AN INTERNATIONAL COMPARISION OF ENVIRONMENTAL TAX WITH AN EMPHASIS ON SOUTH AFRICA

by

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ABSTRACT

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Every country should have a moral responsibility to sanction its residents in a bid to curb the effects of global warming. South Africa has a unique economic and social set-up which has to be considered in crafting a policy and legislation or designing an environmental tax regime.

The objective of this study was to analyse the current incentives for environmental taxes as contained in the Income Tax Act and provide recommendations on proposed changes to the existing incentives. In addition, it compares and establishes what South Africa can learn and adapt from Malaysia and Denmark, two countries who have successfully implemented environmental taxes and renewable energy incentives. It also explores the arguments for and against carbon tax (tax mechanism system) in South Africa on the energy intensive sector. The study continues to consider what the prospects are of achieving this purpose and the possible adverse impact it may have on the operating profits of energy-intensive companies. Carbon tax may result in a substantial elimination of tax contributions, a massive reduction in exports and major retrenchment and job losses, given the ever rising electricity tariff.

There is much debate as to whether a cap-and-trade system would be preferable to a tax mechanism system, therefore the pros and cons of both systems are addressed and both systems' sustainable positive and negative impacts are compared. This study explored the

shortcomings of South Africa's environmental tax laws by comparing them to the environmental tax regimes and the different incentives and tax rebates offered by Malaysia and Denmark to reduce emissions.

The study firstly concluded that positive encouragement through incentivising green behaviour is preferable to a punitive tax mechanism given the fact that South Africa is still growing its economy. Therefore the introduction of a carbon tax would significantly reduce company profits, may result in unemployment and a substantial reduction in exports especially if it is not gradually introduced at a minimum charge given South Africa's volatile labour and trade union nature. Secondly, if South Africa eventually decides to introduce carbon tax, it should emulate the Danish system that is taxing the industrial emission of carbon and earmark that income for industrial subsides and investment in greener sources of energy.

Keywords:
Environmental tax
Denmark
Malaysia
Tax mechanism
Cap-and-trade system
Renewable energy
South Africa

OPSOMMING

VERGELYKING VAN GROEN BELASTING MET DIE KLEM OP SUID AFRIKA

deur

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Elke land het 'n morele verantwoordelikheid om sy inwoners bewus te maak van aardsverwarming in 'n poging om die gevolge daarvan te bekamp. Suid Afrika het 'n unieke ekonomiese en sosiale opset het wat behoorlik oorweeg moet word voor ’n groenbeleid of wetgewing geïmplementeer word.

Die doelwit van die studie is om die huidige groenbelastingaansporings te analiseer soos in die Inkomstebelastingwet vervat en om aanbeveelings te maak in terme van moontlike veranderinge tot dié bepalings. Bykomstig hiertoe vergelyk en bepaal die studie wat Suid Afrika van lande soos Maleisië en Denemarke kan leer in terme van groenbelastingaansporings. Albei hierdie lande het 'n reputasie dat hulle groenbelasting en hernubare-energie aansporings suksesvol geimplementeer het. ‘n Ondersoek is gedoen om die impak van koolstofbelasting (belastingmeganisme ontwerp) in Suid-Afrika op die energie-intensiewe sektor te bepaal. Die impak van koolstofbelasting en die moontlike negatiewe gevolge wat dit kan inhou vir die bedryfswins van die energie-intensiewe maatskappye, word ook in ag geneem. Die negatiewe gevolge kan moontlik lei tot ‘n substansiële afname in belastingbydraes, 'n vermindering in uitvoere en verliese aan werkgeleenthede, gegewe die immer stygende elektrisiteitstariewe in Suid-Afrika.

Daar word tans gedebatteer of 'n handelsbeperkingbeleid (plafon-en-handelstelsel) beter vir Suid Afrika sal wees as 'n belastingmeganisme ontwerp om koolstofvrystellings aan te spreek. Die voor- en nadele van elke stelsel sal ondersoek word en die twee stelsels se

doeltreffendheid ten opsigte van die hantering van ekologiese uitdagings sal vergelyk word. Die studie sal die tekortkominge van Suid-Afrika se groenbelastingwette ondersoek deur dit te vergelyk met die groenbelastingstelsels, die verskillende aansporingsmeganismes en belastingkortings wat deur Maleisië en Denemarke aangebied word, om koolstofgasse te beperk of te verminder.

Daar is eerstens tot die gevolgtrekking gekom dat positiewe aanmoediging deur insentiewe vir groengedrag verkies word bo ‘n belastingmeganisme aangesien Suid-Afrika in ‘n ontwikkelende stadium is. Koolstofbelasting mag 'n uitgebreide negatiewe effek op maatskappywins hê, wat kan lei tot ‘n toename in werkloosheid en ‘n aansienlike vermindering in uitvoere, veral as dit nie geleidelik geïmplementeer word teen 'n minimum koste nie., gegewe Suid-Afrika se wisselvallige arbeids-en vakbond-omgewing. Tweedens, indien Suid-Afrika besluit om koolstofbelasting te implementeer moet Denemarke se voorbeeld gevolg word waar belasting gehef word op industriële vrylating van koolstof. Die herinvestering van die belastinginkomste in die bedryf deur middel van subsidies vir navorsing en beleggings in alternatiewe energiebronne, skoner ontbranding van brandstof, koolstof-opname tegnologie en ander omgewingsinnoverings sal koolstofbelasting se sukses bepaal.

Sleutelwoorde:
Groenbelasting
Denemarke
Maleisië
Belastingmeganisme
Plafon-en-handelstelsel
Hernubare energie

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Carbon taxes are under consideration in several of the Organization for Economic Co-operation and Development (OECD) countries as a potential policy mechanism in the reduction of carbon dioxide emissions (Hoeller & Wallin, 1991:92).

South Africa signalled her intent to seriously curb emission growth in 2010 at the Climate Change Convention. South Africa affirmed government intervention would target a 34% reduction by 2020 and further increasing that target to 42% by 2025. The strategic drive of the Cabinet anchored in consideration of the long-term mitigation scenarios in mid-2008 has been successfully internationalised. The long-term mitigation scenarios evaluated a host of intervention alternatives, considering a variety of economic measures to incentivise these mitigation alternatives. Pricing the carbon content of fuel was identified as a highly effective mitigation alternative, consequently reducing carbon emissions (Winker, Jooste & Marquard, 2010:527-542). The baseline is the standard measurement of the amount of carbon dioxide emissions that are reduced or secluded from our environment and is the standard unit of measurement for carbon trading programmes worldwide.

A task force representing South Africa's largest industries in mining and minerals determined that a combination of carbon tax and electricity tariff hikes expected by 2014 effectively reduced operating profits of the surveyed companies by 63% (Bisseker, 2012).South Africa has resolute economic objectives to create five million jobs by 2020 through sustained real gross domestic product growth of around 7% per annum and in addition simultaneously intends to cut greenhouse gases (GHG) emissions by 34%. However, as National Treasury ascertained, these targeted objectives are difficult to pull

together, hence the need for National treasury to reassess its proposal on carbon tax. According to Bisseker (2012), a R50 per tonne carbon tax scenario would lead to a large energy intensive company losing over 90% of its operating profits and this would surpass a 100% loss in operating profits given a scenario of R100 per tonne carbon tax. In addition, National Treasury would need to consider the impact of increased energy costs on the surveyed companies' exports, jobs and tax contributions. If, for instance, surveyed companies were no longer cost-effective after a 50% decrease in operating profit, then a R100 per tonne carbon tax would erode R54billon of exports, R23billon of taxes, and 63 000 jobs (Bisseker, 2012). Therefore it is pointless to initiate a carbon tax without considering alternative carbon pricing mechanisms given the continuous steep electricity price increase.

As stated by the industry task force on climate change, it is necessary for the government to carry out an enhanced factual study on South Africa's potential to reduce emissions together with the associated outlay of reducing emissions, prior to a carbon tax implementation. Although the majority of critics suggest postponing carbon tax, financial expert Scholtz (2012:1) argues that businesses, inclusive of mining, can no longer avoid paying for carbon emissions. He placed emphasis on the fact that, if one seriously believes in global warming and carbon emissions, then the pricing of carbon is crucial, either by way of a cap-and-trade system or by means of a tax mechanism, whichever way carbon should be priced.

Duane Newman (2012:1) points out that although emissions reductions are important, tax on carbon is a pioneering global concept and it is uncertain whether this tax would in fact lessen emissions. After the release by National Treasury of the discussion document on carbon tax, Deloitte assessed the impact of implementing a carbon levy in the United Kingdom, Australia, India, and British Columbia. It established that both the British Columbia and the United Kingdom governments were of the view that the introduction of a carbon tax by itself was insufficient to the diminution of carbon emissions. Sinclair (2012), reports that this discussion paper establishes a link of carbon tax merely to profit, which is flawed as it assumes GHG occurs from the initial unit of cost of operation though an entity has not yet reached its break-even point. He concluded however that those aspects of the proposed taxes can be refined through for instance, channelling tax revenue exclusively to

be reinvested in lowering emission. This in essence reveals the realisation by the authors that growth of the mining sector in the absence of alternate forms of energy to coal would be self-defeating. Thus, what must be of uttermost concern are incentives to lower emissions in South Africa before carbon tax is introduced as it bears no short-term relief/remedies.

Although there is a lot of literature on global warming, little attention has been given to the practical implementation from a South Africa perspective. An extensive literature search, suggests that no academic research has examined the shortcomings of South Africa's environmental tax laws.

1.2 PROBLEM STATEMENT

Despite at least two decades of intense application in both research and practice on the effect of global warming, the imposition of environmental taxes and the use of other measures/incentives to reduce emissions have not been given much attention in South Africa. As mentioned above the intended proposal of introducing a carbon tax in South Africa given the ever- rising electricity tariff, could have an extensive adverse impact on the operating profits of the energy-intensive firms which would result in a substantial elimination of tax contributions, a massive reduction in exports and major retrenchment and job losses.

South Africa therefore still has much to learn from the rest of the world on how best to price carbon; the impact of imposing carbon tax on energy intensive firms; to determine whether the introduction of carbon tax would actually reduce emissions and the use of other alternative measures /incentives to reduce emissions such as renewable energy projects.

1.3 PURPOSE STATEMENT

Every country should have a moral responsibility to sanction its residents in a bid to curb the effects of global warming. According to Dane (2011:56-57), South Africa is morally

bound to control effects of climate change given her placement in the top twenty of world's largest emitters of GHG.

This study explores how the National Treasury can support the government's initiatives to reduce carbon emissions and incentivise energy-intensive firms in South Africa to invest in renewable energy sources as remedial action. It also explores the arguments for and against carbon tax in South Africa on the energy intensive sector and considers what the prospects are of achieving its purpose. There is much debate as to whether a cap-and-trade system would be preferable to a tax mechanism system, therefore the pros and cons of both systems are addressed and both systems' sustainable positive and negative impacts are compared.

Through analysis of the tax regimes and incentives in Denmark (a world achiever in emission reduction as a result of carbon taxes) and Malaysia (a similar developing country with successful renewable energy policies), key lessons from experiences of these countries are considered and the focus is on the adoption of these in the South Africa environment.

Therefore the main purpose of this study is to establish areas where South Africa can improve its current legislation on environmental tax and also learn from other countries specifically Malaysia and Denmark on how best to address the global warming problem through sanctioning its residents in a bid to curb emissions.

The secondary goal of this study is to explore the shortcomings of South Africa's environmental tax laws by comparing it to the environmental tax regimes and the different incentives and tax rebates offered by the above-mentioned countries to reduce emissions.

1.4 RESEARCH OBJECTIVES

The study is guided by the following specific research objectives:

- To analyse the current incentives contained in the Income Tax Act which deals with environmental tax and provide recommendations on proposed changes.

- To analysis the evolution of environmental taxes and renewable energy incentives in Malaysia and Denmark.
- To compare and establish what South Africa can learn and adapt from Malaysia and Denmark who have implemented environmental taxes and renewable energy incentives.
- To consider the full spectrum of possible ways to pricing carbon in South Africa, in particular to analyse the tax mechanism versus the cap-and-trade system.

1.5 DELIMITATIONS

There are several delimitations to the study related to context, construct, literature streams and/or theoretical perspectives. First, this would be a case study limited to the South Africa tax system, environment, economic and social context.

No detailed study on the implications of any proposed approach to the environment, economy and the revenue authorities is offered.

The delimitations of this study especially the environment, economic and social context in which it is designed as well as the conceptual nature of the study, are assumed to have no negative impact on the accuracy of the outcome or conclusions and recommendations drawn from this study.

1.6 ASSUMPTIONS

This study acknowledges a number of assumptions that underpin any undertaking of this nature. The theories, theoretical frameworks and literature streams on which this study is based are assumed to be accurate and a true reflection of the *status quo* in their respective environments.

Global warming is assumed to be a universal iniquity brought from emission levels the world over. It is further assumed that the response of companies, organisations and

governments in foreign settings to various tax incentives and regimes, can be generalised to ring true in the South Africa context.

The choice of methods and techniques including the selection of literature and case studies is assumed to be unbiased and the most appropriate to this particular study and the South Africa context.

1.7 DEFINITIONS OF KEY TERMS

Key concepts and terms of a technical nature are defined below.

An environmental treatment and recycling asset is defined in section 37B of the Income Tax Act (58/1962) (hereafter referred as 'the Act') as any air, water and solid waste treatment and recycling plant or pollution control and monitoring equipment including any improvements thereto.

An environmental waste disposal asset is defined in section 37B of the Act as any air, water and solid waste disposal site, dam, dump, reservoir or other structure of a similar nature, or any improvements thereto, if the structure is of a permanent nature.

Carbon tax is defined by Ecolife (2011) as an environmental tax applied to the burning of fossil fuels in order to discourage the production of GHG emissions such as carbon dioxide.

Environmental taxes is defined by the office for National Statistics in the United Kingdom as a tax whose base is a physical unit such as a litre of petrol, or a proxy for it, for instance a passenger flight, that has a proven specific negative impact on the environment. This definition has been adopted by the statistical offices of the European Communities (Eurostat) and the OECD. Environmental taxes would generally include carbon taxes and renewable energy incentives.

Greenhouse gas is defined by Ecolife (2011) as a gas that absorbs and releases radiation within our atmosphere.

Kyoto Protocol is defined by the United Nations Framework Convention on Climate Changes (The UNFCCC and the Kyoto Protocol, 2011) as an international agreement that sets binding targets for 37 industrialised countries and the European community for reducing GHG emissions. The protocol was adapted in Kyoto, Japan on 11 December 1997 and came in force on 16 February 2005.

Table 1: Abbreviations used in this document

Abbreviation	Meaning
ASEAN	Association of Southeast Asian Nations
COP	Conference of the Parties
FIT	Feed-in Tariff
GDP	Gross domestic product
GHG	greenhouse gases
IRSA-ASEAN	Inter-Regional System of Analysis for ASEAN
OECD	Organisation of Economic Co-operation and Development
The Act	The Income Tax Act (58/1962)
UNFCCC	United Nations Framework Convention on Climate Change
US	United States (of America)
USD	United States dollar

1.8 RESEARCH DESIGN AND METHODS

The study can be classified as a conceptual study (literature review) with no empirical component, however it will also utilise the case study approach. The aim of a basic conceptual research study is to increase scientific knowledge (Fox & Bayat, 2007:10). It is undertaken purely to understand processes and their outcomes as a result of an academic agenda for which the key consumer is the academic community (Saunders, Lewis & Thornhill, 2007:592). This type of research is not designed to inform managerial decision-making or public policy formulation, but it is hoped that this research will ensure a clearer understanding and thus generate new insights that can be a foundation for greater and more comprehensive studies.

1.9 OVERVIEW OF CHAPTERS

In an attempt to recommend a suitable taxation system, the environmental taxes currently available in the South Africa tax system will be analysed first. Following this analysis, the study recommends certain amendments to the current Act in order to improve the current environmental tax system. A comparative analysis is done on the tax mechanism and the cap-and-trade system with a particular emphasis on its applicability to both developed and developing countries and its suitability to the South Africa context. After analysing the environmental tax regimes of Malaysia and Denmark, this study determines what South Africa may learn and adapt from these countries tax regimes as well as making recommendations on whether and how carbon tax should be introduced in South Africa.

CHAPTER 2

ENVIRONMENTAL TAXES IN SOUTH AFRICA

2.1 INTRODUCTION

The case against South Africa implementing a blanket carbon tax system is a solid one. Although globally, South Africa is positioned as one of the 20 major emitters of GHG, Dane (2011:56-57) stated that, it has a unique economic and social set-up which has to be considered in crafting a policy and legislation or designing a environmental tax regime. The key is to recognise the policy most suitable for attaining the objectives of lowering carbon dioxide emissions and attaining increased economic development and viable growth leading to better higher standards of living. A blanket carbon tax regime may have the undesirable effect of increasing costs of production and or raising prices (if passed on to the consumer). The revenue generated from such taxes should be channelled back into research and development of environmentally friendly energy technologies if emissions are to be lowered otherwise the revenue authorities become the unintended beneficiary at the expense of the environment. (Fernandez, Perez & Ruiz, 2011:4253-4263).

The current trends in carbon taxation are either a purely environmental tax incentive system such as that employed in Malaysia or a hybrid system that is both punitive and incentivised in nature such as the Danish and the US tax regimes.

2.2 CURRENT LEGISLATION IN SOUTH AFRICA

The Act is currently inclusive of the following clauses that are considered in favour of protecting the environment.

2.2.1 Special depreciation allowance

Section 12B of the Act, stipulates that a depreciation allowance can be claimed in respect of assets owned or purchased by the taxpayer in terms of an instalment credit agreement.

The following are included:

- Machinery, plant, implements, utensils or articles first brought into use by the taxpayer in the production of bio-diesel or bio-ethanol.
- Any machinery, plant, implements, utensils or articles used by the taxpayer for the first time in generation of electricity (not exceeding 30 megawatts) from sunlight, wind, gravity and organic waste.
- Improvements to any plant, utensils, implement, machinery, articles mentioned and used as described above.

The allowance in terms of section 12B is subject to the taxpayer using the asset for the purposes specified above, and the asset being utilised by the taxpayer for the first time. The allowance can, however be claimed on both new and used assets utilised by the taxpayer for the first time. The allowance is claimed in full in the year the asset is used even if for only part of that year. The deduction is calculated as half of the lesser of actual and market base in the first year of use, 30% in the following year and 20% in the last year. In terms of section 12C(6) of the Act, expenses incurred in moving or relocating a section 12B asset may be written off in the year in which they are incurred.

2.2.2 Environmental expenditure deductions

In terms of section 37B of the Act, a depreciation relief is allowed as a deduction to environmental treatment and recycling assets and to environmental waste disposal assets. Both groups of assets should be used in the course of the taxpayer's trade in a process that is ancillary to any manufacturing or other processes which are of a similar nature. They should also be required for purposes of fulfilling legal environmental obligations.

Section 37B (2) (a) of the Act states that environmental treatments and recycling assets are eligible for an allowance of 40% of whichever proves lesser between actual and market base and 20% in the three subsequent years. In terms of section 37B(2)(b) of the Act, the rate applicable to environmental waste disposal assets is 5% per annum that is a 20-year write off period. The rates of depreciation are based on the cost of the asset to the taxpayer. In order to obtain either allowance the assets should be new and unused. A

taxpayer cannot claim a deduction in respect of a qualifying asset if the asset is no longer owned by the taxpayer (section 37B (5) of the Act).

In terms of section 37B(6) of the Act, a deduction is also allowed for any expenditure or loss incurred in respect of decommissioning, remediation or restoration arising from any trade previous carried on by that taxpayer. An assessed loss attributable to expenditure and losses relating to decommissioning, remediation or restoration may be set off against the income of the taxpayer during a year of assessment even if a taxpayer is not carrying on a trade during that year.

2.2.3 Deductions in respect of environmental conservation and maintenance (section 37C)

In an effort to preserve nature and environment, a tax incentive regime has been introduced for the conservation and maintenance of a particular area of land on behalf of the Government. The new regime creates a mechanism for the deductibility of environmental maintenance and rehabilitation expenses as well as the loss of the right of use of land associated with biodiversity conservation and management. This is in terms of section 37C of the Act.

Expenditure actually incurred by a taxpayer to conserve or maintain land is deemed to be expenditure incurred in the production of income and for purposes of trade carried on by that taxpayer (section 37C(1) (a) and (b) of the Act), if:

- The conservation or maintenance is carried out in terms of a biodiversity management agreement that has a duration of at least five years and which has been entered into by the taxpayer in terms of section 44 of the National Environmental Management: Biodiversity Act No.10 of 2004.
- Land utilised by the taxpayer for the production of income and for purposes of a trade that consists of, includes or is in the immediate proximity of the land that is the subject of the agreement contemplated in the above paragraph.

In terms of section 37C(2), any deduction of expenditure is only allowed to the extent that the expenditure does not exceed the income of the taxpayer from the trade carried on in

respect of the land mentioned above. Any excess is carried forward to the following year of assessment and will be set off against future years' income from such land.

Expenditure actually incurred by a taxpayer to conserve or maintain land owned by the taxpayer is deemed to be a tax-deductible donation by the taxpayer in terms of section18A of the Act. The conservation or maintenance should be carried out in terms of a declaration, having duration of at least 30 years in terms of National Environmental Management: Protected Areas Act No.57 of 2003.

In terms of section 37C(5) If land is declared a national park or a nature reserve in terms of the National Environmental Management: Protected Areas Act and the declaration is endorsed on the title deed of the land and has a duration of at least 99 years, the taxpayer is deemed to have made an additional tax-deductible donation. This deemed donation amounts to 10% of the lesser of the cost or market value of the land per annum, for ten succeeding years counting from the year when the land is so declared.

2.2.4 Closure rehabilitation

Section 10(1)(cP) of the Act exempts 'the receipts and accruals of a company or trust contemplated in section 37A'. Section 37A of the Act, is applicable to a closure rehabilitation company or trust whose objective is to apply its property solely for rehabilitation upon premature closure, decommissioning and final closure and post-closure coverage of any latent and residual environmental impacts on the area covered in terms of any permits, right, reservation or permission granted to restore one or more areas to their natural or predetermined state. In term of section 37A (1) (c), the profits of such an institution may not be distributed and should be utilised for the purpose for which they were created. Any contributions made by a taxpayer to such a rehabilitation company or trust are tax-deductible.

2.2.5 Wear and tear rates on solar energy units

Interpretation note 47 (Issue 2), which is currently used in conjunction with section 11(e) of the Act to determine the write-off period of certain assets, determine that the write-off

period that can be used to determine the wear and tear claimable on solar energy units is five years.

2.2.6 Carbon dioxide emissions tax

The new 'environmental tax' on cars came into effect on the 1 September 2010 (as part of the environmental levy imposed in terms of items 151.01 of Part 3D of Schedule No. 1 of the Customs and Excise Act 91 of 1964). This tax applies to persons buying new cars that release over 120g/km and the applicable tax rate shall be R75 for each gram per kilometre above 120 g/km. As from March 2011, the tax also applies to double cab vehicles and shall be a tax rate at R100 for every gram per kilometre above 175 g/km thereby encouraging the purchase of vehicles that are more fuel-efficient and that emit less carbon dioxide. The National Treasury argued that the environmental tax is based on the 'polluter pays principle' and is intended to change consumer behaviour; therefore the National Treasury and industry recommended that dealers indicate the carbon dioxide emissions tax separately on the invoices. This tax was introduced due to the fact that the motor transport industry is responsible for a tenth of the world's carbon dioxide emissions. It was also introduced as a measure to support South Africa's commitment during the 2009 United Nations Climate Change Conference to cut emissions by 35% below current expected levels by 2020 *(*Van Rijswijck, 2011).

2.3 RECOMMENDED AMENDMENTS TO CURRENT LEGISLATION

2.3.1 Special depreciation allowance (section 12B)

The special allowance can be claimed for both new and unused assets brought into use by the taxpayer for the first time. This study recommends that section 12B of the Act should also specifically include sale and lease back assets.

2.3.2 Deduction in respect of environmental expenditure (section 37B)

With regard to environmental assets, section 37B(2) provides for an allowance of 40% of the cost of any new and unused environmental treatment and recycling asset in the year which the asset was brought into use and 20% in the three subsequent years. However, the rate applicable to new and unused environmental waste disposal assets is only 5% per annum that is a 20year write-off period.

This study proposes that section 37B of the Act should be amended to not only allow the allowance for 'new and unused' environmental treatment, recycling and environmental waste disposal assets, but to include 'used' environmental treatment, recycling and environmental waste disposal assets. Although it may be understandable that the environmental treatment and recycling assets play a bigger role in preserving the environment as compared to the environmental waste disposal assets (this being the possible reason for the extreme differences in the allowance rates applicable to these different assets). This study, however, proposes that the applicable rate available for environmental waste disposal assets should be increased to at least 10% per annum thereby allowing a ten-year write-off period instead of the current 20-year write-off period.

Specifically included in section 37B(5) is a clause that a taxpayer cannot claim a deduction in respect of a qualifying asset if such an asset is no longer owned by the taxpayer. This study proposes that section 37B of the Act should be amended to include sale and lease back assets.

2.3.3 Wear and tear rates on solar energy units

Interpretation note 47, determines that the write-off period that can be used to determine the wear and tear claimable on both solar energy units and portable generators is five years. Portable generators usually function on diesel, a much more harmful electricity generator than solar energy units. It is therefore suggested that the write off period for solar energy units be decreased to three years so as to encourage investment in electricity generators that are less harmful to the environment.

2.3.4 Carbon dioxide emissions tax

Currently the vehicle emissions tax (as per the environmental levy imposed in terms of items 151.01 of Part 3D of Schedule No. 1 of the Customs and Excise Act) is only applicable to passenger cars and double-cab vehicles, therefore this study proposes that this tax be extended to commercial vehicles, which are generally much less fuel efficient and have a higher carbon dioxide emissions rate than passenger vehicles. This view is supported by Van Der Merwe (2010:22).

However, according to Seegers (2010:1), another point to note on South Africa's carbon dioxide emissions tax is that government is penalising the purchase of new cars instead of tax incentives, such as a subsidy, to an investment in newer technologies, such as hybrids. South Africa can learn from Japan that offers tax incentives for vehicles with high fuel efficiency and low carbon dioxide emissions. The sector's carbon dioxide emissions in 2001 were 267 million tons, but by 2007 this decreased to 246 million tons, over-achieving the projected reduction target for 2010.

2.3.5 Deduction in respect of research and development (section 11D)

Expenditure which qualifies for a deduction in terms of section 11D(1) of the Act includes expenditure directly incurred by a taxpayer for purposes of the discovery of novel, practical and non-obvious information or the devising, developing or creation of any invention, design, computer program or knowledge essential to the use of such invention, design or computer program if that information, design, computer program or knowledge is of a scientific or technological nature.

The deduction that may be claimed by a taxpayer in respect of qualifying expenditure is equal to 150% of the expenditure incurred by that taxpayer directly in respect of activities undertaken in South Africa. The information, design, computer program or knowledge must be of a scientific or technological nature and must either be intended for use by the taxpayer in the production of his income or have been discovered , devised, developed or created by the taxpayer for purposes of deriving income.

This study proposes that this section of the Act should be amended to specifically include the research and development of renewable energy projects.

2.3.6 Additional investment and training allowance (section 12I)

In terms of section12I(2) of the Act, an additional incentive allowance has been introduced for the deduction of investment and training expenditure incurred in respect of industrial policy projects. A company may deduct an amount known as an additional investment allowance. The deduction available shall be equal to 55% of the cost of new and unused manufacturing assets used in an industrial policy project with preferred status or 35% in the case of any other approved industrial policy projects. A company may also claim a deduction known as an additional training allowance that is equal to the cost of training provided to employees in the year of assessment during which the costs are incurred for the furtherance of the industrial policy project.

This study proposes that this section of the Act should be amended to not only allow the additional investment and training allowance for industrial policy projects, but to specifically include renewable energy projects. In addition, with regard to the renewable energy project, this section should then not limit the allowance to only manufacturing sector projects but should apply to all renewable energy projects.

2.3.7 Tax concessions for investing in environment-friendly projects

Lester (2009:14) recommends that South Africans seeking to make a meaningful contribution to a cleaner country need a tax incentive that would assist Eskom in rebuilding a modern, environment-friendly energy grid. He proposes that South Africans should be encouraged to invest in environment-friendly projects by making these investments tax-deductible. In addition to this, Lester (2009:14) proposes that the growth in these investments should be tax-free where the cash out could be taken in the form of electricity credits (which can be applied against a taxpayer's electricity bill), or which can be tradable without any tax consequences on date of disposal.

In terms of the current South Africa tax legislation, any investments would be regarded as being of a capital nature and would therefore not be tax-deductible in terms of section 11(a) of the Act. However, the only tax break that one would qualify for in accordance with the eight schedules of the Act is that, upon disposal of the investment (assuming that the taxpayer does not trade in these type of investments), the capital gain/loss would be subject to capital gains tax at an inclusion rate of 66.6% and not 100%.

2.4 CONCLUSION

The existence of a strong case against the implementation of a blanket carbon tax system has already been alluded to in Chapter 2. Reasons varied from the need to keep an eye on South Africa's triple goals (i.e. emissions reduction, high economic growth and sustainable economic development) to an acknowledgement of the country's unique and fragile socio-political economic fabric. The chapter proffered specific suggestions to existing legislature targeting depreciation, environmental expenditure allowances, carbon dioxide emissions tax and deductions in respect of research and development. The gist of the suggested amendments includes maintaining if not lowering costs of production thus protecting company profits and protecting consumer disposable incomes all the while achieving emissions reduction targets. A more exhaustive exposition of the advantages and disadvantages of a tax mechanism in comparison with a cap-and-trade system are given in the next chapter. The basis of that analysis is relevance and adaptability in the South Africa context. Questions are asked of each method's fit into existing legislation and or ability to be piggy-backed by existing institutions from an administrative point of view without of course, sacrificing effectiveness.

CHAPTER 3

COMPARISON OF THE TAX MECHANISM VERSUS THE CAP-AND-TRADE SYSTEM

3.1 INTRODUCTION

When comparing the tax mechanism and the cap-and-trade system, the basis of comparison can be in terms of price efficiency (certainty/uncertainty), environmental effectiveness, coverage (industrial or economy-wide coverage), administrative and compliance issues, visibility of the tax and in terms of design structure. This implies an analysis of each system's suitability and adaptability to both existing structures and institutions, in both developed and developing countries as well as applicability to the South Africa context (Weisbach, 2008).

In determining the best way of achieving environmental goals in South Africa, a comparison of the carbon credit trading and environmental taxes should be examined. Speculation is rife in the media on which system would be more effective in South Africa (Temkin, 2006:2). It is one of the objectives of this study to establish the most suitable system.

There are two efficient methods of managing the risks associated with economic public goods, postulates Nordhaus (2005:5).These methods are:

- **Tax mechanisms** - use harmonised and predetermined levels or figures of taxation to police countries.
- **The tradable capping system** as provided for under the Kyoto Protocol and it makes provision for limits on emissions to be observed by member countries.

3.2 TAX MECHANISM VS CAP-AND-TRADE APPROACH

The challenges policymakers face with regards to quantitative environmental policy has largely eroded the fundamental advantages of the tax mechanism approach. The following are the differences between the cap-and-trade system and tax mechanism methods.

- The Kyoto Protocol is flawed in that it is detached from the economic cost-benefit strategies of GHG reductions. Tax mechanisms on the other hand, are more tangible and goal oriented. A further disadvantage of cap-and-trade systems under the Kyoto Protocol is that they tend to take a baseline approach ignoring flexible measurables such as unequal economic growth and ever advancing technology. This method of assessment (the 1990 historical base year) skews calculations and is punitive towards efficient and rapidly growing countries. On the other hand, a tax mechanism approach equalises both early and late entrants basing countries' efforts on a zero carbon tax level natural baseline.
- The regulation of tax methodologies has been shown to yield more efficient outcomes due in greater part to the higher sensitivity of the marginal costs of emissions reduction over those of emissions (Hoel & Karp, 2001:91-114).
- One of the most understated and disregarded problem with the cap-and-trade system is that they are much more prone to corruption than tax mechanism regimes particularly in less strict administrations. The fear is that tradable commodities are created in the process and if unchecked maybe abused by means of artificial shortages that can be bought and sold by corrupt leaders thereby harming environmental goals for a profit. A cap-and-trade system uses precise quantities of emissions, emitted by each and every relevant party, and as such is susceptible to financial tampering. The accounting scandals of the last decade in countries deemed to have impeccable legal records have exposed its weaknesses.
- Observing and accomplishment of a carbon tax approach is tremendously complicated in practice. Countries can create loopholes by offsetting taxation on emissions with obscure compensatory policies with adverse effects by the new carbon tax.
- From a global efficiency perspective, it is senseless for countries (for example some countries in Europe with soaring existing taxes) to add further penalties before countries with financial support comply with the carbon tax policy.

The view that a tax mechanism system is the optimal solution was supported by Kahn and Franceschi (2006:781) who further explain that the tax mechanism system has substantial advantages, which are hereby mentioned below:

- Uppermost is that the incentive to reduce emissions does not diminish with stagnating taxes. The system is doubly desirable as a result of its accommodation of the small polluter (households) increasing the likelihood of developing country participation.

- The lack of flexibility synonymous with controlled systems tends to heighten costs associated with emissions control. This is in stark contrast with economically incentivised schemes which enhance the cost of emitting. In simpler terms, technological innovations would have different results under the two systems. Whereas under the cap and trade system there is a noticeable lowering of the emissions permit, there is none in the emissions category itself (Kahn & Franceschi, 2006:781).

3.3 COP 2011

COP 2011, reconfirmed that the domestic action of each country to the Kyoto Protocol agreement shall take precedence over the mechanisms that can be used and such domestic action will accordingly comprise of a major part of the cap-and-trade system and reduction commitments under the Kyoto Protocol agreement, or any modification to it, for the purpose of decreasing release of such gases in the committed era 2013 to 2020 by at least [Y] % lower 1990 levels. In addition, the countries participating in the Kyoto Protocol agreement have been permitted to utilise any units created through the market-based system to assist them in attaining fulfilment of their cap-and-trade restraint and reduction pledges set in the agreement. Where one country obtains units from another country to the Convention, the obtained units will be deducted from the quantity of units in possession of the country transferring the units and included in the amount for the receiving country. (Framework Convention on Climate Change, 2012).

An accord by the parties to work towards developing a new legally binding cap-and-trade system by 2015, to be executed by 2020 was noted as the most significant achievement of COP 2011. An important feature of the accord that varies distinctly from the existing Kyoto Protocol is that it would apply to both developed and developing countries. A major flaw with the Kyoto Protocol was that it only obligated emission reduction commitments from developed countries, even though developing countries, such as China, Brazil, India, and Indonesia, are among the major carbon emitters. Although, it is pleasing to note that the

countries that met in Durban at the COP 2011 decided to develop a lawfully compulsory pledge that will affect all parties to the agreement and it moreover emphasised the need for better transparency and more accountability. However, one of the greatest challenges of the Convention is obtaining a process that will result in attaining the agreed outcome with legally binding implications applicable to all the parties. In addition, leaving it until 2020 may be seen as losing some valuable time before taking seriously the danger of climate change and making a decision as to some real action on a global scale (Business and the Environment, 2012).

3.4 VIEW TAKEN BY THE NATIONAL TREASURY IN THE DISCUSSION PAPER ON REDUCING GREENHOUSE GAS EMISSIONS

National Treasury (2010) found carbon tax as a very useful tool in order to derive consumption and production decisions from external costs. Such outcomes where most proficiently done by providing a standard tax rate equivalent to the marginal external cost of a single added GHG unit. A greater percentage of these marginal external costs perched in the $5 to $30 per tonne of carbon dioxide category. It is important when considering economic indicators to rectify failures of the market. Instruments like carbon tax are potentially more useful as compared to regulatory policy instruments in terms of efficiency. This is achievable given carbon tax creates incentives for lest cost activities aims at lowering emissions. An added effect would be the generation of revenues, ease of implementation *vis-a-vis* regulatory frameworks. It boils down to a seamless integration of external negatives into consumer pricing that trigger behavioural change (National Treasury, 2010).

A tax mechanism would have certain administrative advantages over the cap-and-trade system such as lower visibility of the tax to the current revenue authority. The costs would also be expected to be lower given the lower involvement of entities. The mechanism is also likely to be safer due to its simplistic structure, which tend to alleviate the administration load as no entirely new accounting systems are required. It is unlikely that a carbon tax would fix cap-and–trade system values in the short term, however if gradually introduced over a period it would set firm signals for both producers and consumers to change behave over the medium to long term (National Treasury, 2010).

An evaluation of tax mechanism and cap-and-trade system as per the discussion paper are summarised in Table 2.

Table 2: Comparison of tax mechanism and cap-and-trade system

	Tax mechanism	Cap-and-trade system
Carbon Pricing	Price fixed over elongated periods. Greater flexibility in time terms to achieve reduction.	Price uncertainty – high volatility Subject to quantum of permit. Rigid time frame for adjustment.
Effectiveness	Targets for emissions retardation are unpredictable.	More predictable outcomes due to capping of emissions.
Coverage	Extends the length and breath of the entire economy except volatile industries	Coverage typically superior for high emitters
Compliance and administration	Reduces costs by a current system.	New institutions necessary for tax accounting. Drawn out permit discussions.
Prominent of tax	Extrovert tax level setting.	Concealed cap-and-trade system costs.
Structure	Engages reflection of the point of collection, tax base, mitigating process and price level.	Necessitates reflection of point of obligation, level of the cap and scheme coverage.

Source: Goldblatt, M (2010).

3.5 SOUTH AFRICAN APPLICATION

For developing countries to implement a cap-and-trade system, a sufficient organisational structure is needed. Transparency is the watchword and this would foster the model of operation of the body and membership in terms of emissions, their valuation, submission and auditing. The energy sector is a likely problem area in the South Africa context because of the mammoth oligopolies existing there (National Treasury, 2010).

It would seem then that a domestic emissions trading system would not be a fitting policy to a developing economy such as South Africa's in attempting to stem the tide of climate

change in the foreseeable future. The reasons include but are not limited to a moribund administrative system, the unpredictable nature of environmental outcomes which are region based, uncertain business costs and the controversial nature of specified targets (National Treasury, 2010).

3.6 CONCLUSION

From a South Africa government perspective the tax mechanism approach seems to offer far greater flexibility than the cap-and-trade system. However, South Africa needs to conduct a more detailed and specific fact-based study on how best to implement the tax system without decimating company profits which would in turn result in job losses. Certainly, the funds generated thus should be reinvested into research and development by the same companies into cleaner and more renewable energy forms. This would ensure that viability is not curtailed and a balance is struck between governmental objectives and the private sector goals. An assessment of the tradeoffs between tax mechanisms in Malaysia and Denmark can lead to the devising of the best possible environmental tax system in the South Africa context.

CHAPTER 4

ENVIRONMENTAL TAX IN MALAYSIA

4.1 INTRODUCTION

Both Malaysia and South Africa are regional powers burdened with providing employment and regional stability. The similarities do not end there, as both countries have relatively large populations and an abundance of natural resources and economies forged out of agro-mining and later out of manufacturing (United Nations Conference on Trade and Development, 2011). Malaysia invested heavily in education and human capital and earned a reputation rivalling Singapore as a human skills centre. Now both countries are huge contributors to global emissions due to a peculiar dependence on fossil fuels for electricity generation, heating and transportation. Although South Africa has made progress with respect to public awareness of the acute shortage of power, an investment in alternate forms of renewable energy is still lagging behind and Malaysian policies may be emulated here.

Malaysia‘s grand vision is to attain developed country status by 2020 (Solangi *et al*., 2011:2149-2163).The area it has targeted to readdress resembles South Africa’s goals in addressing its own social, environmental and economic situation. A commitment was made at the Copenhagen Summit to bring down emissions to the 40% mark, this being a derivative of the 2020 GDP. The service sector pollution footprint is clearly visible in electricity, heating and transportation contributing 32% and 17% respectively (Solangi *et al*., 2011:2149-2163).

The Malaysian tax regime is now explored in more detail as well as an evaluation of the plans and policies implemented by Malaysia to stimulate renewable energy usage and how successful these plans and policies have been.

4.2 MALAYSIA'S RENEWABLE ENERGY PLANS AND POLICIES

According to Hashim and Ho (2011:4780-4787) current emphasis sees Malaysia attempting to develop policies (renewable energy) aimed at reducing fossil fuel dependency. The Malaysian government is now pushing towards energy diversification in order to alleviate problems associated with global warming and ever rising petroleum prices. The last decade has seen the introduction of a myriad of programmes and measures aimed at incentivising usage of alternative renewable energy forms (Hashim & Ho, 2011:4780-4787). This in itself can be a lesson for South Africa that policies, checks and balances are as important as economic indicators.

The Malaysia's eight Plan which covered the period from 2001 to 2005, is explained by Hashim and Ho (2011:4780-4787) as an attempt to promote renewable energy use and address concerns arising from climate change. The recommended renewable energy forms meant to provide a target of 350megawatts of electricity are bio fuels made from common municipal waste, solar and mini-hydro installations that can be integrated into the national grid (Hashim & Ho, 2011:4780-4787). The ninth Malaysian Plan which covered the period from 2006 to 2010 sought to enhance usage of renewable energy and naturally occurring energy sources native to Malaysian such as palm oil, residue rice husks and wood. Furthermore the photovoltaic (mainly solar energy development) and an educational centre (mainly to boost knowledge of the importance of renewable energy to the public as part of training and education) were introduced as part of the Malaysia's ninth plan.

The theme of sustainable development resonated with the Malaysia's seventh plan which covered the period from 1996 to 2000 whilst the eighth plan stressed renewable energy. In a period stretching fifteen years an investment worth over RM150million was provided for research and development to institutions of higher learning and to industry, focusing on the development of technology to harness natural gas, solar and wind energy. The fact that Malaysia continues to explore its renewable energy objectives and reaffirm its commitment to global solutions is best observed in Malaysia's tenth plan which covers the period from 2011 to 2015. The threshold value of over 980megawatts by 2015 is envisaged and this would total five and a half % of Malaysia's entire energy generation mix. Prominent new

initiatives under this plan were the FIT programme and the renewable energy fund. (Hashim and Ho, 2011:4780-4787).

4.3 THE EFFECTIVENESS AND OPERATIONS OF FEED-IN TARIFF

Feed-in Tariff (FIT) has been a welcome revelation as an efficient tool to promote renewable energy as opposed to quotas and other minimalistic incentives or pro-voluntary schemes. Forty countries have integrated FIT with success including two of Europe's largest economies (Spain and Germany). FITs are payments for every use of power generated by renewable energy in kilowatt/hour. FITs thus takes the form of incentives or money back schemes as motivation for going green (Hashim & Ho, 2011:4780-4787).

The National Renewable Energy Laboratory in Newsroom (2009) outlined key factors which ware critical in the effective implementation of FIT: stability, long term contract and adequate prices. A minimum of five years is required before results can be observed and a further 15 to 20 years should be allowable for investor recoupment. The advantages of FIT include reduction of GHG emissions, more employment prospects, and generation of fast, low-cost use of renewable energy, superior investment markets and security as it is not used up. Consequently, FIT is deemed to be the most effective renewable energy strategy.

4.4 CONCERN AND CHALLENGES OF RENEWABLE ENERGY FOR POWER GENERATION

Educational, technical, institutional and regulatory obstacles are the main factors that could potentially hinder the progress of renewable energy and therefore need to be attended to by the Malaysian government so as to achieve the anticipated feasible development (Ali, Daut & Taib, 2012). The pricing of renewable energy systems would be extremely high given that the costs involved in the research and development of are high as the majority of renewable energy products and technology are modern. Banks and creditors are generally reluctant in financing renewable energy ventures due to the fact that the repayment period may surpass their potential. The majority of renewable energy ventures are unappealing to prospective financiers as they entail high preliminary investments in comparison to inexpensive conventional energy resources (Ali *et al*., 2012).

Technological hurdles such as different climate conditions and trends of supply sources may require unique equipment and systems set-ups for the country in comparison to the others. This implies that proven renewable energy projects in one country might not be suitable for another country as an example of solar, biomass, wind and ocean between countries in the tropical and temperate regions. Lack of local expertise in efficient handling equipment and systems are also a barrier to ensure stability on the renewable energy supply. Training and educating the personnel add to costs and longer time constraints to realise on the project.

The expansion of the renewable energy growth sector may be achieved through tax cuts, incentives and higher selling tariffs for renewable energy power generation by the regulatory bodies. Government subsides should be redirected from the conventional fuel sources to renewable energy sources. Furthermore, the partnership of the government and private sector in the renewable energy area would be beneficial in exploring the technological feasibility and industrial viability of a renewable energy ventures (Ali *et al*., 2012).

Knowledge of the environment and future energy crisis should be made available to the public in order to appreciate Malaysia's future energy development. If the community is not well informed of the renewable energy technology initiation, it may cause undesirable results and complaints since the new technology well fall short of their expectation level. The tourism sector may however be negatively affected by the development of renewable energy for instance mini-hydro units, solar and wind farms as they may be detrimental to the water streams of the location and the attractiveness of the scenery.

4.5 WAY FORWARD FOR RENEWABLE ENERGY

Mustapa, Peng and Hashim (2010), concur that the renewable energy restructuring may fall foul in Malaysia to a host of barriers that are fiscal, technical, regulatory and institutional and need to be attended to for renewable energy growth to be viable as mentioned. However, they suggest that government leadership, financial tools, renewable

energy policy and social responsibility may be considered as the way forward for renewable energy. These suggestions are discussed below:

- **Government leadership:** The Government is viewed as the driving force in implementing suitable renewable energy policies; however the involvement of the business community would complement the renewable energy programme. By introducing the National Green Technology Policy, Malaysia was able to convert into a green state and encourage viable growth. This strategy promotes the reduction of GHG emissions and encourages the utilisation of renewable energy. Through the implementation of this policy Malaysia experienced less destruction of the environment. The government setup a fund that issued low interest rate loans to companies that provided and made use of green technology. With more information on environmental conservation being available patrons will ultimately opt for technology that is environmentally friendly to the gain of the country (Mustapa *et al*., 2010).

- **Financial tools:** Through its promotion of the Clean Development Mechanisms Malaysia witnessed an improvement in the execution of environmentally friendly expertise and reduction in the reliance on fossil fuels. Therefore the Clean Development Mechanism is regarded as an economic tool that furnishes monetary contributions so as to aid renewable energy projects (Mustapa *et al*., 2010)..

- **Renewable energy policy:** FIT was introduced as part of the renewable energy strategy due to the exorbitant costs of renewable energy which hinders the renewable energy implementation. The renewable energy policy delivers the means and money to make renewable energy a vital element of the country's energy blend, prevail over technological difficulties, tackling active market malfunctions, and reduces costs. It is imperative to create an operating turf where all energy resources can perform at par as there is significant aid for common energy sources in the forms of grants. The introduction of the compulsory FIT has provided renewable energy policy with leverage over the conventional energy sources. The system is intended to modify the attitude of consumers which is based on the ''polluter-pays'' belief. It is government's responsibility to deject ecological destruction and to make certain that polluters pay for

the harm they have caused. It is deemed that consumers would be less expected to cause pollution if they were obliged to pay for it (Mustapa *et al*., 2010).

- **Social responsibility:** While a renewable energy activity strategy is imperative, its success hinges on other factors. It has to be sold to the society and other agencies over a lengthy period. Compromises are necessary from all stakeholders including the government arms and the private sector, through social responsibility efforts and longer return periods. With the introduction of FIT, the threshold value of costs changes and creates new challenges. A counter balance to redeem these higher costs is stimulating demand (markets) which ultimately lowers costs. All stakeholders must be compelled to partake by means of regulatory guidelines if Malaysia is to progress in a quest for a low-emitting society (Mustapa *et al*., 2010).

4.6 MALAYSIA'S GOVERNMENT EFFORTS AND COMMITMENT TO GREEN DEVELOPMENT

Lee (2010:1) points towards the shift of focus by the Malaysian government towards going green, acknowledging the ultimate price on the environment and society as a whole if green technologies are left unimplemented. This emphasis on a distinct green technology policy should be emulated by the South Africa authorities if it intends to meet its 2020 goals on emission reduction. Previously attempted tax incentives by Malaysia mirror incentives implemented in South Africa with respect to accelerated depreciation and total write-off of investment tax allowances for capital savings expenditure and building incremental cost exemption.

The seriousness of Malaysia is evident in its long-term commitment to promoting green initiatives. The burden of payment must be borne by the actual polluter as outlined in the Green Technology Fund (Lee, 2010:1). Public awareness and cooperation are essential for the success of this initiative. This has already taken shape in South Africa as is reflected by Eskom's (a South African electricity public utility) televised energy consumption monitoring (Eskom,2012) as well as recycling campaigns and facilities ran by organisations such as Greenworks (Greenworks,2012), Clean-up South Africa(Clean-up South Africa 2012) and Industrial Development Cooperation (IDC, 2012) and resources

in communities and at workplaces which are seen in corporate organisations such as the new Absa Towers West building which achieved the first five star green building status in South Africa (Absa ,2012) .

According to Ali *et al*., (2012), the three primary energy objectives which guide future development from which South Africa can learn and adapt that were ushered in by the Malaysian National energy plan are:

- The supply goal-requires provision of enough guaranteed but cheap energy supplies from local materials.
- The utilisation goal-demand to use these green energies must be promoted or raised.
- Environmental goal-curtail harmful impacts of production and transportation on the environment.

4.7 KEY LESSONS SOUTH AFRICA MAY LEARN WITH REGARD TO TECHNOLOGY TRANSFER AND CO-ORDINATION OF GOVERNMENT

Craven (2010:6943-6950) identified the two themes highlighted below relating to Malaysian success in being the universal leader in production of palm as a key lesson for technology transfer and demonstrating the broad and precise co-ordinated Malaysian government efforts. Emphasis on value addition has seen Malaysia become a world beater in the production of palm stearin which is virtually indispensable in the food sector manufacturing process. These key lessons are detailed below.

- **Governance**: The most commonly credited single factor in Malaysia's success story is good governance. That a fairly new state succeed in implementing radical reforms, must be applauded and mention be made of the requisite strength of purpose and monitoring ability of relevant custodian institutions on all levels, political, financial and on the grassroots level. Another reason for this success has been the close co-operation between government policy makers and the private sector players' right from the beginning. Their cooperation was essential tool for attracting investment in technological development (Chandra, 2006; Rasiah, 2006).

- **Investment in human capital and research**: 70% of Malaysian's oil processing firms have attributed their success to direct investment in research and development by government. This brings to the fore the need for a myriad of working relationships with all stakeholders including institutions of higher learning. Uppermost however is the underpinning of that investment with a solid backing of investment in human resources. The government for a sustained period covering half a century tended heavily in education, research, skills training and employment creation (Rasiah, 2006).

4.8 THE POSSIBILITY OF A CARBON TAX IN MALAYSIA

Nurdianto and Resosudarmo (2011) developed a multi-country matrix for the Association of Southeast Asian Nations (ASEAN), which was meant to analyse regional pros and cons of collaboration within member states, essentially if done uniformly. They further utilised the Inter-Regional System of Analysis for ASEAN (IRSA-ASEAN) model to consider a host of economic factors and their impact on implementation. Their findings revealed that there would be a trade-off between this environmental success and the GDP growth which would see social welfare facets reduce, including disposable income per household. Philippines, Malaysia, Vietnam, Singapore and Thailand are the main members of ASEAN. Observations of variations of mechanisms are observable and allowable in this model.

In the IRSA-ASEAN model, aside from the typical increase in government expenditure due to revenue generated from the newly existing carbon tax, there are two other alternatives in which the government may use the revenue to gain a double-dividend:

- Firstly, government may directly transfer part, or the entirety, of the revenue obtained from the carbon tax to households in order to increase social welfare.
- Secondly, the government may use the revenue to cut production taxes to generate a less distortionary tax system (Nurdianto & Resosudarmo, 2011).

In their findings Nurdianto and Resosudarmo (2011), stated that with regard to Malaysia, although carbon tax is a positive environmental factor, it is costly as it shrinks the economy. In other words Malaysia more or less has little else motivating the adaptation of carbon tax other than environmental gain. However Nurdianto and Resosudarmo (2011), concluded that implementing a carbon tax in ASEAN is no longer a question of whether it

should be implemented or not; but a question of how to implement such a scheme to obtain the most benefit in terms of economic growth , equity and environmental improvement. The introduction of the ASEAN community is imminent meaning harmonisation of various policies are necessary and because some of the ASEAN members rank high as GHG polluters to the extent that a response is immediately necessary if emission levels are to be curbed (Nurdianto & Resosudarmo, 2011).

However Nurdianto and Resosudarmo (2011) furthermore submitted that a win-win scenario was not always attainable within the ASEAN group, when a combination of carbon tax and recycling policy are employed. Quite often it is possible to experience a contraction in GDP of these countries. In addition countries react ostensibly different to carbon tax, an across the board system would produce ‘victors’ and ‘vanquished’. Losses in such countries would stem from further distortionary taxation while the gains would be realised in the environmental sectors. Industry is also forced to streamline operations making it more efficient and this eases the negative impact of additional tax (Nurdianto & Resosudarmo, 2011).

4.9 CORPORATE RESPONSIBILITY IN MALAYSIA

According to Yap (2010), harmony achieved among stakeholders and both foreign and local companies, indicates a high level of corporate accountability when compared with continental players exclusive of South Korea, China, Japan and Singapore. Government took a bold step in making it compulsory to report corporate responsibility measures annually.

Corporate responsibility aligned activities target matters such as control of pollution, less simplistic systems like carbon tax credit and these monitor and render corporate accountable. The Malaysian government has also committed to the corporate responsibility theme by accommodating its integration to business survival within the fiscus. It is critical to influence the paradigm shift of leadership to view corporate responsibility as an integral part of company operations and not an end of year gesture or quota fulfilment (Yap, 2010).

4.10 CONCLUSION

Good governance, an investment in research and human capital, a distinct green policy and committing to cleaner energy technologies would ultimately lead the way for South Africa as it has for Malaysia. The long-term benefit of investment in research and human capital is one of the most important lessons to be gleaned from the Malaysian case by South Africa. Ultimately a holistic approach encompassing good governance, a distinct green policy, investment in researching alternative renewable energy technologies and human capital, skills and the crucial need for public awareness should be considered and implemented by South Africa in order to achieve its carbon emission reduction targets. There are parallels to be drawn from the East and South-eastern Asian economies response (or lack thereof) especially from Malaysia to carbon tax implementation. Given the similarities for both South Africa and Malaysia, it is vital that South Africa softens the impact of the carbon tax policy on economic growth targets and household incomes. Therefore it is imperative for South Africa to draw inspiration on how to incentivise implementation of carbon taxing without hurting the economy. The next chapter analyses the Danish tax regime in detail and identifies concepts and policies that can assist South Africa in its plan to improve its current environmental tax regime.

CHAPTER 5

ENVIRONMENTAL TAX IN DENMARK

5.1 INTRODUCTION

In this chapter, a Danish case study is analysed to assess how Denmark managed to introduce carbon tax without negatively affecting its economy, employment figures, company profits and competitiveness.

5.2 CARBON TAX IN DENMARK

Danish experimentation with various forms of taxation is well documented from as early as the beginning of the 20th century, when petrol tax was introduced. By the end of that century Denmark was driven by the need to save resources (both energy and environmental wise) and this led to an increase in the range of product under levies. These were remodelled in 1991 into more specific energy and carbon taxes in line with Danish environmental fears. This tax system has gradually extended with most of the revenue directed at addressing energy efficiency issues. Further reforms ushered in environmental tax which emphasised resources utilisation rather than income generation. (International Energy Agency, 2012:1).

Prasad (2008:1-2) states that Denmark is one state where carbon levies have brought about significant cuts in emissions, these falling by about fifteen % per capita over a fifteen year period from 1990. This was achieved in spite of aggressive economic gains and no nuclear dependency for power. There are numerous factors to its achievement, but collectively taken, the lesson provided is emissions cuts are driven most when carbon is levied but not collected. The urge to maximise revenue is resisted by Danish authorities, instead proceeds resurface as subsidies in the quest for innovative environmental technologies and solutions ensuring the economy retains a competitive advantage.

5.3 KEY ASPECTS SOUTH AFRICA SHOULD CONSIDER FROM DENMARK BEFORE IMPOSING CARBON TAX

Amongst the most important considerations to be made by South Africa before deciding on introducing carbon tax are the effects carbon tax had on the Danish environment. There were extensive affirmative impacts born out of the environmental tax system (Danish Energy Authority, 2002:1-12). Most Danish companies have advanced more efficient energy models, curbed consumption and replaced fuels high in sulphur and carbon content. The four % cutback target of 2000 was achieved partly (i.e. 50%) as a result of these carbon tax levies while the other half can be credited to subsidies and policies in place (Danish Energy Authority, 2002:1-12).

South Africa should be particularly wary of tax effects on the economy given its volatile labour force and trade unions. In Denmark the amplification of production costs by less than half a % of gross national product can be considered a success as there were no adverse effects on industry as a whole. The consideration would be the effects taxes would have on employment figures, disposable income and South Africa's balance of payments.

It is encouraging again for South Africa to note that environmental tax reforms in Denmark have had minimal effect on the competitiveness of its companies. The major factor for this is that environmental taxes were off-set by rebates and incentives from the same revenue base. More likely to cause a stir would be interest rates and inflation or higher wage demands in South Africa. The significant administrative expenditure experienced by the Danish government during it first years of launching environmental tax, should be taken into account when considering introducing carbon tax. However, it should be noted that the administrative outlay in Denmark has decreased substantially (Danish Energy Authority, 2002:1-12).

5.4 FACTORS INFLUENCING INVESTOR CONFIDENCE AND SOCIAL ACCEPTANCE CONCERNING RENEWABLE ENERGY

Denmark currently tops the world with 33 % market share of wind turbines and wind technology exports. It has one fifth of her wind farms tapped into the national energy grid which is the highest of any country. Its success is attributable to the prevalence of the following factors that create conditions where socio-political, community, and market acceptance of renewable electricity technologies will occur. (Sovacool & Ratan, 2012):

- **A strong institutional capacity**: The Danish government has long had an affinity for wind energy and this is reflected in its policies since the Danish Ministry of Energy was established in 1979. This support has manifested itself by way of subsidies, FITs and a broad stakeholder involvement.
- **Political commitment**: The Danish government policy has been accused of inconsistency and ineffectiveness particularly in their promotion of wind and other renewable energies.
- **Favourable legal and regulatory frameworks:** To curtail the costs of grid connection in Denmark, wind turbine owners bear the costs of interconnection whereas utilities must cover all costs relating to transmission access of distribution. Operators are legally obliged to expand the grid and connect wind power where required. The objective of taxes has always been to ensure that the costs of renewable energy research are borne equally by the society of electricity consumers as are the benefits (i.e. displaced imports, better jobs and economic competitiveness).
- **Competitive installation and/or production costs:** Based partly on strong winds and favourable detailed and precise conditions, as well as a robust domestic manufacturing hub, installation and production costs for wind energy in Denmark are competitive. Even though wind turbines generate electricity intermittently, and have a capacity factor below 40percent, they still generate electricity more cheaply than most coal and fossil fuelled plants in Denmark. Since wind farms can be completed much quicker than other types of power plants, and are not reliant on imported and carbon-intensive fuels, they are highly competitive in the Danish electricity market. According to participants, over the 25year period from 1980, the charge per kilowatt hour of Danish wind turbines

reduced significantly and now produce 180 times additional electricity at one fifth of the expenditure incurred.

- **Information sharing and feedback:** Dedicated institutions emerged to promote the establishment of several points of direct sharing and learning. This interactive model of feedback enabled the concentration of a plethora of small competitors to push the boundaries in wind technology with innovative new blade designs, lighter materials with higher tensile strength and better structural design.
- **Access to financing:** Investment subsidies were provided from as early as 1980 and these gave money-back to any investor in wind turbines and individual municipal or communal. These were set at 30% of capital installation expense. Local manufacturing was also encouraged by the provision of capital financing in the long-term to users of local components.
- **Communal and individual ownership:** Entrepreneurs became ‘‘do-it-yourself’’ builders encouraging communities to own and operate wind turbines themselves. By 2007, individual and communal ownership stood at 90%. Local recognition is necessary to successfully operate wind turbine as ownership limitations have a distinct connection with local recognition and is influential on behave and mind-set of the community.
- **Participatory project sitting:** Danish political institutions have also incentivised participatory methods of project sitting. This system of governance ensures that many energy policy decisions, especially relating to wind farms, are made at the local rather than national level resulting in high levels of participation.
- **Positive public image:** Danish researchers emphasised the importance of local ingenuity and skill in gradually scaling up turbine designs, creating a product quickly associated with Danish culture and a strong brand presence.

5.5 LESSONS TO BE LEARNT FROM THE EFFORTS OF THE DANISH GOVERNMENT IN ENERGY MANAGEMENT

The primary target of the Danish government is to eliminate usage of fossil fuels altogether by halfway through the twenty first century. In the short term however, more realistic goals have been set such as achieving 30% quota of renewable energy a quarter ways through this century. This assimilation of cleaner energy systems meant Denmark did not suffer

much during the oil shortage of the seventies. The focus by the Danish energy system towards a comprehensive energy mix for heating and power has freed Denmark from a 95% dependency on imported oil, to other forms of renewable energy. (The Danish Government, 2011).

An outline of broad outcome based initiatives by Denmark was provided by KLIMAOG (2009). There were designed to power the go-green shift. As emphasised in the 2008 agreement, growth of renewable energy and savings were initiated. The full spectrum of tax reforms sought to introduce a more well thought out green levy system reducing carbon dioxide emissions. Construction subsidies availed funds for energy savings and construction of buildings as well as renovation work. This push towards tighter by-laws for buildings was presented in 2009 and included a long-term cleaner transport plan for roads and rail utilising sustainable energy technologies (KLIMAOG, 2009).

5.6 FEED-IN TARIFF POLICY IN DENMARK

Lipp (2008) points out that FITs encourage renewable energy investment by providing financial incentives at a fixed rate per energy unit for a fixed period of time. This creates investor confidence by guaranteeing rates and minimising investor risks. According to Langniss, Diekmann and Lehr (2009:37), some of the characteristics that can influence the rate of the tariff include: technology type, size or application, resource or site, length of payments, how often the policy is reviewed, inflation, adjustment and degression. Wile and Corscadden (2010) found that successful FITs must provide a reasonable return on investment of at least five per cent above the generation costs. Tariff rates can also be chosen to stimulate investment in an individual technology since a higher rate provides more incentive for investment in certain renewable energy projects, however a tariff that is set too high is costly to society and can be a burden to electrical consumers. Söderholm and Klaassen (2007) have reported that tariffs that are set too high can actually promote installations in areas of low resources (i.e. low wind speeds), reducing the incentive for investors to minimise project costs.

The concept of a FIT policy is simple, yet developing a FIT policy proves to be a difficult process due to competing policy objectives such as maximising renewable energy

generation, reducing GHG emissions, encouraging investor uptake while minimising the cost to the ratepayer. Most successful FIT policies tend to base tariffs on generation costs. Factors considered when setting rates include capital investment and associated costs (licensing etc.), operating and maintenance costs, inflation, interest rates, profit margins and investor confidence (Mosher & Corscadden, 2012).

Findings by Mosher & Corscadden (2012) indicate that major challenges associated with determining FIT rates include upfront administrative costs, ensuring rates would not be too high or too low to encourage or discourage investor development and ensuring the policy is simple enough to encourage investors while at the same time allowing for periodic revisions, inflation and degression within the policy. Degression occurs when tariffs are reduced periodically to account for a decrease in costs over time due to the decrease in technology costs as the technologies mature and implementation increases. Another challenge with setting FIT rates is controlling the total cost of the tariff to society. The cost of the FIT programme is usually weighed against economic benefits and the impact new jobs would have on the economy. Capacity limits can be implemented to mitigate the risks of an expensive FIT policy. Policies need to be reviewed and updated regularly to ensure the tariff is meeting the policy's objectives. Revision is typically performed either periodically or adjusted when capacity targets are reached. However, it can be beneficial to consider the installed capacity by an individual sector, to determine the effect the policy has on different stakeholders in the economy (i.e. consumers, business, farmers etc.).

Toke, Breukers and Wolsink (2008) found that the countries that were most successful in local ownership of wind projects (i.e. Germany, Denmark and the Netherlands) have implemented FITs. Denmark has successfully implemented a FIT that has substantial agricultural participation, with 64% of wind turbines being owned by farmers and over 60 small farm biogas plants, in addition to 20 large, jointly-owned renewable projects (with farmers and investors) in 2003. Allowing small, private investors the opportunity to partake in wind investments has substantially increased wind power deployment in other countries, especially Denmark.

There is an inherent complexity associated with FIT development as is explained by Lesser and Su (2008). Policy-makers have to state qualities of FIT at administrative level

especially the quantum of payment for separate technologies (i.e. solar, wind and thermal). Duration and structuring of these levies must also be specified. A fair amount of estimation is required with particular reference to unforeseeable market conditions or rate of adoption of technologies. Yet Lipp (2007) in arguing the advantages of FIT sites the ability to separate various technological aspects, their development and costs. In addition FIT does not stifle competition but actually drives costs down.

FIT use has distinct benefit that user countries may expect to derive. The drive towards renewable energy sources is primarily meant to safeguard against shortages or fluctuation in supply of fossil fuel (Lipp, 2007). In addition, emission reduction protects against environmental degradation and associated consequences, whilst being adept in alternate technology creates a niche industry with potential export potential and skills empowerment. For instance, the current consensus amongst experts is that wind technology has attained global competitiveness versus conventional energy if only subsidies for the latter could be removed and if the cost of their environmental harm could be factored in.

5.7 CENTRALISATION AND DECENTRALISATION STRATEGIES

The Danish outlook on energy is pivoted on renewable energy sources. The emphasis is to localise planning as much as possible, thus local energy authorities are expected to adopt and refine this idea in various local perspectives. Concurrently the state is required to offer municipalities planning tools and create a matching planning structure, thereby simultaneously centralising and decentralising execution of the hundred % renewable energy ideas (Sperling, Hvelplund &, Vad Mathiesen, 2011).

The following were identified as necessary elements required to achieve the aforementioned vision (Mathiesen, Lund & Karlsson (2011) :

- a long-term energy demand reduction;
- a general increase in energy efficiency;
- an expansion of installed renewable energy capacity; and
- balancing energy supply and demand through developing more intelligent energy systems.

Table 3 below organises activities by relevance and suggests the level at which this may be useful. Highlighted in green are those activities that may already have been localised for planning or have at the very least been outlined at institutional level therefore local planning is inapplicable. Grey areas reflect what is largely uncompleted at institutional and local level.

Table 3: Dissection of responsibilities between the government and the municipalities

Focus area	Central level	Local level
Wind power	• Draft long-term policy with concrete expansion targets • Provide stable financial support scheme • Secure involvement of and acceptance among local population • Develop appropriate planning guidelines	• Draft municipal wind power plans • Locate and plan wind power sites in cooperation with local population • Support local initiatives and deal proactively with protests
District heating	• Establish appropriate district heating tariff structure in favour of e.g. the complete conversion of district heating to renewable energy; energy savings in houses located in district heating areas as well as continuous energy savings in the district heating network; and 'wind-friendly' district heating with heat pumps etc. • Clear policy on how to convert natural gas areas and all other individual, fossil-fuel heated buildings • Clear guidelines and necessary (spatial) information for integrated heat planning in the municipalities	• Carry out municipal heat planning in combination with e.g. strategic municipal energy plans • Local subsidy and tariff schemes that accelerate connection of buildings to district heating • Municipal utility companies as key players in implementing energy savings in the district heating network
Energy savings	• Continuous revision of the building code, spatial planning regulations and energy labelling of buildings standard in relation to national energy savings targets • Clear plan for implementation of energy savings in existing	• Local spatial planning in accordance with highest possible energy efficiency requirements for new buildings • Plan for reduction of energy demand in existing public and private buildings (as part of the heat plan/strategic municipal

	buildings • Financial support schemes, tax relief and green property taxes for energy efficient refurbishment	energy plan) • Build partnerships between local craftsmen, credit banks, utility companies, building owners and residents to offer straightforward solutions for energy efficient refurbishment
Electric vehicles	• Long-term objectives for replacement of existing vehicle fleet (partially) with electric vehicles on the basis of an integrated strategy for a 100% renewable energy system, deadline for complete phase out of vehicles based on fossil fuels • Financial support schemes, tax relief, scrapping schemes etc. • Technical standards to support energy system regulation and balancing (e.g. smart charging and/or vehicle-to-grid charging)	• Municipal electric vehicle charging infrastructure plans • Introduction of electric vehicles in public authorities, parking spaces for electric vehicles • Local plan and incentive programmes to shift to electric vehicles in private transport
Intelligent energy system	• General long-term policy on the integration of intermittent renewable energy sources into the energy system, general grid stability and maintenance of transmission lines • Technology-specific actions plans and standards regarding e.g.: intelligent household appliances, energy storage, flexible electricity/heat tariffs, smart grids • Appropriate tax and tariff system to support handling of peak electricity production and integration with heat and transport sectors • Guidelines for how to integrate the issue into strategic energy planning in the municipalities	• Strategic municipal energy plan with a focus on system integration • Local utilities need to prepare for the introduction of flexible tariffs and expansion of regulation and storage capacity at production units
Biogas	• National long-term action plan for the sustainable utilisation of biogas (in relation with a general sustainable biomass strategy) • Financial support schemes (e.g. FITs) and at least fiscal equality between natural gas and biogas, removal of barriers for distribution in gas grid	• Draft local biogas strategy, assess local biogas (and biomass) potential in cooperation with e.g. the local utility and agricultural organisations • Locate and plan biogas plant sites in cooperation with farmers and the local population

Source: Sperling *et al*, (2011).

To implement a successful local energy plan within national energy objectives it's imperative that there is a shift from localised planning towards a holistic approach. This requires an emphasis shift from 'parallel planning' to a more strategic form of implementation where both central and local energy objectives are aligned. The keywords in achieving these ideas of harmonisation are decentralisation and simultaneous localisation of strategic thinking. A totally decentralised renewable energy system is achievable only if the local municipalities are not only given the mandate and authority to plan but are also supported resource-wise and by national strategic guidelines (Sperling *et al.,* 2011).

5.8 CONCLUSION

Denmark demonstrates valuable lessons to South Africa as to the significance of an unwavering renewable energy plan and the emphasis that should be placed on local ownership. It also provides lessons as to how South Africa can incorporate renewable energy within society, not just theoretically. South Africa would need to integrate the various areas influencing the renewable energy strategy, which basically are political, cultural dynamics, social, incentives and ownership within the local community. South Africa can emulate the wind co-operatives, the FIT support scheme, and the political decision-making processes implemented in Denmark, which have resulted in a world successful renewable energy policy. One of the reasons for that success was the successful participation of stakeholders and the community as a whole.

Although similarities and lessons can be drawn between Denmark and South Africa, it must be noted that there are areas of disparity. Denmark's achievements in emission reduction must be placed in context though as she benefited from a high Gross National Product per capita due to her significantly lower population, whereas in South Africa one eye has to be kept on unemployment and poverty in general, the erosion of disposable income and the balance of payments.

The next chapters provide a comparative analysis of the environmental tax regimes of South Africa, Malaysia and Denmark and determine what South Africa may learn and adapt from these countries tax regimes as well as making recommendations on whether carbon tax should be introduced in South Africa and if so how it may be implemented locally.

CHAPTER 6

AN ANALYSIS OF ENVIRONMENTAL TAXES IN MALAYSIA AND DENMARK

6.1 INTRODUCTION

Though South Africa is morally bound to control effects of climate change given her placement in the top twenty of the world's largest emitters of GHG, Dane (2011:56-57) pointed out that, it has a unique economic and social set-up which has to be considered in crafting a policy and legislation or designing a environmental tax regime. South Africa may, however, learn and adapt from the different environmental taxes and renewable energy incentives used to reduce emissions such as renewable energy projects which have been successfully implemented in Malaysia and Denmark. In addition, South Africa should determine how best to price carbon through analysing the tax mechanism versus the cap-and-trade system.

6.2 AN ANALYSIS OF ENVIRONMENTAL TAXES IN MALAYSIA AND DENMARK

6.2.1 Environmental taxes and renewable energy incentives in Malaysia

For over a decade the Malaysian government gradually implemented a number of successful plans and policies to encourage the use of renewable energy. In addition the photovoltaic (mainly solar energy development) and an educational centre (mainly to boost knowledge of the importance of renewable energy to the public as part of training and education) were initiated as part of the Malaysia's ninth plan. In a period stretching fifteen years, an investment worth over RM150million was provided for research and development to institutions of higher learning and to industry, focusing on the development of technology to harness natural gas, solar and wind energy. The fact that Malaysia continues to explore its renewable energy objectives and reaffirm its commitment to global solutions is best observed in Malaysia's tenth plan which covers the period from 2011 to 2015. A threshold value of over 980megawatts by 2015 is envisaged and this would total five and a half % of Malaysia's entire energy generation mix. Prominent new initiatives

under this plan were the FIT programme and the renewable energy fund. (Hashim and Ho, 2011:4780-4787).

Financial, technical, regulatory and educational barriers were identified as the challenges hindering the growth of renewable energy implementation in Malaysia (Ali *et al.,* 2012). Mustapa *et al.,* (2010), concurred with these challenges. However, they suggested that government leadership, financial tools, renewable energy policy and social responsibility may be considered as the way forward for renewable energy.

According to Craven (2010:6943-6950), devoting sufficient resources to research and development, the workforce and coordinated governance led to Malaysia's success at being the universal leader in the production of palm. Emphasis on value addition has seen Malaysia become a world leader in the production of palm stearin which is virtually indispensable in the food sector manufacturing process.

Nurdianto and Resosudarmo (2011) utilised the IRSA-ASEAN model to consider a host of economic factors and their impact on implementation. Their findings revealed that there would be a trade-off between this environmental success and the GDP growth which would see social welfare facets (including disposable income per household) reduce. In their findings, Nurdianto and Resosudarmo (2011) asserted that although carbon tax is a positive environmental factor in Malaysia, it is costly as it shrinks the economy. In other words Malaysia more or less has little else motivating the adaptation of carbon tax other than environmental gain. However Nurdianto and Resosudarmo (2011) concluded that implementing a carbon tax in ASEAN is no longer a question of whether it should be implemented or not; but a question of how to implement such a scheme to obtain the most benefit in terms of economic growth, equity and environmental improvement.

The Malaysian government contributed to encouraging the corporate responsibility among local companies in Malaysia, by taking a bold step in making it compulsory to report corporate responsibility measures annually.

6.2.2 Environmental taxes and renewable energy incentives in Denmark

Prasad (2008:1-2) asserts that Denmark is one state where carbon levies have brought about significant cuts in emissions, falling by about fifteen % per capita over a fifteen year period from 1990. It accomplished this while posting a remarkably strong economic record and without relying on nuclear power. There are many elements to its success, but taken together, the insight they provide is that if reducing emissions is the goal, then a carbon tax is a tax you want to impose but never collect. Denmark avoids the temptation to maximise the tax revenue by giving the proceeds back to industry, earmarking much of it to subsidise environmental innovation. Danish firms are literally forced into environmental innovation, and the country's economy retains a competitive advantage.

Danish experimentation with various forms of taxation is well documented from as early as the beginning of the 20th century, when petrol tax was introduced. By the end of that century Denmark was driven by the need to save resources (both energy and environmental wise) and this led to an increase in the range of product under levies. These were remodelled in 1991 into more specific energy and carbon taxes in line with Danish environmental fears. This tax system has gradually extended with most of the revenue directed at addressing energy efficiency issues. Further reforms ushered in environmental tax which emphasised resources utilisation rather than income generation (International Energy Agency, 2012:1).

Investors' confidence and social acceptance pertaining to renewable energy is hinged upon the occurrence of the following nine factors (Sovacool & Ratan, 2012):

- strong institutional capacity;
- political commitment;
- favourable legal and regulatory frameworks;
- competitive installation and/or production costs;
- mechanisms for information and feedback;
- access to financing;
- prolific community and/or individual ownership and use;
- participatory project siting; and
- recognition of externalities or positive public image.

The occurrence of these nine factors is anticipated to create market environments where wind and solar energy are accepted; their lack prompts environments where they are rejected.

As the Danish emphasis is to localise planning as much as possible, local energy authorities are expected to adopt and refine this idea in various local perspectives. Concurrently the state is required to provide municipalities with planning tools and create a matching planning structure, thereby simultaneously centralising and decentralising execution of the hundred % renewable energy ideas (Sperling *et al.,* 2011).

CHAPTER 7

CONCLUSION

7.1 WHAT SOUTH AFRICA CAN LEARN AND ADAPT FROM MALAYSIA AND DENMARK'S ENVIRONMENTAL TAXES AND RENEWABLE ENERGY INCENTIVES

7.1.1 What South Africa can learn and adapt from Malaysia

A gradual implementation of renewable energy policies and plans is a key lesson South Africa should learn from Malaysia. The implementation of successful renewable energy policies in South Africa would not happen overnight not only would it take time to develop but, the underlying policies and plans would also require frequent reassessments to improve their effectiveness and achieve their intended results. For South Africa to be as successful as Malaysia in implementing renewable energy policies and plans, she could seek to invest capital into dedicated research and development projects at the various institutions of higher education and research organisations. Private sector participation is another crucial factor to consider when implementing effective renewable energy projects, as evidenced in Malaysia's plans and policies (Mustapa et al., 2010).

The current Eskom power shortages throughout South Africa highlight a need to invest in alternative forms of renewable energy as well as the importance of public education and training to increase awareness of alternative energy forms thereby reducing the strain on the national electricity grid. In addition, South Africa should consider the implementation of FIT as it has been proven to be the most successful means of promoting renewable energy. It has also been proven to create more employment, greater investment markets and security which all are essential aspects South Africa needs currently. However, South Africa should learn to adapt the key factors identified in Malaysia that define the successful implementation of FIT.

South Africa may perhaps learn from some of the issues and challenges faced by Malaysia in implementing renewable energy, which includes:-

- difficulties in obtaining financial assistance to meet the huge initial investments requirements;
- the possibilities that proven renewable energy schemes in one state might not be suitable to another state; and
- the necessity to encourage networking and collaboration between the private sector and the government to achieve mutually beneficial positions in exploring the industrial feasibility and technological practicability of renewable energy projects.

The involvement and dedication of the South Africa government would be vitally important in executing any type of policy; this would also include renewable energy programmes. South Africa should comprehend the fact that it has taken Malaysia over ten years to endorse and institute a range of successful renewable energy programmes and policies. Initially, development of renewable energy generation had been minimal but ultimately the progression of renewable energy in Malaysia has revealed an increasing tendency as the government incentives offered to the energy consumers were utilised. Therefore South Africa should realise that the introduction, implementation and enforcement of renewable energy strategies should be on a progressive basis.

In addition, South Africa ought to follow Malaysia's tiger-like commitment to promote a spirit or mindset of accountability and responsibility amongst corporations towards carbon emissions arising from their business operations. Disclosing such corporate activity should be made mandatory in annual reports until they are embedded as part of corporate culture.

7.1.2 What South Africa can learn and adapt from Denmark

The examination of the factors influencing investor confidence and social acceptance concerning renewable energy resulted in Denmark’s world-leading success in wind energy. Indeed, it may be that these criteria are applicable to the acceptance of other energy technologies, and could be explored by South Africa in the context of wind power and solar energy.

The strong governance system in Denmark ensured that many energy policy decisions, especially relating to wind farm, were made at the local rather than national level. This

resulted in high levels of participation, which will fit in well in the South Africa context with its large rural population in need of alternate forms of energy. Vast tracts of rural Limpopo, Eastern Cape and KwaZulu-Natal would stand to benefit the most from the decentralisation of solar technology. Danish researchers emphasised the importance of local originality and skill in gradually scaling up turbine designs, creating a product quickly associated with Danish culture and a strong brand presence. Such public awareness campaigns using the motive 'local is lekker' or 'Proudly South African' would take pride of place in local communities.

Drawing similarities from Denmark's centralisation and decentralisation strategies, with the South Africa context, one can deduce that, to be able to implement a successful local energy plan within national energy objectives it's imperative that there is a shift from localised planning towards a holistic approach. This requires an emphasis shift from 'parallel planning' to a more strategic form of implementation where both central and local energy objectives are aligned. The keywords in achieving these ideas of harmonisation are decentralisation and simultaneous localisation of strategic thinking. A totally decentralised renewable energy system is achievable only if the local municipalities are not only given the mandate and authority to plan but are also supported resource-wise and by national strategic guidelines (Sperling *et al.,* 2011).

Denmark's success in implementing carbon tax was mainly due to its policy that emissions cuts are driven most when carbon is levied but not collected. The urge to maximise revenue is resisted by Danish authorities, instead proceeds resurface as subsidies in a quest for innovative environmental technologies and solutions ensuring the economy retains a competitive advantage.
Denmark's approach in gradually introducing carbon tax can also be implemented in the South Africa context especially given her volatile labour and trade union nature. The possible effects of implementing carbon tax on the environment, the economy, competitiveness and administrative effects should be examined and considered by the South Africa National Treasury before introducing carbon tax in South Africa

7.2 POSSIBLE WAYS TO PRICE CARBON IN SOUTH AFRICA THROUGH ANAYLSES OF THE CAP-AND-TRADE SYSTEM AS OPPOSED TO TRADE MECHANISM

Although research has shown that the tax mechanism is more efficient to the cap-and-trade system, one must consider the applicability to South Africa's unique economic and social set-up. COP 17(Framework Convention on Climate Change, 2012), reconfirmed that the domestic action of each country to the Kyoto Protocol agreement shall take precedence over the mechanisms that can be used and such domestic action would accordingly comprise of a major part of the cap-and-trade system and reduction commitments under the Kyoto Protocol agreement. An important feature of the COP 17 accord that varies distinctly from the existing Kyoto Protocol is that it would apply to both developed and developing countries. A major flaw with the Kyoto Protocol was that it only obligated emission reduction commitments from developed countries, even though developing countries, such as China, Brazil, India, and Indonesia, are among the major carbon emitters (Business and the Environment, 2012).

National Treasury (2010) pointed out that it is important when considering economic indicators to rectify failures of the market. Instruments like carbon tax are potentially more useful in terms of efficiency than regulatory policy instruments. This is achievable given carbon tax creates incentives for least cost activities aimed at lowering emissions. An added effect would be the generation of revenues, ease of implementation *vis-a-vis* regulatory frameworks. It boils down to a seamless integration of external negatives into consumer pricing that trigger behavioural change. However, it should be noted that the next stage of the South African government's enquiry into a carbon-pricing system would give detail and expand on the technique, economics and expediency of a cap-and-trade system. This involves an analysis of implemented and proposed cap-and-trade systems internationally (National Treasury, 2010). Without this investigation of the cap-and-trade system followed by a comparison with the previously examined tax mechanism systems, it is unlikely that National Treasury would reach an informed and conclusive decision on the best option for South Africa.

7.3 CURRENT INCENTIVES CONTAINED IN THE SOUTH AFRICAN INCOME TAX ACT DEALING WITH ENVIRONMENTAL TAXES AND RECOMMENDATIONS

Specific suggestions to existing legislature targeting depreciation, environmental expenditure allowances, carbon dioxide emissions tax and deductions in respect of research and development is recommended by this study to South Africa's current legislation. The essence of the suggested amendments includes maintaining, if not lowering, costs of production thus protecting company profits and protecting consumer disposable incomes all the while achieving emissions reduction targets in favour of protecting the environment.

7.4 OVERALL CONCLUSION AND RECOMMENDATION

Based on the literature reviewed, this study proposes that positive encouragement through incentivising green behaviour is preferable to a punitive tax mechanism given the fact that South Africa is still growing its economy. As it is common practice in South Africa for all taxes to eventually flow to the consumer, what must be of uttermost concern would be for incentives to lower emissions in South Africa (i.e. the use of tax incentives and tax credits) before carbon tax is introduced as the latter bears no short-term relief/remedies. In addition, the imposition of a carbon tax would have an extensive adverse impact on the operating profits of the energy-intensive firms which would result in a substantial elimination of tax contributions, a massive reduction in exports and major retrenchment and job losses especially if the carbon tax is not progressively introduced at a minimum charge given South Africa's volatile labour and trade union nature. This study also proposes that the current legislation in South Africa tax could be amended as per the proffered specific suggestions detailed in chapter two. However if South Africa should ultimately decide to introduce carbon tax it should emulate the Danish system, that is, tax the industrial emission of carbon and earmark that income for industrial subsides and investment in greener sources of energy.

7.5 FUTURE RESEARCH

As this study entailed a preliminary literature review, a survey amongst businesses as to their perception and comments with reference to the proposed introduction of carbon tax will be required. However, South Africa needs to conduct a more detailed and specific fact-based study on how best to implement the tax system without decimating company profits which would in turn result in job losses. Such feedback from the government would need to be considered. In addition, feedback from National Treasury with regard to investigation of the cap-and-trade system which will then be compared to the already examined tax mechanism systems would also need to be considered.

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