

# **The Use of Tax-based Fiscal Measures in the Legal Response to Climate Change**

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By

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## **Abstract**

Climate change is currently one of the most pressing environmental concerns globally and in South Africa. South Africa is especially vulnerable to the effects of climate change because of the country's socio-economic context, water scarcity, unique geography and climate sensitive biodiversity. South Africa's road transport and energy sectors are among others major contributors to climate change. The traditional command and control measures designed to mitigate climate change in South Africa's road transport and energy sectors do not suffice on their own, there is a need for tax-based fiscal measures to assist in mitigating climate change in these sectors. Tax-based fiscal measures offer certain unique climate change mitigation capabilities, therefore numerous tax-based fiscal measures are already in place in South Africa's road transport and energy sectors. The development of new tax-based fiscal measures should be encouraged and existing tax-based fiscal measures can and should be refined and extended to enhance their climate change mitigation efficacy.

**Key phrases**

- Climate change mitigation
- Road transport sector
- Energy sector
- Command and control measures
- Tax-based fiscal measures

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## List of abbreviations

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| CO <sub>2</sub>  | Carbon dioxide                                                |
| CFC's            | Chlorofluoro carbons                                          |
| CH <sub>4</sub>  | Methane                                                       |
| Cms              | centimeters                                                   |
| C/kWh            | Cents per Kilowatt-hour                                       |
| C/l              | Cents per Litre                                               |
| DME              | Department of Minerals and Energy                             |
| HFCs             | Hydro-fluorocarbons                                           |
| IEM              | Integrated environmental management                           |
| IPCC             | International Panel on Climate Change                         |
| N <sub>2</sub> O | Nitrous oxide                                                 |
| NERSA            | National Energy Regulator of South Africa                     |
| NEMA             | National Environmental Management Act 107 of 1998             |
| NEMAQA           | National Environmental Management: Air Quality Act 39 of 2004 |
| NCCRS            | National Climate Change Response Strategy (2004)              |
| PFC's            | per-fluorocarbons                                             |
| UNFCCC           | United Nations Framework Convention on Climate Change (1992)  |
| REFIT            | Renewable Energy Feed-in-tariffs                              |
| REPA             | Renewable Energy Purchasing Agency                            |
| SADC             | Southern Africa Development Community                         |
| SF <sub>6</sub>  | Sulphur-hexafluoride                                          |



## 1 Introduction

Climate change<sup>1</sup> is currently one of the most pressing environmental concerns globally and in South Africa.<sup>2</sup> It is widely believed to be the main cause of *inter alia* unstable weather patterns, rising sea levels and the depreciation of biodiversity.<sup>3</sup> Furthermore, it is perceived to have significant socio-economic impacts.<sup>4</sup> This will be particularly evident in a poverty stricken South Africa, where large parts of the country's population could in future become unable to cope with the adverse impacts of climate change.<sup>5</sup>

The phenomenon of climate change is primarily the result of large quantities of greenhouse gases<sup>6</sup> in the atmosphere, which are significantly increased by various human activities.<sup>7</sup> On a global and domestic scale rapidly growing road transport<sup>8</sup> and the energy sectors<sup>9</sup> are major contributors to greenhouse gas emissions and accordingly, climate change.<sup>10</sup>

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<sup>1</sup> Climate change can be defined as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods." Art 1(2) UNFCCC.

<sup>2</sup> King "On exponential curves and closing windows - is environmental law fraternity up to the challenge".

<sup>3</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1050-1052.

<sup>4</sup> Art 1(1) UNFCCC.

<sup>5</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1054-1063, DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>6</sup> The UNFCCC defines greenhouse gases as: "(t)hose gaseous constituents of the atmosphere both natural and anthropogenic that absorb and re-emit radiation." Art 1(5) of the UNFCCC.

<sup>7</sup> It is generally accepted that greenhouse gases is the main cause of climate change. Glazewski *Environmental Law* 586, See also International Panel on Climate Change 2007 (IPCC)

[http://www.ucsusa.org/global\\_warming/science\\_and\\_impacts/science/findings-of-the-ipcc-fourth-2.html](http://www.ucsusa.org/global_warming/science_and_impacts/science/findings-of-the-ipcc-fourth-2.html), United Nations Environment Programme 2007 [http://www.unep.org/geo/geo4/report/GEO-4\\_Report\\_Full\\_en.pdf](http://www.unep.org/geo/geo4/report/GEO-4_Report_Full_en.pdf), DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>8</sup> Road transport refers to the movement of people and goods from one location to another via roads. South Africa's road transport sector includes five sub-categories namely: passenger transport; freight transport; rental of commercial vehicles with operator; maintenance and repair of road equipment and; supporting services for road transport services. South Africa's road transport sector accounts for 75% of the CO<sub>2</sub> emissions produced in the country's transport sector and are responsible for 10% of the world's carbon footprint. In South Africa, the transport sector was responsible for 16% of the

Traditionally command and control measures<sup>11</sup> were the primary measures used to facilitate the mitigation<sup>12</sup> of climate change in South Africa's road transport and energy sectors. Generally, these command and control measures are costly and difficult to administer effectively.<sup>13</sup> They furthermore do not necessarily encourage industries and individuals to surpass compliance standards and do not encourage the regulated community to explore the benefits of new

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country's total CO<sub>2</sub> emissions by 1990, and 20% of the total by 2000. It is likely for this figure to have significantly increased. This probability can *inter alia* be attributed to the popularity of heavier cars, equipped with an increasing number of energy demanding features, which add to a greater than expected growth in energy use by the transport sector. This growth is however expected to be halted by new environmental taxes that puts a heavier financial burden on car purchasers. Ciobanu 2009 <http://www.ips.org/TV/copenhagen/climate-change-reducing-roadtransport-is-taboo/>, Price *et al* 2006 *Berkeley National Laboratory, Environmental Energy Technologies Division Berkeley* 3, DEAT 2010 <http://soer.deat.gov.za/496.html>.

<sup>9</sup> The energy sector is a generic term for all of the industries involved with the production and sale of energy including fuel extraction, manufacturing, refining and distribution. South Africa's energy sector is currently responsible for 90% of the greenhouse gas emissions in South Africa. This mainly results from the country's reliance on coal-based energy generation, which accounts for 40% of all carbon dioxide emissions. Steady population growth and further industrial development may further increase the demand for electricity and elevate greenhouse gas emissions even more. Davidson, Tyani and Afrane-Okesse *Energy and Development Research Centre University of Cape Town* 2002 7, National Treasury *Market-Based Instruments* 17, DEAT 2010 <http://soer.deat.gov.za/496.html>.

<sup>10</sup> DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>11</sup> The command and control approach to environmental regulation involves two primary processes: prescribing legal requirements and obligations and enforcing compliance therewith through the use of a selection of enforcement measures in the case of non-compliance. It can be divided into administrative measures (directives, abatement notices, compliance notices and provisions empowering the withdrawal of authorisation) and criminal measures (fines, compensation orders and reparation orders). For an extensive discussion see Craigie, Snijman and Fourie "Dissecting Environmental Compliance and Enforcement" 45-55, Kidd "Criminal Measures" 258-265 and Winstanley "Administrative Measures" 225.

<sup>12</sup> The climate discourse evolves for the biggest part along two lines of required action. It is universally acknowledged that climate change impacts necessitate mitigative as well as adaptive measures at all levels. Climate mitigation is any action taken to permanently eliminate or reduce the long-term risks and hazards of climate change to human life, property. Climate adaptation refers to the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences. Increasingly the distinction between the objectives between climate adaptation and mitigation becomes more distorted. It is however possible to categorise the reduction of emission levels and energy efficiency as mitigation strategies. International Panel on Climate Change 2007 [http://www.ucsusa.org/global\\_warming/science\\_and\\_impacts/science/findings-of-the-ipcc-fourth-2.html](http://www.ucsusa.org/global_warming/science_and_impacts/science/findings-of-the-ipcc-fourth-2.html), Global Greenhouse Warming.Com 2010 <http://www.global-greenhouse-warming.com/climate-mitigation-and-adaptation.html>, DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>13</sup> Kidd "Criminal Measures" 224-248.

technology, for example.<sup>14</sup> More specifically, command and control measures are not sufficiently flexible to effectively address the significant growth and subsequent environmental impact that has occurred in the road transport and energy sectors over the last few decades. The hypothesis is that the command and control approach to regulation in these sectors may be inadequate to regulate and control emission levels to the extent necessary for climate change mitigation.<sup>15</sup>

Accordingly many governments including that of South Africa, recognise the existence and use of alternative regulatory measures.<sup>16</sup> Alternative regulatory measures in the realm of environmental governance and accordingly climate governance include agreement-based measures,<sup>17</sup> civil measures<sup>18</sup> and fiscal measures, for example.<sup>19</sup> It has been proposed that for environmental regulation to be most efficient, the hybrid use of command and control mechanisms and regulatory alternatives is necessary.<sup>20</sup> This study aims to analyse but one of

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<sup>14</sup> For a more detailed discussion see, Paterson 2006 *PER* 88.

<sup>15</sup> See Paterson 2006 *PER* 89.

<sup>16</sup> Craigie, Snijman and Fourie "Dissecting Environmental Compliance and Enforcement" 58.

<sup>17</sup> Agreement based measures are measures undertaken voluntarily by the private sector. There are four categories of voluntary compliance measures. They are: public voluntary programmes, which are initiatives developed by environmental authorities; unilateral agreements, which are environmental measures introduced by an industry on its own initiative; and private agreements, which are agreements entered into between industry and other actors within civil society. Agreement-based measures include international agreements; covenants and co-operative agreements; environmental management systems or controlled self-regulation; mediation; arbitration; environmental tribunals; courts; and revision and appeal. For further discussion see Nel and Du Plessis 2001 *SAJELP* 16, Lehman "Voluntary Compliance Measures" 274.

<sup>18</sup> Civil based measures include: all measures to empower; inform; educate; and co-opt civil society to be involved with the enforcement process. Some examples include: education; public awareness; access to information; public participation; increased *locus standi*; class actions; private prosecution; beneficial cost awards; green rights; protection of whistle blowers; protection of workers; eco-labeling and public waste and pollution inventories. For further discussion see Nel and Du Plessis 2001 *SAJELP* 1-37.

<sup>19</sup> National Treasury *Draft Policy Paper* 2.

<sup>20</sup> This approach should provide government with ample regulatory power through a strong command and control base; promote the voluntary, proactive and cost-effective strengths of agreement-based measures; encourage public participation and environmental education through civil-based measures; and enhance flexibility, innovation and technological development through fiscal measures. Nel and Du Plessis 2001 *SAJELP* 1-37.

these alternative regulatory measures, fiscal, specifically tax-based fiscal measures. These measures is therefore by no means presented as being the sole measure to be utilised, it should be utilised in combination with other measures to ensure utmost efficacy. Fiscal measures can be defined as: "a collection of policy instruments with the goal of correcting environmentally related market failures through the price mechanism" and tax-based fiscal measures can within the context of this study be defined as: "environmentally related taxes to correct environmentally related market failures."<sup>21</sup>

In the light of the above, this study questions the extent to which fiscal and specifically tax-based fiscal measures, provided for in domestic policy documents and legislation, may contribute to climate change mitigation in South Africa's road transport and energy sectors.

This study is limited to a discussion of the following areas:

- The phenomenon of climate change, its global impacts and the contribution thereto by road transport and energy production and usage globally;
- The specific impacts of climate change in South Africa and the contribution of South Africa's road transport and energy sectors to climate change;
- The need for and benefits of fiscal and tax-based fiscal measures to mitigate climate change in the road transport and energy sectors;
- The efficacy of existing tax-based fiscal measures provided for in policy documents and legislation in the road transport and energy sectors;
- The prospective extension and refinement of discussed measures, with the goal of enhancing their climate change mitigation efficacy.

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<sup>21</sup> In the context of this study market failures mean the deficient consideration of environmental matters in daily market activities. Paterson "Incentive-based Measures" 298.

## 2 Global climate change

This section gives a brief overview of some core matters of concern about the global phenomenon of climate change. Due to the focus of this study, no attempt is made to provide a detailed scientific analysis of climate change as such. Although scientific figures and statistics seem essential in the climate discourse generally, it will be kept to a minimum here and will only be mentioned in so far as it supports the objectives of this study as underpinned by law.

Global climate change is in essence a natural phenomenon.<sup>22</sup> Climate has changed throughout geological history due to many natural reasons, such as changes in the solar energy received by earth arising from slow orbital changes and volcanic eruptions.<sup>23</sup> Several man-made occurrences also contribute to climate change. This study is particularly concerned with the contribution of human activities to climate change via road transportation (air emissions) and the generation and use of energy, specifically. One can however only fully comprehend the impact of human-based activities such as the former when the science behind climate change is more clear. The earth's atmosphere acts as a transparent, enveloping blanket to the planet. It filters sunlight through to the earth's surface while it retains some of the reflected warmth created by the sunlight on the earth's surface.<sup>24</sup> This retention of heat or the so-called greenhouse effect is primarily caused by water vapour, CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and ozone which are recognised as greenhouse gases.<sup>25</sup> Since oceans and surfaces do not suffice as heat absorbers, almost one-third of the solar radiation that hits

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<sup>22</sup> United Nations Environment Programme 2007  
<http://www.unep.org/geo/geo4/report/GEO-4>.

<sup>23</sup> American Meteorological Society "Climate Change" 2-3.

<sup>24</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1050.

<sup>25</sup> Other greenhouse gases listed by the International Panel on Climate Change (IPCC) are Tetrafluoromethane (CF<sub>4</sub>), hexafluoroethane (C<sub>2</sub>F<sub>6</sub>) and sulphurhexafluoride (SF<sub>6</sub>). The Kyoto Protocol categorises six greenhouse gases: carbon dioxide (CO<sub>2</sub>); Methane (CH<sub>4</sub>); nitrous oxide (N<sub>2</sub>O); hydrofluorocarbons (HFCs); per fluorocarbons (PFCs); and sulphur hexafluoride (SF<sub>6</sub>).

the earth reflects back to space.<sup>26</sup> However, balanced amounts of greenhouse gases in the atmosphere serve to retain a sufficient measure of heat and are fundamental components to sustain life, generally.<sup>27</sup>

Research shows that climate change is aggravated by human activities.<sup>28</sup> Increased levels of atmospheric greenhouse gases and aerosols are major contributors to this phenomenon.<sup>29</sup> Excessive greenhouse gases trap exponentially more heat in the atmosphere, subsequently raising the earth's average temperature.<sup>30</sup> Global surface temperatures increased on average by about 0.6°C over the period 1956–2008.<sup>31</sup> By 2008, eleven of the previous twelve years were warmer than any other years since 1850.<sup>32</sup> Furthermore it is predicted that temperatures will rise by 2 to 4.5°C by the year 2100.<sup>33</sup> This increase in surface and water temperature reduces sea ice and mountain glacier coverage, which subsequently raises sea levels.<sup>34</sup> It is predicted that sea levels will rise by 38 to 55 centimetres over the next century<sup>35</sup> and that the swift depreciation of Arctic sea ice will persist and lead to the vanishing of summertime ice within this century.<sup>36</sup> Furthermore, the unusual rainfall distribution and seasonal changes caused by increased temperatures contribute to droughts,

<sup>26</sup> DEAT 2009 <http://soer.deat.gov.za/69.html>.

<sup>27</sup> Without the atmosphere and its greenhouse gases, the earth's temperature would be approximately 30°C colder. Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1050.

<sup>28</sup> Glazewski *Environmental Law* 586.

<sup>29</sup> DEAT NCCRS 1.

<sup>30</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1051.

<sup>31</sup> American Geophysical Union 2007  
[http://www.agu.org/sci\\_pol/positions/climate\\_change2008.shtml](http://www.agu.org/sci_pol/positions/climate_change2008.shtml).

<sup>32</sup> American Geophysical Union 2007  
[http://www.agu.org/sci\\_pol/positions/climate\\_change2008.shtml](http://www.agu.org/sci_pol/positions/climate_change2008.shtml).

<sup>33</sup> International Panel on Climate Change 2007  
[http://www.ucsusa.org/global\\_warming/science\\_and\\_impacts/science/findings-of-the-ipcc-fourth-2.html](http://www.ucsusa.org/global_warming/science_and_impacts/science/findings-of-the-ipcc-fourth-2.html).

<sup>34</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1051, DEAT 2009

<http://soer.deat.gov.za/themes.aspx?m=519>.

<sup>35</sup> DEAT 2009

<http://soer.deat.gov.za/themes.aspx?m=519>.

<sup>36</sup> WWF 2010 [www.panda.org/about.../living\\_planet\\_report/2010\\_lpr/](http://www.panda.org/about.../living_planet_report/2010_lpr/), WWF 2008  
[http://assets.panda.org/downloads/living\\_planet\\_report\\_2008.pdf](http://assets.panda.org/downloads/living_planet_report_2008.pdf).

flooding, raging wildfires, cyclones, as well as the degradation of physical and biological systems.<sup>37</sup> It is generally understood and also apparent from the above, that climate change results in human and natural vulnerability<sup>38</sup> with economic, social and environmental impacts.<sup>39</sup>

As was alluded to above, various substances contribute to distorted levels of greenhouse gases in the atmosphere. The impact of specifically the road transport and energy sectors seems to be significant all over the world. The transport sector already accounts for 25% of the global CO<sub>2</sub> emissions and is expected to become the most rapidly growing source over the next 30 years, with an increase of 2 to 3% annually.<sup>40</sup> Furthermore, road transport accounts for 75% of the global CO<sub>2</sub> emissions produced in the transport sector<sup>41</sup> and accounts for 10% of the world's carbon footprint. With respect to the energy sector it is vital to note that the power generation sector is responsible for approximately 41% of the global fossil fuel combustion emissions.<sup>42</sup>

<sup>37</sup> WWF 2010 [wwf.panda.org/about.../living\\_planet\\_report/2010\\_lpr/](http://wwf.panda.org/about.../living_planet_report/2010_lpr/), WWF 2008 [http://assets.panda.org/downloads/living\\_planet\\_report\\_2008.pdf](http://assets.panda.org/downloads/living_planet_report_2008.pdf).

<sup>38</sup> Human and natural vulnerability can in the context of this study be defined as: the interface between exposure to the physical threats to human well-being natural resources and the capacity of people and nature to cope with those threats. United Nations Environment Programme 2007 <http://www.unep.org/geo/geo4/report/GEO-4>.

<sup>39</sup> United Nations Environment Programme 2007 <http://www.unep.org/geo/geo4/report/GEO-4>, American Geophysical Union 2007 [http://www.agu.org/sci\\_pol/positions/climate\\_change2008.shtml](http://www.agu.org/sci_pol/positions/climate_change2008.shtml), World Wildlife Fund 2010 [wwf.panda.org/about.../living\\_planet\\_report/2010\\_lpr/](http://wwf.panda.org/about.../living_planet_report/2010_lpr/), World Wildlife Fund 2008 [http://assets.panda.org/downloads/living\\_planet\\_report\\_2008.pdf](http://assets.panda.org/downloads/living_planet_report_2008.pdf), DEAT NCCRS iii.

<sup>40</sup> This growth is amplified by the popularity of heavier cars, equipped with an increasing number of energy demanding features (for example air conditioning and power windows), which add to a greater than expected growth in energy use by the transport sector. Price *et al* 2006 *Berkeley National Laboratory, Environmental Energy Technologies Division Berkeley* 3.

<sup>41</sup> International Panel on Climate Change 2007 [http://www.ucsusa.org/global\\_warming/science\\_and\\_impacts/science/findings-of-the-ipcc-fourth-2.html](http://www.ucsusa.org/global_warming/science_and_impacts/science/findings-of-the-ipcc-fourth-2.html), Ciobanu 2009 <http://www.ips.org/TV/copenhagen/climate-change-reducing-road-transport-is-taboo/>.

<sup>42</sup> Global Carbon Exchange 2009 <http://globalcarbonexchange.co.za/sa-power-sector-emissions-to-rise-if-no-action-is-taken.html>.

### 3 South Africa's vulnerability to climate change

South Africa can of course not be isolated from the international climate debate. The factors contributing to climate change and the impacts of climate change are similarly not different in South Africa in comparison with the rest of the world. However, due to a number of factors, South Africa is particularly vulnerable to the impacts of climate change. One of the main factors contributing hereto is poverty. At the 12<sup>th</sup> Conference of parties to the UNFCCC, the former United Nations Secretary General, Kofi Annan stated that:

The impacts of climate change will fall disproportionately on the world's poorest countries, many of them here in Africa. Poor people already live on the front lines of pollution, disaster and the degradation of resources and land. For them, adaptation is a matter of sheer survival.<sup>43</sup>

In South Africa 47% of the country's population still lives below the lower bound poverty line.<sup>44</sup> Approximately 59% of the poor are rural dwellers whom are settled in the overcrowded and highly degraded former homelands.<sup>45</sup> These communities live in abject poverty<sup>46</sup> and are isolated from economic opportunities. Differences in property rights, lack of access to information, unemployment, low literacy levels and unequal access to resources create a context wherein the ability of these poor communities to adapt to the impacts of climate change is severely limited.<sup>47</sup> They are furthermore dependant on natural resources for their livelihoods, which makes them even more vulnerable should these resources be depleted by the impacts of climate change.

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<sup>43</sup> 12<sup>th</sup> Conference of Parties to the UNFCCC 2006 Kenya.

<sup>44</sup> Masego Madzwamuse 2010 <http://www.boell.org.za/web/107-558.html>.

<sup>45</sup> NGO pulse 2009 <http://www.ngopulse.org/article/poverty-remains-priority-sa>.

<sup>46</sup> Large parts of these communities suffer from diseases such as Tuberculosis, HIV/Aids and malaria. In many cases there is a lack of adequate healthcare for these people. Boer Fritschi and O'Beirne Human "Health in Environmental Assessment and Management" 810-819.

<sup>47</sup> Boer Fritschi and O'Beirne "Human Health in Environmental Assesment and Management" 810-819.

Other factors contributing to South Africa's vulnerability to climate change is the country's: unsustainable land use practices;<sup>48</sup> polluting mining activities<sup>49</sup> and lack of mining rehabilitation;<sup>50</sup> generation of waste;<sup>51</sup> and alien invasive species.<sup>52</sup> These factors already put strain on South Africa's biodiversity<sup>53</sup> and natural resource base with climate change expected to aggravate these effects.<sup>54</sup>

South Africa is furthermore a water scarce country.<sup>55</sup> Therefore, most rivers have been dammed and most catchments have been hydrologically altered in some way.<sup>56</sup> This excessive hydrological alteration coupled with inefficient water use and poor infrastructure maintenance have led to the degradation of some of

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<sup>48</sup> This includes overexploitation and over-grazing which causes desertification. Furthermore, habitat loss is also driven by land-use decisions that favour development over conservation. Turpie "Environmental and Resource Economics" 42.

<sup>49</sup> The mining sector is the largest single generator and accumulator of solid wastes in South Africa. The main types of pollution resulting from residue deposits are water pollution and air pollution. Wells *et al* "Terrestrial Minerals" 534.

<sup>50</sup> Even where mining operations have been discontinued, environmental problems associated with mining frequently continue. For instance, water from an abandoned mine may, by reason of its acidity, continue to cause pollution of both surface and ground water. Wells *et al* "Terrestrial Minerals" 534.

<sup>51</sup> As a result of increases in population growth and the process of industrialisation, there has been increased pressure on natural resources and increased generation of enormous quantities of waste, in solid, liquid or gaseous form. These can result in environmental degradation which in turn has detrimental effects on human health and economic activity. Bosman "Integrated Waste Management" 699-703.

<sup>52</sup> Although the transfer of species, many of which have become invasive in their new territories, has been an inevitable consequence of international trade. These invasive species have been allowed to proliferate to the level that they threaten natural ecosystems. Turpie "Environmental and Resource Economics" 42, Olivier Myakayaka Richards "Indigenous Plants" 355-358

<sup>53</sup> South Africa is ranked as the third most biologically diverse country in the world. The country has various biodiversity hotspots such as the Fynbos and Succulent Karoo Biomes which is extremely climate sensitive. Kidd *Environmental Law* 89, Algotsson "Biological Biodiversity" 97, Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1062.

<sup>54</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1062, FitzPatrick 2009 <http://www.fitzpatrick.uct.ac.za/docs/climate.html>

<sup>55</sup> South Africa is known as an arid country with rainfall that is unevenly distributed and which is considerably less than the world average. Kidd *Environmental Law* 64.

<sup>56</sup> Turpie "Environmental and Resource Economics" 42, Fitzpatrick 2009 <http://www.fitzpatrick.uct.ac.za/docs/climate.html>.

South Africa's most critical water catchments, resulting in lack of water and poor water quality.<sup>57</sup>

These are some of the reasons why South African authorities and the community must plan, design and implement suitable mitigation and adaptation mechanisms to prevent climate change from aggravating the impacts of the above mentioned factors. The subsequent sections consider the following: an insight into the socio-economic impacts of climate change domestically; an overview of the impacts of climate change on South Africa's natural resource base; and an overview of the most prevalent domestic contributors to climate change (specifically in relation to road transportation and the generation and use of energy);

### ***3.1 Human life, health and well-being and culture (socio-economic impacts)***

Firstly, an increase in greenhouse gas emissions and other harmful pollutants that contribute to climate change will increase the occurrence of respiratory problems, heart and lung disease and even premature death.<sup>58</sup> Furthermore, in addition to the serious health effects associated with a lack of potable water,

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<sup>57</sup> WWF 2010 ://www.wwf.org.za/what\_we\_do/freshwater/, DEAT 2010  
<http://soer.deat.gov.za/69.html>.

<sup>58</sup> Climate change and its impacts on the health and well-being of South Africans health may place additional strain on South Africa's health care system. There is thus a need to apply mitigative as well as adaptive measures to overcome the predicted increase in the frequency of extremes of temperature, flooding, ultra violet radiation, vector borne diseases, waterborne diseases and storms. The anticipated impacts associated with climatic change for the health sector may be exacerbated by factors such as poverty, poor housing conditions, inadequate education, and accessibility to medical care. People with existing health conditions such as cancer, HIV/Aids, obesity and diabetes may be more susceptible to waterborne and vector-borne diseases and to physical stresses, such as those experienced during cold spells, floods or severe storms. Adequate protection from these stressors is important and depends upon the mitigation of climate change as well as access to sanitation, adequate housing conditions, and proper health care services. Von Blottnitz, Fedorsky and Bray "Air Quality" 579, Department of Science and Technology 2007  
<http://www.dst.gov.za/publicationspolicies/strategiesreports/SA%20climate%20change%20technology%20needs%20assessment.pdf>.

rainfall and temperature changes affect the development rates of vectors and parasites.<sup>59</sup> Small changes in temperature and precipitation will boost the population of disease-carrying mosquitoes and result in increased malaria epidemics.<sup>60</sup> Whereas increased flooding in certain areas could facilitate the breeding of these malaria carriers in formerly arid areas.<sup>61</sup>

It is furthermore vital to take note of the economic impacts climate change will have on South Africa. It is estimated that climate change could lead to a fall of about 1.5% in the country's annual gross domestic product (GDP) by 2050 which is roughly equivalent to the total annual foreign direct investment in South Africa at present.<sup>62</sup>

While predicted shortages of water will have devastating effects on industry, the agricultural sector, upon which 1.5 million households are directly dependant, will be facing major economic challenges caused by climate change.<sup>63</sup> These

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<sup>59</sup> WWF 2008 <http://www.worldwildlife.org/climate/Publications/WWFBinaryitem4926.pdf>, WWF 2008

[http://assets.panda.org/downloads/east\\_africa\\_climate\\_change\\_impacts\\_final\\_2.pdf](http://assets.panda.org/downloads/east_africa_climate_change_impacts_final_2.pdf), DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>60</sup> Approximately 8 0000 cases of malaria are reported annually in South Africa Department of Government communication and Information System 2009 [http://www.gcis.gov.za/resource\\_centre/sa\\_info/pocketguide/2009/026\\_health.pdf](http://www.gcis.gov.za/resource_centre/sa_info/pocketguide/2009/026_health.pdf).

<sup>61</sup> Department of Government communication and Information System 2009 [http://www.gcis.gov.za/resource\\_centre/sa\\_info/pocketguide/2009/026\\_health.pdf](http://www.gcis.gov.za/resource_centre/sa_info/pocketguide/2009/026_health.pdf).

<sup>62</sup> Concerning adaptation to climate change, most estimates of developing country funding needs vary from \$50 billion to \$100 billion per year. That is approximately R400 billion to R800 billion per year. UN Department of Economic and Social Affairs 2010 <http://www.un.org/en/development/desa/climate-change/adaptation.shtml>, DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>63</sup> Between 80-85% of surface area of South Africa is devoted to Agriculture. Degradation of South Africa's natural agricultural capital may be exacerbated by climate change (as well as existing challenges to the agricultural sector). Increasing evaporation and reduced water availability will compromise dry land and irrigated agriculture, as well as a variety of livestock farming systems. Livestock farming systems are further affected by: sensitivity to higher temperatures and great stock water requirements. Water supply and water quality challenges will compromise irrigated agriculture. For instance, maize production, which contribute around 70% of South Africa's total grain production is predicted to decline by up to 20% over the next 50 years as a result of hotter and drier conditions. Rumsey and King "Climate Change: Impacts, Adaptation and Mitigation; Threats and Opportunities" 1055, Verster *et al* "Soil" 294, Masego Madzwamuse 2010 <http://www.boell.org.za/web/107-558.html>.

challenges include: a reduction in the amount of land suitable for both arable and pastoral agriculture; and a shortening of the growing season. In addition to the subsequent decrease in food export which will negatively affect the economy, local food security will be severely affected.<sup>64</sup>

Marine and coastal resources are extremely valuable to the South African economy. The fishing industry currently contributes approximately R 4.5 Billion to gross domestic Product (GDP) every year and directly employs some 36 500 individuals.<sup>65</sup> The impacts of climate change may significantly affect these breeding grounds for many fish and shellfish which will negatively affect fisheries.<sup>66</sup>

Lastly, the predicted warming of the bio-climate and aridification are predicted to shrink the country's biomes by 38-55%, resulting in a displacement and loss of wildlife species and biodiversity.<sup>67</sup> These changes could seriously harm the South Africa's tourism sector which currently contributes R100 billion to South Africa's economy each year.<sup>68</sup>

### **3.2 Impacts on the domestic natural resource base**

Possible changes to the South African climate include: a warming of between 2-6°C over the next century; a potential reduction of approximately 5-10% of

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<sup>64</sup> Rumsey and King "Climate Change: Impacts, Adaptation and Mitigation; Threats and Opportunities" 1055, Verster *et al* "Soil" 294, Masego Madzwamuse 2010 <http://www.boell.org.za/web/107-558.html>.

<sup>65</sup> Mclean and Glazewski "Marine Systems" 464.

<sup>66</sup> Department of Environmental Affairs and Development Planning, Western Cape 2010 [http://www.oneworldgroup.co.za/wp-content/uploads/2009/09/CC-Strategy-and-Action-Plan-FINAL-DRAFT-version2-DRAFT-10-\\_.pdf](http://www.oneworldgroup.co.za/wp-content/uploads/2009/09/CC-Strategy-and-Action-Plan-FINAL-DRAFT-version2-DRAFT-10-_.pdf).

<sup>67</sup> See discussion in 3.2. Masego Madzwamuse 2010 <http://www.boell.org.za/web/107-558.html>.

<sup>68</sup> Furthermore, the introduction of a carbon tax on air travel may, for example, encourage long haul tourists to seek destinations closer to home, to limit costs. Tourism also places stress on scarce resources such as water. Increased temperatures in the country may lead to an increased energy demand, for example, in greater demand for air conditioning. Increased air pollution may impact negatively on tourism. The challenges climate change poses to the country's coastal infrastructure and beaches will have a major impact on South Africa's tourism sector. DEAT 2010 <http://soer.deat.gov.za/69.html>.

current precipitation over the next 50 years; and an increase in daily maximum temperatures in summer and autumn in the western half of the country.<sup>69</sup> These changes are predicted to have significant impacts South Africa's natural resource base.

First, the intensity, distribution and seasonality of rainfall will lead to increasing water shortages, increased desertification,<sup>70</sup> and, at times, flooding in other areas.<sup>71</sup> Furthermore, climate sensitive riparian, endorheic and floodplain wetlands will be degraded even further. Secondly, rising sea levels and changes in the oceanic conditions will threaten the country's coastal zones and marine life.<sup>72</sup> Thirdly, a warmer and drier climate is likely to cause a progressive impoverishment of biodiversity.<sup>73</sup> Some of the impacts on South Africa's biodiversity hotspots include the following: the Cape Floral Kingdom<sup>74</sup> and

<sup>69</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities", Masego Madzwamuse 2010, King "On exponential curves and closing windows - is environmental law fraternity up to the challenge", <http://www.boell.org.za/web/107-558.html>, WWF 2008 <http://www.worldwildlife.org/climate/Publications/WWFBinaryitem4926.pdf>, WWF 2010 [http://www.panda.org/about.../living\\_planet\\_report/2010\\_lpr/](http://www.panda.org/about.../living_planet_report/2010_lpr/).

<sup>70</sup> The arid and semi-arid western regions of the country is particularly sensitive to changes in precipitation. Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1055

<sup>71</sup> The North-Eastern part of the country will experience a significant increase in precipitation.. Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1054, WWF 2008 <http://www.worldwildlife.org/climate/Publications/WWFBinaryitem4926.pdf>

<sup>72</sup> South Africa has in excess of 11 000 marine species, totalling approximately 15% of the global marine species. Coastal and marine systems and resources will be exposed to extreme events, which may increase in terms of frequency and intensity with increased salt-water intrusion, raised groundwater tables and increased coastal erosion. South Africa's coastline is sensitive to sea level rises, which will impact on coastal ecology, particularly where developments are close to high-water lines. For example, the Western Cape's 50 estuaries are particularly vulnerable to climate change and these are important feeding and nursery grounds for many shellfish, fish and bird species and are economically important as fisheries. Impacts include: increased salt-water intrusion into coastal aquifers, flooding connected to extreme storm events, and coastal erosion resulting from the high energy wave regime. Glazewski *Environmental Law* 586., Mclean and Glasewski "Marine Sytems" 463. Earthlife Africa 2009 [http://www.earthlife.org.za/wordpress/wpcontent/uploads/2009/02/cc2\\_single\\_pages.pdf](http://www.earthlife.org.za/wordpress/wpcontent/uploads/2009/02/cc2_single_pages.pdf).

<sup>73</sup> Mclean and Glasewski "Marine Sytems" 463.

<sup>74</sup> The Cape Floral Kingdom currently hosts 7300 plant species. Species other than plants are also well represented in this area. Kidd *Environmental Law* 89.

Succulent Karoo<sup>75</sup> is expected to turn into a desert environment and will no longer be a suitable habitat for the species it currently hosts; South Africa's Grasslands will be transformed into savanna by the warmer climate that is more suitable to woody plants; the Nama-Karoo is expected to become even drier, especially in the western parts thereof; the Fynbos, especially its northern parts will probably vanish. Many of the drought-sensitive plants it hosts will become extinct; and the Savannah which hosts various vegetation types and therefore large amounts of herbivores will be altered by climate change. The distribution of vegetation and precipitation upon which these herbivores rely will change, consequently limiting the areas available for supporting current wildlife diversity.<sup>76</sup> Therefore the alteration of migratory routes of species that use both seasonal wetlands and track seasonal changes in vegetation will be particularly evident in the Savannah. This effect can have negative repercussions for the breeding rates and eventually the survival of these species.<sup>77</sup> Fourthly, alien invasive species which are already a major problem in South Africa have generally shown to be more adaptive to variable climatic conditions than native species and will therefore flourish under changing conditions. This will put even more strain on the country's native species.<sup>78</sup>

It is therefore apparent that climate change is predicted to have serious consequences on South Africa's natural resource base.

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<sup>75</sup> The Succulent Karoo hosts 4000 plant species. WWF 2008 [http://assets.panda.org/downloads/east\\_africa\\_climate\\_change\\_impacts\\_final\\_2.pdf](http://assets.panda.org/downloads/east_africa_climate_change_impacts_final_2.pdf), Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1061, DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>76</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1048.

<sup>77</sup> WWF 2008 <http://www.worldwildlife.org/climate/Publications/WWFBinaryitem4926.pdf>, D

<sup>78</sup> DEAT 2010 <http://soer.deat.gov.za/69.html>.

### 3.3 Domestic activities contributing to climate change

South Africa has one of the highest per capita greenhouse gas emission rates in the world.<sup>79</sup> Of the three main greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) the most challenging one in South Africa is CO<sub>2</sub>.<sup>80</sup> South Africa is not only the largest emitter of CO<sub>2</sub> in the Southern African Developing Community (SADC),<sup>81</sup> but in the whole of Africa.

Although energy generation is the main cause of CO<sub>2</sub> emissions in South Africa,<sup>82</sup> various other domestic activities produce large amounts of CO<sub>2</sub> and other greenhouse gases. Furthermore, these activities increase the demand on energy production through their energy inefficiency and therefore contribute to higher greenhouse gas emissions. These activities include transport, especially road transport,<sup>83</sup> agricultural activities,<sup>84</sup> industry,<sup>85</sup> building and maintaining residential<sup>86</sup> and commercial buildings.<sup>87</sup>

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<sup>79</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1048.

<sup>80</sup> DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>81</sup> SADC is a regional economic community established in 1991 under the auspices of the *Treaty Establishing the African Economic Community*. For a detailed organisational layout and the working and functions of SADC see <http://www.sadc.int/>.

<sup>82</sup> See discussion in 3.3.1.

<sup>83</sup> See discussion in chapter 3.3.2.

<sup>84</sup> Agriculture generates about a 20th of South Africa's greenhouse gas emissions, in equal amounts of CH<sub>4</sub>, and N<sub>2</sub>O. The former is predominantly from enteric fermentation in ruminants (livestock).

<sup>85</sup> Industry is responsible for 55% of South Africa's overall energy consumption. Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1053-1063.

<sup>86</sup> Residential buildings are responsible for 16% of South Africa's energy usage. Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1063.

<sup>87</sup> Commercial buildings are responsible for 11% of South Africa's energy usage. Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1063.

### 3.3.1 Energy sector

The energy sector is the largest single source of greenhouse gas emissions in South Africa, accounting for about 90% of the total.<sup>88</sup> This is mainly caused by the country's reliance on domestic coal reserves as the principal energy source.<sup>89</sup> As a result, South Africa's energy sector is ranked 8<sup>th</sup> on the list of highest emitting energy sectors globally.<sup>90</sup>

Currently Eskom is supplying 95% of the country's electricity – 93% of which comes from coal-fired power stations.<sup>91</sup> Consequently, Eskom is causing approximately half of the country's total greenhouse gas emissions<sup>92</sup> and ranks second on the list of the world's highest CO<sub>2</sub> producing companies, producing 214 million tons of CO<sub>2</sub> annually. Population growth and industrial development will of course further increase the demand for electricity and may elevate greenhouse gas emissions even more.<sup>93</sup> The emissions created in electricity production are projected to rise from approximately 200 Megatons (Mt) CO<sub>2</sub> in 2004 to almost 300 Mt of CO<sub>2</sub> in 2022.<sup>94</sup>

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<sup>88</sup> Davidson, Tyani and Afrane-Okesse *Energy and Development Research Centre University of Cape Town* 2002 7.

<sup>89</sup> Glazewski *Environmental Law* 584. Primary energy supply and consumption in South Africa are dominated by coal accounting for 71%. Davidson, Tyani and Afrane-Okesse *Energy and Development Research Centre University of Cape Town* 2002 6, DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>90</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1064.

<sup>91</sup> Nuclear energy provides 2.8% of electricity supply and hydro-electricity only 0.8% of the country's electricity. Davidson, Tyani and Afrane-Okesse *Energy and Development Research Centre University of Cape Town* 2002 6.

<sup>92</sup> The chief source of CO<sub>2</sub> emissions was the energy sector, which generated approximately 90% of the total CO<sub>2</sub> emissions in 1990 and 91% of the total CO<sub>2</sub> emissions in 1994. Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities", Earthlife Africa 2009 [http://www.earthlife.org.za/wordpress/wpcontent/uploads/2009/02/cc2\\_single\\_pages.pdf](http://www.earthlife.org.za/wordpress/wpcontent/uploads/2009/02/cc2_single_pages.pdf).

<sup>93</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1063.

<sup>94</sup> Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1063.

### 3.3.2 Road transport sector

Another major contributor to greenhouse gas emissions is the transport sector. South Africa's transport sector contributed 20% to the country's total CO<sub>2</sub> emissions by 2000,<sup>95</sup> with this figure expected to rise even higher. Road transport produces 75% of the transport sector's CO<sub>2</sub> emissions and is responsible for 17% of South Africa's energy usage.<sup>96</sup> These figures are mainly caused by inadequate technological development with regards to fuel inefficient vehicles and fuel quality, a steady increase of the number of vehicles on the roads and an increase in the annual distance driven are contributory factors to this desperate situation.<sup>97</sup>

## 4 The need for and use of fiscal and tax-based fiscal measures

As discussed above, South Africa's is particularly vulnerable to the impacts of climate change because of the country's socio-economic context and climate sensitive natural resource base. Especially South Africa's energy and the road transport sectors are major contributors to climate change. Therefore, effective measures need to be implemented and successfully utilised to minimise the contribution these sectors make towards climate change.

Traditionally, command and control measures<sup>98</sup> were the primary measures used in climate change mitigation efforts in the road transport and energy sectors.<sup>99</sup> This presents some challenges that are relevant for this study.<sup>100</sup> First,

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<sup>95</sup> Paterson "Incentive-based Measures" 13.

<sup>96</sup> City Energy 2007  
<http://www.cityenergy.org.za/files/transport/resources/updates/Energy%20Climate%20Change%20and%20Transport%20.pdf> Energy Climate and Transport.

<sup>97</sup> City Energy 2007  
<http://www.cityenergy.org.za/files/transport/resources/updates/Energy%20Climate%20Change%20and%20Transport%20.pdf> Energy Climate and Transport.

<sup>98</sup> For definition of command and control measures, see 1.

<sup>99</sup> Craigie, Snijman and Fourie "Dissecting Environmental Compliance and Enforcement" 45-55, Kidd "Criminal Measures" 258-265 and Winstanley "Administrative Measures" 225.

<sup>100</sup> The problems associated with environmental compliance and enforcement in these sectors can often not only be attributed to the absence of command and control

command and control measures are not flexible enough to cope with the escalating greenhouse gas emissions from the ever-growing road transport and energy sectors,<sup>101</sup> and to adequately provide for geographical, sectoral and individual specificities.<sup>102</sup> Secondly, Command and control measures have proved to be ineffective in these sectors because of their time-consuming and often cumbersome, reactive nature and they often not being the most suitable measures for specific situations.<sup>103</sup> They are costly to apply and are often undermined by capacity constraints in these sectors.<sup>104</sup> Thirdly, the command and control approach does not encourage or assist relevant voluntary initiatives and may hamper technological development by merely enforcing compliance with a minimum regulatory standard, which does not cultivate innovation or encourage people to go beyond the regulated performance levels.<sup>105</sup> Fourthly, these measures fail to remedy market failures by not accounting for the efficient use of environmental goods and services relevant to these sectors such as soil, air, water, fauna, flora and broader ecosystems.<sup>106</sup> Finally, all of the above,

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measures, but can be attributed to the specific characteristics of these measures and their inadequate implementation. Paterson and Kotzé "Towards a more effective Environmental Compliance and Enforcement Regime for South Africa" 376.

<sup>101</sup> Command and control measures do not provide government with the necessary discretion to tailor compliance and enforcement solutions to fit specific situations. For the effective mitigation of climate change in the road transport and energy sectors flexible measures are needed so that these measures can effectively be extended and refined to cope with new technological developments, especially in the road transport and energy sectors where new technologies are developing daily. Craigie, Snijman and Fourie "Dissecting Environmental Compliance and Enforcement" 52.

<sup>102</sup> These command and control measures are generally applied on a consistent basis throughout the country, they do not sufficiently provide for more stringent regulation in problem areas where there are higher rates of greenhouse gas emissions or in more vulnerable areas such as the country's biodiversity hotspots. Burns and Kidd "Administrative Law & Implementation of Environmental Law" 244-248, Paterson 2006 *PER* 2.

<sup>103</sup> Kidd "Criminal Measures" 240-253.

<sup>104</sup> Burns and Kidd "Administrative Law & Implementation of Environmental Law" 244-248.

<sup>105</sup> The international trend of "green" companies and "green" technologies are not supported by these measures. For instance, the energy producers are only encouraged to comply with certain emission standards and are not encouraged to develop technologies that enable them to surpass these standards with their sustainability efforts. Sufficient encouragement in the form of financial incentives could possibly encourage industry to surpass regulatory standards. Lehman "Voluntary Compliance Measures" 294.

<sup>106</sup> High poverty rates and unemployment often causes the economic component to overshadow environmental considerations in daily market activities. For instance, South Africa has in the past focused on producing as much energy as fast as possible to meet the country's demand and to sell as much energy as possible to our neighbouring

coupled with the general incompetence of prosecuting authorities in these specialised fields and inconsistent active enforcement,<sup>107</sup> create a context within which the sole application of command and control measures in combating climate change the road transport and energy sectors seems futile.<sup>108</sup>

Therefore many governments are recognising the significance using command and control measures in combination with alternative measures.<sup>109</sup> These alternative measures include: agreement-based measures;<sup>110</sup> civil measures;<sup>111</sup> and fiscal measures in combination with command and control measures.<sup>112</sup> To ensure utmost efficacy in addressing the urgent need to mitigate climate change, a unique combination of measures should be utilised in each situation to ensure utmost efficacy.<sup>113</sup> The focus of this study, tax-based fiscal measures, is

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countries. The consideration of environmental externalities was an afterthought. South Africa's policy documents and measures followed suit with inadequate consideration of the environmental component. Paterson 2006 *PER* 2.

<sup>107</sup> As depicted in section 1, command and control measures can be divided into administrative measures and criminal measures. Concerning criminal measures, inadequate training of officials whom are tasked with the enforcement of criminal measures and a lack of political will to effectively train these officials contribute to the inefficiency of command and control measures. Furthermore, although contemporary environmental laws prescribe harsh penalties and innovative sentencing options are available, they are frequently insufficient to adequately penalise offenders since the financial advantage these offenders obtain from their offence overshadows the financial burden of penalties. Furthermore, there is a lack of awareness of the existence and nature of these sentencing options among prosecutors and the judiciary. The burden of proof (beyond reasonable doubt) used in criminal matters are often hard to prove in air quality matters. It is for instance difficult to prove that an energy producer or certain fuel type emits more than the allowed amount of emissions, since specific sampling and testing is needed to prove this. On the other hand administrative measures form an integral part of many of South Africa's environmental laws and are theoretically simpler, less expensive and more flexible than criminal measures. However, administrative measures lack teeth. For instance, if a company does not comply with the regulatory standards set in a directive, that non-compliance can not be enforced by criminal sanction. Lengthy and costly civil litigation will be the only option for remedying this non-compliance. Paterson and Kotzé "Towards a more effective Environmental Compliance and Enforcement Regime for South Africa" 376, Kidd "Criminal Measures" 242.

<sup>108</sup> Nel and Du Plessis 2001 *SAJELP* 15, Kidd "Criminal Measures" 242-244.

<sup>109</sup> Craigie, Snijman and Fourie "Dissecting Environmental Compliance and Enforcement" 58.

<sup>110</sup> See 1 for explanation of agreement-based measures.

<sup>111</sup> See 1 for explanation of civil measures.

<sup>112</sup> Craigie, Snijman and Fourie "Dissecting Environmental Compliance and Enforcement" 59.

<sup>113</sup> Relevant for this study, this approach could contain the following: command and control measures (air emission standards with active prosecution through criminal sanctions); agreement-based measures (voluntary agreements between government and Eskom,

therefore by no means presented as being the panacea for mitigating climate change in the road transport and energy sectors. It is but one type of measure, which should be utilised in combination with others.

Fiscal and specifically tax-based fiscal measures offer certain unique benefits which makes them particularly attractive to mitigating climate change in the road transport and energy sectors. Before discussing these benefits, it is vital to understand the basis of these measures which is set in their aim to influence economic behaviour in order to attain certain set objectives.<sup>114</sup> Their hypothetical underpinning is found therein that markets generally present a valuable means of distributing scarce resources, although not necessarily the most equitable.<sup>115</sup> Prices resulting from a competitive environment theoretically encourage the most productive businesses to thrive and it provides incentive-based persuasion to enhance the productive use of resources.<sup>116</sup> Conversely, some markets are subject to failure, particularly to accurately assess the value of environmental goods and services.<sup>117</sup> This regularly contributes to deficient consideration of environmental matters in daily market activities.<sup>118</sup> Fiscal measures seek to influence the relative prices that persons, industry and organisations face in the provision and use of environmental goods and services.<sup>119</sup> Their application will effectively alleviate market failure, internalise the environmental costs habitually

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fuel producers and vehicle manufacturers to minimise greenhouse gas emissions); civil-based measures (private prosecutions and class actions against unsustainable energy and fuel producers and users); and fiscal measures (environmental taxes that encourage energy and fuel producers and vehicle manufacturers to invest in cleaner technologies. Nel and Du Plessis 2001 *SAJELP* 1-37.

<sup>114</sup> For instance, tax based fiscal measures can be utilised to manipulate energy and vehicle producers to obtain the objective of minimising greenhouse gas emissions and thus mitigate climate change. Craigie, Snijman and Fourie "Dissecting Environmental Compliance and Enforcement" 58-59.

<sup>115</sup> National Treasury *Draft Policy Paper* 41.

<sup>116</sup> A company that is more efficient with regards to the inputs (resources) needed to produce its aimed product or service will generally rise above its competitors. Paterson 2006 *PER* 11.

<sup>117</sup> For instance energy, fuel and vehicle producers have in the passed failed to consider environmental externalities such as greenhouse gas emission rates in the valuation of their products. Consideration of these externalities where seen as a component that hampered economic growth and development.

<sup>118</sup> National Treasury *Draft Policy Paper* 42.

<sup>119</sup> Fiscal, and specifically tax-based fiscal measures are believed to put a price tag on environmental externalities.

unaccounted for in ordinary market relations, endorse the proficient use and responsible management of environmental goods and services, and raise revenue to finance environmental costs.<sup>120</sup> Therefore, fiscal measures can for the purposes of this study be defined as a collection of measures in the road transport and energy sectors which have the goal of correcting environmentally related market failures through the price mechanism and therefore encouraging the mitigation of climate change.<sup>121</sup>

In the South African context fiscal measures refer to those measures that use existing markets,<sup>122</sup> and those measures that create new markets.<sup>123</sup> Those measures that use existing markets include both positive fiscal measures and negative fiscal measures. Positive fiscal measures aim to unswervingly reward the conduct of those individuals and corporations which actively seek to decrease their environmental impacts or to contribute to the protection and conservation of natural resources.<sup>124</sup> Positive measures include, for example, tax benefits;<sup>125</sup> deposit refund systems;<sup>126</sup> and direct subsidies.<sup>127</sup> Negative

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<sup>120</sup> Energy and fuel producers and vehicle manufacturers are for instance encouraged to minimise their resource use and their greenhouse gas emissions by financial incentives in the form of tax rebates for companies that comply with air emission standards and use cleaner technologies. Financial disincentives in the form of heavy taxes on products that do not comply with standards will also encourage companies to comply with emission standards and the income generated from these taxes can give government much needed funds that can be invested in the development of cleaner technologies. Consequently, for companies to keep thriving in a highly competitive environment they will be left with little choice but to start considering the effects of their products and services on the environment. Paterson "Incentive-based Measures" 299, National Treasury *Market-Based Instruments* 32-45.

<sup>121</sup> National Treasury *Draft policy paper* 2, Paterson "Incentive-based Measures" 298.

<sup>122</sup> Fiscal measures that use existing markets are those that seek to manipulate existing markets and current market forces. Paterson "Incentive-based Measures" 300-304.

<sup>123</sup> Fiscal measures that create new markets aim to develop a new set of property rights for environmental goods or services, such as tradable use and discharge rights. National Treasury *Market-Based Instruments* 44.

Paterson "Incentive-based Measures" 300, Turpie "Environmental and Resource Economics" 61-66.

<sup>125</sup> The granting of a variety of tax benefits to persons, individuals, industry and organisations to reward certain conduct. tax rebates can for instance be granted for cleaner fuels such as low octane fuels and bio fuel and for cleaner energy sources such as renewable energy. See 6 and 7 for a discussion of such measures in the road transport and energy sector respectively. Paterson "Incentive-based Measures" 300, Turpie "Environmental and Resource Economics" 61-66, National Treasury *Market-Based Instruments* 32-45.

fiscal measures aim to impose costs on individuals, industry and corporations whose behaviour impact negatively on the environment. Negative measures include, for example, emission, effluent and disposal charges;<sup>128</sup> user charges;<sup>129</sup> licensing tariffs; product taxes;<sup>130</sup> and performance bonds.

Fiscal and specifically tax-based measures are growing in prominence in South Africa and various opportunities exist for introducing new tax-based fiscal measures or extending existing ones.<sup>131</sup> They are distinctive therein that they can be used to reward efficient and sustainable behaviour (positive) and to discourage inefficient and unsustainable behaviour (negative).<sup>132</sup> Furthermore, they are said to: improve efficiency and equitability; potentially decrease

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<sup>126</sup> The imposition of a deposit at point of sale on specific products such as glass, plastic and paper which are suitable for reuse or recycling. The deposit is then returned to the person on delivery of the used product at specified collection points. Paterson "Incentive-based Measures" 301. Turpie "Environmental and Resource Economics" 61-66.

<sup>127</sup> The granting of assistance to individuals or industry to encourage economically sustainable activities. Industry and companies that invest in cleaner fuels, vehicles and cleaner energy sources can for instance be granted subsidies to assist them herein. See sections... for a discussion of such measures in the road transport and energy sectors. DEAT NCCRS 8, Paterson "Incentive-based Measures" 301.

<sup>128</sup> These are imposed to manage water effluent, atmospheric emissions, solid waste and noise from industrial and domestic sources. Heavier taxes can be charged for products such as fuels and energy that emits more greenhouse gas emissions. See sections 6 and 7 for discussions of such measures in the road transport and energy sectors. Paterson "Incentive-based Measures" 302, National Treasury *Market-Based Instrument* 15-20.

<sup>129</sup> A 'user-charge' is a 'requited payment for a specific service rendered' It is based on the individual benefit principle and attempts to connect the amount paid to the benefit received by an individual. Vital characteristics of a user charge include the provision of a marketable service to individual beneficiaries; direct benefits accrued to beneficiaries in exchange for payments; and transactions that take place in a willing buyer market. Generally, user charges should not exceed the typical cost of providing the service. National Treasury *Market-Based Instrument* 5.

<sup>130</sup> Product taxes are imposed on various products with the goal of integrating the indirect environmental costs of manufacturing these products. See 6 and 7 for discussions of with regards to such measures.

<sup>131</sup> South Africa is far behind other countries with regards to the development and use of tax-based fiscal measures. Therefore the country can actively use the knowledge gained from the successes and failures of other countries to ensure that the measures are implemented smoothly while allowing ample opportunity for extension and refinement. The existing tax-based fiscal measures in the road transport and energy sectors, the possible extension of these measures and the potential for new measures are discussed in 6 and 7. Paterson and Kotzé "Towards a more effective Environmental Compliance and Enforcement Regime for South Africa" 377.

<sup>132</sup> The notion of positive and negative taxing, which creates incentives and disincentives. Paterson "Incentive-based Measures" 298, DEAT NCCRS 8, Turpie "Environmental and Resource Economics" 61-66.

administrative, compliance and enforcement costs;<sup>133</sup> promote voluntary initiatives and innovation;<sup>134</sup> encourage individuals and corporations to surpass regulatory standards; and alleviate market failures, whereby the use of natural resources is protected.<sup>135</sup> Accurately designed tax-based fiscal measures have the benefit of raising much needed revenue, which can contribute to achieving vital objectives such as: promoting responsible resource use; enhancing actual environmental outcomes; altering key perpetrators' disposition and the entire society's perception; and promoting the principle of sustainable development.<sup>136</sup> Tax-based fiscal measures are also grounded on the principles of certainty; simplicity; and cost minimisation,<sup>137</sup> which make them particularly attractive.

Lastly the hybridised (positive and negative taxing), incentive-based nature of tax-based fiscal measures, coupled with their flexibility (found in their ability to function without any formal regulation or as an extension of command and control measures),<sup>138</sup> make them feasible auxiliaries for combating climate change in the road transport and energy sectors, whilst also alleviating economic pressure and promoting equity.<sup>139</sup>

Especially the last two mentioned benefits (alleviating economic pressure and promoting equity) are of particular importance to this study, since there has been

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<sup>133</sup> Expensive and timely prosecution and enforcement by officials and environmental authorities is not necessary for the effective working of tax-based fiscal measures. This will also alleviate the burden on the country's courts that are consistently overburdened with huge amounts of cases.

<sup>134</sup> For instance companies will take initiative to comply and even surpass emission standards because they can benefit by doing so in the form of financial incentives.

<sup>135</sup> Paterson "Incentive-based Measures" 298.

<sup>136</sup> Revenue can for instance be used to fund various air quality awareness projects that can change the perception of society towards air quality. Funds could also be used to invest in cleaner technologies. Paterson 2006 *PER* 2.

<sup>137</sup> Taxpayers should be certain about the tax liability in a given set of circumstances. Simplicity is important to ensure greater certainty and facilitate cost minimisation. Administration and compliance costs should also be kept to a minimum. Equally, the loss in welfare to society as a whole (the dead-weight loss) should be kept to a minimum. National Treasury *Draft Policy Paper* 57.

<sup>138</sup> International Network for Environmental Compliance and Enforcement 2009 <http://www.inece.org/>.

<sup>139</sup> National Treasury *Draft Policy Paper* 57.

some concern with regards to the additional financial burden tax-based fiscal measures may place on taxpayers in a country already burdened with poverty and inequality.<sup>140</sup> In reality, the majority of tax payers burdened additionally by these tax-based fiscal measures are so burdened because of their unsustainable business practises or product purchasing choices.<sup>141</sup> These taxes are in the form of negative taxing on for instance fuels that emit high rates of greenhouse gases. Producers are burdened hereby, since their production costs will be hoisted by such a tax. Similarly, consumers that choose to purchase such a product will be burdened by a higher price that accommodates the negative tax. However, both producers and consumers can choose to produce and consume more sustainable products that for instance emit less greenhouse gas emissions. Thereby, they can evade negative taxes and thus alleviate economic pressure while mitigating climate change. Furthermore, the promotion of equity in this context refers to the so called: "ability to pay principle".<sup>142</sup> This entails that similar individuals be treated similarly and that those in different circumstances bear appropriately different burdens. The wealthier part of society will for instance be more likely to bear the additional burden that can be associated with tax-based fiscal measures in the roads transport and energy sectors, seeing that they are in control of thriving businesses that use hefty amounts of energy and they are the ones that can afford vehicles. On the other hand, large numbers of South Africans will not be directly affected by the burden associated with these tax-based fiscal measures, since some of them do not even have access to electricity and do not own vehicles.<sup>143</sup> Another factor that needs to be taken into account is the reality that tax-based fiscal measures offer ample financial incentives for companies and individuals that choose sustainable business practices.<sup>144</sup> These funds would not be available if it was not for tax-based fiscal measures and these funds can assist in alleviating economic pressure. Tax-

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<sup>140</sup> See 3 and 3.1.

<sup>141</sup> National Treasury *Market-Based Instruments* i-x.

<sup>142</sup> National Treasury *Draft Policy Paper* 57. International Network for Environmental Compliance and Enforcement 2009 <http://www.inece.org/>.

<sup>143</sup> WWF 2008 <http://www.worldwildlife.org/climate/Publications/WWFBinaryitem4926.pdf>, DEAT 2010 <http://soer.deat.gov.za/69.html>.

<sup>144</sup> National Treasury *Market-Based Instruments* 89-101.

based fiscal measures also provide government with additional revenue which can be used to encourage sustainable business practices and investment in cleaner technologies.<sup>145</sup> Lastly, the possible effective mitigation of climate change through these measures will minimise the expenditure needed for adapting to the impacts of climate change.<sup>146</sup>

In the above paragraphs the theoretical underpinning of tax based fiscal measures has been explained and it has been argued that tax-based fiscal measures offer certain unique benefits to climate change mitigation efforts in the road transport and energy sectors. The following sections will focus on South Africa's policy and law response to this need for tax-based fiscal measures by assessing:

- The momentous tax reform that is taking place in South Africa and which is promoting the development of tax-based fiscal measures in the form of environmentally related taxes;
- Tax-based fiscal measures in the road transport sector and the possible extension thereof and;
- Tax-based fiscal measures in the energy sector and the possible extension thereof.

## **5 Tax reform and the development of tax-based fiscal measures**

Historically the South African tax system was "neutral" in the sense that it did not aim to influence the taxpayer's behaviour other than to pay the required taxes.<sup>147</sup>

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<sup>145</sup> National Treasury *Market-Based Instruments* 26-38.

<sup>146</sup> Paterson "Incentive-based Measures" 332.

<sup>147</sup> This traditional theory favoured tax neutrality and the taxing of price inelastic goods. This taxing of price inelastic goods means that the demand for products or services is not responsive to change and therefore imposing the taxes on a specific product does not impact on demand, and accordingly on tax revenue. However, most products that are relevant for this study such as fuel and motor vehicles are price elastic in nature. This means that the demand for the product or service is responsive to change and therefore imposing the tax on a specific product will impact on demand, and accordingly tax revenue. It is thus apparent that South Africa's traditional tax theory did not support the development and use of tax-based fiscal measures. National Treasury *Draft Policy*

This has changed since the dawn of the new democratic era as South Africa has undertaken wide-ranging tax reforms with the goal of encouraging: economic growth; social development; job creation; investments; sustainable development; and climate change mitigation.<sup>148</sup> Reform efforts have focused on simplifying the tax system,<sup>149</sup> broadening the tax base and reducing tax rates to ensure a more constructive fiscal environment within which economic growth can take place.<sup>150</sup> The inclusions of issues such as climate change and sustainable development into the reform efforts have stimulated the development of environmentally related tax measures<sup>151</sup> into South Africa's tax system.<sup>152</sup> A variety of environmentally related taxes and charges, have been introduced into South Africa's tax system, currently accounting for approximately 10% of the country's total tax revenue and 2% of the country's Gross Domestic Product (GDP).<sup>153</sup>

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*Paper 26, National Treasury Market-Based Instruments 7-11, Paterson "Incentive-based Measures" 333.*

<sup>148</sup> The tax reform has shifted towards using tax as a measure to mould human behaviour in key problem areas in South Africa's socio-economic and environmental context. It is especially vital for this study since it overrides the favour towards the taxing of inelastic goods and tax neutrality. It provides space for new innovative taxes to be implemented in key areas such as climate change mitigation.

<sup>149</sup> This simplicity is one of the major benefits associated with tax-based fiscal measures. It provides society with greater certainty as to their tax liability in a certain set of circumstances and therefore encourage cost minimisation. National Treasury *Market-Based Instruments 7-11, Paterson "Incentive-based Measures" 333.*

<sup>150</sup> National Treasury *Market-Based Instruments 7-11, National Treasury Draft Policy Paper iii.*

<sup>151</sup> For the purposes of this study the word "environmentally related taxes" can be understood as a synonym for: "tax-based fiscal measures".

<sup>152</sup> Although undermining the ideal of tax neutrality, the granting of various tax benefits to individuals, industry and organisations to reward sustainable conduct and heavy taxing for unsustainable conduct are increasingly recognised as a valuable regulatory measures in the environmental context. National Treasury *Market-Based Instruments 7-11, Paterson "Incentive-based Measures" 303.*

<sup>153</sup> The introduction of numerous environmentally related taxes such as fuel and energy levies among others is a major step in the right direction. Unfortunately fiscal authorities have until recently been opposed to earmarking the considerable funds received from these taxes solely for investment in environmental initiatives such as renewable energy and cleaner technologies. These funds have also in the past not been adequately utilised to improve the administrative, compliance and enforcement capacity of relevant fiscal and environmental authorities. This is definitely an area that can be considerable improvement to maximise the benefit of environmentally related taxes. National Treasury *Draft Policy Paper iii, Paterson "Incentive-based Measures" 333.*

It is thus apparent that a momentous environmental tax reform is taking place in South Africa, and that a variety of tax-based fiscal measures have been introduced as a result hereof.

## **6 Tax-based fiscal measures in the road transport sector (Policy)**

Generally speaking the elevation of transport fuel prices through the imposition of fuel levies can indirectly act as an incentive to reduce emissions by discouraging the use of private vehicles, energy wasteful vehicles and fuel with doubtful specifications.<sup>154</sup> It can also encourage the use of public transport, the development of fuel-efficient technologies and cleaner transport fuels.<sup>155</sup> This will in turn reduce greenhouse gas emissions and minimise our contribution to climate change. Therefore, the South African government has proposed the systematic increase in the general fuel levy over the last few years, to some extent to raise revenue, but primarily with the goal of limiting fuel consumption and traffic density, and minimising the environmental impacts caused by the transport sector.<sup>156</sup> Another important aspect recognised by The *Draft Policy Paper*,<sup>157</sup> the *Joint Implementation Strategy for the control of exhaust emissions from road-going vehicles*,<sup>158</sup> and the *Draft Energy Strategy*<sup>159</sup> is the fact that differentiated tax rates for cleaner fuels can support the development and use of such fuels, will enhance air quality, and therefore contribute to climate change mitigation.<sup>160</sup> Similarly, the *Budget Tax Proposal* (2008/2009) proposed a hoisting of the bio-diesel fuel tax concession to 50% and the exclusion of bio-ethanol from the fuel levy scheme.

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<sup>154</sup> Paterson 2006 *PER* 25.

<sup>155</sup> Paterson "Incentive-based Measures" 13.

<sup>156</sup> The general fuel levy has been raised from 121 c/l (for petrol) and 105 c/l (for diesel) in 2007 to 150 c/l (for petrol) and 135 c/l (for diesel) in 2009. See National Treasury *Budget Tax Proposals (2009/2010)* 15. It gives effect to GN 322 in GG 32014 of 20 March 2009.

<sup>157</sup> National Treasury *Draft Policy Paper* 71-74.

<sup>158</sup> DME *Joint Implementation Strategy for the control of exhaust emissions from road-going vehicles* 1-7.

<sup>159</sup> DME *Draft Energy Efficiency Strategy* 2-10.

<sup>160</sup> DEAT *NCCRS* 25.

South African policy documents also propose some changes to product taxes on vehicles in the form of *ad valorem* customs and excise duties. Historically, this tax was primarily a tax on luxury, seeing that the more expensive the vehicle, the higher the tax burden was thereon.<sup>161</sup> No consideration was given to environmental criteria.<sup>162</sup> However, the *Draft Policy Paper* recognises that the transformation of existing vehicle excise duties could promote the production and purchase of vehicles using cleaner technologies.<sup>163</sup> Consequently, the *Budget Tax proposals* (2008/2009) anticipated that existing vehicle *ad valorem* excise duties could play a vital role, with environmental criteria integrated into their design. The prospect of the inclusion of engine size as a proxy for the level of emissions and or fuel consumption was also put on the table.<sup>164</sup> Furthermore, the *Draft Policy Paper* explicitly mentioned that the impact of medium and heavy commercial vehicles on air quality is underestimated and that it should be included in the *ad valorem* excise duty system as well.<sup>165</sup> More recently the *Budget Tax proposal* (2009/2010) proposed an *ad valorem* CO<sub>2</sub> emissions tax on new passenger motor vehicles to be implemented from 1 March 2010.<sup>166</sup> Based on subsequent consultations,<sup>167</sup> the *Budget Tax proposals* (2010/2011) recommends that the original tax proposal be converted into a flat rate CO<sub>2</sub> emissions tax, effective from 1 September 2010. The main objective of this tax is to influence the composition of South Africa's vehicle fleet to become more

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<sup>161</sup> National Treasury *Draft policy paper* 73.

<sup>162</sup> These excise duties are imposed on all new passenger and light commercial vehicles under Schedule 1 of the *Customs and Excise Act* 91 of 1964.

<sup>163</sup> National Treasury *Draft policy paper* 72.

<sup>164</sup> National Treasury *Budget Tax proposals* (2008/2009) 7.

<sup>165</sup> It remains to be seen to what extent these criteria will be implemented and to what extent National Treasury *Draft policy paper* 73.

<sup>166</sup> National Treasury *Budget Tax proposals* (2009/2010) 11.

<sup>167</sup> This proposal has been met with great complaints from the car manufacturing industry and motoring fraternity. Not only was it believed that government got the timing wrong (the industry is emerging from one of the deepest and most severe recessions in its history), but they also alleged that government got the calculation wrong. Motoring experts commented that if the emissions tax component was also calculated on an *ad valorem* basis, buyers of expensive cars with low emissions may end up paying more than those acquiring cheaper cars but with much higher emissions, a scenario not in line with the goal of environmental reform. The complaints of the motoring industry have been met. It has consequently been proposed that the *ad valorem* proposal be amended to a flat rate emissions tax and that the current *ad valorem* luxury tax remain as is. *Budget Tax Proposals* (2010/2011) 9.

energy efficient and environmentally friendly. The emissions tax will initially apply to passenger cars, but will be extended to commercial vehicles once agreed CO<sub>2</sub> standards for these vehicles are set. The proposed CO<sub>2</sub> vehicle emissions tax will be implemented as a specific tax, instead of the previously proposed ad valorem tax.<sup>168</sup>

From the above it is apparent that government and especially the National Treasury has made some innovative and groundbreaking environmental tax proposals relevant to the road transport sector. The following section will analyse the extent to which South African legislation provide, or leave space for the implementation of these proposals through tax-based fiscal measures. The possible extension and refinement of measures provided for will also be analysed.

### **6.1 Tax-based fiscal measures in the road transport sector (legislation)**

The *Customs and Excise Act* gives effect to the notion of stimulating investments in cleaner fuels through differentiated rates for cleaner fuels. It grants bio-ethanol producers a rebate of 16.7 cents/litre and bio-diesel producers 27.3 cents/litre, both up to the amount of R20 million biofuel.<sup>169</sup> The *Income Tax Act* also seeks to stimulate biofuel technologies through various tax benefits.<sup>170</sup> Furthermore, the Central Energy Fund Act 38 of 1977 imposes a demand-side

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<sup>168</sup> Despite the fact that this tax is expected to cause a decrease the sale of new passenger vehicles in an already fragile motoring industry, the encouragement of investment in cleaner technologies and the consequent mitigation of climate change creates a context where the immediate economic impact of this tax seems inferior. National Treasury *Budget Tax proposals* (2010/2011) 9.

<sup>169</sup> The fuel levy applicable to the production of certain grades of bio diesel has been rebated by 40% for mass producers and 100% for small producers. S 12(4)(e).

<sup>170</sup> The cost of assets brought into use for the first time by a taxpayer for the purpose of producing biofuels and renewable energy from wind, sunlight or biomass, can be deducted for income tax purposes on the following basis: 50% of the cost incurred for the year in which the asset is brought into use; 30% in the second year of assessment and 20% in the third year. S 12(b)(1)(g) and (h).

levy to reduce the viability of using high-octane fuels.<sup>171</sup> The above mentioned measures provided for, can be extended therein that the demand-side management levy can be increased<sup>172</sup> and broadened by also including lead and other high-sulphur grades of fuel. The use of raw materials (not coal) to produce fuel should also be promoted through more specified and intensive tax benefits and grants.<sup>173</sup> In so doing investment in cleaner fuels will be accelerated.

The proposed CO<sub>2</sub> tax on new passenger vehicles has been implemented on 1 September 2010 by means of the *Customs and Excise Act*, whereby passenger vehicles with a CO<sub>2</sub> rating above 120g/km will be taxed R75 for every g/km over that value.<sup>174</sup> This measure can be further extended by including all new commercial vehicles.<sup>175</sup>

The *National Land Transport Act* 5 of 2009 provides that subject to the *Municipal Fiscal Powers and Functions Act* 12 of 2007, a municipality which has established a municipal land transport fund may impose user charges on

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<sup>171</sup> It aims to discourage the use of high-octane grades of petrol. It imposes a 10 c/l levy on 95-octane unleaded petrol.

<sup>172</sup> An increase in and broadening of the demand-side levy can further discourage industry from using higher greenhouse gas emitting fuels such as lead and high sulphur fuels. For the proper functioning of this measure, it is vital that this measure be extended to include all fuel types.

<sup>173</sup> These grants and benefits should encourage industry to, for instance, use waste products that cannot be recycled for energy creation instead of burning high greenhouse gas emitting coal. It can even act as an alternative to biofuel, since there has been heated debates with regards to the effect biofuel production will have on food security. The production of biofuel is dependant on corn, grain and sunflower, which are also some of South Africa's most important food sources.

<sup>174</sup> The effects of this tax can be illustrated by utilising the example of a new passenger car emitting 200g/km of CO<sub>2</sub>. Since the tax starts at emissions above 120g/km threshold, this vehicle will be taxed on the 80g/km emitted above this threshold. Therefore, at the flat rate of R75 per g/km, such a vehicle will attract additional tax of R6000. Part 1 of schedule number 1 in terms of s 48 and regulations in terms of s 120 of the *Customs and Excise Act* has been amended by GN 772 in GG 33514 of 31 August 2010 to provide for this tax from 1 September 2010.

<sup>175</sup> This can be extremely beneficial since large amounts of vehicles on South Africa's road are commercial vehicles. Each year approximately 40 000 commercial vehicles are sold in South Africa. These vehicles travel great distances. The imposition of a CO<sub>2</sub> tax on new commercial vehicles can contribute to minimising greenhouse gas emissions by encouraging investments in cleaner technologies. Van der Mescht 2006 <http://repository.up.ac.za/upspace/bitstream/2263/6100/1/093.pdf>.

specified classes of motor vehicles entering specified portions of its area at specified times.<sup>176</sup> The efficacy of this measure can be extended by identifying more problem areas within each local authority's boundaries. Differentiated tax rates proportional to the fuel efficiency and the amount of emissions emitted should be payable by vehicle owners entering these areas.<sup>177</sup>

Lastly, S 53(1) of the *National Environmental Air Quality Act* 39 of 2004 (NEMAQA) gives the minister the power to make regulations to provide for fiscal incentives and disincentives, to encourage behavioural changes towards mitigating air pollution. This provision gives government ample freedom to implement and extent innovative tax-based fiscal measures with the aim of minimising greenhouse gas emissions.

From the above it can be derived that there are some innovative legislative provisions giving effect to the proposals discussed in the previous section. However, these tax-based fiscal measures can and should be extended and refined to enhance their climate change mitigation efficacy.

## **7 Tax-based fiscal measures in the energy sector (Policy)**

Despite the recent elevation of electricity prices, South Africa still has some of the lowest electricity prices globally.<sup>178</sup> This phenomenon is a result of our profound dependence on vastly polluting coal-based energy generation and the fact that our pricing system does not consider environmental externalities. Irrespective of other valid considerations,<sup>179</sup> the further raising of electricity prices to incorporate these externalities remain a vital means of balancing the demand for electricity and promoting the development of alternative energy sources, and

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<sup>176</sup> S 28.

<sup>177</sup> This can encourage the use of public transport and cleaner technologies.

<sup>178</sup> Eskom *Annual report* 2006 16.

<sup>179</sup> Such as society's financial and social constraints, which make further increasing electricity levies unappealing.

encouraging the installation of energy efficient appliances.<sup>180</sup> Therefore, the *Draft Policy paper* proposes a fuel consumptive tax, which entails imposing a tax on consumers relative to their use with the aim of decreasing demand.<sup>181</sup> This advance seems to be in discord with current governmental policy, which focuses on the broadening of access to electricity and the promotion of electricity use in low-income households.<sup>182</sup> It is further envisaged to impose a fuel input tax on electricity generators proportional to their fuel inputs, thereby encouraging improved fuel conversion, efficacy and ultimately reducing harmful emissions.<sup>183</sup> Furthermore, the *Budget Tax Proposal* 2008/2009 recognises that current electricity shortages necessitate intercession in order to support demand-side management, which will in turn enhance sustainability of the environment. Accordingly, a 2 c/kWh tax on electricity generated from non-renewable energy sources was proposed. This tax will be collected at source from the producers or generators of electricity.<sup>184</sup> This levy will be imposed on all electricity generation plants excluding those with a capacity lower than five megawatts; those utilising renewable sources such as biogas, biomass, geothermal, solar, wind or water; and those utilising by-products in the forms of steam or heat from other renewable or non-renewable processes.<sup>185</sup> This electricity levy is expected to raise about R4 billion and is expected to be a valuable means of minimising our primary source of greenhouse gas emissions, namely coal-based electricity generation.<sup>186</sup>

In order to attain government's prospective 4% renewable energy market penetration by the year 2013<sup>187</sup> the *National Energy Regulator of South Africa*

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<sup>180</sup> Paterson "Incentive-based Measures" 24.

<sup>181</sup> National treasury *Draft policy paper* 79.

<sup>182</sup> Paterson 2006 *PER* 22.

<sup>183</sup> National treasury *Draft policy paper* 79.

<sup>184</sup> National treasury *Budget Tax Proposal* (2008/2009) 15.

<sup>185</sup> Paterson "Environmental fiscal reform in South Africa" 32.

<sup>186</sup> National Treasury *Budget Tax Proposals* 2008/2009 10.

<sup>187</sup> This effectively translates into 10 000GWh of renewable energy by 2013. GN 513 in GG 26169 of 14 May 2004.

(NERSA)<sup>188</sup> commenced a study into the feasibility of implementing another fiscal measure in the form of a *renewable energy feed-in-tariff* (REFIT). In short, a feed-in-tariff assures a standard electricity rate that envelops the generation costs and promotes investment in renewable energy generation through reasonable profit.<sup>189</sup> Eskom has been appointed as the *Renewable Energy Purchasing Agency* (REPA). It will be obliged to purchase renewable energy produced by registered renewable energy generators at prearranged tariffs, which notably surpass the tariffs for traditional energy generation.<sup>190</sup> These additional funds will serve the purpose of promoting renewable energy investments and production. The tariffs will be reviewed annually in the light of inflation, unstable investment costs and mounting technological expenditure. This annual review of tariffs will furthermore be extremely beneficial therein that it provides the flexibility to adapt to the unpredictable effects of climate change. Despite extensive monitoring and reporting duties imposed on REPA<sup>191</sup> and there are still major concerns about Eskom's incompatible interests as the chief purchaser in the form of REPA and also the primary producer.<sup>192</sup> It is nevertheless possible that this concern can be overcome by utilising an independent body as REPA.<sup>193</sup> Increased investment in renewable energy resulting from the obligation imposed on REPA to purchase renewable energy and the substantially higher tariffs for renewable energy will undoubtedly level the

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<sup>188</sup> NERSA was established in terms of the *National Energy Regulation Act* 40 of 2004 to regulate the electricity supply in South Africa.

<sup>189</sup> NERSA *REFIT Guidelines* 1.

<sup>190</sup> The current REFIT's provided for are: wind (R1.25/kWh); small hydro (R0.94/kWh); landfill gas (R0.90/kWh); and concentrated solar (R2.10/kWh). This is positive if it is kept in mind that the tariff for energy generated by conventional means is in the region of R0.22/kWh. NERSA *REFIT Guidelines* 12.

<sup>191</sup> REPA will be required to monitor and report to NERSA on power production by RE Generators and the cost of the energy purchased under REFIT. NERSA *REFIT Guidelines* 10.

<sup>192</sup> The concern is that Eskom will be caught in a situation where their interests will be in conflict. As producer, Eskom will have the need to sell as much of their renewable energy at as high a rate as possible. As purchaser, in the form of REPA, Eskom will want to purchase renewable energy at the lowest possible prices. Therefore, the notion of Eskom in effect purchasing renewable energy from itself seems to be a recipe for disaster where smaller producers could be seriously prejudiced. Paterson "Environmental fiscal reform in South Africa" 11.

<sup>193</sup> NERSA *REFIT Guidelines* 24.

playing field to the extent that our reliance on vastly polluting coal-based electricity will diminish.

From the above it is apparent that South African policy documents propose innovative tax-based fiscal measures to mitigate climate change in the energy sector. The following section will analyse the extent to which the country's legislation gives effect to the above proposals and the possible extension and refinement of the measures provided for.

### **7.1 Tax-based fiscal measures in the energy sector (legislation)**

First, an overview of various legislative provisions that provide for tax-based fiscal measures that stimulate energy efficiency and investment in cleaner technology will be discussed.

Section 12K of the *Taxation Laws Amendment Act 18 of 2009* replaces S 26(1) of the *Income Tax Act 58 of 1962*. It proposes that any person or company holding a Clean Development Mechanism (CDM) project registration while implementing the project will be exempt from normal taxation and capital gains tax on the amounts received for disposal or anticipated disposal of carbon emission reductions.<sup>194</sup> Section 12L of the *Taxation Laws Amendment Act 18 of 2009* replaces S 27 (1) of the *Income Tax Act 58 of 1962* and provides for certain energy efficiency savings.<sup>195</sup> The *Income Tax Act 58 of 1962* provides for

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<sup>194</sup> The CDM process seeks to bring together developed and developing countries. It allows an industrialised country to fund projects that reduce carbon emissions in a developing country (such as energy efficiency studies), while obtaining credit towards meeting environmental targets. Globally, the CDM is highly controversial in the sense that it may in fact not lead to any reduction in emissions at all, simply allowing rich country's to "pay-off" poorer countries whilst continuing to emit at the same rates. However, in South Africa, CDM is regulated by the Designated National Authority (DNA) which ensures that proposed CDM projects will in reality contribute towards sustainability goals before implementing them. This quality control makes tax rebates for companies holding CDM certificates a valuable means of encouraging companies to enter into such CDM agreements and thereby for instance promote energy efficiency. Rumsey and King "Climate Change: Impacts, Adaption, and Mitigation; Threats and Opportunities" 1066-1069.

<sup>195</sup> In determining the taxable income derived by any person in any year of assessment ending before 1 January 2020 from carrying on any trade, there must be allowed as a deduction the amount determined in accordance with the formula:  $A = (B \times C) / D$ . "A"

various tax benefits of relevance to corporations involved in sustainable development projects like investments in biofuel, renewable energy and recycling.<sup>196</sup> Furthermore, donations tax exemptions are granted to corporations that donate money or property to sustainable development projects.<sup>197</sup> Furthermore, direct subsidies such as through the *Renewable Energy Subsidy Scheme* are granted for certain new renewable energy projects.<sup>198</sup> Lastly the *Electricity Regulation Act* 4 of 2006, provides that tariff principles should provide for or prescribe incentives for continued improvement of the technical and economic efficiency with which services are to be provided.<sup>199</sup>

The above measures are definite steps into the direction of an energy efficient society. However, the power presented to government in the *National Energy Act* 34 of 2008<sup>200</sup> and NEMAQA<sup>201</sup> should be utilised to implement new tax-based fiscal measures and to extend the above measures to enhance their efficacy. For instance, direct subsidies through the *Renewable Energy Subsidy Scheme* can be redesigned to also include projects under the current R100

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represents the amount to be determined. "B" represents the energy efficiency savings expressed in kilowatt-hours or kilowatt- hours equivalent for the year of assessment of the taxpayer. "C" represents the applied rate as the lowest feed-in-tariff, expressed in Rand per kilowatt-hour in effect at the beginning of the year of assessment as determined in terms of the Regulatory Guidelines of NERSA, issued in terms of sections 4(a)(ii) and 47(1) of the *National Energy Regulator Act* 40 of 2004. "D" represents the number two unless a different number has been announced by the Minister. In such case 'D' represents that number. This measure can be extremely beneficial for individuals and companies that take active steps to maximise their energy efficiency.

<sup>196</sup> The cost of assets brought into use for the first time by a taxpayer for the purpose of producing biofuels and renewable energy from wind, sunlight or biomass, can be deducted for income tax purposes on the following basis: 50% of the cost incurred for the year in which the asset is brought into use; 30% in the second year of assessment and 20% in the third year. S 12(b)(1)(g) and h) and S 12(b)(20).

<sup>197</sup> Two such exemptions exist: First, a general exemption is granted in respect of annual donations of R10 000 by individuals and R50 000 by corporations. S 56(2); Secondly, donations of any amount to various institutions are exempted. S 56(1)(h). Such institutions include those in S 10(1) and public benefit organisations in terms of S 30.

<sup>198</sup> To qualify for direct subsidies the relevant project has to use proven renewable energy technologies, has to be situated in South Africa, has to comply with relevant black economic empowerment standards and the cost of the project has to be more than R100 million.

<sup>199</sup> S 16.

<sup>200</sup> It empowers the Minister to make regulations regarding measures and incentives designed to promote the production, consumption, investment, research and development of renewable energy. S 19.

<sup>201</sup> It empowers the minister to initiate regulations that provide for fiscal incentives and disincentives, to encourage behavioural changes towards mitigating air pollution. S 53(1).

million benchmark. This will encourage smaller business owners to undertake renewable energy projects. Furthermore, tax benefits provided for in *the Income Tax Act* 58 of 1962 should also be extended to include nuclear energy projects, since nuclear energy could form an integral part of South Africa's energy future.<sup>202</sup>

The proposed 2 c/kWh environmental tax on electricity generated from non-renewable energy sources was implemented in terms section 42(5) of the *Local Government: Municipal Finance Management Act* 56 of 2003 and came into effect on 1 July 2009. The 2c/kWh are included in recent tariff increases and must be recovered by the energy producer, Eskom.<sup>203</sup>

GN 721 in GG 32378 of 5 August 2009 deals with the implementation of REFIT's.<sup>204</sup> It mandates non-discrimination,<sup>205</sup> cooperation between producer and REPA,<sup>206</sup> and feasibility studies<sup>207</sup> in order to promote the efficiency of this measure. The Department of Minerals and Energy (DME) has announced that revised new generation regulations will be released for public comment during October 2010 prior to the full implementation of this measure in 2011.<sup>208</sup> Currently, the scope of the REFIT scheme only includes four renewable energy sectors: wind power plants; small hydro power plants; landfill gas power plants; and concentrated solar power plants.<sup>209</sup> It can and should be further extended to

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<sup>202</sup> Currently Eskom operates the Eskom operates the nuclear power station at Koeberg which have the generating capacity of 1 800 Mega Watt and currently supplies 2.8% of South Africa's energy. Despite some concern with regards to the specific environmental impacts the production and use nuclear energy will have, it is expected to become a major source of energy as Eskom is planning to construct further nuclear plants, both conventional as well as the Pebble Bed Modular reactor currently under development. Strydom and Surridge "Energy" 766-769.

<sup>203</sup> GN 32309 in GG 670 of 9 June 2009.

<sup>204</sup> See discussion of REFIT's in 7.

<sup>205</sup> This is especially important in the light of the discussion in 7 with regards to the concern of Eskom as primary producer and REPA. S 2.

<sup>206</sup> S 3.

<sup>207</sup> S 4.

<sup>208</sup> DME 2010 <http://www.sabinetlaw.co.za/mining-and-energy/articles/revised-renewable-energy-regulations-pipeline>

<sup>209</sup> NERSA *REFIT Guidelines* 5.

include all alternative energy technologies such as nuclear energy.<sup>210</sup> Furthermore, efforts should be made to appoint an independent body as REPA to avoid the conflict of interest associated with Eskom being the REPA and the primary producer of energy.

From the above discussions, it is apparent that South African legislation provides for numerous tax-based fiscal measures that can contribute to minimising greenhouse gases and thus mitigate climate change. These measures should however be extended and refined to enhance their efficacy.

## **8 Conclusion and recommendations**

This study questioned the extent to which fiscal and specifically tax-based fiscal measures, provided for in domestic policy documents and legislation, may contribute to climate change mitigation in South Africa's road transport and energy sectors.

In addressing this question, particular attention was paid to the phenomenon of climate change in Sections 2 and 3. It was discovered that climate change is a major global concern which is caused by an abundance of greenhouse gases in the atmosphere. Various domestic activities contribute thereto, but South Africa's road transport and energy sectors are major contributors to the country's high greenhouse gas emissions that cause climate change. South Africa is furthermore particularly vulnerable to the impacts of climate change because of the country's socio-economic context, water scarcity, unique geography and climate sensitive biodiversity. This vulnerability accentuates the need to implement innovative, efficient measures to mitigate climate change, not only in the road transport and energy sectors, which was the focus of this study, but in all sectors.

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<sup>210</sup>

NERSA *REFIT Guidelines* 5.

In Section 4 it was depicted that since the traditional command and control measures designed to mitigate climate change in the road transport and energy sectors do not suffice on their own, there is a need for fiscal, and specifically tax-based fiscal measures to assist in mitigating climate change in these sectors. The hybridised (positive and negative taxing), incentive-based nature of tax-based fiscal measures, coupled with their flexibility (found in their ability to function without any formal regulation or as an extension of command and control measures) makes them feasible auxiliaries for combating climate change in the road transport and energy sectors.

Although many tax-based fiscal measures impose additional costs on individuals, industry and organisations, which is a concern in a country overwhelmed with poverty, the climate change mitigation capabilities of tax-based fiscal measures coupled with ample financial incentives for sustainable behaviour, theoretically tips the money scale in favour of these measures.

In Section 5 it was determined that the development of tax-based fiscal measures in South Africa are caused by the continuous tax reform process and that an assortment of environmentally related taxes and charges has been introduced as a result thereof. The road transport sector is no exception hereto, and in Sections 6 and 6.1 it was determined that South African policy documents have recently proposed some innovative tax-based fiscal measures in the road transport sector. Numerous legislative provisions give effect to these proposals, while following the goal of mitigating climate change by: promoting the production and purchase of vehicles using cleaner technologies; limiting fuel consumption and traffic; encouraging the use of public transport; and promoting investment in and development of cleaner technologies.

Some of these implemented measures include: systematic increases in general fuel levies; allowing for demand side levies on certain fuels and differentiated tax rates for cleaner fuels; granting of various tax benefits for cleaner fuel projects and investments; and adding a CO<sub>2</sub> emissions tax on all new passenger vehicles.

This paper however proposed that policy makers and legislators initiate the extension and refinement of these measures to enhance their climate change mitigation efficacy. Some of the proposed extensions include: increasing and broadening demand side levies, so that all fuel types are included in this evaluation; increasing the liability for the CO<sub>2</sub> emissions tax to commercial vehicles, since they form a major part of our road-going vehicles; and extending tax grants and benefits to encourage the use of waste products that cannot be recycled for fuel creation.

In Sections 7 and 7.1 it was discovered that government has proposed some innovative tax-based fiscal measures to mitigate climate change in the energy sector in various policy documents. Numerous legislative provisions give effect to these proposals by: promoting energy efficiency and investment in cleaner technologies and alternative energy sources.

Some of these measures include: various donations tax exemptions, tax benefits and direct subsidies for renewable energy projects; a 2 c/kWh environmental tax on electricity generated from non-renewable energy; and REFIT scheme (not yet fully implemented) whereby renewable energy generation is encouraged.

This paper proposes that policy makers and legislators initiate the extension and refinement of these measures to enhance their climate change mitigation efficacy. Some of the proposed extensions and refinements include that: donations tax exemptions, tax benefits and direct subsidies should also focus on smaller projects to encourage small business owners to initiate renewable energy projects. Furthermore, these exemptions and benefits should also encourage investment and research in nuclear energy, since it will form a major part of the country's energy future; the REFIT scheme that includes wind, hydro, gas and solar power generation should be extended to include all alternative energy sources such as nuclear energy. Furthermore, an independent body should be appointed as REPA to avoid the conflict of interest associated with Eskom being the REPA and the primary producer of energy.

It can thus be concluded that tax-based fiscal measures are vital components of a combined compliance and enforcement approach to mitigate climate change in the road transport and energy sectors. It offers certain unique benefits that encourage industry to utilise and invest in cleaner technologies and renewable energy. This contributes to minimising greenhouse gas emissions and therefore to mitigating climate change. Although there are numerous existing tax-based fiscal measures in place in the road transport and energy sectors which have the promise of effectively mitigating climate change, these should continuously be extended and refined along the lines indicated in this study, to enhance their efficacy. In so doing, South Africa can play a vital role in safeguarding the environment for future generations.

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