production efficiency, recycle revenues derived from them, enhance the government budgeting process, improve consumption patterns, and, above all, to influence consumer behaviour (Milne, 2007).

### 6.2 Environmental taxes in South Africa and in selected jurisdictions

In South Africa, there are currently five environmental levies that are administered by the South African Revenue Service to achieve the purpose of protecting the environment. In Denmark, Green Budget Europe (2016) states that energy taxes, water tax, pesticide tax, taxation of waste and waste-based heating, landfill tax, car taxes, packaging tax, disposable tableware tax, plastic bag tax and the weight-based tax are the most successful environmental taxes. A weight-based tax is charged on carrier bags of paper and plastic with a handle. The tax is only paid for bags with a capacity of minimum 5 litre (Green Budget Europe, 2016).

In Norway, environmental taxes constitute a large portion of the total taxes. These include petrol taxes, beverage package tax and final waste disposal tax, energy taxes, electricity levy and sulphur ($SO_2$) tax, as the most successful taxes (Ministry of the Environment, Norway, 2005b). Statistics Finland (2013) states that environmental taxes in that country are comprised

of energy taxes, transport taxes, emission taxes and resource taxes. Sweden has faced serious environmental challenges caused by the acidification of soil and water (Nyman, 2010). As a result, sulphur taxes, nitrogen oxides charge and energy taxes are the most successful environmental taxes in Sweden.

### *6.2.1 Denmark's experience*

Denmark introduced environmental taxes in the period around World War 1, earlier than any of the other Scandinavian countries (Larsen, 2011). Also, the first differentiation of the petrol tax according to lead content was implemented in Denmark between the years 1970 and 1980, Larsen (2011) explains. Additionally, taxes on electricity, mineral oils, gas and coal were also introduced in the late 1970s and early 1980s (Larsen, 2011:9).

During the 1980s available water resources began to diminish due to the leakage of different pollutants into groundwater and this resulted in the introduction of water taxes (European Commission, 2008). This is because groundwater is the predominant source of water in Denmark, accounting for about 99% of its total water supply; the water balance on the main island, Zealand, became a delicate issue when extraction reached a level that affected the flow of water in major streams, resulting in the level of groundwater reserves falling in many places (European Commission, 2008). Larsen (2011) stated that Denmark realised that economic incentives are important drivers for changes in behaviour, and so, for decades, Danish politicians understood that taxes were very important tools in this regard. In the 1970s, the most common waste disposal practice in Denmark was the dumping of wastage on open sites without environmental protection on landfill and, as a result, during the 1980s, landfill space was exhausted in Copenhagen (European Environmental Agency, 2013). At the beginning of 1987, the Danish government introduced a Landfill Tax, together with a tax on incineration. The first packaging tax was introduced in 1977 as a unit fee based on volume and material. The tax included certain packages for beverages and edible oils and in 1994, a tax on plastic bags was implemented (Danish Ecological Council, 2010).

### *6.2.2 Norway's experience*

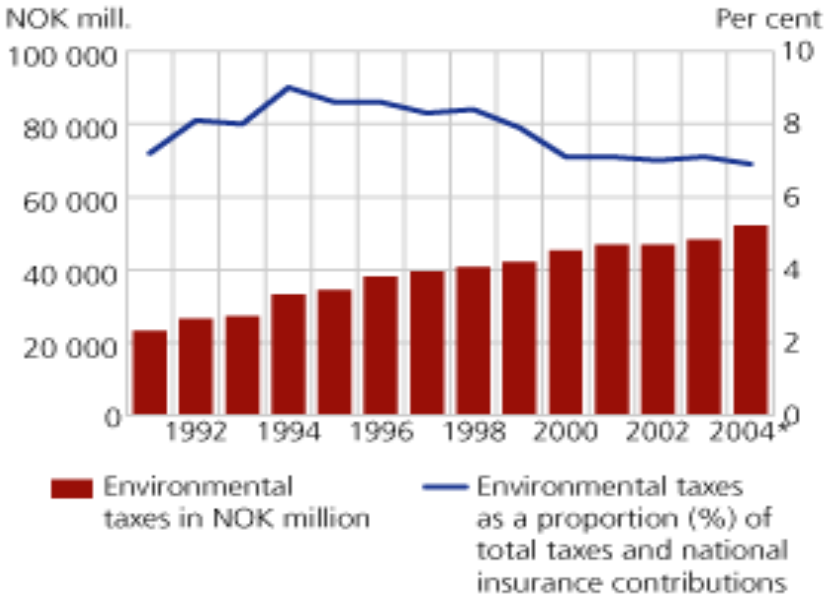
Norway has had a long experience with environmental taxation, having introduced environmental taxes in 1931 in an attempt to reduce environmentally harmful greenhouse gases affecting clean air and water (Norwegian Ministry of Finance, 2014). The design of the main taxes included provision for environmental impact, long before environmental taxes were established, as an instrument to improve environmental policy. By 1931 Norway had

introduced a petrol tax and the first tax that had an explicit environmental purpose was levied on sulphur in mineral oil in 1971 (Norwegian Ministry of Finance, 2007).

The wide-spread use of environmental taxes, however, was not seen until the late 1980s and early 1990s. A $CO_2$ tax was introduced in 1991 on petrol, auto-diesel oil, mineral oil, and the petroleum sector (offshore only), while the sulphur tax on mineral oil was raised substantially over time. Tax instruments have played a vital role in creating incentives for cleaner production and consumption patterns since the early 1990s. Until the introduction of environmental taxes, regulation had been the main policy instrument to reduce environmental damage in Norway (Norwegian Ministry of Finance, 2014).

In Norway environmental taxes constitute almost 28 percent of total taxes, as shown in Figure 7 below.

***Figure 7: Percentage of environmental taxes on total taxes***




***Source***: Ministry of Finance Norway (2014)

The tax on coal and coke was abandoned at the end of 2001 and replaced with a voluntary $SO_2$ reduction scheme (Speck, Andersen, Nielsen, Ryelund, & Smith, 2006). Jagers and Hammar (2009) state that Norway has been developing new forms of environmental taxes ever since the introduction of petrol taxes. A major accomplishment in Norway regarding environmental law was the launch and implementation of an environment tax on beverage packaging in 1994, as well as taxes on final waste disposal in the year 2000 (Norwegian Ministry of Finance, 2014; Courtelis, 2012). Also, the energy tax on mineral oil was introduced in 1970 (Institute for European Environmental Policy, 2013).

### *6.2.3 Sweden's experience*

Although economic instruments have existed as Swedish environmental policy instruments for a considerable time, their greatest breakthrough did not come until towards the late 1980s (Nyman, 2010). The pressure from environmental reports in Sweden resulted in the appointment of the Environmental Charges Commission in 1987, which had a mandate to consider the introduction of multiple new economic instruments that would enhance the impact of environmental policies (Nyman, 2010). A tax on sulphur was introduced from 1 January 1991 with the purpose of minimising emissions from fossil fuels that are a direct result of burning oil, coal and peat in that country. Also, Sweden started imposing energy taxes: petrol from 1924 and diesel have been part of energy taxes since the early 1930s and this was followed by the taxation of heating fuels in the 1950s (Akerfeldt & Hammar, 2015). An energy tax on oil, electricity and coal used for heating purposes was imposed from the 1950s. In subsequent years energy taxes covered liquefied petroleum gas and natural gas. The oil crisis during the mid-1970s led to an awareness that these commodities were running out and measures to prevent that had to be considered, hence, higher taxes for these products were applied (Ackva & Hoppe, 2018).

## 6.3 Successes and failures of environmental taxes

Norway has not been successful in reducing emissions, although its production efficiencies have increased because of these taxes. In most Scandinavian countries, environmental taxes are earmarked and are not entirely absorbed by the government budget. The design and the integration of these taxes determines the success rate of each of these countries. Courtelis (2012) demonstrates how the Scandinavian countries, with the exception of Norway, have concluded that the implementation of environmental tax policies has been both successful and effective with regard to the reduction of $CO_2$ emissions.

Courtelis (2012) reports that Scandinavian countries have concluded that the implementation of environmental tax policies is both successful and effective. Also, Sebastián, Mauricio and Vela (2013) report that the Scandinavian countries have managed successfully to maintain a high level of Gross Domestic Product despite a persistent imposition of carbon taxes.

The way South Africa arranges its environmental tax rates is meaningful in a South African context not least because, by comparison with Scandinavia, which uses market instruments within a framework of the 2003 European Union Energy Tax Directive's setting out of minimum rates for the taxation of energy products (Organisation for Economic Corporation

and Development, 2018), South Africa is alone in dealing with carbon emissions because it is not part of a group of countries and its policies must necessarily be different. Scandinavian countries have multiple successes with environmental taxes because they work as a collective; for instance, Denmark is not required to set its own energy tax rates as its energy taxes are linked to $CO_2$ tax and Emissions Trading Schemes. From the earlier discussion of South African environmental levies, their success in achieving the policy objective has not been established and there are indications of failures. The carbon tax has only been implemented from July 2019 and its success or failure is yet to be proven.

## 6.4 Discussing important themes

### *6.4.1 Factors influencing policy formulation*

There are various factors that influence the type of policy adopted. One of these relates to the question of economic strength. Table 6 briefly summarises the economic background of countries under discussion in this thesis for the purposes of a comparative analysis:

***Table 6: Economic Analysis of participating countries in 2017***

| Country | Population | Gross Domestic Product | Unemployment |
|---|---|---|---|
| Denmark | 5 755 570 | $324,872 Billion | 4% |
| Norway | 4 089 000 | $398,832 Billion | 4.68% |
| Finland | 5 534 644 | $251,885 Billion | 6.39% |
| Sweden | 9 986 774 | $538,041 Billion | 6.76% |
| South Africa | 57 467 231 | $349,299 Billion | 27.5% |

***Source*:** Worldometre (2018)

South Africa is unlike any of the Scandinavian countries, on the basis of population, Gross Domestic Product, and the rate of unemployment. That would, of necessity, influence the type of policies adopted in South Africa.

### *6.4.2 Reduction targets*

Scandinavia has a range of tools available to reduce carbon emissions, such as their Emission Trading Schemes and environmental tax systems, notably the carbon tax, whereas South Africa applies only one of these – a carbon tax. From 2015 to the end of the year 2020 the European Commission targets a reduction of emissions by 21% and by 43% by 2030. To achieve this, an emissions cap, which is reduced each year had to be set (Deme, 2015). At the 2009 Copenhagen Summit South Africa undertook to reduce 34% of its carbon monoxide emissions by 2020 and a further 42% by 2025. This undertaking was to be achieved with the application of carbon

taxes only. Clearly, South Africa is unlikely to meet these targets because, from 2016 to 2019, much time would have been lost in achieving its originally stated targets, as implementation of the carbon tax was delayed. Based on the peak, plateau and decline trajectory graph in chapter one, however, the Chamber of Mines stated that, since South Africa is currently operating below the peak-plateau-decline range, it has already met its peak-plateau-decline targets, there is no justification for having established these targets (Polity, 2015).

When the Norwegian government introduced the $CO_2$ tax in 1991, the tax targeted the consumption of petrol, auto diesel oil, mineral oil and the offshore petroleum sector (Sumner, Bird, & Smith, 2009; Institute for European Environmental Policy, 2013). In 2013, the Norwegian government announced that it planned to reduce greenhouse gas emissions by at least 40% in 2020 from the 1990 base, which is seen as the most significant mitigating pledge by a developed country so far (Institute for European Environmental Policy, 2013). Sumner et al. (2009) state that this is in line with Denmark's commitment to reduce greenhouse gas emissions in sectors outside the European Union Emission Trading Scheme by 20% by 2020, as part of its obligation under the 2008 European Union climate and energy package. The Norwegian government has also announced its intention to phase out fossil fuels by 2050, without the use of nuclear energy, and to reach an agreement to have 50% of all electricity consumption from wind power by 2020 (Jamet, 2012). Importantly, Norway experienced a decrease of about 21% in $CO_2$ emissions caused by stationary combustion plants (Mann, 2002).

Denmark's Carbon Tax was finally approved in 1991 and took effect in May 1992 (Sumner et al., 2009). In 1992, the tax target was households and in 1993 the tax target was expanded to include industry (Bae, 2013). In Denmark fossil fuels are subject both to an energy tax and a $CO_2$ tax (Sumner et al., 2009). Bae (2013) states that at the inception of Carbon Taxes the following were the four emission reduction goals for the Danish government:

1) Reduce carbon emissions from 61.1milion tons (1988 levels) to 48.9 million tons before 2005 (at least 20% reduction).
2) Avoid the temptation to maximize tax revenue for the government budget by giving it back to the industry as a subsidy for environmental innovation.
3) As an incentive tax encourage Danish enterprises to move away from carbon and towards environmental innovation.
4) Encourage all energy users, including households and businesses, to change their behaviour and achieve a large decrease in carbon emissions.

For the Danes the goal to be the world leader in cutting emissions began with their setting of measurable goals (Mann, 2002).

Mann (2002) shows that between the years 1987 to 1994 Sweden had reduced its $CO_2$ emissions by 19% by integrating environmental taxes before the introduction of carbon taxes. In Finland, carbon emissions would have been 7% higher had carbon taxes not been implemented (Mann, 2002).

No information is yet available in South Africa regarding progress in reducing $CO_2$ levels.

### *6.4.3 Sector coverage, exemptions and the final rate*

The South African carbon tax targets the electricity sector, petroleum (coal to liquid, gas to liquid), petroleum (oil refinery), iron and steel, cement, glass and ceramics, chemicals, pulp and paper, sugar and fugitive emissions from coal mining (National Treasury, 2014). A 60% tax-free threshold was introduced for all the identified and affected sectors in the first phase of introducing the carbon tax and therefore only 40% of emissions will be taxed before any additional allowances are granted (National Treasury, 2014). In addition to basic tax-free allowances, an additional 10% tax-free allowance applies for sectors that involve process emissions (National Treasury, 2014). The remaining portion to be taxed will be 30%, since both the basic and process emission allowances amount to 70% (National Treasury, 2014). A variable tax-free allowance of up to 10% for sectors exposed to trade will also apply. Sectors that take early action or make efforts to reduce emissions will be entitled to a further tax-free allowance of 5%. In the event of a company's participating in phase 1 (up to 2022) of the carbon budgeting system, an additional 5% tax-free allowance will be granted (National Treasury, 2014). Finally, a carbon offsetting allowance of either 5% or 10% will be granted to affected sectors. The Davis Tax Committee (2015) showed how, overall, the combined effect of the above tax-free thresholds would be capped at 95%, except for residential, agriculture, forestry and land use and waste sectors, which would be totally exempted. Taking the tax-free thresholds into account, the effective carbon tax rate will vary between R6 and R48 per $tCO_2e$ in the first phase between 2019 and 2022 (National Treasury, 2014).

The agriculture and fisheries are dealt with differently in Denmark where fossil fuels applied in the agricultural sector are taxed both under the energy tax and the $CO_2$ tax; yet fuels used for fishing are untaxed, although the European Union Emission Trading Scheme covers 2% of the agriculture and fishing sector. This means that an amount of energy use and carbon emissions from agricultural activities, corresponding to 2%, is untaxed under the Danish

Carbon Tax. In Denmark, pesticides such as herbicides, insecticides, fungicides and rodenticides, including chemical fertilisers, have a vital role in sustaining and raising agricultural productivity (United Nations Development Programme, 2015). Making use of products containing toxins could severely affect both the environment and human health as they have a considerate potential to produce negative externalities such as water contamination or human-poisoning and disease (United Nations Development Programme, 2015). Danish authorities understand that taxes on pesticides and fertilisers should not be abandoned as they can play a crucial role in correcting some market failures. The exclusion of taxation on pesticide/fertiliser would have both social and environmental costs and an increase in the use of the most harmful pesticides and fertilisers should be avoided in order to encourage farmers to investigate and possibly invest in more environmentally friendly products (Institute for European Environmental Policy, 2013). The pesticide tax also generates a tax income stream that could be earmarked, for example, for possible use in the reduction of the environmental impact of pesticides and fertilisers and by adopting sustainable agriculture practices and thereby contributing to the accomplishment of Denmark's sustainable development goals (Institute for European Environmental Policy, 2013). This ensures that income from these taxes complements the current regulations and standards in place on chemical and toxic content (Institute for European Environmental Policy, 2013).

Also, taxes on mineral fertilisers, pesticides and lubricant oil were launched in 1988 in Norway to deal with effects arising from agricultural activities (Norwegian Ministry of Finance, 2007). Sweden's climate policy incorporates measures in all the sectors involved (World Bank, 2017). Among the industries covered are manufacturing, agriculture, co-generation plants, forestry and aquaculture (Sumner et al., 2009:19).

In South Africa, unlike the Scandinavian countries referred to above, the carbon tax coverage exempts residential, agriculture, forestry and land use and waste sectors.

South African environmental taxes have been criticised for being charged at low tax rates and for having no targets to achieve, and the monies recovered from them have no intended or desired destination of use. Courtelis (2012) states that, among the OECD member countries, the Scandinavian countries levy the highest proportion of environmental taxes in relation to their Gross Domestic Product. Denmark also levies more tax through environmental taxes than the other Scandinavian countries. It is clear here that no matter for what purpose tax revenues are used, environmental protection is achieved only if the tax rate is high enough to send the

appropriate signal. As a result, there is no doubt why Denmark has been successful in implementation: Denmark levies more taxes through environmental taxes than do the other Scandinavian countries.

In 1995 Denmark successfully introduced pesticide taxes with the aim of taxing farmers only. In addition, both Denmark and the United Kingdom have used these revenues to minimise social security contributions by employers, thereby also attempting to reduce inflationary consequences (Courtelis, 2012).

### *6.4.4 Implementation plan*

In their first phase (1994-8) Denmark mainly targeted the household sector (Speck & Jilkova, 2009). When Carbon Tax was introduced as a role player in the reform of the Swedish tax system the existing energy taxes had to be reduced by 50%, a move that meant that an increase in the use of all fuels was inevitable (Akerfeldt & Hammar, 2015). Sweden has, over the years, been able to increase the $CO_2$ tax rates with the overall aim of achieving the most cost-effective emission curbing. This was done with caution, first by making an announcement in advance to the affected targets, in this case households and firms, with the intention of giving them time to adapt (Akerfeldt & Hammar, 2015). In South Africa, the approach has been similar because in both phases 1 and 2 of the carbon tax implementation the taxpayers were informed by various budget speeches that carbon tax was underway. This also allowed a fair process of consultation and comments. In fact, the implementation date was even delayed further in South Africa, which allowed affected persons to adapt. This delay was caused mainly due to National Treasury taking account of comments from many subsequent consultation processes. Each time, the implementation date was postponed.

The Swedish Ministry of Environment estimated that Carbon Tax had cut emissions by an additional 20% (as opposed solely to relying on regulations), enabling the country to achieve its 2012 target under the Kyoto Protocol (David Suzuki Foundation, 2017). The other differentiating factor between Sweden and South Africa is that Scandinavian residents accept the implementation of Carbon Taxes, concur with the aim of curbing carbon emissions and understand the importance of living up to that promise in order to curb the harm done by carbon emissions today, which would have increasingly dire consequences for generations to come (Akerfeldt & Hammar, 2015). In South Africa, as demonstrated in earlier chapters, there has been wide-spread criticism of the intention to impose a carbon tax and its subsequent imposition.

### *6.4.5 Revenue recycling, tax shifting and earmarking*

South Africa has, like the Scandinavian countries (except for Denmark), not earmarked Carbon Tax revenues (Bae, 2013). Unfortunately, a concern with South Africa is that the government does not publish either the anticipated earnings from carbon taxation or the designated utilisation for those monies. Denmark, on the other hand, has public records of the level of annual revenue from carbon taxes, amounting to $485.7 million in 1994, $585.5million in 1995 and $905 million in 2008 (Bae, 2013). Norway provides no information about revenues. The Ministry of the Environment in Finland (2008b) states that carbon tax revenues generate close to $750 million (€500 million) each year, while Sweden made close to $3.65 billion (25 billion SEK) in each of the years 2005, 2006 and 2007 (Sumner et al., 2009; Akerfeldt & Hammar, 2015).

In Norway, Finland and Sweden governments have all adopted the strategy of collecting carbon tax revenues for prescribed purposes of government spending (Sumner et al., 2009; Institute for European Environmental Policy, 2013). It also appears that environmental taxes are used partially to reduce the burden of other taxes, to improve production efficiency, to recycle revenues derived from them and/or to enhance the government budgeting process, improve consumption patterns and above all, to influence consumer behaviour (Milne, 2007).

South Africa does not plan to earmark its carbon tax revenue because National Treasury (2015) is of the view that the rigid earmarking of specific tax revenue streams in general is not consistent with best fiscal management practices. National Treasury (2010a) suggests, too, that South Africa's decision to avoid full earmarking of specific revenue streams is supported by public finance theory and good public finance practice. The most efficient and effective recycling of carbon tax revenues is, however, crucial to ensure structural adjustments that will support the required transition from "business as usual" to a low carbon, climate resilient economy (National Treasury, 2010a). National Treasury (2015), therefore, has proposed only three categories of recycling mechanisms for this purpose:

- Tax shifting**:** to mitigate the effects of other taxes, such as the electricity generation levy. Mitigation would generally include curbing or not increasing the revenues from the electricity generation levy.
- Tax incentives**:** includes the energy efficiency savings tax allowance as envisaged in section 12L of the Income Tax Act.

- Soft earmarking**:** the aim is to stimulate a free basic electricity programme and to improve public transport for all South Africans.

National Treasury (2015) also highlights that, other than the three recycling measures above, carbon tax could be allocated by using the usual and transparent method that is followed during the budget allocation. Section 6(2) of the Carbon Tax Act seems to suggest an additional recycling measure: this section of the Act deals specifically with the determination of the tax liability of entities that have the sole responsibility of generating electricity from renewable energy sources as set out in the guidance provided by the Integrated Resource Plan. The plan was that the current electricity generation levy had to be converted to an electricity credit once the Carbon Tax Act came into operation on 1 June 2019. This credit had to be applied against the calculated carbon tax of the affected taxpayer in determining the taxpayer's final carbon tax liability (Carbon Tax Bill, 2018).

### *6.4.6 Electricity generation*

Carbon emissions are caused mainly by the way electricity is produced in South Africa. The South African electricity supply relies mainly on coal for its supply of energy. It is necessary to make simple comparison to find out if the situation in the selected foreign countries is the same. Table 7 below summarises the electricity generation of the countries used in this research.

***Table 7: Summary of electricity generation***

| Denmark | Norway | Finland | Sweden | South Africa |
|---|---|---|---|---|
| **Coal and peat:** 43.77% | **Coal and peat:** 0.09% | **Coal and peat:** 26.55% | **Coal and peat:** 1.83% | **Coal:** 85% |
| **Oil:** 1.93 % | **Oil:** 0.02% | **Oil:** 0.6% | **Oil:** 1.19% | **Oil:** Nil |
| **Natural gas:** 20.39 % | **Natural gas:** 3.94% | **Natural gas:** 14.0% | **Natural gas:** 1.94% | **Natural gas:** Nil |
| **Nuclear energy:** Nil | **Nuclear:** -Nil | **Nuclear Power:** 28.6% | **Nuclear Power:** 38.94% | **Nuclear Power:** 2.5% |
| **Hydro:** 0.05 % | **Hydro:** 94.7% | **Hydro:** 44.71% | **Hydro:** Nil | |
| **From other sources:** 33.85 % | **Renewable (other than hydro) and other:** 1.24% | **Other:** 14.6% | **Other:** 44.71% | **Other:** 12.5% **(This includes Hydro)** |
| **100 per cent** | **100 per cent** | **100 per cent** | **100 per cent** | **100r cent** |

***Source*:** Own design

The manner in which electricity is generated seems to make a significant contribution to carbon emissions. Norway has the most favourable electricity system because Norway's electricity system is almost carbon-free due to its high share, 95%, of hydropower (Bruvoll & Dalen, 2009). The Swedish energy supply has a very low-carbon rate with about 75% of energy use derived from zero- or very low-carbon sources (Ackva & Hoppe, 2018). Sweden consumes

about 4.25 tonnes of $tCO_2e$ per year per capita compared to the EU average of 6.91 $tCO_2e$. The reason for this is that Sweden has a high share of low-carbon electricity which is mainly derived from nuclear, hydropower and wind, amounting to over 90%.This is also combined with a high share of district heating (Ackva & Hoppe, 2018) and means that electricity in Sweden is mainly de-carbonised. With district heating, large boilers provide heat for entire districts through a network of heating pipes. In Denmark in particular, the Danish neighbourhoods did away with individual boilers and instead have their hot water piped directly into their houses from one larger, and much more efficient, shared boiler (Lund, Werner, Wiltshire, Svendsen, Thorsen, Hyelplund & Mathiesen, 2014)

Sweden does not succeed only because of punitive measures, but there are additional programmes that contribute to their carbon reduction success. As explained in Table 8 below, there are several other programmes in place in Sweden which create and spread public awareness.

***Table 8 Swedish participating institutions in the emission reduction process***

| **Authorities** | **Targets** |
|---|---|
| The Swedish Research Council for Environment, agricultural Sciences and Spatial Planning (Formas) | Support scientifically significant research related to sustainable development (the environment and agricultural sciences). |
| The Swedish Environmental Protection Agency | Evaluate the environmental situation, implement environmental policy decisions, disseminate information, and follow up the environmental situation. |
| Swedish Sustainability Council | Reports environmental effects, best practice, research findings. Increases co-operation between administration, science and industry. |
| The Swedish National Water Supply and Sewage Tribunal | Deals with cases under the Act concerning public heating systems. |
| Swedish Energy Agency | Works towards transforming the Swedish energy system into an ecological and economically sustainable system through guiding state capital towards the area of energy. |
| Oil Crisis Board | Deals with certain compensation matters under the Oil Crisis, in agreement on an international energy program, focusing on minimising the oil dependency. |
| Swedish National Grid | Runs the national grid for electric power and responsible for the Swedish system of electricity supply, worry to reduce the impact on the environment and the GHG emissions. |
| The Board of the Swedish Nuclear Waste Fund | Finance future costs for dealing with spent nuclear fuel and other radioactive waste. Nuclear is regarded as a clean energy, with no-carbon emissions. |
| The Swedish Nuclear Power Inspectorate (SKI) | Monitor compliance with the necessary requirements of all organisations engaged in nuclear technology operations. |

***Source***: World Bank (2017)

Today, Sweden is one of the lowest carbon dioxide emitters. This is due to Sweden charging high carbon taxes after having established this as the most effective means of sending an appropriate signal to the customers to control emissions (Akerfeldt & Hammar, 2015; World Bank, 2017; Abrell, J., Kosch, M. & Rausch, S., 2018; Ackva & Hoppe, 2018).

### 6.5 Conclusion

Where environmental tax policies are not economically viable and do not receive taxpayers' cooperation and acceptance, they cannot succeed, even if they are intended to be punitive in nature. Taxes can only be punitive when the penalty is strong enough to send a signal. In a low-income economy such as South Africa, any amount taken from the small disposable incomes that people have is significant. What is evident from all the countries studied, is that environmental taxes have distributional effects and are effective in reducing carbon emissions. Environmental taxes are intended to create a system that stimulates ecological awareness. There is a view that the environmental taxes must not be designed with the purpose of increasing general taxes. It is believed that once environmental taxes are introduced, the concept of "double dividend" has to be created and maintained. This has been the case in Denmark where the monies collected from industry through environment taxes are returned to industry for the improvement of industrial technology. With a lack of defined targets for most of South Africa's environmental taxes, the manner in which the taxes are deployed creates no "double dividend". In some countries environmental taxes have been used to reduce personal taxes and, in that way, became acceptable because the overall tax burden was being maintained. This is not the case in South Africa.

Most of the environmental taxes in the selected jurisdictions are considered to be successful but based on the discussion in chapter 5 of this study none of the same taxes have been viewed as being successful in South Africa. It is submitted that this is caused by the government's failure to set correct targets and because of inconsistencies between the purpose of introducing these taxes and the use to which the monies are finally put. The selected Scandinavian countries began to introduce environmental taxes a long time before they were introduced into South Africa. The administration of these taxes by the selected Scandinavian countries has made it possible to make significant adjustments that make these taxes respond as intended by their objectives; these include the reasons for and purpose of a specific environmental tax and a thorough analysis of why carbon emissions cannot be addressed by any other existing taxes. This was made possible by determining the adjustments required and finally making

appropriate amendments to existing taxes so that introducing a new tax does not conflict with existing taxes.

In South Africa, the final amount of carbon tax liability is still difficult to determine. Further, there seem to have been recommendations that section 23(d) of the Income Tax Act had to be amended to allow the carbon tax and the motor vehicle levy to be deducted from income for the purposes of determining taxable income. Another consideration that was raised regarding the motor vehicle levy and the Customs and Excise Act was why a new levy was introduced, rather than necessary adjustments being made to the Customs and Excise Act.

Of all the countries referred to, South Africa ranks highest in its use of coal as an electricity source. Coal is accessible in South Africa and is inexpensive. It could be argued that in view of the electricity demand by the South African population, coal is the best method to produce electricity and that there is no reason for the government to levy a carbon tax. Whatever method these selected Scandinavian countries use to produce electricity, they do it for a very small population compared to South Africa. With the current population and current lack of economic growth this method of generating electricity may be justified under the circumstances. Denmark and Sweden, on the other hand, are very different in their incorporation of about 25% of renewable energy in their electricity use.

# CHAPTER 7
# CONCLUSION AND RECOMMENDATIONS

## 7.1 Introduction

This concluding chapter summarises the content and intentions of preceding chapters. It also provides the main findings that have emerged from the research. Problems encountered during the research process are presented as well. This chapter then discusses recommendations and possible areas for further study. A conclusion is reached concerning the achievement of the goals of research.

## 7.2 Summary of chapters

**Chapter 1:** This chapter introduced the concept of carbon taxes in general as they apply in South Africa. The emphasis is on the Carbon Tax Act, a new and additional South African tax that became effective on 1 June 2019. The research context was discussed first to outline the study's direction, together with various concerns relating to carbon taxation, with input from several scholarly sources. The question this study poses and attempts to answer was set out, together with a justification of why the thesis was undertaken. This introduction was followed by a description of its goals and these were listed together with several sub-goals to clarify the means by which the results were to be achieved. The methods, procedures and techniques were then outlined.

**Chapter 2:** This chapter reviewed current literature on the subject. It began from a broad perspective which narrows down to considerations of the South African environment, its problems of climate change and the role played by carbon emissions. The impact on the environment and living organisms was examined and this was followed by a list of actions taken and efforts made by various organisations to combat climate change. Lastly various measures that could be used to combat carbon emissions were debated, including a discussion of policies adopted by international countries. Some conclusions were offered.

**Chapter 3:** This chapter began with an outline of the characteristics of academic research and an explanation of the research purpose. This provided a concise justification for the design and methods used in this study. The chapter informed the way data had to be collected and analysed. Themes that described the analysis framework were identified, including the following: economic background; tax policy origins; reduction targets; final rate; exemptions and allowances; the implementation plan; revenue recycling; tax shifting and earmarking; sectoral

coverage; the economic effects of the tax policy; and performance. The research method was described and justified as the appropriate research method for this study and a conclusion was made.

**Chapter 4:** This chapter analysed the first goal of the study by looking at the design of the Carbon Tax Act as new legislation designed to respond effectively to its intended purpose of reducing carbon emissions. This tax was discussed separately, as newly implemented legislation, together with concerns arising from the Carbon Tax Act.

**Chapter 5:** This chapter examined in detail current South African environmental taxes. The role and basis of environmental taxes was explained so that similarities and differences in these tax types could be analysed with a view to lessons, if any, which South Africa could apply to its current environmental taxes. This method promoted an understanding of the following areas: imposition, administration, shifting of the tax burden onto final consumers, a double dividend, the tax structure and implementation. The alignment of the Carbon Tax policies with other environmental taxes levied in South Africa was discussed, together with the overall impact of all environmental levies.

**Chapter 6:** A discussion was presented on the implementation of Carbon Taxes in the selected Scandinavian jurisdictions, also highlighting potential problems identified in the application of the carbon taxes. Aspects of the successes and failures of environmental taxes in the selected jurisdictions were discussed. Additionally, the context of challenging times and the lessons that had to be learnt were considered.

### 7.3 Findings

The goals of this research were to present a comparative analysis of the application and success of carbon tax and other environmental levies in selected foreign jurisdictions and to apply those lessons, by analysis, to evaluate the extent to which the South African Carbon Tax Act and other environmental levies are likely to respond to South Africa's commitment to reduce carbon emissions. In addressing the main goal, the research set out to address the following sub-goals:

- to analyse the newly introduced Carbon Tax Act in South Africa; this was discussed in detail in chapter 4;
- to discuss other environmental taxes levied in South Africa; these taxes were dealt with in chapter 5;

- to discuss the implementation of Carbon Tax and environmental taxes in Finland; Sweden; Norway and Denmark, highlighting potential problems; chapter 6 dealt with this sub-goal; and
- to form an opinion on whether South Africa has any lessons to learn from the selected Scandinavian countries on the implementation of the Carbon Tax Act, combined with other environmental taxes; these lessons are dealt with throughout the thesis and are discussed as part of the recommendations below.

Vorster et al. (2011), Merven et al. (2014), Winkler et al. (2010a), Winkler and Marquard (2009), Winkler and Marquard (2011) and Winkler et al. (2010b) undertook research and collaborated to study carbon pricing options in South Africa. Various authors, including Alton et al (2012), Blignaut and de Wet (2001), Brick and Visser (2010), Winkler et al. (2009), Cloete and Robb (2010), Cloete and Tyler (2012), Goldblatt (2010), Tyler and Cloete (2015), and Tyler and du Toit (2008), found that introducing a carbon price would be an efficient, effective and practical approach to decreasing net greenhouse gas emissions in South Africa. Research indicates that the choice of carbon taxes would be more successful than either the emission trading schemes or the regulation method. There are a number of concerns, however, that cast significant doubt on the implementation of carbon taxes and other environmental taxes in South Africa and these are discussed below.

*Firstly*, the authors have differed on the need to introduce a carbon tax. The use of the peak-plateau-decline trajectory was considered by the Chamber of Mines which indicates that South Africa is currently operating below the peak-plateau-decline. The Chamber of Mines therefore argued that South Africa has already met the peak-plateau-decline targets and that there was therefore no justification for introducing a carbon tax (Polity, 2015). The Chamber of Mines also pointed to the fact that the relatively low 0.9% contribution by South Africa towards total global carbon emissions is a valid reason for the South African government not to have introduced a Carbon Tax Act as it would have no material effect (Polity, 2015). The United Nations Environmental Agency (2016), on the other hand, lists South Africa as the 12$^{th}$ largest emitter of $CO_2$ in the world. South Africa, a developing country but the only African country in this grouping, is ranked among the top 20 countries measured by absolute $CO_2$ emissions (National Treasury, 2010a; Polity, 2015). The South African economy is energy intensive and depends on the primary sectors of the economy, namely agriculture, fisheries and mining. The National Treasury (2010a) confirms that about 64% of South Africa's population are employed in the primary sectors, for which reason South Africa needs to curb the effects of climate change

(National Treasury, 2010a). Van Heerden et al. (2016) argue that the carbon tax is necessary and would ensure the formulation of appropriate policies and price signals transmitted to all stakeholders. Further, Van Heerden et al. (2016) and National Treasury (2010a) confirm that carbon taxes should correctly reflect the value of the external costs of greenhouse gas emissions which cause climate change.

*Secondly*, countries also differ on how to deal with the effects of climate change. Africa is susceptible to the effects of climate change; as Weitzman (2011) notes, the consequences of extreme global warming are uncertain but are probably profoundly negative. In South Africa, as with the rest of the African continent, there are no funds to invest in dealing with climate change. This was the major and contentious issue at the Rio Summit. It was established that developing countries required finance as a major requirement for sustainable development and also it meant that they should reduce their industrialisation, something that they were not ready to do (Meakin, 1992; Intergovernmental Panel on Climate Change, 2007). The Copenhagen Conference in 2013 was faced with similar challenges regarding the disparity between the developed and the emerging economies such as China, India and Brazil, all of which believe that the measures proposed for the reduction of greenhouse gas emissions would impede their economic development (Intergovernmental Panel on Climate Change, 2013). What emerged was that the majority of participants agreed that the industrialised economies were responsible for the current environmental damage and should provide financial assistance for less-developed economies who need to bear the burden of reducing emissions (Intergovernmental Panel on Climate Change, 2013).

*Thirdly*, responding to carbon emissions using market-based policy measures such as an escalating carbon tax to price carbon and internalise the external costs of climate change at a rate of R120 per tonne of carbon dioxide equivalent is seen to be a challenge (National Treasury, 2013). This is because the assumptions from which this calculation is derived are guided by and appear to be based on, some of the principles of the United Nations Intergovernmental Panel on Climate Change (Engineering News, 2015). This could be misleading as those principles might have been dependent upon the situation and circumstances of developed and Annex 1 countries. Also, the Davis Tax Committee (2015) suggests that National Treasury's announcement that it would apply carbon taxes to mitigate carbon emissions represents a challenge for the country, notably due to its historical reliance on cheap, coal-fired electricity and its energy-intensive industries.

*Fourthly*, Government has created an impression that there will be a disclosure of funds available from the electricity levy and what those funds have achieved, since the electricity levy served both to promote energy efficiency and encourage lower greenhouse gas emissions (National Treasury, 2013). Currently, however, there has been no information forthcoming. If the electricity generation levy serves as a proxy, its performance should indicate what could be expected with regard to the Carbon Tax Act. Unfortunately, no such results have been published. Electricity is the primary source of heating for households, and it is not certain whether National Treasury's (2015) assumption is correct that carbon tax will decrease the demand for electricity. As it stands, all indications are that although electricity is price sensitive, citizens will still buy it.

*Fifthly*, there are various initiatives to be introduced to assist the Carbon Tax to work effectively (Davis Tax Committee, 2015). National Treasury (2014) confirms that a mix of economic instruments, complemented by appropriate regulatory policy measures, are essential in driving and facilitating mitigation efforts across a wide range of key economic sectors, but there is no mention of what these are. The starting point has to be the integration of all environmental taxes, including the Carbon Tax Act. The second requirement is the integration of indirect taxes, including the Carbon Tax Act, into the Income Tax Act, in terms of the deductibility of these taxes. The third requirement is the clear and explicit detailing of recycling measures to ensure that carbon tax funds are appropriately dealt with (Davis Tax Committee, 2015).

*Sixthly*, it appears that the rate of the carbon tax is too low to achieve its purpose. According to the Davis Tax Committee (2015), the 60% basic tax-free threshold, the 10% tax-free allowance for sectors that involve process emissions, the variable tax-free allowance of up to 10% for sectors exposed to trade and a further tax-free allowance of 5% will be granted in the first implementation phase. A carbon offsetting allowance of either 5% or 10% will also be granted to the affected sectors so that, overall, the combined effect of the tax-free thresholds would be capped at 95%, except for residential, agriculture, forestry and land use, and waste sectors, which would be totally exempted. In South Africa, lower rates during the first implementation phase for certain sectors are justified in order to address competitiveness concerns, in the absence of internationally harmonised carbon taxes.

*Seventhly*, the Carbon Tax Act failed to specify the standard to which South Africa's GHG inventory or a corporate entity's carbon footprint would be calculated. In addition, the capacity of South Africa's industries to absorb the additional fiscal cost and transition to lower-carbon practices is also a point of contention (Davis Tax Committee, 2015). There is no information

on the readiness of the Department of Environmental Affairs or whether there will be additional funds available, because the calculation and GHG inventory management will be the responsibility of the Department of Environmental Affairs and additional equipment is required to make these calculations (Davis Tax Committee, 2015). The Department of Environmental Affairs is an integral part of the Carbon Tax, so it is worrying that there is no report on its state of readiness.

*Lastly,* the Asian Development Bank (2016) states that the choice and design of instruments for any specific jurisdiction depends on many factors such as its economy, energy mix, the country's greenhouse gas, social and environmental objectives, political circumstances and the capacities of the parties that would be involved in developing and implementing the system. The major shortfall of a carbon tax is that it allows regulators to control the price of carbon emissions, but they have less direct control over the environmental outcome, that is, the emissions reductions that are actually achieved (National Treasury, 2014).

### 7.4 Challenges encountered during the research process

There is insufficient literature available on the Electricity Filament Lamps Levy for a full analysis, and there is very little commentary from other researchers. Original information from Scandinavia was not in English so this study had to rely on other publications. On environmental taxes, only those that have been successful in the selected countries have been discussed in detail. The effects of the environmental taxes on individuals have not been addressed in this thesis. Also, because the overarching focus of this thesis is at a National level, strategies by local, District, and/or Metropolitan municipalities are intentionally omitted. Although the thesis predominantly makes specific mention of the Department of Environmental Affairs, it is in fact the Departments of Energy, Mineral Resources, Agriculture, Forestry and Fisheries, and Water and Sanitation that are major stakeholders in environmental reform, but a lack of a significant and Nation-wide policy on the environment, has made it difficult to consolidate data from all these Departments.

### 7.5 Recommendations

Except for the first introductory phase when there is an electricity credit and a 70% tax free allowance on electricity, the costs of generating electricity are not fully absorbed by the credit. One of the ways in which Scandinavian countries managed this was to align their environmental taxes to ameliorate the negative effects that carbon taxes bring. In South Africa, the only integration will be between the electricity generation levy and carbon taxes. This

should not only be done between environmental taxes but should be integrated with all other taxes.

Transparency is lacking, moreover, on the reporting of the electricity generation levy and detailed information should be furnished to support the means by which the levy has performed so far.

The state of the South African economy is not conducive to the introduction of carbon taxes. A uniform application of the carbon tax is not a desirable approach as it has serious side effects for the poor over time on whom the disproportionate share of the tax burden will inevitably fall (National Treasury, 2010a). The South African government would need to approach this carefully by addressing economic development imperatives such as poverty, population planning and skills development programmes that help individuals to open their businesses; there would also have to be unemployment alleviation initiatives that are not government dependent, alternative and more sustainable ways to reduce economic inequality and improve access to basic and affordable energy sources for low-income households (National Treasury, 2010a).

Another problem is that South Africa's possible contribution to reducing carbon emissions will be less than a measurable quantity. There is more to be done than the simple imposition of carbon taxes and the application thereof. Carbon tax design must be done such that it includes other compensating bases to reduce adverse impacts on low-income households. Government has not committed to anything other than imposition of Carbon Taxes (National Treasury, 2010a).

Finally, a plausible approach is the one that promotes the idea of taxing those more heavily that contribute most to environmental degradation and are highly energy concentrated, to promote parity between the harm to the environment and the taxes levied to redress the harm.

### 7.6 Potential areas for further research

Emerging from this study are the following future research areas:

- Research could be done to determine the extent to which Southern African Developing Countries could jointly respond to the reduction of carbon emissions. In this the role of carbon offsets, Clean Development Mechanisms and Emission Trading Schemes can be evaluated. In this way, a market similar to the European Trading Scheme could be considered.

- Further research can be done to indicate how a method to create an Emissions Trading Scheme market in South Africa could be formulated and operated.
- As it is currently suggested that Nigeria's Gross Domestic Product is bigger than South Africa, a study as to why the Nigerian government have not opted for carbon reduction while South Africa has, should be undertaken to understand how other African countries perceive and respond to climate change.
- A study could be undertaken to establish the correct South African energy mix that would keep carbon emissions low while improving and sustaining the economy. Countries could be selected that also make use of both nuclear and non-renewable energy to examine how they are affected by climate change and to understand their participation in the carbon reduction agenda.
- South Africa has nine provinces which are not all the same. A study of how climate change has affected South Africa, combined with urbanisation, could be pursued to inform the carbon policy design. Different areas in South Africa are affected differently by each government intervention.
- The audit of carbon emissions and taxes is yet another focus area. There is no International Financial Reporting Standard for the accounting for these areas and that could be integrated with auditing and taxation. The question is: "Are Trading Schemes, Fuel Taxes and Trading Certificates, financial instruments"?

### 7.7 Basis for conclusion

Steinbach et al. (2008:55) states that: "...environmental taxes are taxes whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment." Pigou (1920) argues that environmental taxes are only effective if their punitive measures are efficient enough to enforce and correct consumer behaviour. Arendse (2007) claims that environmental tax incentives facilitate a positive change in consumer behaviour, especially in relation to the environment. This view is supported by Van Heerden et al. (2016) who argue that the introduction of carbon taxation is necessary in South Africa and would ensure the formulation of appropriate policies and price signals transmitted to all stakeholders. Andersen, Barker, Christie, Ekins, Gerald, Jilkova, Junankar, Landesmann, Pollitt, Salmons, Scott & Speck (2007) and European Environmental Policy (2013) confirm that the only and significant difference between Sweden and South Africa is that Sweden currently has the world's highest $CO_2$ tax imposed on non-trading sectors and households/services. Energy taxes are set high on fuel and electricity and also high on $CO_2$ taxes on fossil fuels, with the intention

of effectively steering demand through environmental signals, imposing an implicit price on carbon, while simultaneously providing the state with a source of revenue (International Energy Agency, 2013). Sweden also introduced its carbon taxes to influence final consumer buying preferences and to force manufacturers to invest in green technologies (Akerfeldt & Hammar, 2015).What is clear is that higher carbon tax rates send a strong signal to final consumers to change their behaviour, while lower rates do the opposite and are only used to provide funds for carbon mitigation programmes (Sumner et al., 2009).

### 7.8 Conclusion

There is no doubt that South Africa carried out substantive work to prepare itself for the imposition of carbon tax. These preparations included drawing up all related documents and the setting out of commitments to reduce emissions. At the Copenhagen Summit, South Africa undertook to reduce 34% of its carbon monoxide emissions by 2020 and a further 42% by 2025, before National Treasury was ready to fulfil this pledge. The "National Climate Change Response Green Paper" and the "Discussion Paper for Public Comments – Reducing Greenhouse Gas Emissions: The Carbon Tax Option" were both issued in 2010, a year after the commitment was made. The "National Climate Change Response White Paper" followed in 2011, the "Carbon Tax Policy Paper: Reducing Greenhouse Gas Emissions and Facilitating the Transition to a Green Economy" followed four years later and the "Carbon Offsets Paper" was published five years after the Copenhagen commitment.

The second phase of carbon tax implementation covers the period 2022 to 2030, during which time there will be a gradual increase in price. The South African government has failed to provide coherent the reasons why the taxes have been introduced or implement measures to ensure that the objectives of these carbon taxes are met. As it stands, carbon tax appears to be a means of raising government funds and not to curb emissions – at least for the present.

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