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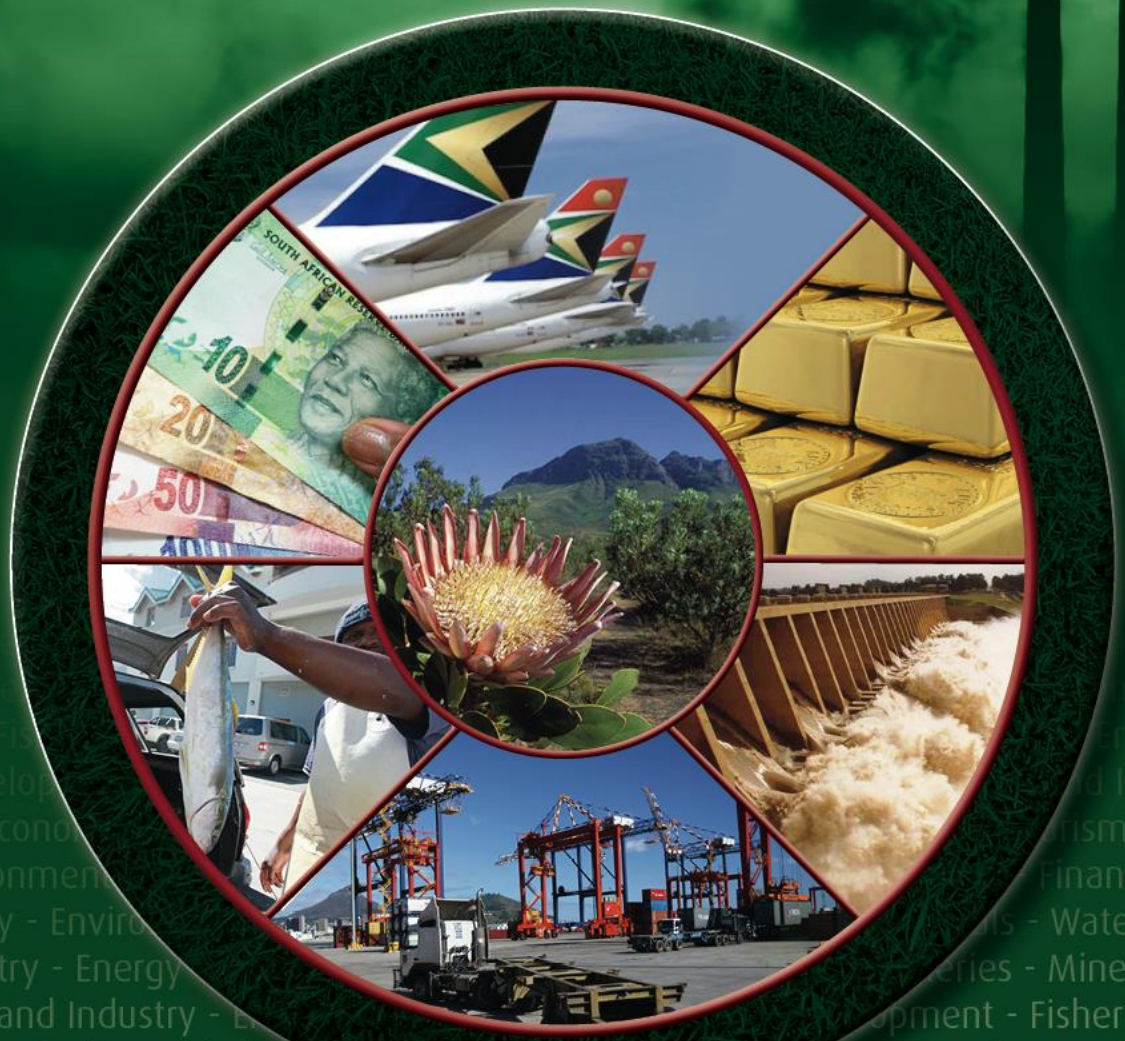

THE POTENTIAL IMPACT OF THE PROPOSED CARBON TAX ON VARIOUS SECTORS IN SOUTH AFRICA

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EXECUTIVE SUMMARY

The introduction of the Carbon Tax Policy reflects Government's commitment to intensify its efforts to confront the challenge of climate change mitigation. This growing concern is a major element in the National Development Plan (NDP) and the New Growth Path (NGP) as well as numerous other plans and initiatives, including the National Climate Change Response Policy White Paper, with its clear focus on carbon budgeting. A carbon tax is designed to reduce the output of greenhouse gases, particularly carbon dioxide, into the atmosphere with the goal of environmental protection. By increasing the cost of greenhouse gas emissions, the Government hopes to curb consumption, reduce the demand for fossil fuels and push more companies towards creating environmentally friendly substitutes. National Treasury's model suggests that a carbon tax coupled with various revenue recycling options will have a negative impact on economic growth going forward, albeit limited, with a gradual transition to a low carbon economy. The 2016 implementation of the carbon tax is expected to have a cross-cutting impact on various sectors within South Africa. This paper looks at the potential impact of the carbon tax on the different economic sectors namely; Water, Fisheries, Tourism, Energy, Minerals, Environment, Finance, Trade and Industry, and Small Medium and Micro Enterprises (SMMEs).

The national economy is highly dependent on energy production and use: South Africa is amongst the 30 largest emitters of greenhouse gases globally. The largest share of carbon dioxide emissions comes from the electricity sector. If the carbon tax is imposed, South Africa's power utility, Eskom, will have to pass the cost of the tax onto the consumer. The carbon tax will further increase the cost of coal, pushing up the primary energy costs. Eskom indicated that for every R2 billion increase in its cost, there would be a 1c/kWh increase in the tariff. Pertaining to mineral resources, the assertion is that a high carbon tax would have a negative impact on mining in South Africa and delay economic growth. However, the proposed carbon tax is not high enough to pose a threat to the growth of the sector but it provides an incentive for mines to look for ways to reduce GHG emissions. All things being equal, the increased costs of the tax will come off profits and reduce returns (to a very small degree because the level of the tax is so low).

South Africa is currently hit hard by the impact of administered prices; a carbon tax might further escalate this problem. Among the most vulnerable sectors in terms of the use of electricity are the basic metals; mining and quarrying; non-metallic minerals; agriculture, forestry and fisheries; pulp, paper and printing; and chemicals and petrochemicals sectors. These sectors are the most vulnerable as they are most energy-intensive and it is likely that these sectors will also be vulnerable to the carbon tax. An adverse impact on these sectors will further strain South Africa's economic growth and competitiveness globally and could result in a contraction of the manufacturing sector and exports. For small businesses, the biggest impact comes from increases in the price of electricity required to run the businesses. It is posited that even if a South African business is not directly subject to the new carbon tax, it may have an impact on costs. The ripple effects could be a higher attrition rate for start-up businesses and this may not bode well for job creation in a country that is already suffering from high levels of unemployment. There are major threats for tourism, especially since in South Africa there are further challenges such as vehicle emissions tax; aviation tax; tollgates and, at times, a rise in oil prices. All these factors have the potential to increase travel costs, hit hard on the pockets of tourists and consequently would negatively affect travel patterns. The implementation of a price on carbon is also likely to lead to a small reduction in real disposable incomes across the economy which will in turn reduce demand for domestic tourism.

Droughts, floods, desertification, poverty and water pollution have been identified as key consequences of global warming and climate change. Nonetheless, there is an enormous body of evidence that there is no relationship between carbon tax and CO_2 emissions. Climate change will alter species' habitats, compelling them to shift ranges and migration patterns. Some species will be unable to evolve or shift their range quickly enough to persist; others will decline in number significantly. South African fisheries are moderately exposed to climate change impact, despite having high fisheries landings. Trade in fish and fish products play a major role as a creator of employment, food supplier, income generator, and contributor to economic growth and development, particularly, in the Western Cape. The shift in distribution of some economically important species and poor recruitments are already straining the industry. Increases in fishing and transport costs through carbon taxes could affect markets and potentially reduce the profitability of the sector. This may also affect the food security of poorer communities as they will bear the burden of the transferred tax.

The potential impact on the poor is openly acknowledged by National Treasury in their latest carbon tax discussion paper which posits that the burden of the tax will likely fall disproportionately on the lower income households and will undoubtedly result in the loss of jobs. South Africa's commitment to manage carbon emissions is thus voluntary. It therefore does not seem to make sense, from a strategic perspective, to embark on implementing a carbon tax, particularly when South Africa is not obligated to do so. However, the future global positioning of the South Africa economy is likely to be affected by the decision to implement a carbon tax. Carbon tax, within the South African context, will not reduce greenhouse gas emissions for as long as the emitters can afford to pay the tax. International experience has shown that carbon taxes do not always achieve a reduction in carbon emissions. Instead, carbon tax could cost jobs and push the poor deeper into poverty.

GENERAL INTRODUCTION

The South African Government has been intensifying its efforts to confront the challenge of climate change mitigation. This concern is a major element in the New Growth Path that had been adopted as the framework for economic policy and the driver of the country's jobs strategy and the National Development Plan (NDP). The NDP notes that emissions of carbon dioxide and other greenhouse gases are changing the earth's climate, potentially imposing a significant global cost that will fall disproportionately on the poor. Rising temperatures, erratic rainfall and extreme weather events are likely to take a heavy toll on South Africa, with growing losses on human and financial resources, particularly from droughts and flooding. Climate change has the potential to reduce food production and the availability of potable water, with undesirable consequences for the poor segments of South African society. The negative effects of climate change on health, livelihoods, water and food would bear disproportionately on the poor, especially women and children. It is in this regard that industries and households will have to reduce their negative impact on the environment, by implementing far-reaching changes to the way people live and work.[1] Numerous plans and initiatives have been proposed and developed to mitigate South Africa's vulnerability to the growing threats of climate change, including the National Climate Change Response Policy White Paper (hereinafter referred to as the White Paper on Climate Change) that proposes a myriad of mitigation and adaptation measures to regulate the impact of climate change.

The White Paper on Climate Change commits South Africa at the international level to reduce emissions relative to a Business-as-Usual scenario by 34 per cent by 2020 and 42 per cent by 2025, as the nation's contribution to an international effort to limit warming relative to pre-industrial times to less than 2°C. Although this commitment is conditional on the provision of external financing, it has become increasingly clear that South Africa needs to implement certain domestic emissions reduction measures to safeguard its economy and enhance the wellbeing of its people from the ensuing threats of climate change. The White Paper identifies the use of a carbon tax as one of the key instruments in the context of the Carbon Budget approach, which entails specifying the desired emission reduction outcomes for specific sectors consistent with the benchmark national greenhouse gas emissions range trajectory. South Africa also needs to enhance its competitiveness, in terms of international trade, as climate change impacts will have highly variegated impacts across regions and across sectors suggesting that they could have measurable effects on trade relations, mainly through border tariff adjustments to minimise carbon leakage and/or loss of competitiveness. These concerns underpinned the Government's desire to introduce a carbon tax through the release of the Carbon Tax Policy Paper in May 2013, the culmination of a process that started in the mid-2000s. In fact, carbon tax is highly favoured in designing climate change mitigation policies, as it is an easy-to-implement instrument with limited demands on administrative capacity.

However, like any Government policy decision that would demand shifts in human and economic behaviour, the Carbon Tax Policy Paper has raised certain concerns, ranging from the potential of the tax to harm South Africa's competitiveness to the transfer of the potential burden of the tax to poor consumers. The political challenges of introducing carbon taxes, such as a reduction in national employment and wages as well as job losses in the mining and heavy industries, among others, were also highlighted. It is in this respect that this study was designed to provide Members of Parliament (MPs) with sector-specific impacts of the proposed carbon tax that will be implemented in 2016, on the respective national executive portfolios that they oversee in Parliament. Thus, nine sectors were covered in this investigation,

[1] National Planning Commission (2012).

comprising Fisheries; Water; Environment; Minerals; Trade and Industry; Economic Development, with a focus on small, medium and micro-enterprises; Tourism; and Finance. A uniform approach has been used in assessing the implications of the proposed carbon tax for all the sectors covered by the study. Each sector opens with an introductory part where the scope or relevant subsectors within a sector which are to be covered, are presented. Background information to the sector may is provided in this section. This is followed by the substantive sections of the study, featuring the socio-economic impacts of global climate change on particular sectors or subsectors thereof.

Equally significant is the section outlining the progress made in the implementation of climate change adaptation strategies for the relevant sectors/subsectors, typically encompassing institutional frameworks, programmes and measurable outcomes on the ground, statistics or indicators applicable to adaptation and mitigation, gaps, weaknesses, impact (current and future), proposals or recommendations. The potential impact of the proposed carbon tax is assessed for each sector where applicable, and observations on the experiences of other countries in dealing with the implementation of carbon tax, are also made. An effort has been made to highlight how South Africa could draw from the experiences of those other countries, avoiding pitfalls that they could not see due to lack of prior experience with this dynamic market-based instrument for mitigating climate change. Finally, the paper for each sector concludes by identifying to legislators how they could effectively participate in guiding and overseeing the successful implementation of the Carbon Tax Policy to realise the strategic objective of reducing greenhouse gas emissions, and in facilitating South Africa's climate adaptation responses, consistent with the existing policy frameworks, notably the White Paper on Climate Change.

THE IMPLICATIONS OF SOUTH AFRICA'S CARBON TAX POLICY ON THE ENVIRONMENTAL SECTOR, WITH A BIAS TOWARDS BIODIVERSITY AND ECOSYSTEMS ADAPTATION

S Watts

1. INTRODUCTION

The discovery and exploitation of natural resources gave rise to an improved standard of living and life expectancy for most people, especially in the developed world. This has since led to the increased use of energy in fuelling economic growth and development. However, with the benefits of energy consumption also come substantial societal costs, particularly those associated with air and water pollution, road congestion and now climate change. Many of these costs are not directly borne by the businesses and individuals that use fossil fuels and thus are ignored when energy production and consumption choices are made. Consequently, there is too much consumption and production of fossil fuels worldwide. It is in this context that economists have long recommended specific taxes on fossil fuel energy sources as a way to address these problems. This has gained additional urgency recently, owing to the fiscal situation of many countries, and also considering the fact that new revenue from energy taxes could be used to reduce the debt or finance reform or reductions in other taxes.[2] The tax under consideration in this paper refers to the newly introduced carbon tax, which in simple terms is an environmental fee levied by governments on the production, distribution or use of fossil fuels such as oil, coal and natural gas. The amount of the tax depends on how much carbon dioxide each type of fuel emits when it is used to run factories or power plants, provide heat and electricity to homes and businesses, drive vehicles and so forth.[3]

A carbon tax is essentially a tax on pollution based on the economic principle of *negative externalities*. Externalities are costs or benefits created by the production of goods and services. When utilities, businesses or homeowners use fossil fuels, they generate pollution that carries with it a cost for society, because the pollution affects everyone. A carbon tax factors the societal cost of greenhouse gas emissions into the price of the fossil fuels to ensure that those responsible for causing the pollution actually pay for it.[4] Environmental taxes and charges are the most widely used market-based instrument for environmental policy in Europe. Taxes and charges were introduced for different reasons and purposes: some to raise revenue, others to provide incentives to reduce pollution levels or the use of polluting products or natural resources. They are particularly effective in tackling the environmental challenges of diffuse sources of pollution, such as vehicles and the use of pesticides. Taxes are generally seen as the most cost-effective instrument for achieving environmental objectives, provided that the transaction costs are not higher than those of alternative instruments. However, environmental taxes cannot guarantee a defined quantifiable outcome unlike the regulatory measures and emissions trading schemes, which are established in terms of quantifiable outcomes and should therefore be able to achieve clearly defined policy objectives.[5]

Carbon tax reduces the build-up of greenhouse gas emissions; replaces command-and-control regulations and expensive subsidies with transparent and powerful market-based incentives; promotes economic activity through reduced regulatory burden and lower marginal tax rates.[6] The main advantage of taxes is that the price signals should encourage producers and

[2] Gale et al. (2013).
[3] West (Undated).
[4] Ibid
[5] European Environment Agency (2005).
[6] Morrison (2013).

consumers to change their behaviour. These price signals are the rationale for the taxes; they can result in static and dynamic efficiency gains. “Static efficiency gains can be realised at the level of abatement measures undertaken by industry, the impact on consumer decisions, and industry structure”[7], and dynamic efficiency gains can be achieved because taxes “create a continual incentive for firms to further reduce polluting emissions, through cost-effective abatement, innovation of cleaner production techniques and better abatement technologies and through industrial restructuring”.[8] There are two recognised approaches to internalising environmental costs through the application of a tax. First, the tax is set at the level that internalises all the environmental costs, or the costs of environmental damage, also called externalities or external costs into the price of traded goods. To ensure that this succeeds, the tax rate must be equal to the marginal social costs and the marginal social benefit that results from the activity that emits an additional unit of pollution. This approach is referred to in the literature as the Pigouvian tax. Secondly, the tax is set at a level which is estimated to be sufficient to achieve a given environmental objective.[9]

Although a carbon tax would be a new policy for the South African Government, the tax has been implemented in several other countries, such as Finland, Norway, Sweden and Denmark, which instituted carbon taxes in the early 1990s, followed by the Netherlands and Germany in the latter part of the 1990s. The United Kingdom (UK) and Australia followed suit in 2001. North American jurisdictions started implementing carbon taxes from the mid-2000s onwards, for example, the town of Boulder in Colorado adopted the carbon tax in 2006; Montgomery County in Maryland did so in 2010; and the Canadian provinces of Alberta and Quebec adopted carbon taxes in 2007, whereas British Columbia followed in 2008.[10]

2. IMPACTS OF CLIMATE CHANGE ON BIODIVERSITY AND ECOSYSTEMS

Ecosystems are especially important for developing countries, where the livelihoods of many people depend directly on healthy ecosystems. In fact, economic activity, human security, health, well-being and quality of life depend on healthy functioning and biodiverse ecosystems. Ecosystems provide important services to society, such as the formation of soil; the provision of food, freshwater, wood, fibre and fuel; the regulation of climate, flood and disease; protection from storm surges and floods; and a range of cultural, spiritual, educational and recreational services. Climate change poses severe challenges for ecosystems, both as a direct threat and by heightening their existing stresses, which include degradation of habitat and landscapes through vegetation clearing, introduced pest animals and weeds, highly modified and overcommitted water resources, altered fire regimes, widespread use of fertiliser and other chemicals, urbanisation, mining and, for some species, over-harvesting. The degradation of ecosystems affects their ability to deliver ecosystem services, which in turn has a direct negative impact on human well-being as well as socio-economic conditions, especially for the poor. Climate change is likely to cause stress to ecosystems by altering their functioning and by compromising individual species.[11]

Biodiversity is an important resource for African people, offering consumptive uses, such as food, fibre, fuel, shelter, medicine and wildlife trade as well as non-consumptive ecosystem services and the economically important tourism industry. This heavy dependence renders many communities vulnerable to the biodiversity loss resulting from climate change.[12] Climate

[7] OECD (2001:22).
[8] OECD (2001:23).
[9] European Environment Agency (2005).
[10] Gale et al. (2013).
[11] Department of Environmental Affairs (2013).
[12] Desanker (2002).

change is predicted to become the biggest single driver of terrestrial biodiversity loss over the next 50–100 years, bigger than the loss of habitat, over-exploitation and the introduction of invasive species. In Africa, 25–42 per cent of plant species are projected to lose all their habitat by 2085 and 10–40 per cent of mammals are projected to fall within the critically endangered or extinct categories by 2080. Climate change will alter species habitats, compelling them to shift ranges and migration patterns. Some species will be unable to evolve or shift their range quickly enough to persist; others will decline in number significantly. Temperature rises will be associated with increased climate volatility, including more frequent extreme conditions such as droughts and floods.[13] Climate change-driven impacts on biological systems will pose major threats to livelihoods in Africa, both directly and through complex interactions between drivers such as population growth and globalisation. People will be impacted directly by a growing number and frequency of extreme climatic events, including floods, droughts and storms, as well as indirectly by the negative impacts of biodiversity loss and degraded ecosystem services. The loss of species and biodiversity will have dramatic impacts on key economic sectors.[14]

Observed recent changes in climate, especially warmer regional temperatures, have already had significant impacts on biodiversity and ecosystems, causing changes in species distributions, population sizes, the timing of reproduction or migration events, and an increase in the frequency of pest and disease outbreaks. It is indisputable that climate change and its impacts may be the dominant direct driver of biodiversity loss and changes in ecosystem services globally by the end of the 21st century. The impact on biodiversity will grow world-wide as a consequence of both the increasing rates of change in climate and the increasing absolute change in climate. Some ecosystem services in some regions may initially be enhanced by projected changes in climate, such as increases in temperature or precipitation, thereby experiencing net benefits at low levels of climate change. However, as climate change becomes more severe, the harmful impacts on ecosystem services are likely to outweigh the benefits in most regions of the world. The balance of scientific evidence suggests that there will be a significant net harmful impact on ecosystem services worldwide if global mean surface temperature increases more than 2^{O}C above pre-industrial levels or at rates greater than 0.2^{O}C per decade. Climate change is projected to exacerbate the loss of biodiversity and increase the risk of extinction for many species, especially those already at risk due to factors such as low population numbers, restricted or patchy habitats, and limited climatic ranges.[15] This will have substantial impacts on southern Africa's biodiversity, including wide-scale extinctions over the next 50 years.[16]

The predictions are that most of the current biomes in South Africa (which is one of the few areas in sub-Saharan Africa where detailed analysis has been conducted) will reduce in size and will be shifted to the east of the country. Up to half of the country will have a climatic regime that is not currently found in the country.[17] The Succulent Karoo biome, which is a succulent-dominated semi-desert located on the south-western coast of southern Africa, is projected to be the most severely impacted, with the grassland and *Fynbos* biomes also likely to suffer from high climate change impacts.[18] It is noteworthy that *Fynbos* and Succulent Karoo are biodiversity hotspots of international importance[19], with the Succulent Karoo being one of only two globally important arid-climate biodiversity hotspots.[20] Similarly, climate change has

[13] Millennium Ecosystem Assessment (2005).
[14] African Wildlife Foundation (2009).
[15] Millennium Ecosystem Assessment (2005).
[16] Von Maltitz *et al.* (2006).
[17] Rutherford et al. (1999).
[18] Ibid.
[19] Myers *et al.* (2000).
[20] Von Maltitz *et al.* (2006).

the potential to significantly affect the ecology and biodiversity of aquatic systems, with changes in sea surface temperatures. For example, an increase in temperature, no matter how slow or insignificant, can influence the growth and metabolic processes of a species and thus biological production. This is attributed to the body temperature of most marine organisms that varies with the external environment. Temperature influences behavioural and physiological responses of living organisms.[21]

It suffices also to state that organisms that rely on heat from their environment are typically active near their upper rather than lower thermal limit, and although this provides greater scope for activity and maximises power output, it also increases their vulnerability to temperature increases. Furthermore, the effects of climate change may have both positive and negative impacts on even the same species. Marine fisheries resources could either benefit or collapse in response to climate change, depending on which environmental signal is most important and on the biological responses to environmental change. However, the capacity of each species to adapt genetically to change will depend on existing genetic variation and the speed of genetic change. Changes in community distributions and composition are probable, although widespread extinction is unlikely to occur.[22]

3. RATIONALE FOR THE CARBON TAX IN SOUTH AFRICA

Environmental pollution can result in damage to human health, ecosystems and infrastructure, imposing a significant economic impact on society, as this damage is typically not reflected in market prices. It is on this premise that the "Polluter Pays Principle" (PPP), for example, was adopted by the OECD Council in 1972 as the primary economic principle for allocating the costs of pollution prevention and control. Taxes are seen as appropriate tools for implementing this principle, which has become the widely accepted framework for internalising environmental externalities.[23] In South Africa, the adoption of the PPP was underpinned by the Constitution of the Republic of South Africa, particularly section 24 of this supreme law, which states that: "Everyone has the right to:

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

The constitutional directive to have the environment protected has been enhanced in the National Environmental Management Act (NEMA) No 107 of 1998. NEMA was carefully designed within the framework of the Constitution and is aimed at the promotion of sustainable development. Section 2(3) of the Act stresses one of its important aims as "development must be socially, environmentally and economically sustainable." NEMA specifically promotes the use of the PPP in South Africa. The main objective of the PPP is the preservation and protection of the environment. The principle is a measure aimed at the prevention of pollution and environmental degradation as directed by section 24 of the Constitution. Section 2(4)(p) of NEMA expressly states that: "The costs of remedying pollution, environmental degradation and consequent health effects must be paid for by those responsible for harming the

[21] Clark *et al*. (Undated).
[22] Ibid.
[23] European Environment Agency (2005).

environment." PPP is also referred to in other South African Acts of Parliament, for example, Section 19 of the National Water Act No 36 of 1998 contains stringent provisions for preventing pollution and for remedying the effects thereof. An owner or occupier of land may be required, at his/her expense, to take reasonable steps to prevent an activity or rectify a situation on that land which causes or could cause the pollution of a water course. The PPP is thus invoked.

The PPP holds that the cost imposed on society and the environment by pollution must be borne by the polluter. The principle is generally accepted as an economic principle because the implementation of the principle has cost implications for the polluter. PPP could also be applied to impose sanctions for wrongful conduct, or to require corrective measures to restore a given environmental asset to its pre-damage condition. PPP also serves to steer the conduct of potential polluters by internalising environmental and other social costs into production processes and other activities.[24] In fact, PPP is one of the fundamental principles of modern environmental policies. It simply means that the cost of pollution abatement should be paid by the polluters and not by their governments. This cost is added by the polluter to the production cost of the goods and is passed on to the consumer. PPP is considered to be the most efficient economic instrument in modern environmental policies and is used both in OECD member states as well as elsewhere. The potential solutions to the problems of externality became the basis of PPP. Requiring the polluter to internalise the external cost, or to add the cost of pollution abatement to the production cost and pass it on to the user, is significant indeed. In so doing, the full production cost is reflected in the prices of the traded goods.[25]

4. INTRODUCTION OF THE CARBON TAX POLICY IN SOUTH AFRICA

South Africa's strong commitment to reduce greenhouse gas emissions substantially is reflected in its long-term objective of a cut from 1990 levels to be achieved by 2050. The National Climate Change Response Policy White Paper that was launched in October 2011 contains clear policy directions and mechanisms for achieving this objective. The concept of Carbon Pricing that underpinned the proposed interventions for meeting the emissions reduction targets has further been enhanced in the Carbon Tax Policy Paper that was released by the National Treasury in May 2013. It suffices to note that the carbon tax has been in planning since 2006 when the National Treasury released the policy discussion document for circulation using market mechanisms for environmental fiscal reform. This was followed by the first Carbon Tax Discussion Document published in 2010, and a further announcement in the 2012 National Budget.[26] The Carbon Tax Policy Paper that was released in mid-2013 cascaded from this process, and encompasses policy measures in energy generation, manufacturing, transport, waste management, construction and agriculture to encourage a transition to a low-carbon economy.[27] The introduction of the Carbon Tax Policy reflects Government's commitment to intensify its efforts to confront the challenge of climate change mitigation. This growing concern is a major element in the National Development Plan (NDP) and the National Growth Policy (NGP) as well as numerous other plans and initiatives, including the National Climate Change Response Policy White Paper, with its clear focus on carbon budgeting.[28]

A carbon tax could raise significant revenues, with several additional positive effects, for example, it would improve environmental outcomes, increase economic efficiency and allow the elimination of selected other tax subsidies and spending programmes. It is noteworthy that a carbon tax imposes a disproportionately larger burden on lower-income households, although

[24] Nabileyo (2009).
[25] Munir (2013).
[26] Cloete (2012).
[27] National Treasury (2013).
[28] OECD (2013).

the opposite applies for many of the other options like scaling back tax expenditures. However, a long-term deficit reduction package that includes a reduction in income tax expenditures as well as a carbon tax and offsetting payments could in principle provide a balanced distributional effect.[29] There are suggestions that reducing implicit and explicit subsidies for energy and coal consumption in favour of other instruments, such as cash transfers or supply vouchers, could protect the poor. Nevertheless, it seems that putting in place a carbon tax is going to take longer than expected, considering the time that has elapsed in the formulation of the relevant policy. It is also going to take a very long time to effect the desired behavioural change when the carbon tax is put in place, particularly as the tax is set at a very low level.[30]

Well-designed fiscal policies, such as emissions taxes or their 'cap-and-trade' equivalents with allowance auctions are the most natural instruments for incorporating environmental damages into the price of products and non-market activities, for most environmental problems. Taxes that are, at least in part, justified on environmental grounds have long been a significant source of Government revenue, as environmental tax revenues generated primarily through taxes on motor fuels and vehicles constitute approximately 3–10 percent of total tax revenues in typical OECD countries. In fact, some Nordic countries took the first steps in the restructuring of the tax system to more effectively promote environmental objectives during the early 1990s. The tax reform initiative spread fairly quickly to other countries like the Netherlands, the United Kingdom and Germany, and is now under serious consideration in emerging and developing countries, such as China, Vietnam, Cambodia, South Africa, Thailand and Tunisia. The International Monetary Fund (IMF) is the leading organisation providing an increasing amount of technical assistance on environmental tax issues.[31]

Several factors point to continued momentum for environmental tax reform, with the first being pressure for new revenues to strengthen fiscal positions. Secondly, there is growing acceptance among policymakers that emissions pricing instruments are far more effective at exploiting the entire range of emissions reduction opportunities than are regulatory approaches.[32] Swapping environmental taxes that apply to traded goods for labour taxes might also be a means of improving competitiveness. Finally, environmental problems are of growing concern, ranging from rising greenhouse gas concentrations to deteriorating urban air quality in industrialising nations to increasing congestion of transportation systems, which is a related externality.[33]

Besides the carbon tax, there is a need to make a greater use of other green taxes, such as fuel levies, as this appears to be increasing in recent years. For example, the general fuel levy was increased by a total of 30 cents a litre over the past two years and total fuel taxes by 46 cents a litre. The fuel levy in South Africa represents a tax paid at the pump on fuel, predominantly processed fossils fuels like petrol and diesel.[34] In addition to the positive budgetary impacts of a carbon tax, there are significant environmental benefits as well. The effective implementation of the Carbon Policy Paper would reduce taxed emissions relative to the existing baseline or level without the carbon tax. Further benefits could arise from increased GHG abatement by other countries in response to South Africa's climate action and diplomacy. South Africa should use its new carbon tax policy to become an international regional leader for pricing GHG emissions globally. It should encourage carbon pricing by other major emitters, particularly in the major developing countries of the South that trade with South Africa. Such

[29] Gale et al. (2013).
[30] OECD (2013).
[31] Heine (2012).
[32] TemaNord (2011).
[33] Heine (2012).
[34] OECD (2013).

diplomatic efforts would help address climate risks, protect energy-intensive South African industry, limit the need for border carbon adjustments insofar as South Africa's export commodities are concerned, and signal to the international community that the nation is taking positive and transparent steps to curb its emissions.[35]

4.1 Main characteristics of the South African Carbon Tax Policy

The Minister of Finance announced that a carbon tax would be introduced with effect from 1st January 2015, but this has now been postponed to 2016. He also announced that a carbon tax policy paper would be published that would contain the details of the carbon tax. That policy paper was published on 2nd May 2013. The proposed carbon tax is a cornerstone of South Africa's plan for reducing its greenhouse gas emissions. The introduction of the carbon tax will have implications for all South African business sectors, not only those that are liable to pay the carbon tax. The carbon tax is to be implemented in a phased approach, with the first phase initially running from 1st January 2016 to 31st December 2020. The tax is to be introduced at an initially low rate with an increase of 10 per cent per annum to enhance the acceptability of the carbon tax. The sectors covered will be liable for the carbon tax. During the first phase the carbon tax rate of R120 per ton of CO_2-e will only apply to those emissions above the applicable tax-free thresholds. The carbon tax rate will be increased annually by 10 per cent (e.g., 2016 – R132; 2017 – R145.20; etc.). Each of the covered sectors will be entitled to a 60 per cent tax-free threshold while certain of the covered sectors will be entitled to a maximum trade exposure allowance and a process emissions allowance. Finally, certain of the covered sectors will be entitled to offset their carbon tax liability by purchasing carbon credits. The tax-free thresholds will be reduced during the second phase and may be replaced with absolute emissions thresholds. This section of the paper contains the key design features of the carbon tax as set out in the policy paper.[36]

Key design features of the carbon tax proposal

- Tax rate placed at R120 per ton of CO_2e above suggested thresholds with annual increases of 10 per cent, with the first 5-year phase running from 1st January 2016 and will be followed by a second 5-year phase. Thereafter an entirely new tax system will be introduced;
- An across-the-board basic 60 per cent tax free threshold of actual emissions below which the tax will not be payable;
- Up to an additional 10 per cent relief for emissions-intensive and trade-sensitive sectors, e.g., iron and steel, cement, glass and so forth, to take into account the risk of carbon leakage and competitiveness concerns;
- Offsets could be used by firms to reduce their carbon tax liability up to limits of 5 or 10 per cent, depending on the sector;
- Emissions from agricultural and waste sectors will be exempted during the first phase. This complete exemption will be reviewed during the second phase; and
- The electricity sector will qualify for a tax-free threshold of up to 70 per cent and some sectors will be able to qualify for a tax-free threshold of up to 90 per cent during the first phase.[37]

There is general support for the Government's initiative in proposing a carbon tax to deal with the challenge of climate change and facilitate the much desired low-carbon transition. The implementation of the proposed carbon tax will place South Africa amongst the leading countries that have taken concrete measures towards climate change mitigation and will

[35] Morris (2013).
[36] Sonnenbergs (2013).
[37] National Treasury (2013).

certainly set a good example for developed and developing countries alike, especially those that undoubtedly need to take climate change mitigation actions in meaningful ways. The tax, in principle, has the potential to shift South Africa from its current energy-intensive economic development trajectory and drive energy efficiencies, innovation and employment in a cleaner and low-carbon economy. However, more should have been done to enable the tax to achieve its intended purpose of effectively mitigating climate change. For example, there needs to be a stronger link between the tax and the strategic objectives of a low-carbon economy, broadly covering issues of high levels of resource efficiency; and shift towards less energy- and less carbon-intensive economic sectors, which can generate economic wealth and create jobs, inter alia. In its current form and in the current market and policy environment of the country, the tax may have limited effects on intended outcomes, may not be sufficient to incentivise the much-needed behavioural and technological shifts toward a low-carbon future and could unfairly burden the consumer in the process[38] in the face of best intentions that underpin the current carbon tax design.

The organisation, Business Unity South Africa (BUSA), made a 58-page submission to the National Treasury, stating that it was not opposed to the introduction of the carbon tax, indicating that it might eventually be needed to reduce the country's carbon emissions. However, the organisation argued that the tax could not be introduced in isolation and should be linked to a range of other mitigation measures still being developed by the Department of Environmental Affairs and the Department of Energy. A similar point was made recently by the Department of Trade and Industry (DTI) during a parliamentary briefing that concurrent support measures would have to be linked to the carbon tax to purposefully promote structural change across industry. The Department further argued that any carbon tax would have to take account of key structural features of the domestic economy to avoid the real risk of shrinking or even closing existing energy-intensive sectors. The energy and chemicals group, Sasol, highlighted during the same parliamentary briefing that the proposed tax ran contrary to South Africa's aspiration to increase levels of mineral beneficiation, describing it as punitive and onerous. BUSA interjected that the proposed carbon tax rate and the level of protection for vulnerable energy-intensive and trade-exposed sectors appeared to be respectively higher and lower than South Africa's key competitors.[39]

BUSA also pointed out a lack of clarity on certain elements of the carbon tax design and called for the compilation of a separate comprehensive regulatory impact assessment, which could be considered in conjunction with a World Bank modelling study into the socioeconomic impact of carbon tax under the aegis of the Partnership for Market Readiness that should be published during 2014. BUSA, like other critics of the carbon tax, argued that the imposition of a carbon tax on the electricity sector would simply raise costs for the economy, without necessarily reducing emissions from the sector. There are also concerns that the National Treasury's released Carbon Tax Policy Paper contains little detail, or commitments, on the revenue-recycling options, such as tax credits and other offsets. There is a deep concern that the tax will not be applied to mitigation because the carbon tax will be sizeable and revenue recycling is still unclear. Similarly, there was a concern that South Africa's carbon tax should not be imposed in isolation of global negotiations, which are expected to concretise a formal commitment by South Africa on carbon emissions only by the end of 2015, for implementation in 2020. A further critic of the Policy Paper is that it failed to recognise any of the current existing carbon-price instruments, including the carbon tax on motor vehicles, the levy on non-renewable electricity and the proposed biofuels levy.[40]

[38] WWF South Africa (2013).
[39] Creamer Media's Engineering News (2013).
[40] Ibid.

5. CLIMATE CHANGE ADAPTATION STRATEGY

South Africa is widely considered the third most biologically diverse country in the world.[41] Natural and semi-natural ecosystems and intrinsic biodiversity yield valuable and often irreplaceable ecosystem services to human society whose value has been estimated at roughly seven per cent of the gross domestic product (GDP) in South Africa. The full value of ecosystem services to all South Africans is certainly higher than this estimate and the current progress being made in quantifying and mapping the value of these ecosystem services is expected to shed more light on this. Biodiversity loss as a result of climate change is projected in South Africa, especially in regions showing high levels of endemism, which is particularly vulnerable to biodiversity loss, as previous generation assessments had indicated that a number of South African biomes were likely to be partly displaced, limiting their overall area. The Succulent Karoo, Grassland and Fynbos biomes were projected to show the highest impacts, although more recent work using updated climate scenarios has reduced the severity of these projections substantively for the Succulent Karoo. It is in this respect that developing conservation strategies for adaptation to climate change requires rethinking conservation strategies. Potential adaptation options to prevent extinction of biodiversity include the following:[42]

- Manage and reduce the impacts of non-climate related stressors on ecosystems (e.g. pollution, overharvesting, inappropriate management, invasive alien species);
- Reconfiguration of the reserve system to strategically conserve areas that accommodate climate change;
- Design corridors that link protected areas effectively;
- Matrix management, i.e., managing the biodiversity in areas outside of reserves;
- Translocation of species into new habitats; and
- Ex-situ conservation, e.g, gene banking, cryopreservation, zoos and botanical gardens.[43]

In South Africa, there is no climate change adaptation strategy for the environmental sector or biodiversity *per se* besides the National Biodiversity Strategy and Action Plan (NBSAP) of 2005 that was not specifically formulated as a climate change adaptation measure. Notwithstanding, the National Biodiversity Strategy and Action Plan is one of the key policy documents that supports national adaptation in South Africa. The Strategy is based on the outcomes of a consultative process which took place in 2004 and included a National Stocktaking and Biodiversity Assessment Report; consultative workshops in all the nine provinces; civil society consultations and workshops with municipalities. It is noteworthy that the goal of the NBSAP is "to conserve and manage terrestrial and aquatic biodiversity to ensure sustainable and equitable benefits to the people of South Africa, now and in the future". In support of this goal, the strategy has five key strategic objectives:[44]

- An enabling policy and legislative framework integrates biodiversity management objectives into the economy;
- Enhanced institutional effectiveness and efficacy ensures good governance in the biodiversity sector;
- Integrated terrestrial and aquatic management across the country minimises the impacts of threatening processes on biodiversity, enhances ecosystem services and improves social and economic security;

[41] Midgley et al. (2011).
[42] Midgley et al. (2011).
[43] Ibid.
[44] Department of Environmental Affairs and Tourism (2005).

- Human development and wellbeing is enhanced through sustainable use of biological resources and equitable sharing of benefits; and
- A network of conservation areas conserves a representative sample of biodiversity and maintains key ecological processes across the landscape and seascape.

It suffices to state that climate change adaptation is explicitly mentioned under the third strategic objective above. The NBSAP deals mainly with climate change adaptation, while recognising the importance of climate change mitigation. *Outcome 3.4* of the NBSAP that seeks to realise "an integrated national programme facilitates adaptation to the predicted impacts of climate change on biodiversity across the landscape and seascape" is particularly explicit in this instance. Consequently, the purpose of *Activity 3.4.1* would be to "Implement an integrated programme for climate change adaptation, with an emphasis on vulnerable ecosystems and sustainable livelihoods". The NBSAP recognises that climate change adaptation is an issue that cuts across several strategic objectives, as such interventions are necessary to conserve and sustainably use biodiversity. Similarly, *Activity 3.4.2* would "Ensure that the protected area network is designed to allow for long-term species and ecosystem responses to climate change". This activity responds directly to the loss of habitat and habitat fragmentation resulting from exposure of rangelands and grasslands (especially, in already marginal areas) to climate change variability; extremely vulnerable biomes in the west and northern parts of the country; and the vulnerability of freshwater and coastal ecosystems. Climate change impacts are predicted to affect the movement of species and may mean that areas that would have been suitable for species to migrate into under changing climatic conditions are unable to support such shifts. In response to these changes the NBSAP ensures that adaptation options for maintaining animal diversity include the implementation of a conservation area and corridor networks that would buffer the effects of climate change.[45]

It is further worth noting that South Africa's NBSAP derives from the Convention on Biological Diversity's call for each Party to develop a National Biodiversity Strategy and Action Plan (NBSAP) to guarantee that the objectives of the Convention are undertaken at all levels and in all sectors in each country. Thus, the National Biodiversity Strategy reflects how a country intends to fulfil the objectives of the Convention, while the National Biodiversity Action Plan comprises the concrete actions to be taken to achieve the goals of the strategy. These actions are developed by each Party in accordance with its national circumstances and capabilities.[46] The National Biodiversity Strategy and the National Biodiversity Action Plan are fused into one document, the NBSAP.

South Africa's National Climate Change Response Strategy and National Action Programme for combating land degradation both incorporate biodiversity-related matters, while the recently published National Framework for Sustainable Development and discussion document Towards an Anti-Poverty Strategy for South Africa both take cognisance of the important role that healthy ecosystems play in sustainable development[47] and hence in climate change adaptation. For example, environmental sustainability, i.e., requiring strategies and programmes that help link increasing economic opportunities for the poor to the protection and rehabilitation of ecosystems, reversing environmental degradation and promoting eco-tourism, is considered one of the nine pillars on which the anti-poverty framework is anchored, consistent with the multidimensional nature of poverty.[48]

[45] Ibid.
[46] Convention on Biological Diversity (2010).
[47] Department of Environmental Affairs (2009).
[48] Presidency (2008).

6. LESSONS FROM OTHER COUNTRIES

Finland was the first country to enact a carbon tax in 1990. This was originally based only on carbon content, but it was subsequently changed to a combination of carbon/energy tax. Sweden followed suit to enact a tax on carbon emissions in 1991, although no tax is applied to fuels used for electricity generation, and industries are required to pay only 50 per cent of the tax, with non-industrial consumers paying a separate tax on electricity. Fuels from renewable sources such as ethanol, methane, biofuels, peat, and waste are exempted. This led to heavy expansion of the use of biomass for heating and industry. Great Britain introduced a "climate change levy" in 2001 on the use of energy in the industry, commerce and public sectors. Revenues are used to provide offsetting cuts in employers' National Insurance Contributions and to provide support for energy efficiency and renewable energy. There are various exemptions including for electricity generated from new renewable energy and fuel used for "good quality" combined heat and power.[49]

Ireland enacted a carbon tax in 2010. However, over the past three years, with its economy in tatters, Ireland embraced a novel strategy to help reduce its staggering deficit by charging households and businesses for the environmental damage that they cause. The Irish Government imposed taxes on most of the fossil fuels used by homes, offices, vehicles and farms, based on each fuel's carbon dioxide emissions, immediately driving up prices for oil, natural gas and kerosene. Household garbage is weighed at the curb, and residents are charged for anything that is not recycled. Currently, the Irish pay purchase taxes on new cars and yearly registration fees that rise steeply in proportion to the vehicle's emissions. The new tax has delivered environmental and economic results, with Ireland having witnessed its emissions drop than more 15 percent since 2008, against the backdrop of being one of Europe's highest per-capita producers of greenhouse gases, with levels nearing those of the United States. When faced with new environmental taxes, the Irish quickly shifted to greener fuels and cars and began recycling with fervour. Auto manufacturers such as Mercedes found ways to make powerful cars with an emissions rating as low as tinier Nissans. Consequently, many landfills in Ireland closed down due to less waste coming from residential areas. Fossil fuels became more costly, boosting efforts to establish sustainable renewable energy sources, which increasingly became more competitive, allowing Ireland's wind power industry to thrive.[50]

New Zealand made plans in 2005 to enact a carbon tax equivalent. The tax would have been revenue-neutral, with proceeds used to reduce other taxes, but a new Government determined that the carbon tax would not cut emissions enough to justify the costs, and hence the tax was abandoned altogether. Australia began implementing a carbon tax in July 2012, with climate-equivalent fees also imposed on methane, nitrous oxide and perfluorocarbons from aluminium smelting, and is collected from roughly 500 of the nation's biggest emitters. Use of the carbon tax revenues is rather complex, with some going to the Australian Renewable Energy Agency for project funding and other monies providing a raft of other compensation and development funds focused on biodiversity, low-carbon agriculture, small business grants and support for indigenous communities. However, Australia, in a similar fashion like the neighbouring New Zealand, has recently abandoned the carbon tax, mainly due to resistance from voters.[51]

The City of Boulder in Colorado implemented the United States' first tax on carbon emissions from electricity, on 1st April 2007. The tax was costing the average household about $1.33 per

[49] Where Carbon is Taxed [Internet]. Available from <http://www.carbontax.org/progress/where-carbon-is-taxed/> (Accessed on 27th November 2013).
[50] Rosenthal (2012).
[51] Where Carbon is Taxed [Internet]. Available from <http://www.carbontax.org/progress/where-carbon-is-taxed/> (Accessed on 27th November 2013).

month, with households that use renewable energy receiving an offsetting discount. The city expected the tax to generate about $1 million annually until its expiration in 2012, with the revenues used to fund Boulder's climate action plan to further reduce energy use and to comply with the Kyoto Protocol despite the fact the US had not ratified the Protocol. Similarly, Quebec, which is Canada's second largest province, began collecting a carbon tax on hydrocarbons, i.e., petroleum, natural gas and coal on 1st October 2007. The tax made Quebec the first North American state or province to charge a carbon tax, although the tax rate is rather small. It intended using carbon tax to force energy producers, distributors and refiners to pay about $200-million a year in taxes as one part of an ambitious plan to fight global warming.[52] Furthermore, a rare consensus was reached in British Columbia among individuals, certain business interests, environmental organisations, and economists that a carbon tax is a key and necessary tool in the move to reduce GHG emissions, with one significant proviso. This occurred in the context of a compelling argument about the need to put a price on GHG emissions, which is indeed an important element of an effective climate action strategy, along with other types of measures. It was in this instance that the Budget 2008 provided the fiscal tools to meet the climate challenge. The carbon tax that was introduced in the British Columbia has a broad base, to affect emissions throughout the provincial economy, but it was being introduced gradually to give individuals and businesses time to adjust. All of the revenue raised would be offset by cutting other taxes; none of the revenue will be used to fund Government programmes. The Government also guaranteed certainty about rates for the first five years.[53] However, it is noteworthy that these carbon tax-related interventions were taking place all in First World countries, which itself raises questions as to the efficacy and appropriateness of this measure to a developing country, such as South Africa.

7. THE ROLE OF PARLIAMENT IN CARBON TAX – RECOMMENDATIONS TO CONSIDER

- Individual members of Parliament (MPs) or a parliamentary committee could introduce relevant legislative proposals for effective implementation of the Carbon Tax Policy.
- Individual MPs or a parliamentary committee could amend the current carbon tax proposal in a manner that protects the poor, as a carbon tax would have the immediate consequence of increased prices for fuel (e.g., paraffin) and electricity with a costly impact on low-income families and businesses alike. Besides, in South Africa, the poor are already struggling to eke out a living under their current socio-economic circumstances, without the carbon tax.
- Parliament should assess the overall impact of the proposed carbon tax design on the economy in conjunction with existing fuel and vehicle emissions taxes with the aim of streamlining these environmental taxes to spur production and new investment.
- Parliament should consider introducing and passing a law that permits environmentally-related taxes and levies, including the proposed carbon tax to allow them to be used for environmental purposes despite the National Treasury's position to the contrary, considering also the previous views expressed about the need to ring-fence plastic bag levy under the defunct Buyisa-e-bag Company.
- Parliament, through the Portfolio Committee on Water and Environmental Affairs should request the Department of Environmental Affairs to formulate Biodiversity Sector Climate Change Adaptation Plan/Strategy, rather than continue making references to adaptation scenarios or options for the sector.
- Parliament should encourage the Department of Environmental Affairs to prioritise addressing the outstanding mitigation potential and impact studies in order to understand the choices at our disposal as a country in responding to the commitments that we have

[52] Ibid
[53] Ministry of Finance (2008).

made to mitigate greenhouse gas emissions in international fora, and also submit to Parliament how the proposed carbon tax fits into this approach, considering that the proposed tax rate is lower relative to our trading partners in the North. The Department should further report on the status of legislation alignment studies, which are necessary to identify gaps in the lead to formulating optimal instruments for implementing the White Paper on Climate Change, and should also report on the effectiveness of the carbon tax to cater for those perceived gaps.

- Parliament should probe how the carbon tax complements or constrains the national response measures in the "Framework for South Africa's Response to the International Economic Crisis" that was developed by the Department of Trade and Industry (DTI) in 2009. Was there any study to determine the impact of the carbon tax or lack thereof on this framework?

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THE POTENTIAL IMPACT OF THE PROPOSED CARBON TAX ON THE WATER SECTOR IN SOUTH AFRICA

T Manungufala

1. INTRODUCTION

Droughts, floods, desertification, poverty and water pollution have been identified as key consequences of global warming and climate change, which could lead to a socioeconomic downturn.[54] However, in proposing carbon tax as a solution to these problems, enormous body evidence has already shown that there is no relationship between carbon tax and CO_2 emissions. For instance, the introduction of carbon tax in many countries has led to various outcomes, such as an increase in emissions and increased unemployment rates. In France, it was considered and rejected after their Constitutional Court had ruled that the tax breached the principle of tax equality as it had too many exemptions.

The approval of the National Water Resource Strategy second edition (NWRS2) by the Cabinet is a landmark achievement towards the development of a Climate Change Adaptation Strategy. The NWRS2 highlights climate change challenges for the water sector and lays down strategies for climate change adaptation and mitigation.[55] The Water Conservation and Water Demand Management is a perfect example of an adaptation Strategy, which aims to manage the quantity and reliability of South Africa's water resources in order to achieve optimum, long-term, environmentally sustainable social and economic benefits for society.

The main lesson learnt from other countries that have implemented carbon tax, is that emissions would not be reduced by carbon tax. Instead, the emitters would continue to emit for as long as they can afford to pay the tax levied. However, a rare case was noted in Australia wherein the carbon tax drastically affected the socioeconomic arena, which resulted in the abandonment of the tax. It was also learnt that carbon tax could help fund the development and implementation of climate change adaptation initiatives, for example, the Working for Water and Wetlands programmes. These are national environmental programmes administered by the Department of Environmental Affairs (DEA). Working for Wetlands champions the rehabilitation, protection and sustainable use of wetlands while the Working for Water Programme champions the eradication of invasive alien plants. Wetlands are able to improve water quality, reduce flood impacts, control erosion, sustain river flows, capture and store carbon. In providing these services to people, they also help communities to adapt to the impacts of climate change.

Last but not least, a number of concerns were raised by Parliament, for consideration with regard to the development and implementation of a carbon tax in South Africa.

[54] IPCC (2013).
[55] Department of Water Affairs (2013a).

2. SOCIO-ECONOMIC CONSEQUENCES OF GLOBAL WARMING AND CLIMATE CHANGE

The impacts of climate change are current and more severe than previously thought (IPCC 2013). They pose an increasingly serious risk to ecosystems and ecosystem services, food security and the realisation of sustainable development. No part of the globe - whether developed or developing; rich or poor - is without impact from climate change. In acknowledging the seriousness of climate change, the South African Government approved the framework for the development of a National Climate Change Response Policy in July 2008, which is aimed at building the climate resilience of the country, its economy and its people and manage the transition to a climate-resilient, equitable and internationally competitive lower-carbon economy and society in a manner that simultaneously addresses South Africa's over-riding national priorities for sustainable development, job creation, improved public and environmental health, poverty eradication, and social equality.[56]

With regard to water resources, South Africa's rainfall is already highly variable in spatial distribution and unpredictable, both within and between years. Much of the country is arid or semi-arid and the whole country is subject to droughts and floods.[57] Bulk water supplies are largely provided via a system of large storage dams and inter-basin water transfer schemes and such infrastructure takes years to develop.[58] Thus a reduction in the amount or reliability of rainfall, or an increase in evaporation would exacerbate the already serious lack of surface and ground water resources. Water availability in the arid and semi-arid regions, which cover nearly half of South Africa, is particularly sensitive to changes in precipitation. Desertification, which is already a problem in South Africa, could be exacerbated by climate change. Furthermore, climate change may alter the magnitude, timing and distribution of storms that produce flood events.

Water is predicted to be the main area through which early climate change impacts will be experienced.[59] Changes to water quality and availability will affect numerous sectors and jeopardise economic development and poverty reduction efforts. As the fundamental drivers of the hydrological cycle are affected by increasing climate variability and climate change, they will have large impacts on the availability and demand of water resources. These changes in water availability and demand will exacerbate development issues in almost all other sectors such as health, food production, sustainable energy, human settlements, and biodiversity. Increased water related risks associated with the changes in frequency of extreme events, such as flash floods, storm surges, and landslides, will put further stresses on these sectors.[60]

3. PROGRESS TOWARDS THE DEVELOPMENT AND IMPLEMENTATION OF A CLIMATE CHANGE ADAPTATION STRATEGY

Climate change is one of five critical trends noted in the National Development Plan (NDP),[61] which recognises that South Africa is not only a contributor to greenhouse gas emissions – it is also particularly vulnerable to the effects of climate change on health, livelihoods, water and food, with a disproportionate impact on the poor, especially women and children. While adapting to these

[56] IPCC (2013).
[57] Department of Environmental Affairs and Tourism (2004).
[58] Lani Van Vuuren (2013).
[59] Department of Water Affairs (2013).
[60] World Meteorological Organisation (2013).
[61] The Presidency (2012).

changes, industries and households have to reduce their negative impact on the environment. This will require far-reaching changes to the way people live and work. The NDP recognises that the impacts of climate change will be felt substantially in the water arena, and reflects the need to build economic sustainability and resilience to enhance the resilience of people and the economy to climate change. In line with the NDP, the Department of Water Affairs (DWA) developed the NWRS2,[62] established in terms of the National Water Act (No. 78 of 1998).

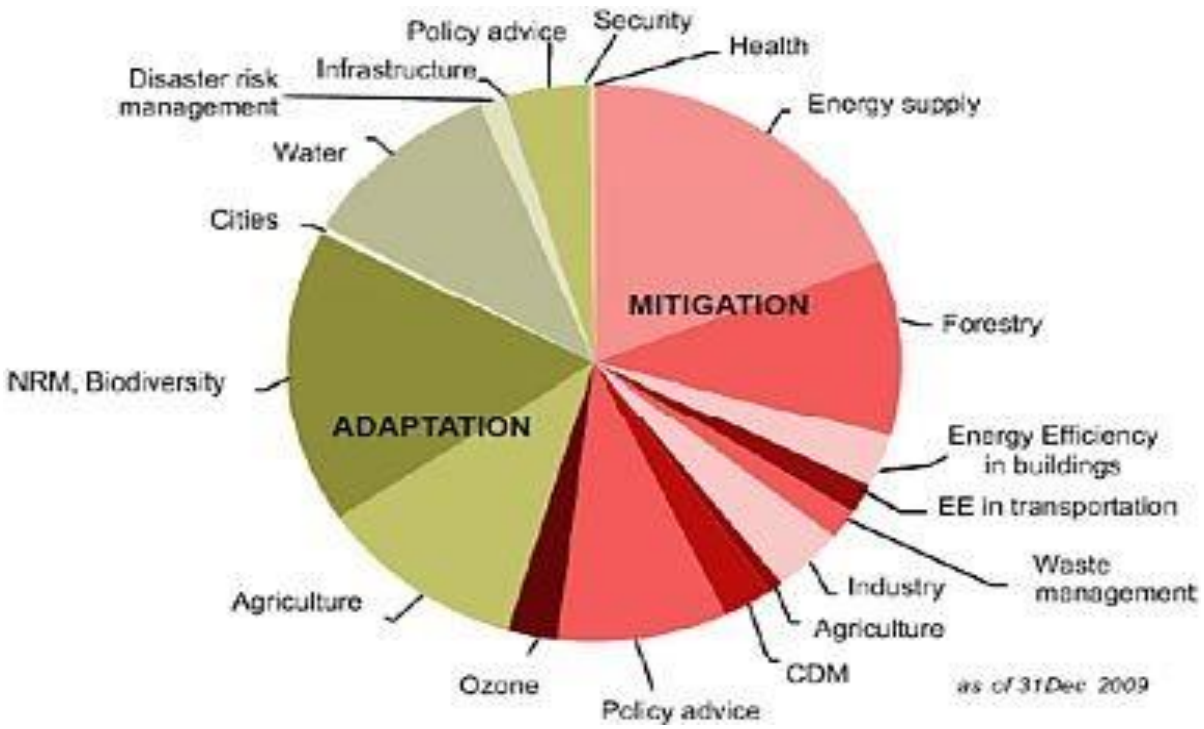

Figure 3.1. Climate change adaptation and climate change mitigation strategies per sector.[63]

The approval of the NWRS2 is a groundbreaking achievement for the water sector. The NWRS2 provides the basis for development and implementation of climate change adaptation strategies for the water sector. Chapter 10 of the NWRS2 is dedicated to managing water resources for climate change. The NWRS2 identified uncertainty in projected water-related climate change impacts as one of the biggest challenges facing water managers. These managers must understand how this uncertainty influences the management decisions to be made and that decisions must be appropriate to a possible range of scenarios. A critical tool in this regard is adaptive management, in which water resource systems are carefully monitored and management actions are tailored and revised in relation to the measured changes on the ground. It is against this background that the DWA is developing a Climate Change Response Strategy for Water Resources in South Africa. This strategy will provide guidance on adaptation to the water-related impacts of climate change and maximise any beneficial impacts. The Strategy will include the approach to be taken to climate and water adaptation, as well as measures and actions, where possible, focusing on actions that support both adaptation and mitigation (refer to figure 3.1). The water sector provides a considerable spectrum for adaptation opportunities as shown in figure 3.1.

The National Desalination Strategy and the National Strategy for Water Re-use are some of the strategies recommended in the NWRS2, to expand the water sources mix in light of the climate

[62] Department of Water Affairs (2013a).
[63] Thompsom and Ndlovu (2010).

change threat to the available water resource. There are few existing water re-use projects across the country that are intended for various uses, such as drinking, industrial, and groundwater recharge. These strategies are perfect examples of climate change adaptation measures in the water sector.

4. POTENTIAL IMPACT OF CARBON TAX ON WATER SECTOR

South Africa's total greenhouse gas emissions (GHG) in 2000, including emissions from bunker fuels is estimated to be around ~446 Mt CO2-eq. This amounts to a ~28% increase in emissions in the last ten years from 1990.[64] And from 2000 to 2010 the emission percentage increased to 38.[65]

Based on figure 4.1, electricity generation appears to be the worst GHG emitter compared to other sectors. This is due to the fact that most of e South Africa's electricity is generated from coal powered stations. This implies that the electricity generation sector would be the most affected sector by the introduction of carbon tax. There are two options that the electricity sector could opt for if the carbon tax cost is unbearable. The sector could switch from coal-powered stations to hydroelectricity or any other renewable energy sources such as solar and wind. This would remarkably reduce the electricity generation sector's carbon footprint on water resources and would eliminate the coal mining and coal consumption impact on water resources. For instance, water pollution issues such as Acid Mine Drainage (AMD) would be drastically reduced. However, hydroelectricity generation has its own problems such as damage to the ecosystem and land; siltation and flow shortage[66]; relocation conflicts and cost; and failure risks due to poor construction, natural disasters or sabotage can be catastrophic.[67]

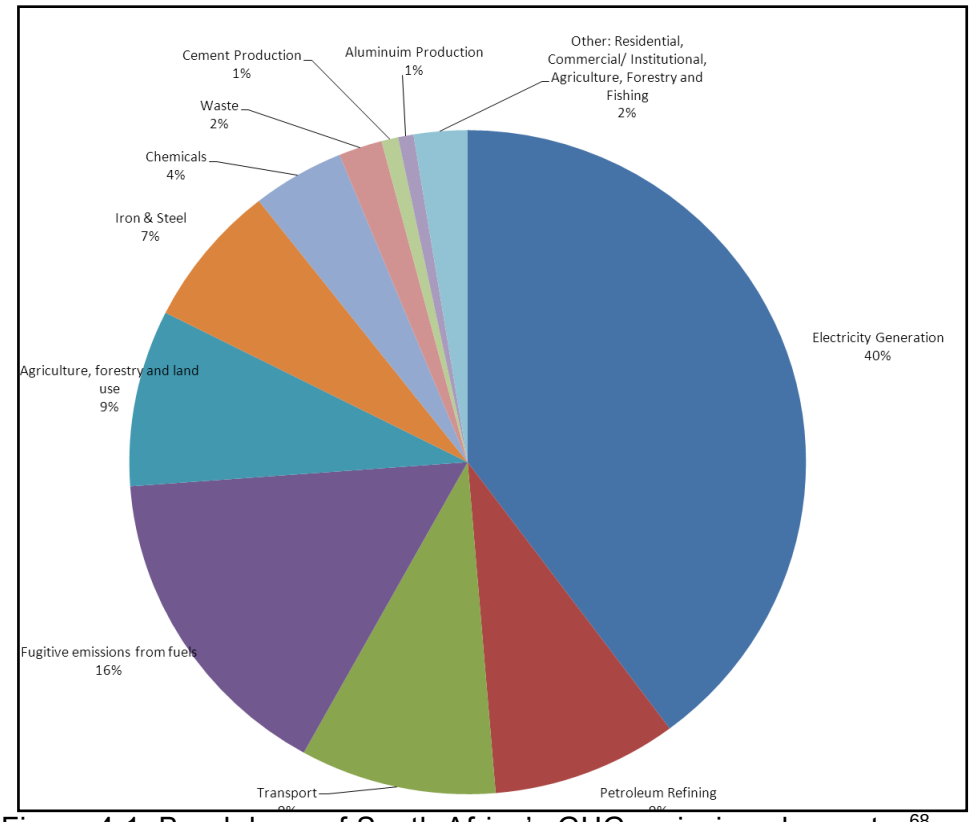

Figure 4.1. Breakdown of South Africa's GHG emissions by sector[68]

[64] Inter-governmental Committee on Climate Change (2009).
[65] United Nations (2013).
[66] Patrick James, H Chansen (1998).
[67] Robbins, Paul (2007).
[68] National Treasury (2013).

Having considered the potential impact of carbon tax on the water sector, it is clear that a carbon tax will not reduce green house gas emissions for as long as the emitters can afford to pay the tax. Table 5.1 bears testimony to this fact.

5. LESSONS FROM OTHER COUNTRIES

Emissions dropped from 57-million tonnes in 1992 to 54-million by 2007 in Sweden before the introduction of the carbon tax. Denmark went from 59-million tons in 1972 to 58-million tons in 2007 after the introduction of carbon tax. Table 5.1 shows that in Sweden CO_2 emission increased by 30% after the introduction of carbon tax. Finland introduced a carbon tax in 1990 at a modest level of $1.4 per tonne of CO_2 and increased the rate over time. Finland's emissions were 47-million tonnes in 1990 and grew to 52.6-million tonnes by 2007. The government of India implemented carbon tax on coal at the rate of 50 rupees (about R7.85) per tonne of coal. In 2010, India's coal consumption was 629.7-million tonnes. It rose to 648.7-million tonnes in 2011 and 715-million tonnes in 2012. Between 1997 and 2008, carbon dioxide emissions in grew by more than 60% in Costa Rica.

Table 5.1. Comparison of countries per CO_2 emissions after the introduction of the Carbon Tax

Country	Percentage (%) increase of CO_2 emissions
Sweden	31
Denmark	-2
Finland	13
India	14
Australia	tax abandoned
Costa Rica	60
South Africa	38

Source: own calculation from United Nations Millennium Development Goal Indicators data[69]

In Australia, the carbon tax caused enormous economic damage that ran into billions and thousands of jobs were lost. Consequently, Australia abandoned the carbon tax. Several other countries have recently introduced a carbon tax, but it is still too early to determine the effect, if any, for example South Africa introduced a carbon tax on vehicles, but an increase on the purchase of vehicles with high CO_2 emission rates was reported over the same period. South Africa's CO_2 emissions increased by 38 percent from 1990 to 2010 without carbon tax in force refer to Table 5.1. Some countries, like France, have considered and rejected the tax after their Constitutional Court had ruled that the tax breached the principle of tax equality as it had too many exemptions.[70]

In conclusion, carbon tax is not a deterrent to reduce CO_2 emissions as shown in Table 5.1. However, it is a viable climate change mitigation tool that could help a country to address various climate change challenges.

[69] United Nations (2013).
[70] Parassuni, D. (2009).

6. THE ROLE OF PARLIAMENT

Parliament should consider how, through its oversight role, it can encourage the following actions by relevant departments:

- There is a need to mainstream climate change challenges into coordinated national strategies and action plans specific to the water sector. There is also a need for a water sector climate change adaptation strategy.

- There is a need for financial support to fund research that seeks to address second order impacts of climate change on the water sector, for example, impacts of weather extremes, variability, groundwater recharge, and the dynamics of projected changes in land use interwoven with effects of climate change, as well as third order impacts including consequences of changes in water quality.

- There is a need to investigate the direct impact of carbon tax on the water sector because it is not clear in the carbon tax policy document, how the water sector would be affected or the implications thereof. In other words, the policy should be clear in terms of appropriating the tax revenue to various climate change adaptation and mitigation initiatives.

- There is a need to vigorously support projects or programmes aimed at climate adaptation and mitigation.

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THE POTENTIAL IMPACT OF THE PROPOSED CARBON TAX ON THE FISHERIES SECTOR IN SOUTH AFRICA

NJ Ginindza

1. INTRODUCTION

Over the past 5 decades, increased fishing pressure has resulted in the overexploitation and depletion of some fisheries resources. The once pristine marine and freshwater ecosystems have been degraded to an appalling state. Not all changes in fish stocks and ecosystems are due to sustained harvesting of the fisheries resources, because climate change, habitat loss, invasive species and long-term natural fluctuations, have also played a role.[71] However, there is a glimpse of hope as some of the implemented recovery strategies to limit overfishing and rebuild fish stocks are bearing positive results. Some environmental factors will still affect the fisheries and coastal economies now and well into the future. Carbon dioxide, for instance, the chief greenhouse gas (GHG) behind climate change, threatens the marine and freshwater ecosystems, thereby threatening the sustainability of the fishing industry and livelihoods of fishing communities.[72] Without country commitments and action to reduce GHG emissions, the global temperature could rise by more than 3°C above preindustrial climate. The developing countries will suffer the most from the adverse effects of climate change mainly due to limited financial, institutional, scientific, and technical capacity to cope and adapt. Some highly vulnerable regions, such as Southern Africa, are already being affected by the impacts of climate change.[73]

South Africa has gone beyond a mere expression of commitment - the country is developing strategies and systems that will ensure that GHG emissions are reduced and impacts from climate change are well-managed or adapted to. Carbon tax was identified as an appropriate tool to deal with anthropogenic GHG emissions. The proposed tax rate of R120 per total CO_2 equivalent above the tax-free threshold will be implemented in January 2016. It is proposed that the tax should increase by 10 per cent per annum until the end of December 2020, and be reduced thereafter. The agriculture, forestry and fisheries sectors will be excluded during the first five-year period.[74] Despite the fact that fisheries and aquaculture contribute minimal GHG emissions compared to other sectors, there is a need to increase efforts that seek to reduce emissions. The emissions in the fisheries and aquaculture are mainly from production operations and the transport, processing and storage of fish.[75] This paper will look at the potential impact of the proposed carbon tax on the South African fishing sector.

2. SOCIO-ECONOMIC CONSEQUENCES OF GLOBAL WARMING AND CLIMATE CHANGE

2.1 Socio-economic contribution of the fishing industry

The South African fisheries sector is divided into marine and inland fisheries, which are further divided into capture, aquaculture and, to a lesser extent, culture[76] fisheries. The capture fishery is subdivided into commercial, sport and recreational, and subsistence or small-scale fisheries.

[71] FAO (2003, 2009).
[72] Department of Agriculture, Forestry & Fisheries (2012c); FAO, (2009); Pankhurst & Munday (2011).
[73] The World Bank (2012).
[74] Department of Environmental Affairs (2011); National Treasury (2013).
[75] FAO (2009).
[76] Culture fishery refers to the release of seeds or juveniles into the wild environment to be harvested later or for simply stock enhancement.

The marine fisheries are more developed and have structured regulatory and legislative instruments, while the inland fishery sector is underdeveloped and has fragmented legislative instruments.[77] Fisheries play a crucial role in terms of providing jobs, livelihood and sustainable economies in many the coastal and inland communities. The sport and recreational fishing sector (inland and marine) has approximately 2.5 million participants annually, translating to over R18 billion worth of direct and indirect economic impact in terms of jobs, salaries and businesses.[78] Estimating the total value and impact of the commercial fishery (marine and inland) is difficult due to short-comings, mainly in the inland commercial fishing sector, such as limited access to resources, low demand for freshwater fish, the lack of an inland fisheries policy, unclear fisheries management objectives and the scarcity and outdated nature of available information on the sector. The marine commercial fishing industry currently employs approximately 27 000 people directly and approximately 100 000 indirectly and is valued at approximately R6 billion annually.[79] However, there are more than 7 300 subsistence and small-scale fishers in 137 marine fishing communities of which approximately 53 per cent are food insecure. Employment figures and information on the value of freshwater aquaculture is scarce and poorly documented, however, it is known that marine aquaculture employs more than 1 600 permanent employees and is valued at R379 million.[80]

2.2 Effect of climate change on fisheries

Climate change happens at a time when the capture fishing industry is already facing various challenges such as the decline of fish stocks, mainly from overfishing. The environmental changes in the oceanic, estuarine and inland waters are adding to the myriad of challenges that have to be addressed in order to sustain jobs, food security and livelihoods in fishery-dependent communities.

2.2.1 Increased ocean acidity

The oceans are an immense carbon sink, absorbing more than 45 per cent of CO_2 from the atmosphere per day. As the gas dissolves in the water, it forms carbonic acid and reduces the concentration of carbonates, thus reducing the ocean's pH. Another source of the acidity is atmospheric sulphur and nitrogen from cars and industrial processes which results in acidic rain. Ocean acidification poses a significant threat through its capacity to alter larval behaviour and impair sensory capabilities. Corals, calcareous phytoplankton,[81] oysters, mussels, abalone, sea urchins and other marine organisms use calcium and carbonate in seawater to construct their calcium carbonate shells or skeletons. As the pH decreases, carbonate becomes less available, which makes it more difficult for organisms to secrete calcium carbonate to form their skeletal material. For invertebrates and some fish, CO_2 accumulation lowers internal pH and may result in acidosis or a build-up of carbonic acid in body fluids. This can lead to lowered immune response, depression of metabolic and physical activity, and impaired reproduction. It is worth mentioning that animals vary in their capacity to adapt to environmental changes, however, young recruits may be the worst affected. These developments may have a dire impact on the South African shellfish industry which is worth more than R640 million per annum.[82]

[77] Department of Agriculture, Forestry & Fisheries (2012b); McCafferty et al., (2012).
[78] Leibold & Van Zyl (2008).
[79] McCafferty et al. (2012); Department of Agriculture, Forestry & Fisheries (2012a).
[80] Department of Agriculture, Forestry and Fisheries (2012a, 2013); McCord & Zweig (2011).
[81] Calcareous phytoplankton – phytoplankton that uses calcium carbonate to form scales or plates.
[82] Clark (2006); Kroeker et al. (2010).

2.2.2 Ocean circulation and coastal upwelling

There are conflicting studies on whether global warming will result in increased or reduced circulation and upwelling, however, this varies according to regions. During upwelling, the high nutrient concentrations generally found in deeper waters rise upward into the upper layer where photosynthesis by algae (phytoplankton) is promoted. Algae in turn are eaten by zooplankton that feed fish larvae. Fisheries depend on this process entirely. Without nutrients, algae do not grow, and without algae no fish can survive (as happens during El Niño conditions or Benguela Niño).[83] Increased sea surface temperatures and reduced coastal upwelling limits the speed with which oxygen can be mixed into deeper waters and results in stratification. Low oxygen levels were behind the mass strandings or "walkouts" of West Coast rock lobsters as a result of oxygen depletion in 1997. The occurrences of low oxygen zones or dead zones are predicted to increase in the future as a result of climate change. The upwelling is thus of vital importance as it, to a certain degree, determines the success of fishermen and fish farmers, since the weakening of an upwelling system can bring socio-economic disaster. The El Niño conditions favours higher recruitment of tropical tuna species (e.g. yellowfin tuna) while subtropical tunas (e.g. albacore) have low recruitment during El Niño and higher during La Niña. During the periods of reduced circulation (El Niño conditions), inland fisheries may be affected by extended droughts which could result in increased water temperatures, salinities and evaporation. The incidences of increased flooding, greater storm intensities and extreme sea conditions in certain areas will likely increase which could affect the livelihood of fishers. Such conditions may increase the vulnerability of fishing communities through damage to infrastructure, reduced opportunities to go to sea, increases costs of insurance and/or rebuilding and increasing threats to human health. Increased frequency and severity of storms may negatively affect inshore and offshore aquaculture operations as they will be at greater risk for damage and stock losses.[84]

2.2.3 Change in river flows and sea level rise

South Africa is well endowed with estuaries that serve as nurseries, passages and feeding grounds for migrant birds, fish and invertebrates – both endemic and migratory species. The reduction in rainfall reduces the required runoff to sustain estuarine life. The projections are that average runoff on the South African west and south coast would decrease by 0–50 mm per annum.[85] Reduced runoffs could result in the formation of larger sand shoals in the river mouths and lower reaches of estuaries, thus reducing tidal exchange with the sea and restrict passage of migratory and nursing species. Reduced rainfall and river flow together with a high evaporation rate will reduce the dilution rate of waste water, thereby increasing the concentration of pollutants and other solutes in rivers and ultimately the estuaries. The drought effect may be profound along the West Coast and its estuaries affecting the closed or open periods.[86]

Contrastingly, some parts of South Africa, such as in Kwa-Zulu Natal and Wild Coast, may experience heavy rains and floods. That could increase runoff of fertiliser and sewage into coastal waters, and possibly trigger algal blooms that could poison fish and humans. Increased river flows may also present an opportunity for a boom in brackish water species. The rise in

[83] Benguela Niño is Africa's El Niño where warm, nutrient poor, salty water from the Angola Current moves southward. Depending on how far the incoming water mixes with water on the West Coast, the mixing often results in decreased breeding and survival of pelagic fish as well as survival of juvenile fish off the West Coast.
[84] Allison et al. (2009); Brander (2010); Department of Agriculture, Forestry & Fisheries (2012b); Dulvy et al. (2011); FAO (2009).
[85] Department of Environmental Affairs (2011).
[86] Ibid.

sea levels on the other hand could result in loss of coastal habitat of fish, invertebrates and birds, as well as intrusion of freshwater by seawater. Global average sea level has already risen by 10-20 cm. Potential outcomes could thus be reduced production of coastal marine and freshwater systems and related fisheries. The observed rise in sea level could result in habitat loss for some fisheries resources along the coast and saline intrusion into freshwater habitats. Communities that are likely to be negatively affected are those deriving their livelihoods in the intertidal zones (e.g. such as those on the Wild Coast) as those areas may no longer be accessible.[87]

2.2.4 Shift in distribution and changes of sea surface temperatures

The distribution of fisheries resources is governed by a multitude of factors that act on different life-history stages and operate at different spatial and temporal scales. Across the Benguela Current Large Marine Ecosystem, there is a southward move of demersal and pelagic fish into deeper water. This observation is in agreement with expected changes predicted with global warming, including oceanic temperature.[88] The sardine population which has traditionally been distributed along the West Coast during the 1990s has since moved further east of the South Coast. The anchovy stocks have also shown a shift from west of Cape Agulhas to being located primarily off the South Coast to the east of Cape Agulhas. An eastward expansion in the distribution of kelp in recent years is linked to cooling along the South Coast. The southward expansion of West Coast water as well as a reduction in the frequency and magnitude of upwelling events in Benguela El Niño years has facilitated the expansion of West Coast dusky kob into Namibian waters at the expense of silver kob. A major shift in West Coast rock lobster availability from the traditional fishing grounds on the West Coast to the more southern fishing grounds has caused more challenges in terms of ecological, fisheries and resource management.[89]

The shift of the fish stocks exerts heavy costs on the logistics and operations of fishing companies or fishers and the ecosystem. In some instances there is no clear reason for the shift in distribution of fish stocks, however, temperature change is generally accepted as the main cause. As temperature rises, there are indications that tropical fish will migrate towards the cooler waters of the South African coast. Temperate water species will retreat further south. Notwithstanding some of the complications of understanding the shifts, there is a clear trend that marine species are gradually driven towards the poles.[90] Plankton tends to shift towards the poles, and the fish species depending on plankton follow that trend. Furthermore, the shifts will likely result in reduced production and availability of species. This may emanate from a possibility that there is a mismatch in the timing of the occurrence of plankton and larvae (of commercially important fished species). There is a concern that marine resources may move outside the boundaries of marine protected areas. The shift in fish distribution may also present opportunities as incoming species may be exploitable, as was recently observed in the Kwa-Zulu Natal coast where there is an increase in species richness and diversity. Despite this potential opportunity, changes in the availability of fish products can affect total revenues and harvesting costs (net revenues) of fishermen, thus influencing the choice of target species.[91]

Increasing temperatures cue reproductive development in spring-spawning species, and falling temperatures stimulate reproduction in autumn-spawners. Elevated temperatures shorten

[87] Clark (2006); Department of Environmental Affairs (2013); FAO (2009); Macfadyen & Allison (2009).
[88] Yemane et al. (2012).
[89] Department of Agriculture Forestry & Fisheries (2012c); Department of Environmental Affairs (2013).
[90] Perry et al. (2005).
[91] Brander (2010); FAO (2009); Schumann et al. (1995); Wilkinson et al. (1999); Department of Environmental Affairs (2013).

spring spawning, and delay autumn spawning. If climate change is not controlled, the reproduction of certain species (e.g. abalone) may be restricted, or worse be inhibited, while the proliferation of others (e.g. tilapias) encouraged. Larval fishes are usually more sensitive than adults to environmental fluctuations, and might be especially vulnerable to climate change. In addition to the direct effects on embryonic duration and egg survival, temperature also influences size at hatching, the developmental rate, pelagic larval duration and survival. In short, increasing oceanic temperatures as well as in some inland water bodies, may result in a marked change in species composition, size (individual and population) and recruitment success. The aquaculture industry could be indirectly impacted by failed recruitment of pelagic fish because these play a significant role in fishmeal production. Increased water temperature will result in significant increases in food intake to maintain energy requirements. This may result in the rapid depletion of prey that fish depend upon.[92] It is worth mentioning that some inshore areas along the west, south and southeast coast are cooling instead of warming as widely expected.

3. PROGRESS TOWARDS THE DEVELOPMENT AND IMPLEMETATION OF A CLIMATE CHANGE MITIGATION AND ADAPTATION STRATEGY

3.1 EXISTING POLICY AND STRATEGY FRAMEWORKS

The Department contributed towards South Africa's First and Second National Communication under the United Nations Framework Convention on Climate Change. Both reports formed a baseline for developing climate change prevention, mitigation and adaptation strategies as well as policy and implementation plans. During January 2013, the Department gazetted the Draft Climate Change Sector Plan for the agriculture, forestry and fisheries sectors for public comment, and by June 2013 most inputs were already collated. In October 2013, the Department of Environmental Affairs published the Long Term Adaptation Scenarios for the marine fisheries sector. The adoption of the ecosystem approach to fisheries management is a step in the right direction; however, it needs to be implemented in the inland fisheries as well. The Small-scale Fisheries Policy is aimed at developing and empowering marine small-scale fishers to promote food security and sustainable fishing which considers climate change. Aquaculture has received some attention as a viable alternative to capture fisheries and has been prioritised for development. The National Aquaculture Policy Framework and the National Aquaculture Strategic Framework responds directly and indirectly to climate change.

The Department has yet to develop a climate change response strategy and policy informed by thorough research for the fisheries and aquaculture sectors. According to a 2009 study, South African fisheries are moderately exposed to climate change impact, despite having high fisheries landings.[93] The country's sensitivity, vulnerability and adaptive capacity to climate change were found to be low. The study's outcomes are reflective of the commercial fisheries sector. The accuracy of the effects of climate change on aquaculture and small-scale fisheries are not known. Despite this shortcoming, according to the adaptation scenarios developed by the Department of Environmental Affairs, South Africa can cope by securing existing fisheries and biodiversity, and working towards recovery of impacted resources and ecosystems. Judging from the June 2013 briefing to the parliamentary Portfolio Committee on Agriculture, Forestry and Fisheries by the Department on progress made in developing and implementing climate change prevention, mitigation and adaptation strategies, the aquaculture and fisheries sectors received little attention as there was greater focus on the agriculture and forestry

[92] Kellermann (2010); Lo-Yat et al. (2011); Pankhurst & Munday (2011).
[93] Allison et al. (2009).

sectors.[94] Despite the projected minimal impact of climate change on the fisheries sector, the Department should intensify efforts to build greater resilience in this sector. The climate change adaptation strategies or plans should be thoroughly consulted among policy makers, managers, fishers and their representatives and must have clearly defined and quantifiable objectives. In responding to climate change, the Department needs to set in motion both reactive and anticipatory actions.

3.2 Proposed mitigation and adaptation measures

Currently there is neither a quick way to remove absorbed CO_2 from the oceans nor the means to reverse its probable biological effects. Reducing carbon dioxide emissions to the atmosphere appears to be the only practical approach to mitigate against the degree of impact from anthropogenic climate change. The fisheries sector can only minimise the 1.2 per cent of global fuel it uses annually. However, the reliance of the fishing industry on fossil fuel poses a serious challenge. Increasing fuel costs are likely to continue to exert pressure on the fishing industry to improve fuel efficiency in order to remain profitable. However, the capacity to adapt or switch over to fuel-efficient fishing gears or vessels will vary according to available finances from various fishing entities. Small-scale fishers may be at a disadvantage in this regard because they may not be able to afford switching to more efficient and low impact fishing vessels or gears. State intervention may thus be required in this regard to assist in the acquisition of suitable boats and other relevant fishing or processing equipment. However, such adjustments are only estimated to offer a reduction in fuel use and emissions of up to 20 per cent. Options also exist for small-scale fishers to reduce their fuel use by improving the efficiency of their vessels, using sails or changing fishing behaviour.

3.2.1 Re-building stocks and improving fisheries governance

Better management strategies focused on rebuilding over-exploited fish resources and impacted ecosystems would yield more productive fish stocks, higher biodiversity and improved resilience and adaptive capacity to climate change. Rebuilding fish stocks should be accompanied by increased efforts to consistently enforce fisheries laws in all fisheries sectors. Responsible co-management of the resources has been shown to be fruitful, as is observed in the hake fishery. It is also worth encouraging the Department to make the ecosystem approach to fisheries management a standard management system in all fisheries sectors.

3.2.2 Managing declining incomes and fostering alternative livelihood activities

Climate change is not the only stress facing fishing communities. Many fishing communities are poorly served by infrastructure, markets and social services and are thus economically, socially and politically marginalised. Inter-departmental involvement and cooperation should increasingly be directed towards poverty reduction and the maintenance or enhancement of food security.

3.2.3 Disaster preparedness and response

Given the predicted increases in the severity of extreme weather events, increased investment aimed at improving weather information and storm warnings, may ensure that fishermen and their assets are not lost at sea, and that loss of life and damage to infrastructure on shore is reduced. Additionally, since the fisheries sectors seem to have been given minimal attention, there is therefore a need to include the aquaculture and capture fisheries in national disaster

[94] Allison et al. (2009); Department of Agriculture, Forestry & Fisheries (2013b).

preparedness and response planning. One of the points that came strongly from the fishers during the Public Hearings on the Marine Living Resources Amendment was that the small-scale fisheries sector is neglected in terms of disasters and responses.

3.2.4 Aquaculture development

The South African Government has taken a decision to prioritise aquaculture development. There is a need to align aquaculture practices with climate change through the implementation of the ecosystem approach to aquaculture, reduction of dependence on fishmeal and fish oil, exploiting inland water bodies, increased bio-security measures and the establishment of aquaculture insurance. The country may need to consider diversifying the farmed species, as well as including sea weeds and algae. There should be a prioritisation of the culture of omnivorous and herbivorous finfish and non-feed aquaculture such as farming filter-feeders and seaweeds because they are more environmentally friendly to farm than carnivorous fish. The Department should put more effort into developing culture-based fishery as well as stock enhancement.

3.2.5 Fishing gear

Fleet capacities and the number of allocated fishing rights may need to be adjusted to match the available resources and the capacity of the Department to manage fishing activities. This may also require incentives to switch to operations using sustainable fishing gear and techniques. Support for the use of static-gear – pots, traps, longlines and gillnets, which use less fuel than active gear such as trawls and seines – should be the norm as this emits less CO_2.

3.2.6 Training, education and research

Education and skills upgrading are powerful adaptive strategies for fishers. Higher educational attainment may enable fishers to make a broader series of choices, ranging from fish quality management practices and maximising returns to assessing potential risk when an extreme event strikes. There should be a concerted effort to raise awareness of the impacts of climate change in order to ensure that the special risks to the fishery sector are understood and used to plan national responses to climate change, including the setting of mitigation targets. There should be increased funding towards research and development and investments in technologies to predict migration routes and the availability of commercial fish stocks.

4. POTENTIAL IMPACT OF CARBON TAX ON ECONOMIC GROWTH

Capture fisheries are largely driven by fossil fuels and so contribute to GHG emissions through capture operations and subsequently processing, storage and transportation. There is no available South African study that has studied the carbon footprint of fish and fish products from aquaculture and the 22 fisheries sectors. Based on the observed migration of valuable fisheries resources further off-shore, there is a likelihood that emissions will increase as the distances to fishing zones increase. Furthermore, the increase will emanate from increased fishing efforts as some economically valuable resources are becoming scarce. Another fact which applies to South Africa, as in most developing countries, is that vessels tend to be less fuel efficient in terms of costs and catch revenue, spending up to 50 per cent of total catch revenue on fuel.

Aviation and shipping currently play a central role in revenue generation from trade in fish and fish products. Both these industries (including fisheries operations) are entirely reliant on fossil

fuels, hence are vulnerable to any change in the availability or price of fuel. Trade in fish and fish products play a major role as a creator of employment, food supplier, income generator, and contributor to economic growth and development, particularly, in the Western Cape. During 2012, the South African aquaculture and fishing industry exported R3.6 billion worth of fish and fish products without bearing any environmental tax, and grew by 1 per cent between 2011 and 2012. Increases in fishing and transport costs through carbon taxes or other mitigation measures could affect markets and potentially reduce the profitability of the sector.[95] International experience has also shown that carbon taxes do not achieve a reduction in carbon emissions; instead, carbon tax could cost jobs.[96] This may also affect the food security of poorer communities as they will bear the burden of the transferred tax. Since aquaculture, particularly the pump-ashore or recirculation systems, depends on electricity supply, transferred tax from the energy sector could stifle its potential growth. The Carbon Tax Policy paper shows that the poor will be worst affected, yet maintain that emissions should be charged.[97]

5. LESSONS FROM OTHER COUNTRIES

- The European Union's emission trading scheme (ETS) was started in 2005 and the system has resulted in overall carbon emission reduction - the EU has been praised for establishing wide-ranging climate initiatives that has enabled various sectors to adapt. The fishing sector is exempted from carbon tax requirements.

- In 1991, Norway introduced a tax on carbon and has reduced carbon emissions per capita. The Norwegian Government is investing in clean energy and climate change research and adaptation in Norway and in developing countries. The fisheries sector was not affected. In 2012, carbon tax was increased, particularly in the fishing sector where it was doubled. There is yet to be an assessment of the impact of the recent increase in emission tax on the fisheries sector.

- The New Zealand Government started an emissions trading scheme in 2008 in order to reduce emissions. The scheme covered forestry initially, and was then expanded in 2010 to cover stationary energy, transport, liquid fossil fuels and industrial processes. The New Zealand Government created special assistance for the fishing sector to change fishing assets and allocated free units to fishing quota-holders that can be traded for emissions. Emissions have marginally decreased and there is no noticeable impact on the economy.

- The Australian Government implemented carbon pricing in 2012, however, there are conflicting reports on whether emissions have escalated or declined since implementation. Australia is now in the process of repealing the carbon tax legislation and pressure is mounting to have carbon tax scraped. The main reason for scrapping the tax is the belief that it increases the cost of living (by increasing electricity and gas bills for families). The tax burden was unequally distributed among different household groups with low-income households carrying a relatively higher burden. The negative impact was severely felt by the small-scale fishers, cooperatives and downstream processors. The Australian Government is now investing in fisheries and aquaculture to ensure competitive and sustainable fisheries and aquaculture sector.

[95] Legare (Not dated).
[96] Spash & Lo (2012).
[97] National Treasury (2013).

6. THE ROLE OF PARLIAMENT

- Parliament should lobby for the exemption of the fisheries sector from carbon tax.
- Parliament should encourage the finalisation and implementation of a sound climate change fisheries policy that protects and enhances the livelihood of the poor.
- Parliament should encourage the use of renewable energy and establishment of incentive schemes within the fisheries sector (e.g. varying tax exemptions for companies or fishers that switch to low emission operations).
- Parliament should encourage investment in the development of policies that will help reduce vulnerabilities and encourage people to take the actions needed to adapt to changed circumstances.
- Parliament needs to encourage the Department to help establish institutions or schemes that will train fishers about financial and business management in order to ensure business sustainability in this phase of changing climate.

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THE POTENTIAL IMPACT OF THE PROPOSED CARBON TAX ON THE TOURISM SECTOR IN SOUTH AFRICA

JCL Ntuli

1. INTRODUCTION

Tourism has quickly become one of the fastest growing economic sectors in the world. The United Nations World Tourism Organisation (UNWTO) alludes to tourism's contribution towards development in a number of destinations and has shown how tourism has, for a number of destinations, become a key driver for socio economic progress.[98]

Tourism has further produced economic and employment benefits in a number of linked sectors including construction, agriculture, telecommunications, and aviation. In a nutshell, 1.035 billion tourists travelled the world in 2012, which translated to 4 per cent growth when compared to the previous year.[99] This growth was mostly anchored by emerging economies contributing a positive 4.3 per cent growth while advanced economies contributed a positive 3.7 per cent growth. Africa performed relatively well (experiencing a positive 6 per cent growth) compared to 2011 for international arrivals after declining by 1 per cent due to challenges in North Africa. This growth stance on arrivals positively tipped the scales for South Africa as well, with 10.2 per cent growth on international arrivals way above global and regional averages.[100]

South Africa's tourist arrival growth is highly anchored by overseas traffic with 15 per cent growth in 2012 when compared to 2011. The major markets for South Africa include the United Kingdom, United States, Germany and China.[101] According to the Tourism Satellite Account (TSA) the direct tourism contribution to the Gross Domestic Product (GDP) in 2012 increased by 5 per cent to R84.3 billion and the combined direct and indirect contribution of the sector was 9 per cent - this is highly commendable since it surpassed the automotive manufacturing sector. In terms of employment, direct employment in the sector increased from 4.3 per cent to 4.5 per cent between 2010 and 2011.[102] These statistics place tourism above automotive manufacturing and mining in terms of direct and indirect employment growth in the country.

In line with tourism's past contribution and future contribution projections, the National Development Plan (NDP) has recognised tourism as one of the main drivers of country's economy and job creation. The NDP envisages the promotion of South Africa as a major tourist destination, with unique features (beaches, flora and fauna), in order to boost tourist numbers and enable tourism to contribute to sustainable economic growth and poverty reduction, in light of the industry's potential to absorb greater levels of young and unskilled labour. In the New Growth Path (Government's strategy for inclusive growth and employment creation) the tourism sector has set a target of 250 000 jobs by 2020 and a R499 billion contribution to the GDP.[103] Moreover, achieving these targets will ensure that South Africa occupies a space in the global arena as one of the top 20 tourism destinations.[104]

Global warming has become an inevitable threat to tourism activities around the world and since this threat has mainly been aligned to tourism's dependency on air transport, mitigation

[98] UNWTO (2013).
[99] UNWTO (2013a).
[100] Ibid.
[101] Van Schalkwyk (2013).
[102] Kilbourn (2013).
[103] National Department of Tourism (2013).
[104] Ibid.

of the resulting Greenhouse Gas (GHG) emissions remains a big challenge.[105] Tourism is currently seen as a minor contributor to climate change, accounting for an estimated 5 per cent of global carbon dioxide emissions in 2009. Recent growth trends indicate that tourism is well on its way to becoming a major source of GHG emissions due to the transportation of tourists and other factors.[106]

The carbon tax policy seeks to:

- Address challenges of climate change and to allow for a smooth transition to a low carbon economy.
- Tackle early development of and /or implementation of cleaner technologies; and
- Reduce the risk of South Africa's exports being exposed to Border Carbon Adjustments (BCA).[107]

In recognition of the tourism industry's impact on climate change (and vice versa), as well as an acknowledgement of the importance of engaging in sustainable tourism practices, the UNWTO held its first international conference on climate change and tourism in Tunisia in 2003, while the second conference was held in 2007 in Davos, Switzerland.[108]

This section will provide information on the impact of the proposed carbon tax. Lessons from countries that introduced carbon tax and the role of Parliament in achieving a green and sustainable economy will be provided.

2. SOCIO-ECONOMIC CONSEQUENCES OF GLOBAL WARMING AND CLIMATE CHANGE

In the past 10 years, environmental constraints linked to climate change have greatly contributed to a decline in tourism in countries such as Japan and Haiti among others. This, in essence, indicates some of the risks that climate change holds for the global tourism industry. It is true that some countries have temporarily benefited from the seasonal shifts that have been brought about by the political and economic instability present in some countries that deflect tourists to safer and more predictable countries.[109]

In an article compiled by Deutsche Bank Research it is categorically stated that the countries that would be most affected by climate change are those bordering the Mediterranean, especially in the East. This is because the countries bordering the Mediterranean are mostly popular for their beach and seaside holidays and in recent years summer months have been masked by an increasing number of heat waves. While the poorer countries around the world expect tourism to be the key driver of development,[110] chances are that if efforts are not made to counter the scourge of climate change, this will not be realised. In the above-mentioned research, it is evident that the countries that will experience positive spinoffs from climate change are mostly countries in Europe and North America, with Africa experiencing a slight negative effect and Australia feeling most of the wrath of climate change. However, in recent years North America has also been experiencing colder winters, while Britain & Europe have experienced disastrous floods during winter. It is also important to note that, where there are positive spinoffs for Europe and North America, these will only favour these regions for a short

[105] Dhubois et al. (2013).
[106] OECD/UNEP (2011).
[107] National Treasury (2013).
[108] UNWTO (2009).
[109] Ehmer and Heymann (2008).
[110] Ibid.

period.[111] For example, when heat waves hit places like the Mediterranean, tourists may then prefer to only visit during spring and autumn, or people's travelling patterns could change to favour other regions places like the Northern Atlantic Coast of Spain due to excessively high temperatures in the Mediterranean region. The expected increase in long haul flights, rising temperatures resulting in the problem of high Ultraviolet (UV) radiation and the bleaching of coral in the sea[112] which will greatly impact on Oceania,[113] a region centred on the islands of the tropical Pacific Ocean. It has to be noted that in many instances if the emissions are to be drastically reduced in the tourism sector, structural changes towards low carbon utilisation for mobility need to be considered.

The transport industry is instrumental in delivering tourists to different destinations in various countries around the world. However, it is also the major contributor of the carbon dioxide (CO_2) emissions generated by tourism, since it contributes around 75 per cent of the total tourism emissions.[114] Of the 75 per cent, aviation accounts for 40 per cent of these emissions. Although tourism contributes only a relatively small share of the total GHG emissions, there is a need to put measures, including innovative technologies and regulatory frameworks, to mitigate against the generation of these emissions. Concerns have been raised with regards to the carbon emissions associated with travel to and within South Africa and it has been unequivocally stated that, unless the industry takes responsibility for these emissions the country will lose market share to destinations that do.[115] In a number of instances, optimists have seen an opportunity for the carbon offset market, where domestic and international travellers provide ample opportunity for the development and the sale of carbon offsets in a voluntary carbon market.[116] Examples of these kinds of offsets in many instances include renewable energy schemes in countries that generate income from carbon – sources where conventional methods would have otherwise been used. However, over the years, many of these offshore schemes have had their reputation questioned and strong criticism has surrounded carbon offsetting initiatives outside the country concerned as they have not positively contributed towards source markets, as they do not offset any emissions in source countries.[117]

As it is, the South African tourism domestic market is lagging behind, when comparing figures of the 1st quarter of 2013 to those of the same period in 2012. A decline of 21 per cent in domestic trips taken was experienced, with trips having dropped from 7 million to 5.5 million caused by a number of factors, with the cost of travelling topping the list. Again, when assessing total foreign direct spend the African region revenue decreased by 1.3 per cent when comparing the first quarter of 2012 to that of 2013. This decrease in revenue affected the total direct spend which experienced a 1.1 per cent drop in the same period. This should be a cause for concern as it means that if this continues to be the overall picture, tourism's contribution towards employment in the country would drop from the current 16 tourists, which translates to one job, but it would require even more tourists to create one job opportunity.[118]

[111] Ibid.
[112] Coral bleaching - is the loss of intracellular endosymbionts (zooxanthellae) through either expulsion or loss of algal pigmentation.(Wikipedia, 2011).
[113] Ehmer and Heymann (2008).
[114] UNWTO (2008).
[115] Imvelo Awards (2011).
[116] Climate Risk and Opportunity (2011).
[117] Imvelo Awards (2011).
[118] SAT (2013).

Rising input costs have been consistently highlighted through the quarterly Tourism Business Index (TBI) as a key negative factor impacting on the travel and tourism trade. Furthermore, the costs have a potential to increase, making it even harder to do business in the sector.[119]

3. PROGRESS TOWARDS THE DEVELOPMENT AND IMPLEMETATION OF A CLIMATE CHANGE ADAPTATION STRATEGY

3.1 Policy Interventions and programmes towards addressing the Climate change Agenda in South Africa

Because the major tourist attractions in the country are mostly linked to the environment ranging from the beaches, flora, fauna, biodiversity and the warm climate; it should be noted that the abovementioned elements are very sensitive to climate change. This, together with the fact that tourism is gradually becoming a big player in the economy of South Africa, means that the sector needs to be aware of its responsibilities in rising to the challenges posed by climate change. In this regard, the former Department of Environmental Affairs and Tourism (DEAT) produced the White Paper on the Development and Promotion of Tourism with "Responsible Tourism" in 1996, as a guiding principle.[120] Responsible tourism promotes efficient and effective use of resources, for example the new practice in hotels where not all towels are replaced except when they are left at the floor and half used rolls are not replaced as was previously done (instructions on these new practices are displayed in hotel rooms for occupants to see). Since then the milestones which have been achieved are as follows:[121]

- In 2002:
    - The DEAT developed guidelines for responsible tourism, which were further endorsed by the national sector for tourism development in South Africa.
    - The first international conference on Responsible Tourism in Destinations was held in South Africa, which led to the Cape Town Declaration.
    - The Imvelo Awards for Responsible Tourism was launched.

- In 2008 the international Green Leaf Environmental Standard was initiated, due to pressure from United Kingdom (UK) tour operators (core market for international arrivals). However, very few establishments have taken this up for grading due to the costs aligned with assessment, membership, and installation of energy saving devices.[122]
- In 2003 the Responsible Tourism Manual and Handbook was developed by DEAT.
- In 2010 the National Department of Tourism completed the National Tourism Sector Strategy (NTSS); and
- In 2011 the National Minimum Standard for Responsible Tourism was published by the National Department of Tourism.

Furthermore, the Department of Environmental Affairs (DEA) has recognised the importance of the tourism industry to the issue of climate change and thus included it in the White Paper on Climate Change Response. The interventions outlined for this sector are as follows:[123]

- South Africa will have to mainstream climate change into tourism planning, policy and development.

[119] TBCSA (2013).
[120] National Department of Tourism (2011).
[121] National Department of Tourism (2011).
[122] Green Times (2013).
[123] Department of Environmental Affairs (2011).

- The country will also have to build climate resilience and the adaptive capacity of tourist attractions/destinations and encourage green tourism infrastructure investment.
- There will be a need to promote domestic tourism in order to counteract a decline/shift in international travel that may follow the implementation of transport mitigation policies in other countries.
- The country will need to encourage both domestic and international visitors to participate in the protection and conservation of South Africa's natural environment and to enjoy a responsible travel experience.
- The country will promote research, capacity building, and awareness in the tourism sector.
- The country needs to support the establishment of energy efficiency programmes and the introduction of renewable energy into the tourism sector; and
- South Africa will establish programmes that will allow tourists to offset the emissions generated through their travel to and in South Africa.

The National Department of Tourism (NDT) has also taken the initiative to play a significant role in climate change issues. In collaboration with the DEA, the Department of Water Affairs (DWA) and the country's power utility ESKOM, have conducted National Greening and Resource Efficiency road shows to educate the tourism product owners on the importance of using available natural resources (water and energy) optimally and efficiently in their sector.[124] The Department has also gone a step further and established a Tourism Climate Change Task Team, which comprises of the business sector, Government, non-governmental organisations (NGOs) and academia. The role of the Task Team is to assist in the development of the National Tourism Climate Change Action Plan. The Department also employs several instruments in order to achieve the same results in the tourism sector - these are the Long Term Mitigation Scenario (LTMS),[125] and Technology Needs Assessment (TNA).

4. POTENTIAL IMPACT OF CARBON TAX ON ECONOMIC GROWTH

In recent years the travelling patterns of tourists have changed and many people are attracted to remote and long haul destinations as many nations (realising the role played by tourism in the economy of the world), put more effort into attracting international tourists. South Africa is one of the long haul destinations that have embarked on vigorous marketing to ensure that about 12 million visitors by 2015 come to our shores. In-as-much as this move will positively contribute to the economy of the country it will also negatively contribute towards the world's tourism-related emissions. The recent climate change and tourism policy[126] has flagged user fees, levies, congestion charges, low emission zones and various taxes as a positive step towards greater sustainability for tourism.[127] What should be noted, however, , is that with these kinds of interventions, travelling patterns will be affected too – this is of concern to South Africa whose core markets are generally long haul.[128]

In line with the above policies, mitigation options and scenarios, there are major threats for tourism especially in case of South Africa where there are challenges such as vehicle emissions tax; aviation tax; tollgates and rise of oil prices. All these factors have the potential to increase travel costs, and thus will hit hard on the pockets of tourists and consequently would affect travel patterns. With South Africa being a long haul destination these scenarios may become a serious hindrance to the growth of tourism in the country. To a greater extent the tax would affect tourism's direct contribution to the country's Gross Domestic Product

[124] National Department of Tourism (2011).
[125] The LTMS investigates costs associated with mitigation options and the available options - OECD/UNEP (2011).
[126] OECD/UNEP (2011).
[127] OECD/UNEP (2011).
[128] Van Schalkwyk (2011).

(GDP). The implementation of a price on carbon is also likely to lead to a small reduction in real disposable incomes across the economy that will reduce demand for domestic tourism in Australia.[129]

An article by Richard Tol, indicates that a carbon tax would favour medium distance trips over long haul trips and that people would soon prefer short distance car and train holidays, thus negatively impacting on tourism-linked employment in the aviation industry. Furthermore, a regional approach in the implementation of carbon tax can prove detrimental to the country as compared to a global one. This is because the countries which implement a carbon tax before others do would be in a disadvantaged position, allowing countries closer to their target countries to benefit from tourists watching their budgets, whereas, with a global approach the scales would remain balanced. Again it is important to note that to have a significant impact on carbon emissions the carbon tax implemented needs to be relatively high; otherwise the emission will only decline by a relatively small percentage which would be insignificant when correlated to the other shortcomings of carbon tax.[130] The Figure1 (below) shows the diversion of tourist from the United States of America (USA) Africa and the Middle East to Europe.

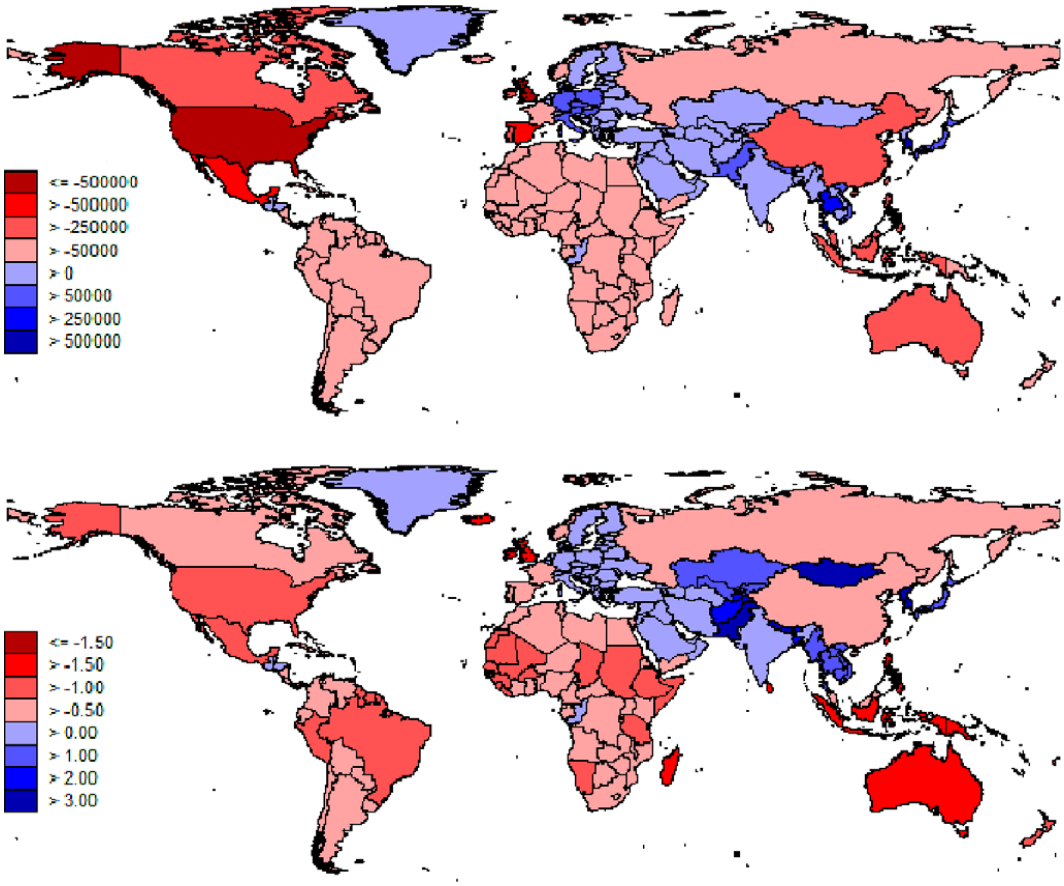

Figure1,The difference in international tourist arrivals in 2010 in absolute numbers (top panel) and in percentage in the case without tax (bottom panel)Source: Tol RSJ (2013)

Tim Jackson (2005) has highlighted the challenges in breaking patterns already created, or those to which people become accustomed, this is important in the sense that in many instances policy makers disregard or don't want to venture into the challenges of behavioural change. For example, it is a known fact that in South Africa the energy industry (e.g. electricity) has had a hard time changing behavioural patterns where electricity consumption is concerned where people have to switch off geysers. This point is raised because the Carbon Tax Policy disregards the Emissions Trading System (ETS) and goes for a carbon tax approach even

[129] Dwyer et al. (2013) Economic Impacts of a Carbon Tax on the Australian Tourism Industry
[130] Tol (2007).

though they acknowledge the carbon tax policy's shortcoming in reducing emissions. This approach has the potential of growing revenue but may not reduce emissions – instead, it has the potential to increase emissions.

5. LESSONS FROM OTHER COUNTRIES

5.1 AUSTRALIA

In Australia after the introduction of the carbon tax, the following was experienced [131]

- The country's price competitiveness was hampered as a result of the rise in the input costs of the tourism industry.
- Exchange rate appreciation affected inbound tourism.
- Inflation-adjusted household electricity price index increased.
- Unemployed workers increased by more than 10 per cent between July 2012 and July 2013 and tourism employment opportunities were predicted to fall by 0.52 per cent (loss of 3104 jobs) by 2020.[132]
- CO_2 emissions increased; and
- The carbon tax had a potential to cost the accommodation sector an extra 115 million dollars a year in operational costs, resulting in a profit reduction by 12 per cent, according to a study commissioned by Tourism Accommodation Australia (TAA). However, no information was available on the current impact.

The latest on Australia's carbon tax system is that business groups (these include tourism businesses) in Australia have called on Parliament to scrap the carbon tax; and the Australian Prime Minister Tony Abbott has set plans to introduce a Carbon Tax Repeal Bill during the first meeting of the new parliament.[133].The idea is to replace the carbon tax with a Direct Action Plan where industries would receive incentives to reduce emissions. However, this plan is not supported by the Greens and the opposition Labour Party (the introducers of the carbon tax legislation).[134]

5.2 IRELAND

It is important to note that projection in Ireland on the impact of carbon tax was the rise in cost of living; this of course would be compensated for, by an income tax reduction. As promising as that may sound, a worrying factor is that compensation would only be felt by people with a taxed income, meaning there would be an extra need for an in increase social welfare payments.[135] In Ireland the carbon tax model works for the growth of the economy because energy in Ireland forms only a small part of the production costs and labour is a larger part. However, over time this scenario will change to the extent where employment drops because labour and energy complement each other, and since energy will become more costly the cost of living will rise too. This scenario is closely related to the South African economy; only in South Africa energy also forms a big part of production.[136]

5.3 NEW ZEALAND

The argument in New Zealand is that "Non-harvested native forest sinks are an important part of the New Zealand carbon cycle and could be increased in area to buy time for tourism to come up with

[131] Dwyer et al. (2013).
[132] Ibid
[133] The Australian (2013).
[134] BBC News (2013).
[135] Tol (2008).
[136] Tol (2008).

more effective energy use, allowing the New Zealand tourism industry to become carbon neutral".[137] Suggestions were of voluntary schemes that stress multiple benefits (i.e. carbon sequestration and restoring forest ecosystems (by motivating to plant a tree when visiting new Zealand) were made. It was further argued that, for New Zealand, a regulatory model was likely to be more effective, especially given that a carbon tax was already planned. The other option was to impose a general eco-tax on entry to New Zealand, or some combination of both an entry eco-tax and ETS.[138]

5.4 NORWAY

In a study conducted in Norway, which is different from the focus of this paper, it was revealed that a rigid approach to implementing the carbon tax does not necessarily contribute towards GHG emission reduction, as this can only be achieved through the responsible utilisation of resources that results in a significant reduction of emissions. This study revealed that over a nine-year period, carbon tax only contributed to a 2.3 per cent reduction in emissions and that figure is further reduced to 1.5 per cent when only onshore emissions are considered.[139] What is interesting is that, fair (responsible) use of resources contributed to 14 per cent reduction in emissions.

6. CONCLUSION

South Africa will be affected a great deal by climate change that will result from high carbon emissions. Although it is a known fact that transport is the major contributor of emissions where tourism is concerned, there is little detailed knowledge on the impact of carbon tax on tourism businesses. However, it is without doubt that when economies around the world feel the pinch economically, the initial response to this is the tightening of the belts, resulting in a reduction in long haul travel. This is a worrying factor as most of our major markets are from Europe and the UK with new entrants being the BRICS countries (viz. Brazil Russia, India, South Africa) BRICS which are also long haul destinations.

The recent outcry on the introduction of carbon tax by the European Union is another sign that this tax may not be the only solution to addressing the challenge of carbon emissions. With limited knowledge and few case studies on how tourism is being affected in the event that carbon tax is instituted, it will be a wise move for the South African tourism industry, in collaboration with government, to commission a study to ascertain the extent to which the carbon tax will affect tourism in the country. Australia is a classic example of a long haul destination that has suffered with the introduction of a carbon tax, and since then the tourism industry has fought hard to have it scrapped off.

Judging by the recent performance of the tourism industry in terms of average spending and domestic trips, as well as choice of accommodation, it is evident that the more expensive the cost of living the less people travel. Furthermore, people are also not willing to spend more; so they opt for residing with relatives in order to minimise holiday costs, meaning the accommodation industry will soon also be negatively impacted as people begin to feel the pinch – it will be small businesses that will be impacted first and this will directly translate to the loss of job opportunities. This will avert the industry from its role in addressing the National Development Plan's objectives.

[137] Hart et al (2004).
[138] Ibid.
[139] Larsen and Bruvoll (2002).

There is an opportunity for South Africa to address the issue of curbing CO_2 emissions in the correct manner, having learnt lessons from other countries that have, in most instances, chosen to use carbon tax alone. However, as this is precisely the approach South Africa intends to embark on, this will not only make South Africa vulnerable to high emission production but will also have unintended consequences, such as a decline in tourist arrivals that may result in job losses.. For this reason, it becomes important to examine the negative impacts of this tax. Literature suggests that while the carbon tax has a positive effect on the balance of payments, it may lead to a contraction in GDP, consumption, investment and employment, thus it may be beneficial for government to promote the sustainable use of resources before aligning with radical approaches implementing the carbon tax.

Based on the foregoing, the following recommendations are made:

- The Department of Tourism needs to ensure that the climate change considerations and the climate change responses relating to its sector outlined in the White Paper are fully mainstreamed into its workings by reviewing all the policies, strategies, regulations, and plans falling within its jurisdiction. This should be done on a regular basis to ensure full alignment with the National Climate Change Response Policy.

- Awareness and capacity within the Department in relation to the challenge of climate change may be limited. Therefore, the Department should vigorously promote environmental awareness among its employees and the industry. The Department needs to ensure that its awareness programmes are devised and implemented in accordance with the National Climate Change Response White Paper.

- The Department should conduct an environmental audit in order to assess its carbon footprint. Once this has been carried out, the Department should take action to address any negative environmental impacts that may have been identified in partnership with the industry.

It is evident that something needs to be done about the country's ever-rising carbon emissions; however, there is no unanimity on the best method of offsetting these emissions. It is also important that, while we try and solve this problem, we do not end up exaggerating the problem - that is, in the quest to minimise the impact of climate change and sustaining our equestrienne beaches, diverse flora and fauna, mitigation efforts should not result in this beautiful scenery not being appreciated by people from all over the world due to the high cost of travel.

7. THE ROLE OF PARLIAMENT

Parliament should:

- Oversee the implementation of existing climate change mitigation policies by requesting the Department to report on the impact of existing policies.
- Oversee the promotion and implementation of National Minimum Standards for Responsible Tourism (NMSRT) and improvement thereof.
- Encourage government departments to promote a culture of innovation in order to come up with alternative methods of energy and carbon offsetting mechanisms.
- Advocate for the utilisation of renewables and advocate for the acknowledgement of renewables through subsidies.
- Encourage a dialogue on this issue from all spheres of government, communities, and civil society, including academics, NGOs, media, service providers, cultural groups, the elderly and youth groups and faith groups.

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THE POTENTIAL IMPACT OF THE PROPOSED CARBON TAX ON THE ENERGY SECTOR IN SOUTH AFRICA

S Maboda & L Bramwell

1. SOCIO-ECONOMIC CONSEQUENCES OF GLOBAL WARMING AND CLIMATE CHANGE

1.1 Electricity Generation

With an estimated population of over 50 million people, South Africa is reported to be the most industrialised country in Africa. The country's national economy is highly dependent on energy production and use so much so that South Africa is said to be amongst the 30 largest emitters of greenhouse gases globally. The largest share of Carbon Dioxide ($CO_{2)}$) emissions comes from the electricity sector. South Africa's power generation sector is dominated by the state-owned utility, Eskom. Eskom generates, transmits and distributes approximately 95 per cent of electricity used in South Africa.

Eskom emitted 227.9 million tons of CO_2 in the 2012/13 financial year. Eskom operates 27 power stations, of which 85 per cent of the capacity is coal-fired. The balance is provided by nuclear, open-cycle gas turbine, hydro and pumped-storage power plants. Since 1991, more than 4.3 million households have been electrified by Eskom[140] within its supply area. The electricity that Eskom produces is a major driver of the economy. About 3 per cent of the country's Gross Domestic Product (GDP) can be attributed to Eskom.

1.2 Effect of climate change on supply of electricity

In the process of generating electricity, Eskom is a significant user of South Africa's natural resources, particularly fresh water and coal. Moreover, given its current power generation mix, Eskom has a considerable CO_2 footprint and is a large emitter of sulphur dioxide (SO_2) and nitrogen oxides (NOx) particulates.

According to research conducted by the International Center for Climate Governance (ICCG) in 2013, developing countries are more vulnerable to changes in seasonal temperatures and in precipitation patterns given the high population density and low standards of living – all of which are due to climate change. So as temperatures increase, water scarce areas also increase, putting pressure on water consumption. And this affects the biggest consumers of water such as the electricity and the mining industry. The scarcity of water will put pressure on mining which in turn will also affect the quantity of coal that is mined. In the long term, climate change can have severe effects on the generation of electricity due to the scarcity of water and coal, both of which are the primary resources Eskom requires to generate electricity.

If the above occurs, the price of electricity could increase which in turn will increase the number of people that would not be able to afford electricity any longer. Thus, the number of indigents will increase, resulting in an increase on the demand for government subsidies. This will put pressure on the governments' purse and invariably on tax payers.

1.3 Effect of climate change on demand for electricity

[140] Currently, 85 per cent of households are electrified in SA (this includes electricity connections by both Municipalities and Eskom)

According to research conducted by ICCG, developing countries may be more sensitive to temperature changes and their demand for electricity. As developing countries and newly industrialised countries improve their standards of living, their use of air conditioning and other weather-dependent electrical appliances may increase their sensitivity to climate change more than in developed countries.[141] The degree to which electricity demand in a given country might be sensitive to changes in climate will depend on its climate type, its energy mix, as well as its level of economic development.

The ICCG research states that if a warmer climate is at lower latitudes, as is the case with South Africa, cooling loads will increase with higher temperatures. This means that global warming will increase electricity demand but overall energy use could instead decrease.

Although developing and industrialising countries seek to diversify their electricity supply through the development of renewable energies, these renewable energies only contributes less than 10 per cent to their energy mix. In the next 30 years it is non-OECD countries that will drive growth in electricity demand due to growing urbanisation, improvement of standards of living, and climate change. These countries will demand more electricity to desalinate water and switch on air conditioning.

The ICCG research states that in newly industrialised countries such as China and India, increased urbanisation and industrial growth pose as significant drivers for electricity demand. It further states that Africa is expected to experience a rapid growth in electricity use, the demand increasing 335 per cent due to the high rate of population growth and urbanisation levels.

Studies undertaken in Thailand found that there is a good correlation between growth and electricity demand and GDP. Thailand demand and GDP growth between 1994 and 2004 has been found to have a correlation coefficient of 0.77 per cent. Forecasts of demand growth in Thailand suggest around 5.7 per cent per year up to 2020.

Thus given South Africa's climate type, its energy mix (which is heavily reliant on coal), and the fact that SA is a developing country, electricity demand is most likely to increase. As the standards of living of most South Africans continue to increase, the use of air conditioning and other weather-dependent electronic appliances will increase the country's demand for electricity..

2. PROGRESS TOWARDS THE DEVELOPMENT AND IMPLEMENTATION OF A CLIMATE CHANGE ADAPTATION STRATEGY

2.1 Electricity (Eskom)

In the 2010/11 financial year, Eskom emitted 230.3 million tons of CO_2 from power generation.

In 2012 the Department of Public Enterprises launched the booklet on the Framework of Climate Change for State-Owned Companies (SOC), which represented the Department's commitment to supporting the national effort to transition towards a greener economy.

In line with that Framework of Climate Change for SOCs, Eskom recognises the imperative to reduce its reliance on coal. South Africa is already taking steps to expand the use of both renewable and nuclear energy; to explore the use of carbon capture and storage (CCS)

[141] Alloisio (2013)

technology; and to reduce energy demand. Eskom has set a target to reduce dependence on conventional coal to 70 per cent by 2025 and South Africa's current target is to have 1 000MW of renewable capacity by 2013 and 3 800 MW by 2016.[142]

Pursuant to that, Eskom further developed a six-step approach to climate change mitigation and adaptation, which involves the following:

1. Diversification of generation mix to lower carbon-emitting technologies by increasing nuclear, gas, renewables, imports and clean coal.
2. Energy efficiency measures to reduce demand and greenhouse gas and other emissions – reducing demand by 3 038 MW in the 2012-2017 period and Internal Energy Efficiency measures (billion kWh programme).
3. Adaptation to the negative impacts of climate change.
4. Innovation through research and development (R&D) in areas which include solar thermal plant, smart grids and underground coal gasification.
5. Investment through carbon market mechanisms such as providing carbon financing and opportunities for trading in the global CO_2 market.
6. Progress though advocacy, partnership and collaboration with national and international stakeholders.

The energy efficiency steps include Eskom's work on the Integrated Demand Management, internal energy efficiency, solar water heater rebate programme, efficient lightning programme involving the rollout of Compact Fluorescent Lights, and the retro-fit of low-income houses.[143]

In an effort aimed at introducing adaptation measures, Eskom has installed electrostatic precipitators or bag filters at Eskom's power stations to reduce the amount of ash emitted into the atmosphere. Electrostatic precipitators remove 99.8 per cent of the fly ash from gases released through smokestacks[144] and Eskom has installed abatement technologies at each power station.

If desulphurisation plants were to be installed at all coal-fired power stations currently in operation, the cost of electricity would go up by approximately 20 per cent.[145] The climate change consequences of reducing emissions of air pollutants are complex. Installing flue gas desulphurisation to reduce sulphur dioxide emissions will increase relative CO_2 emissions from power stations since the efficiency will drop, and will result in additional CO_2 emissions directly from the Flue Gas Desulphurisation (FGD) process (which converts SO_2 and calcium carbonate ($CaCO_3$; limestone) to gypsum ($CaSO_4$) and CO_2. An improvement in the efficiency of a power station, or a switch to a lower emitting technology like nuclear or renewable would lower emissions of both greenhouse gases and air pollutants.[146]

Eskom's water-management processes and practices aim to reduce fresh-water usage and eliminate liquid effluent discharge. More environmentally friendly sources of water have been identified, including mine-water recovery and effluent reuse. And in this respect, investigations with mining partners are ongoing.

With regards to renewable energy, the 100 MW Sere wind farm will be fully commissioned by December 2014 and will save approximately 230 000 tons of carbon emissions per year. The

[142] Climate Change Policy Framework for State Owned Companies (2012) pg.8
[143] http://www.eskom.co.za/c/96/climate-change-cop17/
[144] COP17 fact sheet. Adaptation: Particulate Emission Control at Lethabo Power Station
[145] COP17 fact sheet. Adaptation: Particulate Emission Control at Lethabo Power Station
[146] COP17 fact sheet. Air quality and climate change

100 MW concentrating solar thermal power plant station near Upington, due to be commissioned in 2017, will also help reduce Eskom's carbon footprint by saving about 450 000 tons of carbon emissions per year. Eskom is also looking at other renewable-energy projects such as photovoltaic installations, solar boosting, biomass fuels and ocean energy.[147]

Despite the implementation of this strategy, relative particulate emissions worsened to 0.35kg/MWh sent out in 2012/13 compared to the .031kg/MWh in 2011/12. Eskom has spent R1.7 billion on environmental capital projects and R1.3 billion on environmental operations projects in 2012/13.[148]

2.2 Electricity (Department of Energy)

With regards to the formulation of policies, the Department of Energy (DoE) has done a considerable amount of work in response to the implementation of the national climate change response strategy. Energy Efficiency (EE) is central to responding to the climate change related challenges.

The White Paper on Energy (1998) gives a mandate to the DoE to promote EE through various means. The Energy Act (2008) and the Electricity Regulation Act give the government considerable powers, correspondingly, the DoE will invoke regulations where necessary, implement plans where possible, and ensure appropriate leadership in the sector.[149]

In response to the stated mandates, a number of policies, standards and regulations promoting energy efficiency have been published, and these include the following:

The **National Energy Efficiency Strategy (NEES)** which was promulgated in 2005 and projected a reduction of the national energy demand of 12 per cent by 2015 with the following sectoral targets: Commercial and Public Buildings 15 per cent; Transport 9 per cent, Residential 10 per cent, and 15 per cent for Industry and Mining. The first review of the NEES was held in 2008, and a revised Strategy was afterwards gazetted for public comments.[150]

The second review process started in 2011 as part of the Industrial Energy Efficiency Improvement Project (IEEIP) and the process was implemented in collaboration with the Department of Trade and Industry, Business, and other international partners. The 2011 NEES review has considered the power crisis of 2008; the world financial crisis and its impact on South Africa; climate change impacts and response measures; energy policy development including the Integrated Energy Plan; and Integrated Resource Plan and other plans.[151]

Energy Efficiency Target Monitoring System (EETMS): The purpose of the EETMS is to introduce and institutionalize an EE Target Monitoring System for measuring and reporting of the achievement of the sectoral targets set out in the NEES. The EETMS will also be applicable to the public sector including street lighting, waste water and water purification process and public buildings.[152]

Regarding public buildings, the Minister of Public Works launched the **National Green Building Framework** in December 2011, which also has elements of energy efficiency in

[147] Eskom Holdings SOC Limited (2013)
[148] Ibid.
[149] DoE (2012)
[150] Ibid
[151] Ibid
[152] Ibid

buildings. This National Green Building Framework supports the energy efficiency regulations including the building regulations that have been amended to include mandatory EE standards for new buildings. The DoE is working with the Department of Public Works and other key stakeholders to introduce a policy framework that will see the introduction of energy performance certification in buildings. The energy performance certificate is a tool to rate buildings according to their level of energy consumption. The interventions identified will be a five step process which will commence with establishing a baseline on the extent of energy usage by public buildings. This exercise will be in the form of pilot projects on selected public buildings, and will further establish a standard for data measurements and issuing of the energy performance certificates. [153]

The **National Building Regulations** have been amended to include a specific requirement for energy efficiency in new buildings (SANS10400XA). The National Regulator for Compulsory Specifications is responsible for its enforcement. According to the regulations, at least 50 per cent of the annual average hot water heating requirement shall be provided by other means other than electrical resistance heating including but not limited to solar heating, heat pumps, heat recovery from other systems or processes and renewable combustible fuel. The regulations also provide for the inclusions of ceilings and ceiling retrofits in all buildings.

Standards for energy labeling appliances are an internationally tried and tested tool to build awareness of energy efficiency among consumers. Accordingly, the South African Government will introduce **mandatory labeling of some domestic appliances in 2013 (SANS 941)**. The aim is to discourage the use of inefficient household appliances.

Regulations on the Allowance of Energy Efficiency Savings in terms of section 12L of the Income Tax Act, 1962 are also in the process of being finalized, whilst section 12i of the Act, which has a component of energy savings has already been introduced to the market by the Department of Trade and Industry.

The DoE promulgated the **Regulations for Mandatory Provision of Energy Data** in March 2012 under the National Energy Act of 2008.[154]

3. POTENTIAL IMPACT OF CARBON TAX ON ECONOMIC GROWTH

This section presents impact of carbon tax on economic growth. Emphasis will be put on the impact of carbon tax on the electricity (mainly Eskom) and the petroleum sector.

3.1 Electricity Sector

According to the National Treasury (2013), electricity generation is the main contributor to carbon emissions. To be precise, electricity generation is reported to make up for 40 per cent of carbon emissions. It is therefore imperative that measures to reduce carbon emissions in this sector are intensified. However, it is also imperative to ensure that measures introduced do not impact on the economy negatively. What follows is a discussion on the extent to which the introduction of the carbon tax would impact on the electricity sector.

In terms of Section 4 of the National Energy Regulator Act, 2004, the National Energy Regulator of South Africa (NERSA) has the mandate to regulate the electricity industry in terms

[153] Ibid
[154] DoE (2012)

of the Electricity Regulation Act, 2006. The Energy Regulator determines Eskom's allowed revenue on a multi-year basis. The Multi-Year Price Determination (MYPD) incorporates some of the Rate of Return (RoR) and incentive based principles. The RoR methodology states that "the revenue to be earned by Eskom should be equal to the efficient cost to supply electricity plus a fair return on the rate base".[155] Therefore, any cost increase will be reflected in the electricity tariff which determines Eskom's revenue.

Eskom's last tariff application to the NERSA did not factor in a carbon tax. If Eskom had factored in the carbon tax, the utility would have requested for 17.6 per cent instead of the 16 per cent it requested. This is an indication that once a carbon tax is implemented, electricity prices will also increase. According to Swart in Lamprecht (2013) electricity prices will go up. Swart is also of the view that the electricity price could increase by 4.8c per kWh as a result of the carbon tax—this effectively works out to an increase of around 8 percent.[156] On the contrary, other energy analysts have calculated that the carbon tax of R120 per ton of CO_2 would add 12c per kWh on to Eskom's electricity prices.[157] Irrespective of which holds true, indications are that the prices of electricity will go up. This is likely to impact negatively on both Eskom and its consumers.

Eskom is of the view that the carbon tax is premature as the Integrated Energy Plan (IEP) has not been finalised as yet.[158] Eskom is gearing itself towards the IEP that is currently being developed by the Department of Energy. Eskom stated that the IEP already came with a 34 per cent savings factor on emissions and additional costs and further taxes added to the plan were not factored in. However, if the tax is to go ahead, Eskom will have to pass the cost of the tax onto the consumer. Eskom stated that if the tax was imposed, even at its lowest rate, it would be R54 a tonne of carbon dioxide, equated to R108 a tonne of coal. Currently, Eskom is not even paying half of that for a tonne of coal.[159]

The utility's primary energy costs for the 2012/13 financial year amounted to R60.7 billion from R46.3 billion in 2011/12. Per unit, primary energy costs increased from 20.6c/kWh in 2011/12 to 28.1c/kWh in 2012/13.[160] The carbon tax will further increase the cost of coal, pushing up the primary energy costs. Eskom indicated that for every R2 billion increase in its cost, there would be a 1c/kWh increase in the tariff.

3.2 Petroleum Sector

The petroleum refining and the transport sectors contribute, respectively, 9 per cent each to carbon emissions and when combined, they contribute about 18 per cent.[161] According to the South African Petroleum Association (SAPIA), the crude oil refinery sector accounts for only 0.5 per cent of the national greenhouse gas emissions. Furthermore, SAPIA reiterates that the sectors' emissions are not primarily from carbon, but from fuels in the refinery, such as fuel oil and fuel gas. The sector could achieve a maximum of 10 per cent reduction on its emissions, but the cost of achieving this is perceived to be extremely high and the effectiveness of such an endeavour is questioned.[162] In this respect, it is stated that the introduction of the carbon

[155] NERSA (2013)
[156] Lamprecht (2013)
[157] Groenewald (2013)
[158] Mclaughlin (2013)
[159] Vecchiatto (2013)
[160] Eskom Holdings SOC Limited (2013)
[161] National Treasury (2013)
[162] Portfolio Committee on Energy Roundtable Discussion on Carbon Tax, (2013)

tax could result in the discouragement of investors to sustain investment in the petroleum sector.

Similarly to SAPIA, Sasol Oil Company is of the view that a carbon tax would reduce the capital and funds the group would have available to invest in low-carbon feedstock alternatives. An analysis by Sasol of the effect of the tax on its business indicated that instead of the R120/tonne proposed by the Treasury, it would be paying as much as R170/tonne in some parts of its business.[163]

4. LESSONS FROM OTHER COUNTRIES

4.1 AUSTRALIA

In 2011/12 approximately 91 per cent of Australia's electricity was generated from fossil fuels, with 75 per cent from coal and the remainder from natural gas. Renewable energy made up the remaining 9 per cent.

The National Electricity Market (NEM) began operating as a wholesale market for the supply of electricity to retailers and end-users in Australia since December 1998. The Australian Energy Market Operator (AEMO) was established to manage the NEM and gas markets from 1 July 2009. AEMO's core functions can be grouped into the following areas:

- Electricity Market – Power System and Market Operator
- Gas Markets Operator
- National Transmission Planner
- Transmission Services
- Energy Market Development

AEMO operates on a cost recovery basis as a corporate entity limited by guarantee under the Corporations Law. Its membership structure is split between government and industry, 60 and 40 per cent respectively. An overarching aim of AEMO is to provide an effective infrastructure for the efficient operation of the wholesale electricity market, to develop the market and improve its efficiency and to coordinate planning of the interconnected power system. AEMO's primary responsibility is to balance the demand and supply of electricity by dispatching the generation necessary to meet demand. AEMO's key financial objective of being self-funding is achieved through the full recovery of its operating costs from fees paid by market participants.

Carbon tax, in Australia, is charged at a fixed price of Aus$23 per carbon ton from the country's top 500 polluters and this began on 1 July 2012, and is set to increase by 2.5 per cent annually until 2015 before changing to a floating-rate price - with the government controlling the amount of tradable permits released annually and implementing a price floor and ceiling. At that point companies will be able to trade carbon credits and the scheme is expected to be linked with other systems in New Zealand.[164]

The Australian government's official carbon reduction target is for a 5 per cent reduction in emission below 2000 levels by the year 2020. The government estimated that the tax will increase the cost of living by 0.7 per cent in 2012/13, dominated by a predicted increase of

[163] http://www.bdlive.co.za/business/2013/08/21/treasurys-carbon-tax-plans-draw-sasols-fire
[164] Curran & Brindal (2011)

less than 0.5 per cent increase in food prices. Electricity and gas prices are estimated to rise by 10 per cent and 9 per cent respectively.

According to research undertaken by an economist, Dr. Alex Robson, at Australia's University of Brisbane for the Institute for Energy Research, electricity prices had risen 15 per cent a year after the tax was enacted. He states the carbon tax increased taxes on 2.2 million citizens and has not decreased the country's carbon emissions. Australian newspapers reported that the carbon tax contributed to the plight of 10 632 businesses that faced insolvency in 2012 – up from 10 481 in 2011. They also reported that provincial hospitals made payments which ranged from 8 per cent of hospitals' total energy costs to 22 per cent.[165]

The increase in prices is supported by the Australian Industry Group survey on business pricing responses to Australia's carbon tax after the first six months of implementation. Business estimated that the carbon tax increased their energy costs by an average of 14.5 per cent and around half of businesses surveyed experienced an increase in some of their input costs (energy and other inputs) according to the survey. The survey found that the amount of pricing pass through[166] varied across sectors. A sectors' ability to pass on costs reflects a number of factors including:

- The level of trade exposure in the sector, through either export activity or import competition;
- The willingness of a sector's customer base to accept price rises of any sort;
- General demand, competitive pressures and margin compression for each sector more broadly.[167]

However, according to the Australian National Greenhouse accounts, quarterly update of Australia's National Greenhouse Gas inventory for September 2012, annual emissions from the beginning of the year to September 2012 were estimated to have declined in emissions of 0.5 per cent when compared to the year to September 2011. The decrease in annual emissions was largely attributed to a decline in emissions from electricity, reflecting lower electricity demand and changes in the generation mix. Electricity generation is the largest source of emissions in the national inventory, accounting for 35 per cent of emissions in the year to September 2012.

The quarterly report stated that emissions from electricity declined over the past three years, but accelerated in the September 2012 quarter. During the quarter, electricity emissions decreased by 2.9 per cent in trend terms to its lowest level since 2001, and 5.9 per cent in seasonally adjusted and weather normalised terms.[168] By December 2012, electricity emissions were at their lowest level since 2001-02.

Changes in ruling parties have also had an effect on carbon tax in Australia -, the Liberal Party, which took over from the Labour Party, plans to repeal the carbon tax law with effect from 01 July 2014. However, according to the chief executive of the Energy Supply Association of Australia, Matthew Warren, due to price regulation and forward contracting, it is very difficult to unwind the carbon price in the middle of a financial year. He stated that it would create enormous logistical problems to try to unwind the carbon price from electricity pricing before the end of the financial year in which the carbon price repeal takes place.[169]

[165] Bastash. (2013)
[166] Pricing pass through refers to the ability of producers to pass on cost increases to consumers.
[167] Australian Industry Group (2013)
[168] Australian Government (2012)
[169] Taylor (2013)

Australian economic growth for 2012 was 3.1 per cent, in line with expectations. Their unemployment rate remained relatively stable from 5.1 per cent in 2011 to 5.2 per cent in 2012. According to these statistics, carbon tax did not have an adverse effect on the Australian economy.

4.2 INDIA

Electricity supply in India is the sole responsibility of the government of India and the states. The Union Government controls the Central Electricity Authority (CEA), the main regulatory body, and the central generating companies. These generating companies are bulk power generators who sell their entire output to state-run utilities. The states control the State Electricity Boards (SEBs), which generate power and account for most of the distribution in the country.

The electricity sector in India has an installed capacity of 227.356 GW as of August 2013, of which 133.188 GW or 58 per cent is produced by thermal coal. 69 per cent of India's electricity is generated by thermal (coal, gas and diesel) while the remaining 31.9 per cent is generated through nuclear, hydroelectric and renewable energy sources.[170]

India's carbon tax is specific to coal only. In July 2010, India introduced a nationwide carbon tax of 50 rupees per tonne (less than Aus$1) of coal both produced and imported to India. Revenue raised is designated to research and innovation in clean energy technologies and environmental remedial programmes undertaken by the National Clean Energy Fund. Most of India's coal is supplied through the world's largest coal miner, Coal India Ltd (CIL). CIL is the supplier to the power projects. Under the terms of fuel supply agreements, CIL supplies either 100 per cent or 65 per cent of coal from domestic sources and 15 per cent through imports. CIL is projecting that 6 to 10 million tonnes of coal will be imported. The government, through the Cabinet Committee on Economic Affairs (CCEA) decides on the tariff at which electricity is supplied. Electricity tariffs have increased by 15 to 17 cents since the introduction of the carbon tax on coal due to the price of coal increasing.

SEBs are state-owned utility companies responsible for operating the electricity grid and delivering electricity to customers. SEBs buy electricity from power generators at a price negotiated through a Power Purchase Agreement (PPA), which they in turn sell to electricity consumers. Widespread electricity theft and low electricity prices have led to a lack of necessary investment to improve grid infrastructure by SEBs. The Indian government had to approve a debt restructuring to address the problems the SEBs faced. Reduced debt pressure on the state utility companies will allow them to invest in more infrastructure, operation improvements and revitalise the electricity sector by enabling new PPA's that are currently beyond SEBs' financial capacities.[171]

A case study on India done by Ama Baafra Abeberese from Wellesley College showed that an exogenous increase in electricity prices, firms reduce their electricity consumption and switch to industries with less electricity-intensive production processes. It was also found that firm output, machine intensity and labour productivity decline with an increase in electricity price. The exogenous increase in electricity prices is the price of coal paid by power utilities.[172]

[170] Central Electricity Authority
[171] Makhijani (2012)
[172] Abeberese. (2012)

Since India's carbon tax is only applicable on coal, and CIL mines and suppliers of all India's coal, the tax only affects local coal and imported coal that is used in the generation of electricity. As long as government approves electricity tariff levels, the costs of generating electricity need not to be passed onto the consumer of electricity. Thus there was no direct impact on electricity consumers. However, the SEBs suffered from the higher input costs and low electricity prices, which increased their debt costs. The SEBs were then unable to invest in infrastructure. The Indian government had to step in to lower the SEBs levels of debt, to reverse this situation.

5. ROLE OF PARLIAMENT

In light of the above, it is suggested that the role of Parliament should be the following:

- Parliament should ensure that the Integrated Energy Plan is finalised and makes provisions for carbon tax.
- Parliament should further ensure there is better policy alignment on climate change amongst government departments and parastatals.
- Parliament should explore the possibility of having a single and overarching environmental tax policy which would address all environmental related taxes including the carbon tax, instead of having a number of environmental related taxes and levies.

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THE POTENTIAL IMPACT OF THE PROPOSED CARBON TAX ON THE MINERAL RESOURCES SECTOR IN SOUTH AFRICA

M Nicol

1. INTRODUCTION

> "For the first time in the history of mankind, there is arising a crisis of worldwide proportions involving developed and developing countries alike—the crisis of human environment. ... It is becoming apparent that if current trends continue, the future of life on earth could be endangered."[173]

These words were written more than forty years ago by U Thant, the then Secretary-General of the United Nations.

The mining sector is one of the major contributors to pollution and environmental devastation. Despite the protective laws and regulations that exist for mining, the industry creates enormous harm to the environment, often leaving behind ruined wastelands and dumps of toxic tailings. Tailings are held in fine-silted dams, heavy with the chemicals used to extract minerals from ore, will have to be managed forever in the future[174]. The scale of modern mines is immense and mines will get bigger in the future because, as the richer deposits are mined out, the only way to continue mining is to process ore of a lower grade. This means that much more dirt will be moved and processed to yield the same amount of product. Mining is going to get more intense in coming decades and centuries – for as long as human civilisation exists.

South Africa is already the most mining intensive economy in the world when we compare the proportion of our workforce employed in mining to that in other countries. Despite over a century of large scale, industrial mining, South Africa still has vast amounts of valued minerals in the ground. The country ranks in the top ten in world reserves of antimony, chrome ore, coal, fluorspar, gold, lead, manganese ore, nickel, platinum group metals (PGMs), phosphate rock, titanium minerals, uranium, vanadium, vermiculite, zinc and zirconium.[175] Mining is written into South Africa's future, as much as it has figured in the past.

As explained below, mining is a major greenhouse gas (GHG) emitter.

The aim of the carbon tax is to get mining (along with all other sectors) to change its behaviour[176]—to be more efficient in using energy and more careful about releasing methane and other GHGs into the atmosphere. It is not the aim of the tax to raise revenue for government.[177]

If South Africa is going to target GHG emissions, it has to target mining, despite the negative effects this will have, in the present circumstances, on mining jobs, mining output, mining exports and revenues from mining.[178]

In order to ease the impact on mining, the carbon tax will be phased in. It is also set at a relatively low starting level of R120 per ton. As an energy-intensive and trade-intensive (EITI)

[173] Kennan (1970).
[174] Siegel (2013).
[175] Chamber of Mines of SA (2012).
[176] National Treasury (2013) – the point is repeatedly repeated. See for example paragraphs 9 and 106, 167-8 and 221.
[177] Ismail Momoniat (National Treasury) quoted in *Finweek* (2013).
[178] Newman and Andrews (2013); Alton *et al.* (2012).

sector, the mining industry gets an additional 10 per cent rebate, on top of the standard 60 per cent allowance. Coal mines may get an extra rebate of up to 10 per cent for fugitive emissions – gases such as methane which escape from mining operations.[179] As it is presently planned, the carbon tax will not sink the mining industry. The impact of the carbon tax in South Africa will be nothing in comparison to the effects that the rising costs of electricity and labour will have on the mines, particularly when combined with the costs of compliance with existing environmental and social regulations.

The carbon tax has nevertheless been harshly criticised by commentators[180], organised business, such as Business Unity SA (BUSA)[181] and the mining industry itself. Questions have been raised as to whether a carbon tax is effective in reducing GHGs, whether South Africa should not delay action until international agreement has been reached and whether there is sufficient co-ordination in the introduction of other mitigation measures and with the government incentives to move towards a greener economy.[182]

The American diplomat and strategist George Kennan, writing in 1970, just as the world was waking up to the global scope and consequences of environmental degradation, commented that "... one cannot make do with just the reinforcement of what now exists. If the present process of deterioration is to be halted, things are going to have to be done which will encounter formidable resistance from individual governments and powerful interests within individual countries."[183]

Just because the carbon tax is widely opposed by the mining industry does not mean that it is the wrong decision for the South African government to take.

2. SOCIO-ECONOMIC CONSEQUENCES OF GLOBAL WARMING AND CLIMATE CHANGE

2.1 Increased water scarcity

The main economic consequence of climate change for the mining industry in South Africa is likely to be the increasing scarcity of water.

Many mines and mineral processing facilities use huge volumes of water. Underground mines use water for cooling and to power hydraulic machinery. Unconventional gas extraction, where hydraulic fracturing (fracking) is the new technology under consideration, uses considerable amounts of water and its appropriateness for already water scarce areas such as the Karoo, is being questioned even at present.[184] Those mines in arid and water-stressed regions, which rely on the use of water, will be particularly threatened by greater water scarcity. This will lead to conflicts with other water users unless correctly managed.

2.2 More storms at sea

[179] National Treasury (2013:14).
[180] Lloyd (2013).
[181] Creamer (2013).
[182] Ensor (2013).
[183] Kennan (1970).
[184] Saville (2013); In August 2013, the Minister of Water Affairs announced her intention to make fracking a 'controlled activity' in terms of the National Water Act, No 36 of 1998. (Department of Water Affairs, 2013). In October 2013, the Minister of Mineral Resources gazetted the additional mining regulations proposed for hydraulic fracturing for public comment. (Minister of Mineral Resources 2013).

Shoreline and off shore mining operations, whether for diamonds, heavy metals or oil and gas production could become less viable because of the increased intensity and variability of bad weather which is anticipated to be a consequence of climate change.

The conclusion is that the South African mining industry is likely to be able to adapt to climate change at a relatively low cost for the foreseeable future.[185] It is important to note that the industry faces constraints on its growth from the scarcity of water at present, without the added impact expected from climate change.[186]

3. PROGRESS TOWARDS THE DEVELOPMENT AND IMPLEMENTATION OF A CLIMATE CHANGE ADAPTATION STRATEGY

Most mining companies pay lip service to the need for sustainability in mining although many have also made real efforts to move away from patterns of the past.[187] Companies such as these, first focus on efficiency issues. There is a large measure of self interest here, because when they monitor their carbon footprint and use this as an indicator for improved energy efficiency, mines can save costs and raise profits. The main difficulty faced by mining companies, after energy efficiency issues have been dealt with, is that the main driver of their carbon footprint is their use of electricity and their main supplier, Eskom, "remains wedded to coal for electricity generation".[188] Coal burning is a potent emitter of GHG. Because South Africa lacks alternative mechanisms to generate electricity, it is one of the highest world emitters of carbon on a per capita basis, despite being a developing country.

Sustainability reports produced by large mining companies refer to environmental, water and pollution issues. They frequently mention GHG emissions, climate change and may measure their carbon footprint. The reports are compiled according to various models, sponsored by institutions such as the Global Reporting Initiative (GRI)[189] or the International Organization for Standardization (ISO)[190]. These bodies encourage companies to use a common format when reporting on the climate change mitigation and adaptation measures that they take. Reports may be formally verified by company auditors.

Mining companies on the Johannesburg Stock Exchange now have to include a sustainability report as an integral part of their annual report as a condition of their listing. A 2013 critique of ten years of sustainability reporting by Lonmin, the third largest platinum producer in the world, by The Bench Marks Foundation[191] presents evidence that commitments made in such reports are often dropped if they become hard to implement. The sustainability reports frequently report a *lack* of compliance both with company policy and indeed with statutory emission limits. Company reports on environmental responsibility take on the character of public relations releases – with fuzzy statements and inconsistent transparency. It is not clear that ESG (environmental, social and governance) standards are being upheld – even when these are buttressed by laws and regulations, such as the Mining Charter.[192]

[185] Nordhaus (2013:4) distinguishes between the impact of climate change on "highly managed sectors" – such as nonagricultural sectors in high income economies – and "unmanaged or unmanageable sectors" – such as rain-fed agriculture in Africa – which are highly vulnerable to future climate change.
[186] Reuters (2013); Schulze (2012). South Africa is defined as "water-stressed" in Muller *et al* (2012:1).
[187] See Kolver (2013).
[188] Reichardt (2007:30).
[189] GRI (2013).
[190] ISO (2010).
[191] The Bench Marks Foundation (2013).
[192] Bench Marks Foundation (2013).

Mr Bernard Swanepoel, one of South Africa's most experienced mining executives, told a conference in October 2013: "I've never had to justify environmental or safety issues relating to companies I've been involved with… as far as fund managers in this country are concerned SRI (socially responsible investment) may as well not exist."[193] He continued: "There is concern about fatalities in the mining sector but that's because section 54 of the Mine Health and Safety Act requires companies to stop operations and that affects profits...Unless it hurts investor returns, investors won't care… the incentive system is far too perverse."[194]

If you want to focus the minds of mining executives on dealing with GHG emissions, you need to put a price on carbon.

A 2013 study on the *Effects of U.S. Tax Policy on Greenhouse Gas Emissions*[195] which was commissioned by the United States (US) Congress, states that "a key finding of economic studies of climate-change policy is that the most reliable and efficient way to achieve given climate-change objectives is to use direct tax or regulatory policies that create a market price for CO_2 [carbon dioxide] and other greenhouse gas emissions."

The authors cite an earlier report that:

> Most economists and policy analysts have concluded, however, that putting a price on CO_2 emissions (that is, implementing a "carbon price") that rises over time is the least costly path to significantly reduce emissions and the most efficient means to provide continuous incentives for innovation and for the long-term investments necessary to develop and deploy new low-carbon technologies and infrastructure. A carbon price designed to minimize costs could be imposed either as a comprehensive carbon tax with no loopholes or as a comprehensive cap-and-trade system that covers all major emissions sources.[196] ["Cap and trade" places a legal limit on the amount of allowable emissions but permits companies to trade – buy or sell – the right to emit GHGs to other companies.]

The US National Research Council says that several reports and literature reviews have consistently found that the approach of uniform pricing of GHGs is the most reliable and efficient way to achieve different climate-change objectives.[197]

The important thing in the mining sector, particularly in the light of Swanepoel's remark above, is to bring economic forces to bear on mine planning and behaviour around GHG emissions.

At the same time, the US [Congress-appointed] Committee on the Effects of Provisions in the Internal Revenue Code on Greenhouse Gas Emissions admits that there is a lot we don't know and understand. The economic models that predict the effects of different taxes on GHG emissions are not robust – anywhere in the world. The committee recommends "continued support of energy-economic modeling to better understand the impacts of taxes and other public policies on greenhouse gas emissions and the broader economy".[198] Details are provided of areas in which particular attention should be given to improving current models.

It is evident that economic growth leads to GHG emissions and there is robust scientific understanding of the connection between rising GHG concentrations and regional climate

[193] Crotty (2013).
[194] Ibid.
[195] Nordhaus, Merrill and Beaton (2013).
[196] Nordhaus, Merrill and Beaton (2013) citing NRC(2011:58).
[197] Ibid.
[198] Nordhaus, Merrill and Beaton (2013:9).

change, which imposes ecological and economic impacts.[199] We know that climate change policies are needed to reduce GHG emissions, but we do not know *how much* effort is required to make a difference – we don't even know if it is not too late for any remedial action to have an effect that will slow down climate change.[200] There is a need for continuing research and for open minded enquiry on the complex mechanisms involved in climate change and on their impacts. There are big differences of opinion between analysts of climate change on the stringency of the anti-GHG policies that are required.[201] We do not know what targets need to be set for reducing GHG emissions (for mines or for any sector) and even if we did, it would be necessary to weigh up the costs of attaining such goals against the benefits.

The uncertainties are important to highlight because they are not an argument against the implementation of the carbon tax. They support the need for climate change policies. Policies to slow GHG emissions should be introduced as soon as possible.[202] Professor Robert Pindyck of the Massachusetts Institute of Technology stated in a 2013 interview:

> "I think that we [the US] ought to have a carbon tax. I think that it ought to become clear to people, not just economists, politicians, and the public at large that there is a social cost of carbon. That there is a cost to society of burning carbon that goes beyond the individual cost you pay when you buy the carbon. And I think it's very important for people to understand that. It may be a while before we figure out what the right number is, but I think it's important to get started. And try to get some countries on board. We're not going to get the whole world on board. There are going to be free riders."

South Africa has taken a decision not to be a free rider, but to set an example to the world. The carbon tax proposals put SA on a trajectory that will allow the country to contribute towards a climate change adaptation strategy which may have international relevance. Implementation of a carbon tax which applies to the mining sector is a necessary element in the national climate change adaptation strategy. Our newly opening growth path, with the emphasis on the green economy, will enjoy spin off benefits from the development of skilled scientists, engineers and policy evaluators who are dedicated to finding ways to reduce GHG emissions within the mining sector.

4. POTENTIAL IMPACT OF CARBON TAX ON ECONOMIC GROWTH

Mining has a big carbon footprint – industrial mining projects are always energy intensive, using large quantities of electricity and petroleum products for both mining and for cooling, hoisting, ore transport and processing. In addition, mining releases GHGs from the earth and when processing ore (fugitive emissions). This is particularly the case for coal mining and for oil and gas drilling.

A high carbon tax would have a negative impact on mining in South Africa and delay economic growth. But there is no proposal for a high tax. R120 per ton is a very low figure, compared with the "low" figures of $30-$40 per ton contemplated in the United States[203]. While the proposal is to increase this by ten per cent a year "in order to provide a clear long-term price signal" it would reach R146 (still a low figure) by 2019, when the rate of increase will be

[199] Nordhaus, Merrill and Beaton (2013:22); Nordhaus (2013:10).
[200] Pindyck (2013).
[201] Nordhaus (2013:7-8).
[202] Pindyck (2013). This is also a "major finding of integrated assessment models" - see Nordhaus (2013:3). It is also the view of Nobel economics laureate Professor Paul Krugman who reviews Nordhaus (2013). Krugman (a former graduate student of Nordhaus) states "…when it comes to climate change uncertainty strengthens, not weakens, the case for action now." (Krugman 2013).
[203] Pindyck (2013).

reviewed.[204] (And one needs to take into account that the tax is payable only on 20 or 30 per cent of emissions when including the rebates for EITI sectors).

This level of carbon tax is not high enough to pose a threat to the growth of the sector – while it provides an incentive for mines to look for ways to reduce GHG emissions.

There was a time when environmental issues in SA were seen as being a "white" issue. They were characterised "by a wildlife-centred, preservationist approach which appealed to the affluent, educated and largely white minority"[205]. Black South Africans were largely hostile to "what was perceived as an elitist concern peripheral to their struggle for survival"[206]. That situation has begun to change since 1994.

It is now more widely appreciated that environmental destruction in support of growth can be self-defeating. Rivers and water sources need to be healthy to provide people and livestock with clean water.[207] Wilderness areas protect biodiversity, making available plants and landscapes which have sacred significance for communities[208] and which also foster tourism. Asbestos mining generated huge profits for mining shareholders for a generation – but this led to workers dying many years later of lung diseases and to air and earth pollution problems which limit the lives of people in rural communities even today.[209]

Will the growth of the economy be affected by mines increasing their prices to pass on the price of the carbon tax to consumers? Mines are price takers. The prices they receive are market prices - mainly. There are some "cost plus" contracts (for example with Eskom for coal) where the tax would be included and passed on. All things being equal, the increased costs of the tax will come off profits and reduce returns (to a very small degree because the level of the tax is so low).

5. LESSONS FROM OTHER COUNTRIES

Lessons are difficult to point to because little is proven. The US Committee on the Effects of Provisions in the Internal Revenue Code on Greenhouse Gas Emissions cited above[210] was unable to show that any of the tax measures of the federal government has had an impact on GHG emissions. This may because there have been none – the US has never imposed a tax on carbon – but the argument is that we don't understand enough about the economic and environmental processes at work here to be sure of anything. Research, monitoring and open enquiry are still needed over many years.

The main lesson, perhaps, is general and obvious.

Smart regulation by government can encourage firms so that they become more efficient and more competitive.[211] That is the aim of the tax on carbon.

Energy intensive industries such as mining however face a huge difficulty in South Africa, where they have to rely on coal for electrical power. Coal burning and fugitive emissions from

[204] National Treasury (2013:15 and 58).
[205] Khan (2002).
[206] Ibid. An exception here is the National Union of Mineworkers which from its inception in 1982 criticised the mining industry for its careless disregard for the environment – if mainly because of its impact on the health of workers.
[207] Duncan (2013:4).
[208] Centre for Environmental Rights (CER) (2012).
[209] Nicol (2013a).
[210] Nordhaus, Merrill and Beaton (2013:7-9).
[211] Porter and Van der Linde (1995).

coal mines hugely inflate the size of the mines' carbon footprint. Innovations are always possible[212], but their extent is constrained for this reason.

In the US, Professor Paul Krugman believes it is highly unlikely that the US Congress will pass any measures to introduce a carbon tax – because Congress is controlled by the Republican Party, with its free-market opponents of more taxes and its climate change denialists. If a carbon tax is impossible in the US, a measure "almost as good"[213] would be to take direct action to regulate and sharply reduce emissions from coal-fired electricity generation. The US Environmental Protection Agency has the right to regulate power plant emissions, and, Krugman comments, has already introduced rules that will probably prevent the construction of any new coal-fired plants in the US. "Taking on the existing plants is going to be much tougher and more controversial, but looks for the moment like a more feasible path than carbon pricing." This may be the case in the US, but the lesson is not yet an option for SA. We lack the hydro power and oil options available to the US and the existence of meaningful amounts of shale gas available through fracking has yet to be proved in SA.[214]

6. THE ROLE OF PARLIAMENT

6.1 Parliament could question whether there is a need to address the externalities of mining beyond GHG emissions

The concepts of externalities and external costs run as a constant, repeated theme through the National Treasury paper on the carbon tax.[215]

Climate change and air and water pollution create severe environmental challenges.

> "Society is affected by the resulting pollution, and the polluter is often not held accountable for the costs of such pollution. In economic theory, this is defined as a negative environmental externality, and therefore a market failure, because the costs of pollution are not reflected in the final prices of the goods and services. In order to correct market failures and include these external costs in the prices of goods and services, and hence ensure efficient and environmentally beneficial outcomes, the government intervenes by way of regulations or market-based instruments to influence the decision-making processes of producers and consumers."

Parliament has the opportunity to question how the concept of externalities applies to mining more broadly, as it seeks to support the move towards a green and sustainable economy.

The mining sector's environmental externalities (following paragraph 56 of the paper on Carbon Tax) are wide and varied. They include direct GHG emissions as, for example, where methane is released from mines, from drilling for oil and gas and from tailings dams. They include local water pollution (just one aspect of which is Acid Mine Drainage[216]) and air pollution through emissions of sulphur dioxide[217] and other gases from on-mine chemical processing plants and smelters. Mines are intensive users of electricity (11 per cent of costs are electricity and 9 per cent of SA electricity is used directly by mines in cooling, hoisting, transporting and processing

[212] See Porter and Van der Linde (1995).
[213] Krugman (2013).
[214] Nicol (2013b).
[215] National Treasury (2013: paragraph 7). Also see paragraphs 103-6 in particular.
[216] Fig (2011).
[217] Lonmin (2012).

activities). Mines therefore contribute in a major way to the GHG emissions and other negative environmental impacts of the energy sector.

The question could be posed whether the Treasury's focus on externalities should be limited to the environment and, within that, to carbon emissions? If externalities are present, should they not all be addressed? The carbon tax addresses only a small part of the environmental externalities associated with mining – it does not, for instance, deal with air and water pollution, acid mine drainage and the environmental harms visited by mine dumps, toxic tailings storage facilities, roads and other construction on ecosystems in general. The carbon tax completely bypasses the social externalities associated with mining – the migrant labour system, the failure of mines to provide real housing alternatives for their workers, the "sea of poverty"[218] that surrounds almost every mine in the country, with informal settlements and degrades living environments where minimum standards for water, sanitation or electricity are not realised. The carbon tax completely bypasses the historical externalities associated with mining – in the form of derelict and ownerless mines, acid mine drainage and ecosystem devastation.[219]

By recognizing one externality, the Treasury paper invites one to consider all externalities associated with mining. The externality they have identified definitely needs to be addressed, but what about all the others? The social and environmental externalities associated with mining, apart from those which the carbon tax seeks to address, are immediate, urgent and enormous in scale. R41-billion was estimated by the Department of Mineral Resources as the extent of government liability for rehabilitating abandoned, dangerous mine sites[220] of which over six thousand are known.

The argument here points to the need to develop an entirely different approach to mining. The analyst Shefa Siegel argues that mining has never developed an approach to sustainability that matches the progress made in forestry, fishing and agriculture, which are also based on natural resources extraction, but, all of which have scope for resource renewal – unlike mining.[221] Siegel advocates a new, ethical, approach to mining – and to oil and gas production (whether unconventional or not) – which combines mining together with development and environment in the way a mine is developed, in the way it is built, in the way it is operated and the way it is reclaimed and restored at the end.[222] These are arguably principles already present in the South African Constitution and in the Preamble (at least) of the Mineral and Petroleum Resources Development Act (MPRDA), with the instruments of the social and labour plan and the environmental plan required in law for every mine. There is a need for a "mineral resource integrity system" which considers planned resource use; landscape and ecological rehabilitation; and better rewards for miners for taking on the risks of mining – even as these are better managed through safety, health, environment and quality (SHEQ) initiatives.

The most accessible and the richest deposits of minerals in the world, and in SA too, have already been mined. Technology makes it possible to extract minerals from very low grades of ore (even re-processing mine waste dumps from an earlier era) or to mine deeper deposits. But this means that the scale of mining has to increase tremendously (and it is already very large). A huge, industrial mine can extract a surplus from low grade ore and meet all the external costs (if over a long period) while small scale operations can only struggle and compete on a race to the bottom – increasing the negative consequences for the environment, for labour and for tax and royalty revenue. The present pattern in the mining sector is to place

[218] Parliament. Committees (2013).
[219] See Madihlaba (2002).
[220] Nicol (2013c), citing Responses of the National Treasury to the Portfolio Committees – 2012.
[221] Siegel (2013).
[222] See Siegel and Tessitore (2013).

all mining operations on this latter trajectory, even if they are large, as they struggle to profit from volatile markets and ever declining ore grades.

As the world population grows, the demand for a better life, and for more minerals, increases. Mining is only going to grow worldwide. The number of operating mines in SA has grown by 65 per cent, to over 1 600 since 2004.[223] Mining in the future will also be associated with recycling and reclaiming already mined and processed minerals which have been discarded as waste after use. The future for mining, in a responsible world, lies in a carefully planned, properly regulated big mining sector. The carbon tax is part of the recipe. It aims to change mine behavior to be less profligate with the use of GHG-emitting energy. As the carbon tax is increased, as planned, over time, government and the mining sector (mines, unions, customers) need to move onto a new path in which all the other externalities of the mining sector are confronted and dealt with.

The carbon tax can open this debate. It should be welcomed by citizens and promoted by Parliament, even as the mining industry, with its primary interest in profits, objects and protests.[224]

The new "greener" mining industry will create jobs in at least five ways:

- mining new deposits;
- reclaiming minerals from mine waste;
- rehabilitating the environment around mines that close or shift their location;
- rehabilitating ownerless and derelict mines that were abandoned before harmful ecological impacts were recognized, or where owners did not carry through their restoration commitments;
- research and development to promote efficiency in mineral extraction, to find alternative products to present mineral uses, and to combine mining with restoration ecology[225] in all of the above activities.

These areas all use skill and expertise that are presently available to the mining sector.

6.2 Parliament can encourage government to take unconventional gas extraction as a test case for addressing all the externalities associated with the use of a mineral resource.

The potential of shale gas has been described as a "game changer".[226] The overall judgement of the National Development Plan (NDP) is that "South Africa should seek to develop these resources [of shale gas], provided the overall economic and environmental costs and benefits outweigh those associated with South Africa's dependence on coal, or with the alternative of nuclear power."[227]

The NDP mentions shale gas a number of times in particular contexts:

- the contribution it could make to diversify the energy mix and reduce carbon emissions;[228]

[223] Nicol (2013e)
[224] Ensor (2013).
[225] Siegel and Tessitore (2013).
[226] Nicol (2013d).
[227] NPC (2012) p.167. In the 2013 State of the Nation Address, the President made it clear that the NDP has been adopted as the plan of Government.
[228] National Planning Commission (2012). pp.46,171 and Chapter 5

- the need to prove the nature and viability of the resource and consider carefully the environmental issues;[229]
- the realisation that the development of shale gas resources, "if available, will still take some time"[230]; and
- the need for the long term move to a low-carbon and resilient economy and society to be carefully planned and well co-ordinated.[231]

The NDP accommodates – and indeed indicates – a cautious approach to this potential new industry.

It accepts that the size and viability of shale gas deposits in SA have still to be demonstrated. The Water Research Commission (WRC) stated in 2012: "The volume of gas in the Karoo Supergroup formation is still unknown and no relevant data is available to even give a rough estimate."[232]

The NDP recognises that there are concerns that fracking operations will destroy the integrity of ecologically sensitive areas particularly in the Karoo. In this context, the Cabinet has decided that a monitoring committee will be responsible for the "strict supervision" of hydraulic fracturing when this is authorised, following "comprehensive and co-ordinated augmentation of the regulatory framework". "In the event of any unacceptable outcomes, the process may be halted".[233]

Normal mineral prospecting and exploration has a minimal impact compared to the mining that it may precede. That is not the case with exploring for shale gas, where there is virtually no difference between the techniques used for exploration and those used in production. The regulations for exploration phase have to be as strict as those used in the production phase.

There is an opportunity, probably ten years before shale gas becomes part of the energy mix (if anticipated deposits are proven), to ensure that all the externalities of fracking are fully addressed at all links of the value chain. This goes beyond the cost-benefit calculation suggested in the NDP which uses the present use of coal as the benchmark to judge whether shale gas production is desirable.

As argued above, many economic and environmental costs associated with South Africa's use of coal (for example, by the major consumers, Eskom and Sasol) are neither assessed nor met at the present time. By taking into account the externalities associated with shale gas, by contrast, it will be possible to plan a truly sustainable use of the resource. This will also encompass decisions on how the people of South Africa will benefit from the development of this new industry. The benefits of all mineral extraction to date have been appropriated by narrow interest groups – local and foreign companies – whose short term behaviour has provided their shareholders with magnificent profits, while bequeathing dangerous, unrehabilitated mine sites to the nation, and legacies of polluted water, soil and air; mineworkers broken by disease and migrancy and devastated communities.

Shale gas can only be considered "better" than coal if the comparison is not based only on GHG emissions, but on whether South Africans will manage this new industry in a way that accounts for all its externalities.

[229] Ibid. pp.167, 175
[230] Ibid. p.172
[231] Ibid. pp.211/2
[232] Steyl *et al* (2012).
[233] DMR (2012). The recommendations were accepted by Cabinet on 21 August 2012. (Nicol 2013d).

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THE POTENTIAL IMPACT OF THE PROPOSED CARBON TAX ON THE SOUTH AFRICAN ECONOMY: A TRADE AND INDUSTRY PERSPECTIVE

Z Madalane

1. INTRODUCTION

The South African government announced the introduction of a carbon tax in 2013 through the Minister of Finance, Pravin Gordan. In his budget speech, the Minister noted that the government is proposing a carbon tax of R12 per ton of CO_2 set to be implemented from the 1st January 2015.[234] South Africa is the largest carbon emitter in Africa and among the top fifteen carbon dioxide emitters in the world.[235] The carbon tax is used as a measure to minimise carbon emissions in the country in line with South Africa's commitment to reduce emissions by 34 per cent by 2020 and by 42 per cent of the current level by the year 2025.[236]

The introduction of the carbon tax is at the backdrop of increasing administered prices. Administered prices include both electricity prices and transport costs, particularly port charges. The increase of administered prices was a major concern for the manufacturing sector in 2013, therefore the looming introduction of a carbon tax will add to this concern and the manufacturing sector will be adversely affected; value-adding sectors use a significant amount of energy and therefore contribute greatly to carbon emissions. The likely impact of a carbon tax on the country's manufacturing sector will not only affect our domestic industry but will also have an adverse impact on the country's external trade.

With that said, the introduction of a carbon tax may also bring with it new opportunities for the manufacturing sector. Among these are opportunities in alternative energy sectors and the introduction of new production methods to ensure efficient use of energy in the value-addition processes.

The purpose of this paper is to give an overview of the possible impact of a carbon tax of the South Africa economy with specific focus on Trade and Industry. This paper is divided into sections as follows:

- **Section 2** provides an overview of the socio-economic consequences of global warming and climate change.
- **Section 3** outlines progress made towards the development and implementation of a climate change adaptation strategy.
- **Section 4** gives an overview of the potential impact of carbon tax on economic growth with a specific focus on the impact on trade and industry.
- **Section 5** gives an overview of lessons learned by other countries in using carbon tax as a policy measure.
- **Section 6** provides a summary of the role of Parliament towards the implementation of policies and legislative tools for achieving a green and sustainable economy.

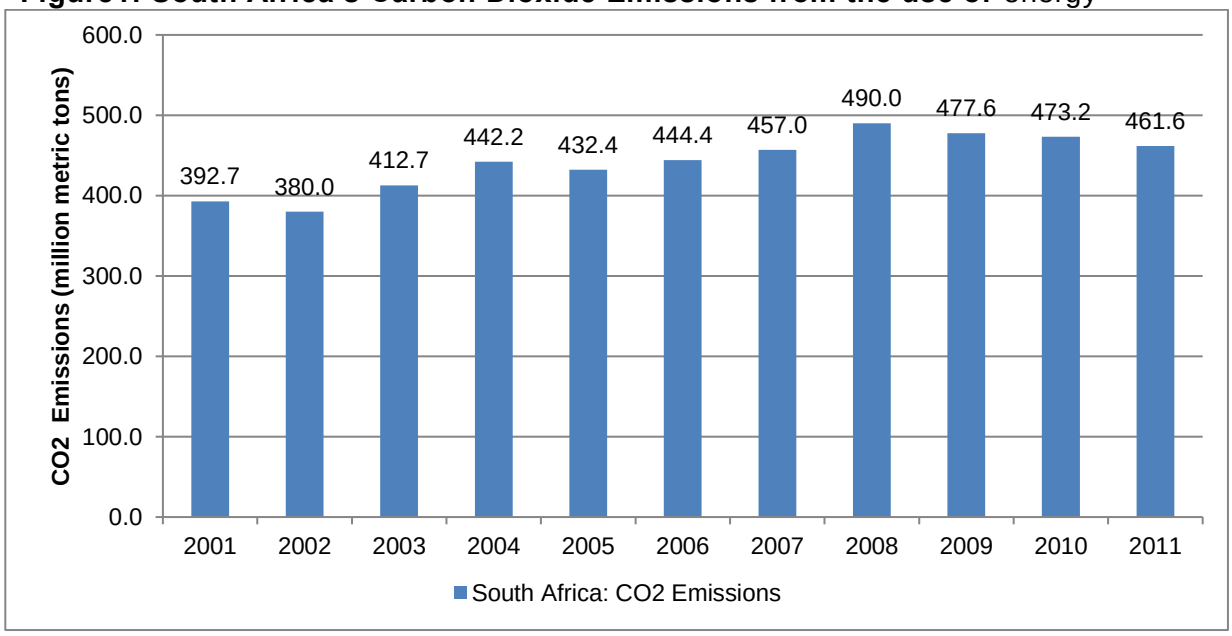
[234] Budget speech (2013)
[235] US Energy Information Administration (2011)
[236] National Development Plan (2012)

2. SOCIO-ECONOMIC CONSEQUENCES OF GLOBAL WARMING AND CLIMATE CHANGE

Carbon emissions have increased significantly in the past thirty years. Global carbon dioxide emissions have almost doubled between 1980 and 2011. This has brought about concerns about the impact of carbon emissions on the environment and impact on future generations; given the impact they have on various sectors of the economy. South Africa is among the top fifteen largest emitters of carbon emission in the world along with the developed countries including China, the United States, Germany, Japan, Brazil and Canada among others. South Africa is also the largest carbon emissions emitter in Africa. In 2011, South Africa emitted a total of 461.5 million metric tons of carbon dioxide from the consumption of energy, this accounts for 1.4 per cent of global emissions and approximately 40 per cent of Africa's emissions.[237]

As can be seen from the figure below, South Africa's carbon dioxide emissions have steadily increased over the past ten years. Carbon emissions increased from 392.7 million metric tons in 2001 to 490 million metric tons in 2008. However, from 2009, carbon emissions have been declining from 477.6 million metric tons in 2009 to 461.6 million metric tons in 2011. Despite this decline, South Africa's carbon emissions remain high.

Figure1: South Africa's Carbon Dioxide Emissions from the use of energy



Source: EIA (2013)

Most carbon emissions from an industrial perspective result from mining and manufacturing activities. In South Africa sectors that are most electricity-intensive therefore emit more carbon emissions. These sectors are basic metals, mining and quarrying; non-metallic minerals; agriculture and forestry; paper, pulp and printing; chemical and petrochemical; transport; wood and wood products; textile and leather; food and tobacco; machinery and equipment; transport equipment; and construction respectively.

[237] US Energy Information Administration (2011)

Table 1: Electricity Intensity by Sector

Sector	Electricity intensity (GWh/$million)	Sector	Electricity intensity (GWh/$million)
Basic metals	1.095	Wood and wood products	0.069
Mining and quarrying	0.634	Textile and leather	0.067
Non-metallic minerals	0.524	Food and tobacco	0.021
Agriculture and forestry	0.316	Machinery and equipment	0.005
Paper, pulp and printing	0.207	Transport equipment	0.003
Chemical and petrochemical	0.203	Construction	0.002
Transport	0.069		

Source: Deloitte (n.d)

Substantial scientific evidence links high levels of carbon dioxide emissions to climate change. Climate change results in changes to the earth's weather, this includes changes in temperature, rainfall and wind patterns. The increase in temperature, also known as global warming, is an increase in the temperature of the earth's atmosphere and is a more common sign of climate change. Climate change results from the increase in use of particular gases that pollute the air, particularly carbon dioxide.[238] Climate change in turn has negative consequences on the environment and the way an economy does business.

Some of the socio-economic consequences of climate change for the business sector are the result of the changes in weather patterns which lead to change in crop production and quality. The change in crop production and quality affect the quantity of agricultural trade and outputs of the manufacturing sector, particularly food production. The potential impact of climate change on international trade and manufacturing sector output will be discussed below.

2.1 Impact on International Trade

International trade is trade with other countries in processed and unprocessed goods. Unprocessed goods included fresh fruits and vegetables. The production of fruits and vegetables is thus is of particular importance to South Africa, the country is among the top exporters of fruits and vegetables in the world. South Africa's exports of fruits and vegetable exports account significant amount of South Africa's exports exports. Any factor that affects crop production both in terms of quality and quantity may affect the country's trade in that export product.

South Africa's agricultural produce depends mostly on rain (is rain fed). In the case of climate change, changing temperatures, rainfall and wind patterns result. This change results in droughts and floods, these affect crop production. While droughts and floods are natural, they become more frequent (and often more extreme) with climate change and their impact is devastating on socio-economic livelihoods of people and trade is affected. With droughts and floods there is usually a loss of agricultural output, This means that less is available for the international market and/or the quality required by the international markets cannot be achieved.

[238] Oxford dictionary

2.2 Impact on Manufacturing Sector Output

The manufacturing sector is interlinked to the agricultural sector. Food, beverages and tobacco manufacturing accounts for approximately 17 per cent of the total manufacturing sector in the country and is worth R 50.5 billion in GDP. Furthermore, the manufacturing sector contributes greatly to employment. Inputs to the food and beverage manufacturing sector are outputs of the agricultural sector. Any factors that affect agricultural output may affect manufacturing output, either in quality or quantity.

In cases where there are changes in climate patterns resulting in floods or droughts, agricultural produce may be severely reduced and so will inputs to the manufacturing of food and beverages. A lack of inputs to a manufacturing sector may lead to businesses closing down.

3. PROGRESS TOWARDS THE DEVELOPMENT AND IMPLEMENTATION OF A CLIMATE CHANGE ADAPTATION STRATEGY

The Department of Trade and Industry (DTI) is the owner of the Industrial Policy Action Plan (IPAP) and the implementation thereof. IPAP is informed by the vision set out by the National Development Plan (NDP) and is aimed at driving economic growth through domestic, regional and international trade and investment to create sustainable jobs.

The central theme of IPAP informs the Department's key priorities. As stated in the IPAP document, the theme is to facilitate labour-absorbing industrialisation in the manufacturing sector.

The Department implements the goals of IPAP by;

- Providing incentives for new and expanding manufacturers;
- Encouraging initiatives that improve productivity or competitiveness; and
- Promote the exporting of locally produced goods.

All of the above contribute greatly to the creation of an enabling environment for businesses and manufacturers to operate effectively and efficiently to enable job creation and economic growth. Furthermore, within the IPAP, climate change has been identified as one of the factors that will have an impact on South Africa's economic environment. Strategies or programmes should be put in place to deal with the causes of climate change and the impact of climate change. The Department of Trade and Industry's strategy is to "*support the adaptation required in terms of our GHG emission commitments in a responsible manner by developing policies to enhance measures to minimise the impact on local industries and support the realisation of opportunities to develop both new green industries and value-adding, labour-intensive, less energy-intensive sectors*" (IPAP, 2013).

In managing climate change, a structural change from industries is required. A structural change that will lead to the:[239]

- Introduction of new technologies and production methods and investments in the green technologies sector to replace electricity intensive production methods.

[239] IPAP (2013)

- Need to promote sustained growth in the green and energy efficiency sectors.

The Department of Trade and Industry in collaboration with other Departments though IPAP has put in place programmes that aim at reducing carbon emissions by incentivising the use of alternative energy. This will be achieved through the:

- Renewable Energy Independent Power Producer Procurement Programme (REIPPP) , forty-seven bids have been awarded for the local content in the manufacturing of solar, wind and solar CSP ranging from 25% to 45%; set to rise to maximum 65%

- Provision of funding for local manufacturers of solar water heaters; further investments to follow in wind tower production, solar PV structures, PV panel assembly.

Furthermore, the Department is involved in the Nuclear Energy Programme through which the country aims to "... *build additional electricity generation capacity of 9,6 GW from nuclear power, as part of a balanced energy mix that will ensure supply security and mitigation of CO2 emissions*". The Department is therefore ensuring the Localisation of Nuclear Components and Services.

3.1 Balancing Policy Priorities

Despite the recognition that climate change requires urgent attention and the support from the Department of Trade and Industry there is an industrial policy in place that promotes investment into electricity intensive sectors. This industrial policy has promoted the establishment of Special Economic Zones (SEZs), the former Industrial Development Zones (IDZs) Policy in which investments into sectors including aluminium smelting, steel production are the main attraction for investors. ".... *industrial development has promoted electricity-intensive investments, such as the smelting of aluminium at Coega or steel at Saldanha. Low electricity tariffs for industry are seen as a competitive advantage in attracting aluminium smelters to South Africa rather than other countries. The Coega Development Corporation actively marketed the availability of electricity at 'very favourable rates' to attract investment*" (Winkler and Marquard, 2011). The challenge for South Africa in reducing carbon emissions would be balancing carbon tax policy with the promotion of industrialisation through beneficiation. Industrialisation is based on the promotion of value-adding sectors which tend to be electricity intensive.

The Department of Trade and Industry has identified sectors for which the Department will develop strategies and action plans to promote backward and forward beneficiation in the following sub-sectors; ferrous (iron ore, ferro-alloys, steel and specialty steels); the platinum group metals; titanium and pigments; polymers (from coal, gas and oil); and mining inputs.[240] This is where the balancing act is required, where sectors earmarked for the industrialisation of the country are electricity-intensive while the country is at the same time making efforts to reduce its carbon emissions.

4. POTENTIAL IMPACT OF CARBON TAX ON ECONOMIC GROWTH

4.1 The Proposed Carbon Tax

A carbon tax is a levy on companies for emissions they produce during the production processes. A carbon tax can be applied to individual products.[241] The purpose of a carbon tax is to reduce

[240] IPAP (2013)
[241] Kaineg (2013)

Green House Gases (GHG) emissions. In an economy with a carbon tax, GHG will be reduced through two ways:

- The demand effect - as a result of carbon tax, energy prices will increase and this will encourage energy users to use less energy by finding more energy efficient production methods.
- The substitution effect – the users of energy will switch to less carbon intensive sources of energy.

Table 2: Pros and cons of carbon tax

Pros	Cons
▪ Carbon tax can be used to generate revenue for the public sector, and may be used to displace other taxes, such as corporate income tax or VAT. ▪ Carbon tax provides certainty for the business community, facilitating planning of investments. ▪ Carbon tax is simple to implement and does not require complex financial infrastructure to function.	▪ No guarantee of achieving emissions reduction goals. ▪ No mechanism to profit from "over compliance" with target goals ▪ May unduly impact on key industries and constituencies.

Source: Reuters (2013)

The proposed carbon tax is to be initially implemented in 2015. According to the Minister of Finance, Pravin Gordan, the implementation will be in five year phases, phase 1 from 2015 to 2019 and phase 2 from 2020 to 2025. Implementation beyond 2015 will be considered at a later stage. The carbon tax is not to be implemented without some measures to minimise its impact on certain sectors as follows[242]:

- A 60% threshold of the emissions – no tax will be payable for any emissions below the threshold.
- A 70% threshold of the emission for the electricity sector – no tax will be payable for any emissions below the threshold.
- A 10% relief for some sectors to allow for technical barriers to reducing emissions.
- Emissions-intensive and trade-intensive sectors including steel; cement; glass among others, to receive a further 10% relief.
- Total exemption of the agricultural and waste sectors from the carbon tax between 2015 and 2019.

According to Winkler and Marquard (2013), a carbon tax is the most effective measure for reducing carbon emissions. Winkler and Marquard note that a carbon tax has two effects. Firstly, the carbon tax increases energy prices and as a result of the price increases the demand for energy declines. Secondly, a carbon tax results in a shift from using more carbon-

[242] Finweek (2013)

intensive energy sources to less carbon-intensive energy sources, namely the substitution effect.[243]

4.2. Potential impact of a carbon tax on economic growth

While the introduction of a carbon tax is perceived by many to have the potential for an adverse impact on the economy, there could also be opportunities as a result of its introduction, one being the emergence new green sectors. The table below lists possible risks as well as possible opportunities for the manufacturing sector associated with the introduction of a carbon tax.

Table 3: Manufacturing Sector – Risks and Opportunities

Risks	Opportunities
▪ Increased admin prices through a direct carbon tax, through the purchase of emission allowances. ▪ Risk of large penalties if companies are unable to reduce emissions, penalties that may threaten the profitability of companies. ▪ Increase in supply chain costs as a result of passing on h the costs of a carbon tax. ▪ Competition risks with companies that are more energy efficient and can produce goods more cheaply for sale to the public with those that produce goods less efficiently. ▪ Risk of non-compliance with the new pricing mechanism. ▪ Reputation risk for companies, if not seen to be reducing emissions by more environmentally-conscious consumers.	▪ Emergence of 'green' technologies for use in the manufacturing industry. In addition, 'green' technologies could become increasingly feasible as they develop and become more attractive with the introduction of a carbon price. ▪ Opportunities for the manufacturing sector to develop local capacity to manufacture clean technologies and renewable energy products. ▪ Emergence of grants and incentives for the manufacturing industry in terms of energy efficiency, solar, wind and biomass. Already we see this in the South African Department of Trade and Industry's Industrial Policy Action Plan. ▪ Opportunities for revenue generation through the carbon market in a cap-and-trade mechanism.

Source: Deloitte (2013)

4.2.1. Impact on the existing manufacturing industry

The possible increase in energy prices has been the root cause of reservations towards the carbon tax in South Africa. Gina Downes (2013), a representative from Eskom stated that "*the only effect that the carbon tax will have is an increase in the price of electricity*". South Africa is currently hard hit by the impact of administered prices; a carbon tax might further escalate this problem. Among the most vulnerable sectors in terms of the use of electricity are the basic metals; mining and quarrying; non-metallic minerals; agriculture, forestry and fisheries; pulp, paper and printing; and chemicals and petrochemicals sectors. These sectors are the most vulnerable as they are most energy-intensive[244] and it is likely that these sectors will also be vulnerable to the carbon tax. An adverse impact on these sectors will further strain South

[243] Winkler and Marquard (2011)
[244] Genesis (2013)

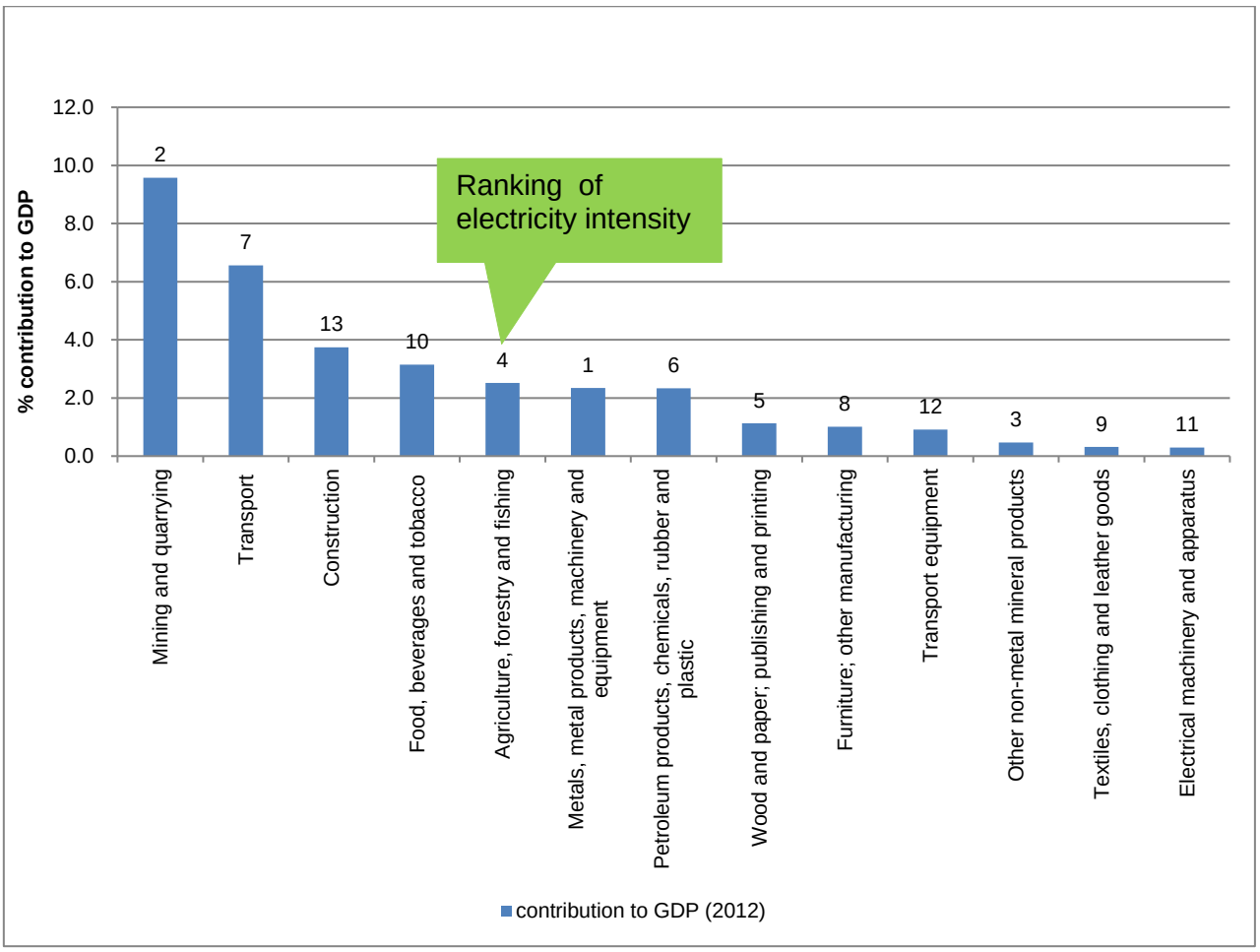
Africa's economic growth and competitiveness globally. The carbon tax is aimed at reducing carbon emissions, however, its impact could result in a contraction of the manufacturing sector and exports.

A carbon tax threatens to have an adverse impact on international competitiveness of trade and sectors involved in international trade.[245] Firstly, an increase in the price of an input such as electricity will increase the prices of the final product, consequently manufacturers may push forward to the consumer the tax in the way of higher prices. This is likely to, lower competitiveness of South Africa's exports internationally. As prices of exported goods also become more expensive as the result of the cost of the carbon tax being pushed to the consumers, South Africa's products will become less competitive internationally. This is likely to have on adverse effect on trade. Secondly, as a result of higher prices in the domestic market, local consumers may opt for imported goods, this will not only have an impact of the trade balance, it will also have an impact on the local manufacturing sector. As consumers substitute locally produced goods for imports local manufacturers are likely to go out of business depending on the extent of losses.

The most electricity intensive sectors will be the hardest hit and this will lead to slower economic growth. The most electricity intensive sectors contribute greatly to GDP. The mining and quarrying sector ranks second in terms of electricity intensity and contributes a total of 9.6 per cent to the country's GDP. The Metals, metal products, machinery and equipment sector and the Agriculture, forestry and fishing rank first and fourth respectively in terms of electricity intensity and contribute 2.3 per cent and 2.5 per cent to the country's GDP. South Africa's main export product products are carbon intensive (produced in carbon intensive sectors), a carbon tax will therefore have a significant impact on trade.[246]

Figure2: Contribution to GDP (2012) and Electricity Intensity by sector

[245] National Treasury (2013)
[246] Davies et al (2011)



Source: Statistics South Africa (2013)

While a carbon tax may have adverse impact on the economy, Winkler and Marquard (2011) believe that the adverse socio-economic impact of a carbon tax can be offset through the use of revenue collected as the tax. According to Winkler and Marquard, revenue collected from the carbon tax can be used by government in three ways:

- to reduce deficit that results from the tax;
- to further mitigate the impact, through production subsidies for nuclear/renewable energy and biofuels; or
- by off-setting the potential effects of higher energy prices on the poor, through food subsidies, reduced Value Added Tax (VAT) or income tax or increased welfare transfers.

4.2.2. Possible emergence of an alternative sector

According to the National Treasury (2013), the traditional capital-intensive, resource-based and energy-intensive industrial production methods are likely to become increasingly unsustainable in the future. The introduction of a carbon tax brings about an opportunity for the development of a new green energy sector and shifting from using normal energy sources to using alternative energy. In using alternative energy that is environmentally friendly the goal of reducing carbon emissions by 34 per cent of the current levels by 2020 may be achieved.[247] However, one critical question comes to mind, how much investment into alternative energy the country needs to be at a point where there is a significant shift from the use of electricity to alternative energy? A carbon tax, as a policy

[247] National Treasury

instrument cannot be used in isolation, there is a need to support it with other programmes including the promotion of investment into alternative energy.

5. COMPARATIVE EXAMPLES

Australia

Australia's carbon tax was introduced in July 2012 at a price of $23AU_D per tonne of emitted carbon dioxide. The carbon tax applied industrial emitters and selected fossil fuels. Revenue collected from this initiative was used to reduce income tax through increasing the tax-free threshold; increasing pensions and welfare payments cover expected price increases; and introducing compensation for some significantly affected industries.

Ireland

Unlike the other countries, Ireland had a different agenda when it adopted a carbon tax policy. Ireland adopted carbon tax as a measure to reduce its fiscal deficit while other countries are usually driven by the need to fulfil their commitments of reducing carbon emissions. The carbon tax was introduced in 2010 at a level of €15 per tonne of carbon dioxide and increased to €20 in 2012. Through this, the Irish government managed to raise more revenue that initially estimated.

British Columbia

British Columbia, a province in Canada first implemented its carbon tax policy in July 2008. This carbon tax was a provincial strategy to reduce carbon emissions to 33 per cent by the year 2020 from the 2007 levels.[248] The carbon tax was initially applied to transportation fuels, natural gas, and fuels used in industrial processes. Between 2008 and 2012, the demand for fuels that are taxed declined by 15 per cent, however, the GDP of the province continued to grow.[249]

5.1 LESSONS FROM OTHER COUNTRIES

From other countries' experiences it has been proven that:

Firstly, a carbon tax guarantees a price for carbon dioxide emissions but that does not mean the desired environmental outcome will be achieved. Pricing carbon gives consumers a signal to change consumption behaviour, however, the change in behaviour does not always happen.[250] In the case of Ireland for example, while revenue received by government the benefits to the environment cannot be guaranteed as the revenue.

Secondly, a carbon tax is regressive, meaning that the poor are the most affected compared to the other groups. The tax is higher for a person with low income as a percentage of their income. This is of concern to South Africa, as smaller businesses will carry a heavier tax burden than the well established companies with larger revenues. For example, this was the case for British Columbia when the carbon tax was introduced, however, the impact was then offset by simultaneous personal and income tax reductions. The Australian government, to minimise the impact of a carbon tax, provides income tax relief, pensions and family allowances

[248] Sumner, et al (2009)
[249] Bloomberg (2013)
[250] Bloomberg (2013)

and payment. Like the other two countries, Ireland, subsidises low income households to minimise the impact of the carbon tax.[251] Given that revenue collected from carbon tax needs to the invested back into low-income households or green initiatives, a carbon tax is not an instrument for collecting revenue for the fiscus.

Lastly, the introduction of a carbon tax can bring about increased efficiency in production. Industries will tend to find better and more energy-efficient methods of production to substitute the use of electricity or energy sources that are harmful to the environment. The emergence of a prominent renewable energy sector may also be brought about by the presence of a carbon tax. The emergence of new sectors contributes positively to economic growth. Examples of this are Denmark, Slovenia, Germany, Finland, the United Kingdom, the Netherlands, and Sweden whose economies showed slightly positive effects on GDP after the introduction of a carbon tax.

6. THE ROLE OF PARLIAMENT

Parliament's mandate is passing legislation, overseeing the work of government Departments, facilitating public involvement, co-operative government and international participation. The Parliament of South Africa comprises of two houses, the National Assembly and the National Council of Provinces, both houses have explicit legislative and oversight roles. According to section 42 of the Constitution, the National Assembly's main role is to represent the people by "…*providing a national forum for public consideration of issues, by passing legislation and by scrutinizing and overseeing executive action*" and the National Council of Provinces performs its oversight role by "...*by participating in the national legislative process and by providing a national forum for public consideration of issues affecting the provinces*".[252]

In the case of the carbon tax or climate change mitigation, Parliament should exercise its oversight role by ensuring that the various Department put in place programmes and policies that support the adaptation required in terms of our GHG emission commitments and develop opportunities for new green industries, value-adding, labour-intensive, and less energy-intensive sectors.

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[251] Bloomberg (2013)
[252] Constitution of the Republic of South Africa, (1996)

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THE POTENTIAL IMPACT OF THE PROPOSED CARBON TAX ON VARIOUS SECTORS IN SOUTH AFRICA: SMALL MICRO AND MEDIUM ENTERPRISES (SMMES)

N Mbelekane

1. INTRODUCTION

Small and medium sized businesses and entrepreneurs play a significant role in all economies and are the key generators of employment and income, as well as being drivers of innovation and growth according to the Organisation for Economic Co-operation and Development's Centre for Entrepreneurship, SMEs and Local Development[253]. Authors of the Economics of SMMEs in South Africa, Berry, Von Blottnitz, M, Cassim, Kesper, Rajaratnam, B and Van Seventer, argue that SMMEs contribute to a country's national product by either manufacturing goods of value, or through the provision of services to both consumers and/or other enterprises. This encompasses the provision of products, and to a lesser extent, services to foreign clients, thereby contributing to overall export performance.[254]

The significance of small businesses for socio-economic development in any country cannot be overemphasized. Small businesses account for approximately 90 percent of all global businesses and employ nearly 60 percent of the global workforce. They can significantly contribute to building a sound and competitive economy, wealth creation, employment generation, combating poverty and exclusion from economic activity, and achieving sustainable development[255].

South Africa's estimated 2.8 million SMMEs contribute between 52% and 57% to Gross Domestic Product (GDP) and provide about 61% of employment. SMME development is therefore critical for driving employment, economic growth and stability. Consistent with global economic trends, SMMEs remain key drivers of economic growth and development. In South Africa, SMMEs contribute more than 40% of our country's total remuneration[256]. The Global Entrepreneurship Monitor has observed an increase in total early-stage Entrepreneurial Activity in South Africa from 5.1 to 8.9 between 2005 and 2010[257].

It is estimated that in 2007 there were 5.6 million SMMEs in South Africa that contributed to more than 40% of total GDP and accounted for more than 60% of all employment (Annual Review of Small Business in South Africa (SA), August 2008, Department of Trade and Industry). All things held constant, this level of contribution to the economy indicates the importance of SMMEs for economic growth, job creation and the upgrading of human capital. The 2011 Global Entrepreneurship Monitor (GEM) survey report records that there were 5.9 million small businesses in South Africa during 2010[258] while the Banking Association in South Africa adds that, small and medium-sized enterprises make up 91% of formalised businesses.

2. SOCIO-ECONOMIC CONSEQUENCES OF GLOBAL WARMING AND CLIMATE CHANGE

[253]Organisation for Economic Co-operation and Development's Centre for Entrepreneurship, SMEs and Local Development (2009).
[254] Berry, Von Blottnitz, Cassim, Kesper, Rajaratnam, and Van Seventer (2002).
[255] Diarra (2012) .
[256] Thabethe (2013).
[257] Information for Development Programme and Gauteng Climate Innovation Centre (2012).
[258] This section is adapted from the *Annual Review of Small Business in South Africa 2005-2007*, Final Draft, August 2008, Department of Trade and Industry, unless otherwise noted.

According to a paper written by the Castalia Advisory Group for the Australian Chamber of Commerce, temperatures are on the rise all around the globe. During the past 125 years, the warmest years on record were 1998 and 2005. The number of extremely hot days is expected to dramatically increase in the future. There is scientific evidence that the climate is changing. The changes in climate are related to increases in the concentration of greenhouse gases in the atmosphere, which trap infrared radiation close to the Earth's surface. Human activities have contributed to the build-up of these gases. As a result of global warming, sea levels are rising, glaciers are retreating, polar ice caps are melting, and the number and severity of extreme weather events are increasing. In light of these and anticipated future impacts, there is increasing urgency to reduce emissions of greenhouse gases and to prepare to adapt to the impacts of the changing climate[259].

Castalia states that gases that occur naturally in the Earth's atmosphere — mainly water vapour, carbon dioxide and methane — are responsible for keeping the Earth warm enough to sustain life as we know it. These "greenhouse gases" work much like the glass of a greenhouse, allowing the sun's rays to pass through and warm the Earth, and then trapping some of this heat in the atmosphere. Without these naturally occurring gases the Earth would be a frozen landscape. For thousands of years, levels of greenhouse gases in the atmosphere have remained relatively stable. Natural processes on Earth absorbed as much carbon dioxide as was released. More recently, however, many scientists have concluded that human activity has upset this balance[260].

Most of this, according to Castalia, warming is very likely (> 90% certainty) due to the human-induced increase in greenhouse gases (GHGs). In South Africa, the most likely climate changes during the 21st century are:

- The temperature is projected to increase by 3-5°C over the central interior and by 3°C in coastal regions.
- The western part of South Africa will experience an increase in extremely hot days and during summer and autumn.
- Average rainfall is projected to decrease by 5-10% but changes will vary across the country.
- During summer, the east of the country is projected to become wetter while the west of the country will become drier. The summer rainfall season will begin later and severe rainfall events will occur more often. The south-western Cape is projected to receive significantly less winter rainfall[261].

The major impacts of these projected changes in South Africa during the 21st century are:
Water: Water resources are already under pressure in South Africa and climate change will lead to a decline in the availability of surface water resources. This will happen at the same time as socioeconomic development increases the demand for water.
Agriculture: Agriculture is an important source of livelihood for many rural South Africans and this sector can expect multiple impacts. In some crops productivity will be affected by changes in soils, peak temperature and rainfall changes. In others, there is the potential to amend the growing season or change to more drought-tolerant varietals or substitutes.
Grasslands: Grassland pastures will also be vulnerable to invasion by alien plants and conversion to less bio diverse shrub land. The change in range for plant growth will also affect biodiversity, threatening the high number of endemic species found in South Africa such as the fynbos of the Cape Floral Kingdom.

[259] Castalia Advisory Group (2011).
[260] Ibid.
[261] Standard Bank (2010).

Health: The areas at risk from malaria (and other vector-borne diseases) will also increase[262].

Studies have shown that South African agricultural and coastal areas will be adversely affected by increasing global temperatures and changing rainfall patterns. Infrastructural, economic and human losses from more destructive natural disasters may also be observed. Other assessments show that by 2100, changes in temperature and precipitation could cause strong southward expansion of the malarial transmission zone into South Africa[263].

South Africa is particularly vulnerable to climate change because of its dependence on climate-sensitive economic sectors, high levels of poverty and the inter-related impacts of HIV/AIDS, according to a report by the Financial and Fiscal Commission[264]. The poor are disproportionately affected, as they rely on sectors that will be directly affected by climate change: agriculture, biodiversity, ecosystems and water supplies. Agriculture is highly dependent on climate and therefore particularly vulnerable. Climate change will have a significant impact on low-input farming systems in developing countries in Africa. Smallholder farmers are expected to be more vulnerable, as they lack the means for adaptation. The effect of climate change on agricultural output will directly affect rural communities, through reduced income and employment, and knock-on effects for rural economies as a whole.

According to a report by the Small Business Majority and the American Sustainable Business Council extreme weather events associated with climate change pose a variety of direct and indirect risks to small businesses that vary by geographic region, proximity to coastlines, and the nature of the business affected. Directly destructive events include, hurricanes, tornadoes, droughts, wildfires, floods, storm surge, and ice storms, as well as extremes of heat and cold. Indirect risks of extreme weather can include power outages, lack of access to water, increased demand for heat or air conditioning, rising insurance costs, supply chain disruptions, lack of access to natural resources, and loss of work hours. The economic impacts of climate change to small businesses range from costs associated with direct damage such as flooding or storm surge, to gradual challenges arising from changes in temperature. In addition to the physical risks of climate change, many small businesses also face indirect risks, such as reputational risk or changes in customer demand[265].

The report featuring case studies in the USA from the roofing, retail, tourism, landscape architecture, agriculture, and small-scale manufacturing sectors, and policy recommendations on how to help small businesses better prepare for extreme weather events, states that;

- As a result of a lack of access to the capital and resources of large corporations, small businesses can suffer lasting economic damage as a result of a single extreme weather event. For example, according to the U.S. Chamber Foundations Business Civic Leadership Centre, of the 60,000 to 100,000 small businesses negatively affected by Hurricane Sandy, up to 30 per cent are estimated to have failed as a direct result of the storm.
- According to the Institute for Business and Home Safety, an estimated 25 per cent of small to mid-sized businesses do not reopen following a major disaster.
- The average cost of downtime from a small business affected by an extreme weather event is $3,000 per day. Small businesses' physical assets tend to be more concentrated: a single building or factory could represent most of the book value of a small business, whereas large businesses benefit from greater geographic diversification.

[262] Ibid.
[263] Information for Development Programme and Gauteng Climate Innovation Centre (2012).
[264] Financial and Fiscal Commission (2013).
[265] Reynolds and Bradley & Associates (2013)

- 57% of small businesses have no disaster recovery plan, and for those small businesses that do have continuity, or risk management plans, 90 per cent spend less than one day a month preparing and maintaining them[266].

Commercial enterprises will experience hikes in water prices and other raw materials, as water availability decreases (as a result of decrease in rain in some parts of the country and increases in water demand) and climate change impacts on the current production of goods and services. Increased prices will impact smaller businesses, which rely on cheap commodities, possibly resulting in the closure of these enterprises. Food productivity and availability will also be impacted by the decrease in productivity and increase in raw material prices[267].

Climate change will therefore increase the vulnerability of the poor who rely on subsistence urban agriculture, and those businesses that rely on cheaper, readily available raw materials. This would hike the price of basic commodities. Subsequently, input costs would rise and small business goods and services would become more expensive, increasing the cost ofliving. Thus climate change has an impact on the sustainability of small businesses[268]. Coastal communities and seasonal businesses are especially vulnerable due to storm surge, hurricanes, increased demand for heat or air conditioning, rising insurance costs, lack of access to natural resources, and loss of work hours during a shorter season[269].

In a submission to the National Treasury recently, Business Unity South Africa (BUSA)[270] urged government to delay the introduction of the carbon tax beyond 2015. BUSA is concerned that:

- The carbon Tax needs to be linked to a range of other mitigation measures still being developed by the Department of Environmental Affairs and the Department of Energy respectively;
- The imposition of a carbon tax on the electricity sector will have a significant impact on electricity costs for the economy, without necessarily reducing emissions from the sector, at a time when the SA economy will remain vulnerable to cost-push pressures;
- National Treasury's proposals on a carbon tax do not recognize any of the current existing carbon price instruments, including the carbon tax on motor vehicles, the levy on non-renewable electricity and the proposed bio-fuel levy;
- The proposed level of the carbon tax rate and the level of protection for vulnerable energy-intensive and trade-exposed sectors appear to be respectively higher and lower than SA's key competitors. SA's competitor commodity exporters outside Australia (Canada, Brazil, etc) do not have a carbon tax and there is the possibility that Australia may yet abolish its carbon tax, depending on the outcome of its forthcoming elections; and
- A carbon tax should not be imposed in isolation of global negotiations, which are expected to concretize a formal commitment by SA on carbon emissions only by the end of 2015, for implementation in 2020[271].

3. PROGRESS TOWARDS THE DEVELOPMENT AND IMPLEMETATION OF A CLIMATE CHANGE ADAPTATION STRATEGY

[266] Ibid.
[267] Ibid.
[268] N.A. (n.d)
[269] Shneider (2013).
[270] Business Unity South Africa (2013)
[271] Business Unity South Africa (2013)

According to a Standard Bank report on the Sustainable Development Forum, adaptation has received less attention within the international policy framework than mitigation, but it is arguably more important in Africa, which has been identified as particularly vulnerable to the impacts of climate change. Recent studies, according to the report, suggest that climate change could have serious impacts on many sectors of the South African economy, with the areas of highest vulnerability being the health sector, maize production, biodiversity and water resources (LTMS, 2007). The aim of adaptation strategies is to reduce vulnerability caused by current climate change conditions and to provide protection against projected future changes, together with developing any new opportunities that may arise from climate change's beneficial effects. Whilst large transaction costs are associated with adaptation, these should be measured against the risks of maintaining business-as-usual[272].

The Information Development Programme (InfoDev) and the Gauteng Climate Change Innovation Centre (CIC) state that a Hong Kong and Shanghai Banking Corporation (HSBC) report estimates that the low-carbon energy sector of the broader climate economy will triple to USD 2.2 trillion by 2020. Increasing pressures on the environment and natural resources offer employment and trade benefits for those countries that can take a lead in the climate economy, which includes mitigation, adaptation, and climate finance[273]. The report states that global climate change policy has advanced rapidly over the past five years, with many countries having adopted greenhouse gas (GHG) emission and renewable energy targets, implemented policy measures such as energy efficiency, technology and vehicle performance standards, and provided financial signals such as carbon prices and incentives to encourage private investment in clean energy[274].

InfoDev and CIC have noted that the climate technology has been a consistent theme in South Africa's economic growth strategies, examples of which include the following South Africa's New Growth Path (NGP). The NGP strategy document sets out critical markers for employment creation and growth and identifies where viable changes in the structure and character of production can generate a more inclusive and greener economy over the medium to long term. It is further acknowledged that technological innovation will open up the opportunity for substantial employment creation. The New Growth Path targets 300,000 additional direct jobs by 2020 to green the economy, with 80,000 in manufacturing and the rest in construction, operations and maintenance of new environmentally friendly infrastructure.

Significant public finance in South Africa is geared to supporting climate change through the procurement of sustainable technologies by Government as well as developing catalytic projects and programs[275]. InfoDev and CIC argue that the development finance system in South Africa which funds SMMEs is critical to integrating development with climate change. They add that development finance institutions, such as the Development Bank of Southern Africa (DBSA), Industrial Development Corporation (IDC), Land Bank and Small Enterprise Development Agency (sefa) can incubate climate-resilient development. These institutions serve an important role in building technical capacity and knowledge platforms to mobilize action at regional, provincial and local levels.
InfoDev and CIC report that the development finance institutions are particularly needed for climate-proofing infrastructure and industrial processes; designing and testing new financing instruments; localizing and rolling out sustainable technologies; and unlocking new economic opportunities through enterprise development and job creation.

[272] Standard Bank (2010).
[273] Information for Development Programme and Gauteng Climate Innovation Centre (2012).
[274] Ibid.
[275] Ibid.

The IDC, which reports to the Department of Economic Development, has undertaken several programmes to promote and fund energy efficiency. The IDC's Green Energy Efficiency Fund (GEEF) supports the introduction of energy efficiency and self use renewable energy technologies and will ultimately continue contributing to global climate protection while supporting South Africa's economic development and growth[276].

Through the Gro-E scheme, over the next five years the IDC is investing R10 billion that will offer financial support to start-up businesses, including funding for buildings, equipment, and working capital. The Gro-E Scheme is aimed at start-up businesses and works by funding businesses with a minimum of R1 million to a maximum of R1 billion per project with interest of prime less 3% for loans and the Real After Tax Internal Rate of Return (RATIRR) of 5% for equity financing. Funding is available over five years or until the scheme is exhausted. On top of the list of projects that the IDC funds under this scheme are green industries, which includes renewable energy, energy efficiency, pollution mitigation, waste management and recycling, biofuels, and the agricultural value chain, including agro-processing[277].

In the Gauteng province, funds accessible to SMES and/or climate-oriented projects have grown significantly in recent years, following government recognition of the green economy as a key contributor to South Africa's New Growth Path and Industrial Policy Action Plan[278].

Climate-related SMEs are competing with other sectors for funding that is generally targeted towards all SMEs (e.g. commercial bank loans, microfinance, etc.). This puts them at a disadvantage due to relatively longer development times and higher start-up costs that characterize the industry. Alternatively, specific "green" funds do exist, in which case an SME is often required to demonstrate proven technology or comply with prohibitive collateral requirements. These funds, moreover, tend to broadly categorize green initiatives; few mandate that entrepreneurs focus on specific sectors, and those that do are focused in energy[279].

The mix of financing options available is tilted in favour of grants (non-repayable or conditionally repayable) and loans. This presents an opportunity to enhance the contribution of viability-minded risk capital, which aligns both financiers" and entrepreneurs" incentives towards maximizing the value of the business[280].

4. POTENTIAL IMPACT OF CARBON TAX ON ECONOMIC GROWTH

An evaluation of the impact of taxes to reduce carbon emissions must among others consider the effects of these taxes on equity in the distribution of welfare among households, according to authors of Carbon Taxes and Economic Welfare, Jorgenson, Slesnick, Wilcoxen, Joskow and Kopp. A carbon tax has potentially significant distributional consequences because it would affect the relative prices faced by consumers. This analysis, according to the authors, could also apply to many small businesses in the retail sector because they depend on wholesale markets for their goods and services. The impact of this change in relative prices could vary widely among consumer groups with different expenditure patterns. For example, an increase

[276] Industrial Development Corporation (2013).
[277] Ibid.
[278] Information for Development Programme and Gauteng Climate Innovation Centre (2012).
[279] Industrial Development Corporation (2013).
[280] Information for Development Programme and Gauteng Climate Innovation Centre (2012).

in the price of energy, resulting from the imposition of a carbon tax, would adversely affect those consumers who devote a large share of their total expenditures to energy[281].

As identified in a paper on Examining the political and Economic Effects of a Carbon Tax on Australian Small Businesses[282], carbon tax adopted in other countries tend to focus on the effects on consumers and that there is a dearth of research on small businesses[283]. Most studies focus mainly on economic indicators, ignoring more indirect effects e.g. when retailers pass on costs to consumers. Nonetheless, although small medium enterprises (SMEs) are not generally as highly energy-intensive as large heavy industries, they may be extremely trade-exposed. The degree of trade-exposure will influence the competitive sensitivity of a company to input-cost increases. The paper states that a company which is highly trade-exposed can therefore be severely (competitively) impacted by energy cost increases, even if it only has moderate emissions-intensity. I believe that this may be a common situation for many SME's, especially those in manufacturing[284].

In addition, although less common, some small businesses may actually be highly emissions intensive, even though their total emissions may be quite low. Small businesses, according to the paper, may also experience greater impacts from a carbon price because they are less able to relocate to countries without a carbon tax/ETS, or to out-source energy intensive processes to such countries, unlike larger corporations, which generally have access to the far greater human and financial resources required to do this[285].

The SME sector plays a crucial role in maintaining high employment and income generation and is therefore critical for a country to achieving sustainable growth. To enhance their role, SME's need to focus on a number of key business challenges such as reducing costs, improving employee productivity and building competitive advantage through producing quality products and services and other entrepreneurial interventions (UNCTAD, 2005). Furthermore,[286] small businesses have the added burden of dealing with direct or indirect effects of the carbon tax. Carbon tax impact however, depends on:

- Level of exposure to goods and services from energy intensive suppliers;
- Carbon intensive nature of products or services; and
- Business's ability to pass on costs.

Australia[287] identified a number of industries which are expected to pass on costs as the following

- Energy (electricity and gas, especially if from fossil fuels);
- Water (depending on your provider's carbon output);
- Waste (disposal to landfill);
- Transport (air, heavy construction and transport);
- Construction materials (cement, steel, aluminium, glass);
- Industrial chemicals (refrigerants, fire retardants); and
- Air travel

[281] Jorgenson, Slesnick, Wilcoxen, Joskow and Kopp (1992).
[282] http://isen.northwestern.edu/doc/pdf/URG-ISEN_ALloyd.Jun12_ProjectSummary.pdf.
[283] Ibid.
[284] Ibid.
[285] Ibid.
[286] Queensland Government (2014).
[287] Ibid.

Mansoor Parker, a tax expert and Andrew Gilder, an environment expert at Edward Nathan Sonnenbergs, posit that even if a South African business is not directly subject to the new carbon tax, it may have an impact on costs. For example, electricity prices or other inputs may increase in price due to a supplier being subject to the carbon tax. Businesses may respond to this challenge in several ways: retrofit their operations to reduce their energy consumption thereby qualifying for the soon to be introduced energy efficiency savings tax allowance or adjust their prices to deal with the impact of the carbon tax. The tax allowance will introduce a deduction of 45c per kilowatt hour on proven energy efficiency savings[288].

In Australia, for most, any potential impact will be felt in increases to energy bills, or in price rises in key supplies like cement and steel, as costs incurred by Australia's heaviest-emitting industries are passed down the line[289]. Various perspectives have been offered about how a carbon tax could affect the economy. Experts generally agree that how the tax is designed and how revenues are used will be the largest determinants of the effects of the tax on the economy[290].

A carbon tax increases the cost of fossil fuels, encouraging companies to switch to currently more expensive (albeit cleaner) fuels and leading households and companies to reduce energy use. These factors could make the economy less dependent on fossil fuels and thus less likely to be hurt by energy price shocks. While a carbon tax could slow the growth of industries that emit large amounts of CO_2, the tax could also boost other industries, particularly clean energy. A carbon tax could slightly reduce economy-wide employment due to lower demand for workers in carbon-intensive industries and weakened incentives for labor force participation (because the tax would lead to higher prices, reducing workers' buying power)[291].

5. LESSONS FROM OTHER COUNTRIES

This section of the paper focuses on the Australian experience as the country seems to have conducted numerous studies on the effect of a carbon tax on small businesses. Furthermore South Africa and Australia are likely to experience similar climate change effects to due to climate similarities and dense coastal ribbon development with a sparsely populated, arid interior.

The economic impact on small businesses will be different from that of big businesses. The 500 biggest polluters in Australia are expected to pay the tax but the small businesses are not on the list. The biggest impact therefore for small businesses comes from increases in the price of electricity required to run the businesses[292]. The Australian government is compensating individual households for increases in utility costs, but it is not providing such compensation to small businesses[293]. The government however is offering incentives aimed at making small businesses more energy efficient which includes a $40 million grant to provide information to small businesses on practical ways to reduce energy costs.

Carbon Tax in Australia, according to a discussion paper[294], refers to a carbon pricing scheme that was launched by the Government in July, 2012, as part of wider efforts that are aimed at taming global warming. The scheme requires businesses that emit the equivalent of 25,000 tonnes of carbon dioxide to buy emission permits. Though every business in Australia faces

[288] Moneywebtax (2013).
[289] Vorrath, (2012).
[290] Centre for Climate and Electricity Policy (n.d).
[291] Centre for Climate and Electricity Policy (n.d).
[292] http://isen.northwestern.edu/doc/pdf/URG-ISEN_ALloyd.Jun12_ProjectSummary.pdf .
[293] Ibid
[294]Qessays.com (2013).

the effects of carbon tax in one way or another, chances are that small business are paying a higher price[295].

The discussion paper states that the effects of Carbon Tax on Australian small businesses are many and varied, and may depend on the following factors;

- The level at which a business indulges into energy intensive products and services;
- The level at which a business relies on energy intensive supplies; and the ability of the business to pass the carbon tax costs to others in the supply chain.

A national survey conducted by News Limited established some interesting effects. Of the 186 small firms included in the study, 50% of them reported experiencing hikes in power bills and other supplies as a direct result of carbon related taxes. Only 33% of them were able to effectively pass the cost to their customers[296].

With the prevailing economic conditions, up to 92% percent disliked the scheme. Close to 66% of the businesses surveyed, including cafes, shoe stores, bookshops, automotive outlets and other retailers stated that they had absorbed the tax with a negative impact on their profits[297].

The discussion paper states that in a study conducted in 10 electorates in Australia. Some of the key findings in the various regions included the following:

In South Australia, more than 50% of businesses reported on experiencing the effects of carbon tax. Up to 85% of the businesses strongly believed that the costs would go much higher. In South Australia, only 10% of all businesses had managed to pass costs on consumers. In New South Wales, only 43% of businesses reported to have experienced the impacts of carbon tax. However, some businesses reported a very significant rise in costs, with one reporting a rise of close to AUS$200,000 a year. Businesses in other areas did not have exact figures of the effects but expected the costs to rise in the coming months[298].

Even though the Australia's Treasury confirmed that the effect carbon tax on the cost of energy should be negligible (about 0.2 percent to overall cost of business), small businesses, according to the discussion paper, report that the cost of supplies have increased substantially. It is feared that wholesalers might be using the carbon tax as an excuse to push prices up. The tax is also likely affect all sectors of the economy and, therefore, impact on inflation and interest rates. This will negatively impact on the Australian market and small businesses are particularly vulnerable to such effects[299].

Unfair competition from big retailers, as identified in the paper, is one factor that complicates matters for small businesses in Australia. A poor competition policy, coupled with the dominance of few landlords makes it hard for retailers to pass the carbon tax. In summary, the inability for small businesses to pass increased costs related to carbon taxes has impacted negatively on their profits. Some small business owners have considered closing down their businesses[300]. In Australia, there are currently calls for the carbon tax legislation to be repealed.

[295] Ibid.
[296] Ibid.
[297] Qessays.com (2013).
[298] Ibid.
[299] Ibid.
[300] Ibid.

Critical analysis of the problem

By limiting carbon taxes to businesses that generate 25,000 tonnes of carbon equivalent, the government was trying to limit the burden to large companies and, therefore, shield small businesses from the effects. However, the strategy seems to have largely failed as the big businesses are passing the cost on to small businesses, which are ill-positioned to deal with the high costs. The Government did not foresee the ripple effect that has resulted from implementing the program[301].

The paper on the effect of Carbon Tax on Small Businesses in Australia[302], states that a number of factors could be responsible for the failure of the strategy. First, the government did not provide a clear guideline on whether the carbon tax should be passed on to others or should be factored into the company's expenditure. In addition, the government estimated that the impact of carbon tax on businesses would be negligible, at around 0.02 percent, however this has not been the case. If the government estimates are correct then it implies that there are other aspects that have come into play following the implementation of the carbon tax[303].

There are a number of salient features that, according to the paper, might be making small businesses particularly vulnerable. One of them is the lack of a comprehensive competition policy to cushion small businesses from the conduct of their more established counterparts. As shown above, suppliers have increased the cost of their products leaving small businesses with the burden of passing the cost onto consumers[304].

Another complication is the lack of a proper framework to guide on how businesses should share the cost resulting from carbon tax. The government has not done much to help small businesses pass the cost. Most are doing it their own way – a few have succeeded (about 10%) while others are on the brink of collapsing for absorbing all the costs of carbon tax[305].

6. THE ROLE OF PARLIAMENT

Chapter 4 of the Constitution of South Africa, Act 108 of 1996 sets out in detail the powers, functions and procedures of Parliament. Parliament through Committees, such as the Portfolio Committee on Economic Development, is tasked with the following functions, functions and procedures of Parliament. Parliament through Committees, such as the Portfolio Committee on Economic Development, is tasked with the following functions;

- Making laws;
- Maintaining oversight over national executive authority and any organ of state;
- Facilitating public involvement in the legislative and other processes of the Assembly and its committees
- Participating in, promoting and overseeing co-operative government; and
- Engaging and participate in international participation (participate in regional, continental and international bodies).

Regarding SMMEs, Parliament, through the Portfolio and Select Committee on Economic Development which oversee development finance institution, could use parliamentary powers to ensure that the IDC disburses funds from Green Energy Efficiency Fund to deserving SMEs.

[301] Ibid.
[302] Qessays.com (2013).
[303] Ibid.
[304] Ibid.
[305] Ibid.

Parliament should ensure that the Department and the development finance entities adequately disseminate information to SMMEs about the Carbon Tax Policy and the implications thereof.

Parliament should ensure that Government provides a clear guideline on the passing of costs resulting from carbon tax and that the relevant competition policy makes it hard for retailers to pass the carbon tax to SMMEs particularly survivalist businesses.

In a 2005-2007 study it was reported that South Africa has a very high rate of business failure, with an estimated 40% of new business ventures failing in their first year, 60% by the second year and 90% within the first 10 years of existence[306]. According to the Global Entrepreneurship Monitor (GEM), in 2010, South Africa recorded total early stage entrepreneurial activity (TEA) of 8.9% which rose to 9.1% the following year[307]. South Africa's TEA rate decreased from 9.1% in 2011 to 7.3% in 2012. It is significantly below the average (14.3%) of efficiency-driven countries. Looking at the prevalence of business start-ups within the population and using TEA as an indicator of early-stage entrepreneurial activity, the GEM paints a bleak picture for South Africa[308]. Therefore, it is important to ensure that the introduction of a carbon tax is able to create new sustainable businesses as an imposition of a tax has a potential to make particularly new businesses prone to failure.

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THE CARBON TAX – THE FINANCIAL IMPLICATIONS

B Ellse

1. INTRODUCTION

A carbon tax essentially aims to correct the perceived pricing distortions that exist in markets. It is posited that negative externalities such as carbon emissions enforce a cost on society that is not accounted for in the market price of products produced by perpetrating sectors of the economy.

It is proposed that legislation be introduced to enforce the inclusion of the unaccounted for cost of carbon emissions in the price of relevant products.

The carbon tax would seek to change the behaviour of South Africans through a pricing mechanism. This is an enormous challenge given that South Africa suffers from a systemic dependence on fossil fuels such as coal and oil.

What is undeniable is that prices have an effect on behaviour. A specific market's pricing regime essentially establishes the milieu in which free agents are incentivised to act. The choice of tax instruments selected to alter prices appropriately is controversial with each instrument offering various pros and cons.
The global trend appears to be a shift towards indirect taxation as the more efficient and equitable tool to raise revenue for the state. Taxing certain undesirable behaviours, as opposed to a direct taxation levied on productive behaviour, appears sensible. Furthermore, in introducing a carbon tax, the ultimate goal is to ensure that the net tax effect on the economy is negligible.

To achieve this aim, a cornerstone of the National Treasury's carbon tax proposal is the implementation of mitigating revenue recycling options in an attempt to incentivise productive behaviour whilst discouraging carbon emitting activities[309]. Revenue recycling can take many forms and as such the National Treasury has experimented with several revenue recycling mixes in its economic modelling. Ideally, the pricing mechanism employed should be tax neutral, that is to say that the revenue raised from the carbon tax would be redistributed through cuts in other taxes.

In deciding upon the appropriate mix of revenue recycling options, the National Treasury has to consider the impact of altering the existing tax rates on the stratified South African economy.

As such, various stakeholders have raised concerns as to the potential distorting effects of the carbon tax on the economy.

This paper will introduce the National Treasury's carbon tax and the rationale behind it before moving on to focus specifically on the pricing mechanism favoured. It will conclude with an analysis of the strategic importance of the carbon tax as well as a summary of the feedback received from industry experts.

2. OVERVIEW: NATIONAL TREASURY'S CARBON TAX

[309] National Treasury (2013).

In May of this year, the latest discussion paper (hereafter referred to as "the paper") on the carbon tax was released for public comment by National Treasury and is entitled, "Reducing Greenhouse Gas Emissions (GHG) and Facilitating the Transition to a Green Economy".

The paper highlights the primary objective of the carbon tax which is to achieve an environmentally sustainable economic development growth path for South Africa[310].

The Government of South Africa has committed to reducing green house gas (GHG) emissions by 34 per cent by 2020 and 42 per cent by 2025, which is well below the business as usual trajectory[311]. In achieving this goal, Government has committed to developing a suite of legislation to facilitate this transition. The proposed carbon tax will be housed within this framework.

In order to achieve the targets set be Government, a multipronged policy approach is deemed necessary. Poignantly this involves both a market based approach as well as direct regulation[312]. In the National Treasury's paper it envisages utilising a carbon pricing mechanism through a carbon tax in conjunction with regulation to restructure South Africa's economy.

The paper delineates the carbon tax design. The tax will be phased so as to enable a smooth transition trajectory towards carbon friendly property, plant and equipment.

Arguments in favour of implementing a carbon tax in a phased manner posit that this will:

- Mitigate potential future punitive border carbon adjustment (BCA) tariffs;
- minimise the financial and structural impact on carbon heavy industries;
- reduce the impact on households and consumers;
- enhance the acceptability of the tax;
- provide certainty to industry sectors and investors allowing emitters time to adjust[313].

The central tenet of the paper in justifying the use of a carbon price is that the market price of a product does not fully assimilate the negative externalities associated with its production and use. The market price is therefore not a "true" reflection of the cost of the products' production and use to society[314]. National Treasury therefore describes this as a market failure and therefore, it argues, necessitates direct intervention by the state in the setting of prices. In doing so, it alters the incentives of producers and consumers, which will lead towards more carbon conscious decision making.

It is proposed that the carbon pricing mechanism will create "dynamic incentives for research, development, and technology innovation in low-carbon technologies"[315]. It is proposed that the resultant proliferation in low carbon alternatives will narrow the gap in costs between current factors of production and their green alternatives. Until this gap is bridged, state intervention aimed at channelling investment in carbon friendly factors of production will essentially serve as an additional tax on South African producers.

[310] National Treasury (2013).
[311] *Ibid*.
[312] *Ibid*.
[313] *Ibid*.
[314] National Treasury (2013).
[315] *Ibid.*

The two mechanisms of carbon pricing considered by the National Treasury were a direct carbon tax or an emissions trading system (ETS).

A carbon tax precisely outlines the prise of carbon whilst giving no indication as to what the appropriate levels of pollution are. Conversely, an ETS sets desired carbon levels but leaves the price up to the market.

National Treasury posits that an ETS is inappropriate in the South African context given the oligopolistic nature of the energy sector[316]. We would therefore lack sufficient market participants and trading volumes to create a properly functioning carbon market.

The certainty in the carbon price invoked by a tax is proposed to be comparatively investment friendlier. Long term investments require price certainty and in this regard a tax is preferable.

3. THE CARBON TAX DESIGN FEATURES

The specific design features of the carbon tax where delineated in the National Treasury's most recent discussion paper.

The paper identifies three potential tax bases:

- Tax applied directly to measured GHG emissions;
- fossil fuel input tax on coal, crude oil and natural gas, based on their carbon content; and
- tax levied on energy outputs (electricity and transport fuels)[317].

Ideally, the tax would be applied directly to the GHG emissions of entities, however this is administratively complex if not practically impossible to implement.

After extensive consultation, the paper states that a preference emerged for a fossil fuel input tax on coal, crude oil and natural gas. The Department of Environmental Affairs would publish information outlining the estimated GHG emissions for various processes and sectors. Using this methodology, entities GHG emissions are essentially determined by the extent and nature of their usage of fossil fuels.

The paper goes on to categorise the sources of GHG emissions. More specifically, it refers to Scope 1, Scope 2 and Scope 3 sources where:

- Scope 1 – direct GHG emissions from activities/sources that are owned or controlled by the entity;
- Scope 2 – indirect GHG emissions resulting from the entities use of electricity, heating and cooling or steam generated off site; and
- Scope 3 – any other indirect GHG emissions that are generated off site as a result of the entities activities[318].

The proposed carbon tax will only cover Scope 1 emissions in the tax base. The paper clarifies that this effectively means that the tax will only be levied on emissions that result directly from

[316] *Ibid.*
[317] *Ibid*.
[318] National Treasury (2013).

fuel combustion and gasification and from non-energy industrial processes. This does not include emissions resulting from the purchase of electricity, heat or steam[319].

The paper conveys that a complementary energy efficiency savings tax incentive will be introduced to encourage a reduction in emissions arising from Scope 2 sources.

This is noteworthy given that the paper also reveals that emissions from the energy sector accounted for more than 80 per cent of South Africa's total emissions in 2000[320].

Given the fact that a global agreed-upon carbon price has yet to materialise and the need for South Africa to remain competitive, National Treasury has proposed sector specific tax free thresholds.

The tax free thresholds have been determined based on the concerns raised by various sectors about the tax's potential punitive effect on trade. The thresholds also take into account the impact of pass through pricing on low income households. The proposed thresholds are described as transitional and will fall away after five years as the relevant sectors would be expected to have made the necessary adjustments by this time[321].

The table below describes the proposed emission tax free thresholds in detail:

Table 1: Tax Free Thresholds and Offsets by Sector

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

[319] *Ibid.*
[320] *Ibid.*
[321] *Ibid.*

(Source: National Treasury 2013)

It is worth noting that the overall maximum tax-free threshold (including the offsets and possible adjustments to the basic 60 per cent tax-free threshold for carbon intensity) is limited to 90 per cent. This limit excludes those sectors which have been granted comprehensive exclusion for the first five year period.

The basic tax free threshold of 60 per cent will be adjusted upwards or downwards by a maximum of 5 per cent based on the agreed benchmark for emissions intensity in a sector[322].

The proposed tax free thresholds will remain fixed during the first five year period (i.e. from 2015-19). The existing thresholds will be replaced after the five year period. Absolute emissions thresholds are being considered as an option post 2019[323].

The paper recognised that certain industries will face enormous challenges in reducing carbon emission due to structural factors (such as the coal, iron, steel, and glass, ceramic and other chemical industries). For these industries, the paper highlights the importance of allowing entities operating within these sectors to invest outside their sector in carbon reducing initiatives. These investments could then be used in applying for offsets[324].

The National Treasury propose a further paper dealing specifically with the design of offsets towards the end of 2013.

The actual carbon tax rate is meant to correct the market price of carbon emitting goods and services by inserting the marginal societal cost of their production.

National Treasury therefore proposed a carbon tax rate of R120 per ton of Carbon Dioxide equivalent gas. This rate will only apply to emissions above the tax free thresholds (including proposed offsets) and will be applicable from the 1 January 2015. This tax rate will be increased by 10 per cent per annum until 31 December 2019 with a revised tax design to be announced at the time of the annual budget in February 2019[325].

The effective tax rate will be significantly lower than R120 per ton once the tax-free thresholds are taken into account.

The paper explicitly states the importance of ensuring that the tax does not have a significantly detrimental effect on low income households as well as industry competitiveness.

The paper admits that the “impact of a carbon tax on households is likely to filter through to higher energy and electricity prices as well as higher fuel and transport costs.”[326]

The relocation of business from South Africa to other carbon tax free countries is recognised as a risk; however it is proposed that the gradual implementation of the tax, including the tax-free thresholds, serve to mitigate these risks.

In an attempt to mitigate the negative economic consequences of the proposed carbon tax, the National Treasury makes reference in the paper to the targeted funding of a number of priority

[322] National Treasury (2013).
[323] National Treasury (2013).
[324] *Ibid.*
[325] *Ibid.*
[326] *Ibid.*

flagship programmes in the energy, water, transport and waste sectors. In addition, it is proposed that further tax incentives will be introduced along with tax shifting. It is hinted that the introduction of the carbon tax could "either delay or prevent increases in income tax or other taxes as part of an environmental fiscal reform agenda."[327]

4. REVENUE RECYCLING OPTIONS

National Treasury's research has indicated that the net financial impact of the carbon tax would depend largely on the preferred revenue recycling methodology as well as the affordability of greener technologies. With regards to the latter, it has acknowledged that developing cost effective alternatives could prove difficult given the existing barriers to investment in such technologies[328].

National Treasury conclude that the overall impact of the carbon tax would be "small negative"[329]. This conclusion assumes several reductions in other direct and indirect tax instruments including Value Added Tax (VAT). A uniform reduction in indirect sales tax, a marginal reduction in corporate income tax and the scaling up of social transfers to households has been envisaged.

In choosing the most appropriate mix of revenue recycling options, the impact of revenue recycling instruments must be assessed in terms of their potential wealth effects and the extent to which they offset the effects of the carbon tax.

The National Treasury's models suggest that based on the revenue recycling mix chosen, the impact on GDP is said to equate to annual growth declines of 0.0005 per cent or 0.18 per cent by 2035.

National Treasury has several options if they are to attempt to render South Africa's carbon pricing mechanism tax neutral with each option presenting a particular set of benefactors.

A marginal reduction in Corporate Income Tax would unquestionably favour big business, as approximately 221 large South African companies are responsible for generating 50 per cent of the Corporate Income Tax revenue[330]. Since the majority of the Carbon Tax revenue is likely to come from the industrial juggernaughts, this would appear an attempt to replace lost revenue through incentivising the abandonment of undesirable behaviour with the promotion of productive behaviour.

Any reduction in VAT would be tax neutral in that all South African households would be potential benefactors in relative terms.

It is further proposed that since that carbon tax only applies to gross emissions as opposed to net emissions, a rebate will be offered to companies that employ carbon capture and storage technology[331].

Further revenue recycling options include:

[327] National Treasury (2013).
[328] *Ibid.*
[329] *Ibid.*
[330] South African Revenue Service (2012).
[331] National Treasury (2013).

- The extension of the allocation for free basic electricity initiative under the Integrated National Electrification Programme (INEP). There is a brief mention of the Department of Energy's attempt to develop the National Liquefied Petroleum Gas Strategy, which would provide the South African economy with a cleaner and cheaper alternative fuel source;
- a proposed energy efficiency savings tax incentive aimed at businesses. Businesses would be able to deduct capital expenditure for verifiable energy efficiency savings;
- the establishment of safe and affordable public transportation; and
- through the implementation of special feed-in tariffs for renewable electricity generation[332].

Excise duties on liquid fuels are set to remain as the paper states that these costs serve "environmental, demand-side management and revenue objectives".[333] In addition, the current electricity levy will be considered for a process of "gradual phasing-down"[334]. As a result, it is argued that double taxation will not be an issue as long as the carbon tax is set at a level below a price which would fully reflect the negative externalities associated with carbon emissions.

Effectively, it is proposed that as the carbon tax is gradually increased, the electricity levy may be gradually decreased.

In terms of households, the full extent of the costs associated with the introduction of the carbon tax cannot be quarantined to the carbon tax rate and accompanying thresholds, it should also include the existing electricity levy.

When all the costs are considered, it is inevitable that a portion of the price effects of a carbon tax will filter through to the end consumer and in this sense; the poorest households are still likely to be left worse off.

Despite listing several revenue recycling options, the National Treasury have thus far been relatively non-committal on precisely which instruments will be employed, which has invariably spurred on carbon tax detractors who have thus far been able to deliver damning ripostes.

Furthermore, National Treasury has repeatedly reiterated its desire to separate revenue raising instruments with that of expenditure outlining that such a practise is in line with sound fiscal policy management practise[335].

Detractors point to an example of a working model provided by British Columbia, the westernmost province of Canada. The revenue raised from its carbon tax is strictly ring-fenced for green projects and the tax is revenue neutral, meaning that the money taken for emissions is returned through tax cuts elsewhere. British Columbia even has a low-income climate-tax credit, to offset the losses of carbon taxes paid by low-income individuals and families[336].

The resistance towards any form of earmarking with respect to the carbon tax presents to National Treasury the difficult challenge of transparency. It may prove difficult to convince detractors that revenue raised through a carbon tax, and added to the greater pool of funds that is the National Revenue Fund, will be efficiently and equitably redistributed to the general population.

[332] *Ibid*.
[333] *Ibid*.
[334] *Ibid*.
[335] National Treasury (2013).
[336] British Columbia Ministry of Finance (2013).

South Africa, it seems, has two potential options with regards to revenue recycling. The first is to favour a policy of redistributing the revenue through social transfers to households; given the high levels of poverty and unemployment, this option will undoubtedly prove tempting to the National Treasury.

The second and arguably more circumspect option would be to utilise the funds to incentivise the creation of a prospering domestic green energy sector which would not deliver welfare benefits to poor households in the short run, but would undoubtedly do so in the long run.

National Treasury appears to favour the former through its assertions that the revenue raised would reduce inequality by making possible the increase of social transfers to households, which would ultimately boost aggregate domestic demand[337].

The proposed increase of social transfers to poor households is an attempt to mitigate any potential deleterious effects on the most financially vulnerable groups. Whether or not it is prudent government policy to extend an already vast and unconditional social welfare net is likely to prove a controversial topic.

5. THE STRATEGIC IMPORTANCE OF THE CARBON TAX

Aside from the debate on the structure of the carbon pricing mechanism, the strategic importance of introducing a carbon tax in South Africa needs to be assessed.

National Treasury posits several arguments in favour of implementing a carbon tax as soon as is practically possible.

One of the prominent arguments put forward by the department focuses on the need to avoid punitive Border Tariff adjustments (BTA's) instituted by our trading partners. BTA's are basically when another country imposes a carbon tax or price on applicable South African goods.

National Treasury's latest discussion paper refers to the potential threat of trade partners (mostly developed countries) implementing BCA's in the future and suggests that by introducing the carbon tax, South Africa would give it's a first mover advantage in low carbon markets. No consideration is given to the likelihood that developed countries would impose such BCA's on developing nations such as South Africa[338].

In support of this argument, under the South African Renewables Initiative (Sari 2011), a regulatory impact assessment was conducted to examine the effects of a carbon border tariff on South African exports. It was found that R85 billion worth of exports could be vulnerable to additional costs of R5.4 billion every year[339].

It has been suggested that carbon border tariffs will be imposed by the EU and USA by as early as 2020 with 71 product categories covered, amounting to approximately 5.4 billion Euros in trade[340].

[337] National Treasury (2013).
[338] National Treasury (2013).
[339] South African Renewables Initiative (2011).
[340] *Ibid.*

In its study, the Sari initiative supposed a carbon tax of US20c per ton of South African exports for the EU. Given this assumption, the carbon tax would cost the iron and steel producers of South Africa 104 million Euros, gold producers 89 million Euros, Platinum producers 80 million Euros and Coal producers 68 million Euros a year[341].

For the US, 13 product categories would be covered accounting for approximately $2.4 billion in trade. Assuming a US20c per ton carbon tax, the gold and platinum sectors could expect to pay $159 million; the steel and basic iron producers would pay $28 million and $10 million respectively[342].

The study concluded by advising that global markets would increasingly penalise carbon intensive goods and services. BTA's would effectively serve to safeguard domestic industries as well as establish the basis for ongoing carbon conscious trade relations[343].

It was the opinion of the study that within a decade, carbon pricing would be adopted worldwide and that a uniform global carbon pricing mechanism would emerge within 20 years[344].

In essence, the National Treasury proposes that South Africa would be best served by adopting a forward-looking strategy with respect to carbon pricing insofar as many of its export industries are likely to be affected.

In addition, National Treasury has argued that given South Africa's position as the largest economy on the African continent, the implementation of a carbon tax would send an important message to the rest of Africa and the developing world. Despite South Africa's relatively small global carbon footprint, the argument appeals to the need to act now to reverse the devastating effects of global climate change. In a presentation by the National Treasury to the Standing Committee on Finance, it was posited that the implementation of the carbon tax in 2015 would secure a better future for the children of South Africa[345].

The fact remains that South Africa needs to comprehensively assess the costs and benefits associated with adopting carbon pricing now versus at a later date.

The potential benefits to an early adoption would be a more gradual introduction of the pricing effects which would give affected industries more time to make the necessary structural adjustments.

In addition, implementation at a later date could result in punitive BTA's by our largest trading partners which would result in many of our local industries choosing to relocate to neighbouring countries with less of a marked carbon footprint. These ex-pat industries would then export their products back into South Africa. The potential loss in jobs and tax revenue makes this outcome extremely undesirable.

However, arguments against the implementation of a carbon tax now suggest that a delayed response may benefit vulnerable industries in the short run. It has also been argued that these industries would begin to transform towards an environmentally friendly business model in anticipation of the inevitable implementation of the carbon tax. There are also experts who

[341] *Ibid.*
[342] *Ibid.*
[343] *Ibid.*
[344] South African Renewables Initiative (2011).
[345] National Treasury (2013).

question the likelihood of South Africa's trading partners implementing BTA's given their relatively poorer global carbon footprint[346].

6. FEEDBACK ON THE CARBON TAX AND ITS IMPACT ON ECONOMIC GROWTH

This section aims to provide an evaluation of the arguments posed in response to the implementation of a carbon tax by compiling the views of industry experts before assessing the impact on economic growth.

Regardless of the mechanism of carbon mitigation adopted, the fundamental objective is to reduce the GHG emissions of the South African economy. In achieving this core objective, the latest discussion paper by National Treasury explicitly highlights the need to "phase out high emissions-intensive power stations over time and provide support for renewable"[347].

National Treasury's methodology of obtaining this core objective seems curious given the current construction of two of the world's largest coal-fired power stations[348] and the potential construction of a third.

National Treasury argue that a carbon tax is a necessity as the market prices of products produced from carbon emitting industries do not incorporate the societal costs of the harmful effects of production. National Treasury refer to this as an example of market failure.

Whilst it is certainly true that the market prices of products do not fully incorporate all the costs associated with their production, it is unclear as to exactly what the true societal cost of their production is.

A reputable pan-European team conducted a study lasting 15 years to determine the cost to society of both the negative and positive externalities arising from the production of unclean energy. The team found that the total environmental costs — health effects from emissions, acid rain effects on crops, water chemistry changes on fish life and climate change — amount to between about €0.20/kWh (R2.66/kWh) and €0.75/kWh (R9.97/kWh[349]). Whilst these costs are deplorable, the team's further finding puts this cost into context. The team also found that the monetary benefit of energy is approximately €25/kWh (R332.31/kWh).

It is clear from these figures that society is actually significantly better off from the production of unclean energy. It is therefore difficult for the National Treasury to argue for the market failure hypothesis whilst only considering the negative externalities and omitting the greater positive externalities.

A further argument in the paper for the carbon tax suggests the need to mitigate the risks associated with punitive BTA's. Given the fact that South Africa's major trading patterns in Europe, the United States and Asia are all responsible for emitting substantially more GHG than South Africa; the likelihood of BTA's being a threat to South African trade is remote[350].

The paper proceeds to suggest that appropriately funded programmes targeting the green technology sector, along with the incentives provided by the carbon tax itself, would assist in

[346] Engineering News (2013).
[347] National Treasury (2013).
[348] Medupi and Kusile.
[349] At Rand/Euro exchange rate on 09/09/2013 at 15:16.
[350] Engineering News (2013).

ushering in a new and dynamic green technology sector. It has been argued by critics that this notion does not adequately take into account the global reliance on fossil fuels and the inertia associated with adopting alterative energy. Any significant adoption of cleaner technologies is likely to be extremely gradual.

It has also been argued that carbon taxes fail to adequately change behaviour. It should be obvious that without the attainment of its primary objective, the tax amounts to straightforward revenue raising.

On this issue, Philip Lloyd at the Energy Institute at the Cape Peninsula University of Technology (CPUT) argues that National Treasury has failed to check the effects of carbon taxes implemented elsewhere in the world.

He lists a series of countries that have implemented a carbon tax without achieving any significant reduction in GHG emissions.

The paper lauds the carbon pricing mechanism implemented by the EU without acknowledging that the price of carbon has recently plummeted with Germany acting in response by building 23 new coal-fired power stations[351].

Since the introduction of the carbon tax by Finland in 1990, GHG emissions have grown substantially. Costa Rica has seen emissions grow by 60 per cent since the introduction of their carbon tax in 1997. India's carbon tax on coal has seen consumption increase by 30 per cent since its inception in 2010[352].

Furthermore, South Africa's own petrol levy has not served to reduce the amount of vehicles on the road[353].

Of all the international case studies observed, Australia should provide South Africa with the best example of what is to be expected should the carbon tax be instated.

Australia introduced its carbon tax in July of 2012 and has seen its economy subsequently stall. Philip Lloyd posits that the introduction of the carbon tax ultimately cost the Prime Minister Julia Gillard her position in Government with the recent announcement by Tony Abbott, Australia's incoming prime minister that the carbon price mechanism (along with its 30 per cent tax on mining profits) is set to be scrapped. These sentiments are echoed by the Head of tax services at Deloitte, Nazrien Kader, who warns that South Africa should heed the warning with regards to the Australian case[354].

Patricia Williams, head of the new tax dispute resolution and controversy management division at Deloitte, has also warned that the abolishment of carbon taxes may result in the occurrence of business shifting to "tax friendlier" regimes[355]. The threat of such losses is acknowledged by National Treasury its latest paper.

Williams goes on to suggest that there has been inadequate consultation on the implementation of a carbon tax, which may result in retrospective legislative amendments to address a plethora of unintended consequences. Why a carbon tax should be a priority is

[351] Engineering News (2013).
[352] *Ibid.*
[353] *Ibid.*
[354] *Ibid.*
[355] Engineering News (2013).

further questioned by Williams as she advises that "South Africa has bigger fish to fry. Recently announced measures to address base erosion and profit shifting will have a much bigger impact on tax revenue in future. Why stifle business with additional layers of taxes?"[356]

Similar sentiments have been expressed to Parliament by Energy and chemicals company Sasol and Steel producers ArcelorMittal. Representatives from Sasol told parliament that the proposed carbon tax would mitigate South Africa's aspirations to increase leaves of mineral beneficiation[357].

Business Unity of South Africa (BUSA) pointed out to parliament that competitor commodity export countries such as Canada, Brazil and soon-to-be Australia do not have a carbon tax and would thus have a significant strategic advantage over South Africa in global commodity markets. Their submission posits that the policy paper developed by the National Treasury fails to recognise any of the current existing carbon-price instruments, including the carbon tax on motor vehicles, the levy on non-renewable electricity and the proposed bio fuel levy[358].

The organisation is also critical of the lack of clarity on segments of the carbon tax design.

The South African Chamber of Commerce and Industry (SACCI) concurs by arguing that the paper offered scant detail on the revenue recycling options touted and that any carbon tax would need to be tax neutral[359].

BUSA further argued in their submission to National Treasury that the carbon tax could not be introduced in isolation and should be linked to a range of other mitigation measures which are currently being developed by the Department of Environmental Affairs and the Department of Energy[360].

The Department of Trade and Industry (DTI) expressed a similar view by telling Parliamentarians recently that concurrent support measures would have to be linked to the carbon tax to purposively promote structural change across industry[361].

These factors have led BUSA to call for an independent and comprehensive regulatory impact assessment to be conducted in conjunction with a World Bank study into the socioeconomic impact of carbon tax. The World Bank study is expected to be published during 2014.

The organisation added that South Africa's carbon tax should not be imposed in isolation of global negotiations. Such negotiations are ongoing are expected to result in a formally binding commitment by South Africa on carbon emissions by the end of 2015, for implementation in 2020.

Given the recent appointment of a tax-focused committee of enquiry under Judge Dennis Davis, subsequent to the original proposal for a carbon tax, it may prove prudent to first assess precisely how a carbon tax would practically be positioned within the broader initiative to reform tax in South Africa.

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[356] *Ibid.*
[357] *Ibid.*
[358] *Ibid.*
[359] *Ibid.*
[360] *Ibid.*
[361] Department of Trade and Industry (2013).

Regardless of whether or not the carbon tax is implemented, Philip Lloyd advises that approximately 80% of global energy comes from fossil fuels; the consumption of energy is therefore inextricably linked to GHG emissions.

In South Africa's case, the Department of Energy has indicated that approximately "77% of South Africa's primary energy needs are provided by coal. This is unlikely to change significantly in the next two decades owing to the relative lack of suitable alternatives to coal as an energy source. Many of the deposits can be exploited at extremely favourable costs and, as a result, a large coal-mining industry has developed"[362].

Concordantly, the DTI have warned that any carbon tax would have to take account of key structural features of the domestic economy to avoid the "real risk of shrinking or even closing existing energy-intensive sectors".

In reality, the status quo is unlikely to change for many years. This has lead to the associate director for tax management consulting at Deloitte, Izak Swart, to indicate that a carbon tax does not take into account South Africa's dependency on coal, nor does it consider the effect the tax might have on the price of electricity[363].

BUSA has also stated that the carbon tax would be unlikely to reduce carbon emissions.

Swart adds to these concerns by questioning the appropriateness of the carbon tax given the lack of alternatives. He also raises questions as to whether or not industry stakeholders have sufficient access to cost efficient green technologies as a viable alternative. He goes on to suggest that a methodology of first providing an incentive to change behaviour and then subsequently introducing a carbon tax to penalise those that haven't changed. Industries would therefore be incentivised to change now in anticipation of a future tax burden should they fail to do so.

Given the views of industry experts, if the carbon tax is implemented, what will the impact be on economic growth?

National Treasury's model suggests that a carbon tax coupled with various revenue recycling options will have a negative impact on economic growth going forward, albeit limited, with a gradual transition to a low carbon economy [364].

More specifically, the model forecasts lower growth for the mining sector whilst envisaging higher growth for the agriculture, food, textiles, vehicles and tertiary sectors.

Given South Africa's widening current account deficit and the fact that Mining products comprise approximately 60 per cent of all South African exports, any reduction in growth in this key sector could be problematic.

At present, the current account deficit places the South African economy at the mercy of foreign capital flows to fund both domestic consumption and investment. This reliance is solidified by the fact that South Africa has a relatively low domestic savings rate and therefore cannot adequately fund its own expansion.

[362] Department of Energy (2013).
[363] Engineering News (2013).
[364] National Treasury (2013).

In addition, the Rand is highly exposed to foreign capital flows with potentially damaging inflationary knock-on effects, with the poorest households likely to be the worst affected.

The impact on the poor is openly acknowledged by National Treasury in their latest discussion paper which posits that the burden of the tax will likely fall disproportionately on the lower income households and will undoubtedly result in the loss of jobs[365].

To exacerbate these effects, the paper states that "the electricity sector will be able to pass on the carbon tax to final consumers"[366]. Given the shrinking disposable incomes and growing indebtedness of households, the timing of the carbon tax could be deleterious.

Notwithstanding the many detractors, the National Treasury has suggested, in a briefing to the Standing Committee on Finance earlier this year, that the department views the carbon tax as a moral imperative[367].

Whilst it is acknowledged that the global economy needs urgent restructuring towards a more sustainable growth path, it cannot be done by ignoring the underlying economics.

Even if South Africa were to achieve its proposed carbon emissions target, the impact this would have on global emissions is negligible.

The latest discussion paper by National Treasury posits that South Africa is one of the largest emitters of GHG in the world. However, this is misleading when the populations of countries are taken into account. On a per capita basis, South Africa ranks 34th in the world for GHG emissions and produces only 451,839 thousand tonnes of CO2 emissions which is only 1.46 per cent of all global emissions[368].

The United States of America, China and the European Union account for approximately 56 per cent of all global emissions; add India and Russia to this group and together they account for 67.3 per cent of global carbon emissions[369].

It is clear that carbon emissions are highly concentrated amongst a few key regions of the world. Therefore it stands to reason that any meaningful move towards a low carbon global economy will require a restructuring of the economies of these key regions.

As a developing country, South Africa is categorised as a non-Annex 1 country under the Kyoto Protocol[370]. Essentially this means that South Africa does not face any binding target for emissions reduction. This is in line with the principle of common but differentiated responsibilities and respective capabilities.

South Africa's commitment to manage carbon emissions is thus voluntary.

It therefore does not seem to make sense, from a strategic perspective, to embark on implementing a carbon tax, particularly when South Africa is not obligated to do so.

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[365] *Ibid.*
[366] *Ibid.*
[367] *Ibid.*
[368] Carbon Dioxide Information Analysis Centre (2010). [368] Carbon Dioxide Information Analysis Centre: Record High 2010 Global Carbon Dioxide Emissions from Fossil-Fuel Combustion and Cement Manufacture Posted on CDIAC Site
[369] Carbon Dioxide Information Analysis Centre (2010).
[370] United Nations (1997).

South Africa does not however have to accept an unsustainable growth path as an immovable fact, since there are other options which may prove viable.

Lloyd proposes such an alternative that he posits is more likely to assist South Africa in achieving its objectives; that alternative is the proliferation of the natural gas industry in South Africa.

A recent study by Yale University has shown that the arrival of shale gas is predominantly responsible for dialling back GHG emissions in the US to where they were 25 years ago. In addition, the advancement of energy efficient technologies in the transport sector has assisted in this regard[371].

It has been reported that several countries acquire approximately a third of their energy requirements from natural gas whilst South Africa sources only 3 per cent[372].

Lloyd proposes that 20 per cent growth in gas consumption (with a concurrent 20 per cent reduction in coal consumption) would reduce South Africa's GHG emission by an estimate 33 per cent. He therefore suggests that South Arica should shift its focus away from a carbon tax and towards the exploration for gas[373].

The future global positioning of the South Africa economy is likely to be affected by the decision to implement a carbon tax. It's just sensible to ensure that the decision made should be based on sound economic arguments rather than on ad hominem alternatives.

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