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I hereby declare that I have read and understood the regulations governing the submission of MPhil dissertations, including those related to length and plagiarism, as contained in the rules of the University, and that this dissertation conforms to those regulations.

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Abstract

South Africa faces significant environmental challenges in relation to greenhouse gas (GHG) emissions mainly caused by the use of fossil fuels to provide energy coupled with the relatively inefficient nature of the South African energy sector. In addition the country now faces electricity supply constraints as evidenced by the electricity crisis in 2008. Industrial energy consumption forms a large component of the energy sector in South Africa. Therefore, there is significant scope for improved energy efficiency in industry to reduce greenhouse gas emissions and electricity supply constraints. Market-based instruments (MBIs) are being increasingly used to drive environmental improvement globally and in South Africa and provide a potentially powerful tool to promote domestic industrial energy efficiency. This dissertation evaluates the current array of MBIs that use existing markets to promote industrial energy efficiency in South Africa. The MBIs identified in this regard are the additional investment and energy efficiency allowances available under s12I and s12L of the Income Tax Act 58 of 1962, the electricity levy implemented under the Customs and Excise Act 91 of 1964, Eskom's Demand Side Management (DSM) programme and NERSA's proposed Cogeneration Feed-in Tariff (COFIT) programme. The latter three MBIs are incorporated into the recent attempt to make electricity prices more 'cost reflective' along with Renewable Energy Feed-in Tariff (REFIT) costs and the cost of capital to fund the new build programme. The main shortcoming of this range of MBIs is the failure to cover energy products such as coal and fuel oil as the main focus has been on electricity pricing to date. Energy-carbon taxes have been used successfully in Europe to drive industrial energy efficiency and reduce GHG. Drawing on the experience of the European Council directive 2003/96/EC of 27 October 2003 *Restructuring the Community Framework for the Taxation of Energy Products and Electricity* and the carbon tax options described in the National Treasury Discussion Paper *Reducing Greenhouse Gas Emissions: The Carbon Tax Option* (2010) there may be an opportunity for South Africa to extend the current array of MBIs to include a similar energy-carbon tax.

List of abbreviations

CDM	Clean Development Mechanism
CO ₂	Carbon Dioxide
COFIT	Cogeneration Feed-in-Tariff
CTL	Coal to Liquid
CCA	Climate Change Agreement (UK)
CCL	Climate Change Levy (UK)
CSP	Concentrated Solar Power
DME	Department of Minerals and Energy
DEAT	Department of Environmental Affairs and Tourism
DWEA	Department of Water and Environmental Affairs
DSM	demand side management
DTI	Department of Trade and Industry
ESCO	Energy Services Company
ETS	Emission Trading Scheme
ETR	Environmental Tax Reform
EU	European Union
GDP	Gross Domestic product
GHG	Greenhouse gas
GTL	Gas to Liquid
IPP	Independent Power Producer
kWh	Kilowatt-hour
LTMS	Long Term Mitigation Scenarios
MBI	Market-Based Instrument
MW	Megawatt
NEM:AQA	National Environmental Management : Air Quality Act
NERSA	National Energy Regulator South Africa
NERT	National Energy Response Team
NO _x	Nitrous Oxides
PCP	Power Conservation Programme
REPA	Renewable Energy Purchasing Agent

REFIT	Renewable Energy Feed-in-Tariff
RTC	Right to Consume
SANEDI	South African National Energy Development Institute
SAPIA	South African Petroleum Industry Association
SARS	South African Revenue Service
SO ₂	Sulphur Dioxide
UNFCCC	United Nations Framework Convention on Climate Change
VOC	Volatile Organic Compounds

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1. Introduction

South Africa faces significant environmental challenges, especially in relation to greenhouse gas (GHG) emissions associated with the widespread use of fossil fuels. In world terms, South Africa is ranked as the 11th highest GHG emitting country¹ and even higher in terms of emission intensity.² Significant emission reduction efforts would be required by the country to meet the theoretical targets estimated to represent South Africa's contribution to global stabilisation of GHG levels.³ South Africa has recently committed to mitigation action to reduce GHG emissions to 42 per cent below the 'business as usual' growth trajectory by 2025.⁴

South Africa's energy sector accounts for 79 per cent of the country's total GHG emissions.⁵ For the purposes of this dissertation, the energy sector is here defined as the production and supply of energy as well as the consumption of energy due to the intrinsic link between supply and demand and the cradle to grave

¹ Department of Environment Affairs and Tourism *National Climate Change Response Policy* Discussion Document for the 2009 National Climate Change Response Policy Development Summit, Midrand, 2-6 March 2009 at 12.

² Emissions measured as a function of GDP. South Africa ranks higher than developed OECD countries and developed countries such as India and Brazil. Scenario Building Team 2007 *Long Term Mitigation Scenarios-Strategic Options for South Africa: Technical Summary* (2007) Department of Environment Affairs and Tourism, Pretoria at 3.

³ *Long Term Mitigation Scenarios* (2007) at 25.

⁴ The commitment includes an interim target of 34% below 'business as usual' emissions by 2020 and is predicated on provision of financial resources, the transfer of technology and capacity building support be developed countries. Department of Environment Affairs (Alf Wills) letter to Executive Secretary of UNFCCC 29 January 2010. Available at <http://unfccc.int/meetings/items/5276.php>. (Accessed 10.09.2011).

⁵ Inventory data from 1990, 1994 and 2000 show an increasing trend in the energy sector's contribution to GHG emissions from 75.1 to 78.9%. Table 0-4. Department of Environment Affairs and Tourism *Draft National Greenhouse Gas Inventory for the Republic of South Africa: Invitation for written representations and/or objections* in GN 1104 GG 32490 of 12 August 2009.

(lifecycle)⁶ responsibility imposed on producers by modern environmental thinking. The high contribution to GHG emissions is mainly attributed to the dominant use of coal to supply the country's energy needs.⁷ There are two primary aspects to this. Firstly, coal is emission intensive as an energy source in that the combustion of coal to provide energy or generate electricity and the conversion to liquid fuels in Sasol's coal to liquid technology is very energy-intensive.⁸ Secondly, abundant resources of low-grade coal have resulted in the inefficient consumption of energy. Coal is relatively cheap by international standards so that historically South Africa has been able to maintain low electricity prices⁹ and foster the development of energy-intensive industry.¹⁰ In addition, industrial policy has actively encouraged the development of energy-intensive industry through policies and incentives.¹¹

A side effect of low electricity prices is that energy efficiency was not sufficiently prioritised in the past and South Africa is fairly energy inefficient as a result.¹² The 1998 *White Paper on the Energy Policy of the Republic of South Africa* defines energy efficiency as 'a measure of the savings of energy, which is used to provide goods and services, while maintaining the desired benefits.'¹³ It is generally

⁶ National Environmental Management Act 107 of 1998.

⁷ About 75% of the total energy consumption in 2004 from coal. South African Government *Draft Clean Technology Fund Investment Plan* (October 2009) at 3.

⁸ Only one third of energy from coal is usable as liquid fuel. Department of Minerals and Energy *National Energy Efficiency Strategy of the Republic of South Africa, First Review October 2008* in GN 908 GG 32342 of 26 June 2009 at 16.

⁹ Even after proposed electricity price increases, South Africa will be among the lowest cost producers of electricity. South African Government *National Response to South Africa's Electricity Shortage* (Jan 2008) at 2. Available at http://www.info.gov.za/otherdocs/2008/resp_elec.pdf (Accessed 06.09.2011)

¹⁰ *Energy Efficiency Strategy* (2008) at 17.

¹¹ Winkler H, Jooste M & Marquard A 'Structuring Approaches to Pricing Carbon in Energy-and Trade-Intensive Sectors in South Africa' (2010) 10 *Climate Policy* 527 at 529.

¹² Department of Minerals and Energy *White Paper on the Energy Policy of the Republic of South Africa* GN 307 GG 19606 of 17 of December 1998.

¹³ *Energy White Paper* (1998) at 84.

agreed that there is significant scope to reduce greenhouse gas emissions through more efficient energy consumption.¹⁴

Industry and mining account for almost half of the energy usage in the country¹⁵ due to energy-intensive processes such as deep shaft gold mining, coal to liquid fuel production and aluminium smelting.¹⁶ The Department of Minerals and Energy (DME) suggests that energy savings of 50 per cent of current usage is theoretically possible when compared to international best practice for the sector.¹⁷

In recent years, the South Africa's energy industry's constraints in meeting electricity demand give additional impetus to the need for dramatic change in the sector. The electricity crisis in 2008 highlighted the problem that demand had caught up with generation capacity in the country and that the reserve margin was and remains insufficient for planned maintenance and unplanned outages.¹⁸ Since 2008, short-term conservation measures were implemented to ration energy consumption to manage the short fall¹⁹ while, more recently, plans are being developed to provide additional generation capacity.²⁰ Energy demand has stabilised since then, but this is believed to be more a consequence of the economic downturn than a measure of

¹⁴ *Long Term Mitigation Scenarios* (2007); *DEA Climate Change Policy Discussion Document* (2009); Department of Water and Environment Affairs *Draft National Strategy on Sustainable Development and Action Plan 2010-2014* in GN 393 GG 33184 of 14 May 2010; *Energy Efficiency Strategy* (2008).

¹⁵ 43.2 % made up of 36.2 % from industry and 7% from mining. *Energy Efficiency Strategy* (2008) at 16.

¹⁶ *Energy Efficiency Strategy* (2008) at 17.

¹⁷ *Energy Efficiency Strategy* (2008) at 24.

¹⁸ *Energy Efficiency Strategy* (2008) at 5.

¹⁹ Eskom implemented a power conservation program (PCP) that includes demand side management measures such as load shedding, quota allocations, penalties and cut-offs, incentives and a 'right to consume' (RTC) trading scheme. *Energy Efficiency Strategy* (2008) at 11-12.

²⁰ Capacity expansion plans include a 'new build' programme and 'return to service' of several mothballed coal fired power stations. More detail is available in *Energy Efficiency Strategy* (2008) at 7-9.

success for demand side management (DSM) measures.²¹ Similar shortages are likely to recur once the economy begins to recover.²² The government clearly needs to implement a policy framework that drives energy efficient development on a more sustainable basis.²³

Therefore, it is not surprising that industrial energy efficiency is increasingly highlighted as a focus area by government²⁴ and emerging policy in the arena of sustainable development, climate change and energy seeks to address many of the issues discussed above, including strategies that promote energy efficiency.²⁵

A range of regulatory instruments and strategies is available to government to drive the desired improvement in energy efficiency. Initial regulatory efforts to promote energy efficiency have focused primarily around either prescriptive interventions such as standard setting and labelling²⁶ or voluntary programmes such as the Energy Accord.²⁷ These measures remain largely ineffective in encouraging energy efficiency improvements while coal and electricity prices remain low.

²¹ Citing Trevor Manual, Minister in the Presidency responsible for the National Planning Commission - Creamer T 'South Africa Has to Show Greater Power-Crisis Urgency' 15 Jan 2010 *Engineering News*.

²² Ibid.

²³ It should be noted that conservation measures are short-term emergency measures that may have a negative impact on production, whereas interventions are envisaged in the medium to longer term to improve energy efficiency while having a positive impact on production. *Energy Efficiency Strategy* (2008) at 5.

²⁴ Buyelwa Sonjica, Minister of Minerals and Energy in the foreword to the *Energy Efficiency Strategy* (2008) at 4.

²⁵ *Draft Sustainable Development Strategy* (2010); Department of Minerals and Energy *White Paper on the Renewable Energy Policy of the Republic of South Africa* (2003) in GN 513 GG 26169 of 14 May 2004; *Energy White Paper* (1998); *DEA Climate Change Policy Discussion Document* (2009)

²⁶ *Energy Efficiency Strategy* (2008) at 5 and 10.

²⁷ A voluntary *Energy Efficiency Accord* was initiated by DME in 2005 and is administered by the National Business Initiative (NBI) Energy Efficiency Technical Committee. Department of Minerals and Energy *Energy Efficiency Accord* (August 2006) (updated). Available at

Another important component of possible regulatory mechanisms is a group of measures known as market-based instruments (MBIs) which employ market-based forces to shape the behaviours of energy consumers. The range of MBIs is complex and diverse and different instruments may be more suitable to achieve specific objectives. MBIs may be characterised as those using existing markets such as taxes and those creating new markets such as emissions trading schemes.²⁸ Typically, new market mechanisms are complex and expensive to set up.²⁹ This dissertation is delimited to MBIs that use existing markets as these appear to be favoured by current South African fiscal policy.³⁰ Policy documents and legislation published in the last four years show an increasing trend towards the use of MBIs to achieve environmental and demand management objectives in the energy sector.³¹

http://www.nbi.org/za/SiteCollectionDocuments/energy_efficiency_accord.pdf (Accessed 11.09.2011).

²⁸ National Treasury *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa* (2006) Government Printers, Pretoria at 43; Paterson A 'Incentive-Based Measures' in A Paterson A and Kotze LJ (eds) *Environmental Compliance and Enforcement in South Africa: Legal Perspectives* (2009) 232-321 at 300.

²⁹ Robb G, Tyler E and Cloete B *Carbon Trading or Carbon Tax? Weighing Up South Africa's Mitigation Options* Unpublished paper presented at 'Putting a Price on Carbon' Conference held at the University of Cape Town, 23-24 March 2010, 196-213 at 208.

³⁰ National Treasury Discussion Paper *Reducing Greenhouse Gas Emissions: The Carbon Tax Option* (2010) at 6. Available at

<http://www.treasury.gov.za/public%20comments/Discussion%20Paper%20Carbon%20Taxes%2081210.pdf> (Accessed 06.09.2011); National Treasury *Budget 2010/2011 Tax proposals* (2010) at 26.

Available at

<http://www.treasury.gov.za/documents/national%20budget/2010/guides/Budget%20Tax%20Proposals.pdf> (Accessed 06.09.2011).

³¹ These policy documents will be discussed in more detail in chapter 4. Examples are *Draft MBI Policy* (2006); *Energy Efficiency Strategy* (2008); *DEA Climate Change Policy Discussion Document* (2009); *Draft Sustainable Development Strategy* (2010).

In light of the above, this dissertation focuses on the growing role that MBIs play in promoting energy efficiency in South African industry as a targeted approach to address greenhouse gas emissions and electricity supply constraints in the energy sector.

The dissertation is divided into seven chapters. Following this introductory chapter, the second chapter explores in more detail the role of industrial energy consumption in South Africa's energy realities and why there is a need to promote energy efficiency through the use of MBIs. Chapter 3 describes the theoretical understanding of MBI's and discusses the key issues identified for their successful introduction. The fourth chapter reviews the relevant South African environmental, energy and fiscal policies to highlight governments' recognition of the role that industrial energy efficiency and MBIs may play in the promotion of energy efficiency in local industry. The fifth chapter identifies and critically evaluates major MBIs (using existing markets) that have been implemented to date in South Africa to promote energy efficiency in industry. In chapter 6, the European Union (EU) experience with energy-carbon taxes and the fledging carbon tax developments in South Africa are assessed as a possible way forward to address potential gaps in the existing array of MBIs identified in chapter 5. The seventh chapter contains the conclusions drawn from the dissertation.

2. A Background to South Africa's Energy Sector

As discussed in chapter 1, this dissertation focuses on improved energy efficiency in South African industry as a means to address some of South Africa's current environmental and economic challenges. To better understand the importance of the role that industrial energy efficiency may play in this regard, one needs to know where industrial energy consumption fits within the context of the South African energy sector and the challenges that face the country within this sector. This chapter outlines the main features of the domestic energy sector, highlighting industrial energy consumption patterns. It includes a brief survey of the key challenges facing the local energy sector and the role that energy efficiency might play in addressing them. These include socio-economic, environmental and regulatory challenges.

2.1. Nature of the Domestic Energy Sector

The energy sector comprises both the production and consumption of energy products such as coal, liquid fuels and electricity. It is difficult to disaggregate the production and consumption aspects of these energy products as they are linked in various ways. Firstly, energy production output is necessarily determined by energy consumption patterns. Secondly, energy is consumed by the energy industry during the production of energy products and electricity. Thirdly, the impact of changes in energy consumption may occur upstream at the production level. For example, reduced electricity demand may ultimately result in reduced air emissions from coal-fired power stations. Therefore, the domestic energy sector is discussed below in terms of the primary energy sources used and the main energy products that are produced and consumed in South Africa.

Although South Africa is described as a developing country, the energy production and supply system is well developed.³² The country relies heavily on fossil fuels with close to 90 per cent of the country's primary energy source is provided by coal and crude oil, roughly 70 per cent from coal and 20 per cent from crude oil.³³ The remaining 10 per cent is made up of nuclear, gas³⁴ and renewable energy sources. Renewable energy in South Africa consists largely of biomass material that can be replenished.³⁵ Technologies using wind power or solar energy are not yet being widely implemented although there is increasing activity in this area as wind farm proponents prepare for the implementation of the REFIT.³⁶

Much of this primary energy is converted to other forms of energy.³⁷ Coal is used to generate electricity and produce liquid fuels using Sasol's coal to liquid

³² Department of Minerals and Energy, Directorate: Energy Planning and Development *Digest of South African Energy Statistics* (2006) at 1.

³³ Coal: 72.7 % (2003) and 68% (2004) and crude oil: 13.7% (2003) and 19.4 % (2004) *DME Energy Statistics* (2006) at 2. The most recent figures (2006) show continuation in trend of slight decrease in percentage of energy production from coal (67.21%) versus crude oil (21.93%) although overall supply from both in TeraJoules (TJ) has increased. Department of Minerals and Energy, Directorate: Energy Planning and Development *Digest of South African Energy Statistics* (2009) 4 ed at 4.

³⁴ Some natural gas is converted to liquid fuels in Sasol's Gas to Liquid process although Sasol Gas also supplies natural and processed gas to directly customers for energy and process needs, including the cogeneration of electricity and steam at Richards Bay and Newcastle. Sasol is currently investing R1.1 billion to increase the natural gas operations by 20% over the next few years. South Africa.info *Infrastructure: Synthetic Fuels, Oil and Gas*. Available at <http://www.southafrica.info/business/economy/infrastructure/energy.htm> (Accessed 06.09.2011) and *Sasol Sasol Facts* (2009). Available at http://www.sasol.com/sasol_internet/frontend/navigation.jsp?navid=1600033&rootid=2 (Accessed 06.09.2011).

³⁵ *DME Energy Statistics* (2009) at 4. Commercially, typical applications would be the provision of process heat through burning bulk from logs, bagasse or black liquor in the sugar and pulp and paper industries. Biomass is also used for some domestic purposes, but is difficult to estimate.

³⁶ Department of Environmental Affairs and Tourism *South Africa: Initial National Communication under the United Nations Framework Convention on Climate Change* (2004) at 8.

³⁷ Examples are coal for electricity production and coal, crude oil and natural gas for the production of liquid fuels.

technology (CTL). Imported crude oil is refined into petroleum products at crude oil refineries.

The predominant energy products produced and consumed in South Africa are therefore coal, electricity and petroleum products. Each product roughly accounts for one third of the country's energy consumption in South Africa.³⁸

Coal reserves are abundant and relatively cheap to exploit in South Africa.³⁹ South Africa is a net exporter of coal.⁴⁰ As much as 75 per cent of the total energy consumption in 2004 was fuelled by coal.⁴¹ About 20 per cent of the coal consumed in the domestic market is used in primary form. The rest is used in the production of electricity and liquid fuels.⁴² Industry dominates the consumption of coal both as an energy source and as a raw material in the production of secondary energy products.⁴³

Electricity provides about 30 per cent of the country's energy needs.⁴⁴ The main provider is Eskom, a parastatal utility company that supplies more than 95 per cent of South Africa's electricity. It ranks as one of the top seven electricity generators in the world and accounts for more than half the energy generated in Africa.⁴⁵ Up until recently, it was one of the four cheapest energy providers in the

³⁸ Department of Minerals and Energy *National Energy Efficiency Strategy of the Republic of South Africa, First Review October 2008* in GN 908 GG 32342 of 26 June 2009 at 15.

³⁹ *DME Energy Statistics* (2006) at 21.

⁴⁰ Winkler H (ed) *Energy Policies for Sustainable Development: Options for the Future* (2006) Energy Research Centre, University of Cape Town at 4.

⁴¹ South African Government *Draft Clean Technology Fund Investment Plan* (October 2009) at 3.

⁴² 55% to electricity, 21% to petroleum products. Davidson O 'Energy Policy' in Winkler *Energy Policies* (2006) at 4.

⁴³ Winkler *Energy Policies* (2006) at 32.

⁴⁴ *Energy Efficiency Strategy* (2008) at 15.

⁴⁵ *DME Energy Statistics* (2006) at 38.

world.⁴⁶ Electricity is produced mainly from coal-fired power stations. These account for 13 of the 24 power stations in South Africa and 32066 Megawatts (MW) of electricity production. Nuclear contributes 1800 MW, two pumped storage facilities 1200 MW, six hydro-electric stations, 600 MW and two gas turbine stations 342 MW.⁴⁷

Industry is the largest consumer of electricity in South Africa (36 per cent), followed by the transport sector (26 per cent).⁴⁸ Residential demand has been increasing since 1994 and the post-apartheid government's commitment to delivering services to previously disadvantaged sectors of society.⁴⁹

South Africa's petroleum products provide 32 per cent of the country's energy needs⁵⁰ and are produced from three primary energy sources, namely crude oil, coal and some natural gas. About 35 per cent of liquid fuels are produced from Sasol's coal to liquid technology (CTL), 9 per cent from natural gas in Gas to liquid (GTL) processes and the bulk from imported⁵¹ crude oil.⁵² There are four crude oil refineries⁵³ designed to process a total throughput of 513 000 Barrels per Stream Day (BPSD).⁵⁴ Sasol Secunda is designed to process about 150 000 BPSD⁵⁵ of coal and

⁴⁶ *DME Energy Statistics* (2006) at 38.

⁴⁷ Department of Energy, Electrification Policy Development and Management Directorate *Electrification Statistics* (2009) at 8.

⁴⁸ *Ibid.*

⁴⁹ Eskom's electrification programme has increased the supply of electricity from 30% to 75% of households. Electrified households total 9245357. *DOE Electrification Statistics* (2009) at 10 and 30.

⁵⁰ *Energy Efficiency Strategy* (2008) at 15.

⁵¹ Crude is imported through coastal ports and transported via pipeline to the refineries. Only about 3% of the crude oil processed is sourced within South Africa. *Initial Communication to UNFCCC* (2004) at 7.

⁵² *DME Energy Statistics* (2006) at 1.

⁵³ These are Chevron in Cape Town, Engen and Sapref (jointly owned by Shell and BP) in Durban and Natref (joint venture between Sasol and Total SA) inland at Sasolburg.

⁵⁴ Sum of Chevron (100 000 BPSD); Engen (125 000 BPSD); Natref (108 000 BPSD); Sapref (180 000 BPSD). *SAPIA Petrol and Diesel in South Africa and the Impact on Air Quality* (2008) at 18.

natural gas in its CTL and GTL plants.⁵⁶ Petroleum products marketed in South Africa are petrol, diesel, jet fuel, illuminating kerosene, fuel oil, bitumen and Liquid Petroleum Gas (LPG) and are consumed predominantly in the transport sector.⁵⁷ The liquid fuels industry, comprising crude oil refining and CTL and GTL processes, forms a large component of South African industry. These are typically energy-intensive processes.⁵⁸ The main use of petroleum products in industry is fuel oil for heavy industry.⁵⁹

Overall, industrial energy consumption forms a large proportion of South Africa's energy supply- and demand complex. The main energy products consumed by industry are coal followed by electricity.⁶⁰ As such, industrial energy consumption is a large component of what drives energy production and therefore has a large influence on the South African energy sector.

2.2. Challenges Facing the Domestic Energy Sector

The South African energy sector is currently facing significant challenges. Many of these originate from industrial development and energy governance during the apartheid era.⁶¹ Over the past decade, limited progress has been made towards

⁵⁵ Crude equivalent at average yield.

⁵⁶ Natural gas is imported from the Mozambique Natural Gas fields to Secunda via an 865 km cross border pipeline for production of liquid fuels in gas to liquid (GTL) process.

⁵⁷ 77% transport, 5% residential, 4% commerce, 3% mining, 2% Industry, 2% Non-energy, 1 % other from *DME Energy Statistics* (2006) at 32.

⁵⁸ Winkler H, Jooste M & Marquard A 'Structuring Approaches to Pricing Carbon in Energy-and Trade-Intensive Sectors in South Africa' (2010) 10 *Climate Policy* 527 at 531.

⁵⁹ Winkler *Energy Policies* (2006) at 31.

⁶⁰ Based on 2005 DME data, Harald Winkler provides the following breakdown: Coal 51%, electricity 33 % and petroleum products 12% in Winkler *Energy Policies* at 32.

⁶¹ Department of Minerals and Energy *White Paper on the Energy Policy of the Republic of South Africa GN 307 GG 19606* of 17 of December 1998 at 5.

resolving issues such as the need to restructure the energy sector to allow for diversification of supply and improved competition.⁶² In addition, linked to global as well as local change, new challenges now face the sector. These challenges are discussed below under the headings: Socio-Economic, Environmental and Regulatory Challenges with particular reference to the role that industrial energy consumption may play.

2.2.1. Socio-Economic Challenges

The energy sector is central to South Africa's economic development.⁶³ Historically, industrial development in South Africa has been based largely around the availability of cheap coal and electricity. Eskom built several coal-based power stations in the 1970s and 1980s to the extent that there was an oversupply of electricity. The resultant low electricity prices attracted energy-intensive industries such as aluminium smelting and deep shaft gold mining to the country and contributed much to the economic growth.⁶⁴ This trend was actively promoted by industrial development policy.⁶⁵ However, the abundant supply of cheap coal and electricity did not foster energy efficient consumption within these industries, nor other consumers. South African industry is therefore relatively energy-intensive and energy inefficient by international standards.⁶⁶

The need for energy efficient consumption by all sectors, including industry, is pushed into focus as energy supply becomes limited. The electricity crisis in 2008

⁶² Tyler E *Aligning South African Energy and Climate Change Mitigation Policy* (2009) Energy Research Centre, University of Cape Town at 10.

⁶³ *Energy White Paper* (1998) at 2.

⁶⁴ Winkler (2010) *Climate Policy* at 529.

⁶⁵ Policies existed from as far back as 1970s. For more information on this topic see Winkler (2010) *Climate Policy* at 529 and Winkler H & Marquard A *Analysis of the Economic Implications of a Carbon Tax* (2009) Energy Research Centre, University of Cape Town at 9.

⁶⁶ *Draft Clean Technology Fund Investment Plan* (2009) at 4, *Energy White Paper* (1998) at 25.

highlighted the problem that increased demand has caught up with generation supply capacity and that the reserve margin is insufficient to allow for planned maintenance and unplanned outages.⁶⁷ As described by President Mbeki in his State of the Nation address at the annual opening of Parliament in Cape Town in 2008, ‘This situation has precipitated the inevitable realization that the era of very cheap and abundant electricity has come to an end.’⁶⁸ Various interventions were developed to address the shortfall of capacity. These included ‘new build’ and ‘return to service’ power generation plans (supply side)⁶⁹ and demand side management (DSM) measures encapsulated in the Power Conservation Programme (PCP) such as quota allocations, penalties and cut-offs, incentives and trading.⁷⁰

Energy efficiency measures form an important part of the medium to long-term strategy.⁷¹ While rationing electricity formed a large part of the short-term response to the crisis, energy efficiency measures that effectively obtain the same economic output for reduced energy input clearly provides a more cost effective solution with less detrimental effect to economic development. The longer term plans for the proposed power generation expansion requires significant capital investment.⁷² Energy efficiency improvements could postpone the need for additional power stations by three to four years according to one study.⁷³

⁶⁷ South African Government *National Response to South Africa’s Electricity Shortage* (Jan 2008) at 5. Available at http://www.info.gov.za/otherdocs/2008/resp_elec.pdf (Accessed 06.09.2011).

⁶⁸ Timberg C ‘Government at Fault in S. Africa’s Electricity Crisis, Mbeki Says’ 9 February 2008 *Washington Post*.

⁶⁹ See details of planned capacity expansion in *SA Response to Electricity Crisis (2008)* at 7-9.

⁷⁰ *SA Response to Electricity Crisis (2008)* at 11-12.

⁷¹ Goal 8: Reduce the necessity for additional power generation capacity. *Energy Efficiency Strategy (2008)* at 13.

⁷² The World Bank approved a loan of \$3.75 billion to Eskom to fund this programme. Rastello S and Lourens C ‘Eskom Gets \$3.75 Billion World Bank Loan for Coal-Fired Plant’ 9 April 2010 *Bloomberg Business Day*.

⁷³ Winkler *Energy Policies* (2006) at xi.

The National Electricity Response Team (NERT) was set up in December 2008 to coordinate the various initiatives and report to Cabinet through its steering committee.⁷⁴ However, the downturn in the economy and consequent reduction in power demand has led to a “false sense of security” about the state of electricity supply in South Africa.⁷⁵ In the interim, neither of the coordinating bodies set up to respond to the crisis (namely the Electricity Advisory Committee and NERT) has been meeting as required to progress the response initiatives and the concern remains that as the country recovers from the recession, it will be faced by similar power constraints.⁷⁶

Apart from the economic driver of decreased energy costs, the need for energy efficient consumption is also justified when the social and environmental impacts of energy consumption are taken into account.⁷⁷

From a social impact perspective, a legacy of the apartheid era was that modern energy services were available mainly to industry and a small section of the population.⁷⁸ The energy supply industry was also limited to a few companies.⁷⁹ The post-apartheid government of 1994 initiated an electrification programme with Eskom to provide more equitable access to electricity. There has been significant progress in that electricity supply has been extended from 30 to 75 per cent of households in the ensuing period.⁸⁰ However, some of the other socio-economic challenges remain. The progress towards diversifying energy supply and improving

⁷⁴ Creamer T ‘South Africa Has to Show Greater Power-Crisis Urgency’ 15 Jan 2010 *Engineering News*.

⁷⁵ Citing Trevor Manual, Minister in the Presidency responsible for the National Planning Commission. Creamer (2010).

⁷⁶ Creamer (2010).

⁷⁷ Spalding-Fecher R and Matibe DK ‘Electricity and Externalities in South Africa’ (2003) 31 *Energy Policy* 72.

⁷⁸ Winkler *Energy Policies* (2006) at 6.

⁷⁹ *Energy White Paper* (1998) at 25.

⁸⁰ *DOE Electrification Statistics* (2009) at 10 and 30.

economic efficiency through increased competition in the sector has been very slow.⁸¹ The failure to include the costs involved in providing equitable electricity services and opening up the energy supply sector to new entrants, such as independent renewable energy generators, has contributed to the current energy sector realities.

2.2.2. Environmental Challenges

Another growing concern that regulators of the energy sector face is the urgent need to reform environmental performance. Historically, low income consumers have been subject to potential health risks from indoor and outdoor pollution from the combustion of coal and fuel wood.⁸² In the ensuing years, air pollution, especially in relation to greenhouse gas emissions has gained prominence as a global environmental focus.⁸³ As the energy sector, particularly the industrial energy consumption component is a major contributor to air pollution and GHG emissions in South Africa, these particular issues are discussed in detail below.

Greenhouse Gas Emissions

SA is a signatory to United Nations Framework Convention on Climate Change (UNFCCC)⁸⁴ and the Kyoto Protocol.⁸⁵ As such the country is committed to

⁸¹ Tyler (2009) at 10.

⁸² *Energy White Paper* (1998) at 26.

⁸³ Specifically international negotiations which are ongoing under the United Nations Framework Convention on Climate Change (UNFCCC).

⁸⁴ South Africa ratified the United Nations Framework Convention on Climate Change (UNFCCC) adopted at the Earth Summit in Rio de Janeiro, 1992 in 1997. Department of Environmental Affairs and Tourism *Ratification of the United Nations Framework Convention on Climate Change* in GN1676 GG18539 of 19 December 1997.

⁸⁵ Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) adopted at COP3 in Kyoto, Japan in 1997.

the global effort to stabilise greenhouse gas (GHG) emission levels (mitigation) and respond to the impacts of climate change (adaption). South Africa participates in the UNFCCC/Kyoto arena as a developing country and in line with the ‘common, but differentiated responsibility’⁸⁶ approach, has not been required to take on a legally binding reduction target. However, after the 2009 negotiations at Copenhagen, the country has made public the intention to ‘take nationally appropriate mitigation action to enable 34% deviation below the ‘Business as Usual’ emissions growth trajectory by 2020 and 42% deviation below the ‘Business as Usual’ emissions growth trajectory by 2025.’⁸⁷

The scale of the South Africa’s mitigation challenge is informed by two GHG inventories.⁸⁸ A summary of the sector trend data published in August 2009 is shown below:

Table 1: Sector Emissions Trend and Percentage change from 1990⁸⁹

TABLE 0-4: SECTOR EMISSION TRENDS AND PERCENTAGE CHANGES FROM 1990

Sector	GHG emissions CO ₂ e Gg							
	1990 (CO ₂ e Gg)	% of total	1994 (CO ₂ e Gg)	% of total	2000 (CO ₂ e Gg)	% of total	2000 % change from 1994	2000 % change from 1990
Energy	260 886	75.1	297 564	78.3	344 106	78.9	15.6	31.9
Industrial processes and product use	30 792	8.9	30 386	8.0	61 469	14.1	102.3	99.6
Agriculture	40 474	11.6	35 462	9.3	21 289	4.9	-40.0	-47.4
Waste	15 194	4.4	16 430	4.3	9 393	2.1	-42.8	-38.2
Total (without LULUCF)	347 346		379 842		436 257		14.8	25.6

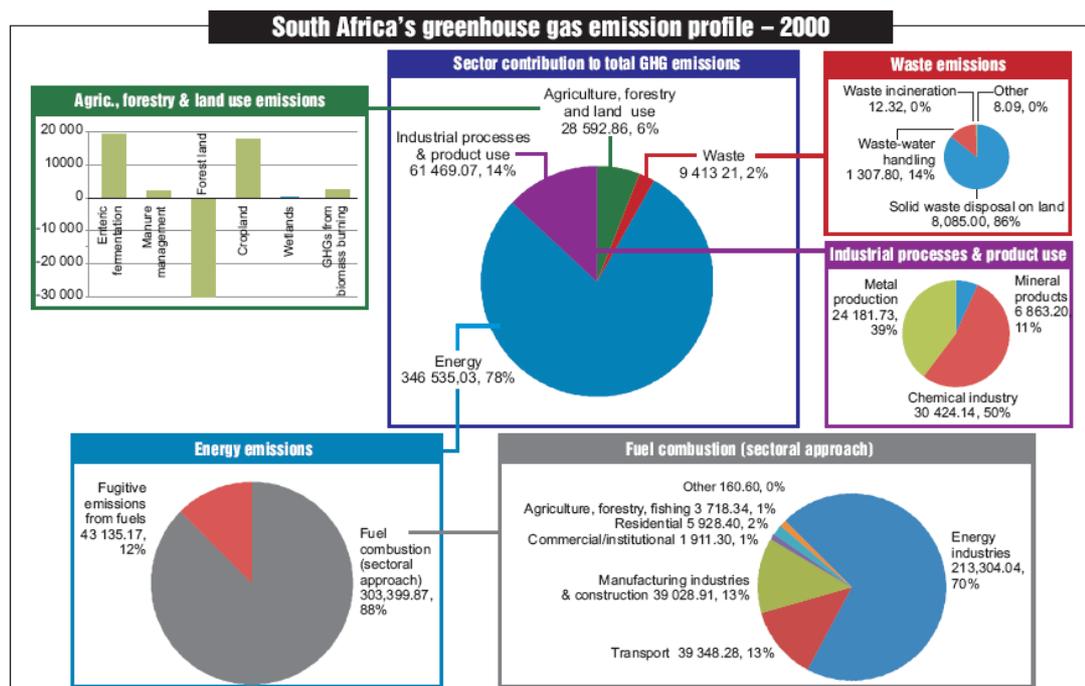
⁸⁶ United Nations Framework Convention on Climate Change (UNFCCC) 1992, Article 3.1.

⁸⁷ Department of Environment Affairs (Alf Wills) letter to Executive Secretary of UNFCCC 29 January 2010. Available at <http://unfccc.int/meetings/items/5276.php>. (Accessed 10.09.2011).

⁸⁸ Greenhouse gas emissions were estimated for 1990 and 1994 Department of Environmental Affairs and Tourism *Initial GHG inventory Report of South Africa* (2004) prepared for submission with the *Initial Communication to UNFCCC* (2004) and recently for 2000. Department of Environment Affairs and Tourism *Draft National Greenhouse Gas Inventory for the Republic of South Africa: Invitation for written representations and/or objections* in GN 1104 GG 32490 of 12 August 2009.

⁸⁹ *GHG Inventory* (2009) at v.

A comparison of the results shows an increase of about 25.6 per cent in the country's total emissions over the ten year period. The energy sector is by far the largest contributor to GHG in South Africa (75.1-78.9 per cent) and is following an increasing trend relative to other sectors.⁹⁰ There is considerable scope to reduce South Africa's overall GHG emissions by targeting the energy sector in particular. Further to this, most emissions from the energy sector are associated with energy consumption through the combustion of fuel. Industry accounts for 83 per cent of greenhouse gas emissions from fuel combustion, the bulk from the energy industry itself and a smaller contribution from manufacturing and construction industries.⁹¹ Therefore improving energy efficiency in industry has the potential to address a considerable portion of the total GHG emissions in South Africa. This is depicted in the chart below that shows the contribution by sector as determined in the 2000 inventory.⁹²



⁹⁰ Agriculture and Waste sectors show decreasing trends while industrial and energy sector reflect increasing trends. Some of the changes however are considered to be more of an attribute of differences in IPCC estimation methodologies and sector classification used for the different inventories as opposed to real changes.

⁹¹ Government of South Africa *Background Information and Discussion Document to facilitate the Climate Change Policy Engagement* (2010) Revision 5.0 at 21.

⁹² *GHG Inventory* (2009) at 13.

Figure 1: The South African greenhouse gas emission profile, base year 2000 (Department of Environmental Affairs, 2009) ⁹³

The high emissions from the energy sector are mainly attributed to the energy-intensive nature of South Africa's industry and the predominant use of coal to supply the country's energy needs. ⁹⁴ The combustion of coal results in the highest GHG emissions out of the range of fossil fuels. In this sense, the South African energy sector is emission or carbon intensive as well as energy-intensive. ⁹⁵

The inventory data points clearly to the energy sector as a focus area for efforts aimed at reducing greenhouse gas emissions. Increased energy efficiency and switching away from fossil fuels are key mitigation strategies and identified in various studies and policies being developed in this regard. ⁹⁶

Air Pollution

Industrial energy consumption also impacts on air quality in parts of South Africa. There are a number of other air pollutants related to power generation and other industry's reliance on fossil fuels. In particular, sulphur dioxide (SO₂), nitrogen oxide (NO_x) and particulate matter (PM) are emitted from the combustion of low grade coal ⁹⁷ and crude oil in the production of electricity and petroleum

⁹³ *Climate Change BID* (2010) at 21.

⁹⁴ See chapter 2.1.

⁹⁵ *Climate Change BID* (2010) at 21.

⁹⁶ Scenario Building Team 2007 *Long Term Mitigation Scenarios-Strategic Options for South Africa: Technical Summary* (2007) Department of Environment Affairs and Tourism, Pretoria; *Energy Efficiency Strategy* (2008); Department of Water and Environment Affairs *Draft National Strategy on Sustainable Development and Action Plan 2010-2014* in GN 393 GG 33184 of 14 May 2010; Department of Environmental Affairs *National Climate Change Response Green Paper* (2010) in GN 1083 GG 33801 of 25 November 2010.

⁹⁷ Spalding-Fecher R and Matibe DK 'Electricity and Externalities in South Africa' (2003) 31 *Energy Policy* 721 at 724; Winkler *Energy Policies* (2006) at 92.

products.⁹⁸ High particulate emissions are also caused by coal mining operations.⁹⁹ These pollutants are associated with health impacts such as respiratory illness.¹⁰⁰ In addition, SO₂ and NO_x may cause acidic deposition, commonly referred to as ‘acid rain’.¹⁰¹ In South Africa, the air quality in areas such as the Vaal Triangle does not meet the national ambient air quality standards,¹⁰² mainly due to emissions from power stations, petroleum and petrochemical industries, mining and other industries.¹⁰³

In summary, industrial energy consumption is responsible for a large part of the environmental challenges of climate change and air pollution. As a high proportion of industrial emissions is associated with the combustion of fuels to provide energy, either at power stations or at industrial sites, increased energy efficiency would have the ‘co-benefit’ of reduced pollution and GHG.¹⁰⁴ Therefore, improved industrial energy efficiency is absolutely central to both global and local attempts to address pollution.

⁹⁸ SAPIA (2008) at 38; Minimum emissions standards were set SO₂, NO_x and PM for various industries including Power Generation and Petroleum Industries under Department of Environmental Affairs and Tourism *National Environmental Management: Air Quality Act 39 of 2004: List of Activities which Result in Atmospheric Emissions which Have or May Have a Significant Detrimental Effect on the Environment, including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage* in GN 248 GG 33064 of 31 March 2010.

⁹⁹ Winkler *Energy Policies* (2006) at 16.

¹⁰⁰ Spalding-Fecher and Matibe (2003) at 724

¹⁰¹ Ibid.

¹⁰² Department of Environmental Affairs and Tourism *National Environmental Management: Air Quality Act (39/2004): National Ambient Air Quality Standards* in GN 1210 GG 32816 of 24 December 2009.

¹⁰³ Department of Environmental Affairs and Tourism *National Environmental Management: Air Quality Act (39/2004): Vaal Triangle Air-Shed Priority Area Air Quality Management Plan* in GNR 613 GG 32263 of 28 May 2009.

¹⁰⁴ *Draft Clean Technology Fund Investment Plan* (2009) at 18.

2.2.3. Regulatory Challenges

Since the inclusion of the ‘environmental right’ in the Constitution,¹⁰⁵ there has been a rapid development of legislation to give effect to the government’s imperative to provide a regulatory system that supports ‘an environment that is not harmful to human health or well-being’.¹⁰⁶ New laws governing water, waste and air quality management are likely to result in a step change in operational and capital expenditure by industry to meet their environmental obligations.¹⁰⁷ Emerging climate change and energy policy and legislation may add to this burden.

Many of the South Africa’s environmental laws rely on a command-and-control approach. Authorisations, licenses or minimum standards are set and failure to comply attracts legal consequences.¹⁰⁸ This form of regulation tends to be overly prescriptive and inflexible and ultimately costly to both regulator and regulated, usually industry in the local context. The regulator must have sufficient capacity to administer and enforce legislation and there is often little scope for industry to adopt most cost effective measures to achieve environmental objectives.¹⁰⁹

¹⁰⁵ Constitution of the Republic of South Africa, 1996.

¹⁰⁶ Section 24.

¹⁰⁷ These laws include National Water Act 36 of 1998; National Environmental Management Air Quality Act 39 of 2004; National Environmental Management Act 107 of 1998; National Environmental Management: Integrated Coastal Management Act 24 of 2008; National Environmental Management: Waste Act 59 of 2008.

¹⁰⁸ Kleynhans and Kotze estimate at least 25 laws some form of authorisation. Kleynhans EPJ and Kotze LJ ‘A Critical Analysis of the Effect of South African Environmental Legislation on the International Competitiveness of Local Industries’ (2008) 15 (2) *SAJELP* 245 at 263. Some examples of legislation see note 108.

¹⁰⁹ Kleynhans and Kotze (2008) at 264; Paterson AR ‘Pruning the Money Tree to Ensure Sustainable Growth: Facilitating Sustainable Development through Market-Based Instruments’ 2006 (3) *PER* 1/27 at 1/27-2/27.

In South Africa, the drawbacks of the command-and-control approach are heightened by institutional and legislative fragmentation where environmental laws are administered and enforced across different levels and departments within the government.¹¹⁰ Effective regulation around energy-related environmental issues requires a high level of cooperative governance between the Department of Environmental Affairs and the Department of Minerals Resources and the Department of Energy (the latter two formerly combined into the Department of Minerals and Energy (DME)).¹¹¹ In the past, this has been largely lacking with DME priorities being focused on economic development. Lack of capacity in both energy and environmental departments adds to the inefficiencies and delays caused by the duplication and unclear separation of roles.¹¹² This has resulted in a negative perception within industry that environmental laws are difficult and costly to comply with as they are unclear and there is insufficient guidance.¹¹³ Overall, industry perceives that current environmental regulations impact negatively on South African industry's international competitiveness.¹¹⁴

The command-and-control approach and institutional fragmentation also impact negatively on the promotion of energy efficiency. Several institutions have been put in place since 1994 to coordinate energy planning and promote energy efficiency. These include the National Energy Regulator of South Africa (NERSA) in 1995, DME's National Energy Efficiency Agency (NEEA) in 2006, the South African National Development Institute (SANEDI)¹¹⁵ and the National Energy Response Team (NERT) in 2008. However, these bodies are viewed as under resourced and hampered by unclear mandates.¹¹⁶

¹¹⁰ Kleynhans and Kotze (2008) at 265-268.

¹¹¹ *Climate Change Green Paper* (2010) at 32.

¹¹² Kleynhans and Kotze (2008) at 268.

¹¹³ Kleynhans and Kotze (2008) at 250-251.

¹¹⁴ *Ibid.*

¹¹⁵ National Energy Act 34 of 2008 s7.

¹¹⁶ Tyler (2009) at 9.

Several commentators suggest market-based instruments (MBIs) may provide a more appropriate and cost-effective means of overcoming the inefficiencies and high costs of South Africa's traditional command-and-control approach.¹¹⁷ As the concept of energy efficiency is based fundamentally on the use of the economic market, the promotion of energy efficiency lends itself to the use of MBIs as a regulatory approach. Energy efficiency means that the same output is achieved with less energy input. The saving in energy equates to cost savings commensurate with the price of the energy used. Energy pricing that reflects social, economic and environmental costs is fundamental to energy efficiency.¹¹⁸

In summary, it is clear that South Africa is facing significant socio-economic and environmental challenges associated with the energy sector. These are compounded by regulatory challenges. Improved energy efficiency measures in industry are central to any strategy to addressing these concerns. The low price of energy has traditionally been one of the main barriers to the development of energy efficient industry in South Africa.¹¹⁹ Therefore, it is not surprising that the South African government is turning to MBIs as a tool to overcome these challenges.¹²⁰ Before considering the extent to which SA has done so and what options exist for extending their use, we need to understand what MBIs are and the theoretical benefits, disadvantages and prerequisites that underlie their successful introduction.

¹¹⁷ Kleynhans and Kotze (2008) at 274; Paterson (2006) *PER* at 4/27; Paul G W Henderson 'Fiscal Incentives for Environmental Protection – Introduction' (1994) 1 *SAJELP* 49 at 51.

¹¹⁸ *Energy Efficiency Strategy* (2008) at 34.

¹¹⁹ *Energy White Paper* (1998) at 34; *Climate Change Green Paper* (2010) at 19.

¹²⁰ Several policy documents and legislation published in past four years make provision for MBIs. Some examples are the *Draft MBI Policy* (2006); *Energy Efficiency Strategy* (2008); *Climate Change Green Paper* (2010); *Draft Sustainable Development Strategy* (2010). MBIs implemented to date discussed in chapter 5.

3. The Case for Market-Based Instruments in Environmental Regulation

In the last few years market-based instruments (MBIs) have become increasingly popular both locally and internationally as a means of achieving environmental objectives. Much has been written on the theory underlying the use of such mechanisms and their advantages and disadvantages.¹²¹ This chapter summarises the theoretical basis for MBIs and how they can support governments and industries to achieve environmental objectives such as improving energy efficiency and reducing GHG pollution.

3.1. What are MBIs?

MBIs are a range of measures that governments can introduce to attempt to attach a cost to environmental goods (such as clean air and water) or to influence

¹²¹ This section draws on a sample of writings on the subject. Paterson A 'Incentive-Based Measures' in A Paterson A and Kotze LJ (eds) *Environmental Compliance and Enforcement in South Africa: Legal Perspectives* (2009) 232-321; Stavins R 'Experience with Market-Based Environmental Policy Instruments' in Möler K & Vincent J (eds) *Handbook of Environmental Economics* (2003) Vol 1 North-Holland/Elsevier Science 355-435; European Environment Agency *Market-based Instruments for Environmental Policy in Europe* (2005) EEA Technical Report No. 8/2005; Paterson AR 'Pruning the Money Tree to Ensure Sustainable Growth: Facilitating Sustainable Development through Market-Based Instruments' 2006 (3) *PER* 1/27; Henderson PGW 'Fiscal Incentives for Environmental Protection – Conceptual Framework' (1995) 1 *SAJELP* 55; Henderson PGW 'Fiscal Incentives for Environmental Protection – Introduction' (1994) 1 *SAJELP* 49; Henderson PGW 'Fiscal Incentives for Environmental Protection – Way Forward' (1995) 2 *SAJELP* 151; Commission of European Communities *Green Paper on Market-Based Instruments for Environment and Related Policy Purposes* COM (2007) 140; National Treasury *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa* (2006) Government Printers, Pretoria.

behaviour through market signals.¹²² In South Africa, the National Treasury defines MBIs as ‘a group of policy instruments that seek to correct environmentally-related market failures through the price mechanism.’¹²³ Similarly, Stavins defines MBIs as ‘regulations that encourage behaviours through market signals rather than through explicit directives regarding pollution control levels or methods.’¹²⁴

Analysts suggest that to a large extent pollution and environmental degradation, such as those outlined in the previous chapter, have come about as a consequence of the incorrect pricing of environmental goods.¹²⁵ Traditionally, these resources have been viewed as common goods, owned by all, and therefore not considered in the overall cost of production and consumption. As a result hidden costs to society and the environment, such as health impacts from pollution and increased scarcity of resources for future generations, are not reflected in the market price of the finished product.¹²⁶ Given that the market is theoretically the most efficient means of distributing scarce resources, this failure to adequately account for environmental costs has been termed ‘market failure’.¹²⁷

In terms of the South African energy sector, ‘market failure’ is clearly linked to the historical processes of industrial development outlined in the last chapter that privileged the generation of cheap electricity from coal, thus fostering the growth of high energy-intensity industries and low energy efficiency practices both in industry and households. As discussed in chapter 2, until recently, and arguably even today, energy prices have not reflected the costs to the environment, particularly in terms of air quality and greenhouse gas emissions and drove what is increasingly understood as undesirable energy inefficient behaviour.

¹²² Stavins (2003) at 358.

¹²³ *Draft MBI Policy* (2006) at 2.

¹²⁴ Stavins (2003) at 358.

¹²⁵ EEA (2005) at 6.

¹²⁶ *Ibid*; Henderson (1994) at 50; Paterson in Paterson and Kotze (2009) at 299.

¹²⁷ *Draft MBI Policy* (2006) at 41; *EU Green Paper on MBIs* (2007) at 3; Paterson in Paterson and Kotze (2009) at 298-299; Henderson (1994) at 50.

In cases where the market failure results in unacceptable consequences such as environmental degradation or unsustainable resource use, there is a strong case for governments to intervene to address the market failure.¹²⁸ One of the most effective intervention options is the use of MBIs which have been described as ‘harnessing market forces’ to achieve environmental goals by providing an economic driver for pollution control within industry.¹²⁹

MBIs are categorized in various ways by commentators and analysts.¹³⁰ The scheme described by Paterson¹³¹ is used here to summarise the types of MBIs commonly employed in environmental management. There are broadly two main categories of MBIs, those that create new markets and those that use existing markets. This dissertation focuses on the latter as described in the chapter 1.

3.1.1. MBIs that Create New Markets

MBIs that create new markets attempt to improve environmental performance by allocating ownership rights to environmental goods such as clean air or water. These rights generally take the form of tradable permits or certificates. A cap is set on the overall use of the environmental good, usually a maximum allowable quantity in terms of emissions or discharge volume or the exploitation of natural resources. A market of tradable permits or rights is then set up to determine the apportionment of the allowance amongst those competing for the use of this good.¹³² These instruments are often referred to as ‘Cap and Trade’ programmes. The most common

¹²⁸ *Draft MBI Policy* (2006) at 41; Henderson (1994) at 52.

¹²⁹ Stavins (2003) at 358.

¹³⁰ See more discussion Paterson in Paterson and Kotze (2009) at 303-304; Henderson- Way Forward (1995); Stavins (2003) 360- 361; EEA (2005) at 6.

¹³¹ Paterson in Paterson and Kotze (2009) at 300.

¹³² Paterson in Paterson and Kotze (2009) at 304.

examples are emission trading systems (ETS) to manage air quality¹³³ and greenhouse gas emissions.¹³⁴ There are some examples of energy savings trading schemes such as the Right to Consume (RTC) trial scheme implemented by Eskom as a response to the electricity crisis in 2008.¹³⁵ ETS are theoretically an efficient means of reducing emissions or improving energy efficiency particularly where a specific reduction target must be achieved, but there are a number of pitfalls and design issues that must be considered for effective implementation. Much has been written on the subject,¹³⁶ but it is not discussed in depth here as the scope of the dissertation is delimited to MBIs that use existing markets.

3.1.2. MBIs Using Existing Markets

MBIs that use existing markets form the focus of this dissertation. This category encompasses a range of instruments that build on markets and pricing structures that already exist. MBIs that use existing markets can be negative or positive in nature.¹³⁷ Those labelled as ‘positive’ MBIs provide an incentive for firms

¹³³ Examples are Acid Rain program, NOx Budget Trading program and various regional air quality trading schemes such as ‘Regional Clean Air Incentives Market (RECLAIM)’. For more see Stavins (2003).

¹³⁴ Some USA examples are Western Climate and the Regional Greenhouse Gas Initiatives (RGGI). Some European greenhouse gas trading schemes are the UK greenhouse gas emissions trading scheme and the European Union emissions trading scheme (EU ETS). For more information see EEA (2005) at 27-34; Tyler E, Du Toit M & Dunn Z *Emissions Trading as a Policy Option for Greenhouse Gas Mitigation in South Africa* (2009) Energy Research Centre, University of Cape Town at 7-11.

¹³⁵ See chapter 2.2.1.

¹³⁶ For more information refer to EEA(2005) at 16-39; Stavins (2003) at 392-407; European Commission *Proposal for a Directive of the European Parliament and of the Council Amending Directive 2003/87/EC so as to Improve and Extend the Greenhouse Gas Emission Allowance Trading Scheme of the Community* COM (2008) 16; Gilbertson T and Reyes O ‘When the cap does not fit- cap and trade and the failure of the EU emissions trading scheme’ (2009) 7 *Critical Currents Dag Hammarskjold foundation occasional paper series* 31; Tyler, Du Toit & Dunn (2009).

¹³⁷ Paterson in Paterson and Kotze (2009) at 300; Henderson – *Conceptual Framework* (1995) at 67-68.

to take action to improve environmental performance. In contrast, what have become known as ‘negative’ MBIs act as disincentives for environmentally damaging behaviour.¹³⁸

Negative MBIs

Negative MBIs aim to impose costs on activities that impact detrimentally on the environment. In this regard, they give effect to the ‘polluter pays’ principle and internalise costs associated with environmental degradation or depletion of natural resources.¹³⁹ These usually take the form of pollution charge systems;¹⁴⁰ user charges; license fees; product taxes and performance bonds.¹⁴¹ Some commentators also include liability rules and compensation schemes and the removal of ‘perverse subsidies’ as MBIs that would fall within this category.¹⁴² Each of these is briefly discussed below:

Pollution charges such as emission, effluent and disposal charges incentivise action to reduce pollution by charging per unit mass or concentration of pollutant emitted.¹⁴³ Revenue generated may be ‘earmarked’ to support environmental management, monitoring or enforcement.¹⁴⁴

¹³⁸ Henderson – Conceptual Framework (1995) at 67.

¹³⁹ Henderson – Conceptual Framework (1995) at 67.

¹⁴⁰ Stavins (2003) at 363.

¹⁴¹ Paterson in Paterson and Kotze (2009) at 302-304.

¹⁴² Stavins (2003) at 361; EEA (2005) at 6; *Draft MBI Policy* (2006) at 85.

¹⁴³ This is known as a Pigouvian tax based on the concept that environmental taxes should be imposed per unit pollution at an optimal tax rate that would balance the marginal cost of pollution abatement to the benefit achieved. EEA (2005) at 13 citing A C Pigou *The Economics of Welfare* (1932).

¹⁴⁴ Paterson in Paterson and Kotze (2009) at 302.

User charges are imposed to finance specific environmental services by charging those who benefit from them.¹⁴⁵ Users (both companies and individuals) are charged for the use of environmental goods and public amenities such as municipal waste collection, water use or access to national parks. The idea is that environmental and administrative costs associated with environmental management are passed on to the user. However, reduction of consumption or impact on resources is only really encouraged if differential rates are imposed on the use of goods more in line with pollution charges described above.¹⁴⁶

License fees are administrative charges that share some similarity with user fees, but typically are associated with legislation that allows for the licensing of ‘environmentally deleterious activities’ including air, water and waste disposal permits among others; the exploitation of natural resources such as minerals or marine and terrestrial living resources; and commonly used products that negatively impact the environment such as vehicles. License fees finance license administration and may act in some way to internalise environmental costs and promote ‘cleaner production’.¹⁴⁷

Product taxes or levies are placed on certain environmentally deleterious products such as plastic bags, and transport fuels to internalise the costs of pollution and steer environment-friendly consumer behaviour. Revenue generated may be used for environmental management.¹⁴⁸ The electricity levy introduced in South Africa is an example of a product tax.¹⁴⁹

Performance bonds involve companies posting sums of money as a bond or guarantee against meeting specified targets or standards. The company is encouraged

¹⁴⁵ Paterson in Paterson and Kotze (2009) at 302.

¹⁴⁶ Paterson in Paterson and Kotze (2009) at 302.

¹⁴⁷ Paterson in Paterson and Kotze (2009) at 302-303.

¹⁴⁸ Paterson in Paterson and Kotze (2009) at 303.

¹⁴⁹ See chapter 5.7.

to meet these targets to recover the bond (or part thereof), and if it fails to do so, the bond finances the State to rectify any environmental damage caused by the failure.¹⁵⁰

Liability rules and compensation schemes may also provide an economic incentive to companies to implement control measures that reduce the risk of environmental incidents. For example, in certain jurisdictions, companies are faced with large payouts for clean up or compensation in the case of oil spills or to address waste site remediation liabilities. In some cases these potential costs affect the price of the commodity.¹⁵¹ Payment into statutory funds and fines fall within this category.¹⁵²

Reducing subsidies that adversely impact the environment is also an option within the implementation of MBIs.¹⁵³ Although these ‘perverse subsidies’ are often originally implemented to achieve specific goals such as support industrial growth or promote employment, unintended impacts to society and the environment may in practice outweigh the expected benefits.¹⁵⁴ During international sanctions against apartheid, Sasol’s Coal to Liquid (CTL) process was subsidised as part of the strategy to make South Africa self sufficient in terms of energy.¹⁵⁵ Although this subsidy has been phased out, it allowed Sasol to develop the technology and expertise required by ensuring it remained competitive against oil refining

¹⁵⁰ Paterson in Paterson and Kotze (2009) at 303.

¹⁵¹ EEA (2005) at 119.

¹⁵² Henderson- Way Forward (1995) at 158.

¹⁵³ Stavins (2003) at 414.

¹⁵⁴ For more examples, see Paterson in Paterson and Kotze (2009) at 301; Stavins (2003) at 414-416; *Draft MBI Policy* (2006) at 85; EEA (2005) at 102-103.

¹⁵⁵ Winkler H (ed) *Energy Policies for Sustainable Development: Options for the Future* (2006) Energy Research Centre, University of Cape Town at 6.

competitors.¹⁵⁶ From an environmental perspective though, CTL is an inefficient process in terms of energy consumption and emissions intensity.¹⁵⁷

Positive Incentives

Using existing markets, there are a number of instruments that are positive in the sense that they aim to persuade companies or individuals to reduce their environmental impact by rewarding them in some way. Although they may influence companies to improve environmental performance, positive incentives do not fulfil the objective of internalising environmental costs, nor do they generate revenue. In a way, they would appear to be in contravention of the polluter pays principle.¹⁵⁸ However, as Henderson notes:

‘An exception to the polluter pays principle could be considered where industries have been developed within the framework of a particular environmental knowledge and technological state, and where the industry is then required to change its technology, processes or operations in order to comply with new environmental requirements. In this case an argument may be advanced for the State providing an incentive for a transitional period.’¹⁵⁹

There are three main types of positive incentive, namely, direct subsidies, deposit-refund schemes and tax benefits.¹⁶⁰

¹⁵⁶ The subsidy was based on the price of crude oil which is fairly volatile and is determined by a number of factors on the international market. The subsidy kicked in when the crude price made it more expensive to produce liquid fuels from CTL than crude oil.

¹⁵⁷ Only one third of energy from coal is usable as liquid fuel. Department of Minerals and Energy *National Energy Efficiency Strategy of the Republic of South Africa, First Review October 2008* in GN 908 GG 32342 of 26 June 2009 at 16.

¹⁵⁸ Henderson – Conceptual Framework (1995) at 68.

¹⁵⁹ Henderson – Conceptual Framework (1995) at 60.

¹⁶⁰ Paterson in Paterson and Kotze (2009) at 300-301.

Subsidies are typically used to support specific activities that are deemed to be strategic and beneficial to society, but would not be economically viable within the free market. Historically, they have been used to support vulnerable industries, bolster local production against international competition or protect employment.¹⁶¹ Nowadays, they are being used more frequently to foster environmental programs such as the development of renewable energy technology.¹⁶² Direct subsidies¹⁶³ generally take the form of financial assistance by the State to companies or individuals in order to reduce costs for consumers or producers below the market level.¹⁶⁴

Deposit–refund systems are used to encourage recycling and reuse of products whose disposal may be damaging to the environment. Typical products targeted in these schemes are packaging, used oil and tyres. A user charge is placed on the product, but a refund is available as a positive incentive to return the product to the collection point for reuse or recycling.

The tax system can also be used to encourage certain activities that are beneficial to the environment such as investing in clean technology or fostering the sustainable use of natural resources.¹⁶⁵ These may operate through the existing tax system using tax instruments such as income tax, property tax, excise taxes, capital gains tax and estate duties.¹⁶⁶ Environmental tax benefits may take different forms, namely, differentiation or reductions; rebates; exemptions; accelerated depreciation allowances and deductions. Some examples of tax benefits in South Africa are the energy efficiency and additional investment allowances under s12 of South Africa’s

¹⁶¹ Many of these could be termed perverse subsidies as discussed.

¹⁶² EEA (2005) at 116.

¹⁶³ As noted by Paterson in Paterson and Kotze (2009) at 301, some forms of tax benefits are essentially subsidies administered through the existing tax system while direct subsidies are funds granted for specific purposes outside of the tax system.

¹⁶⁴ EEA (2005) at 101.

¹⁶⁵ Described under the heading ‘Tax benefits’ by Paterson in Paterson and Kotze (2009) at 300.

¹⁶⁶ Paterson in Paterson and Kotze (2009) at 300.

Income Tax Act that aim to promote energy efficiency.¹⁶⁷ The differentiation of product or sales taxes on product alternatives may also be used to encourage the use of environmentally preferred products such as unleaded petrol available at a reduced cost relative to leaded gasoline in Europe in the mid 1980s to mid 1990s.¹⁶⁸ This differentiation takes the form of a reduction on the excise taxes of specific products.

3.2. What are the Positives and Disadvantages of MBIs?

From the discussion above, it is obvious that there is a range of MBIs available to the regulator that may be designed and implemented to fit specific objectives. The next section discusses the main advantages and disadvantages that MBIs have in common when compared to other regulatory options such as command-and-control approaches or information strategies.

An obvious benefit of MBIs in general is that they are arguably the most cost effective means of achieving environmental objectives. In theory, if appropriately designed and implemented, the desired environmental improvement is achieved at the least cost to society as a whole.¹⁶⁹ Abatement is undertaken by those who can do so at least cost.¹⁷⁰ As industries differ in age, technology and complexity, these abatement costs can vary significantly between facilities. In contrast, direct regulation,¹⁷¹ in the form of uniform emission or technology standards, requires that all those who fall within the regulated category must achieve these standards regardless of cost.¹⁷² Theoretically, direct regulation can be applied in such a way that emission abatement is achieved cost effectively. In practice, however, regulators

¹⁶⁷ See chapter 5.1 and 5.2.

¹⁶⁸ Stavins (2003) at 389.

¹⁶⁹ Stavins (2003) at 359.

¹⁷⁰ Ibid.

¹⁷¹ Often referred to as 'command-and-control'.

¹⁷² Stavins (2003) at 358; Henderson (1994) at 51;

would require detailed information at a company level and this is seldom available.¹⁷³

MBIs aim to improve the price signal to internalise environmental costs and influence behaviour. This means that decisions that may affect environmental performance are considered on the same basis as any other investment or operational cost opportunities. If MBIs are not used as a regulatory tool, environmental impact considerations are weighed against financial implications in a more subjective process. Command-and-control regulation may ensure that standards are met, but they do nothing to encourage performance that exceeds the standards.¹⁷⁴ A properly designed MBI gives a price signal to economically justify companies undertaking pollution control activities to the extent that overall environmental objectives are met.

As MBIs do not specify technology or emission standards, they allow for more flexibility in company level response.¹⁷⁵ Companies have more discretion with regards to investment timeframes and abatement technologies that are best suited to their particular circumstances. As direct regulation is often based on installing abatement technologies that are currently available,¹⁷⁶ they tend to hamper the development of new or innovative abatement technologies. MBIs are believed to be more conducive to ‘technological innovation’.¹⁷⁷

As described earlier, negative MBIs give effect to the ‘polluter pays’ principle and may be used to raise revenue for the Treasury or earmarked for

¹⁷³ Stavins (2003) at 359.

¹⁷⁴ Stavins (2003) at 359; Paterson in Paterson and Kotze (2009) at 307.

¹⁷⁵ *EU Green Paper on MBIs* (2007) at 3; Henderson (1994) at 51

¹⁷⁶ Best available technology (BAT) is often specified. European Council Directive 2008/1/EC of 15 January 2008 *Concerning Integrated Pollution Prevention and Control* OJ (L24/8).

¹⁷⁷ *EU Green Paper on MBIs* (2007) at 3; Henderson (1994) at 51; EEA (2005) at 6; Paterson in Paterson and Kotze (2009) at 307.

environmental expenditure, depending on the type and design of instrument.¹⁷⁸ In some jurisdictions, revenue generated from environmental taxes has been used to offset a reduction in income taxes.¹⁷⁹ This is known as the ‘double dividend’ effect as social welfare is improved at the same time as achieving environmental objectives.¹⁸⁰ In addition, there may be positive benefits for employment if labour taxes are reduced, a so-called ‘triple dividend’.¹⁸¹

Taxes and charges provide a ‘dynamic incentive’ to environmental improvement and raise revenue, but the overall outcome is uncertain.¹⁸² However, they provide information on market response to environmental price signals. They have been used successfully as trials to gather data for the design of ETS and environmental taxes.¹⁸³

Subsidies do not generate revenue or give effect to the polluter pays principle, but can be used to shape behaviour. They are often effective for building up fledgling industries that are strategic to environmental policy¹⁸⁴ and for providing

¹⁷⁸ Henderson – Conceptual Framework (1995) at 58; EEA (2005) at 13.

¹⁷⁹ *EU Green Paper on MBIs* (2007) at 5. Most experience has been gained from Scandinavian countries. In the early 90s, Finland (1990), Sweden (1990), Norway (1991) and Denmark (1992) introduced taxes on Carbon emissions in a tax shifting exercise to both address emerging Climate Change concerns and reduce individual income tax. Since then several other European countries have followed suit- Netherlands (1996), Slovenia (1997), Germany (1998) and UK (2000). Andersen MS ‘Environmental and Economic Implications of Taxing and Trading Carbon: Some European Experiences’ (2008) 10 *Vermont Journal of Environmental Law* 61 at 63.

¹⁸⁰ EEA (2005) at 85; *Draft MBI Policy* (2006) at 6.

¹⁸¹ Winkler H & Marquard A *Analysis of the Economic Implications of a Carbon Tax* (2009) Energy Research Centre, University of Cape Town at 3.

¹⁸² EEA (2005) at 14.

¹⁸³ EEA (2005) at 14.

¹⁸⁴ Such as government funds for sustainable development in Sweden and the UK’s Carbon Trust. EEA (2005) at 109.

the right price signal in the market.¹⁸⁵ As discussed above, care should be taken to avoid creating perverse incentives.

Liability and compensation schemes ensure that polluters pay for environmental damage. In some cases, the costs of insurance or remediation fund contributions are reflected in the price signal. The limiting factor of these as effective MBIs is the often drawn out and expensive legal process associated with liability claims.¹⁸⁶

There are some potential drawbacks to the use of MBIs. There is less certainty in the outcome when MBIs are used as opposed to direct regulation methods.¹⁸⁷ If the price signal is not strong enough, there may not be enough of an economic incentive to change behaviour. If the price signal is too high, the economy as a whole may be adversely affected.

There are also concerns regarding the impact that MBIs may have on equity.¹⁸⁸ Although the justification for building the environmental costs into the price of goods is clear, there is a concern that necessities such as water and energy will become unaffordable to poorer households. There are ways of overcoming this effect through rebates, subsidies or graduated pricing structures that allow for basic minimum consumption.¹⁸⁹

¹⁸⁵ To internalise environmental costs and to make environmentally beneficial options, such as alternative energy sources more affordable. Without subsidy, the price would reflect technology and infrastructure development costs. With subsidy, pricing is more attractive.

¹⁸⁶ EEA (2005) at 133.

¹⁸⁷ Trading schemes are an exception. Certainty is provided by the setting of a cap or allowable quota that meets the overall objective. This is seen as one of the main advantages of trading schemes over other MBIs such as taxes.

¹⁸⁸ EEA (2005) at 9.

¹⁸⁹ For example, South Africa allows 6 000 litres per household per month free basic water. Thereafter water prices increase depending on consumption.

MBIs may, in addition, impact on the competitiveness of industry, both internationally and sometimes regionally within the domestic market.¹⁹⁰ If environmental externalities are included in the price of goods in one country, but not in those of their international competitors, the foreign trading parties will have an economic advantage. This potential shortcoming is not unique to MBIs. To some extent any environmental regulatory approach may impact on competitiveness and is certainly perceived by industry to do so.¹⁹¹ It stands to reason that the most cost-effective means of environmental regulation is desirable to limit competitiveness effects. Therefore, MBIs may be favoured over other approaches in this regard. In addition, instruments may be designed to reduce the impact on competition by adjusting excise taxes or exempting or subsidising vulnerable industries. Care should be taken though to ensure that the overall scheme is not rendered ineffective by overprotecting industries.¹⁹²

3.3. What are the Theoretical Prerequisites for their Successful Introduction?

There are a number of characteristics and underlying principles that have been shown to be prerequisite to the successful implementation of MBIs. Overall the principles of good taxation, namely efficiency, equity, certainty, simplicity and cost minimization, underpin the desirability of any financial instrument.¹⁹³ These principles and characteristics form criteria that can be used to evaluate the likely success of MBIs.¹⁹⁴ The criteria specified by the South African Treasury for the

¹⁹⁰ Paterson in Paterson and Kotze (2009) at 307.

¹⁹¹ Kleyhans EPJ and Kotze LJ 'A Critical Analysis of the Effect of South African Environmental Legislation on the International Competitiveness of Local Industries' (2008) 15 (2) *SAJELP* 245 at 250-251. For more see chapter 2.2.3.

¹⁹² By way of example, the carbon tax introduced in Germany failed to achieve the desired emission reductions because coal was not included. Anderson (2008) at 69.

¹⁹³ For further information on the principles of good taxation, see *Draft MBI Policy* (2006) at 26-27.

¹⁹⁴ *Draft MBI Policy* (2006) at 56-64; Paterson in Paterson and Kotze (2009) at 329-334.

evaluation of instruments targeting environmental objectives¹⁹⁵ are used here as headings. These are environmental effectiveness, certainty, technical and administrative aspects, tax revenue, support for the tax, legislative aspects, competitiveness, distributional impacts and adjoining policy areas.¹⁹⁶

Environmental effectiveness: The MBI must be environmentally effective.¹⁹⁷ A clear policy framework is required to set environmental objectives and the boundaries within which such interventions should operate.¹⁹⁸ A rational link must exist between the instrument and the intended environmental outcome¹⁹⁹ and it is important that the results are quantifiable if success is to be measured.²⁰⁰

Certainty: Certainty is desirable in terms of environmental outcomes, price stability and MBI design. Price stability provides companies certainty and confidence to invest in abatement technology as payback can be assessed.²⁰¹ For the same reason, care should be taken to limit changes to MBI design.²⁰²

Technical and administrative aspects: To be effective and overcome potential shortfalls, MBIs must be properly designed. The technical design should incorporate the principles of simplicity, certainty, flexibility and ease of implementation.²⁰³ Trials are often useful to develop market response information prior to design. Flexibility with respect to timing and technology options generally supports more

¹⁹⁵ *Draft MBI Policy* (2006) at 56-64.

¹⁹⁶ Various commentators discuss the criteria using slightly different classification descriptions.

¹⁹⁷ *Draft MBI Policy* (2006) at 59; Paterson in Paterson and Kotze (2009) at 329.

¹⁹⁸ *EU Green Paper on MBIs* (2007) at 3.

¹⁹⁹ Paterson in Paterson and Kotze (2009) at 329.

²⁰⁰ Stavins (2003) at 419.

²⁰¹ For example, a carbon tax is set annually and stays constant for the period. In contrast, the prices of ETS permits are determined by the going rate on the open market and are susceptible to price volatility.

²⁰² EEA (2005) at 10.

²⁰³ *Draft MBI Policy* (2006) at 61-62, 74.

successful results. It is imperative that environmentally acceptable alternatives are available where behaviour change is driven by MBIs.²⁰⁴

Administration aspects are key to determining the ease with which MBIs are implemented. Experience with the design and implementation of MBIs is often lacking within environmental departments of both government institutions and industry. Typically, environmental staff has a better understanding of traditional command-and-control approaches than financial markets and a mind-set change is needed to leverage the full benefits provided by MBIs.²⁰⁵ In terms of regulatory administration, environmental taxes are implemented through existing tax systems and require very little additional institutional capacity. In South Africa the tax system is robust and well capacitated and efficiently administered by the South African Revenue Services (SARS).²⁰⁶ Monitoring and enforcement is still required, but may need to take a different form.²⁰⁷

Tax revenue: For those MBIs that generate revenue through taxes or levies, there are a number of considerations that should be taken into account. The most important issue is setting the tax rate at the optimum level to achieve the desired effect without overburdening the economy. Exemptions should be kept to a minimum.²⁰⁸ From a design perspective, tax rates should be indexed to inflation to avoid erosion of their effectiveness over time.²⁰⁹ Normally taxes are levied on goods where demand is inelastic. This means that the increased price does not reduce demand for the good. However, when an MBI is implemented to promote efficient

²⁰⁴ EEA (2005) at 11.

²⁰⁵ Stavins (2003) at 419.

²⁰⁶ Robb G, Tyler E and Cloete B *Carbon Trading or Carbon Tax? Weighing Up South Africa's Mitigation Options* Unpublished paper presented at 'Putting a Price on Carbon' Conference held at the University of Cape Town, 23-24 March 2010, 196-213 at 208.

²⁰⁷ Stavins (2003) at 418.

²⁰⁸ *Draft MBI Policy* (2006) at 59.

²⁰⁹ EEA (2005) at 11.

consumption, ‘elastic’ goods²¹⁰ should be taxed.²¹¹ Earmarking of funds for specific environmental programs is possible as described above.

Support for the tax: MBIs that are supported by stakeholders are far more likely to be effective. Those that focus on issues that have general support²¹² and where the benefits are clear and responsibilities well defined tend to be more politically attractive.²¹³ Stakeholder engagement processes and adequate advance warning of planned schemes is crucial to successful implementation. Pilot or phasing-in schemes may be used to build stakeholder engagement and support.²¹⁴

Legislative aspects: Legislative aspects are fundamental to the functioning of MBIs. In South Africa a sound environmental legislative framework has been set in place with the implementation of the National Environmental Management Act 107 of 1998 (NEMA) and associated sector-specific acts.²¹⁵ When MBIs are put in place, further regulations are required to clearly define rules and allocate responsibilities. Transparency in this regard is particularly important for promoting stakeholder buy-in²¹⁶ and to avoid manipulation by influential stakeholders.²¹⁷

Competitiveness: Competitiveness is often viewed as a barrier to the implementation of MBIs and must be addressed. A realistic stance by regulators is

²¹⁰ Demand for these goods is elastic in that demand decreases with increased cost.

²¹¹ Paterson in Paterson and Kotze (2009) at 333.

²¹² Described as ‘picking winners’ in EEA (2005) at 10.

²¹³ *Draft MBI Policy* (2006) at 60.

²¹⁴ EEA (2005) at 10; Robb (2010) at 209.

²¹⁵ Such as National Water Act 36 of 1998; National Environmental Management: Protected Areas Act 57 of 2003; National Environmental Management Air Quality Act 39 of 2004; National Environmental Management: Biodiversity Act 10 of 2004; National Environmental Management: Integrated Coastal Management Act 24 of 2008; National Environmental Management: Waste Act 59 of 2008.

²¹⁶ EEA (2005) at 10.

²¹⁷ Robb (2010) at 208.

needed to avoid undermining the effectiveness of measures through overprotection of industry. Industry pressure groups may overstate their case in stakeholder engagement.²¹⁸

Distributional effects: Distributional effects must also be considered for the effective implementation of MBIs to ensure that impacts are equitable and that poorer households are not unduly affected.²¹⁹

Adjoining policy areas: The impacts of proposed MBIs on adjoining policy areas must also be considered. Care must be taken that the behaviour change associated with MBIs fits in with the broader policy framework and socio-economic goals of the country. Policy, legal and institutional alignment is necessary to avoid unwanted impacts and perverse incentives.²²⁰ In some instances, trade-offs may be necessary and should be evaluated using impact assessment techniques.²²¹ For the successful implementation of MBIs to address environmental challenges in the energy sector, cooperative governance between regulators in several policy areas is crucial.²²² National, provincial and local government governing energy, environment, industry and fiscal matters all have a role to play.

In conclusion, the theory establishes a case for MBIs as useful tools to drive environmental objectives. There is a range of complex and diverse MBIs available within the broad classification and these may be tailored to achieve a specific aim such as the promotion of energy efficiency. There are several general prerequisites that underpin their successful implementation. Key among these is that there should

²¹⁸ Paterson in Paterson and Kotze (2009) at 334.

²¹⁹ Ibid; *Draft MBI Policy* (2006) at 63.

²²⁰ Paterson in Paterson and Kotze (2009) at 331; *Draft MBI Policy* (2006) at 64.

²²¹ EEA (2005) at 10.

²²² Paterson in Paterson and Kotze (2009) at 332.

be a clear policy and regulatory framework in place.²²³ Policy establishes environmental objectives and direction and enabling legislation must be developed to implement MBIs. The following chapter describes South African policy relevant to energy efficiency in industry and the potential use of MBIs in this context. MBIs that have been enacted through legislation to promote energy efficiency in industry are thereafter critically assessed in chapter 5.

²²³ Paterson AR 'Environmental Fiscal Reforming South Africa: Considering Recent Developments' (2009) 16 (1) *SAJELP* 23 at 23; *EU Green Paper on MBIs* (2007) at 3.

4. An Overview of the Domestic Policy Framework Relating to Efficient Energy Consumption in Industry

The challenges presented by the domestic energy sector have been recognised by South Africa's policy-makers and response actions have been included in the formulation of various policies. In particular, energy efficiency measures have been proposed in a number of environmental, energy and fiscal policies and strategies. In many instances, the use of market-based instruments (MBIs) is considered to support these measures. This chapter briefly reviews relevant South African policy to highlight the increasing policy focus on the promotion of energy efficiency in industry and the possible use of MBIs as a regulatory tool to achieve this objective.

4.1. Environmental policies

The post-apartheid government initiated the development of a new national environmental policy that culminated in the release of the *White Paper on Environmental Management Policy for South Africa (Environmental Management Policy)*²²⁴ in 1998. It was aimed at providing an overarching environmental framework policy to inform the development of sectoral policies and environmental governance across all government departments.²²⁵ It sets out the then Department of Environment Affairs and Tourism's vision of achieving sustainable development in South Africa through a holistic and integrated environmental management approach.²²⁶ The *Environmental Management Policy* identified that previous development policies had done little to promote energy efficiency in industry and

²²⁴ Department of Environment Affairs and Tourism *White Paper on Environmental Management Policy for South Africa* in GN 749 GG 18894 of 15 May 1998.

²²⁵ *Environmental Management Policy* (1998) at 10.

²²⁶ *Environmental Management Policy* (1998) at 13.

households²²⁷ and highlighted the need to promote energy efficiency to enable the sustainable use of energy resources.²²⁸ In the industrial sector, the *Environmental Management Policy* pointed to some of the Department of Minerals and Energy's plans for the establishment of Energy Services companies (ESCOs) and an Energy Efficiency Agency to support the environmental management policy objectives.²²⁹ The *Environmental Management Policy* promotes the use of MBIs as part of a package of regulatory tools that could be used by Government to internalise the costs of environmental damage,²³⁰ achieve environmental improvements and promote sustainable resource use.²³¹

South Africa has been in the process of developing a climate change response strategy since ratifying the United Nations Framework Convention on Climate Change (UNFCCC)²³² in 1997.²³³ As part of this effort, the *Long term mitigation scenario (LTMS)*²³⁴ study in 2006 modelled the GHG emissions for a number of economic scenarios. The *LTMS* identified improved industrial energy efficiency as having the largest scope for mitigation with an overall positive economic effect.²³⁵ The 'Use the Market' scenario incorporates the wide-scale adoption of MBIs to promote energy efficiency and renewable energy.²³⁶ As this scenario predicts the most successful GHG mitigation, the use of MBIs and the potential of improved

²²⁷ *Environmental Management Policy* (1998) at 68.

²²⁸ *Environmental Management Policy* (1998) at 33.

²²⁹ *Environmental Management Policy* (1998) at 67. These initiatives will be discussed in more detail in chapter 3.2.

²³⁰ *Environmental Management Policy* (1998) at 79.

²³¹ *Environmental Management Policy* (1998) at 81 and 32.

²³² Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) adopted at COP3 in Kyoto, Japan in 1997.

²³³ Department of Environmental Affairs and Tourism *Ratification of the United Nations Framework Convention on Climate Change* in GN 1676 GG 18539 of 19 December 1997.

²³⁴ Scenario Building Team 2007 *Long Term Mitigation Scenarios-Strategic Options for South Africa: Technical Summary* (2007) Department of Environment Affairs and Tourism, Pretoria at 1.

²³⁵ *Long Term Mitigation Scenarios* (2007) at 14.

²³⁶ Mainly an escalating carbon tax, and subsidies for renewable energy, biofuels & solar water heaters. *Long Term Mitigation Scenarios* (2007) at 18.

industrial energy efficiency have become an important aspect of developing climate change policy.

The results of the *LTMS* formed the basis of the Cabinet’s policy approach to reduce GHG along a ‘peak, plateau and decline’ emission trajectory. The approach advocates that GHG emissions stop growing (start of plateau) in 2020-25 and begin declining in absolute terms (end of plateau) in 2030-35.²³⁷ Figure 2 below depicts this strategy against the *LTMS* scenarios.²³⁸

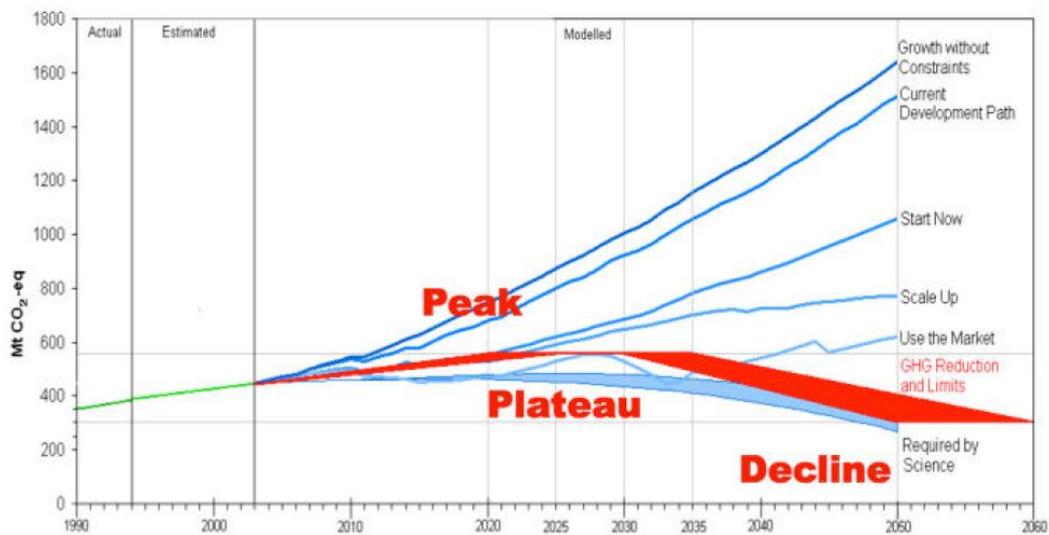


Figure 2: Cabinet’s peak, plateau and decline trajectory²³⁹

South Africa’s commitment to the ‘peak, plateau, decline’ approach has been confirmed in the international context by the country’s submission to the UNFCCC

²³⁷ Department of Environment Affairs and Tourism *National Climate Change Response Policy* Discussion Document for the 2009 National Climate Change Response Policy Development Summit, Midrand, 2-6 March 2009 at 17.

²³⁸ It shows a rise in emissions until about 2020, followed by a plateau until 2035, followed by a decrease of 30% to 40% by 2050.

²³⁹ Tyler E, Du Toit M & Dunn Z *Emissions Trading as a Policy Option for Greenhouse Gas Mitigation in South Africa* (2009) Energy Research Centre, University of Cape Town at 3.

to reduce emissions by 34% by 2020 and 42% by 2050 from business as usual predictions.²⁴⁰

Local policy development continues in order to realise the international commitment. In May 2010, the *Background Information and Discussion Document to facilitate the Climate Change Policy Engagement (Climate Change BID)*²⁴¹ was issued, followed by the *National Climate Change Response Green Paper (Climate Change Green Paper)*²⁴² gazetted for public comment in November. The *Climate Change BID* and the *Climate Change Green Paper* presents the government's vision regarding appropriate response action and identifies the energy and industrial sectors along with transport as key mitigation areas.²⁴³ Energy efficiency and the transition to renewable forms of energy are the main target areas.²⁴⁴

With regards to industrial energy efficiency, significant scope has been identified for improved demand side energy management and energy efficient technology in both energy and non-energy industries.²⁴⁵ To this end, MBIs such as an escalating carbon tax are proposed to motivate the implementation of energy efficiency measures.²⁴⁶ Research and development programs will be put in place to develop and demonstrate new technologies.²⁴⁷ The longer-term effects of such

²⁴⁰ Department of Environment Affairs (Alf Wills) letter to Executive Secretary of UNFCCC 29 January 2010. Available at <http://unfccc.int/meetings/items/5276.php>. (Accessed 10.09.2011).

²⁴¹ Government of South Africa *Background Information and Discussion Document to facilitate the Climate Change Policy Engagement* (2010) Revision 5.0.

²⁴² Department of Environmental Affairs *National Climate Change Response Green Paper* (2010) in GN 1083 GG 33801 of 25 November 2010.

²⁴³ *Climate Change Green Paper* (2010) at 14-19.

²⁴⁴ *Climate Change Green Paper* (2010) at 15.

²⁴⁵ *Climate Change Green Paper* (2010) at 15.

²⁴⁶ *Climate Change Green Paper* (2010) at 16 and 19.

²⁴⁷ *Climate Change Green Paper* (2010) at 16.

programs will be included in future electricity planning.²⁴⁸ Current energy efficiency initiatives will be scaled up and become mandatory.²⁴⁹ Energy efficiency standards,²⁵⁰ guidelines and codes of practice should be developed and awareness training carried out widely within industrial sector.²⁵¹ Industrial sources responsible for more than 0.1 per cent of the total sector emissions will be required to prepare and implement approved mitigation plans.²⁵² These may include energy efficiency and energy management measures.

The emerging policy objectives on climate change are further mirrored in draft sustainable development policy. The *Draft National Strategy on Sustainable Development and Action Plan 2010-2014 (Draft Sustainable Development Strategy)*²⁵³ sets out the strategy and action plan to achieve the vision of a sustainable society.²⁵⁴ The Strategy comprises three elements. Firstly, economic development must be redirected towards a more sustainable path.²⁵⁵ One of the key objectives is to reduce the use and emission intensity of resources.²⁵⁶ Energy efficiency measures, especially where these result in decreased fossil fuel consumption are of relevance. Secondly, behaviour change is required to promote environmentally responsible behaviour (among other goals).²⁵⁷ The Strategy supports the use of MBIs to drive

²⁴⁸ The Integrated Resource Plan for Electricity Generation (IRP). *Climate Change Green Paper* (2010) at 16.

²⁴⁹ *Climate Change Green Paper* (2010) at 17.

²⁵⁰ In particular the *Climate Change Green Paper* (2010) advocates improved industrial and commercial energy efficiency by replacing or reducing energy consumption with the following equipment, amongst others: improved boiler efficiency, energy efficient HVAC systems, heat pumps, variable speed drives, efficient motors and heaters. *Climate Change Green Paper* (2010) at 17 and 19.

²⁵¹ *Climate Change Green Paper* (2010) at 19.

²⁵² This will be regulated under s29 (1) of National Environmental Management: Air Quality Act 39 of 2004. *Climate Change Green Paper* (2010) at 19.

²⁵³ Department of Water and Environment Affairs *Draft National Strategy on Sustainable Development and Action Plan 2010-2014* in GN 393 GG 33184 of 14 May 2010.

²⁵⁴ *Draft Sustainable Development Strategy* (2010) at 9.

²⁵⁵ *Draft Sustainable Development Strategy* (2010) at 12.

²⁵⁶ *Draft Sustainable Development Strategy* (2010) at 13.

²⁵⁷ *Draft Sustainable Development Strategy* (2010) at 12.

behaviour change in various focus areas, including increased energy efficiency.²⁵⁸ The third element to the strategy is the incorporation of sustainability issues into policies and planning of all relevant sectors and levels within government.²⁵⁹

The *Draft Sustainable Development Strategy* Action Plan identifies five strategic priorities of which two, ‘responding to climate change’, and ‘towards a green economy’ have particular relevance to energy efficiency.²⁶⁰ The energy and industrial sectors are targeted to reduce resource use and energy intensity. The energy efficiency targets for overall consumption and for industry and mining are incorporated.²⁶¹ Once again, planned interventions rely heavily on MBIs such as an escalating carbon tax to achieve this.²⁶² The goals will be aligned with the national climate change response strategy when finalised.²⁶³

The review of relevant environmental policies above highlights that energy efficiency measures are central to emerging climate change response and sustainable development strategies. It is, therefore, crucial that the importance of energy efficiency is reflected in South African energy policy.

4.2. Energy Policies

In 1998, the erstwhile Department of Minerals and Energy released the *White Paper on the Energy Policy of the Republic of South Africa (Energy White Paper)*²⁶⁴

²⁵⁸ *Draft Sustainable Development Strategy* (2010) at 14.

²⁵⁹ *Ibid.*

²⁶⁰ *Draft Sustainable Development Strategy* (2010) at 15.

²⁶¹ 12 % overall and 15% for industry and mining. *Draft Sustainable Development Strategy* (2010) at 17 and 20. The energy efficiency targets are discussed in chapter 4.2 of this dissertation.

²⁶² *Draft Sustainable Development Strategy* (2010) at 17.

²⁶³ *Draft Sustainable Development Strategy* (2010) at 17-16.

²⁶⁴ Department of Minerals and Energy *White Paper on the Energy Policy of the Republic of South Africa GN 307 GG 19606* of 17 of December 1998.

which outlines the main challenges facing the energy sector in the post-apartheid era. It identifies five key objectives which need to be addressed in South Africa's energy sector:²⁶⁵ 'increasing access to affordable energy services'; 'improving energy governance';²⁶⁶ 'stimulating economic development'; 'managing energy related environmental impacts' and 'securing supply through diversity'.²⁶⁷

The *Energy White Paper* extends the historical focus on energy production alone to a more sustainable approach that includes considerations of social, health and environmental impacts, including the need to reduce greenhouse gases. As such it 'holds considerable promise in laying the policy basis for a sector well equipped to respond to the challenges of climate change mitigation.'²⁶⁸ Many of the goals outlined in the environmental policies described in chapter 4.1 already featured in the *Energy White Paper*.²⁶⁹

Energy efficiency is identified as a significant tool to provide both financial and environmental benefits.²⁷⁰ The importance of energy pricing is identified and the need to implement energy efficiency measures and technological advancements²⁷¹ which provide a balance between supporting economic growth while internalising social and environmental costs.²⁷² Recognising that previous governments had done

²⁶⁵ *Energy White Paper* (1998) at 23.

²⁶⁶ The *Energy White Paper* (1998) particularly advocated improved energy governance to overcome the lack of transparency and accountability under apartheid structures and to improve capacity and public participation in the sector.

²⁶⁷ *Energy White Paper* (1998) at 23-27.

²⁶⁸ Tyler E *Aligning South African Energy and Climate Change Mitigation Policy* (2009) Energy Research Centre, University of Cape Town at 9.

²⁶⁹ Specifically *Environmental Management Policy* (1998); *Climate Change Green Paper* (2010); and *Draft Sustainable Development Strategy* (2010).

²⁷⁰ The paper estimates that energy efficiency has the potential to reduce consumption by 10 to 20%. *Energy White Paper* (1998) at 10.

²⁷¹ Some alternative technologies are inherently more energy efficient such as combined-cycle natural gas electricity production. *Energy White Paper* (1998) at 73.

²⁷² *Energy White Paper* (1998) at 25.

little to promote energy efficiency, the policy advocates a commitment from government ‘to facilitate greater energy efficiency’,²⁷³ particularly within industry and the transport sector. Part of this effort entails the development on national energy efficiency targets²⁷⁴ and the necessary institutional capacity to promote energy efficiency programmes.²⁷⁵

The *Energy White Paper* includes discussion on fiscal and pricing issues and the usefulness of fiscal mechanisms for achieving energy policy objectives. It advocated that the government investigate further the opportunity to implement MBIs such as income tax options, subsidies, removal of perverse subsidies,²⁷⁶ fuel and energy levies to promote energy efficiency and environmental goals.²⁷⁷ However, a carbon tax was viewed at the time as being a threat to the developing economy.²⁷⁸

Some of the goals and initiatives put forward in the *Energy White Paper* have been the subject of further policy development in the ensuing years, particularly in relation to renewable energy, electricity pricing and energy efficiency.

The *White Paper on the Renewable Energy Policy of the Republic of South Africa*²⁷⁹ (*Renewable Energy Policy*) was published in 2003. It promotes the development of the renewable energy industry in South Africa and sets a ten-year target for renewable energy to contribute 10 000 GWh to total energy consumption

²⁷³ *Energy White Paper* (1998) at 10.

²⁷⁴ *Energy White Paper* (1998) at 27.

²⁷⁵ *Energy White Paper* (1998) at 29, 87.

²⁷⁶ *Energy White Paper* (1998) at 11.

²⁷⁷ *Energy White Paper* (1998) at 101-106.

²⁷⁸ *Energy White Paper* (1998) at 92.

²⁷⁹ Department of Minerals and Energy *White Paper on the Renewable Energy Policy of the Republic of South Africa* (2003) in GN 513 GG 26169 of 14 May 2004.

by 2013.²⁸⁰ The *Renewable Energy Policy* advocates the use of renewable energy sources, mainly biomass, wind, solar and small-scale hydroelectric schemes for power generation and non-electric technologies such as solar water heating and bio-fuels.²⁸¹

MBIs are seen as fundamental to the development of the renewable energy sector and the success of the initiative.²⁸² The initial high costs to commercialise new technologies make renewable energy options uncompetitive in the short to medium term. Government support in terms of subsidies, levies, tax rebates and other measures will be necessary to overcome this barrier to renewable energy entry into the energy market.²⁸³

While the *Renewable Energy Policy* deals primarily with the development of a renewable energy industry, there is some overlap between renewable energy and the promotion of energy efficiency.²⁸⁴ The policy highlights the potential to use renewable energy sources to provide energy close to the point of consumption to reduce transmission losses. This provides an energy efficient means of decreasing demand-side consumption, especially relevant in industrial, commercial and household applications.²⁸⁵ Widespread installation of solar energy equipment in industry and commercial buildings result in decreased demand and therefore forestall predicted investment in new power plants.²⁸⁶ As stated in context of the other related

²⁸⁰ The target equates to about 4% of the projected electricity demand for 2013 or the equivalent to replacing two of Eskom's coal fired power stations (2x 660 MW). *Renewable Energy Policy* (2003) at 25.

²⁸¹ *Renewable Energy Policy* (2003) at 25.

²⁸² *Renewable Energy Policy* (2003) at xi.

²⁸³ *Renewable Energy Policy* (2003) at 27 and 29.

²⁸⁴ *Renewable Energy Policy* (2003) at 36.

²⁸⁵ *Renewable Energy Policy* (2003) at 12.

²⁸⁶ *Renewable Energy Policy* (2003) at 36.

policy documents, legislation will be passed to promote renewable energy and energy efficiency opportunities.²⁸⁷

Building on the *Energy White Paper* theme regarding the importance of electricity pricing, the then Department of Minerals and Energy (DME) developed the *Electricity Pricing Policy (EPP)*²⁸⁸ in 2008. The policy aims to balance the competing objectives of supplying affordable electricity to low income users while at the same time ensuring that electricity prices are ‘cost reflective’ overall. The *EPP* advocates that electricity prices provide a realistic market signal, reflective of supply costs, to generate sufficient revenue to ensure the financial viability of the electricity sector.²⁸⁹

In theory, a competitive electricity market would result in the most efficient prices. As described in chapter 2, environmental and social costs are not always adequately incorporated. The South African electricity supply industry is tightly regulated and dominated by Eskom. Nonetheless, it is very important to set electricity prices at a level that ensures that the allocation of resources and consumption of electricity (and other energy carriers) is as efficient as possible and that the industry remains financially viable.²⁹⁰

There are a number of principles put forward in the *EPP* that are particularly important in relation to promoting energy efficiency. The *EPP* maintains that electricity prices should allow the electricity industry to generate sufficient revenue to cover the costs incurred with a reasonable profit and to obtain reasonable funding

²⁸⁷ *Renewable Energy Policy* (2003) at 34.

²⁸⁸ Department of Minerals and Energy *Electricity Pricing Policy (EPP) of the South African Electricity Supply Industry* in GN 1938 GG 31741 of 19 December 2008.

²⁸⁹ *EPP* (2008) at 9. The electricity sector is defined in the *EPP* (2008) as incorporating generation, transmission and distribution.

²⁹⁰ *EPP* (2008) at 15.

for future investment.²⁹¹ As far as possible, tariffs should accurately reflect the costs incurred in providing electricity.²⁹² Taxes and levies may be imposed ‘over and above the cost reflective charges’²⁹³ for purposes such as promoting environmental improvements. In this regard, transparency is paramount. The *EPP* recommends that electricity billing is ‘unbundled’ so that customers are provided with sufficient information about their consumption and costs to enable them to make informed decisions.²⁹⁴

Another element of the *EPP* that should promote energy efficiency in industry is the policy position that long-term forecasts should be issued by the national Energy Regulator of South Africa (NERSA) on an annual basis. This should provide industry with a greater level of certainty with regards to pay back on medium to long-term energy efficiency initiatives and investment opportunities.²⁹⁵ While the *EPP* generally opposes the concept of cross subsidies and promotes the discontinuation of many of those currently occurring within the energy supply industry, it is recognised that some cross subsidies may be necessary to achieve specific social, political and economic objectives.²⁹⁶ The policy framework however suggests that the terms and objectives of cross subsidies must be transparent and communicated to the public.²⁹⁷

Demand-side management (DSM) forms a key aspect of the *EPP*.²⁹⁸ This is particularly pertinent to industrial energy efficiency in that it advocates an approach that allows a licensee to recover costs for the promotion of DSM and energy efficiency improvements. NERSA would decide the amount of the funding based on

²⁹¹ *EPP* (2008) at 16.

²⁹² *Ibid.*

²⁹³ *EPP* (2008) at 17.

²⁹⁴ *Ibid.*

²⁹⁵ *EPP* (2008) at 19.

²⁹⁶ An example would be ‘Free Basic Electricity’ (FBE).

²⁹⁷ *EPP* (2008) at 41-47.

²⁹⁸ *EPP* (2008) at 50.

application and will ensure that it is fairly administered.²⁹⁹ NERSA is tasked with implementing the *EPP* and providing the regulatory oversight to ensure that tariffs and prices are equitable and reasonable.³⁰⁰

The National Energy Efficiency Strategy for the Republic of South Africa³⁰¹ (Energy Efficiency Strategy) was developed to further the energy efficiency interventions proposed in the Energy White Paper. The Energy Efficiency Strategy was first developed in 2005, but was reviewed in 2008 to incorporate the energy efficiency targets agreed to with several prominent industries under DME's voluntary Energy Efficiency Accord.³⁰² The Energy Efficiency Strategy is aimed at encouraging 'sustainable energy sector development and energy use through efficient practices'³⁰³ that minimise undesirable environmental and health impacts and contribute to 'secure and affordable energy for all'.³⁰⁴ The Energy Efficiency Strategy translates this vision into eight goals covering aspects of social, environmental and economic sustainability³⁰⁵ and sets an overall target to reduce final energy demand by 12 per cent by 2015.³⁰⁶ This is devolved into the following specific targets for individual sectors: industry and mining: 15 per cent; power generation: 15 per cent; commercial and public buildings: 20 per cent; transport: 9 per cent, and residential: 10 per cent. For the industry sector, annual sub-sector

²⁹⁹ Ibid.

³⁰⁰ *EPP* (2008) at 11.

³⁰¹ Department of Minerals and Energy *National Energy Efficiency Strategy of the Republic of South Africa, First Review October 2008* in GN 908 GG32342 of 26 June 2009.

³⁰² Department of Minerals and Energy *Energy Efficiency Accord* (August 2006) (updated). This is a voluntary initiative that was initiated by DME in 2005 and is administered by the National Business Initiative (NBI) Energy Efficiency Technical Committee.

³⁰³ *Energy Efficiency Strategy* (2008) at 12.

³⁰⁴ *Energy Efficiency Strategy* (2008) at 12.

³⁰⁵ *Energy Efficiency Strategy* (2008) at 12 to 13.

³⁰⁶ The target is expressed as % reduction against projected usage in 2015. *Energy Efficiency Strategy* (2008) at 20.

targets to improve energy intensity are incorporated.³⁰⁷ The target for the power generation industry is applicable to ‘non-essential consumption’ only. This equates to the implementation of similar measures envisaged for the general industry sector. Core power generation is exempted from the target because energy efficiency improvements in this regard generally require significant capital investment to refurbish or replace equipment. The Energy Efficiency Strategy tasks Eskom with developing long-term plans to address this.³⁰⁸

These targets are currently not mandatory. A range of command-and-control regulatory methods are put forward to support the Strategy including the development of efficiency standards, appliance labelling, certification and accreditation, awareness education, research and development and energy audits and management systems.³⁰⁹ However, mechanisms such as these can only achieve so much if voluntarily applied. The *Energy Efficiency Strategy* also advocates the implementation of energy efficiency initiatives under the mandate provided by legislation such as the National Energy Act³¹⁰ and Electricity Act.³¹¹ It is anticipated that amendments and regulations will be published as required. It is likely that certain elements like efficiency standards and energy audits may be made mandatory under suitable regulations.³¹²

MBIs provide a further set of implementing instruments under the *Energy Efficiency Strategy*. Most of the interventions identified as part of the Strategy have a short pay-back period³¹³ with current and expected energy prices. Investment or expenditure by industry, companies or individuals is therefore expected to be

³⁰⁷ 1% for Iron and Steel and for Chemical and petroleum industries, 2% for pulp, paper and printing industries and for cement industry. *Energy Efficiency Strategy* (2008) at 23.

³⁰⁸ *Energy Efficiency Strategy* (2008) at 24.

³⁰⁹ *Energy Efficiency Strategy* (2008) at 28-31.

³¹⁰ National Energy Act 34 of 2008.

³¹¹ Electricity Act 41 of 1987 (as amended).

³¹² *Energy Efficiency Strategy* (2008) at 25.

³¹³ Less than 3 years. *Energy Efficiency Strategy* (2008) at 11.

justifiable in pure economic terms. For those interventions with a longer pay-back period, other options are available or may be implemented through the fiscal reform process. These include the existing Clean Development Mechanism (CDM) processes and incentives, rebates and subsidies some of which have been implemented and are discussed in chapter 5.³¹⁴ The sectoral programme for industry and mining stresses the use of energy service companies (ESCOs) and the CDM to maximise potential savings from energy efficiency initiatives.³¹⁵

4.3. Fiscal Policies

The National Treasury recognizes the potential of MBIs as a tool to address certain environmental concerns. In April 2006 the Tax Policy Chief Directorate produced the *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa (Draft MBI Policy)*³¹⁶ that explores how environmentally-related taxes and charges could be used to drive environmental goals³¹⁷ in a cost effective manner and the potential contribution of such taxes to revenue generation. One of the environmental priorities discussed in this context is the role of energy efficiency in addressing air pollution and climate change.³¹⁸ The Treasury focuses on revenue generating instruments such as taxes and charges as opposed to expenditure instruments like subsidies. The *Draft MBI Policy* describes the framework and criteria used by the Treasury to evaluate the suitability of MBIs for use in South Africa. Existing environmental taxes and levies are reviewed against accepted principles of good taxation such as efficiency, equity, certainty, simplicity and cost minimization as well as a set of criteria developed to

³¹⁴ *Energy Efficiency Strategy* (2008) at 31-34.

³¹⁵ *Energy Efficiency Strategy* (2008) at 39.

³¹⁶ National Treasury *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa* (2006) Government Printers, Pretoria.

³¹⁷ Environmental goals are discussed in the context of sustainable development and challenges identified from the DEAT *National State of Environment Report* (1999). Air quality and Climate Change issues are amongst the environmental concerns identified.

³¹⁸ *Draft MBI Policy* (2006) at 17.

specifically evaluate environmentally related tax proposal.³¹⁹ These are: environmental effectiveness; tax revenue; support for the tax; legislative aspects; technical and administrative issues; competitiveness effects; distributional impacts; and adjoining policy areas.³²⁰

Options for environmental tax reform measures are discussed in terms of reforming existing environmentally-related taxes and non-environmentally related taxes with perverse environmental incentives and introducing new taxes or fiscal measures to promote environmental goals.³²¹ A clear message enunciated throughout the *Draft MBI Policy* is that ‘earmarking’ environmental tax revenue is not in line with sound fiscal management practices and should be considered carefully on a case- by-case basis.³²²

The Treasury is in the process of assessing the possible introduction of a carbon pricing mechanism in the form of a carbon tax or an emissions trading scheme (ETS). A discussion paper entitled *Reducing Greenhouse Gas Emissions: the Carbon Tax Option (Carbon Tax Discussion Paper)* was released in 2010.³²³ It outlines some possible options for carbon taxation in South Africa and provides some discussion on the implications and design considerations of carbon taxation to stimulate comment from stakeholders. Similarly a document on a carbon ETS will be prepared to complete the assessment.³²⁴ Currently the Treasury favours a carbon tax

³¹⁹ *Draft MBI Policy* (2006) at 56-64.

³²⁰ *Draft MBI Policy* (2006) at 56.

³²¹ *Draft MBI Policy* (2006) at 65 to 103.

³²² *Draft MBI Policy* (2006) at 321.

³²³ National Treasury Discussion Paper *Reducing Greenhouse Gas Emissions: The Carbon Tax Option* (2010). Available at <http://www.treasury.gov.za/public%20comments/Discussion%20Paper%20Carbon%20Taxes%2081210.pdf> (Accessed 06.09.2011).

³²⁴ *Carbon Tax Discussion Paper* (2010) at 10.

as more suitable for South Africa.³²⁵ The carbon tax options outlined in the *Carbon Tax Discussion Paper* will be discussed in more detail in chapter 6.

In summary, emerging policy for sustainable development, climate change and energy is consolidating into a coherent direction with regards to the transition to a low carbon energy sector through the promotion of renewable energy sources and energy efficiency. South African policy makers clearly favour the use of MBIs to achieve these goals, both generally and in the specific context of improved energy efficiency. The Treasury, in particular, has been clearly proactive in terms of environment-related fiscal reform. In this regard, the Treasury ‘appears to be rapidly ‘greening’ itself.’³²⁶ Institutions and legislation are being put in place to provide ‘the requisite hooks’ on which to pin these economic instruments’.³²⁷ In the following chapter, discussion turns to a critical consideration of relevant MBIs and enabling legislation currently operating in South Africa to promote energy efficiency particularly within industry.

³²⁵ *Carbon Tax Discussion Paper* (2010) at 9 and 29.

³²⁶ Paterson AR ‘Environmental Fiscal Reforming South Africa: Considering Recent Developments’ (2009) 16 (1) *SAJELP* 23 at 23.

³²⁷ *Ibid.*

5. An Evaluation of Market-Based Instruments Currently Implemented in South Africa to Promote Energy Efficiency in Industry

The comprehensive policy framework described in chapter 4 forms the basis for a number of market-based instruments (MBIs) introduced in South Africa in the past few years which seek to promote energy efficiency in industry. Of these, the major instruments that use current markets are described and assessed in this chapter.³²⁸ These are: the S12I investment allowance for industrial policy projects;³²⁹ the energy efficiency allowance;³³⁰ and a number of MBIs that impact on the price of electricity. The latter include: the electricity levy;³³¹ the renewable energy feed-in tariff (REFIT)³³² and cogeneration feed-in tariff (COFIT);³³³ and the demand side management programme.³³⁴ The dissertation now turns to an analysis of these MBIs. Each instrument will be described and then evaluated according to the relevant criteria highlighted in the *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa (Draft MBI Policy)*³³⁵ and discussed in chapter 3.3. These are environmental effectiveness, certainty, technical and administrative aspects, tax revenue, support for

³²⁸ The fluorescent light bulb levy proposed in the National Treasury *Budget 2009/2010 Tax Proposals* (2009) is also potentially relevant to industrial energy efficiency, but is not discussed in depth here as it is considered to play a minor role compared to other MBIs listed.

³²⁹ S12I of the Income Tax Act 58 of 1962.

³³⁰ S12L of the Income Tax Act 58 of 1962.

³³¹ See chapter 5.7.

³³² See chapter 5.4.

³³³ See chapter 5.5.

³³⁴ See chapter 5.6.

³³⁵ National Treasury *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa* (2006) Government Printers, Pretoria.

the tax, legislative aspects, competitiveness, distributional impacts and adjoining policy areas.³³⁶

5.1. Energy Efficiency Investment Allowance for Industrial Policy Projects

5.1.1. An Overview of the Energy Efficiency Investment Allowance

Investment in energy efficient technology is supported by ‘the additional investment and training allowances in respect of industrial policy projects’ inserted as s12I into the Income Tax Act 58 of 1962 (*S12I Allowances*) in 2008.³³⁷ These provisions allow for tax rebates on manufacturing sector investments described as ‘industrial policy projects’ that promote skills development³³⁸ (*S12I Training Allowance*) and energy efficiency through the use of new technology³³⁹ (*S12I Investment Allowance*). While these are the primary aims, several other industrial policy objectives must be met for a project to qualify as an ‘industrial policy project’. These are ‘innovative processes’, the use of clean production technology for improved energy efficiency, general business linkages, procurement from small, medium and micro enterprises, direct employment creation and skills development.³⁴⁰ The qualification process is subject to the approval of the Minister of Trade and Industry based on recommendations made by an adjudication committee.³⁴¹ This committee is comprised of representatives from the departments of Trade and Industry and the National Treasury or the South African Revenue Services (SARS).³⁴²

³³⁶ See chapter 3.3.

³³⁷ Inserted under s26 of the Revenue Laws Amendment Act 60 of 2008.

³³⁸ Income Tax Act 58 of 1962 s12I (4).

³³⁹ S12I (7)(a)(iv).

³⁴⁰ S12I (8)(a)-(f).

³⁴¹ S12I (8).

³⁴² S12I (16).

The *S12I Allowances* apply to qualifying industrial policy projects that exceed R30m for upgrading existing facilities, described as ‘brownfield’ projects, and R200m for new or ‘greenfield’ industrial projects.³⁴³ The allowance is potentially 55 per cent of the cost of the manufacturing asset if assigned ‘preferred status’ or 35 per cent in any other case, up to maximum specified amounts.³⁴⁴ This equates to a potentially lucrative incentive with maximum savings of R900m for greenfields projects or R550m for upgrades on existing facilities.³⁴⁵ Some manufacturing industries are excluded, such as arms manufacture³⁴⁶ and projects that receive concurrent industrial incentives from any national sphere of government or constitute an industrial participation project.³⁴⁷

The National Treasury published *Regulations made under Section 12I of the Income Tax Act, 1962 (Act No.58 of 1962) (12I Regulations)*³⁴⁸ to provide clarity and substance as to what constitutes an ‘industrial policy project’. The *12I Regulations* include a complicated point system that assigns a weighting to the factors that determine whether a project qualifies in this regard.³⁴⁹

To qualify as an industrial policy project, a project must first satisfy a number of prerequisite conditions with respect to skills development and energy efficiency improvement. A project must spend at least two per cent of the annual wage bill on industrial skills development and achieve an energy efficiency improvement of at

³⁴³ S12I (7)(a)(i)

³⁴⁴ S12I (3) Greenfield projects with preferred status: R900m, normal status : R550m; For brownfield projects : R550m and R350m respectively.

³⁴⁵ S12I (3).

³⁴⁶ S12I (1) ‘industrial project’ (b) mainly alcohol, arms and tobacco products as well as bio-fuels that may impact negatively on food security.

³⁴⁷ S12I (7)(a)(ii).

³⁴⁸ National Treasury *Regulations made under Section 12I of the Income Tax Act, 1962 (Act No.58 of 1962)* in *GNR 639 GG 33385* of 23 July 2010.

³⁴⁹ *12I Regulations* (2010) regs 4-6.

least ten per cent over the allowance period.³⁵⁰ For new projects, ‘modern, viable energy-efficient equipment and processes’ in comparison to industry sector must be used.³⁵¹

Thereafter, points are assigned for the ‘industrial policy project’ elements that are described in S12I (8).³⁵² Projects must achieve at least five out of ten points to qualify for the 35 per cent additional allowance and eight out of ten points to attain the ‘preferred status’ that allows for a rebate of 55 per cent of the asset costs.³⁵³

Some guidance and definition is provided around the industrial policy elements that must be considered by the adjudication committee although some aspects still remain vague or inconsistent. The lack of clarity relates particularly to three elements, namely, innovative processes; energy efficiency through cleaner production; and business linkages.

‘Innovative processes’³⁵⁴ refer to the use of new processes that ‘materially improve production time, reduce production costs, improve product quality or improve product longevity’.³⁵⁵ The definition of innovative processes is given as ‘changing pre-existing techniques and the use of plant, machinery or equipment’³⁵⁶ In the case of greenfield projects, this clearly cannot apply to actual equipment or processes so it must infer a comparison with similar processes in the pre-existing industry sector. There is no guidance on how this should be assessed or what benchmarking processes should be used.

³⁵⁰ As measured against a baseline established over the year preceding the application.

³⁵¹ *12I Regulations* (2010) reg 2.

³⁵² Income Tax Act s12I(8).

³⁵³ *12I Regulations* (2010) reg 4.

³⁵⁴ Income Tax Act s12I(8)(a)(i) and *12I Regulations* (2010) regs 5.1 and 6.1.

³⁵⁵ *12I Regulations* (2010) regs 5.1 (b) and 6.1 (b).

³⁵⁶ *12I Regulations* (2010) regs 5.1 (a) and 6.1 (a).

'Improved energy efficiency through cleaner production'³⁵⁷ is one of the primary goals of this MBI. Over and above the prerequisite of a ten per cent energy efficiency improvement, additional points may be allocated above higher thresholds.³⁵⁸ For brownfield projects points are allocated where the manufacturing asset achieves an energy efficiency improvement relative to the baseline energy consumption. The baseline is measured prior to the installation of the technology.³⁵⁹ For a greenfield project, there is no baseline energy consumption for comparison. Therefore, the *12I Regulations* allow for an allocation of points at the discretion of the Minister of Trade and Industry if the project meets the following description:

'(T)he project will utilise modern, viable energy-efficient equipment and processes throughout the additional investment allowance benefit period³⁶⁰ innovative for the particular industrial sector, as certified by South African National Energy Development Institute'³⁶¹.

There is no guidance regarding the determination of what 'modern, viable energy efficient equipment' is or how 'innovative' is benchmarked for the particular industrial sector. It is interesting that the South African National Energy Development Institute (SANEDI) will assess this while the adjudication committee rules on how innovative the process is. These may be closely linked given that the aim of the project is improved energy efficiency.

³⁵⁷ Income Tax Act s12I(8)(a)(ii) and *12I Regulations* (2010) regs 5.2 and 6.2.

³⁵⁸ *12I Regulations* (2010) regs 5.2 and 6.2.

³⁵⁹ The baseline is determined in the annual period prior to application for the allowance. The baseline calculation must be certified by SANEDI.

³⁶⁰ This only applies once the project achieves at least 50% of production. *12I Regulations* (2010) reg 6.2.

³⁶¹ *12I Regulations* (2010) reg 6.2.

‘General business linkages’³⁶² concerns the extent to which the project will support the competitiveness of the local production of goods. This criterion is applied similarly to greenfield and brownfield projects. One point is available for projects that manufacture goods where less than 40 per cent of the South Africa market is produced locally³⁶³ and to projects where local production requires ‘significant investment’.³⁶⁴ It is unclear what constitutes ‘significant investment’ and how the adjudication committee assesses the matter.

5.1.2. Critical Analysis of the Energy Efficiency Investment Allowance

In terms of environmental effectiveness, the additional investment allowance promotes energy efficiency in both existing and new industry. The scope for improved energy efficiency in industry and the potential environmental benefits have been discussed in chapter 2 and 4. There is a direct demonstrable link between improved energy efficiency in industry and better air quality and conservation of natural resources. However, energy efficiency is not the only driver behind the *S12I Allowances*.³⁶⁵ Only those projects that satisfy several other criteria are eligible for the allowances as ‘industrial policy projects’. The *S12I Investment Allowance* is therefore not driven solely by environmental outcomes.

In this sense, there is a trade-off between ‘environmental effectiveness’ and ‘adjoining policy areas’. Many of the factors incorporated in the *12I Regulations* point system could be classified as objectives of adjoining policy areas such as skills development, job creation, support for small, medium and micro enterprises and the creation of industrial development zones. However, some potential energy efficiency investment projects may not qualify under the point system and the potential

³⁶² S12I(8)(b) and *12I Regulations* (2010) regs 5.3 and 6.3.

³⁶³ *12I Regulations* (2010) regs 5.3(a) and 6.3(a).

³⁶⁴ *12I Regulations* (2010) regs 5.3(b) at 75 and 6.3(b).

³⁶⁵ Income Tax Act s12I.

environmental benefit is then foregone if the project is not justifiable without the *S12 Investment Allowance*.

The impact on competitiveness is an interesting consideration. Support for ‘industry policy projects’ is specifically aimed at increasing the competitiveness of industries or projects that incorporate certain desired behaviour. The *S12I Investment Allowances* are offered to projects that upgrade industry through job creation, skills development, energy efficiency improvement, increased local production of scarce goods and various other factors described above. Industries that do not fulfil the criteria are therefore at a competitive disadvantage. The *S12I Investment Allowance* appears to favour new entrants to the industry, or at least new facilities, in that the maximum allowance for greenfield projects is R900m in contrast to R550m for the expansion of existing projects.³⁶⁶

Distributional or equity considerations are similar to those discussed in terms of competitiveness. Originally, the Treasury proposed a 15 per cent deductible allowance on investment in energy efficiency equipment provided energy efficiency reductions were certified by the Energy Efficiency Agency.³⁶⁷ The *S12I Allowances* offer a higher incentive, but only to those projects that fulfil a range of policy objectives. The 15 per cent proposal would have allowed for a more equitable application across industry, but it would not have promoted the additional desired behaviours.

In terms of legislative aspects, S12I makes it mandatory for the Minister of Trade and Industry to publish regulations prescribing the factors that must be considered to qualify a project for the *S12I Allowances*.³⁶⁸ In this regard the point

³⁶⁶ S12I (3).

³⁶⁷ National Treasury *Budget 2009/2010 Tax Proposals* (2009) at 9. Available at <http://www.treasury.gov.za/documents/national%20budget/2009/guides/Budget%20Proposals%202009.pdf> (Accessed 06.09.2011).

³⁶⁸ Income Tax Act s12I (10).

system has been developed and published as the *S12I Regulations*. In light of the large potential benefits accruing from the tax allowance, these regulations are important in providing transparency to the decision making process. The requirement that an independent body³⁶⁹ certifies energy efficiency improvement claims further supports transparency.³⁷⁰ It could be argued, however, that some aspects of the regulations lack clarity and may allow for subjective decision making on the part of the adjudication committee and Minister of Trade and Industry. Some examples are discussed above, such as the determination of what ‘modern, viable energy efficient equipment’³⁷¹ is or how it is determined to be ‘innovative’ for the particular industrial sector.³⁷²

One of the main drawbacks of *S12I Investment Allowance* is the lack of simplicity and the impact this has in terms of certainty. This encompasses both technical design and administrative aspects. Regarding technical aspects, application of the allowance depends on the consideration of many factors. The points system described in the regulations seems unnecessarily complicated and depends on some apparently subjective factors as described above. It would appear that projects proponents planning to apply for approval as potential ‘industrial policy projects’ cannot be certain that the application will be successful.

The administrative requirements are also fairly complex. A new inter-departmental committee is set up for the administration of this allowance. The adjudication committee comprises at least three members each from the National Treasury and the department of Trade and Industry.³⁷³ These committee members should be sufficiently capacitated with the technical skills required to evaluate

³⁶⁹ South African National Energy Development Institute (SANEDI).

³⁷⁰ Paterson AR ‘Environmental Fiscal Reforming South Africa: Considering Recent Developments’ (2009) 16 (1) *SAJELP* 23 at 39.

³⁷¹ *12I Regulations* (2010) regs 2.2 (b) and 6.2 for Greenfield projects. As certified by SANEDI.

³⁷² *12I Regulations* (2010) regs 5.1 (a) and 6.1 (a).

³⁷³ Income Tax Act s12I (16).

applications and make recommendations to the Minister. Given the lack of technical capacity within many government departments,³⁷⁴ this issue may impact negatively on the success of the initiative. In addition, the approval process may be time consuming and subject to delays as interdepartmental committee meetings are sometimes difficult to schedule and the minister is required to make the final approval.

It may be premature to assess how much support there is for this incentive. The *12I Regulations* were only published in July 2010 and so it remains to be seen to what extent applications are submitted and approvals granted. Early indications are positive as five applications have been approved to date.³⁷⁵ The potentially lucrative benefits available under the allowance provide a significant incentive to industry.

The *S12I Investment Allowance* is a positive incentive and as such does not generate revenue. Given the potential benefits of improved energy efficiency, such as avoided costs of new power generation investment, the overall effect on the economy is likely to be positive.

5.2. Energy Efficiency Savings Allowance

5.2.1. An Overview of the Energy Efficiency Savings Allowance

For companies who make energy efficiency improvements through investment in new equipment or through other interventions, potential energy savings may be partly eroded by increased tax liability on higher profit margins.³⁷⁶ To offset this

³⁷⁴ See chapter 2.2.3.

³⁷⁵ The Minister of Trade and Industry has published the application approvals in the following notices: Department of Trade and Industry *Section 12i Tax Allowance Programme* in GN 480 to 484 GG34456 of 13 July 2011.

³⁷⁶ Paterson (2009) *SAJELP* at 40.

anomalous situation, S12L of the Income Tax Act 58 of 1962³⁷⁷ makes provision for a tax allowance for energy efficiency savings (*Energy Efficiency Savings Allowance*). The allowance may be deducted from the taxable income of any person derived ‘from carrying on any trade’.³⁷⁸

The allowance is calculated as the energy efficiency savings³⁷⁹ multiplied by the lowest feed-in-tariff³⁸⁰ and divided by a factor of two.³⁸¹ The energy efficiency savings calculations must be carried out and certified by acceptable institutions or bodies using specific criteria and methodology.³⁸² The outcome of the certification process is an energy efficiency savings certificate that documents the baseline energy consumption,³⁸³ the ‘reporting period energy use’³⁸⁴ and the annual energy efficiency savings determined by these as well as the methodology used for the calculations.³⁸⁵

According to S12L (1), regulations will be issued by the Minister of Energy³⁸⁶ to specify the criteria and methodology as well as accredited institutions or bodies. These regulations do not appear to be available as yet, but some guidance may be obtained from the draft explanatory memorandum that was published with

³⁷⁷ Inserted by S27 of Act 17 of 2009 and amended by S27 of the Taxation Laws Amendment Act 7 of 2010.

³⁷⁸ Income Tax Act S12L (2) in accordance with regulations issued by the Minister of Energy in terms of the National Energy Act 34 of 2008.

³⁷⁹ S12L (3) (b) expressed in kilowatt hours.

³⁸⁰ S12L (3) (c) expressed in rand per kilowatt hours, as determined by NERSA in terms of the *Regulatory Guidelines of the National Energy Regulator of South Africa* at the beginning of the assessment year.

³⁸¹ S12L (3)(d) unless the minister announces a different factor by government gazette.

³⁸² S12L (1).

³⁸³ Determined at the beginning of the assessment year.

³⁸⁴ Wording amended by s27 of the Taxation Laws Amendment Act 7 of 2010.

³⁸⁵ Income Tax Act s12L (1)(c).

³⁸⁶ In terms of the National Energy Act 34 of 2008. The minister of energy consults with the ministers of finance and trade and industry before publication of the regulations.

the Draft Taxation Laws Amendment Bill.³⁸⁷ According to this document, accredited ‘measurement and verification’ professionals will undertake the calculations and SANEDI will act as the certification authority. The *International Performance Measurement and Verification Protocol*³⁸⁸ of the Efficiency Valuation Organisation will form the basis of the regulations with regards to methodology.³⁸⁹ In line with this, the South African Bureau of Standards (SABS) has developed a technical specification, *Measurement and Verification of Energy Savings (SATS 50010)*³⁹⁰ for use in voluntary or regulatory processes where energy savings calculations are required.³⁹¹ *SATS 50010* calculates energy savings as the difference between the reporting period energy use and the baseline energy use adjusted for various factors. The adjustment caters for the fact that conditions may change over the assessment period and a straight subtraction of energy use at end of the period from that at the beginning may misrepresent energy efficiency gains.³⁹² For example, if energy use drops over the course of a year due to turndown in production, the reduction in energy consumption cannot be claimed as an improvement in energy efficiency. Once production increases, energy consumption will return to normal levels.

The *Energy Efficiency Savings Allowance* has yet to come into force although the tax amendments indicated that the allowance would operate between 1 January 2010³⁹³ and 1 January 2020.³⁹⁴

³⁸⁷ National Treasury *Draft Explanatory Memorandum on the Taxation Laws Amendment Bill 2009*. Available at <http://www.treasury.gov.za/public%20comments/EM%20for%20TLAB%202009.pdf> www.treasury.gov.za (Accessed 06.09.2011).

³⁸⁸ Efficiency Evaluation Organisation *International Performance Measurement and Verification Protocol: Concepts and Options for Determining Energy and Water Savings Vol 1* (2010). Available at <http://www.evo-world.org/> (Accessed 11.09.2011).

³⁸⁹ *Draft Explanatory Memorandum* (2009) at 29.

³⁹⁰ SABS *Measurement and Verification of Energy Savings (SATS 50010:2010)* SABS Standards Division Pretoria.

³⁹¹ *SATS 50010* at 3.

³⁹² *SATS 50010* at 6 and 8 to 9.

³⁹³ Income Tax Act s12L (2).

5.2.2. Critical Analysis of the Energy Efficiency Savings Allowance

The *Energy Efficiency Savings Allowance* acts as a positive incentive, or at least prevents a perverse incentive, in supporting energy efficiency improvements in industry.³⁹⁵ Energy efficiency projects would typically be motivated by the avoided energy cost using economic indicators such as payback period. Once the energy savings related to the energy efficiency investment or process improvements have been realised, taxable profits will increase. Energy efficiency improvements would therefore result in increased revenue for the Treasury. The *Energy Efficiency Savings Allowance* is aimed to removing this hurdle, allowing the taxpayer to accrue the full benefit of the energy savings.³⁹⁶

The *Energy Efficiency Savings Allowance* is well designed in several respects. It is fairly simple and available to all who can demonstrate energy efficiency savings related to carrying out a trade. There is no complicated point system or additional criteria that must be satisfied in order for the project to qualify. The only requirement is that energy saving must be demonstrated using acceptable methodology and must be certified by SANEDI. As discussed above, regulations will be published to clarify this process. Although some uncertainty is created by the fact that the allowance has been published before the regulations, some guidance is provided by *SATS 50010*. Project proponents can estimate potential payback with fair certainty in as far as energy savings and feed-in-tariffs can be forecast.³⁹⁷ The ten-year period during which the allowance will be available has been published and is long enough for planned projects to take advantage of the incentive.

The *Energy Efficiency Savings Allowance* is flexible as there is no minimum or maximum allowance. The amount is purely dependent on the energy savings

³⁹⁴ S12L (3).

³⁹⁵ Amongst other businesses that carry out any trade.

³⁹⁶ *Draft Explanatory Memorandum* (2009) at 28 to 29.

³⁹⁷ See chapter 5.4 below for more on feed-in tariffs.

realised. In addition, the Treasury does not need to allocate funds to cover the allowance as the energy saving raises the revenue in itself. From an equity standpoint, all industrial energy efficiency projects are eligible but it stands to reason that it can only apply to existing projects.

The *Energy Efficiency Savings Allowance* is administered through the existing tax system by SARS.³⁹⁸ This government department is widely considered to be efficient and effective.³⁹⁹ The requirement that independent bodies calculate and certify the energy savings will ensure that administration of the incentive is transparent and credible. The certification process may, however, prove costly and time-consuming which may present a barrier from the perspective of the taxpayer attempting to claim the allowance.

One area of potential misalignment is that of the relative pricing of energy carriers. The Income Tax Act does not define energy or energy efficiency. *SATS 50010* describes energy efficiency as the ‘efficient utilisation of an energy carrier or resource’.⁴⁰⁰ If this definition holds for the allowance, then an industry could claim the allowance for improved usage of electricity, fuel oil, coal or gas to name a few energy carriers. The actual savings in monetary terms would be the energy reduction (or ‘energy savings’ in 12L terms) multiplied by the cost of that carrier. The allowance is calculated using the lowest feed-in-tariff which is linked to electricity prices. As different factors may influence the pricing of petroleum industry energy carriers such as fuel oil relative to electricity or coal, there may be unintended consequences. The allowance calculated may be considerably larger or less than the actual monetary savings.

³⁹⁸ South African Revenue Service.

³⁹⁹ Robb G, Tyler E and Cloete B *Carbon Trading or Carbon Tax? Weighing Up South Africa’s Mitigation Options* Unpublished paper presented at ‘Putting a Price on Carbon’ Conference held at the University of Cape Town, 23-24 March 2010, 196-213 at 208.

⁴⁰⁰ *SATS 50010* Definition 3.5 at 4

5.3. Electricity Pricing Reform

As discussed in chapter 2 and 3, energy pricing is crucial in promoting energy-efficient consumption patterns. In theory, the cost of energy sends a price signal to the market and allows for the most efficient allocation of resources. Realistic energy pricing is fundamental to internalising the social and environmental costs of production and providing a clear signal to consumers to reduce consumption. Coal, electricity and to a lesser extent, fuel oil provide most of the energy consumed in industry.⁴⁰¹ Therefore, MBIs that affect the pricing of these commodities will have a greater impact on energy efficiency in industry. Coal and fuel oil prices are not regulated in South Africa but are determined by the market.⁴⁰² There are no MBIs currently in place to intervene in this regard although the carbon tax under discussion may affect coal and fuel oil pricing depending on the design of the tax.⁴⁰³

However, as discussed in previous chapters,⁴⁰⁴ the price of electricity has been low by world standards historically and has resulted in an energy inefficient industrial growth pathway that is viewed as a market failure.⁴⁰⁵ In this respect, there have been significant changes in electricity pricing governance in recent years and NERSA has approved some dramatic electricity price hikes since 2008 to finance Eskom's expansion plans and overcome challenges to meet current electricity supply. These increases incorporate the costs associated with a number of MBIs

⁴⁰¹ Using 2005 data from the Department of Minerals and Energy, Winkler provides the following breakdown: Coal 51%, electricity 33 % and petroleum products 12% in Harald Winkler (ed) *Energy Policies for Sustainable Development: Options for the Future* (2006) Energy Research Centre, University of Cape Town at 32.

⁴⁰² Department of Minerals and Energy *White Paper on the Energy Policy of the Republic of South Africa* GN 307 GG 19606 of 17 of December 1998 at 77.

⁴⁰³ National Treasury Discussion Paper *Reducing Greenhouse Gas Emissions: The Carbon Tax Option* (2010). Available at <http://www.treasury.gov.za/public%20comments/Discussion%20Paper%20Carbon%20Taxes%2081210.pdf> (Accessed 06.09.2011).

⁴⁰⁴ Chapter 1; chapter 2.2.1; chapter 3.1.

⁴⁰⁵ See chapter 3.1.

aimed at improving energy efficiency and supporting the growth of the renewable energy sector. The regulatory framework governing electricity price and tariff setting is discussed further below as well as those MBIs that are currently in place or under discussion for incorporation in electricity pricing. These are the renewable energy feed-in tariff (REFIT), the cogeneration feed-in tariff (COFIT), demand-side management (DSM) and the electricity levy.

5.3.1. Electricity Pricing Regulatory Framework

In terms of the Electricity Regulation Act⁴⁰⁶ (ERA), the National Energy Regulator of South Africa (NERSA) is tasked with regulating electricity prices and tariffs⁴⁰⁷ and promoting energy efficiency⁴⁰⁸ amongst other duties. This is accomplished through the licensing of the electricity industry⁴⁰⁹ and the approval of prices, charges and tariffs that licensees charge customers.⁴¹⁰ As Eskom is the majority electricity provider, prices approved for Eskom influence overall pricing.⁴¹¹ Municipality tariffs are largely set in line with Eskom's approved tariff increases⁴¹² although there is a complex set of laws that govern the setting of tariffs at the

⁴⁰⁶ Electricity Regulation Act 4 of 2006.

⁴⁰⁷ ERA s 4 (ii).

⁴⁰⁸ ERA s 2 (e).

⁴⁰⁹ ERA s 8 (i). The electricity industry is defined here to include generation, transmission, distribution and import/ export sectors.

⁴¹⁰ ERA s 15 (1)(d)

⁴¹¹ Eskom provides 91% of the total electricity supply. Andrew Kenny 'Energy supply in South Africa' in Winkler *Energy Policies* (2006) at 52.

⁴¹² NERSA Decision *Determination of the Municipal Tariff Guideline and the Revision of Municipal Tariff Benchmarks for the Financial Year 2011/2012* on 25 November 2010. Available at <http://www.nersa.org.za/Admin/DocumentUpload/UploadFiles/Reason%20for%20decision%20-%20Determination%20of%20the%20municipal%20tariff%20guideline%20and%20the%20revision%20of%20municipal%20tariff%20benchmarks%20for%20the%202011-12%20financial%20year3803022010120332.pdf> (Accessed 06.09.2011).

distribution level.⁴¹³ Prices and tariffs are set in line with the principles⁴¹⁴ that form the cornerstone of the *Electricity Pricing Policy (EPP)*⁴¹⁵ described in Chapter 4.2. In the past two years, NERSA has approved Eskom's interim price increase of 31.3 per cent on the average standard electricity price⁴¹⁶ for the period 2009 to 2010 and an average increase of about 25.8 per cent increase per year for their *Multi-year Price Determination for 2010 to 2013*⁴¹⁷ (MYPD2). The tariff determination is based on calculation of the allowed revenue that accounts for all the costs associated with generating electricity.⁴¹⁸ In order to make tariffs 'cost reflective' Eskom's expenditure in respect of the cost of finance for the generation capacity expansion programme⁴¹⁹ and government incentives such as REFIT⁴²⁰ and COFIT must be included over and above energy and operating costs.⁴²¹ The electricity levy is also included in the overall determination.⁴²² In addition, ERA makes provision for the inclusion of incentives that drive improved 'technical or economic efficiency'.⁴²³ In this respect, Eskom's cost determination includes funding for their demand-side

⁴¹³ Paterson A 'Incentive-Based Measures' in A Paterson A and Kotze LJ (eds) *Environmental Compliance and Enforcement in South Africa: Legal Perspectives* (2009) 232-321 at 319. Relevant laws include the Electricity Act 41 of 1987; the Local Government Transition Act 209 of 1993; and the ERA.

⁴¹⁴ ERA s 16 (1).

⁴¹⁵ Department of Minerals and Energy *Electricity Pricing Policy (EPP) of the South African Electricity Supply Industry* in GN 1938 GG 31741 of 19 December 2008.

⁴¹⁶ NERSA *Eskom Holdings Limited – Eskom Price Increase Application 2009*. Available at [http://www.nersa.org.za/Admin/DocumentUpload/UploadFiles/Reasons%20for%20Decision%20-%20Eskom%20Interim%20Price%20Increase%20Application%202009\[1\]3246102010024603.pdf](http://www.nersa.org.za/Admin/DocumentUpload/UploadFiles/Reasons%20for%20Decision%20-%20Eskom%20Interim%20Price%20Increase%20Application%202009[1]3246102010024603.pdf) (Accessed 06.09.2011).

⁴¹⁷ NERSA *Reasons for Decision: Revenue Application – Multi-Year Price Determination 2010/11 to 2012/13 (MYPD 2) by Eskom Holdings Limited (Eskom)* (2010). Available at <http://www.nersa.org.za/Regulator%20Decisions%20Electricity> (Accessed 06.09.2011).

⁴¹⁸ ERA s 16 (1)(a).

⁴¹⁹ MYPD 2 at 3 accounted for by Depreciation and return on assets in the allowed revenue calculation

⁴²⁰ REFIT included in MYPD 2 as IPP (Independent power producers).

⁴²¹ MYPD 2 at 3.

⁴²² MYPD 2 at 6.

⁴²³ ERA s(16)(1) (b).

management (DSM) programme.⁴²⁴ Thus the electricity generator is able to recover costs associated with the government's renewable energy and energy efficiency MBIs by passing through costs to consumers via the electricity price. Higher electricity prices mean that consumers, including industry, will be encouraged to become more energy efficient. These MBIs will be discussed in more detail below.

5.4. Renewable Energy Feed-In Tariff

5.4.1. An Overview of Renewable Energy Feed-In Tariff

NERSA has developed renewable energy feed-in tariffs (REFIT) to incentivise the production and supply of energy to the national grid from various renewable technologies. In March 2009, NERSA published the *South African Renewable Energy Feed-In Tariff Regulatory Guidelines*⁴²⁵ (*REFIT Guidelines*) under the mandate provided by the ERA. The *REFIT Guidelines* set out the institutional framework, key roles and responsibilities of participants and tariff conditions.⁴²⁶ In essence, the REFITs provide guaranteed prices for a certain period of time to generators of electricity from renewable energy technologies.⁴²⁷ It is anticipated that most renewable energy generators will be new entrants to the domestic energy market and are generally described as independent power producers (IPPs).

In line with the *EPP*, these prices are based on cost recovery plus a reasonable profit on the part of the IPP. NERSA included four renewable energy technologies in the first phase of REFIT (referred to as REFIT I). The tariffs were set at: landfill gas power plants (0.896 R per kWh); for hydropower plants of less than

⁴²⁴ *MYPD 2* at 3.

⁴²⁵ Department of Minerals and Energy *NERSA Renewable Feed-in Tariff (REFIT) Regulatory Guidelines 26 March 2009* in GN382 GG32122 of 17 April 2009.

⁴²⁶ *REFIT Guidelines* (2009) at 12.

⁴²⁷ *REFIT Guidelines* (2009) at 11.

10 MW (0.940 R per kWh); wind power (1.247 R per kWh); and for concentrated solar power (CSP) plants (2.092 R per kWh).⁴²⁸

The *REFIT Guidelines* also appointed Eskom as the Renewable Energy Purchasing Agency (REPA).⁴²⁹ This codifies the cabinet decision in September 2007 to make Eskom the single buyer from IPPs.⁴³⁰ The REPA is obliged to purchase electricity at the set REFIT from those IPPs who have been successfully licensed by NERSA.⁴³¹ In terms of the *REFIT guidelines* the cost incurred by the REPA namely Eskom, may be ‘passed through’ to electricity end users as with any other costs used to determine cost-reflective prices.⁴³²

After comment was received from stakeholders, the REFIT were revised and expanded to cover nine technology categories overall in October 2009.⁴³³ Additional technologies and their respective tariffs include: biomass solid (1.18 R per kWh); biogas (0.96 R per kWh); grid-connected Photovoltaic systems larger than one MW (3.94 R per kWh); and two variations of CSP, ‘trough without storage’ (3.14 R per kWh) and ‘Tower’ (2.31R per kWh). Despite the two phases of REFIT published to date, the programme has still not commenced due to some institutional issues.⁴³⁴

⁴²⁸ *REFIT Guidelines* (2009) Appendix 1 at 22.

⁴²⁹ *REFIT Guidelines* (2009) at 14.

⁴³⁰ *Ibid.*

⁴³¹ *Ibid.*

⁴³² *REFIT Guidelines* (2009) at 15.

⁴³³ NERSA *Renewable Energy Feed-In Tariff Phase II* (2009). Available at <http://www.nersa.org.za/Admin/Document/Editor/file/Electricity/REFIT%20Phase%20II%20150709.pdf> (Accessed 06.09.2011).

⁴³⁴ NERSA Consultation Paper *Review of Renewable Energy Feed-In Tariffs* (2011). Available at <http://www.nersa.org.za/Admin/Document/Editor/file/Electricity/Consultation/Documents/Review%20of%20Renewable%20Energy%20Feed-In%20Tariffs%20Consultation%20Paper.pdf> (Accessed 06.09.2011).

Even before the REFIT programme has been implemented, a further review of the scheme has been undertaken⁴³⁵ in order to align with the *Electricity Regulations on New Generation Capacity*⁴³⁶ gazetted in November 2010. The revised tariffs set out in the 2011 NERSA Consultation Paper *Review of Renewable Energy Feed-In Tariffs (REFIT Review 2011)*⁴³⁷ are considerably lower than those published in 2009⁴³⁸ due to changes over this period in the financial parameters used to calculate tariffs. The cost of capital component has dropped significantly due to decreased nominal cost of debt and inflation rate.⁴³⁹ It is unclear how the reduced REFIT tariffs proposed would impact on the MYPD2 electricity price increases already approved for 2010 to 2013. It would appear that Eskom revenue could exceed that which is required to cover their REFIT commitments if MYPD2 tariffs are not adjusted accordingly.

5.4.2. Critical Analysis of Renewable Energy Feed-In Tariff

The REFIT is both a positive and negative incentive in the sense that it provides support to renewable energy generators entering the electricity market, while simultaneously promoting energy efficiency through the disincentive of increased electricity prices. The major concern with the programme is that although the REFIT tariffs have contributed to electricity price increases approved for 2011 to 2013, agreements with IPPs are not yet in place.

⁴³⁵ Review undertaken in lieu of the planned tariff review that is a feature of the program for the first five years and every three years thereafter. *REFIT Review* (2011) at 2.

⁴³⁶ Department of Energy *Electricity Regulation Act 4 of 2006. Electricity Regulations on New Generation Capacity* in GNR 1130 GG33819 of 30 November 2010.

⁴³⁷ *REFIT Review* (2011).

⁴³⁸ *REFIT Review* (2011) Table 5 at 25. The reductions range from 10.1% for biomass solid to 40.1% for landfill gas power plants.

⁴³⁹ *REFIT Review* (2011) at 22.

5.5. Cogeneration Feed-In Tariff

5.5.1. An Overview of the Cogeneration Feed-In Tariff

In a similar programme, NERSA is developing feed-in tariffs that will support cogeneration technologies, particularly supporting projects that supply electricity to the grid.⁴⁴⁰ In this regards, a consultation paper entitled *Cogeneration Regulatory Rules and Feed-In Tariffs (COFIT Regulatory Rules)* was published in January 2011 to initiate stakeholder comment.⁴⁴¹ Cogeneration is defined as ‘the simultaneous generation of electricity and useful thermal energy from a common fuel/energy source’⁴⁴² by an industry whose primary purpose is not electricity or energy production. The definition also covers the generation of electricity or recovery of energy from waste or by-products of the industrial process.⁴⁴³ Technologies considered under this scheme are classified into three types. Type one includes processes that recover waste heat or energy from waste gases.⁴⁴⁴ Type two covers combined heat and power technologies (CHP)⁴⁴⁵ using sources that may not be renewable.⁴⁴⁶ Type three focuses on cogeneration processes that generate energy from waste that could be classified as a ‘renewable’ energy source such as wood chips or bagasse from the pulp and paper industry.⁴⁴⁷

⁴⁴⁰ NERSA Consultation Paper *Cogeneration Regulatory Rules and Feed-In Tariffs* (2011). Available at <http://www.nersa.org.za/Admin/Document/Editor/file/Electricity/Consultation/Documents/NERSA%20Consultation%20Paper%20Cogeneration%20Regulatory%20Rules%20and%20Feed-In-%20Tariff.pdf> (Accessed 06.09.2011).

⁴⁴¹ *COFIT Regulatory Rules* (2011).

⁴⁴² *COFIT Regulatory Rules* (2011) at 5.

⁴⁴³ *Ibid.*

⁴⁴⁴ *COFIT Regulatory Rules* (2011) at 5-6 and 18.

⁴⁴⁵ An example is steam generation.

⁴⁴⁶ *COFIT Regulatory Rules* (2011) at 7 and 18.

⁴⁴⁷ *COFIT Regulatory Rules* (2011) at 7 and 18.

Cogeneration feed-in tariffs (COFIT) are developed to allow a licensed co-generator to recover the costs of constructing and operating the cogeneration plant in line with the *EPP*.⁴⁴⁸

5.5.2. Critical Analysis of the Cogeneration Feed-In Tariff

The COFIT programme has particular relevance to energy efficiency in industry. By definition, cogeneration processes improve the overall energy efficiency of the facility by producing more energy per unit throughput. Investment in projects that generate electricity from waste or from waste heat would be recovered through the COFIT pricing over the period of the power purchase agreement. If in the future the Eskom tariff exceeds the COFIT pricing, the co-generator may decide to use the electricity for own use thus avoiding the higher Eskom prices or sell the electricity to a third party as an IPP.

As with the REFIT programme, the main concern with COFIT is that although the electricity price increases include the costs of implementing COFIT, the programme is even further from implementation than REFIT. The draft rules were only issued for discussion in January 2011 and if the rate of implementation is as slow as the REFIT, the risk remains that revenue accrued to Eskom for COFIT will not be spent for that purpose within the period.

⁴⁴⁸ The costs are referred to as the levelised cost of electricity (LCOE). *COFIT Regulatory Rules* (2011) at 9 and 18.

5.6. Demand-Side Management

5.6.1. An Overview of the Design-Side Management Programme

Eskom's Demand-Side Management (DSM) programme has been in operation since NERSA's approval of the programme in May 2004.⁴⁴⁹ It provides a positive incentive to electricity users by fully funding projects aimed at peak load management and subsidising energy efficiency projects by 50 per cent.⁴⁵⁰ The DSM programme is targeted mainly at commercial and industrial electricity users. The programme makes use of the services of energy professionals accredited as energy service companies (ESCOs) along the lines advocated in the *National Energy Efficiency Strategy for the Republic of South Africa*⁴⁵¹ discussed in Chapter 4.2. Companies seeking to take advantage of the programme have to engage an ESCO to audit energy use at the facility and submit feasible energy efficiency improvement projects to the Eskom DSM for evaluation. Eskom then funds successful projects for implementation by the ESCO.⁴⁵²

From an energy industry perspective, the DSM programme aims to harness the potential of demand-side energy efficiency and load management in order to defer capital expenditure on new power generation facilities. Deferring the new power facilities further limits associated electricity price hikes⁴⁵³ and environmental

⁴⁴⁹ Eskom 'Eskom's DSM programme offers greater financial support to businesses and municipalities' (4 December 2004) 10 (4) *Energy Management News* at 1.

⁴⁵⁰ Ibid.

⁴⁵¹ Department of Minerals and Energy *White Paper on the Energy Policy of the Republic of South Africa GN 307 GG 19606* of 17 of December 1998.

⁴⁵² *Energy Management News* (2004) at 1.

⁴⁵³ An estimated 3-5% per annum reduced electricity price path increase with DSM. Eskom *Eskom DSM Current and Future* presented at an M and V workshop on 4 March 2010.

effects.⁴⁵⁴ Eskom still considers DSM to be the most effective tool to address short-term electricity shortages.⁴⁵⁵

Eskom generates revenue to fund the programme through the electricity price charged to customers. NERSA approved of R554m over the three-year period of 2010 to 2013⁴⁵⁶ which equates to less than a cent per KWh. There is a shortfall of R725m over the period compared to Eskom's application. Eskom is investigating alternatives for supplementary funding.⁴⁵⁷

5.6.2. Critical Analysis of the Design-Side Management Programme

Eskom's DSM directly promotes energy efficiency improvements in industry by providing subsidised or 'free retrofits and upgrades'.⁴⁵⁸ The funding is recovered through the electricity price and earmarked for promoting energy efficiency, particularly in industry. A level of transparency and fairness is provided by NERSA's oversight of the cost recovery and funding aspect and the role of independent ESCOs in identifying feasible projects. However, the selection criteria for feasible projects remain the preserve of Eskom and the ESCO and are not widely published. Companies that have potential energy efficiency projects must involve an ESCO and submit to the Eskom's potentially lengthy approval process before the economic justification for the project can be determined. This makes forward planning difficult and has led to a lack of confidence in the programme by industry.⁴⁵⁹

⁴⁵⁴ *Energy Management News* (2004) at 2.

⁴⁵⁵ *Eskom DSM at 'Conclusions'*.

⁴⁵⁶ *MYPD 2* at 3; *Eskom DSM at 'Future outlook_3 to 5 years'*.

⁴⁵⁷ *MYPD 2* at 3; *Eskom DSM at 'Future outlook_3 to 5 years'*.

⁴⁵⁸ *Energy Management News* (2004) at 2.

⁴⁵⁹ *Draft Clean Technology Fund Investment Plan* (2009) at 19 and 23.

Additional measures are contemplated in the power conservation programme (PCP).⁴⁶⁰ The PCP includes a mandatory ‘right to consume’ (RTC) programme for large industry which is a trading scheme for energy efficiency.⁴⁶¹ The RTC is an MBI that creates a new market in tradable RTC units⁴⁶² and therefore does not fall within the scope of this dissertation. Suffice it to say that mandatory participation by large industry is being considered and it is this aspect that diverges from most of the MBIs currently available in South Africa to promote energy efficiency in industry.

5.7. Electricity Levy

5.7.1. An Overview of the Electricity Levy

Another MBI that is ultimately passed on in prices to the electricity user is an environmental levy on generators of non-renewable sources of electricity. The *Electricity Levy*, initially two cents per kilowatt-hour, was proposed in 2008 as a dual-purpose instrument to promote energy efficiency during the electricity shortages and to curb GHG pollution.⁴⁶³ It came into force on 1 July 2009 and is implemented under the Customs and Excise Act 91 of 1964⁴⁶⁴ and amendments to environmental levy items.⁴⁶⁵ The *Electricity Levy* was increased to 2.5 cents per kilowatt-hour in

⁴⁶⁰ NERSA Consultation Paper *Power Conservation Programme (PCP) Rules (2008)*. Available at [http://www.nersa.org.za/Admin/Document/Editor/file/Consultations/Electricity/Documents/Consultation%20Paper%20Power%20Conservation%20Programme%20\(PCP\)%20%20Rules.pdf](http://www.nersa.org.za/Admin/Document/Editor/file/Consultations/Electricity/Documents/Consultation%20Paper%20Power%20Conservation%20Programme%20(PCP)%20%20Rules.pdf) (Accessed 06.09.2011).

⁴⁶¹ Eskom ‘Shaping the Power Conservation Programme in South Africa’ (March 2009) *Interface Magazine* 15 at 15.

⁴⁶² ‘1 MWh spread evenly over a day’ in *PCP Rules (2008)* at 16.

⁴⁶³ National Treasury *Budget 2008/2009 Tax proposals (2008)*. Available at <http://www.treasury.gov.za/documents/national%20budget/2008/guides/Budget%20Proposals%202008.pdf> (Accessed 06.09.2011).

⁴⁶⁴ S54E and 59A: Customs and Excise Rule: 54FA.03 and 59A.01(a)

⁴⁶⁵ Customs and Excise Act 91 of 1964. Levy item 148.01.01 in Schedule 1 Part 3B.

April 2011.⁴⁶⁶ The charge is levied directly on electricity generators of greater than five megawatts within South Africa that consume non-renewable fuel.⁴⁶⁷ The Treasury administers the revenue generated from the *Electricity Levy*. Renewable energy generators and co-generators of electricity, even where fossil fuels are used under the COFIT scheme, are exempt.⁴⁶⁸

5.7.2. Critical Analysis of the Electricity Levy

The generator is allowed to recover the cost of the *Electricity Levy* through the electricity price. Eskom's average 31.3 per cent interim tariff increase approved for the period 2009 to 2010⁴⁶⁹ included the costs to Eskom of the 2c/KWh.⁴⁷⁰ In this respect, the *Electricity Levy* promotes energy efficiency through the electricity costs in the same way as the other MBIs discussed above. However, it does not drive the generators themselves to become more energy efficient or to switch over to renewable energy sources, which some would argue to be the main potential benefit of this MBI.⁴⁷¹ As far as revenue generated for the Treasury, the government did not specify to what purpose the estimated R4bn would be allocated.⁴⁷² The Treasury motivated the *Electricity Levy* increase to provide funding to remedy the damage caused to the country's roads by coal hauling.⁴⁷³ The *Electricity Levy* has been widely hailed as a first step towards a carbon tax⁴⁷⁴ or at least that it has a similar

⁴⁶⁶ Department of Finance *Customs and Excise Act 1964. Amendment of Schedule no 1(No.1/3B/14)* in GNR 256 GG 34166 of 28 March 2011.

⁴⁶⁷ SARS Notes for 'Schedule 1/part3/section B' dated 2011-03-31. Available at <http://www.sars.gov.za> (Accessed 06.09.2011).

⁴⁶⁸ SARS Notes for Schedule 1 at 2(b)-(d).

⁴⁶⁹ Increase came into effect in July 2009.

⁴⁷⁰ MPYD 2 at 6.

⁴⁷¹ Arendse J 'Go Green or Get Taxed' (2008) 9 (4) *JB-PREJ* 21 at 21.

⁴⁷² Paterson (2009) *SAJELP* at 37.

⁴⁷³ *2009/2010 Budget Tax Proposals* (2009) at 13.

⁴⁷⁴ *Carbon Tax Discussion Paper* (2010) at 9; Mandy K 'Carbon Taxes Versus Cap-and-Trade' (Jun/Jul 2010) *Tax Professional* at 3.

effect.⁴⁷⁵ It is envisaged that the scope of the levy will be broadened to incorporate other industries that generate Carbon Dioxide emissions.⁴⁷⁶ In this regard, some carbon tax options are being considered as part of emerging climate change policy described in chapter 4.2. These carbon tax options and their possible future use in South Africa are discussed in more detail in chapter 6. 3.

5.8. Benefits and Shortcomings of Current MBIs that Promote Energy Efficiency in Industry

As described above, several MBIs have been put in place that are either aimed directly at promoting energy efficiency in industry or do so indirectly by increasing electricity prices. Many of these have been introduced in the past two years and it remains to be seen to what extent the available incentives will be taken up by industry and whether this will be sufficient to achieve the *Energy Efficiency Strategy* target of 15 per cent.⁴⁷⁷ However, a brief analysis of the instruments above gives rise to some overall conclusions on the potential effectiveness and shortcomings of the MBIs implemented in South Africa to date with the objective of promoting industrial energy efficiency.

The main barrier to energy efficiency in South Africa's industry has traditionally been the low cost of energy, particularly coal and electricity.⁴⁷⁸ Great strides have been made to address this barrier through efforts to make the electricity price reflective of the full cost of supply, including some environmental costs. The resultant sharp increase in electricity price should automatically stimulate moves

⁴⁷⁵ Winkler H & Marquard A *Analysis of the Economic Implications of a Carbon Tax* (2009) Energy Research Centre, University of Cape Town at 8.

⁴⁷⁶ *Carbon Tax Discussion Paper* (2010) at 9.

⁴⁷⁷ *Energy Efficiency Strategy* (2008).

⁴⁷⁸ Department of Minerals and Energy *White Paper on the Energy Policy of the Republic of South Africa* in GN 307 GG 19606 of 17 of December 1998 at 10; *Draft Clean Technology Fund Investment Plan* (2009) at 19.

towards energy efficiency improvements.⁴⁷⁹ There are some aspects that may detract from this effect. Some concerns exist that industry may not be subject to their full share of the increased prices. Long-term price agreements between Eskom and industry customers should be made more transparent and aligned to the price hikes to ensure that this effect is carried through to industry.⁴⁸⁰ The ability of electricity suppliers to pass the full cost of the electricity levy on to the customer means that the power supply industry is not incentivised to improve energy efficiency by this MBI.⁴⁸¹ Another concern is that the main driver for the current pricing levels appears to be cost of financing the production capacity upgrade. The approach seems to lack the certainty that electricity will continue to be priced at a level that drives energy efficiency once sufficient capacity becomes available to the grid.

Industrial consumers faced with increased energy costs are afforded a number of positive incentives to implement energy efficiency projects, through the DSM and *S12I investment allowance* if the qualifying criteria are met. Industries implementing energy efficiency projects will benefit by reduced investment costs for the project and ultimately a reduced electricity bill. Increased tax from energy savings may be partially offset under the *Energy Efficiency Savings Allowance*. These incentives taken together appear to be extremely favourable to the implementation of energy efficiency projects within industry. However, experience internationally indicates that profitable energy efficiency opportunities are often passed over by businesses.⁴⁸² This phenomenon, sometimes termed the ‘efficiency gap’ or ‘energy paradox’, means that even although energy efficiency projects should be easily justified on avoided energy costs, there may be ‘non-price barriers’ that weaken the effectiveness

⁴⁷⁹ Trade and Industry Chamber *Fund for Research into Industrial Development (FRIDGE): Study to Provide an Overview of the Use of Economic Instruments and Develop Sectoral Plans to Mitigate the Effects of Climate Change* (2010) Genesis Analytics (Pty) Ltd, Johannesburg at iv.

⁴⁸⁰ Winkler H, Jooste M & Marquard A ‘Structuring Approaches to Pricing Carbon in Energy-and Trade-Intensive Sectors in South Africa’ (2010) 10 *Climate Policy* 527 at 528.

⁴⁸¹ See chapter 5.7.

⁴⁸² Jackson J ‘Promoting Energy Efficiency Investments with Risk Management Decision Tools’ *Energy Policy* 38 (2010) at 3865.

of the price signal to promote energy efficiency in industry.⁴⁸³ These may include a lack of understanding by industries of the opportunities available, executive bias towards production improvement over efficiency improvement projects, the perceived ‘high risk’ of energy efficiency projects by investors and high administration costs associated with accessing some of the opportunities.⁴⁸⁴ Most of these barriers would need to be addressed by other forms of regulatory intervention, such as information programmes.⁴⁸⁵ This conclusion supports the international experience that a mix of policy instruments provides a more robust regulatory environment than the implementation of MBIs alone.⁴⁸⁶

Some of the MBIs, particularly the *S12I Investment Allowance* are complicated and may be subject to similar administrative issues that hamper traditional regulatory methods.⁴⁸⁷ There also appears to be a lack of harmonisation between the complex array of MBIs discussed above. Several regulatory bodies are involved. NERSA is taking the lead with the design of REFIT and COFIT, while the Treasury is the main architect of the electricity levy and the S12 incentives.⁴⁸⁸ The DSM funding programme is administered by Eskom in conjunction with ESCOs. This may lead to inconsistencies and unintended interaction between these instruments. In fact, some argue that the current range of MBIs recently introduced to promote energy efficiency and mitigate GHG emissions may prove contradictory and ineffective.⁴⁸⁹ A more structured, coordinated approach is therefore required to align MBIs and other regulatory measures to achieve energy efficiency and climate change objectives.⁴⁹⁰

⁴⁸³ *Fund for Research into Industrial Development* (2010) at xv.

⁴⁸⁴ Draft Clean Technology Fund Investment Plan (2009) at 19.

⁴⁸⁵ *Fund for Research into Industrial Development* (2010) at xv.

⁴⁸⁶ European Environment Agency *Market-based Instruments for Environmental Policy in Europe* (2005) EEA Technical Report No. 8/2005 at 7.

⁴⁸⁷ See chapter 2.2.3.

⁴⁸⁸ See chapter 5.7, 5.1 and 5.2.

⁴⁸⁹ *Fund for Research into Industrial Development* (2010) at iv.

⁴⁹⁰ *Fund for Research into Industrial Development* (2010) at iv.

Much of the recent regulatory activity around energy efficiency has focused on electricity consumption. This is understandable under the current circumstances where there is a shortfall in electricity generation capacity. At the same time though, there have been limited MBIs implemented to internalise the social and environmental costs of other energy products such as coal or fuel oil.⁴⁹¹ The positive incentives provided by *SI2I Investment Allowance* and the *Energy Efficiency Savings Allowance* are applicable to all energy products. There is a risk that industries shift to other energy products, instead of electricity, if the technology is available and the relative prices provide a business incentive. Fuel switching will detract from energy efficiency objectives and may result in increased GHG emissions depending on the fuels involved.

In summary, considerable progress has been made towards implementing energy, environmental and fiscal policies that promote energy efficiency in industry through the use of MBIs, either directly or through their contribution to a more cost reflective electricity price signal. The complexity and apparent lack of coordination between these MBIs and some other non-price barriers may detract from their effectiveness. Some of these issues may be best addressed by more traditional regulatory measures. However, there is an opportunity to extend the current range of MBIs to cover the pricing of other energy products and harmonise the overall effect on energy efficiency and GHG emissions. Experience with energy-carbon taxes in the European Union has indicated that these can be used successfully to promote energy efficiency in industry. The South African government has indicated a willingness to consider carbon taxes to reduce GHG emissions and improve energy efficiency. In view of this, the following chapter considers the potential implementation of an energy-carbon taxation regime in South Africa to overcome this shortcoming in the existing array of MBIs that promote energy efficiency in industry.

⁴⁹¹ Spalding-Fecher R and Matibe DK 'Electricity and Externalities in South Africa' (2003) 31 *Energy Policy* 721 at 722.

6. Future Direction for South Africa: Potential for Energy-Carbon Taxation to Broaden Current Range of MBIs that Promote Energy Efficiency in Industry

As discussed in chapter 5, South Africa currently has a fairly comprehensive array of market-based instruments (MBIs) that promote energy efficiency in industry. The only potential shortfall appears to be the unequal coverage of all energy products. This chapter explores how this may be addressed by examining European Union (EU) experience with the use of energy-carbon taxes and South Africa's fledgling carbon tax direction expressed in the Treasury's discussion paper *Reducing Greenhouse Gas Emissions: the Carbon Tax Option (Carbon Tax Discussion Paper)*.⁴⁹² The introduction to this chapter provides some background on energy-carbon taxes and their successful use in the EU. Thereafter, the energy-carbon tax options as described in the EU Council Directive *Restructuring the Community Framework for the Taxation of Energy Products and Electricity*⁴⁹³ (*EU Directive on Energy Taxation*) and the *Carbon Tax Discussion Paper*, are discussed and compared.

6.1. Introduction

Energy taxes have long been used in Europe, primarily to raise revenue from the use of transport fuels.⁴⁹⁴ In the 1990s, the focus of energy taxation began to

⁴⁹² National Treasury Discussion Paper *Reducing Greenhouse Gas Emissions: The Carbon Tax Option* (2010). Available at <http://www.treasury.gov.za/public%20comments/Discussion%20Paper%20Carbon%20Taxes%2081210.pdf> (Accessed 06.09.2011).

⁴⁹³ European Council Directive 2003/96/EC of 27 October 2003 *Restructuring the Community Framework for the Taxation of Energy Products and Electricity* OJ (L283).

⁴⁹⁴ Speck S 'The Design of Carbon and Broad-Based Energy Taxes in European Countries' (2008-2009) 10 *Vermont Journal of Environmental Law* 31 at 32.

change with the Scandinavian countries leading the way in implementing energy and emissions taxes to address environmental pressures.⁴⁹⁵ Finland (1990), Sweden (1990), Norway (1991) and Denmark (1992) introduced taxes on carbon emissions and adjusted energy taxes in tax shifting efforts to both address emerging climate change concerns and reduce the high income tax burden. Since then several other European countries have followed suit, Netherlands (1996), Slovenia (1997), Germany (1998) and United Kingdom (2000).⁴⁹⁶

The energy-carbon tax regimes implemented in these member states differed significantly in design and application.⁴⁹⁷ The development of energy-carbon tax systems and the differences between them is covered elsewhere in literature.⁴⁹⁸ This dissertation focuses on the EU level legislation regarding energy-carbon taxation, particularly the *EU Directive on Energy Taxation*.⁴⁹⁹

Energy-carbon taxes have taken various forms; either as taxes on energy content, taxes on electricity consumption or taxes on specific emissions associated with fuel use, such as carbon dioxide, sulphur dioxide or nitrous oxides.⁵⁰⁰ The combined effect of an energy-carbon taxation regime is favourable as both demand

⁴⁹⁵ Speck (2008) at 33.

⁴⁹⁶ Andersen MS 'Environmental and Economic Implications of Taxing and Trading Carbon: Some European Experiences' (2008) 10 *Vermont Journal of Environmental Law* 61 at 63.

⁴⁹⁷ Speck (2008) at 35; See also Andersen MS 'Vikings and Virtues: a Decade of CO2 Taxation' (2004) *Climate Policy* 4; Speck S 'Overview of Environmental Tax Reforms in EU Member States' in Andersen M, Barker T, Christie E, Ekins P, Gerald J, Jilkova J, Junankar S, Landesmann M, Pollitt H, Salmons R, Scott S & Speck S (eds) *Competitiveness Effects of Environmental Tax Reforms: Final Report to the European Commission* (2007) National Environmental Research Institute, University of Aarhus.

⁴⁹⁸ See more generally Andersen (2004); Speck (2008); Andersen (2008); European Environment Agency *Market-based Instruments for Environmental Policy in Europe* (2005) EEA Technical Report No. 8/2005 at 49-54; *COMETR* (2007).

⁴⁹⁹ *EU Directive on Energy Taxation* (2003).

⁵⁰⁰ *EU Green Paper on MBIs* (2007) at 7; Examples are Denmark, Sweden and UK from Speck in *COMETR* (2007) Annex 4 at 69 to 78.

and substitution effects come into play to achieve energy efficiency and environmental improvements. The demand effect is brought about by a decrease in demand due to tax-induced higher prices. Ideally, this would be achieved by improvements in energy efficiency. The substitution effect decreases emissions by fostering a switchover to less carbon intensive fuels.⁵⁰¹ This effect is only supported if the taxation regime covers all energy products.

One of the main lessons from EU experience incorporated into the *EU Directive on Energy Taxation* is that all energy products should be covered by an energy-carbon tax regime. Prior to this, countries that allowed exemptions for certain products found that the effectiveness of the tax system was negatively impacted.⁵⁰² A notable example was Germany's exemption of coal from energy taxes up until 2007 under the country's subsidisation of the coal industry.⁵⁰³ The effectiveness of Germany's energy taxes to reduce fuel consumption and greenhouse gas (GHG) emissions was significantly reduced as a result.⁵⁰⁴ This lesson is particularly apt for South Africa where the current range of MBIs does not impact significantly on the energy pricing of products other than electricity. For this reason, energy-carbon taxes are put forward as a potential opportunity to overcome the potential shortfall.

The EU has been developing and implementing policy to promote energy efficiency in its member states since 1998.⁵⁰⁵ Energy-carbon taxes and the EU

⁵⁰¹ Andersen (2008) at 65.

⁵⁰² Winkler H & Marquard A *Analysis of the Economic Implications of a Carbon Tax* (2009) Energy Research Centre, University of Cape Town at 3.

⁵⁰³ Speck (2008) at 47; Winkler and Marquard (2009) at 2.

⁵⁰⁴ Andersen (2008) at 69.

⁵⁰⁵ Commission of the European Communities *Energy Efficiency in the European Community- Towards a Strategy for the Rational Use of Energy* COM (1998) 246; Other policy documents include Commission of the European Communities *Action Plan for Energy Efficiency: Realising the Potential* COM (2006) 545 and Commission of the European Communities *Energy Efficiency: Delivering the 20% Target* COM (2008) 772.

Emission Trading Scheme (EU ETS)⁵⁰⁶ are of key importance in implementing energy efficiency policy.⁵⁰⁷ The EU ETS is not considered in depth in this dissertation as it is an MBI that creates a new market. In any event, even prior to the EU ETS implementation in 2005, the EU has demonstrated considerable success in achieving energy efficiency improvements, especially in industry. The estimated primary energy saving in the EU from energy efficiency improvements between 1997 and 2006 was equivalent to one third of crude imports to the EU in 2006.⁵⁰⁸ The main energy consumers in Europe, namely transport, households and industry improved energy efficiency overall by 11 per cent during the period. Industry proved to be the most successful in implementing energy efficiency measures with an estimated improvement of 24 per cent over the period.⁵⁰⁹

Due to the success of the EU energy efficiency policies and the use of energy-carbon taxes in achieving industrial energy efficiency improvements, the energy-carbon tax system described under the *EU Directive on Energy Taxation* is now considered in the context of broadening the existing array of MBIs in South Africa.

6.2. The EU Directive on Energy Taxation

In order to avoid potential competitiveness effects caused by the inconsistent design and application of energy-carbon taxes within EU member states and to address growing climate change concerns, the EU commission made several attempts

⁵⁰⁶ European Council Directive 2003/87/EC of 13 October 2003 *Establishing a Scheme for Greenhouse Gas Emission Allowance Trading with the Community and Amending Council Directive 96/61/EC* OJ (L275)

⁵⁰⁷ *EU Green Paper on MBIs* (2007) at 6; EE COM (2008) 772 at 5.

⁵⁰⁸ 180 Million tons oil equivalent .Estimates from Odyssee Project EE COM (2008) 772 at 3.

⁵⁰⁹ EE COM (2008) 772 at 7.

to develop legislation for energy-carbon taxation.⁵¹⁰ This culminated in the *EU Directive on Energy Taxation* published in 2003 which provides the fiscal framework and minimum tax rates for energy products and electricity throughout the EU.⁵¹¹ This directive fell short of the harmonised EU energy and carbon tax originally proposed to mitigate GHGs,⁵¹² but it does provide some structure to energy taxation in Europe and significantly extends the coverage of previous legislation that included only the products of mineral oil.⁵¹³

The *EU Directive on Energy Taxation* incorporates all energy products and electricity used for the purposes of fuel or heating⁵¹⁴ and obliges member states to set taxes above minimum prescribed levels.⁵¹⁵ The directive does not require differentiation of taxes into separate energy and environmental (or carbon) taxes, but refers to the total taxes levied on ‘the quantity of energy products and electricity at the time of release for consumption’.⁵¹⁶

As long as the minimum tax levels are exceeded, member states may apply different rates for business and non-business uses.⁵¹⁷ Tax reductions up to the level

⁵¹⁰ Commission of the European Communities *Restructuring the Community Framework for the Taxation of Energy Products* COM (97) 30. See more on the history of the *EU Directive on Energy Taxation* (2003) in Steck (2008) at 32-35.

⁵¹¹ *EU Directive on Energy Taxation* (2003) art 4.

⁵¹² EC COM (97) 30.

⁵¹³ European Council Directive 92/81/EEC *Harmonization of the Structures of Excise Duties on Mineral Oils* and European Council Directive 92/82/EEC of 19 October 1992 *Approximation of the Rates of Duties on Mineral Oils*.

⁵¹⁴ *EU Directive on Energy Taxation* (2003) art 1 and 2. Article 2(4) describes exclusions as energy products used for purposes other than fuels and heating including dual use and electricity used for chemical, electrolytic, metallurgical or mineralogical processes.

⁵¹⁵ *EU Directive on Energy Taxation* (2003) art 4.

⁵¹⁶ *EU Directive on Energy Taxation* (2003) art 4(2).

⁵¹⁷ Art 5.

of complete exemption are allowed for industries classified as energy-intensive⁵¹⁸ or industries that have entered into agreements or trading schemes that result in energy efficiency or environmental improvements.⁵¹⁹ Even industries that are not considered energy-intensive may be eligible for tax reductions up to 50 per cent⁵²⁰ if deemed to achieve a desired environmental outcome.⁵²¹ Industries that benefit from these energy-carbon tax reductions must enter into agreements, trading schemes or undertake other suitable measures to achieve the intended outcome of the *EU Directive on Energy Taxation*.⁵²²

The concept of allowing energy-carbon tax reductions in conjunction with energy efficiency agreements or an emission trading scheme builds on the past experience of EU member states where these have been successfully implemented to achieve energy efficiency improvements and GHG reductions. Denmark was first to implement this approach in 1996 and since then, Danish companies entering into agreements with the Danish Energy Agency have been subject to reduced tax rates of varying amounts. Heavy industry is eligible for the greatest benefits under the scheme. In 2005 the reduced tax rate was 88 per cent lower than the rate applicable without an agreement.⁵²³ Companies with agreements achieved energy efficiency savings of about 60 per cent better than those subject to the tax alone.⁵²⁴ Denmark also earmarked about 20 per cent of energy-carbon tax revenue to promote and fund industrial energy efficiency improvements projects. The funding programme was administered by the Danish Energy Agency and independent auditors were used to identify improvement projects. About one thousand companies received subsidies

⁵¹⁸ EI business is defined under *EU Directive on Energy Taxation* (2003) art 17(1)(a) as business ‘where either the purchases of energy products and electricity amount to at least 3.0 % of the production value or where the national energy tax amounts to at least 0.5% of the added value.’ More restrictive definitions may be employed by member states where appropriate.

⁵¹⁹ *EU Directive on Energy Taxation* (2003) art 17.

⁵²⁰ Art 17(3) read with art 17(4).

⁵²¹ Art 17(4).

⁵²² *Ibid.*

⁵²³ Speck in *COMETR* (2007) at 38 and 71.

⁵²⁴ Anderson (2008) at 70.

annually under this programme.⁵²⁵ These measures are considered to be largely responsible for the 30 per cent improvement in industrial energy efficiency between 1990 and 2000.⁵²⁶

A similar arrangement is in place in the UK. Energy-intensive industries stand to recover 80 per cent of their Climate Change Levy (CCL) by committing to energy efficiency targets within legally binding Climate Change Agreements (CCA).⁵²⁷ The targets are negotiated with the sector associations.⁵²⁸ CCL revenues are partially recycled to support energy efficiency in business. The Carbon Trust was set up to oversee the enhanced capital allowance (ECA) scheme that provides investment funding for energy efficiency projects and runs best practice and low-carbon innovation programmes that supply information and support in the field of energy efficient technology.⁵²⁹

The definition of energy-intensive industry is important in determining who is eligible for special arrangements. This issue has also not been uniformly applied across member states. The *EU Directive on Energy Taxation* classifies industries as energy-intensive if either the energy bill or the energy tax burden exceeds certain thresholds as a percentage of business metrics.⁵³⁰ Alternatively, a more stringent definition may be used. Under the German system, industrial sectors that benefit from special tax arrangements fall within statistical classifications so the actual energy-intensity status of individual industries is not assessed.⁵³¹ This contrasts with

⁵²⁵ Between 1996 and 2001. Andersen MS and Speck S 'Environmental Tax Reforms in Europe: Stabilisation, Mitigation and Compensation' in *COMETR* (2007) at 519.

⁵²⁶ Anderson (2008) at 69.

⁵²⁷ Speck in *COMETR* (2007) at 50.

⁵²⁸ Andersen and Speck in *COMETR* (2007) at 522.

⁵²⁹ EEA (2005) at 92.

⁵³⁰ *EU Directive on Energy Taxation* (2003) art 17(1)(a).

⁵³¹ The government approved a list of energy intensive processes determined using the 'Proms-criterion'. Speck in *COMETR* (2007) at 43.

the Danish system where specific production processes are eligible.⁵³² In the UK, energy-intensive industries are defined to be those registered under the EU Council Directive *Concerning Integrated Pollution Prevention and Control*.⁵³³

‘Tradable permit schemes’ are the alternative option to agreements in the *EU Directive on Energy Taxation*.⁵³⁴ The most prominent scheme in the EU is the EU ETS implemented in 2005.⁵³⁵ Under the EU ETS, emission caps are set for individual facilities. Facilities that emit less than the cap may sell the allowance to other facilities who have failed to reach their target. This sets the overall GHG target to be reached while allowing a carbon pricing mechanism to drive individual company mitigation efforts. In this sense, it has a similar effect to a carbon tax linked to an agreement. The EU ETS covers emission-intensive industries such as, power plants larger than 20 megawatts, oil refineries, and many energy-intensive industries that are covered by the *EU Directive on Energy Taxation*.⁵³⁶ This gave rise to the concern that certain sectors would be subject to double-regulation.⁵³⁷ As the *EU Directive on Energy Taxation* allows for reduced rates for industries that fall under a suitable trading system,⁵³⁸ several countries have applied for exemption of industry covered by the EU ETS.⁵³⁹

At an EU level, there has been little subsequent effort to further develop energy-carbon taxation legislation beyond the *EU Directive on Energy Taxation* as

⁵³² Speck in *COMETR* (2007) at 43.

⁵³³ European Council Directive 2008/1/EC of 15 January 2008 *Concerning Integrated Pollution Prevention and Control* OJ (L24/8); Speck in *COMETR* (2007) at 50.

⁵³⁴ *EU Directive on Energy Taxation* (2003) art 17(4)

⁵³⁵ *EU Directive on Emission Allowance Trading* (2003).

⁵³⁶ Andersen and Speck in *COMETR* (2007) at 538.

⁵³⁷ Andersen and Speck in *COMETR* (2007) at 539.

⁵³⁸ *EU Directive on Energy Taxation* (2003) art 14.

⁵³⁹ Andersen and Speck in *COMETR* (2007) at 539.

the EU ETS provides an alternative mechanism to achieve the GHG commitments made by member states under the Kyoto Protocol.⁵⁴⁰

6.3. The South African Discussion Paper on Carbon Tax

The South African government is in the early phases of evaluating carbon taxation for possible inclusion in the climate change response effort.⁵⁴¹ The National Treasury's *Carbon Tax Discussion Paper*⁵⁴² outlines some possible design options and key considerations which may be used to inform the future design and implementation of a carbon tax regime in South Africa.

The *Carbon Tax Discussion Paper* puts forward three carbon tax options. These include a direct tax on measured carbon dioxide emissions and two variations of a proxy tax on energy sources proportional to their carbon content. The latter variations relate to the incidence of the tax, either upstream at the level of fossil fuel inputs to the economy (crude oil, coal and natural gas) or downstream on energy products, such as liquid fuels and electricity.⁵⁴³ The downstream proxy tax most closely resembles the EU energy-carbon taxes discussed above.

The three options cover different tax bases and are, therefore, differentiated by the level of administrative complexity. The measured emissions option incorporates all emitters of GHG, including industry, transport and domestic consumers of fossil-fuel based energy. Accurate emissions data is required to determine the appropriate amount of tax to be paid by individual emitters. A suitable system of measurement, monitoring and verification would be required to support the

⁵⁴⁰ Speck (2008) at 35.

⁵⁴¹ *Climate Change Green Paper* (2010).

⁵⁴² *Carbon Tax Discussion Paper* (2010).

⁵⁴³ National Treasury *Press Release: Carbon Tax Discussion Paper* (2010) at 1-2. Available at <http://www.treasury.gov.za/public%20comments/Final%20Press%20Release%20Carbon%20Tax%20Discussion%20Paper.pdf> (Accessed 06.09.2011), *Carbon Tax Discussion Paper* (2010) at 30-34.

implementation of the direct tax option.⁵⁴⁴ The upstream proxy tax option covers a small tax base of approximately 67 coal mines, 13 natural gas processors and 6 petroleum refineries.⁵⁴⁵ Rebates or exemptions may be considered for non-combustion uses of fossil fuels and to encourage the implementation of end-of-pipe CO₂ removal, such as carbon capture and storage technologies.⁵⁴⁶ The downstream proxy tax option potentially covers a large tax base similar to the direct tax. All users of fossil fuel-based energy products would be targeted, similar to the measured emissions option.⁵⁴⁷ Although the direct tax on measured emissions is favoured as the most direct approach to GHG mitigation, an upstream proxy tax based on the carbon content of fossil fuel inputs is considered to be the second best option and may be easier to implement.⁵⁴⁸

Regardless of the carbon tax option chosen, *Carbon Tax Discussion Paper* identifies some key considerations for the design of a carbon tax in South Africa. There should be comprehensive coverage of all sectors as far as possible.⁵⁴⁹ Although the intention would be to escalate the tax rate over time to fully internalise the environmental costs of fossil fuels,⁵⁵⁰ low tax rates are proposed for initial implementation.⁵⁵¹ The *Carbon Tax Discussion Paper* suggests that an escalating tax between R75 and R200 per ton CO₂ equivalent⁵⁵² would be feasible and drive the desired GHG emissions reduction and energy efficiency improvements.⁵⁵³ Distributional impacts are of particular concern in South Africa and need to be addressed in a transparent and targeted manner to limit the negative impact on poorer

⁵⁴⁴ *Carbon Tax Discussion Paper* (2010) at 30.

⁵⁴⁵ *Carbon Tax Discussion Paper* (2010) at 34.

⁵⁴⁶ *Carbon Tax Discussion Paper* (2010) at 32.

⁵⁴⁷ *Carbon Tax Discussion Paper* (2010) at 31.

⁵⁴⁸ *Carbon Tax Press Release* (2010) at 2. *Carbon Tax Discussion Paper* (2010) at 59.

⁵⁴⁹ *Carbon Tax Discussion Paper* (2010) at 59.

⁵⁵⁰ *Ibid.*

⁵⁵¹ *Ibid.*

⁵⁵² At 2005 prices.

⁵⁵³ According to Winkler and Marquard (2009) the upper limit equates to price increases of about 20c/kWh for electricity and 45c/litre for liquid fuel. *Carbon Tax Discussion Paper* (2010) at 55.

households and the competitiveness of key industries.⁵⁵⁴ Relief measures to address competitiveness should be limited and temporary.⁵⁵⁵ Some form of revenue recycling through tax shifting is envisaged as part of a carbon tax regime, although full-earmarking is not recommended.⁵⁵⁶

6.4. A Comparison of the South African Carbon Tax Options against EU Energy-Carbon Taxes

This section compares and contrasts South Africa's possible carbon tax options against the energy-carbon taxes contemplated in the *EU Directive on Energy Taxation* using relevant evaluation criteria described in Chapter 3.3

The *EU Directive on Energy Taxation* and the carbon tax options described in the *Carbon Tax Discussion Paper* aim to cover all fossil-fuel energy products. In this sense, if properly designed, any of these tax options would address the potential shortfall with the current array of MBIs that was identified in chapter 5.8.

The environmental intent of implementing energy-carbon taxes is to reduce GHG emissions by fostering a switch to less carbon intensive fuels and by improving energy efficiency. South Africa currently has limited low-carbon energy alternatives such as natural gas and renewable energy.⁵⁵⁷ In terms of energy efficiency, the incentive for improvement depends on the extent to which costs of energy-carbon taxes are passed through to consumers. The South African energy sector is highly regulated and prices for electricity and transport fuels (petrol and diesel) are set by the regulators.⁵⁵⁸ The cost of a carbon tax would presumably be passed on to

⁵⁵⁴ *Carbon Tax Discussion Paper* (2010) at 10.

⁵⁵⁵ *Carbon Tax Discussion Paper* (2010) at 59.

⁵⁵⁶ *Carbon Tax Discussion Paper* (2010) at 10.

⁵⁵⁷ See chapter 2.1.

⁵⁵⁸ See chapter 5.3.1.

electricity consumers in a similar way to the electricity levy.⁵⁵⁹ For transport fuels, an overhaul of the pricing structures would be necessary in order to provide a realistic price signal to consumers and to avoid an inappropriate burden on refiners.⁵⁶⁰ The regulated pricing aspect is not addressed in the *Carbon Tax Discussion Paper*.⁵⁶¹

The pass-through of costs links to the distributional effects of an energy-carbon tax. In South Africa, industry and low-income households may be particularly impacted.⁵⁶² In the EU, energy-carbon taxes have been introduced in a tax-shifting exercise that increases tax on ‘bads’ (emissions) while reducing taxes on ‘goods’ (such as labour).⁵⁶³ This is termed ‘environmental tax reform’ (ETR).⁵⁶⁴ Theoretically, ETR is ‘tax neutral’ so that the economy as a whole is not detrimentally impacted.⁵⁶⁵ The *EU Directive on Energy Taxation* does not cover ETR specifically as the allocation of tax revenue is the preserve of each member state’s administration. EU member states have used ETR unilaterally to reduce income tax,⁵⁶⁶ social security contributions⁵⁶⁷ and recycled to revenue support energy efficiency and GHG mitigation in industry. In South Africa, lower income households traditionally spend a higher proportion of income on transport and energy. The burden of increased costs due to a carbon tax is, therefore, likely to be greater for the poor.⁵⁶⁸ The *Carbon Tax Discussion Paper* supports the concept of

⁵⁵⁹ As described in chapter 5.7/

⁵⁶⁰ Winkler H, Jooste M & Marquard A ‘Structuring Approaches to Pricing Carbon in Energy-and Trade-Intensive Sectors in South Africa’ (2010) 10 *Climate Policy* 527 at 528.

⁵⁶¹ Other than a reference to Winkler and Marquard (2009) who estimate increases of 20 c/KWh for electricity and 45c/litre for liquid fuels. *Carbon Tax Discussion Paper* (2010) at 55.

⁵⁶² *Carbon Tax Discussion Paper* (2010) at 10.

⁵⁶³ *Carbon Tax Discussion Paper* (2010) at 50.

⁵⁶⁴ EEA (2005) at 83.

⁵⁶⁵ Speck in *COMETR* (2007) at 25.

⁵⁶⁶ Sweden, Finland, Netherlands. For further discussion on ETR see Anderson and Speck in *COMETR* (2007) at 523, EEA (2005).

⁵⁶⁷ UK, Denmark, Germany, Netherlands.

⁵⁶⁸ *Carbon Tax Discussion Paper* (2010) at 37.

ETR and advocates off-setting this impact by improved services to low-income groups in the form of free basic services such as electricity.⁵⁶⁹

The competitiveness of industry is also a key consideration in designing energy-carbon taxes.⁵⁷⁰ As described, the *EU Directive on Energy Taxation* EU allows for reductions and exemptions if suitable environmental measures are in place.⁵⁷¹ The main driver for special arrangements for industry in Europe has been to reduce the impact on competition afforded by differing energy-carbon tax regimes within the EU economy. In South Africa, industry would bear a large proportion of the burden of energy-carbon taxation as the largest energy consumer.⁵⁷² Energy-intensive industries,⁵⁷³ some of which are also vulnerable to international competition,⁵⁷⁴ would be particularly impacted. Growth of these industries was actively encouraged by industrial development policy until fairly recently.⁵⁷⁵ Hence, there is a risk that some industries may become uneconomic ‘stranded assets’ under the effective about-turn in policy that a carbon tax represents.⁵⁷⁶ As many of the energy-intensive industries are currently core to the country’s economy, there is a case for reduced rates to be allowed for a period to smooth the impact on the economy while companies implement energy efficiency improvements.⁵⁷⁷

⁵⁶⁹ *Carbon Tax Discussion Paper* (2010) at 39.

⁵⁷⁰ *Carbon Tax Discussion Paper* (2010) at 6.

⁵⁷¹ See chapter 6.2.

⁵⁷² See chapter 2.1.

⁵⁷³ These include iron and steel production, non-ferrous metals, non-metallic metals, chemicals and petrochemicals, and mining. Winkler (2010) *Climate Policy* at 533.

⁵⁷⁴ These are iron and steel, non-ferrous metals and certain mining sectors, including gold, uranium and coal. Winkler (2010) *Climate Policy* at 534.

⁵⁷⁵ See chapter 2.2.1.

⁵⁷⁶ Winkler (2010) *Climate Policy* at 535.

⁵⁷⁷ Cloete B and Robb G *Carbon Pricing and Industrial Policy in South Africa* Unpublished paper presented at ‘Putting a Price on Carbon’ Conference held at the University of Cape Town, 23-24 March 2010 at 27.

The *Carbon Tax Discussion Paper* maintains that special arrangements should be limited and temporary.⁵⁷⁸ The UK Climate Change Programme is given as an example of a temporary measure in a footnote, but the use of tax reductions linked to agreements is not explored in further detail.⁵⁷⁹ The *Carbon Tax Discussion Paper* also examines the potential for border tax arrangements to overcome international competition impacts, but recognises the practical limitations in the absence of harmonised global carbon pricing and potential conflicts with the World Trade Organisation (WTO) rules.⁵⁸⁰ The press release issued with the *Carbon Tax Discussion Paper* suggests that the *Energy Efficiency Savings Allowance* may be viewed as a suitable intervention to overcome competitiveness concerns,⁵⁸¹ although this is not expressly discussed in the document itself. The Treasury is generally opposed to extensive use of ‘earmarking’ revenue, but may consider ‘on-budget funding’ for environmental programmes.

The three carbon tax options put forward in the *Carbon Tax Discussion Paper* relate to design and administration of the tax. The taxes described in the *EU Directive on Energy Taxation* are levied on the quantity of fuel at the point of consumption.⁵⁸² This is similar to the downstream proxy tax in the *Carbon Tax Discussion Paper*. This is the least favoured option due to administrative complexity and environmental effectiveness.⁵⁸³ Energy-carbon taxes are levied as excise taxes in the EU and make use of existing tax administration. In South Africa, the energy-carbon taxes would be an extension of existing fuel taxes and the electricity levy and thus build on existing administrative mechanisms.⁵⁸⁴ For this reason, one could argue that a downstream energy-carbon tax would, therefore, not be administratively more

⁵⁷⁸ *Carbon Tax Discussion Paper* (2010) at 10 and 59.

⁵⁷⁹ *Carbon Tax Discussion Paper* (2010) at 40.

⁵⁸⁰ *Carbon Tax Discussion Paper* (2010) at 41.

⁵⁸¹ *Carbon Tax Press Release* (2010) at 2.

⁵⁸² *EU Directive on Energy Taxation* (2003) art 4 (2).

⁵⁸³ *Carbon Tax Discussion Paper* (2010) at 31.

⁵⁸⁴ *Carbon Tax Discussion Paper* (2010) at 9.

complex than the upstream version, even although more tax payers would fall within the tax regime.

The *EU Directive on Energy Taxation* covers energy products and electricity used for fuel and heating. It specifically excludes fossil fuels used as process raw materials, such as crude oil for refining.⁵⁸⁵ In South Africa, this would necessarily exclude coal feedstock for coal-to-liquid (CTL) technology and crude oil. Most of this carbon is transferred to the liquid fuels products. Hence, the only fossil fuel energy products that would be potentially omitted through a downstream energy-carbon tax would be the own-use energy streams such as refinery fuel gas. In the EU, these energy uses are covered by the EU ETS.

In summary, the energy-carbon taxes described in both the *EU Directive on Energy Taxation* and the *Carbon Tax Discussion Paper* cover all energy products and may provide a further opportunity to promote energy efficiency and reduce GHG emissions. The EU energy-carbon tax most resembles the downstream tax which is the ‘least favoured’ option described in the *Carbon Tax Discussion Paper*. Regardless of the incidence of the tax, the impact on South Africa’s industrial competitiveness and low-income households remain key considerations. Experience from the EU highlights the successful use of energy efficiency or climate change agreements linked to tax reductions to improve industrial energy efficiency and reduce GHG emissions. This may provide a way for the South African government to address competitiveness concerns while ensuring that environmental targets are met. The EU member states have also undertaken tax reform to shift the tax burden from labour to energy-carbon taxes. The *Carbon Tax Discussion Paper* advocates using carbon tax revenue to off-set the impact on low income households in a similar manner. The Government is still gathering input from stakeholders and evaluating the potential impact of a carbon tax on South Africa’s economy. Ultimately, ‘a

⁵⁸⁵ *EU Directive on Energy Taxation* (2003) art 2 (4)(b).

balance will need to be established between environmental obligations and South Africa's growth and development plans'.⁵⁸⁶

⁵⁸⁶ Creamer T 'SA Moves to Finalise Carbon Tax This Year, Despite Global Loose Ends' 16 March 2011 *Mining Weekly*. Available at <http://www.miningweekly.com/article/sa-moves-to-finalise-carbon-tax-this-year-despite-global-loose-ends-2011-03-16-1>. (Accessed 09.09.2011).

7. Conclusions

The energy sector is at the heart of South Africa's significant environmental challenges, particularly in relation to the high level of greenhouse gas (GHG) emissions and the scope of work necessary to reach the government's international climate change commitments. This is mainly due to the consumption of emission-intensive energy products, such as coal, in conjunction with the energy-intensive and relatively energy inefficient industry that characterises the South Africa economy. Industrial energy consumption is, therefore, central to any strategy to address GHG emissions. At the same time, the energy sector is at the centre of some serious socio-economic challenges, not least the electricity shortage identified with the crisis in 2008. Any measures that improve energy efficiency in industrial consumption patterns will address both the socio-economic and environmental challenges.

The need for regulatory intervention to promote industrial energy efficiency is clear. South African regulatory efforts in the environmental arena have been characterised by a reliance on more traditional command-and-control mechanisms. These do not necessarily promote the most efficient and cost-effective response, especially when coupled with administrative inefficiencies caused by fragmentation and the lack of capacity within the Government's environmental and energy departments. Therefore, the South African government is turning increasingly to the use of market-based instruments (MBIs) to address environmental challenges in a cost effective manner.

MBIs are a group of regulatory instruments that aim to achieve environmental goals by using market forces to influence behaviour or to address market failures. In the case of industrial energy efficiency in South Africa, the market failure is represented by high GHG emissions and a shortfall in electricity supply caused by energy pricing that did not include environmental costs or

investment funding for expanding energy needs. Thus, the use of MBIs is an apt approach to promoting energy efficiency in industry.

A brief review of South Africa's energy, environmental and fiscal policy identifies the government's recognition of industrial energy efficiency as a central component of the emerging policy direction to address GHG mitigation and energy planning. The policy documents also highlight Government's willingness to use MBIs in order to achieve improved energy efficiency in industry.⁵⁸⁷

In line with these policies, a number of MBIs have been implemented in South Africa to promote energy efficiency in industry to date. Those that use current markets include the *S12I Investment Allowance* for industrial policy projects;⁵⁸⁸ the *Energy Efficiency Savings Allowance*;⁵⁸⁹ and a number of instruments that impact on the price of electricity, namely: the *Electricity Levy*;⁵⁹⁰ the renewable energy feed-in tariffs (REFIT);⁵⁹¹ cogeneration feed-in tariffs (COFIT)⁵⁹² and demand side management programme (DSM).⁵⁹³ While some of these, such as REFIT, may not be aimed directly at improving energy efficiency, the cost of the MBI contributes to higher electricity prices and drives reduced consumption to avoid increasing costs.

Many of these MBIs have been introduced in the past two years and it remains to be seen to what extent the available incentives will be taken up by industry and whether this is sufficient to achieve the energy efficiency strategy goal

⁵⁸⁷ See chapter 2.

⁵⁸⁸ See chapter 5.1.

⁵⁸⁹ See chapter 5.2.

⁵⁹⁰ See chapter 5.7.

⁵⁹¹ See chapter 5.4.

⁵⁹² See chapter 5.5.

⁵⁹³ See chapter 5.6.

for industry of 15 per cent.⁵⁹⁴ Some potential benefits and short comings with the current array of MBIs are as follows:

The S12 allowances and the DSM provide positive incentives to industry to implement energy efficiency projects. These should be supported by other regulatory instruments, including information programmes to overcome potential ‘non-price’ barriers. Typical barriers include: lack of awareness of the available opportunities; executive bias towards production improvement over efficiency improvement projects; the perceived ‘high risk’ of energy efficiency projects by investors; and high administration costs associated with accessing some of the opportunities.⁵⁹⁵

Some of the MBIs, particularly the *S12I investment allowance*, are complicated and may be subject to similar administrative issues that hamper traditional regulatory methods.⁵⁹⁶ There is an apparent lack of harmonisation in the complex array of MBIs discussed in this dissertation. Several regulatory bodies are involved. NERSA is taking the lead with the design of REFIT and COFIT, while the Treasury is the main architect of the electricity levy and the S12 incentives.⁵⁹⁷ The DSM funding programme is administered by Eskom in conjunction with ESCOs. This may lead to inconsistencies and unintended interaction between these instruments. In fact, some argue that the current range of MBIs recently introduced to promote energy efficiency and mitigate GHG emissions may prove contradictory and ineffective.⁵⁹⁸ A more structured, coordinated approach is required to align MBIs

⁵⁹⁴ Department of Minerals and Energy *National Energy Efficiency Strategy of the Republic of South Africa, First Review October 2008* in GN 908 GG 32342 of 26 June 2009 at 23.

⁵⁹⁵ South African Government *Draft Clean Technology Fund Investment Plan* (October 2009) at 19.

⁵⁹⁶ See chapter 2.2.3.

⁵⁹⁷ See chapters 5.7; 5.1 and 5.2.

⁵⁹⁸ Trade and Industry Chamber *Fund for Research into Industrial Development (FRIDGE): Study to Provide an Overview of the Use of Economic Instruments and Develop Sectoral Plans to Mitigate the Effects of Climate Change* (2010) Genesis Analytics (Pty) Ltd, Johannesburg at iv.

and other regulatory measures to achieve energy efficiency and climate change objectives.⁵⁹⁹

Most of the MBIs discussed in this dissertation contribute to higher ‘cost reflective’ electricity prices. This addresses the market failure identified in relation to the inefficient electricity consumption, although improved transparency and equity in industrial electricity tariffs is required to ensure that the incentive is effective within industry. There are two potential gaps afforded by the current ‘cost reflective’ pricing approach. Firstly, the power supply industry is not driven to improve energy efficiency as the full cost of the electricity levy is passed on to consumers. Secondly, electricity prices may not remain at a level which drives energy efficiency if the investment component contributing to current electricity prices is reduced when the new build programme is completed.

As discussed, much of the recent regulatory activity around energy efficiency has focused on electricity consumption. This is understandable under the current circumstances, where there is a shortfall in electricity generation capacity. At the same time, though, there have been limited MBIs implemented to internalise the social and environmental costs of other energy products, such as coal or fuel oil.⁶⁰⁰ There is a risk that industries shift to other energy products instead of electricity if the technology is available and the relative prices provide a business incentive. Fuel switching may result in increased GHG emissions.

EU experience with the development of energy-carbon taxes, specifically the EU Council Directive *Restructuring the Community Framework for the Taxation of Energy Products and Electricity*⁶⁰¹ (*EU Directive on Energy Taxation*) may highlight

⁵⁹⁹ *Fund for Research into Industrial Development* (2010) at iv.

⁶⁰⁰ Spalding-Fecher R and Matibe DK ‘Electricity and Externalities in South Africa’ (2003) 31 *Energy Policy* 721 at 722.

⁶⁰¹ European Council Directive 2003/96/EC of 27 October 2003 *Restructuring the Community Framework for the Taxation of Energy Products and Electricity* OJ (L283).

an opportunity to overcome the shortfall in energy product coverage identified in the current array of MBIs. At the same time, South Africa is in the process of developing fledging carbon tax direction. This is outlined in the discussion paper *Reducing Greenhouse Gas Emissions: the Carbon Tax Option (Carbon Tax Discussion Paper)*.⁶⁰²

The energy-carbon taxes described in both the *EU Directive on Energy Taxation* and the *Carbon Tax Discussion Paper* cover all energy products and electricity.⁶⁰³ In this sense, any of the design options may be suitable to extend the range of MBIs that promote energy efficiency and reduce GHG emissions. The EU energy-carbon tax most resembles the downstream tax which is the ‘least favoured’ option described in the *Carbon Tax Discussion Paper*. Regardless of the incidence of the tax, the impact on South Africa’s industrial competitiveness and low-income households remain key considerations. The EU experience with energy-carbon taxes offers some lessons for South Africa in this regard. Energy efficiency or climate change agreements linked to tax reductions have been used successfully in Europe. This may provide a way for the South African government to address competitiveness concerns while ensuring that environmental targets are met. The EU member states have also used energy-carbon taxation to shift taxes away from income and social security taxes. The South African Government advocates using carbon tax revenue to off-set the impact on low income households in a similar manner, but it not clear to what extent tax-shifting will be employed.⁶⁰⁴ The Government is still gathering input from stakeholders and evaluating the potential impact of a carbon tax on South Africa’s economy. Ultimately, ‘a balance will need

⁶⁰² National Treasury Discussion Paper *Reducing Greenhouse Gas Emissions: The Carbon Tax Option* (2010). Available at <http://www.treasury.gov.za/public%20comments/Discussion%20Paper%20Carbon%20Taxes%2081210.pdf> (Accessed 06.09.2011).

⁶⁰³ If generated from fossil fuels in the *Carbon Tax Discussion Paper* options.

⁶⁰⁴ Creamer T ‘SA Moves to Finalise Carbon Tax This Year, Despite Global Loose Ends’ 16 March 2011 *Mining Weekly*. Available at <http://www.miningweekly.com/article/sa-moves-to-finalise-carbon-tax-this-year-despite-global-loose-ends-2011-03-16-1>. (Accessed 09.09.2011).

to be established between environmental obligations and South Africa's growth and development plans'.⁶⁰⁵

⁶⁰⁵ Creamer T 'SA Moves to Finalise Carbon Tax This Year, Despite Global Loose Ends' 16 March 2011 *Mining Weekly*. Available at <http://www.miningweekly.com/article/sa-moves-to-finalise-carbon-tax-this-year-despite-global-loose-ends-2011-03-16-1>. (Accessed 09.09.2011).

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