

# **CREATING AN EFFECTIVE AND EQUITABLE LEGAL CARBON TAXING REGIME FOR SOUTH AFRICA**

by

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## Abstract

Human accelerated climate change presents a worldwide threat. It is a problem that requires international as well as local solutions. Human accelerated climate change is induced by the release of so called greenhouse gasses (GHG's) as a result of human activity, most notably by converting fossil fuels into energy. GHG's include Carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous oxide (N<sub>2</sub>O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF<sub>6</sub>). The most notable of these gasses is Carbon Dioxide (CO<sub>2</sub>), this gas is released into the atmosphere in vast amounts and is primarily responsible for the human contribution to climate change.

In recent years, Governments all over the world have begun implementing strategies in order to decrease the amount of GHG's released into the atmosphere. The South African Government set out a range of options in the *National Climate Change Response White Paper* that could be used to reduce GHG emissions. The specific option which forms the subject matter of this dissertation is referred to as the Carbon Tax.

Stripped down to its bare essentials a Carbon Tax entails that producers of GHG emitting products would pay a tax that corresponds to the amount of CO<sub>2</sub> emitted in the production of that product, or the CO<sub>2</sub> equivalent of the product if it emits one of the other GHG's. This amount of money is then incorporated into the price of the product making those emission intensive products more expensive. Theoretically, this should result in a decline in the consumption of the product and/or cleaner methods to produce the product. The underlying idea is to change consumers' behaviour to promote environmental goals by reducing GHG emissions.

Carbon Taxing falls under a category of regulation which is referred to as the 'incentive based approach to environmental regulation' with the incentive being financial or market based. Incentive based measures are used in environmental regulation where traditional command and control measures would be insufficient or where they could be supplemented.

This paper will examine the proposed Carbon Taxing regime for South Africa. It will assess the proposed regime in terms of its effectiveness as an instrument to reduce GHG emissions. It will also assess the equitability of the regime by assessing how the tax will affect citizens in different income classes.

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## List of Abbreviations

COP	Conference of the Parties
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
ETS	Emissions Trading Scheme
ESKOM	Electricity Supply Commission
GHG	Greenhouse Gas
GWP	Global Warming Potential
NEM	National Electricity Market (Australia)
NERSA	National Electricity Regulator South Africa
RET	Renewable Energy Target (Australia)
UNFCCC	United Nations Framework Convention on Climate Change

## 1. Introduction

Overwhelming scientific evidence has demonstrated the link between increasing atmospheric concentrations of greenhouse gasses (GHGs) and rising global temperatures.<sup>1</sup> Average temperatures have increased over the past 50 years at a rate of 0.2°C per decade, largely as a result of human activity that releases GHG's into the atmosphere.<sup>2</sup> Scientists believe that this temperature increase is likely to continue due to greenhouse gasses produced by human activity.<sup>3</sup>

It has been established that global temperatures are rising, the oceans are warming, ice sheets are melting, Arctic Sea ice is declining, glaciers are retreating, extreme weather events are increasing, oceans are acidifying and snow cover is decreasing.<sup>4</sup> At the current pace, global temperatures will rise by 2-3 °C by 2050.<sup>5</sup> This change in global temperatures will have negative effects all over the world that could lead to food and water shortages, extreme weather events, economic instability, environmental degradation and loss of life and property.<sup>6</sup> It could bring significant change to life as we know it today. This change in climate can directly and indirectly be attributed to human activity.<sup>7</sup>

Climate change will be particularly harsh on developing countries like South Africa since its economy is primarily dependent on the primary sector such as agriculture, manufacturing, fisheries and mining. A temperature increase of 3 - 4°C could lead to a 15% decline in African crop yields leading to food shortages for up to 550 million people. Warming is also expected to increase mosquito prevalence leading to a rise in malaria.<sup>8</sup> South Africa is already a dry, water scarce and draught prone country and scientists believe that climate change will have a negative effect on its water resources which will directly affect its primary industries and people.<sup>9</sup> The negative impact that climate change will have on agriculture and

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1 United Nations Environment Program *Global Environmental Outlook* 5 36.

2 National Treasury, Discussion Paper for Public Comment - Reducing Greenhouse Gas Emissions: The Carbon Tax Option 2010 4

3 Anon 'The Current and Future Consequences of Global Change' available at <http://climate.nasa.gov/effects/>, accessed on 13 January 2017.

4 Anon 'Climate Change: How do we know?' <http://climate.nasa.gov/evidence/>, accessed on 4 February 2017.

5 Smit P 'Climate Change – A question of adapt or die' (2012) *SABI Magazine* Vol 4 Issue 2 10.

6 United Nations *op cit* note 1 at 36 – 40.

7 The Davis Tax Committee *First Interim Report on Carbon Tax for The Minister of Finance* 7.

8 National Treasury *op cit* note 2 at 4.

9 Smit *op cit* note 5 at 10.



the prevalence of diseases such as malaria are not restricted to South-Africa, the impact will be more severe in less developed African countries.<sup>10</sup>

Climate change is therefore a global challenge that urgently needs attention. The international community started realising that it is a problem that needs to be addressed internationally and states have begun tackling the problem locally.

During the Conference of the Parties 15 (COP) in Copenhagen climate change negotiations, South Africa voluntarily announced that it would act to reduce domestic GHG emissions by 34 per cent by 2020 and 42 per cent by 2025 from ‘business as usual’ subject to the availability of adequate financial, technological and other support from developed countries.<sup>11</sup>

More recently, and in terms of the COP 21 in Paris, South Africa moved from the ‘business as usual’ commitment and stated that its commitment will take the form of a peak, plateau and decline emissions trajectory. In its *Intended Nationally Determined Contribution* (INDC), South Africa stated that its GHG emissions will peak between 2020 – 2025. South Africa will attempt to keep emissions between 398 – 614 Mt CO<sub>2</sub>e at this time. After its peak, emissions will be on a plateau for about a decade and then decline. Its commitment is also based on assumed climate finance investment, accessible and affordable technology and substantial capacity building commitments.<sup>12</sup>

One way in which we can nudge ourselves towards this goal is through the use of an incentive-based approach. Incentives, as opposed to regulatory (command and control) measures,<sup>13</sup> attempts to ensure compliance with environmental goals by providing incentives to change behaviour rather than coercing compliance. Incentives can be used to change behaviour and influence production and consumption patterns.<sup>14</sup> Incentives attempt to deal with environmental degradation in a preventative way rather than a reactive way.

The regulatory approach to environmental protection have been criticised for being costly, placing uniform rules in a sector in which agents often have different responsibilities, imposing constraints that agents try to bypass, being easily exposed to bargaining and negotiations between authorities and influential agents in the private sector who will attempt

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10 The Davis Tax Committee *op cit* note 7 at 7.

11 2009 Copenhagen Accord <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf> (Accessed on 12 February 2017)

12 South Africa’s Intended Nationally Determined Contribution (INDC) <http://www4.unfccc.int/ndcregistry/PublishedDocuments/South%20Africa%20First/South%20Africa.pdf> (Accessed on 3 January 2018) at 1-3 and 6.

13 Command and control measures such as administrative, regulatory and criminal measures and interdicts which are used to enforce compliance.

14 The Davis Tax Committee *op cit* note 7 at 9.

to bypass rules and regulations, they are static and not aimed at adoption of new technologies. Enforcing regulations are also problematic because of the time and cost involved.<sup>15</sup>

The incentive-based measure discussed in this paper is Carbon Taxing. Carbon Taxing falls in the category that is generally referred to as market-based instruments or MBI's as well as being an Environmental Tax. MBI's are policy instruments that seek to correct environmentally related market failures through the price mechanism.<sup>16</sup> Environmental taxes have also been promoted as being able to overcome the shortcomings of the regulatory approach to environmental protection.<sup>17</sup>

Currently there are two primary market-based options used to reduce GHG emissions: Emission Trading Schemes (ETS) and Carbon Taxes. South Africa has opted to implement a Carbon Taxing regime in order to reduce its GHG emissions.<sup>18</sup>

The *Long-Term Mitigation Scenarios* report (2007) and the National Climate Change Response Green Paper (2010) and White Paper (2011) for South Africa recommends the use of market-based instruments, specifically Carbon Taxes, to induce behavioural changes that contribute to lowering GHG emissions. The role of such instruments to address climate change and support sustainable development has gained increased prominence in recent years. All countries could price carbon domestically, outside of an international arrangement, as this presents opportunities to pursue emission reductions and revenue-raising objectives simultaneously.

In 2010 the National Treasury published the *Discussion Paper on Carbon Taxes* and in 2013 it published the *Carbon Tax Policy Paper*. Both these papers set out a proposed Carbon Taxing regime with the aim to raise revenue and reduce GHG emissions through internalising the external costs of climate change and thereby inducing behavioural change on the part of producers and consumers.<sup>19</sup> In 2015 the *Draft Carbon Tax Bill* was published; the draft bill incorporates the policy proposals into statutory provisions. In its preamble, the draft bill recognizes the importance of stabilize greenhouse gas concentrations in order to avoid interfering with climate systems.

In a nutshell, a Carbon Tax is a mechanism used to place a monetary value on the potential GHG's dioxide a product can emit. As an example: coal contains a certain amount of

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15 Jean-Philippe Barde and Oliver Godard *Economic Principles of Environmental Fiscal Reform* in Janet E Milne and Mikael Skou Anderson (eds) *the Handbook of Research on Environmental Taxation* 35 – 6.

16 The Davis Tax Committee *op cit* note 7 at 9-10.

17 Jean-Philippe Barde and Oliver Godard *op cit* note 14 at 35 – 6.

18 National Treasury: *Draft Explanatory Memorandum for The Carbon Tax Bill 2017* 3.

19 The Davis Tax Committee *op cit* note 7 at 6.

carbon, when coal is burned to generate electricity it emits CO<sub>2</sub> gas which is primarily responsible for climate change. These emissions are harmful to the environment and not paid for by the emitters. The tax can be applied directly to measured GHG emissions; fossil fuel inputs such as coal and other fossil fuels based on their carbon content and on energy outputs such as electricity and fuel.<sup>20</sup>

The emissions impose an external cost on society which is known as an ‘externality’. An externality is a cost to parties not involved in the production or sale of a good or product. In this case the externality refers to damage done to the environment. The monetary value of this externality is then calculated by multiplying the amount of CO<sub>2</sub> with a predetermined price and adding that amount to the final price of the goods and services, as the cost for damage done to the environment. The tax is an attempt to internalise the cost of pollution and thereby change consumer and producer behaviour. The cost of the damage done to the environment is currently not reflected in prices of goods and services, this means that production is cheaper and there is usually overproduction of a product, when this situation occurs it is known as a market failure.<sup>21</sup>

Although it is named Carbon Tax, the tax is not limited to processes that only release CO<sub>2</sub> into the atmosphere. GHG’s include Carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous oxide (N<sub>2</sub>O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF<sub>6</sub>). These gasses also pose a threat to the earth’s climate system, their release into the atmosphere should therefore also be paid for by emitters. Their external cost is calculated by their global warming potential (GWP). GWP is a relative measure of how much heat a certain amount of the gas can trap in the atmosphere relative to how much heat can be trapped by a similar amount of CO<sub>2</sub>. As an example, Nitrous Oxide (N<sub>2</sub>O) can trap 296 times more heat than CO<sub>2</sub>, its CO<sub>2</sub> equivalent is therefore 296. To calculate the tax liability, one therefore has to multiply the amount of N<sub>2</sub>O with 296 to find its CO<sub>2</sub> equivalent (CO<sub>2</sub>e).<sup>22</sup> The ‘CO<sub>2</sub>e’ is the common unit used to describe the warming potential of a GHG.<sup>23</sup>

The underlying rationale for such a tax is, by internalising external costs, carbon intensive products will be more expensive, this will then change consumer behaviour in a way that they reduce the amount carbon intensive products they consume and induce them to make more environmentally sustainable decisions.<sup>24</sup> The tax will attempt to hold the polluters

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20 The Davis Tax Committee *op cit* note 7 at 11.

21 Henderson PGW ‘Fiscal Incentives for Environmental Protection – Introduction’ 1994 1 *SAJELP* 50. The Davis Tax Committee *op cit* note 7 at 10.

22 National Treasury: Draft Carbon Tax Bill 2017 *Definitions*. National Treasury *op cit* note 18 at 28.

23 The Davis Tax Committee *op cit* note 7 at 7.

24 Rumble, Gilder & Parker “Carbon Pricing in South Africa” in *Humbly, Kotze, Rumble, Gilder (eds) Climate Change: Law and Governance in South Africa* (Original Service 2016) at Ch. 20-3

responsible for damage done to the environment in terms of the ‘polluter pays principle’. The tax will also attempt to prevent further environmental degradation by being proactive instead of reactive with regards to holding polluters responsible. This should lead to less GHG emissions, less pollution and ultimately slow down climate change. The tax will also internalise the external costs when producing CO<sub>2</sub> emitting products in an attempt to cure the market failure.<sup>25</sup> Another reason is of course revenue generation.

The two main instruments used to mitigate GHG emissions are Carbon Taxes and Carbon Emissions Trading. Carbon Taxes sets a price for emissions directly and there is no limit on emissions. Carbon emissions trading schemes sets a limit on the amount of carbon that can be emitted by an entity, commonly referred to as an allowance. These allowances can also be traded with other entities.<sup>26</sup> Although our government has opted for a Carbon Taxing regime it is still worthwhile to have a quick look at Carbon Emissions Trading.

Emission trading systems or schemes are currently operated in the EU, Canada, China and certain States in the USA. An ETS works by placing a predetermined cap on emissions and these emissions are auctioned off as permits or units. GHG emitting entities surrender permits corresponding to the amount of GHG’s that they emitted. Although these schemes provide certainty about emission reduction levels, they have a number of drawbacks. It is generally accepted that for these schemes to work they require a number of entities to participate in order for there to be a market. The volume of permits should also be adequate to generate an appropriate carbon price to ensure emission reductions. Over-allocation of allowances may drive down prices which could lead to price volatility and long-term market distortions. Low priced allowances may delay investment in low-carbon technology and will have less influence on production and consumption patterns. Due to administrative complexities in terms of establishing baseline emissions, prices, total number of allowances and enforcement, it will also be necessary to establish an oversight body. It is also not suitable in oligopolistic markets.<sup>27</sup>

Most of the drawbacks of the ETS is negated by the relatively simple working of a Carbon Tax which sets a fixed price for emissions and each entity is liable to pay their tax liability. The tax can also be administered by the existing tax authorities.

Most emissions originate from the electricity sector and since South Africa has an oligopolistic energy market where most electricity is provided by a single producer, ESKOM,

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25 National Treasury *op cit* note 22 Preamble.

26 The Davis Tax Committee *op cit* note 7 at 10.

27 The Davis Tax Committee *op cit* note 7 at 11.

there will not be a market to trade permits. It should however be noted that a price on carbon through a tax could provide uncertainty as to the amount of reductions to be secured.

## 1.1 Context

South Africa has an energy and emission intensive economy which relies on mining and industry for development, carbon-intensive industrial growth, and electricity which is primarily produced by burning coal.<sup>28</sup> Energy consumption in South Africa is ranked at 16<sup>th</sup> in the world.<sup>29</sup> South Africa produces electricity by burning coal and almost 90% of South Africa's electricity is generated by coal fired power stations.<sup>30</sup> Burning coal releases CO<sub>2</sub> which is primarily responsible for climate change. In 2010, it was estimated that the South African energy sector was responsible for 63.6% of GHG emissions in 2010, 55% thereof ascribed to the electricity sector. The second biggest emitter was the transport industry with 10.8% and third was the manufacturing industry with 9.8%.<sup>31</sup>

The electricity sectors' contribution is likely to increase following the completion of Eskom's new Medupi and Kusile coal-fired power stations as well as the new controversial Thabametsi private coal fired power plant. The fact that most of our GHG emissions originate from electricity generation and that there are new coal-fired power stations being constructed presents some significant stumbling blocks for South Africa's Carbon Tax regime.

According to the 2000 – 2010 GHG inventory, electricity consumption demographics look like this<sup>32</sup>:

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28 Rumble, Gilder & Parker *op cit* note 24 at Ch. 20-3

29 Department of Environmental Affairs *GHG Inventory for South Africa 2000 – 2010* (2013) 19.

30 South African Department of Energy [http://www.energy.gov.za/files/electricity\\_frame.html](http://www.energy.gov.za/files/electricity_frame.html).

31 Department of Environmental Affairs *op cit* note 29 at 73.

32 Department of Environmental Affairs *op cit* note 29 at 80.

Consumer group	Electricity consumption	Number of consumers
Residential	17%	7.5 million
Agriculture	3%	103 000
Commercial	13%	255 000
Mining	15%	1100
Industry/ Manufacturing	38%	33000
Transport (mainly railway)	3%	1800
Exports	6%	7
Own use of distributors	5%	N/A
Total	100%	7.9 million

These figures provide some valuable insights:

First, most of the tax generated will be from the electricity sector, this means that a hike in electricity prices are very likely. This scenario will be problematic for poor households as it will increase living expenses. For industry it will increase operating expenses. Due to the slow rollout of alternative renewable electricity generation options in South Africa, most consumers would be subject to increased electricity prices for a long period. However, since most of South Africa's CO<sub>2</sub> is emitted by generating electricity through coal fired power plants, it would not make sense to exclude the electricity sector from the tax.

Second, this also means that Carbon Taxes will mostly be collected from one source, this also limits innovation in GHG reduction methods to certain industries.<sup>33</sup> Eskom is the primary electricity producer in South-Africa and it generates 95% of all electricity with 88% generated by burning of coal, most technological innovation would have to be focused on reducing GHG emissions when generating electricity.

Third, the energy mix and price is regulated by the National Energy Regulator of South Africa and Government. The energy mix is determined by the Department of Energy through its Integrated Resource Plan. Eskom, a State-owned Enterprise, is also the largest electricity producer. In this sense, a Carbon Tax would not be able to change South Africa's energy mix. The tax would merely be passed on to consumers and there would be no incentive for Eskom to change how it produces electricity.

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<sup>33</sup> Henderson *op cit* note 21 at 50.

Fourth, not all residential consumers pay for electricity. This might lead to a situation where some consumers will have to be piggybacked by others. This could adversely affect the perceived equity of the tax.

The main objective of an environmental tax should be to secure an environmental benefit, ancillary benefits such as revenue generation should however not carry too much weight. An environmental benefit could be hard to come by if one takes these circumstances into account.

The study will therefore evaluate the proposed Carbon Tax regime in order to assess its viability and fairness. It should be viable in the sense that it should secure an environmental benefit without placing an undue burden on citizens. It should also be viable in that it should be able to generate revenue. It should be fair in that liability should not fall disproportionately on certain income groups. It should be able to contribute to innovation, technological advancement and investment into technology that is less emission intensive.

## **1.2. Key research questions and outcomes**

Carbon Taxes are introduced as a measure to reduce GHG emissions. The first question this dissertation will attempt to answer is whether the proposed Carbon Tax will be effective as a measure to reduce GHG emissions.

Since the tax will attempt to internalise the environmental and social cost that comes with emitting GHG's, it should be established whether the tax could internalise this cost effectively without placing an undue burden on citizens, especially lower income households.

The second question that the dissertation will attempt to answer is whether the proposed Carbon Tax will be equitable in the sense that it does not place an undue financial burden on citizens and businesses.

## **1.3. Theoretical basis underlying the thesis**

The Carbon Tax is a market-based instrument and as mentioned above its purpose is to correct environmentally related market failures through the price mechanism. South Africa has a policy on the use of market-based instruments to support environmental fiscal reform which sets out the principles for environmental taxes such as the Carbon Tax.<sup>34</sup>

According to South Africa's policy on environmental fiscal reform, the criteria against which the proposed tax should be evaluated are: environmental effectiveness, tax revenue,

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<sup>34</sup> National Treasury *A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa* 2006.

support for the tax, legislative aspects, technical and administrative viability, competitiveness effects, distributional impacts and adjoining policy areas.<sup>35</sup> The aforementioned criteria covers the critical aspects of carbon taxes.

South Africa is not the first country to introduce a Carbon Taxing regime. In the interest of evaluating Carbon Taxes as an effective and equitable measure to reduce CO<sub>2</sub> emissions, it is worth examining at least one other region that has a Carbon Taxing regime. Although there are no two countries with exactly the same amount of CO<sub>2</sub> emissions, there are still important lessons to be learned from other regions. The region that will be examined in this dissertation is Australia. The reasons why Australia was chosen above the other countries is because during the last decade their total emissions were not much different from the total emissions in South-Africa, they also rely heavily on burning fossil fuels such as coal to generate electricity.<sup>36</sup> They were also the first developed country to abandon their carbon taxing regime after only a few years of implementation.<sup>37</sup> Although they elected to repeal their taxing regime after a only few years of operation there are still lessons to be learned from its brief existence. The first being how the Carbon Tax affected their CO<sub>2</sub> emissions. Secondly, how the tax affect consumer's behaviour. Thirdly, how the tax was implemented. Fourth, would they have been able to secure environmental benefits if they had not abandoned the tax. And finally, why did they choose to abandon the tax.<sup>38</sup>

#### 1.4. Methodology

To answer the stated research questions the dissertation will start by examining the criteria against which environmental taxes should be measured as set out in the *Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa*. After discussing the criteria the Draft Carbon Tax Bill will be discussed in light of these criteria. The dissertation will then discuss Australia's carbon taxing regime in light of these criteria in an attempt to draw lessons from their experience. The discussion regarding the Australian carbon tax will also highlight the differences and similarities between the South African and Australian tax. Evaluating the Draft Carbon Tax Bill against the abovementioned

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35 National Treasury *op cit* note 34 at 56 – 64.

36 Australian Energy Regulator *State of the Energy Market 2014* 25

37 Taylor R 'Australia Becomes First Developed Nation to Repeal Carbon Tax' *The Wall Street Journal* 17 July 2014, available at <http://www.wsj.com/articles/australia-repeals-carbon-tax-1405560964>, accessed on 25 May 2017.

38 Australian Department of Accounting, Finance and Economics *Australia's Carbon Tax: An Economic Evaluation*



criteria and the Australian carbon tax should give an indication as to the effectiveness and equitability of the proposed South African carbon tax.

## **1.5 Structure**

The second chapter of the dissertation will discuss the generally accepted principles that apply to environmentally related taxes. The tax will be evaluated against these principles in order to ascertain whether the Carbon Tax is legitimate as an environmental tax. These principles are set out in the *Framework For Considering Market-Based Instruments To Support Environmental Fiscal Reform In South Africa* published in 2006 as well as writings on environmental and environmentally related taxes in the OECD countries.

The third chapter will delve into the Carbon Taxing regime that was once in place in Australia. This chapter will also look at the change the tax brought in CO<sub>2</sub> emissions and consumer behaviour. This chapter will also look at how their tax was implemented, how it was designed, what its effects were on business and citizens, and why they chose to abandon the tax.

The final chapter will conclude the dissertation.

## **Conclusion**

What the research proposes is an in-depth evaluation of the proposed Carbon Taxing regime for South Africa. The research will aim to provide an answer as to the viability of the taxing regime to reduce GHG emissions.

Furthermore, the research will attempt to ascertain whether the tax will be equitable in the sense that it does not place an undue burden on business and citizens. To answer these questions an in-depth literature study will be conducted consisting of writings of academics both national and foreign.

The study will also draw lessons from the carbon pricing mechanism that was in place in Australia.

## **2. Criteria for evaluating environmentally related taxes**

The use of incentives, market-based, financial or otherwise, has been successfully used in South Africa and other jurisdictions to promote environmental goals. The idea of using incentives to supplement the traditional means of environmental regulation is thus not a new

one.<sup>39</sup> It is also an ingenious idea in the sense that persons and organizations are not coerced into compliance in the traditional sense but rather given an incentive to change their behaviour to be environmentally conscious. The underlying idea with the use of incentives is to change behaviour and secure compliance with environmental laws that could provide an environmental benefit. If applied correctly incentives will also be able to secure environmental benefits and sustainable use of resources.

In general, a fiscal incentive in the form of an environmental tax is used to change people's behaviour by increasing the price of environmentally harmful goods and services. Fiscal incentives are usually present when policy instruments place a monetary value on a certain product or the policy instrument influences the pricing of a product or service if certain conditions are met. The policy instrument has a predetermined goal which it tries to achieve by influencing people's behaviour.<sup>40</sup>

Policy instruments regarding fiscal incentives for environmental fiscal reform also set out specific criteria for assessing environmentally related taxes. These criteria should be used to evaluate a tax design before it is implemented in order to ascertain whether an environmental tax is the best instrument to achieve a desired environmental benefit. It should however be kept in mind that, according to the policy paper on environmental fiscal reform:<sup>41</sup>

“Where a tax seeks to achieve an environmental objective, all the criteria together aim to assess two fundamental questions:

1. Can a tax measure be used to address an environmental issue?
2. Is that tax measure the best way of addressing the environmental issue?”

The environmental issue and its most appropriate solution should therefore always be kept in mind. Although it will be impossible to assess the tax with certainty before it has been implemented, there should be some form of *ex ante* evaluation against these principles in order to form a view of the possible benefits and disadvantages of a tax. If these can be made clear it will be possible to anticipate and mitigate possible costs incurred by implementation of the tax.<sup>42</sup>

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39 Markandya “Environmental Taxation: What Have We Learnt in the Last 30 Years?” in Castelluci L & Markandya A (eds) *Environmental Taxes and Fiscal Reform* 10.

40 Henderson *op cit* note 21 at 49.

41 National Treasury *op cit* note 34 at 57.

42 National Treasury *op cit* note 34 at 57 – 58.

Before we assess some of the important design issues and criteria for environmental taxes it is worth looking at some of the definitions. The term ‘Environmental Tax’ includes ‘Environmentally related taxes’ as well as ‘Pigouvian taxes’.

Environmentally related taxes are defined as:

“OECD, IEA and the European Commission have agreed to define environmentally related *taxes* as any compulsory, *unrequited* payment to general government levied on tax-bases deemed to be of particular environmental relevance. The relevant tax-bases include energy products, motor vehicles, waste, measured or estimated emissions, natural resources, etc. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments”<sup>43</sup>

Pigouvian taxes are a subset of environmentally related taxes which has as its main objective the goal to discourage environmentally detrimental behaviour with some revenue raising involved. In contrast herewith, environmentally related taxes aim to raise revenue with some environmental criteria.

These definitions do create confusion since both types of taxes could serve several and even related goals. Environmentally related taxes could provide environmental benefits even though they are designed to raise revenue. On the other hand, Pigouvian taxes could raise revenue even though they are designed to discourage environmentally detrimental behaviour.<sup>44</sup>

The evaluation criteria discussed here includes important design aspects of environmental taxes with a focus on the proposed Carbon Tax for South Africa. It will include: environmental effectiveness; tax revenue; support for the tax; legislative aspects; technical and administrative viability; competitiveness effects; distributional impacts and adjoining policy areas.<sup>45</sup> Each of these criteria will be discussed in turn in order to ascertain whether the proposed taxing regime will be suited to address environmental issues. Examining the criteria will also help us answer the above fundamental questions.

## 2.1. Environmental effectiveness

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43 OECD *The Political Economy of Environmentally Related Taxes* 26

44 Pedro M Herrera Molina *Design options and their rationales* in Janet E Milne and Mikael S Anderson (eds) *The Handbook of Research on Environmental Taxes* 85 – 6.

45 National Treasury *op cit* note 34 at 59 – 64.

To start off, environmental effectiveness should be seen as one of the most important aspects of any environmental tax. A clear environmental objective should therefore be identified and the tax should be aimed at achieving the objective or at least provide an environmental benefit. In order for the tax to be environmentally effective the tax should be directly linked to the externality and where this is not possible it should at least be indirectly linked. The tax should also keep the number of exemptions to a minimum.

### **2.1.1 Linking the tax to the externality**

A Market failure exists when there is overproduction of a product because the product is not priced economically, the product is usually cheaper than what it should be and this could lead to overproduction and overconsumption. The product is cheaper since there are external production costs that are not incorporated into the final price of the product. These external production costs are usually costs to society which takes the form of pollution or damage done to the environment, which is after all a public good.<sup>46</sup>

These external costs are usually referred to as ‘externalities’ and their presence implies that there is a market failure.<sup>47</sup> An environmental tax would attempt to determine the approximate external cost and then add it to the final price of the product to remedy the market failure.

Since the environment is a public good and free for all to use, it has been over-consumed and polluted by producers and consumers who do not ‘pay’ for the privilege to damage the environment. By internalising these external costs by adding them to the final price of the product it would change supply and demand patterns, a higher price should in theory drive down demand as well as production of the product.<sup>48</sup> This would address the cost of the externality imposed on society by producers and drive down production which should lead to less harmful emissions or at least innovation in cleaner technology.<sup>49</sup>

It is therefore imperative that there is a link between the environmental issue and the tax.<sup>50</sup> In terms of the Carbon Tax, the environmental issue that needs to be addressed is the unusually high concentration of GHG’s in the atmosphere as a result of human activity. A Carbon Tax will attempt to address this issue by pricing carbon. This would in theory decrease

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46 Rumble, Gilder & Parker *op cit* note 24 at Ch. 20-6

47 National Treasury *Carbon Tax Policy Paper* 2013 28.

48 Markandya *op cit* note 39 at 12.

49 Andrew B ‘Market Failure, Government Failure and Externalities in Climate Change Mitigation: The case for a Carbon Tax’ 2008 *Public Administration and Development* Vol 28 Issue 5 393 – 398.

50 *ibid* at 59.

the consumption of taxed goods and encourage a shift towards low-carbon means of production and low-carbon and renewable technology and ultimately a low-carbon economy.<sup>51</sup> In order to achieve the desired reduction of GHG's in the atmosphere the tax should preferably be directly linked to the environmental externality. It could be technically and administratively cumbersome to find an appropriate practice to measure actual GHG emissions by certain processes and tax them accordingly.<sup>52</sup> It is therefore more realistic to tax at the source i.e. to add the tax to the selling price of coal as an example.<sup>53</sup> Taxing at the source would ensure that all GHG emitting processes would be subject to the tax on a fair and equitable basis. If all GHG emitting processes are taxed in this way, then all consumers will be subject to the same tax and taxpayer behaviour is more likely to change.<sup>54</sup> Taxing at the source would also streamline tax collection as it is efficient and it requires less resources from tax collection agencies.

According to the Carbon Tax policy paper there are three approaches to linking the tax to the emissions. Firstly, the tax can be applied to actual measured GHG emissions. The problem with this approach is that it can be administratively complex since the GHG inventory in South Africa is still being put together. However, it would be the fairest and most equitable way of applying the tax since the tax will be applied to actual measured and verified emissions.<sup>55</sup>

Second, the tax can be applied to fossil fuel inputs. This option was found to be an equivalent tax base to directly measured taxes. In this case a consumer's tax liability would be based on the amount of GHG's the input fuel can potentially emit. Since GHG emissions caused by the combustion of fossil fuels are closely related to the carbon content of the respective fuels, a tax on these emissions can be levied by taxing the carbon content of fossil fuels at any point in the product cycle of the fuel.<sup>56</sup> The amount of GHG's the fuel can emit is based on approved emissions factors or transparent, verified measuring and monitoring procedures.<sup>57</sup>

The third option is a tax levied on energy outputs.

The Carbon Tax policy paper states that after extensive consultation a preference for a fuel input tax emerged.<sup>58</sup> Industry that will be liable to pay the Carbon Tax will have to report

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51 National Treasury *op cit* note 47 at 29.

52 Rumble, Gilder & Parker *op cit* note 24 at p 20-27.

53 Ibid at 12.

54 National Treasury *op cit* note 34 at 59.

55 The Davis Tax Committee *op cit* note 7 at 12.

56 International Panel on Climate Change (IPCC) Third Assessment Report 6.2.2.1. available at <https://www.ipcc.ch/ipccreports/tar/>, accessed on 16 July 2017.

57 The Davis Tax Committee *op cit* note 7 at 12.

58 National Treasury *op cit* note 47 at 46 – 7.

their emissions if they emit more than 100 000 tons of GHG's per year, the Department of Environmental Affairs will also prescribe emissions factors for certain industry, this will help the authorities to determine a firm's tax liability.<sup>59</sup>

The Carbon Tax Policy Paper notes that there are four key GHG's emitted in South Africa these being Carbon Dioxide (CO<sub>2</sub>) at 79%, Methane (CH<sub>4</sub>) at 16%, Nitrous Oxide (N<sub>2</sub>O) at 5% and Perfluorocarbons (PFC's) at 1% of the total emissions. The largest emitters by sector being electricity generation, petroleum refining, transport, agriculture and industry.<sup>60</sup> Sources of GHG's are diverse and include:

- Scope 1: Direct GHG emissions from sources that are owned or controlled by the entity (e.g. emissions from fuel combustion and industrial processes).
- Scope 2: Indirect GHG emissions resulting from the generation of electricity, heating and cooling, or steam generated off site but purchased by the entity.
- Scope 3: Indirect GHG emissions (not included in scope 2) from sources not owned or directly controlled by the entity but related to the entity's activities (i.e. emissions that occur in the value chain of the reporting company).

Although the Carbon Tax will only cover Scope 1 emissions which result directly from fuel combustion and gasification as well as from non-energy industrial processes,<sup>61</sup> all economic sectors will be affected either directly or indirectly as the tax filters through the economy.<sup>62</sup> The following table was extracted from the from the Carbon Tax Policy Paper and sets out the different processes that generate Scope 1 emissions, the energy inputs and the type of GHG emitted.

Table 1: Scope 1 Emissions

Process or Sector	Energy inputs	Type of GHG	Description
Electricity generation	Coal, natural gas, petroleum products (e.g. diesel), renewable fuels	CO <sub>2</sub> , CH <sub>4</sub>	Fuel inputs are used to generate heat or steam in order to power boilers and turbines that generate electricity.

<sup>59</sup> Ibid at 47.

<sup>60</sup> Ibid at 47.

<sup>61</sup> National Treasury ry at Act 9.

<sup>62</sup> National Treasury *op cit* note 47 at 47.

Coal and gas to liquid (gasification)	Coal, natural gas, crude oil, diesel	CO <sub>2</sub> , CH <sub>4</sub>	Gas preparation in the coal-to-liquid process. Coal is converted to synthesis gas consisting of hydrogen and carbon monoxide, as feedstock into the Fischer-Tropsch process. The hydrogen-to- carbon ratio is adjusted by injecting carbon in the form of carbon dioxide.
Crude oil refining	Crude oil	CO <sub>2</sub>	Direct emissions result from fired steam boilers, fired process heaters and catalytic cracking unit regeneration.
Mining	Electricity, coal	CO <sub>2</sub> , CH <sub>4</sub>	Surface mining and underground mining activities result in methane emissions.
Cement	Coal, electricity, limestone or calcium carbonate	CO <sub>2</sub>	Process emissions result from the calcination of calcium carbonate to calcium oxide, which produces CO <sub>2</sub> as a by-product and clinker production emissions.
Paper and pulp	Coal, gas, oil, biomass	CO <sub>2</sub>	Direct process emissions derive from coal and gas- fired boilers used for electricity generation. Oil is used in the start-up phase. Biomass-based renewable fuel is combined with coal to generate electricity where the renewable fuel (e.g. black liquor) is deemed to be a waste product from the paper and pulp process.
Iron and steel	Coal, natural gas, electricity, liquid fuels	CO <sub>2</sub>	<p>Process emissions due to the production of iron and steel as follows:</p> <ul style="list-style-type: none"> <li>• Integrated or coal-based production route comprising coke making, sinter, blast furnace and basic oxygen furnace facilities</li> </ul>

			<ul style="list-style-type: none"> <li>• Coal-based direct reduction facilities where the main inputs are coal and electricity; here the primary role of coal is that of a reductant</li> <li>• Emissions from the recovery of waste metal.</li> </ul> <p>Direct use of electricity as an input in electric arc furnace operations where scrap metal is recycled.</p>
Aluminium	Liquefied petroleum gas, low sulphur oil, diesel, petrol and electricity	CO <sub>2</sub> , PFCs	Process emissions from melting primary and scrap aluminium, heating of ingots for hot rolling, and homogenising and annealing of metal in the process.
Chemicals		CO <sub>2</sub> , N <sub>2</sub> O, CH <sub>4</sub>	<p>Direct process emissions from:</p> <ul style="list-style-type: none"> <li>• Calcium carbide production</li> <li>• Carbon black formation</li> <li>• Titanium dioxide production</li> <li>• Ammonia production</li> <li>• Nitric acid production.</li> </ul>
Glass	Natural gas, electricity, liquid fuels	CO <sub>2</sub>	<p>Direct emissions from:</p> <ul style="list-style-type: none"> <li>• Processes at glass melting furnaces for melting raw materials, glass conditioning, container forming machines, and glass annealing</li> <li>• Flat glass manufacture for glass melting</li> <li>• Decomposition of soda ash, dolomite and limestone.</li> </ul> <p>CO<sub>2</sub> emissions from natural gas used to produce electricity.</p>



Transport	Diesel, petrol, compressed natural gas, aviation fuel, electricity	CO <sub>2</sub> , CH <sub>4</sub>	Combustion of fuels used in vehicles, aircraft and railways.
Agriculture, forestry and land use		CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	Direct emissions resulting from specific processes, as well as net emissions arising from agriculture, forestry and land-use related activities. These include enteric fermentation, manure management and land use (forest land and cropland).
Waste		CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	Emissions arising from solid waste disposal, biological treatment of solid waste, incineration and open burning of waste, wastewater treatment or discharge. The treatment of wastewater from domestic, commercial and industrial sources contributes to anthropogenic emissions of methane and nitrous oxide.

What should be noted from the above table is that it covers most processes and emissions which have become essential to everyday modern human life. Electricity which powers buildings, houses, and businesses. Mining coal for electricity generation. Paper which we use to write and print. Cement, iron, steel and glass that we use to build buildings and houses. Using fuels for transport. Agricultural processes for food production. It should also be noted that the Carbon Tax will not apply to the agriculture, forestry, other land uses and waste sectors.<sup>63</sup> This means that all major emission sectors would be covered by the tax and most consumers will be liable to pay the tax. A tax which covers as many GHG's and sectors is preferable as it is most likely to change taxpayer behaviour and contribute to a reduction of GHG's.<sup>64</sup>

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<sup>63</sup> National Treasury *op cit* note 18 at 9.

<sup>64</sup> The Davis Tax Committee *op cit* note 7 at 12.

Measuring and reporting GHG emissions per sector and for different processes is essential in determining the appropriate level of action required for GHG mitigation, this information is also essential in determining a monetary value for the externality. The lack of such information presents a significant stumbling block in the application of the Carbon Tax and it will reduce its environmental effectiveness if there is insufficient information on which mitigation action can be based.<sup>65</sup> Fortunately the Department of Environmental Affairs has teamed up with industry in order to fill these knowledge gaps and create a GHG inventory through the National Greenhouse Gas Improvement Programme (NGHGIP). The NGHGIP consists of a series of sector-specific projects that are targeting improvements in activity data, country-specific methodologies and emission factors used in the most significant sectors. The following two tables set out some of the projects that are under implementation as part of the NGHGIP.<sup>66</sup>

**Table 2: DEA driven GHGIP projects**

Sector	Baseline	Nature of methodological improvement	Partner	Completion date
Power Generation [Implications for other sectors]	Using IPCC default emission factors	Development of country-specific CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emission factors	ESKOM, Coal-tech, Fossil-fuel foundation, GIZ	December 2015
Iron & Steel	Using a combination of IPCC default and assumptions based on material flows	Shift towards a material balance approach	Mittal Steel, South African Iron & Steel Institute (SAISI)	June 2015
Transport Sector [Implications for other sectors]	Using IPCC default emission factors	Development of country-specific CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emission factors	SAPIA	December 2015
Gas-To-Liquids (GTL)	Not accounting for all emission sources. Material balance approach needs a review	Detailed life-cycle emissions analysis coupled with material balance approach	PETROSA	March 2015
Coal-To-Liquids (CTL)	Allocation of emissions not transparently done, not accounting for all emissions	Improved allocation of emissions, life-cycle emissions analysis	SASOL	March 2015

<sup>65</sup> National Treasury *op cit* note 47 at 2013 49.

<sup>66</sup> Department of Environmental Affairs *op cit* note 27 at 41 – 42.

Ferro-alloy production	Using a combination of IPCC default and assumptions based on material flows	Shift towards a material balance approach	Xstrata, Association of Ferroalloy producers	March 2015
Aluminium Production	Using IPCC default emission factors	Shift towards a material balance approach	BHPBilliton	December 2014
Petroleum Refining	Not accounting for all emission sources. Data time series inconsistencies	Completeness – provide sector specific guidance document for this sector. Improve completeness and allocation of emissions	SAPIA in collaboration with all refineries	December 2014

**Table 3: Donor funded GHGIP projects**

Project	Partner	Objective	Outcome	Timelines
<b>Development of a formal GHG Inventory National System</b>	Norwegian Embassy	<b>Helping South Africa develop its national system</b>	SA GHG inventories are compiled annually	<b>2014-2016</b>
<b>Stationary Combustion EFs</b>	GIZ, Eskom (Power Utility)	<b>To develop emissions factors for stationary combustion using the Power generation sector as a pilot</b>	Emissions from key sectors based on country-specific information	<b>2014-2015</b>
<b>Land Cover mapping</b>	DFID-UK	<b>To develop land-use maps for 2-time steps [1990, 2013]</b>	Land-use change matrix developed for 36 IPCC land use classes to detect changes.	<b>2014-2015</b>
<b>Waste-sector data improvement project</b>	African Development Bank (AFDB)	<b>To improve waste-sector GHG emissions estimates and addressing data gaps</b>	Waste Sector GHG inventory is complete, accurate and reflective of national circumstances	<b>2015-2016</b>
<b>Compliance with SA Statistical Quality Assurance Framework (SASQAF)</b>	Statistics South Africa	<b>Align GHG Inventory national system with the SASQAF to ensure quality of the inventory</b>	The national GHG inventory and its compilation processes endorsed through the SASQAF evaluation	<b>2014-2016</b>

<b>National Forest Assessment (NFA)</b>	African Development Bank (AFDB); Department of Agriculture, Forestry and Fishing (DAFF)	<b>Piloting of the NFA to map and assess resource demands for a wall-to-wall based NFA</b>	A resource demand analysis based on NFA pilot that informs	<b>2015-2016</b>
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Another important aspect to consider is the price. The price should be set at a level which can effectively internalise the external costs. This is a very difficult process when one takes into account the many variables associated with GHG emissions. There are still many uncertainties about GHG emissions in regards to their environmental impacts and the effects it will have on the economy. Governments also have to take the reduction target they want to achieve into account. At this point the price will mostly be a guess until it can be figured out with certainty and adjusted to provide the most benefits.<sup>67</sup>

### **2.1.2 Keeping exemptions to a minimum**

To be properly effective the Carbon Tax should reduce the number of allowed exemptions. All industries and activities contributing to environmental damage would have to be subject to the tax in order for it to be as effective as possible in reducing GHG's. There can of course be concessions in the form of lower tax rates especially in the commencement stages of the tax in order to give firms a chance to adjust to the tax. These exemption periods should however have a time limit which is adequate enough to help firms adjust. Complete exemptions from the tax to firms should be limited as it could be used by them to unduly benefit while others bear the brunt of the tax.<sup>68</sup>

Since the aim of the tax is to reduce GHG emissions certain industries which also work towards this goal should be exempted, wholly or partially, from the tax. Renewable energy should be exempted in recognition of its environmental advantages. Although the renewable energy industry might not release GHG's in the production of energy, they can still be subject to the tax through the manufacturing and transport of materials used to generate renewable energy. These firms should be exempted as much as possible to enable the industry to grow and provide emission free energy and innovation in emission free technology thereby contributing to the environmental objective of the Carbon Tax.<sup>69</sup>

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<sup>67</sup> Rumble, Gilder & Parker *op cit* note 24 at p 20-9.

<sup>68</sup> National Treasury *op cit* note 34 at 59.

<sup>69</sup> Andrew *op cit* note 49 at 400.

The tax should therefore be aimed at taxing every entity contributing to environmental damage while exempting, wholly or partially, industry that provide environmental advantages in line with the environmental objective of the tax. The tax base should also cover as much emissions as possible with an adequate price. This situation is most likely to influence taxpayer behaviour and lead to environmental benefits in the form of a reduction of GHG emissions while simultaneously stimulating investment in cleaner means of production.<sup>70</sup>

Since South Africa is still an emerging economy the Carbon Tax Bill proposes tax-free thresholds or exemptions in order for firms to adjust to the tax and to avoid unintended consequences of the tax. In the first phase of the tax a basic tax-free threshold of 60 per cent will be allowed for energy (combustion) emissions. The Tax Bill also proposes a tax-free threshold of 70 per cent for process emissions. In addition to the basic tax-free threshold, trade exposed sectors will be allowed a further 10 per cent allowance; a tax-free performance allowance of 5 per cent will also be given in recognition of early efforts to reduce emissions; all sectors will also be allowed a maximum offset at 5 or 10 per cent; certain industries will also be afforded a fugitive emissions allowance of 5 per cent and a carbon budget allowance of 5 per cent.<sup>71</sup>

Accordingly, some taxpayers could apply to have as much as a 95 per cent tax-free threshold.<sup>72</sup> Although it is important to ensure that industry will be able to mitigate any negative financial implications brought on by the Carbon Tax these thresholds should however not impact the effectiveness of the tax due to competitiveness concerns.<sup>73</sup> It is important to note that the tax-free allowance on electricity generation also has a very high cap at 95 per cent. Because of coal's high CO<sub>2</sub> content and the fact that electricity generation makes up a substantial part of South Africa's emissions profile it would not make sense to have a high tax-free threshold for electricity generation.<sup>74</sup> Because of measurement difficulties the agricultural, forestry, land use and waste sectors will be completely exempted during the first phase of the Carbon Tax.<sup>75</sup>

The proposed tax-free thresholds of 95 per cent could potentially weaken the GHG reduction potential of the Carbon Tax. The electricity generation sector which has the highest emissions also has a very high tax-free threshold, this situation is not preferable since most

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70 Rumble, Gilder & Parker *op cit* note 24 at Ch. 20-6

71 National Treasury *op cit* note 22 Schedule 2.

72 National Treasury *op cit* note 18 at 5.

73 Nicholas Stern *The Economics of Climate Change: The Stern Review* (2007) 386.

74 Metcalf GE & Weisbach D "The Design of a Carbon Tax" in *Harvard Law Review* 2009 Vol 33 515.

75 National Treasury *op cit* note 47 at 54.

people consume electricity and this sector could yield the highest reduction of GHG's due to behavioural change and positively influence innovation in an existing low-carbon or renewable electricity generation market.

The tax-free thresholds are very high and I believe they should be reconsidered to ensure that they do not render the Carbon Tax ineffective. If one takes into account the state of affairs brought on by climate change as outlined in the introductory chapter as well as our obligations under the Kyoto Protocol it is necessary that we act to reduce GHG emissions as swiftly as possible. For this reason, the high tax-free thresholds could undermine the potential of the Carbon Tax to influence taxpayer behaviour in order to reduce GHG's.

## **2.2 Tax Revenue**

One of the key attributes of any tax is its potential to raise revenue, this is not much different for environmental taxes – some having a greater revenue raising potential than others of course. In general, the government uses income tax, taxes on company profits and value added tax to raise revenue which is used to fund government expenditure.<sup>76</sup> Money raised through taxation goes into the general fiscus and is used by government and its affiliated departments to keep the country running by spending the revenue on education, healthcare, public transport, housing, pension funds, arts and culture, tourism and government salaries to name but a few of the numerous expenditure programs.<sup>77</sup>

South Africa does have a few existing environmentally related taxes such as the fuel levy, vehicle taxation, aviation taxes, product taxes, electricity related levies and water use related levies. However, it has been submitted that these taxes are only used to supplement the general fiscus and is not specifically earmarked for environmental expenditure.<sup>78</sup> According to the statistics released by National Treasury, environmental taxes made up 0.95% of the total tax revenue for the 2013/2014 financial year.<sup>79</sup> The total revenue generated through environmental taxation amounted to R10.97 billion. The taxes used to calculate this amount is the international air passenger departure tax, plastic bag levy, electricity levy, incandescent light bulb levy and the CO<sub>2</sub> tax on motor vehicle emissions.<sup>80</sup> The fuel levy made up at least

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76 Castelucci & Markandya "Environmental Taxes and Fiscal Reform" 1 – 2.

77 South African National Treasury – National Budget 2015 (Estimates of National Expenditure)  
<http://www.treasury.gov.za/documents/national%20budget/2015/default.aspx>

78 Kirby N and Pillay C 'An Introduction to Environmental Taxes' 2008 *Professional Accountant* 30.

79 National Treasury and South African Revenue Service *Tax Statistics 2017*.

80 Ibid at 12 - 13.

R62.77 billion of the total tax revenue and 1.4% of the total GDP, although it was not strictly cited as an environmental tax.<sup>81</sup>

In 2016, it was estimated that more than USD\$28.3 billion of carbon revenues, generated through taxes and emission trading schemes, gets collected every year throughout the world.<sup>82</sup>

The revenue can be used for general government expenditure environmental expenditure and invested in low-carbon technology, or to reduce personal and corporate income taxes.<sup>83</sup> This section will assess some of the factors associated with revenue generation as well as how revenue can be applied.

### **2.2.1 Level of tax revenues**

The potential revenue that an environmental tax could generate is to a large extent dependent on the price elasticity for demand of the good or product being taxed.<sup>84</sup> ‘Price elasticity of demand’ is defined as the measure of the relationship between a change in the quantity demanded of a particular good and a change in its price. If a small change in price is accompanied by a large change in quantity demanded, the product is said to be elastic (or responsive to price changes). Conversely, a product is inelastic if a large change in price is accompanied by a small amount of change in quantity demanded.<sup>85</sup>

Taxing price inelastic goods is seen as good tax practice since the change in price is unlikely to influence demand and this could generate a significant amount of revenue. Taxing a price elastic good on the other hand will influence and drive down demand for the product which could lead to an unsubstantial amount of revenue and it is likely that the revenue will also decline over time.<sup>86</sup>

Therefore, if the demand for the taxed goods are sensitive in changes to price it could create a strong incentive for consumers and producers to change their behaviour.

A Carbon Tax will only work as a policy instrument if it succeeds in reducing the demand for GHG intensive activities and thereby reducing emissions. Empirical evidence

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81 Ibid at 18 Table A1.2.1.

82 Carl J and Fedor F, ‘Tracking Global Carbon Revenues: A survey of Carbon Taxes versus Cap-and-Trade in the real World’, *Energy Policy*, Volume 96 (2016) 50.

83 The Davis Tax Committee *op cit* note 7 at 14.

84 National Treasury *op cit* note 34 at 59.

85 Anon ‘Price Elasticity of Demand’ available at <http://www.investopedia.com/terms/p/priceelasticity.asp>, Accessed on 13 March 2017.

86 National Treasury *op cit* note 34 at 59.

suggests that taxing goods that emit GHG's is likely to drive down demand for the product and thereby reduce GHG emissions, especially in the energy production sector.

Agnolucci investigated energy demand from the British and German industrial sectors and found that a long run price elasticity of demand of -0.64 (a 10% rise in price) could lead to a long run fall in energy demand of 6.4% and thus a decline in emissions.<sup>87</sup>

Adayemi and Hunt analysed industrial energy demand across members of the OECD countries and also found support for the idea that changes in price will change energy demand.<sup>88</sup>

It has also been suggested that increasing the price of carbon is likely to increase tax revenue at least until low-carbon and renewable energy technology become more cost effective and readily available to replace emission intensive technology.<sup>89</sup>

Since the bulk South Africa's emissions comes from the energy sector and we use fossil fuels to generate electricity the Carbon Tax could succeed in driving down demand and emissions.

Taxing carbon and other GHG's can potentially, as the empirical studies suggest, reduce GHG emissions and raise revenue simultaneously. Although the reduction in demand for emission intensive energy will eventually result in a decline in revenue, this should not be viewed negatively as the main objective of the Carbon Tax is to reduce GHG emissions. Revenue will still be generated until lower emission technology becomes available, this new technological innovation will however be stimulated by the introduction of the Carbon Tax.<sup>90</sup> It should be noted that revenue generation is only an ancillary objective to the Carbon Tax and that the main objective should always be the reduction of GHG emissions.

### **2.2.2 Use of Tax Revenues**

The fact that the Carbon Tax will be able to generate revenue places the authorities in a position where they have to decide how this revenue can be best applied or recycled back into the economy. There are a few options but from the literature the most prominent options are that it should be: earmarked for environmental expenditure or 'green spending'; it should go into

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87 Agnolucci P 'The energy demand in the British and German industrial sectors: Heterogeneity and common factors' in *Energy Economics*, 2009 v. 31.

88 Adayemi OI & Hunt LC 'Modelling OECD industrial energy demand: asymmetric price responses and technical change' *Energy Economics*, 2007 v. 29.

89 Bowen A "The Case for Carbon Pricing" *Policy Brief* 2011 (Grantham Research Institute on Climate Change and the Environment & Centre for Climate Change Economics and Policy) 6.

90 Popp D 'Induced Innovation and Energy Prices' in *American Economic Review* vol 92(1).



the general fiscus with all the other taxes, or it can be used to help minimize the regressive effects of other distortionary taxes such as income tax by recycling the revenue.<sup>91</sup>

All these options are interlinked to some extent but each will be discussed separately.

#### 2.2.2.1 Earmarking revenue for environmental expenditure

Earmarking funds mean that revenue will only be used for certain or predetermined purposes such as conservation.<sup>92</sup> The tax is usually connected in some way to the purpose for which the funds are applied. When considering whether revenues should be earmarked one has to look at the advantages and disadvantages of earmarking funds.

On the advantages side earmarking can promote transparency in the sense that the taxpayer will have greater certainty as to the use of funds. It can also provide funding certainty, the sector to whom the earmarked funds are allocated will be able to expect funds with certainty. There will also be a more direct relationship between payments and benefits that may enhance equity and efficiency.

Some disadvantages are that it tends to fragment and complicate the tax system as some departments would not have to comply with the budgeting process. It also constraints the Executive to use funds for the general public interest and it mostly provides benefits for special interest groups and not the public in general.

It is therefore necessary to weigh up the benefit to special interest groups through earmarking against the broader public interest that will be served through such earmarking practices.<sup>93</sup>

Generally, earmarking funds are not in line with the principles of public finance since it prevents efficient resource allocation across government.<sup>94</sup> In South Africa all spending decisions are made in the context of the normal budgeting process.

The South African climate change regime seems to be against full earmarking of revenues but they do seem open to partial earmarking, with regards to the climate change response white paper it is stated that: ‘although the full earmarking of revenue is not regarded as being in line with sound fiscal policy principles, some form of on-budget funding for specific environmental programmes will be considered.’<sup>95</sup>

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91 Rumble, Gilder & Parker *op cit* note 24 at p 20-12 – p 20-13.

92 Baranzini A, Goldemberg J, Speck S ‘A Future for Carbon Taxes’ (2000) *Ecological Economics* Vol 32 400

93 National Treasury *op cit* note 34 at 101.

94 Stern *op cit* note 73 at 559.

95 Department of Environmental Affairs *National Climate Change Response White Paper* 40.

Partial earmarking indicates that some revenue will indirectly be applied for specific purposes. This is usually done by increasing the budget for certain sectors because of the revenue they generate.

Using funds for environmental expenditure can be termed as ‘green spending’ and it usually includes directing funds to government policies which aim to improve energy efficiency; renewable energy research, development and deployment; reducing greenhouse gas emissions related to agriculture and forestry; landfill management, alternative vehicles, transit orientated development and other measures to adapt to climate change.<sup>96</sup>

The Carbon Tax Policy Paper also sets out a number of environmental flagship programmes related to the energy, transport, water and waste sectors into which the revenue can be channelled.

These programs include the Climate Change Response Public Works Programme, Water Conservation and Demand Management, Renewable Energy, Energy Efficiency and Energy Demand Management, Transport, Waste Management, Carbon Capture and Sequestration and Adaptation Research. Government intends on funding these programmes in order to facilitate a transition to a low-carbon economy and provide assistance to firms and low-income households during this transition.<sup>97</sup>

Other existing support measures include free basic electricity, energy efficiency and demand-side management, renewable energy, public transport and the shift of freight from road to rail.<sup>98</sup>

Partially earmarked funds for environmental and social purposes may be critical to promote acceptance of the tax by showing some of the benefits it can provide.

Partial earmarking seems sufficient in the sense that it will be in line with public finance principles. However, due to the fact that there are a myriad of environmental problems facing us today as well as a large number of flagship programmes that are in dire need for financing in order to be efficient, it will be necessary to review the budgeting process in order to allocate more funds to environmental expenditure without the full earmarking of tax revenues for environmental expenditure. It will therefore still be necessary for departments to go through the normal budgeting process in order to obtain funds. However, with the advent of the Carbon

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96 Carl and Fedor *op cit* note 82 at 51.

97 Department of Environmental Affairs: National Climate Change Dialogue 12 – 14 November 2014 available at:

[https://www.environment.gov.za/event/deptactivity/2014national\\_climatechange\\_responsedialogue#reports\\_presentations](https://www.environment.gov.za/event/deptactivity/2014national_climatechange_responsedialogue#reports_presentations)

98 National Treasury *op cit* note 47 at 65 – 68.

Tax and the extra revenue generated provision should be made for the partial earmarking of funds for environmental expenditure and associated environmental flagship programmes.

#### 2.2.2.2 Minimizing distortionary taxes

Revenue generated through environmental taxes could be used to decrease other taxes such as the income tax. In such a case, the country would have to move away from taxing ‘goods’ (work, income) that we want to encourage to taxing ‘bads’ (such as pollution) that we want to discourage. This means that we will have to tax the activities that we want to discourage. In this case the tax rate would have to be sufficient enough so that government expenditure remains the same, this will mean that the tax burden will have to stay the same – it is only collected from a different source. This idea is also known as ‘tax shifting’.<sup>99</sup>

Closely related to tax shifting is the practice of ‘revenue recycling’. Recycling revenue entails that the funds are directly returned to the population through tax cuts, tax eliminations or rebates in order to offset the aggregate negative impacts of higher energy costs due to the Carbon Tax.<sup>100</sup>

Without an element of revenue recycling, carbon taxes could become regressive. This is due to the fact that the after-tax income of low income earners are reduced by a greater percentage than those of high income earners.<sup>101</sup>

#### 2.2.2.3 Adding revenue to the general fiscus

In this case Government does not ascribe the Carbon Taxing revenues to funding of any specific programmes or purposes. They form part of all the other taxes collected to be distributed in accordance with the normal budgetary process.<sup>102</sup> As stated under paragraph 2.2.2.1, adding revenue generated from environmental taxation into the general expenditure pot without a specific earmarked option is in line with sound fiscal policy.

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<sup>99</sup> Baranzini, Goldemberg & Speck *op cit* note 92 at 400

<sup>100</sup> Carl and Fedor *op cit* note 82 at 51.

<sup>101</sup> The Davis Tax Committee *op cit* note 7 at 11.

<sup>102</sup> Ibid at 51.

## Concluding Remarks on the use of revenues

It is therefore submitted that environmental related taxes do have significant revenue generating capability, however it is the application of revenue that forms the subject of much debate. On the one hand, the revenue could be used to supplement the general fiscus and fund general expenditure. If used in this way some of the revenue might find its way to the environmental departments for use on environmental expenditure programs. In this scenario, only a small amount of the total revenue from environmental taxes will be used to enhance and protect the environment as per the environmental expenditure programs. The tax might therefore run the risk of becoming another tax base for raising the general revenue with no serious application of the revenue to the environment.<sup>103</sup>

On the other hand, there is the view that revenue generated from environmental taxes should be used primarily or solely for environmental expenditure. A tax levied on environmental goods should only be regarded as a fiscal incentive for environmental protection where the revenue is applied for environmental purposes, or where there is at least a partial objective to protect the environment.<sup>104</sup>

If the idea behind the tax is to pay for damage done to the environment then that revenue would serve a greater purpose if invested in rehabilitating and improving the environment, environmental research, emission abatement technology, cleaner methods of production and of course renewable energy. The revenue would also be suited to mitigate costs incurred by low income households because of the tax.

In global terms, Carbon Tax revenues are primarily returned to taxpayers through tax cuts and rebates. It is estimated that 44% of revenue are returned to taxpayers, 28% are used to supplement general government funds and a meagre 15% are used for green spending.<sup>105</sup>

It could very well be argued that earmarking for environmental expenditure will serve the broader public interest. Most of the flagship programmes may not have a direct link to environmental expenditure but they will provide environmental benefits in the medium to long term.

Out of the Preamble of the Draft Carbon Tax Act it is clearly stated that the aim of the tax is to reduce GHG emissions, the tax would only be a halfhearted attempt if the revenue it

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103 Rumble, Gilder & Parker *op cit* note 24 at p 20-41.

104 Henderson *op cit* note 39 at 57

105 Henderson PGW 'Fiscal Incentives for Environmental Protection – Conceptual Framework' 1995 1 *SAJELP* 54 – 56.

generates in the process of curbing GHG emissions is not invested to gain even more reductions.

Funding these flagship programmes will provide other benefits in the sector to which they apply such as innovation and job creation and it cannot then be said that the revenue is purely used for environmental expenditure. The Programmes are aimed at improving their applicable sectors and this way more departments will be benefitted by the revenue.

It would be amiss if environmental expenditure did not increase with the newly generated revenue stream created by the Carbon Tax. Using the revenue in a way that it will provide the most benefits, socially and environmentally, is a crucial aspect in the design of an effective Carbon Tax. It is therefore imperative that government or the entity that administers the Carbon Tax pay more attention to how the revenue will, can and should be applied. At this point in time Carbon Tax Policy and Draft legislation does not provide a sufficiently detailed answer as to how the tax revenue will be used to benefit the general public or the environment.

The recently published Draft Carbon Tax Bill itself is silent on the application of funds generated by the Carbon Tax. However, in the memorandum published with the draft bill it is noted that:

“The Carbon Tax will be revenue-neutral during the first five years and all revenue will be recycled by way of reducing the current electricity levy, credit rebate for the renewable energy premium, a tax incentive for energy efficiency savings, increased allocations for free basic electricity, alternative energy and funding for public transport and initiatives to move some freight from road to rail.”<sup>106</sup>

The position adopted in the memorandum to the Carbon Tax Bill seems to indicate that the revenue will be spent in line with how Carbon Tax revenue is spent in other jurisdictions; a large part will be returned to taxpayers through rebates and reducing other taxes, levies and allocations for free basic electricity. It also indicates that revenue will be applied to ‘green’ initiatives such as alternative energy and transport initiatives. At this instance, a more detailed explanation is needed as to how tax revenues will be divided between them.<sup>107</sup>

## **2.3 Support for the tax**

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<sup>106</sup> National Treasury *op cit* note 18.

<sup>107</sup> Davis tax Committee *op cit* note 7 at 24 – 25.

Any form of government intervention or legislative reform requires the support of the population and the support of the persons most likely to be affected by the said intervention. This is especially true for taxes since it will have financial implications for the general populace. Government cannot operate without the consent and support of those they govern. It is therefore imperative that there be support for environmental fiscal reform measures, especially when they are tax reform measures that will be accompanied by financial implications.

Support for environmental fiscal reform measures can be influenced by a myriad of factors. The existence of other taxes and levies paid to government – if there are too many or too expensive other taxes it would be hard for government to find support to further burden the population with additional taxes. The current state of the economy should also be kept in mind, in harder financial times it would also be harder to garner support for further expenses. Closely related to these factors is the tax rate, a lower rate would be more acceptable but it could compromise the environmental effectiveness of the tax since its behavior influencing potential could be subdued. A higher tax rate could achieve the desired environmental goals but to the detriment of the taxpayers. A very important consideration for the tax will therefore be the tax rate. However, this problem has mostly been addressed by the proposed tax-free thresholds as discussed in chapter 2.1.2. above and will be further discussed in chapter 2.5 below.

Corruption at Government level and the financial state of Eskom should also be kept in mind. The biggest impact that the Carbon Tax will have is through an increase in electricity prices. Eskom is South-Africa's largest State-Owned Enterprise (SoE) and it produces almost 95% of the total electricity in the country.

To date there has not been much support for the tax in South Africa, a quick look at news articles indicates the general consensus of industry regarding the tax.<sup>108</sup> The tax should have been implemented in the beginning of 2015 but its date of implementation has been extended to 2017 and thereafter extended once more to 2018. The reason being that there are still some aspects of the tax that needs further clarification. Support for a half-baked idea will be hard to come by.<sup>109</sup>

Educating people about the tax regarding how it will work, its implications for individuals and firms, what it tries to achieve, the current state of the environment and why it

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<sup>108</sup> <http://mg.co.za/tag/carbon-tax>

<sup>109</sup> McNamara A & Curran P *Carbon Tax Will Motivate Change* <http://mg.co.za/article/2013-03-06-carbon-tax-will-motivate-change>

is necessary that individuals and firms pay for the privilege to pollute the environment could help garner some much-needed support for the tax.

Taxes has never been very popular but they are necessary for the provision of public services. Introducing tax reforms would be much easier if there is widespread support for the idea, there would also be better compliance with the tax. It is important to identify persons that will be negatively influenced by the tax to try and reduce such impacts. Taxes should be applied in such a way that it builds and progresses instead of being regressive. They are indeed a necessary evil.<sup>110</sup>

## **2.4 Legislative Aspects**

The Minister of Finance through the National Treasury is the responsible authority tasked with tabling tax legislation together with SARS. This includes policy papers. It was indeed the National Treasury who was responsible for both the 2011 and 2013 Carbon Tax policy papers as well as the Framework for assessing environmentally related taxes. These papers eventually led to the publication of the Draft Carbon Tax Bill on 2 November 2015 by the National Treasury which was updated in 2017. The treasury is also responsible for legislation ancillary to the Carbon Tax Bill. As an example, on 20 June 2016, it published the Draft Regulations for Carbon Offsets.<sup>111</sup> These Draft Regulations were made in terms of the Draft Carbon Tax Bill.

The National Treasury has therefore had a hand in the creation of a Carbon Tax regime for South Africa from the outset. This is in line with our sound constitutional principles which states that the Minister of Finance is responsible for tabling legislation that imposes taxes.<sup>112</sup> This is also an ideal situation in the sense that the Government departments that is responsible for tax collection and distribution is also responsible for drafting of tax legislation. It should also be kept in mind that Carbon Taxes are firstly an environmentally related tax and therefore there would be a myriad of departments, persons and firms that would need to be consulted in drafting the legislation. Since the Carbon Tax will affect such a vast array of areas such as the environment, economy, business, electricity generation, mining, transport and international trade to name but a few, the drafters and implementers of the tax should ensure that all voices and concerns are heard.

In order to enable the fiscal system to provide adequate environmental protection it is submitted that taxation law should be coordinated with other legislation. Amending the current

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<sup>110</sup> National Treasury *op cit* note 34 at 60.

<sup>111</sup> National Treasury: Documents for public comments: [http://www.treasury.gov.za/public\\_comments/](http://www.treasury.gov.za/public_comments/)

<sup>112</sup> Section 73 and 77 of the Constitution of the Republic of South Africa, 1996.

tax structure can be as effective in protecting the environment as introducing new taxes. The tax structure, if amended, can be used to incentivise environmental protection and move taxes away from distortionary taxes such as the income tax.<sup>113</sup> Tax distortions can be remedied by moving the main source of tax generation away from income taxes or other activities that provide benefits and shifting it to activities which have a negative impact such as polluting activities.<sup>114</sup> In this sense taxes may be shifted to polluting activities where consumers pay a tax for consuming a product in which production causes damage to the environment, the idea being that the total tax burden will be carried by more people and not only by income generating individuals and business. This would have the effect once again that consumers will have to take cognisance of their impact on the environment and change their behaviour to minimize their own tax burden and indirectly provide environmental protection and benefits. They will be indirectly obliged to take account of the consequences their actions have on the environment. Taxes generated in this way could then be used to minimize, but not replace, tax generation from income tax and improve efficiency of the tax system.<sup>115</sup>

If the existing tax structure and tax legislation is modified it would also serve the purpose of efficient tax administration. In South Africa, provision can be made for environmental taxes in the Income Tax Act. The tax could then be effectively administered by an authority which has experience in tax collection and allocation namely the South African Revenue Service (SARS).

Since the National Treasury is already in the process of finalizing the Carbon Tax Act it is submitted that the existing tax legislation will not be amended extensively to provide for a Carbon Tax. It is more likely that existing legislation will be amended to provide support to the Carbon Tax.

## **2.5 Technical and administrative feasibility.**

It is important to evaluate the technical and administrative viability of the tax as it will shed light on the practical application of the tax. This chapter will therefore discuss the practical

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113 Henderson *op cit* note 96 at 57 and Henderson *op cit* note 20 at 52.

114 Dimmer K 'CO<sub>2</sub> Tax: The Dirty Tax' 2011 *Tax Professional* 41.

115 Markandya *op cit* note 36 at 20 – 21, 24.



application of the Carbon Tax and includes a discussion of the taxable commodity, the tax rate, tax evasion, collection costs and compliance costs.

### **2.5.1 Defining the taxable commodity and setting the tax rate**

It is important to adequately define the commodity that will be taxed. It is worth noting that the tax base should be as close to the environmental objective as possible and it should ideally be based on a precise and discretely measurable point of pollution, for a full discussion on this topic see chapter 2.1 above.

After the taxable commodity has been defined and an objective has been defined, it is important to consider how this objective is to be achieved. In this case, the tax rate will be used to achieve the objectives of GHG reductions, raising revenue, and low carbon technological advancements. The tax rate is therefore a critical consideration in the design of the tax.

Ideally the tax rate should correspond to the level of the externality in order to reduce the external costs to a socially optimal level, since it is difficult to estimate and even accurately measure the level of the externality, it is generally not appropriate to use such estimates to define a tax rate. The approach then seems to be that the tax rate should be set at a level that will ensure a specific outcome. The carbon price should therefore be adequate to achieve the specific desired outcome. The outcome first has to be defined before the tax rate can be set.<sup>116</sup>

Since the objective with the tax is to reduce GHG's the tax rate should be closely linked to achieving this objective. The proposed tax rate is set at R120 per ton of CO<sub>2</sub> or its equivalent of GHG emissions above the tax-free thresholds.<sup>117</sup> Given the tax-free allowances discussed in chapter 2.1 above this translates into an initial Carbon Tax rate between R6 to R48 per ton of CO<sub>2</sub> or its equivalent during the first phase of implementation.<sup>118</sup>

Consideration should also be given whether the tax should be phased in over time and increasing the tax rate gradually or whether the intended tax rate should be applied from the outset. This consideration has been addressed through tax-free thresholds and tax-free allowances.

Accordingly, South Africa has adopted an approach that will allow the tax to be phased in over time to give individuals and firms a chance to adjust to the tax. During the first phase

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<sup>116</sup> National Treasury *op cit* note 34 at 60.

<sup>117</sup> S 5 of the Draft Carbon Tax Bill.

<sup>118</sup> National Treasury *op cit* note 18 at 5.

of implementation the tax will be increased at a rate of 10% per annum and after five years the tax would be revised with lower tax thresholds and a revised rate.<sup>119</sup>

This modest initial tax rate could however undermine the ability of the Carbon Tax to gain meaningful reductions in GHG emissions, however it is preferable to let taxpayers adjust to the tax and survive in order for them to implement their own abatement policies and plans. This phase would also allow time for taxpayers to gauge the impact the Carbon Tax will have on them and act accordingly.

This phase could also present the ideal time to collect information about the tax and its implications which could be used to set an acceptable tax rate that corresponds to the level of the externality. Taxpayers can use this phase to invest in low carbon technology and renewables to move away from a complete reliance on fossil fuels. The low tax rate will also be welcoming in these trying economic times.

### **2.5.2 Tax avoidance and evasion**

Tax avoidance and evasion could undermine the effectiveness of the tax in the sense that it could reduce useful GHG reduction gains as well as revenue generation. To avoid this situation, it is important to have a high level of compliance with the tax policy.

In order to achieve high level of compliance the tax should be an instrument which is easy to monitor and enforce. The extent to which avoidance and evasion can be policed will play an important role in compliance. The availability of non-taxable alternatives is also a worthwhile consideration.<sup>120</sup> In general, environmental taxes are more difficult to evade than taxes on labour or income. This is due to the how the tax is designed. A Carbon Tax has certain properties that make it easier to monitor.

The tax base is all ‘Scope 1’ emissions i.e. direct GHG emissions from sources that are owned and controlled by the entity.<sup>121</sup> This means that the entity liable to pay the tax over to the collection agency will be the producer of the pollution. For instance, the entity which burns the coal to produce the electricity.

First, this will ease monitoring as it is less complicated to measure and monitor physical units of energy at supplier level. It will be relatively easy to ascertain how many tonnes of coal has been burned by a certain plant to produce energy.

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119 The Davis Tax Committee *op cit* note 7 at 24.

120 National Treasury *op cit* note 34 at 60.

121 See Chapter 2.1.1 above

Secondly it is easy to monitor how much energy is consumed through existing methods such as meters and bills. Thirdly, it is easier to ascertain the price of energy since the prices are established through the marketplace.

Fourth, energy production produces a variety of pollutants that have a known relationship to the quantity of energy consumed and to the method used to produce the energy.

Finally, since the Carbon Tax will mostly be imposed on producers since they produce the most GHG's, it will limit the number of registered taxpayers and there will be less entities to monitor.<sup>122</sup>

Another factor to consider is the availability of non-taxable alternatives such as low-carbon or renewable energy. The main aim of the tax is a reduction in GHG's, this goal will be easier to achieve if taxpayers could invest in technology and methods that produce energy and other products with fewer and no emissions, thereby reducing their tax burden in the future and the need to avoid the tax.

Therefore, it can be concluded that monitoring an environmental tax could be relatively easy owing to the fact that there are already measuring and monitoring practices in place that could be exploited by collection agencies for the benefit of assessing liability.

The points at which the tax will be collected are also fewer than in the case of existing taxes such as income tax. Since most of our GHG's are released from energy producing activities such as the burning of coal by Eskom, it will be relatively easy to monitor compliance. This situation makes the Carbon Tax hard to evade.<sup>123</sup>

Therefore, the tax only has to be collected from the point of pollution or GHG producing entity and not the consumers, the tax is filtered through to the consumers by the higher prices of taxed products and this system provides less opportunities for evasion. It has been argued that Carbon Taxes are so hard to evade, that by moving away from an income-oriented tax base system, to a system based on a pollution tax, tax evasion would decrease in general.<sup>124</sup>

### **2.5.3 Collection and compliance costs**

A very important aspect to be considered when designing and implementing new taxes is of course the administration cost of the tax. Time and labour will have to be spent to administer

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122 Liu AA 'Tax Evasion and Optimal Environmental Taxes' *Resources for the Future and Cheung Kong Graduate School of Business* September 8 – 9.

123 Ibid at 10.

124 Ibid at 18.

the tax once implemented and of course this will cost the state money. Avoidance and evasion as discussed above could also have an influence on the costs of the tax. To curtail these problems, it is suggested that there should be as few statutory taxpayers as possible, existing collection agencies with experience should be responsible for collecting the tax and evasion opportunities should be minimised.<sup>125</sup>

In this instance, the drafters of our Carbon Tax saw the benefits of having as few as possible statutory taxpayers. This is largely due to the fact that GHG's will be taxed at the source. This in turn will increase the ease of collecting the tax as less time and labour will have to be spent thereon. As discussed above this will also lead to fewer cases of tax evasion since there is such a small number of taxpayers to monitor.

Another instance where the drafters got it spot on was when it was announced that the primary entity that will be responsible to administer the tax will be SARS. They will be supported by the Department of Environmental Affairs in terms of monitoring, reporting and verifying emissions.<sup>126</sup> Collection costs will of course be influenced by the entity responsible therefore, to reduce this cost the existing tax administration systems should be used due to their experience and expertise.

It can therefore be concluded that the tax was designed in such a way that it minimises avoidance and evasion, it is easy to monitor and it will not be expensive to administer. This will in turn also provide the most revenue. This is all due to the fact that the number of statutory taxpayers are kept to a minimum. This in turn improves the administrative feasibility and practicality of the tax system.

Compliance costs for taxpayers is another factor that should be considered. Entities that are liable for the tax will need to submit their tax returns based on their own assessment of the emissions they produce.<sup>127</sup> This emphasis on self-assessment would of course incur extra costs since professionals or equipment would have to be obtained in order for taxpayers to measure their liability. Compliance costs would therefore have to be kept to a minimum.

These costs can be curtailed through sharing information about emission factors linked to certain substances and processes. As stated in chapter 2.1.1 above, there are numerous initiatives that were undertaken by the state in coalition with the private sector to determine the emission factors for certain processes.

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125 National Treasury *op cit* note 34 at 62.

126 National Treasury *op cit* note 18 at 6.

127 National Treasury *op cit* note 18 at 10.

## **2.6 Competitiveness, distributional and economic effects of the tax**

The proposed Carbon Tax will ultimately have an economic impact on the industries and persons subject to the tax. In the context of the Carbon Tax it will be trade-exposed firms who cause to emit GHG's as a consequence of their economic activities that could face adverse competitiveness effects.<sup>128</sup> At its core the tax is designed to influence economic behaviour. The tax therefore has to be designed in such a way as to be able to mitigate the negative economic impacts that the behavioural change will have on the competitiveness of local industries.<sup>129</sup>

Apart from the impact it will have on local industry, the tax will also have implications for persons and groups of persons. Although the tax will be felt by a large number of people through the increased price of goods and services, to some, the impacts will be more severe, especially low-income households. To understand the impact the tax will have on different income groups, one has to assess the effective tax burden as well as the impact the tax will have on our economy.<sup>130</sup>

The key to understanding the economic impacts that will accompany the tax is to assess who will effectively carry the burden of the tax. This discussion will therefore focus on which entities will carry the burden of the tax as well as the impacts the tax will have on firms and people and the South African economy.

### **2.6.1 Bearing the burden of the tax – the Polluter Pays Principle**

The question of who literally has to pay the tax has been answered in chapter 2.5 above. However, this does not answer the question of who will be bearing the burden of the tax. The point where the tax is legally assessed and collected differs from who will actually carry the burden or be directly affected by the tax.

In this context there are two options; firstly, it can be argued that it is the consumer itself that should pay the tax, secondly, the tax burden should be passed down the supply chain of the producers of the taxed product.<sup>131</sup>

Given the fact that electricity prices are due to rise and the structure of the electricity sector, taxes could be passed on to the consumer. This is problematic since the electricity price is already subject to levies, in essence there would then be double taxation. Although, with the

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128 The Davis Tax Committee *op cit* note 7 at 12.

129 National Treasury *op cit* note 34 at 62.

130 National Treasury *op cit* note 34 at 63.

131 National Treasury *op cit* note 34 at 62.

low rate at which the Carbon Tax will be introduced and the exemption thresholds it could be argued that double taxation would be negligible.

Restructuring of the electricity price with the Carbon Tax and electricity generation levy in mind is a potential solution. However, restructuring should ensure that large emitters, producers and consumers improve their energy efficiency to reduce emissions. Care should be taken that restructuring does not allow them to avoid the intent and impact of the tax and the levy.<sup>132</sup>

The question of who should be responsible for carrying the burden can be answered by applying the polluter pays principle. This principle entails that *those responsible for harming the environment must pay the costs of remedying pollution and environmental degradation and supporting any adaptive response that may be required.*

In terms of environmental taxation, the principle is defined as follows:

‘the principle according to which the polluter should bear the cost of measures to reduce pollution according to the extent of either the damage done to society or the exceeding of an acceptable level (standard) of pollution’<sup>133</sup>

This is an internationally accepted principle which first appeared in the international environmental law sphere in 1972 and thereafter frequently featured in international environmental policy.<sup>134</sup> The principle is also accepted in South Africa where it features as an underlying principle to our environmental law regime<sup>135</sup> and it also an underlying principle to our national response to climate change.<sup>136</sup> It has also been stated that the Carbon Tax has been developed along the polluter pays principle<sup>137</sup> and it does feature in the preamble to the Draft Carbon Tax Bill.<sup>138</sup>

In theory, regarding Carbon Taxes, the principle promotes the efficient use of natural resources through internalising external environmental costs and adding to the price of harmful

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132 The Davis Tax Committee *op cit* note 7 at 26.

133 OECD *Glossary of Statistical Terms*, available at <http://stats.oecd.org/glossary/detail.asp?ID=2074>, accessed on 7 September 2017.

134 Pearce D ‘The Polluter Pays Principle’ Gatekeeper Series, *London Environmental Economics Centre* 1989 1 – 2.

135 National Environmental Management Act Section 2(4)(p).

136 Department of Environmental Affairs *op cit* note 95 at 12.

137 National Treasury *op cit* note 18 at 2.

138 National Treasury *op cit* note 4 – 5.

goods in an effort to drive down demand in order to secure economic and environmental sustainability.<sup>139</sup>

What the principle suggests seems simple, the entity who is responsible for the pollution should be the one responsible for remedying such pollution. The principle entails that persons and firms should be held responsible for their actions.<sup>140</sup>

The principle can be interpreted that it should be the producer of the GHG who should be liable since they are producing the polluting substance. On the other hand, it can be interpreted that it should be the consumer who is responsible to bear the burden of the tax for without their demand there would be no reason to produce.<sup>141</sup> Both arguments are correct to a certain extent since it is both the producer and consumer who cause the pollution. The consumer contributes by its demand and thereby creates an incentive to produce, the producer contributes by its emission intensive production methods. Following this argument and the fact that one of the objectives of the tax is to encourage behavioural change through economic incentives a case can be made out that the tax burden should be proportionately attributed to the pollution caused.

If the underlying rationale of the polluter pays principle is to encourage polluters to take cognisance of their environmentally harmful activity and producing a channel for them to change their behaviour, then the tax should be applied to all polluters. If a firm is allowed to just pass on its tax burden to consumers, then there is no incentive for them to change their behaviour. There will be less reason for them to invest in cleaner technology. On the one side industry needs to get its act together by investing in low-carbon technology and on the other side consumers should place a cap on their demand. These results will only be achieved if all role players are forced to take recognition of their action.

So, who will ultimately bear the burden of the tax? As stated above it is not clear cut who will be responsible but according to the interpretation of the polluter pays principle it should be the polluter, the polluters that directly pollute as well as those who indirectly pollute through their demand. Since both producers and consumers are responsible for the pollution both should carry the burden relative to their contribution. The polluter pays principle is an extension of the principles of fairness and justice and responsibility for environmental damage should therefore be attributed proportionately to those responsible.<sup>142</sup> Unfortunately, the

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139 Jean-Philippe Barde and Oliver Godard *op cit* note 14 at 33.

140 Cordato RE 'The Polluter Pays Principle: A Proper Guide for Environmental Policy' *Institute for Research on the Economics of Taxation 2001 Studies in Social Cost, Regulation and the Environment*: No. 6. 1.

141 Pearce *op cit* note 129 at 3.

142 Cordato *op cit* note 140 at 1.

Carbon Tax policy in South Africa does not make it clear who will ultimately be responsible for paying the GHG's.

The lack of direction in this regard leaves the door open for industry to pass on the tax burden to consumers in the form of higher prices and thereby avoid liability. As stated, this situation is not ideal since responsibility can be shifted disproportionately to one side of the polluting equation. This could create an industry mindset that they could merely pass on their tax liability and thereby exclude themselves from GHG mitigation efforts. Knowing who will be footing the bill even before the tax is implemented will help industry prepare for any negative economic effects.

I submit that this is an important factor to be considered at this early stage by the drafters of the Carbon Tax as it could directly affect the effectiveness of our climate change mitigation regime. Further clarity and direction is therefore needed in this regard.

## **2.6.2 Competitive impacts on local industry**

Above it was explained that if it was known who would be bearing the burden of the tax, industry could be better prepared for some of the negative economic effects the tax will have on their competitiveness. Under this heading, the discussion will focus on the measures in place to mitigate some of the negative economic effects brought on by the tax. The discussion will include mitigation measures available to firms competing in the domestic market as well as internationally.

### **2.6.2.1 Firms competing in the domestic market**

Firms competing domestically will be in a position to pass on its tax burden to its consumers in the form of higher prices. The extent to which the burden can be passed to consumers will depend on the price elasticity of demand<sup>143</sup> of the product or service being taxed as well as competition from imports.<sup>144</sup> Another factor to consider is the availability of investment in low-carbon technology. The additional production costs imposed by the tax could spur industry to adopt technology that could decrease their overall tax burden by decreasing emissions. This provides benefits to the firm in that they will be more competitive due to them mitigating their

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<sup>143</sup> 'Price elasticity of demand' is discussed in Chapter 3.2.1 above.

<sup>144</sup> National Treasury *op cit* note 34 at 63.



tax burden. A further benefit is the increased investment in the low-carbon technology and/or renewable energy industry which will further decrease GHG emissions.<sup>145</sup>

#### 2.6.2.2 Firms competing internationally

Firms subject to the tax and trading in the international markets will be less able to pass on the burden of the tax to their international consumers if they were for example competing against firms from other jurisdictions without a Carbon Tax.<sup>146</sup> Local industry could also suffer when the products they produce for local consumption are replaced with products from an international producer who is not subject to a Carbon Tax. Importers would be able to import a product and sell it at a lower rate since the jurisdiction where it was produced is not taxing carbon or they have less carbon intensive means of production, this is a phenomenon commonly referred to as carbon leakage.<sup>147</sup>

Carbon leakage could therefore present a credible threat to the competitiveness of local industry. The most commonly accepted measure to address carbon leakage is through border carbon adjustments (BCAs) or border tax adjustments (BTAs).<sup>148</sup> This measure entails that:

“Border adjustment measures aim to remove the cost advantage of imported goods produced under less stringent climate change policies by levying a tariff on imported goods equal to the differential between the local price of carbon and the price on carbon in the country where the imports originated. Alternatively, importers may be required to surrender permits or certificates equal to the value of the carbon embodied in imports, which will then in turn lead them to require exporters to provide the required permits/certificates so as to not impact on their margins.”

This entails that countries taxing carbon can levy a fee on goods imported from other countries without a Carbon Tax. This levy will be equal to the difference in the importing countries Carbon Tax and the exporting countries Carbon Tax should the importing country have a higher tax rate. It is further suggested that in order to keep internationally competing firm's competitive certain mitigation measures should be implemented.<sup>149</sup> These measures include:

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145 Cloete & Robb “Carbon Pricing and Industrial Policy in South Africa” in Winkler, Marquand & Jooste (eds) *Putting a Price on Carbon: Economic Instruments to Mitigate Climate Change in South Africa and Other Developing Countries* 21.

146 National Treasury *op cit* note 34 at 62 – 63.

147 Cloete & Robb *op cit* note 145 at 20.

148 The Davis Tax Committee *op cit* note 7 at 12.

149 National Treasury *op cit* note 34 at 63.

reduced tax rates, tax ceiling and exemptions,<sup>150</sup> tax refunds and recycling of revenue,<sup>151</sup> gradual implementation and phasing in of the tax instrument,<sup>152</sup> border tax adjustments, tax harmonisation, and financial assistance.<sup>153</sup> Fortunately, the proposed Carbon Tax integrates all these mitigation measures into its design. These measures will also provide benefits to firms competing in domestic markets.

Since the tax will definitely have an impact on firms and persons it follows that the tax will also affect our economy. Many opposing the tax will usually fall back on the argument that more expenses, taxes or otherwise, are bad for business. Although their argument cannot be denied, most research illustrates that the long-term impacts are not as negative as believed. The proposed mitigation measures are a welcome addition to the tax as it aims is to keep firms afloat during the implementation phase of the tax.

### **2.6.3 Low income households**

Another important aspect of the tax design and one that could affect the acceptability of the tax is the impact that the tax will have on low income households. This is due to the fact that lower income households spend a larger proportion of their income on energy than other income groups. The tax could therefore have a regressive impact on such households. The impact the tax will have on low income households depends on the product being taxed and the measures in place to mitigate those impacts.<sup>154</sup> In some studies, it has been found that the effect of the tax on low income households can be linked to domestic energy use and transport. Since the Carbon Tax will lead to price increases GHG emitting products it is accepted that the price of electricity and fuel will inevitably rise.<sup>155</sup> It has also been argued that the same tax that could have a negative impact on low-income households can be progressive since the goods produced by energy-intensive sectors are bought by higher income households.<sup>156</sup>

The rise in electricity and fuel prices would leave lower income households vulnerable to regressive effects of the Carbon Tax in the absence of viable alternatives. It has been suggested that the problem regarding fuel prices could be resolved through safe and affordable

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150 Discussed in Chapter 2.1.2 above.

151 Discussed in Chapter 2.2 above.

152 Discussed in Chapter 2.5.1 above.

153 Rumble, Gilder & Parker *op cit* note 24 at p 20-7.

154 The Davis Tax Committee *op cit* note 7 at 15.

155 Zhang ZX and Baranzini A 'What do we know about Carbon Taxes? An Inquiry into their impacts on competitiveness and Distribution of Income' *Energy Policy* 32 (2004) 511

156 The Davis Tax Committee *op cit* note 7 at 11.

and reliable public transport which could encourage middle income households to switch from private to public transport.<sup>157</sup>

The revenue recycling option could also be explored as a further option to relieve some of the impacts the tax would have on households, although the draft Carbon Tax Bill does make some provision, it is unfortunately not very clear on how exactly the revenue will be used to mitigate the impact.<sup>158</sup> The effect that the tax will have on lower income households should therefore be considered further by the drafters of the Carbon Tax legislation.

## **2.7 Conclusion**

At the start of this chapter the question regarding the Carbon Taxes' suitability to address the environmental issue of climate change was posed. The above chapters attempted to answer this question by evaluating the proposed tax against the criteria for evaluating environmentally related taxes.

The evaluation has shown that the proposed Carbon Tax covers most GHG emitting processes. Most GHG emitting processes and indeed the most prevalent processes will be subject to the tax. That being said, the tax offers high tax-free thresholds for these processes for the first phase of its implementation. This means that the initial tax rate will be significantly reduced. Although this could reduce the effectiveness of the tax to reduce emissions during this period, it will help industry and business prepare for the full extent of the tax after this phase. This will similarly allow households to prepare.

One very important aspect of the tax that needs to be addressed by the legislature is the use of tax revenue. The tax has the potential to raise a significant amount of revenue. How this revenue is applied is not very clear from the draft Carbon Tax Bill. The most popular use for Carbon Tax revenues are to recycle them back to taxpayers, apply it to general government funds or to use it for green spending – in that order. The draft Bill does give an indication on how the revenue will be used but it does not give any certainty as to how the revenue will be divided. It is also submitted that a large portion of the revenues should be used to mitigate the future impacts of the tax, in this sense revenues should be invested in low-carbon and renewable energy. The South-African Renewable Energy Independent Power Project Procurement Program (REIPPPP) and other environmental flagship programmes should be

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<sup>157</sup> The Davis Tax Committee *op cit* note 7 at 22.

<sup>158</sup> The Davis Tax Committee *op cit* note 7 at 28 - 29.

considered as beneficiaries of revenues. Clarity on this issue could also garner some support for the tax which is lacking.

It was also shown that the tax will be technically and administratively feasible. The very much reduced initial tax rate disperses most problems with finding an appropriate tax rate as it will be well below international levels. Since the amount of tax payers will be kept to a minimum and because of the relative ease emissions can be measured or ascertained tax avoidance and evasion can be minimised. Collection and compliance costs can also be minimised as the tax will be administered by the authority which has experience in this field.

It is also very likely that the tax will eventually filter through to consumers. This makes sense in terms of the polluter pays principle and of course if demand needs to be changed it should start with consumers. The problem in the South Africa context is of course that there is a monopoly in the electricity sector, this sector represents the sphere where the tax will have the biggest impact on consumers. The holder of the monopoly is also a State-Owned Enterprise (SoE), namely ESKOM. There is not really much of an incentive for ESKOM to switch to cleaner electricity production methods in these circumstances. If financial troubles hit the SoE because of a reduce in demand due to a change in consumer behaviour as a result of the tax, and it is in any case expected to hit financial trouble even without the tax, it can merely be bailed out with Government funds. The monopoly in the electricity sector might very well be the most significant stumbling block to achieving meaningful reductions.

Initial competitiveness, economic and financial effects of the tax has also been considered through the low initial tax burden as a result of the high tax-free thresholds. Tailor made solutions are however needed for emission intensive industries competing in the international market.

By increasing the prices of carbon intensive goods and services the Carbon Tax has a significant potential to change behaviour and change demand. The reduce in demand will lead to reduced CO<sub>2</sub>e emissions which will contribute to reducing the effects of human accelerated climate change. It is therefore submitted that a Carbon Tax is suited to address the environmental issue. However as stated above there are significant shortcomings that should first be addressed before the tax is implemented in South-Africa.

The next chapter will focus on the carbon pricing mechanism that was once in place in Australia. The aim will be to learn from their experience that could improve the proposed system in South Africa.

### **3. Carbon Taxing in other jurisdictions: Australia**

GHG emissions and its contribution to anthropogenic climate change is a global predicament, therefore South Africa is not alone in the Carbon Taxing arena, several countries have already implemented some form carbon taxing or carbon pricing. These countries include China, Japan, South Korea, Taiwan, Australia, New Zealand, Denmark, Finland, France, Germany, Ireland, Netherlands, Sweden, United Kingdom, Norway, Switzerland, Costa Rica, Canada and certain states in the USA.<sup>159</sup> The list includes economic powerhouses and some of the most prolific polluters today. It is a clear indication of where the world is heading with regards to climate change mitigation. Some European Union countries implemented a climate pricing regime as early as 1990, carbon pricing it is therefore by no means a new or untested mitigation strategy.

This chapter will focus on the carbon pricing regime that was once in place in Australia. There are many reasons why the discussion will focus on Australia. For the most part, it is because Australia has an energy and emission intensive industrial sector. They also produce electricity through burning fossil fuels, most notably, coal. Both of these factors are equivalent with the circumstances in South-Africa. Australia introduced carbon pricing fairly recently. Considering this factor could provide valuable insight into the effects carbon pricing will have in the current political and economic atmosphere. In particular, the challenges the Government faced to introduce a carbon pricing regime. Another interesting factor to take account of is the short lifetime the carbon price had. Studying this aspect could provide valuable insight as to why pricing carbon was so undesirable. Unfortunately, due to the short period of implementation, a study as to the long-term effects of the carbon price is not possible. However, it would provide valuable insights as to the short-term effect of pricing on emission levels, households and the economy.

#### **3.1 Introduction**

Australia falls under the 20 highest GHG emitting countries. The bulk of the country's emissions originate from burning fossil fuels for energy, most notably electricity. During the period of 2008 – 2016, Australia's estimated average total GHG emissions were 544.5 Mt of CO<sub>2</sub>e per year. This is primarily due to the fact that Australia is primarily relies on fossil fuels

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<sup>159</sup> Carbon Pricing Leadership Coalition <https://www.carbonpricingleadership.org/who/> (Accessed on 5 January 2018).

to support the country's energy and industrial sectors.<sup>160</sup> The country has acknowledged that climate change will have a devastating impact on their food production, water supply and economy.<sup>161</sup>

As part of its obligations under the Climate Change Convention and the Kyoto Protocol, Australia will attempt to reduce its GHG emissions to 5% below 2000 levels by 2020 and 80% below 2000 levels by 2050.<sup>162</sup> This has led to Australia introducing a *Carbon Pollution Reduction Scheme* in 2008 which created the framework for an Australian Emissions Trading Scheme (ETS) based on a cap and trade model.

As part of Australia's Carbon Pollution Reduction Scheme, the country introduced a carbon pricing mechanism, this mechanism was broadly referred to as the Carbon Tax. The scheme was introduced through the Clean Energy Act 2011 which came into effect on 1 July 2012.<sup>163</sup> The scheme was intended to operate as a Carbon Tax for the first three years of its implementation whereafter it would operate as a fully functional ETS. During the first three years and in contrast with other emission trading schemes, carbon units could not be traded with other emitters. Since they could not be traded, the units were unlimited. Firms merely purchased carbon units and surrendered an amount corresponding to their emissions, this is similar to how a firm would be liable under a Carbon Tax. The scheme was in operation until it was repealed on 17 July 2014 with effect from 1 July 2014. It therefore never reached the trading stage.<sup>164</sup>

### **3.1.1 Cap and Trade vs Carbon Tax**

As the name suggests, a cap and trade system consist of two elements, cap and trade. The cap is the limit placed on GHG emissions. The system attempts to secure an environmental outcome by placing a limit on the amount of emissions allowed. The available emissions are then given a price and they are sold. They can also be traded with other emitters, domestically or internationally. This will create a market that would possibly ensure that emissions are reduced to the lowest price possible.<sup>165</sup>

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160 The Australian Government Department of Climate Change and Energy Efficiency *Securing a Clean energy Future: Implementing the Australian Governments Climate Change Plan* 1.

161 Australian Government Department of Climate Change *Carbon Pollution Reduction Scheme Green Paper Summary* iii.

162 Department of Climate Change and Energy Efficiency *op cit* note 160 at 5.

163 Australian Clean Energy act 2011 ss 2 and 4

164 Australian Governemnt Department of Environment and Energy *Repealing the Carbon Tax*, available at <http://www.environment.gov.au/climate-change/repealing-carbon-tax>, accessed on 19 May 2017

165 Australian Government Department of Climate Change *op cit* note 161 at 12.

In contrast to a Carbon Tax, a cap and trade system provides certainty as to the amount of GHG reductions that will be secured. However, the price of emissions will fluctuate since there is no certainty as to what the price will be from year to year since the price is determined by the market.<sup>166</sup>

A cap and trade system will also not work where there is a monopoly on certain emission intensive processes. As an example: electricity production is responsible for the bulk of GHG emissions in both South-Africa and Australia. However, in South Africa electricity is produced by a single state-owned entity namely, ESKOM. In Australia electricity production is privatised and there are many companies that produce electricity alongside state owned producers, the market is referred to as the National Electricity Market (NEM). For a ETS, this provides a healthy market for trading emission units since there are many buyers and sellers for carbon units.

Although there are many differences between Carbon Taxes and Emission Trading Schemes, they both attempt to internalise the external costs associated with pollution. Both attempt to influence consumer and producer behaviour through the price mechanism and both attempt to secure investments in low carbon technology.<sup>167</sup>

### **3.1.2 Objects of Australia's Carbon Pricing Mechanism**

The object of their Carbon Tax is not much different to the objectives found in the preamble of the South-African Draft Carbon Tax Bill. It aims to give effect to their obligations under the Kyoto Protocol and the UNFCCC; support the development of a global response to climate change; reduce GHG emissions; put a price on emissions in a way that will provide benefits to jobs and clean technology.<sup>168</sup>

### **3.2 Australia's Emissions Profile**

As will be seen below, most of Australia's GHG's originates from the Energy sector which includes electricity generation, stationary energy, transport and fugitive emission. In 2016, electricity generation accounted for 35% of Australia's total emissions.<sup>169</sup> Electricity generation has been the largest source of emissions since 2008 and has historically been

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166 Rumble, Gilder & Parker *op cit* note 24 at p 20-14.

167 Australian Government Department of Climate Change *op cit* note 161 at 13.

168 Clean Energy Act 2011 ss3

169 Australian Government: Department of the Environment and Energy Quarterly Update of Australia's National Greenhouse Gas Inventory: June Quarter 2016 9.

responsible for more than 30% of total GHG emissions per year. Most of the energy produced in Australia is as a result of burning fossil fuels including natural gas. In contrast to South Africa, Australia's electricity is produced by national and private producers. They therefore do not have an oligopolistic market. The following tables and charts sourced from different official sources sets out Australia's estimated CO<sub>2</sub>e emissions for the years 2007 – 2016.

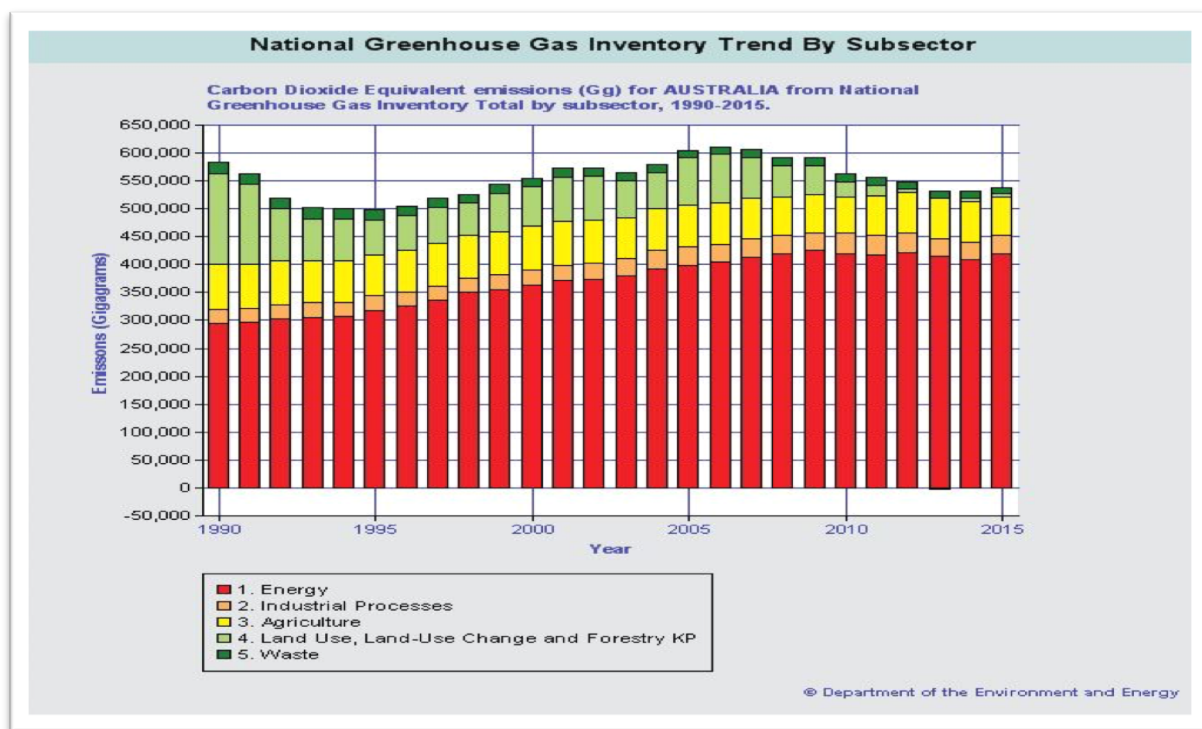
Table 4: Australia annual estimated Mt CO<sub>2</sub>e emissions for the years 2007 - 2015:

Sector	2007	2008	2009	2010	2011	2012	2013	2014	2015
Energy	412,668	418,913	424,992	420,423	417,066	422,325	414,252	408,582	419,575
Industrial Processes	34,393	34,578	32,318	35,363	35,941	33,835	32,490	32,399	32,327
Agriculture	71,272	68,047	68,448	66,449	71,227	72,443	72,734	72,801	70,011
Land Use, Land-Use Change and Forestry KP	73,128	54,940	52,084	26,633	17,717	6,448	-1,853	4,902	4,567
Waste	14,205	14,674	14,598	14,923	14,308	12,654	11,847	12,008	11,367
<b>Total:</b>	<b>605,668</b>	<b>591,154</b>	<b>592,442</b>	<b>563,792</b>	<b>556,261</b>	<b>547,707</b>	<b>529,472</b>	<b>530,694</b>	<b>537,850</b>

Source: Australia's National Greenhouse Gas Inventory

Figure 1: Australia annual estimated Mt CO<sub>2</sub>e emissions per sector for the years 1990 – 2015:





Source: Australia's National Greenhouse Gas Inventory

Table 5: Australia annual estimated Mt CO<sub>2</sub>e emissions from June to June for the years 2007 – 2015. It should be noted that emissions from Land Use, Land Use Change and Forestry are excluded from the following table.

Sector	2008 <sup>170</sup>	2009	2010 <sup>171</sup>	2011 <sup>172</sup>	2012 <sup>173</sup>	2013 <sup>174</sup>	2014 <sup>175</sup>	2015 <sup>176</sup>	2016 <sup>177</sup>
Energy – Electricity	203	204	201	194	194.2	181.3	179.4	186.1	189
Energy – Stationary Energy excluding electricity	93	90	90	94	93.5	92.8	93.1	94.4	98.2
Energy – Transport	80	79	84	86	87.4	93.5	92.1	92.7	93.4
Energy – Fugitive emissions	39	39	42	42	40.9	44.7	45.2	37.9	40.7
Industrial processes	31	29	31	33	30.9	30.4	31.7	31.9	34.1
Agriculture	90	89	85	83	90.1	90.5	87.9	81.2	67.3
Waste	15	15	15	14	14.1	12.6	13.2	12.7	12
<b>Total</b>	<b>551</b>	<b>544</b>	<b>548</b>	<b>546</b>	<b>551.0</b>	<b>545.9</b>	<b>542.6</b>	<b>537.0</b>	<b>534.7</b>

Like South Africa, producing energy and in particular electricity, is responsible for the bulk of GHG emissions. This is because both countries have vast coal reserves and primarily rely on burning coal to generate cheap electricity. Because of these high emissions, this sector presents the largest opportunity for emission reductions.

In the Australian scenario, changes in electricity demand and supply is the most cost-effective method to secure emission reductions. This is due to current existing low-carbon technologies which consumers and producers of electricity can incorporate to effectively

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170 Australian Government: Department of Climate Change *Quarterly Update of Australia's National Greenhouse Gas Inventory*: June Quarter 2009 3.

171 Australian Government: Department of Climate Change and Energy Efficiency *Quarterly Update of Australia's National Greenhouse Gas Inventory*: June Quarter 2010 6.

172 Australian Government: Department of Climate Change and Energy Efficiency *Quarterly Update of Australia's National Greenhouse Gas Inventory*: June Quarter 2011 6.

173 Australian Government: Department of Climate Change and Energy Efficiency *Quarterly Update of Australia's National Greenhouse Gas Inventory*: June Quarter 2012 4.

174 Australian Government: Department of Climate Change and Energy Efficiency *Quarterly Update of Australia's National Greenhouse Gas Inventory*: June Quarter 2013 3.

175 Australian Government: Department of the Environment *Quarterly Update of Australia's National Greenhouse Gas Inventory*: June Quarter 2014 6.

176 Australian Government: Department of the Environment *Quarterly Update of Australia's National Greenhouse Gas Inventory*: June Quarter 2015 6.

177 Australian Government: Department of the Environment and Energy *Quarterly Update of Australia's National Greenhouse Gas Inventory*: June Quarter 2016 6.

mitigate the costs of the carbon price. In the short term, most emission reductions are achieved by mitigation efforts of consumers through the use of solar panels, energy efficient appliances and changes in consumption patterns. Changes on the supply side take more time since it is a much bigger project to construct the low-carbon electricity production facilities needed to diversify the electricity supply portfolio. However, studies have shown that by 2050 an estimated 81% of abatement in the electricity sector could come from the supply side.<sup>178</sup>

These reductions in the electricity sector is very much dependent on the availability of low-carbon technologies and alternatives to coal-fired electricity, such as gas, for consumers and producers. Funding for low-carbon technologies is therefore a design aspect that needs to be thoroughly considered. This also means that to truly assess the impact that a carbon price would have on emission reductions it would have to be implemented for longer than the two-year period it was applied in Australia.

### **3.3 Australia's response to climate change**

In response to the accelerated climate change brought on by GHG's, Australia opted to introduce an Emissions Trading Scheme based on the cap and trade model rather than a Carbon Tax. What follows is an exposition of some of the major design features of their ETS.

#### **3.3.1 Legislative framework**

In 2011, a Clean Energy Future Package consisting of 19 pieces of legislation was introduced with the aim to aid Australia in meeting its obligations under the Copenhagen Accord and to encourage investment in low-carbon technology and innovation. The Clean Energy Future Package was based on three legislative pillars<sup>179</sup>:

1. The Clean Energy Act – which establishes a carbon pricing mechanism;
2. Clean Energy Regulator Act – which sets up a body to administer the carbon pricing mechanism;
3. Climate Change Authority Act – this act established the Climate Change Authority to monitor the Package and to provide periodic recommendations to parliament.

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178 O'Gorman M and Jotzo F, "Impact of the Carbon Price on Australia's electricity demand, supply and emissions" *CCEP Working Paper 1411*, Crawford School of Public Policy, The Australian National University July 2014 3 - 4.

179 CDC Climat 'Australia's Clean Energy Future Package: How does it compare with the EU's approach?' *Climate Brief No.*; 15 2.

Australia's legislative framework is in stark contrast to our own. Their carbon tax was regulated by a vast amount of legislation which covers all aspects of the tax in detail. This provides some certainty as to how the tax will function and how one can prepare for its impacts. At this point in time South Africa only has the Draft Carbon Tax Bill and the Explanatory Memorandum published therewith. We will only know the full extent of South Africa's legislative framework when the tax is ready to be implemented and we could expect a slew of regulations after introduction to sort out the kinks in the system. The lack of legislation, draft or final, is unfortunate as it keeps some of the workings of the tax in the dark. The lack of comprehensiveness of South Africa's Draft Carbon Tax Bill is also problematic especially with regard to how the tax revenue will be used.

### **3.3.2 Tax Base and Liability**

In terms of liability, all entities that produced more than 25 000 tonnes of CO<sub>2</sub>e per year had to obtain carbon units. An entity was also liable if it supplied natural gas, imported, manufactured or produced liquefied petroleum gas or liquefied natural gas for non-transport use.<sup>180</sup> The included GHG's were carbon dioxide, methane, nitrous oxide, Sulphur hexafluoride, hydrofluorocarbon and perfluorocarbon.<sup>181</sup>

Carbon units could be purchased from the government or obtained for free as part of industry assistance measures. Entities that emitted more than the aforesaid amount paid for their emissions by surrendering their carbon units. Emissions from using fuel for Household Transport as well as Agricultural and Forestry emissions were not subject to the scheme.<sup>182</sup>

It was estimated that about 500 of Australia's largest emitters will be liable under the scheme.<sup>183</sup> The scheme covered about 60% of all GHG emissions and included sectors such as energy, oil and gas, industrial processes, fugitive emissions processes and waste.<sup>184</sup>

The scheme covered Scope 1 emissions which is defined as:

“emissions of greenhouse gas, in relation to a facility, means the release of greenhouse gas into the atmosphere as a direct result of an

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180 Clean Energy Act 2011 Sections 33, 36B

181 National Greenhouse and Energy Reporting Act 2007 *Definitions: Greenhouse gas*

182 Robson A 'Australia's Carbon Tax: An Economic Evaluation.' *Economic Affairs* Volume 34, Issue 1 at 4.

183 Department of Climate Change and Energy Efficiency *op cit note 160* 7.

184 O'Gorman and Jotzo *op cit note 178* at 2.

activity or series of activities (including ancillary activities) that constitute the facility (Scope 1 emission).”<sup>185</sup>

Scope 1 emissions are also referred to as direct emissions and include:

- emissions produced from manufacturing processes, such as from the manufacture of cement
- emissions from the burning of diesel fuel in trucks
- fugitive emissions, such as methane emissions from coal mines, or
- production of electricity by burning coal.<sup>186</sup>

### 3.3.3 Price

For the first three years, the price per tonne of CO<sub>2</sub>e, paid for by purchasing and surrendering a carbon unit, was fixed with a starting price of AUD23 and increase at a rate of 2.5% per year to AUD25.40 by 2015.<sup>187</sup> Carbon units were unlimited but they could not be traded internationally or banked. This period was used to assess some of the effects the coming ETS would have on the economy.

In contrast to South Africa, Australians were liable to pay the full carbon tax from the outset. Working on averages, AUD 23 was ZAR224 in 2014 and AUD 25.40 was ZAR220 in 2015.<sup>188</sup> South Africa’s proposed tax rate is R120 and with the tax-free allowances and exemptions it will be between R6 and R48 for the first phase of its implementation. Comparatively, South Africa has a very low carbon tax rate, even without allowances and exemptions.

### 3.3.4 Administration of the carbon pricing mechanism

In order to maintain its efficiency and effectiveness, the Australian Government established two statutory bodies to administer and review the pricing mechanism.

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<sup>185</sup> National Greenhouse and Energy Reporting Act 2007: *National Greenhouse and Energy Reporting Regulations* No 127 of 2008 Regulation 2.23

<sup>186</sup> <http://www.cleanenergyregulator.gov.au/NGER/About-the-National-Greenhouse-and-Energy-Reporting-scheme/Greenhouse-gases-and-energy#n2>

<sup>187</sup> Department of Climate Change and Energy Efficiency *op cit* note 160 7.

<sup>188</sup> OFX Group Ltd Yearly Average Rates <https://www.ofx.com/en-au/forex-news/historical-exchange-rates/yearly-average-rates/>

The *Clean Energy Regulator* was responsible for administering the mechanism. It also had ancillary duties such as administering the *National Greenhouse and Energy Reporting Scheme*<sup>189</sup>, the *Renewable Energy Target*<sup>190</sup>, the *Australian National Registry of Emissions Units*<sup>191</sup> and the *Carbon Farming Initiative*<sup>192</sup>. This body was also responsible for educating businesses on the administrative arrangements of the carbon pricing mechanism; assessing emissions data to determine each party's liability; publishing a database of liable or potentially liable entities; allocating carbon units; and monitoring and enforcing compliance with the carbon pricing mechanism.<sup>193</sup>

The second statutory body was the *Climate Change Authority*. This body was tasked with providing the Australian Government with expert advice on key aspects of the pricing mechanism and climate change initiatives. The Authority was headed by scientists and experts in the field of climate change. The body was tasked with assessing pollution caps, pollution levels and the steps taken to meet Australia's emission reduction target. The Authority was dependent and its findings and reports was open to public scrutiny.<sup>194</sup>

In contrast, South Africa is not intending setting up any new bodies to administer the carbon tax. In the bills, policy papers and documents dealing with the tax it has been stated that the tax will be administered by SARS and the Department of Environmental Affairs (DEA). SARS will be the authority tasked with assessing tax liability with assistance from the DEA which will verify reported emissions and implement an accurate system for monitoring, reporting and verifying emissions.<sup>195</sup>

Although South Africa does not set up any new administrative bodies to administer the carbon tax, the existing bodies should be able to administer the tax very efficiently. Using the existing authorities will also result in cost savings since new bodies will not have to be set up.

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189 The National Greenhouse and Energy Reporting (NGER) scheme, established by the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), is a single national framework for reporting and disseminating company information about greenhouse gas emissions, energy production, energy consumption and other information specified under NGER legislation.

190 The Renewable Energy Target is an Australian Government scheme designed to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources.

191 A system designed to meet one of Australia's commitments under the Kyoto Protocol specifically establishing a national registry to ensure accurate accounting of the issuance, holding, transfer, acquisition, cancellation, retirement and carry-over of Kyoto (or carbon credit) units.

192 The Carbon Farming Initiative (CFI) allows farmers and land managers to earn carbon credits by storing carbon or reducing greenhouse gas emissions on the land. These credits can then be sold to people and businesses wishing to offset their emissions.

193 Department of Climate Change and Energy Efficiency *op cit* note 160 at 9.

194 Ibid at 10.

195 National Treasury *op cit* note 18 at 6.

Administration can also be fine-tuned with time. One advantage that Australia has is the *Climate Change Authority* which gives expert advice on climate change initiatives.

### 3.3.5 Industry and Household Assistance

Included in the Australian *Clean Energy Future Package* was a *Household Assistance Package* which included legislation that focussed on providing assistance to households, amending tax laws and amending tax rates. Household assistance was targeted at middle and low-income households to help them mitigate the effect the tax would have on their budgets. These assistance measures provided that more than 50% of the carbon price revenue would be used to assist households through government grants and tax cuts. The payments and tax cuts were intended to be permanent. The carbon price was estimated to have an average impact of A\$ 9.90 per week per household while the combination of assistance measures would be worth an average of A\$10.10 per week per household.<sup>196</sup> They also increased the tax rate for persons earning between AUD\$ 18,201 – 20, 542 and for persons earning AUD\$ 67 001 – 80 000. These income groups represent about 2 million taxpayers.<sup>197</sup>

Although these will not be discussed in this paper, it is worth mentioning the myriad of other household assistance measures that were intended to mitigate the effects of the carbon price, which included an initial grant paid before the price took effect through the *Clean Energy Advance* to: pensioners on *Age Pension*, *Carer Payment* and *Disability Support Pension*; jobseekers who receive allowances such as a *Newstart Allowance*; single parents on *Parenting Payment*; Students and disability support pensioners; Military veterans on income support and compensation payments. The *Clean Energy Supplement* will also provide extra assistance to the aforementioned persons receiving Government payments by providing an annual increase of 1.7% to their annual payments. Single income families where the income earner receives a taxable income between AUD\$68 000 and AUD\$150 000 will also receive assistance. A further *Low-Income Supplement* will also be available to persons who can show that they did not receive enough assistance through tax cuts or other assistance programs. The *Essential Medical Equipment Payment* program will provide assistance to persons with higher than average energy costs because they have to use essential medical equipment at home. The Government also intended to funnel more funds to the Australian Competition and Consumer

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<sup>196</sup> Ibid at 11 - 12.

<sup>197</sup> Robson *op cit* note 182 at 11.

Commission to ensure that businesses do not mislead consumers about the impact of the carbon price.<sup>198</sup>

The Australian Government recognised that the carbon price would change their whole industrial base in order to have their economic growth decoupled from pollution growth. They had to ensure that the country would be ready and able to compete in a global low-carbon economy. In order to protect industry and jobs, the Australian Government implemented a range of programs with the aim to assist businesses and jobs in transitioning to a low-carbon economy and encourage investment in clean energy, technology and innovation. They implemented a *Jobs and Competitiveness Program* to assist internationally exposed industries by providing free carbon permits for emission intensive industrial activities.<sup>199</sup> Unfortunately, free permits that were available to trade exposed sectors were not made available to non-trade exposed businesses that were unable to pass on the cost increases.<sup>200</sup> A *Clean Technology Program* was adopted to provide grants for investment in low pollution technology for food processing firms and metal foundries.<sup>201</sup> The *Steel Transformation Plan* will help the steel industry transform into an efficient, sustainable industry suited for a low carbon economy by encouraging investment, innovation and competitiveness.<sup>202</sup>

For smaller businesses the *Clean Technology Focus for Supply Chains* would provide funding to enhance clean technology focus of industry for supply chains for businesses who wish to improve their competitiveness in the clean technology sector, develop their capabilities and link suppliers with clean technology projects. Small business instant asset write-off would also be increased to help business secure higher tax deductions for costs of eligible assets to increase their cash flow.<sup>203</sup>

The *Clean Energy and Other Skills Package* would provide funding to promote educating tradespeople and professionals about clean energy and other skills that will become increasingly important in a clean energy future. Key professions include: electrocomms, facility managers, engineers and financial managers.<sup>204</sup>

Most electricity in Australia is produced by burning black and brown coal in. A change in demand for electricity due to a carbon price could translate into employment losses in the coal sector. Their Government has therefore taken steps to provide assistance to the coal sector

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198 Department of Climate Change and Energy Efficiency *op cit* note 160 at 13 - 15.

199 Ibid at 19.

200 Robson *op cit* note 182 at 5 - 6.

201 Department of Climate Change and Energy Efficiency *op cit* note at 152.

202 Ibid at 21.

203 Ibid at 22 - 23.

204 Ibid at 23.



through the *Coal Sector Assistance Package*. The Package includes the *Coal Sector Jobs Package* which would provide transitional assistance to the most emission-intensive coal mines. The package also includes the *Coal Mining Abatement Technology Support Package* which will supplement and support the industry's research into technologies and processes aimed at reducing carbon pollution.<sup>205</sup>

In this sense the South African regime falls far short. Australia had comprehensive industry and household assistance measures in place to mitigate the financial impacts the tax would have. The South African regime attempts to mitigate adverse impacts through reducing the tax rate through tax free thresholds and exemptions, however they will only be applied during the first phase of the tax. The closest the South African regime comes to assistance measures is by stating that some of the tax revenue will be used to reduce the current electricity levy, giving a credit rebate for the renewable energy premium, introducing a tax incentive for energy efficiency savings, increasing allocations for free basic electricity, alternative energy and funding for public transport.<sup>206</sup> It is however not stated in clear terms how this will be achieved.

### **3.3.6 Revenue**

All revenue from the carbon price will be recycled to assist households, support jobs and competitiveness, and invest in clean energy and climate change programs as described in 3.3.5 above.<sup>207</sup> It was projected that the value of emission permits would be around AUD\$9 Billion per year for the first three years. This amount does not only include the value of permits actually bought but also free permits. Households would receive about AUD\$5 Billion per year in the form of lower taxes and increased welfare payments. Emission-intensive trade exposed sectors would receive free permits to the value of AUD\$3 Billion per year for the first three years and this amount would decrease over time. Other assistance measures and payments to power producers would will be roughly amount to AUD\$0.5 Billion and AUD\$1 Billion respectively. Over a five-year period, it was estimated that the coal fired power stations would receive cash and free permits to the value of AUD\$5.5 Billion and coal mines would receive the same benefits to the amount of AUD\$1.3 Billion over a six-year period.<sup>208</sup>

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205 Ibid at 20.

206 See 2.2 and 2.6 above.

207 Department of Climate Change and Energy Efficiency *op cit* note 147 at 5.

208 Jotzo F 'Australia's Carbon Price' *Nature Climate Change* 2 (2012) 2.

### 3.4 Outcomes of carbon pricing

Australia's electricity is produced mainly by burning fossil fuels and the bulk of emissions therefore results from producing electricity. It is therefore logical that the carbon price would have a significant impact on Australia's National Electricity Market (NEM). This section will therefore focus on the impact the carbon price had on Australia's NEM. The focus will be on how the price reduced emissions, impacted supply and demand, changed the electricity generation portfolio and emission intensity.

#### 3.4.1 Emissions in the electricity sector

The most significant emission reductions were achieved in the Electricity Sector. As can be seen from the tables above, emissions in the electricity sector started to decline as early as 2011 and continued on a downward trend. This is the same year that the Clean Energy Future Package was introduced, however, the carbon price was not yet operational. It is estimated that between the years of 2011/12 and 2013/14, emissions were down by a total of 10%. It should be noted that although emissions started declining since 2011, electricity demand only started to decline after the introduction of the carbon price.

This decline prior to introduction can be partly attributed to a rise in electricity prices due to upgrading the electricity network. The first time the electricity price changed due to the carbon price was when it was applied in 2012. After this time emissions and demand also fell sharply and continued to do so. In the 2013/14 period, the carbon price had an insignificant impact on electricity prices, this is because emissions intensity in generation fell and the carbon component of the electricity price is dependent on emission intensive generation processes. More efficient processes with reduced emission intensity will attract a reduced carbon price.<sup>209</sup>

A study conducted in 2014 estimated that since the introduction of the carbon price, electricity generated from renewables and gas increased by an estimated 38% and wind generation reached its highest ever level in 2014. Compared to 2011/2012 electricity generated from coal decreased by 11 TWh by 2012/2013.<sup>210</sup> The decrease in coal generation can be attributed to increased operating expenses as a result of the carbon price. The carbon price also influenced demand on the consumer side which lead to less profit for coal-fired electricity generating companies. The increase in renewables also increased competition for coal-fired

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<sup>209</sup> O'Gorman and Jotzo *Cop cit note 178 at 6 - 12.*

<sup>210</sup> Ibid *at 25 - 26.*

generating companies. All these factors lead to coal-fired generators decreasing output or being taken offline, especially if they were older and less efficient.<sup>211</sup>

The decrease of coal-fired generation together with the increase in renewable electricity generation lead to a decline in CO<sub>2</sub> emissions. Compared to 2011/2012, emissions were down 4.5% in 2012/2013. Although emission intensity has been declining since 2008, the decline in 2012/2013 represents the biggest decline on record and the decline continued afterwards.<sup>212</sup>

The carbon price lead to coal-fired generators searching for ways to be more efficient and develop new technologies, some moved from using brown coal to black coal which had a higher energy to emission ratio. In 2012/2013, the carbon price increased Australia's brown coal generators' carbon cost between AUD\$ 28 – AUD\$ 35 per MWh, Natural gas had a carbon cost of around AUD\$ 12 per MWh and renewables did not pay a carbon price. This meant that natural gas and renewable electricity generators could sell their electricity at a higher price with only a small or no increase in generating costs. This made renewable electricity generation more profitable and ensured a decline in the use of coal and an increase in renewable and gas.<sup>213</sup>

Taking the above into account it is clear that a price on carbon can be a significant driver behind changing the electricity generating portfolio of a country to be less emission intensive. However, the price cannot be singled out as the only reason for the change. The availability of alternatives and/or low-carbon technology also plays a significant role. Australia also has a Renewable Energy Target (RET) which is a scheme designed to increase the amount of large-scale renewable energy being delivered to the electricity grid. It should be noted that the carbon price could have had a greater effect on the composition of the generation portfolio if it had not been as short lived. Even the uncertainty regarding its future was enough to reduce its efficacy.<sup>214</sup>

### **3.4.2 Household, business and industrial electricity demand**

#### **3.4.2.1 Household and Business Demand**

It should very well be noted that the carbon price alone was not responsible for the efficiency gains and lower demand which led to reduced emissions. It was estimated that retail residential

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211 Ibid at 26 – 27.

212 Ibid at 31 – 32.

213 Ibid at 32 – 33.

214 Ibid at 28 – 30.

electricity prices rose by 25% in the two years in the two years after introduction of the carbon price of which only 10% can be ascribed to the carbon price.<sup>215</sup>

The rising price of electricity together with other factors were responsible for the change in demand. Other factors include mandated energy efficiency standards, energy efficient appliances and awareness of energy saving opportunities. Consumers proactively reduced their electricity demand by making simple changes such as purchasing energy efficient appliances and simply hanging their clothes out to dry rather than using a tumble dryer. This attributed to a total decline 3-4% decline on consumption between 2012 and 2014. Consumers became more conscious and changed their behaviour accordingly.<sup>216</sup>

In response to the carbon price it was estimated that household and business consumption was reduced between 1.8 TWh and 2.6 TWh in the 2012/2013 period. This reduction is equivalent to between 1.3% and 1.9% of total consumption during the 2012/2013 period.

Knowledge about the coming price also attributed to consumers preparing for the price increase, in the year before its introduction more than 7000 news articles were published about the carbon price. The effect of the carbon price on electricity prices were also frequently highlighted when political parties started contemplating a carbon price to reduce emissions. Consumers therefore had time to prepare and took advantage of this opportunity.<sup>217</sup> Funding was also provided to 33 000 low income households and to 160 local Government and non-profit groups to increase their energy efficiency.<sup>218</sup> Subsidies and feed-in tariff schemes drove solar power installations in households and business, over the carbon price's two-year period, solar generated electricity rose by 190%.<sup>219</sup>

Due to the above, the carbon price has significant potential to influence consumers' behaviour in such a way that emissions are reduced. As canvassed above, demand fell even before the introduction of the carbon price. So strong is its potential as a behavioural change mechanism that even its contemplated introduction secured GHG reductions. Households and business entities were persuaded by the higher electricity price to take steps to reduce their electricity usage, however, these steps cannot be taken without knowledge and low-carbon technology, time to prepare for a price increase and Government financial assistance.

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215 Ibid at 8.

216 Ibid at 17.

217 Ibid at 18-19.

218 Ibid at 19.

219 Ibid at 19-20.

In terms of residential and small business use, a carbon price has a significant potential to reduce emissions. However, the price cannot stand on its own and it has to be supported by ancillary measures.

#### 3.4.2.2 Industrial demand

Australia's large scale industrial sector includes aluminium and steel producers, liquified national gas export facilities, paper and chemical producers, large grid-connected mines and water desalination plants. At the outset, it is important to note that, in contrast to the residential sector, the large scale industrial sector is less responsive to changes in price because it is more complicated, expensive and time consuming to replace large machinery, equipment and production processes.

The commencement, closure or expansion of an electricity-intensive operation also has an impact on demand. Electricity prices paid by large industrial users are also negotiated in private. Due to the aforementioned it is harder to estimate price impacts on emissions in the short-term.<sup>220</sup>

During the time that the carbon price was in operation the industrial electricity prices increased by 24%, it is estimated that 15% of this increase can be directly attributed to the carbon price. Between the years of 2008 – 2014 there was a decline in electricity demand in the industrial sector. This decline can be attributed to rising electricity prices, improvements in energy efficiency, the high dollar, slower economic growth and sectoral shifts in the economy. The decline during 2012/13 and 2013/14 while the carbon price was in operation was larger than the previous years.<sup>221</sup>

Large industrial electricity users made up the majority of entities covered by the carbon price. The carbon price had an influence on decisions regarding energy efficiency improvements, fuel switching, lighting, installing energy-monitoring equipment, renewable or co-generating installations and upgrades to facility equipment. The price focused attention on energy usage and increased the application of energy efficiency measures. It was not only the carbon price that influenced decision making. The behavioural change brought on by the tax was supported by measures such as the *Clean Technology Program* which used revenue from the carbon price to co-invest in projects aimed at reducing manufacturing companies' emission intensity and develop clean technology, processes and services.<sup>222</sup>

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<sup>220</sup> Ibid at 20.

<sup>221</sup> Ibid at 21.

<sup>222</sup> Ibid at 21.

It is worth mentioning that consumption during the 2012/13 - 2013/14 period was also influenced by a number of emission intensive operation closures which reduced consumption by an estimated 6TWh. The carbon price was not a factor behind the closure of these operations although it did influence the timing.<sup>223</sup>

In response to the carbon price it was estimated that the industrial consumption was reduced between 0.7 TWh and 1.6 TWh in the 2012/2013 period. This reduction is equivalent to between 1.5% and 3.5% of total industrial consumption during the 2012/2013 period.<sup>224</sup>

Although there is a lack of evidence that the carbon price influenced demand in the short-term, it could be argued that it will have a significant effect in the longer term, or it would have if it was in operation for longer than two years. This clearly indicates that the carbon price influenced decision making by large industrial operations regarding their electricity consumption. Once again it is important to note, as with residential and business use, that the carbon price on its own will not be effective to reduce emissions. The price also has to be supported by ancillary measures and technological and production improvements.

## Conclusion

The totality of reduced emissions in the NEM during the time the carbon price was operational cannot be ascribed to the carbon price alone. Emission intensity was on the decline even before the introduction of the carbon price. Other factors that contributed are an increase in gas-fired and renewable electricity generation, a reduction of coal-fired generators, improvements in the carbon intensity of fuel inputs and using fuels more efficiently. The shift to renewables was mostly due to Australia's RET. The shift to gas-fired generation was mostly due to gas schemes. Renewables were cited as the main driver behind the decline in emission intensity. During the time of the carbon price emissions were also reduced due to the flooding of one of Australia's most emission intensive power-plants as well as the practice of "water shifting"<sup>225</sup> which increased emissions before the price and decreased it afterwards.<sup>226</sup>

Notwithstanding the above, the carbon price is responsible for some of the reduction in emission intensity in the NEM. Annual CO<sub>2</sub> emissions fell by 6.7% in 2012/2013 and 3.6% by 2013/2014 in the NEM, a combined decrease of 29 MtCO<sub>2</sub>. Jotzo estimated that on the supply

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223 Ibid at 21 – 22.

224 Ibid at 22 – 23

225 This practice entails that hydroelectric generators stored water in the lead up to the carbon price and used the water at the time of the price so that they could sell electricity for a higher price.

226 O'Gorman and Jotzo *C op cit note 178* at 34 – 36.

side, the carbon price resulted in a reduction of emissions between 4.3 and 7.3 MtCO<sub>2</sub>. On the demand side, the impact of the carbon price attributed to a decline of between 3 and 4.5 MtCO<sub>2</sub> in 2012/2013 and a decline of between 3.4 and 5.1 MtCO<sub>2</sub> in 2013/2014. The effect of the carbon price would likely have been greater if it was not for its looming demise.<sup>227</sup>

The changes in demand, emission intensity and composition of electricity generating capacity inevitably lead to reduced emissions. Arguments can very well be made that all these changes were due to the carbon price and those arguments will be correct to a certain extent. The carbon price definitely contributed to the changes and reduced emissions. However as noted above it can never be said that the carbon price was the actual primary driver. Supporting policy, the availability of alternatives, the availability of low-carbon technology and proactive behaviour by consumers all attributed to the reduced emissions.

### **3.4.3 Overall emissions**

As can be seen from Tables 4 and 5 and Figure 1 under 4.2 above it can be seen that emissions reached their lowest points around 2014. Emissions actually started to decline as early as 2008/2009. The reduction in total emissions were influenced by many factors but if one isolates the changes in the electricity sector it can be seen that carbon pricing had a significant effect on emissions. After the carbon pricing mechanism was repealed in 2014 there is a definite rise in total emissions. It can therefore be concluded that the carbon price contributed to a decline in emissions while it was operational.

### **3.4.4 Revenue generated**

According to the Australian Treasury, the carbon pricing mechanism generated AUD\$6.53 Billion in 2012-2013<sup>228</sup> and in 2013-2014 it generated AUD\$6.62 Billion in revenue.<sup>229</sup> The revenue was used and recycled as described in chapter 3.4.2 above. Additionally, the revenue was used to establish the *Clean Energy Finance Corporation* and to fund land use measures such as biodiversity, carbon farming, carbon sink and offset schemes.<sup>230</sup>

### **3.4.5 Effects on GDP**

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<sup>227</sup> Ibid at 37 – 38.

<sup>228</sup> Australian Treasury *Final Budget Outcome 2012-13* 9.

<sup>229</sup> Australian Treasury *Final Budget Outcome 2013-14* 9.

<sup>230</sup> Carl and Fedor *op cit* note 82 at 67 – 68.

Because of its short term of implementation, it is not possible to state with exact certainty the effects carbon pricing had on the economy in terms of GDP and unemployment. The tax directly affected about 370 Australian businesses, mostly because of the increase in energy prices. Adverse effects of the tax were felt by the electricity-intensive manufacturing sector, most notably refining, cement, aluminum, iron and steel production. Energy-intensive mining activities such as coal, oil and gas mining were also impacted by the tax. For some businesses, the estimated energy increases due to the tax was around 14.5%. Surveys conducted on businesses that was liable under the tax found that a large amount of businesses were not able to pass the increased input costs to their customers, it therefore fell on them to pay the tax.

As expected, the main effect of the tax on households has been through the 10% increase in household electricity prices. Although an attempt was made to mitigate these costs through tax cuts, these changes did have negative side effects.<sup>231</sup>

Over the long term, results of Government modelling on the impact of the Carbon Tax showed that the tax would permanently reduce the GDP while the tax is effective and the costs will grow over time. It was estimated that by 2050 the Carbon Tax could have cost the GDP between \$405 Billion and \$1.25 Trillion.<sup>232</sup>

### **3.5 Repealing the Carbon Tax**

As stated in the introduction to this chapter, the carbon pricing mechanism was repealed after only two years of operation. What follows is an exposition of how and why the mechanism was repealed.

#### **3.5.1 A brief overview from introduction to repeal**

During the 2010 Australian elections, the Government – then the Labor Party, promised that if they are returned to office that they will not introduce a Carbon Tax within the following three years. After being elected they broke their promise and introduced the carbon pricing mechanism. They did so even though most Australians opposed the policy. When the next election came up in 2013, the opposition – then the Liberal/National Coalition party, vowed that they would repeal the Carbon Tax.<sup>233</sup> The Coalition party won the elections and

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<sup>231</sup> Robson *op cit* note 187 at 7.

<sup>232</sup> Robson *op cit* note 182 at 8 – 9.

<sup>233</sup> Robson *op cit* note 182 at 4.



subsequently put the repeal of the carbon pricing mechanism to a vote. The Australian Senate voted to repeal the mechanism on 17 July 2014 by 39 to 32 votes.<sup>234</sup>

### 3.5.2 Reasons for the repeal

Since support for the pricing mechanism was so weak it was argued that the 2013 electoral vote could be seen as a referendum on the tax. A poll held on 19 July 2011 found that:

- Most Australians believed that a Carbon Tax will not have a significant impact on the reducing the world-wide volume of carbon dioxide put into the atmosphere;
- Most Australians agreed that the carbon price should not be higher than AUD\$23 per tonne of carbon;
- Most Australians agreed that the Carbon Tax should not be introduced after China and the USA have a similar tax;
- Almost half of the Australians agreed that the Carbon Tax is not a good first step to a market-based price on carbon.<sup>235</sup>

Together with the reasons for its unpopularity as evidenced by the poll, the pricing mechanism also had a significant economic impact. The relatively high price per tonne of carbon coupled with the country's high emission intensity due to coal-fired electricity generation and the fact that Carbon Taxes generate revenue from the full range of covered emissions translated into a high revenue per capita. For the 2012/2013 years, Australia had the highest overall pool of revenue of all countries that placed a price on carbon and the highest per capita burden of USD\$391 annually. The opposition party saw opportunity to use the unpopularity of the tax as a major policy issue in their campaign and used it to garner votes to get elected, once elected they repealed the tax.<sup>236</sup>

In short, the tax was very unpopular with Australian citizens and political parties used it to their benefit. Promises to repeal unpopular policy secured votes and the elected Government kept their promise.

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234 Anon *Australia Votes to Repeal Carbon Tax* BBC News, available at <http://www.bbc.com/news/world-asia-28339663>, accessed on 27 August 2017.

235 Robson *op cit* note 182 at 4 – 5.

236 Carl and Fedor *op cit* note 82 at 54.

### 3.6 Conclusion

As with South Africa, Australia primarily produces electricity by burning fossil fuels. The biggest impact their carbon pricing mechanism had was through an increase in electricity prices. In the short term, this increase in price drove down demand which in turn reduced GHG emissions. Globally Australia's carbon pricing generated the largest amount of revenues of all Carbon Taxes.

Australia introduced its tax at AUD23 in 2012 which was roughly ZAR225 at the time. Australia attempted to counter the adverse effects the tax would have on business by only making those who emitted more than 25 000 tonnes of CO<sub>2</sub>e per year liable under the tax. For trade-exposed sectors there were free carbon units available as part of industry assistance measures. To assist household's, revenue would be recycled through tax cuts and increased government payments.

Unfortunately, they did not provide assistance to businesses trading domestically and who could not pass on the tax burden to consumers. Although there were tax cuts for some income sectors, others suffered increased tax rates. These assistance measures were mostly comprehensive and introduced by legislation. South Africa's proposed regime will attempt to mitigate adverse impacts by applying tax-free thresholds for the first phase of implementation. Some revenue will also be recycled, however there is no clarity as to how and how much.

The pricing mechanism generated an estimate of AUD\$ 13.15 billion in revenue, this revenue was recycled back to taxpayers as well as invested in measures to reduce GHG emissions.

Australia also introduced legislative bodies to administer the mechanism and to advise the Government on the mechanism. Other authorities were also established in order to ensure that consumers were not misled about the impact of the carbon price on products. Australia therefore attempted to ensure that their pricing mechanism was kept up to date and not abused. An important consideration for South Africa.

During the time that the pricing mechanism was in place, energy demand and emission intensity in the NEM declined. Of course, other factors also attributed to the decline such as the Renewable Energy Target which was introduced before the tax and which secured investments in renewable energy.

In light of the above, South Africa should attempt to secure more investment in renewable energy and Carbon Tax revenue could also be streamed towards low-carbon and renewable energy. The reduced emissions in the NEM caused a decline of Australia's total

emissions. After the tax was repealed it is worth noting that emission in the NEM and total emissions once again increased. This clearly shows that a price on carbon can contribute to a reduction in GHG emissions.

The repeal of the tax did not come as a surprise as it was not a very popular policy. This is unfortunate as the long-term effects on an emission intensive economy could have provided more valuable insights for South Africa.

There are however valuable lessons.

First, the tax needs support of the persons subject to the tax. Our regime also needs to be more transparent on the use of revenues and how it will mitigate the impacts the tax will have on lower income households and how it will protect business and industry from any adverse impacts.

These factors were comprehensively assessed and planned for by the Australian Government. South Africa's Carbon Tax is not as comprehensively thought out as the one that was in place in Australia and this could present significant problems. That being said, a price on carbon can definitely, together with other measures, contribute to a decline of GHG emissions and eventually slow down climate change.

#### **4. Conclusion and recommendations**

It is clear that a price on carbon has the potential to reduce GHG emissions and raise revenue simultaneously. A focal point for reductions is in the electricity sector, especially where electricity is generated by burning fossil fuels. Electricity is used on a daily basis by a large consumer base. The increased prices due to a carbon price can drive down demand as well as emission intensity. Its ability to do so does however depends on a broad range of factors.

As was seen in the Australian example, emissions started to decline from 2008/2009. During this time, there was much talk about the carbon price and consumers and producers started preparing themselves for the tax. The fact that the country had a Renewable Energy Target also helped since this led to investment being directed towards producing 20% of electricity from renewables by 2020. The carbon price also made renewable energy producers more profitable. They could sell their electricity in the NEM for the same price as other producers but without being liable to pay the tax. The same principle also applies to electricity producers who reduced their emission intensities. Official Greenhouse Gas Indexes also indicated that total emissions declined during the time the tax was operational.

Whether a price on carbon could do the same in South Africa is still open to debate. South Africa does have other factors to consider which is not present in Australia.

The most notable factor is South Africa's electricity generation market which is dominated by ESKOM. In Australia the state produces electricity alongside private producers. Taking the lack of competition into account, there is no immediate pressure on ESKOM to invest in emission free technology. The onus will be on consumers to invest in emission free technology for their own households and businesses. The increased energy prices would likely drive down demand as consumers become more energy conscious. The tax therefore might be a heavy burden to carry for consumers. It is also problematic that ESKOM is still rolling out emission intensive electricity generators. The energy mix is dominated by emission intensive electricity generators and a lack of competition. This situation slows down innovation and diversification the energy mix.

To gain any meaningful reductions in GHG emissions the tax would have to be tailor made for our electricity market and emission intensive manufacturing industry. The energy mix and price is regulated by the National Energy Regulator of South Africa and Government. The energy mix is determined by the Department of Energy through it Integrated Resource Plan. Eskom, a State-owned Enterprise, is also the largest electricity producer. In this sense, a Carbon Tax would not be able to change South Africa's energy mix. The tax would merely be passed on to consumers and there would be no incentive for Eskom to change how it produces electricity. This situation would have to be reviewed before a Carbon Tax is introduced.

To answer the first research question, I submit that the carbon tax will be able to reduce GHG emissions, most likely through causing behavioral change that results in a decrease in energy demand. The reduction might manifest itself in a lower emissions growth trajectory since South Africa is still rolling out emissions intensive coal generators. Unless there are more renewable options to invest in, the tax might fall short of the effectiveness requirement.

A price on carbon will eventually lead to an increase in electricity prices, fuel prices and various other items. Any jurisdiction that implements taxes should ensure that the taxes do not place undue financial burdens on its people. South Africa is a developing country rife with poverty. Low-income earners, students and pensioners are very likely to be hit by the increase in prices. As also stated in 2.6 above, lower income households spend a larger proportion of their income on energy and transport. This translates into a heavier burden for lower income households.

Nor the draft Carbon Tax Bill or the explanatory memorandum published therewith give any details as to how the Government plans to shield low income households against the

negative effects of the tax. In the Australian example, a large part of the revenue was recycled back to business and citizens through tax cuts and other programs in order to mitigate negative impacts of the tax. The South African taxing regime is also silent regarding how tax revenue will be applied.

I therefore submit that the Government should first attempt to establish how the tax will affect low income households. Thereafter they should put concrete plans in place to mitigate these impacts. Otherwise the tax burden might disproportionately fall on the poor.

To answer the second question, I submit that the carbon tax should be reconsidered in terms of its effects on low income households.

### **Other considerations**

South Africa is responsible for about 2% of global emissions, taking this factor into account one has to evaluate the contribution that reducing emissions in South Africa will have on a global scale. Our emissions are negligible compared to countries such as China and the USA who do not have complete carbon pricing.

Our economy is still growing and we are a developing country – taxing carbon could potentially stifle our development. South Africa as a still developing country should not be expected to place a price on carbon before other developed countries, like the USA, also have a meaningful carbon pricing regime.

Because coal is very emission intensive compared to other fossil fuels, we have a relatively high emission intensive economy. A tax on carbon could be construed as a tax on our economy. As shown in the Australian example, a price on carbon will increase the price of electricity. This increased cost of electricity will have a negative impact on the competitiveness of our mining and manufacturing industry. The international competitiveness of the steel industry could also be severely impacted since the industry uses a large amount of coal in its processes.

South Africa also has a low ratio of carbon consumed to carbon produced because we export a large amount of our carbon intensive products, the tax would also then be seen as a tax on exports. This will severely affect our international competitiveness.

The tax could therefore have a severe impact on economic growth and employment since there is a direct correlation between energy consumption and economic development.

Other than the impacts that the tax will have on our economy is the fact that increased electricity and fuel prices will have significant impacts on poor and lower-income households.

This impact would then have to be mitigated by government measures which are likely to come at the cost of other taxpayers. It is also submitted that the impact could be mitigated through proper application of the Carbon Tax revenues.

South Africa already levies a vehicle emissions tax based on the theoretical amount of carbon a vehicle can emit during its lifespan, the Carbon Tax could then result in double taxation if the tax is applied to fuel.

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