Legal Framework for the Promotion of Renewable Energy in South Africa: a Critical Analysis

by

Hanri Honiball

Student number: 21155380

LLB

Submitted in accordance with the requirements for the degree *Magister Legum* in Environmental Law at the North-West University (Potchefstroom Campus), South Africa

LLM Environmental Law Modules Passed:

LLMO 881

LLMO 885

LLMO 886

LLMO 887

Supervisor: Prof LJ Kotzé

Date: November 2013

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Finally, my heart is filled to overflowing with gratitude towards my Lord and my Saviour Jesus Christ. He has always been, and forever will be, my Provider, my Source and Strength, my Hope and my Guidance. Without Him, I am nothing. He deserves all the honour and all the glory.

Hanri Honiball

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LIST OF ABBREVIATIONS

CDM	Clean Development Mechanism
CI:GRASP	Climate Impacts: Global and Regional Adaptation Support Platform
CO_2	Carbon dioxide
COP	Conference of the Parties
CSP	Concentrated solar power
DBSA	Development Bank of South Africa
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DoE	Department of Energy
EIA	Environmental Impact Assessment
EU	European Union
GG	Government Gazette
GHG	Greenhouse Gas
GN	Government Notice
GN R `	Government Regulation Notice
GW	Gigawatt
GWh	Gigawatt hour
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan

MDGs	Millennium Development Goals
MULR	Melbourne University Law Review
MW	Megawatt
MWe	Megawatt Energy
NCCRWP	National Climate Change Response White Paper, 2011
NEM:AQA	National Environmental Management: Air Quality Act 39 of 2004
NEM:ICMA	National Environmental Management: Integrated Coastal Management Act 24 of 2008
NEMA	National Environmental Management Act 107 of 1998
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
NEMWA	National Environmental Management: Waste Act 59 of 2008
PELJ	Potchefstroom Electronic Law Journal
PULP	Pretoria University Law Press
RECORD	Renewable Energy Centre of Research and Development
REFIT	Renewable energy feed-in tariff
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
SADC	South African Development Countries
SAIPPA	South African Independent Power Producers Association
SANEA	South African National Energy Association
SANEDI	South African National Energy Development Institute
SARi	South African Renewables Initiative

SEMAs	Specific environmental management acts
UNDP	United Nations Developmental Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change, 1992
W/m^2	Watt per square metre
WCED	World Commission on Environment and Development, 1987

Summary

The accepted scientific opinion is that anthropogenic activities and correlated greenhouse gases are the main cause of climate change, with carbon dioxide releases from fossil fuels being one of the main culprits. In South Africa, the main sources of energy have always been coal and other fossil fuels. Society and the economy alike are heavily reliant on energy consumption. In light of the above, it is clear that drastic steps need to be taken to "clean up" the nation's energy sector and usage patterns.

There is an international tendency towards a so-called "green economy," which finds the relation between economic development, social upliftment and conservation of the natural environment. A green economy relies less on carbon inputs, and utilises resources efficiently, whilst taking a "socially inclusive" approach. It therefore makes sense to draw on renewable natural resources in greening the economy. Some of the advantages of renewable energy are that they result in limited or no emissions, the creation of sustainable jobs, improved health of consumers and enhanced energy security. A shift to a green economy cannot take place in a vacuum. The laws and policies regulating the various sectors of the environment; energy generation, distribution and use; investment opportunities and economic factors must stimulate and drive this move, and must create an optimal atmosphere to this end. This study determines how suitable the current South African legal framework is for a shift towards a green economy based on renewable energy, and whether it can successfully catalyse and drive such a shift.

Key words: Renewable energy; green economy; legal framework and climate change.

Opsomming

Die aanvaarde wetenskaplike mening is dat menslike aktiwiteite en verwante kweekhuisgasse die hoofoorsaak van klimaatsverandering is, en dat koolstofdioksied-vrystellings van fossielbrandstowwe een van die vernaamste oorsake is. In Suid-Afrika is koolstof en ander fossielbrandstowwe tradisioneel die hoofbronne van energie. Die samelewing, sowel as die ekonomie, is afhanklik van energieverbruik. Dit is dus duidelik dat drastiese stappe geneem moet word om die land se energiesektor en gebruikspatrone te herskep.

Daar is 'n wêreldwye neiging tot 'n "groen ekonomie," wat die verhouding tussen ekonomiese ontwikkeling, opheffing van die gemeenskap en bewaring van die omgewing beklemtoon. So 'n ekonomie is minder afhanklik van koolstof, benut hulpbronne doeltreffend en neem 'n sosiaal-inklusiewe benadering. Dit maak dus sin om hernubare energiebronne in te span vir die "vergroening" van die ekonomie. Sommige van die voordele wat hernubare energie bied, is beperkte of geen kweekhuisgasvrystellings, skepping van volhoubare werksgeleenthede, verbeterde verbruikersgesondheid en toenemende sekerheid in die energiesektor. 'n Oorgang na 'n groen ekonomie kan nie in isolasie plaasvind nie, maar moet gestimuleer en gedryf word deur wetgewing en beleide wat onderskeidelik die verskeie omgewingsektore; opwekking, verspreiding en gebruik van energie; beleggingsgeleenthede en ekonomiese faktore reguleer. Hierdie studie bepaal hoe geskik die huidige Suid-Afrikaanse regsraamwerk is vir 'n oorgang na 'n groen ekonomie wat gebaseer is op hernubare energie, en of dit sodanige oorgang suksesvol kan kataliseer en dryf.

Sleutelwoorde: Hernubare energie; groen ekonomie; regsraamwerk en klimaatsverandering.

1 Introduction

Climate change has become one of the most prevalent global concerns of our time.[1] The *United Nations Framework Convention on Climate Change*, 1992 (hereinafter the UNFCCC) defines this phenomenon as:

> a change of climate, which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate change poses serious threats to our livelihood.[2] Peel[3] states that it:

> threatens to have a variety of severe impacts, such as increases in human mortality, widespread loss of biodiversity, mass coral reef mortality, deglaciation, a greater frequency of extreme weather events, decreasing global agricultural productivity and food shortages.

Kidd[4] describes climate change as "the most important environmental concern facing the international community." It is, however, not just an environmental concern, but is inevitably also intertwined with social and economic issues, making it a very real sustainable developmental challenge.[5] Opinions about the causes of climate change are somewhat divergent, but the internationally accepted scientific view is that of the

1 There is a scientific debate regarding the reality of human-induced climate change. One argument is that the global warming effect we are currently experiencing is a cyclical phenomenon of the Earth and that similar warming and subsequent cooling periods have taken place before. Supporters of this idea argue that human activities have little effect on this pattern and that no serious action is needed to rectify the situation. This is not a scientific discussion, and does not attempt in any way to deal with the scientific position on climate change, but it is important to qualify right from the outset that this paper is based on the argument that human-induced climate change is, in fact, a reality and that we have the very real responsibility of taking urgent action to save our planet.

2 Lever-Tracy and Pittock "Climate change and society: an introduction" 5; Pittock "The science of climate change: knowledge, uncertainty and risk" 13.

3 Peel 2008 MULR 925; Devine "International Environmental Law" 148.

4 Kidd *Environmental Law* 60.

5 Strydom and Surridge "Energy" 791-792.

Intergovernmental Panel on Climate Change (hereinafter the IPCC).[6] This scientific body enjoys considerable support from scientists the world over.[7] The IPCC ascribes the phenomenon of climate change to a combination of factors, namely "changes in atmospheric concentrations of greenhouse gases and aerosols, land cover and solar radiation [that] alter the energy balance of the climate system."[8]

These phenomena are the joint result of natural processes of the earth and of human activities. The IPCC Report makes it clear, however, that anthropogenic activities are largely to blame, with greenhouse gas (hereinafter GHG) levels in the atmosphere being notably higher today than in the pre-industrial era, due to the continuous development of industries and technology.[9] Of these GHG emissions, carbon dioxide (hereinafter CO_2) is the largest contributing factor. In fact, the Report states that annual CO_2 emissions have increased by roughly 80% in the time between 1970 and 2004.[10] The biggest cause of these emissions is the burning of fossil fuels, such as coal, petroleum, oil and natural gas in energy generation.[11] It is estimated that around 80% of the world's energy is derived from fossil fuels[12] and with continuous world economic development and population growth, this number can only be expected to increase[13] unless a serious effort is made to switch to alternative sources of energy.

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6 The IPCC was established in 1988 and provides "scientific assessments of climate change risk and impacts," as quoted by Peel 2008 MULR 925 in footnote 7. According to the UNFCCC, the IPCC does not do any research of its own, but "reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. The [Community of Parties] receives the outputs of the IPCC and uses IPCC data and information..." UNFCCC http://unfccc.int/bodies/body/6444.php.

7 Peel 2008 MULR 925.

8 *IPCC Fourth Assessment Report* 5 (hereinafter the IPCC Report). Although the *Fifth Assessment Report* is due to be finalised in January 2014, a summary of the contents has been compiled.

9 *IPCC Fifth Assessment Summary for Policymakers* 2-3, 8; *IPCC Fourth Assessment Report* 5; Lever-Tracy and Pittock "Climate change and society: an introduction" 5; Pittock "The science of climate change: knowledge, uncertainty and risk" 19-21; Strydom and Surridge "Energy" 791-792; UN date unknown http://www.un.org/en/sustainablefuture/energy.shtml.

10 *IPCC Fourth Assessment Report* 5.

11 *IPCC Fourth Assessment Report* 5; Lever-Tracy and Pittock "Climate change and society: an introduction" 10; Strydom and Surridge "Energy" 791-792; Rumsey and King "Climate Change" 1051.

12 World Energy Council *2010 Survey of Energy Resources* 3; Van der Linde and Feris (eds) *Compendium of South African Environmental Legislation* 592.

13 Strydom and Surridge "Energy" 765.

In response to climate change, the United Nations drafted the UNFCCC in 1992, and later the *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 1997 (hereinafter the *Kyoto Protocol*).[14] These are the main international regulatory instruments on climate change.[15] The main aspiration of the UNFCCC is to stabilise "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[16] The *Kyoto Protocol* introduces the idea of common but differentiated responsibilities.[17] In essence, this principle requires countries to take responsibility for the climate crisis in a way that matches their contribution to the problem, whilst taking into account their financial abilities, as well as their socio-economic situation. This idea has been the cause of a great deal of international arm-wrestling between developed and developing countries. Developed countries feel that all nations should be subject to binding emission reduction targets; whereas developing countries argue that the imposition of binding targets on them would stifle their economic growth, and that instead, the big emitters of the past should be held responsible for their contribution to climate change.[18]

The existence and growth of an economy is inevitably fuelled by the utilisation of resources,[19] and for the most part, fossil fuels have been the main source of such growth, also in South Africa. Besides the fact that GHG emissions are a major contributor to climate change, the fossil fuels giving off these emissions are also limited commodities.[20] Clearly the global economic growth trajectory cannot continue the same upward trend that was seen over the past half-century, since the current use of natural resources already exceeds the carrying capacity of the earth, and is therefore

14 Rumsey and King "Climate Change" 1048; Carpenter *Taking Stock of Durban: Review of Key Outcomes and the Road Ahead* 4.
15 Kidd *Environmental Law* 60.
16 A 2 UNFCCC.
17 A 10 *Kyoto Protocol*; A 3 UNFCCC.
18 Kidd *Environmental Law* 60.
19 Strydom and Surridge "Energy" 765; Van der Linde and Feris (eds) *Compendium of South African Environmental Legislation* 591; *Draft Integrated Energy Planning Report* 3.
20 Strydom and Surridge "Energy" 766; Van der Linde and Feris (eds) *Compendium of South African Environmental Legislation* 590.

unstainable.[21] Increasingly nations of the world are seeing value in the idea of a so-called "green economy," which concept was emphasised in the Rio + 20 discussions.[22] Broadly this concept embodies the inextricable relation between economic development, social protection and conservation of the natural environment.[23] The South African *Green Economy Summit Discussion Document*[24] defines a green economy as:

> a system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities.

The South African economy depends on coal as its main source of energy[25] and is noticeably all *but* a green economy. In view of the above, it is clear that the country is in a precarious position, and the need arises for innovative solutions to an imminent, and escalating, problem. In 2007 almost 90% of South Africa's carbon emissions were the result of energy generation and use.[26] It is no surprise then that the *National Climate Change Response White Paper*, 2011 (hereinafter the NCCRWP) requires that mitigation efforts must, to a large extent, come from emission reductions in the energy sector.[27] This goal will be achieved partly through endeavours to increase energy efficiency, and partly through increased reliance on renewable energy sources to substitute a part of the supply to the national energy grid.[28] It is argued that this will

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21 Strydom and Surridge "Energy" 76; *Green Economy Summit Discussion Document* 33; Agama Energy *Employment Potential of Renewable Energy in South Africa* iii.

22 See in this regard the *Report of the United Nations Conference on Sustainable Development*, 2012.

23 *Green Economy Summit Discussion Document* 64.

24 *Green Economy Summit Discussion Document* 5.

25 Van der Linde and Feris (eds) *Compendium of South African Environmental Legislation* 590-592; *Green Economy Summit Discussion Document* 18; See also Strydom and Surridge "Energy" 766. According to Statistics South Africa *Energy Accounts for South Africa: 2002–2009* 3, coal made up around 62% of South Africa's energy supply in 2009; US Energy Information Administration 2013 http://www.eia.gov/countries/cab.cfm?fips=SF.

26 A National Framework for Sustainable Development in South Africa (DEAT 2007) 32.

27 NCCRWP 26; Strydom and Surridge "Energy" 791-792.

28 This is also expressly stated in the *National Development Plan: Vision for 2030*, (2011).

benefit the economy in terms of improved efficiency and competitiveness, as well as incentivising economic growth in sectors with lower energy intensities.[29]

The *White Paper on Renewable Energy,* 2003 (hereinafter the *White Paper on Renewable Energy)*[30] defines renewable energy as "sun, wind, biomass, water (hydro), waves, tides, ocean current, geothermal and any other natural phenomena which are cyclical and non-depletable." These resources can be harnessed to produce "clean" energy, which can ultimately contribute to a green economy. In the South African context, some of the most prominent renewable sources are solar, wind, biomass and hydro energy. The *White Paper on Renewable Energy* therefore selects these sources to play an important role in South Africa's efforts to diversify its energy mix, making it less emissions-intensive.[31] An increased dependence on renewable energy sources will necessarily diminish the demand for fossil fuel-based energy production. In the long run, this will lead to lower GHG emissions, reducing the impact of energy production on the climate.[32]

Climate change and concerns over global energy supply present both challenges and opportunities for South Africa.[33] Some of these challenges arise from matters such as policy and legislative development and integration, as well as financing and development of the necessary infrastructure for the deployment of renewable energy.[34] Another big challenge is that at present, South Africa's economy is fuelled largely by coal, and this is not forecasted to change in the near future.[35] A transition to a more diverse energy sector will be costly,[36] but it will be shown that the South African economy must nevertheless be restructured to progressively move towards sustainable, "green" industries and practices. This situation is not simply characterised by

29 NCCRWP 26.
30 *White Paper on Renewable Energy* v.
31 *White Paper on Renewable Energy* pg i, ix*;* NCCRWP 26.
32 *White Paper on Renewable Energy* pg x.
33 National Treasury 2010 http://www.doh.gov.za/show.php?id=2113.
34 SARi *Progress in renewable energy policies* 8.
35 A National Framework for Sustainable Development in South Africa (DEAT 2007) 37; Van der Linde and Feris (eds) *Compendium of South African Environmental Legislation* 591.
36 NCCRWP 43.

challenges, however, but also presents many opportunities for the country. A transition in the economy to one that is more reliant on renewable sources could, amongst others, create new trade and investment opportunities in the renewable energy sector.[37] It could also increase efficiency and technology in production processes, enhance competitiveness of the local economy in the world market and reduce GHG emissions.[38] Another important aspect in the South African context is that such a transition could create sustainable jobs,[39] mainly in climate change mitigation actions, and in so doing, assist in alleviating the extreme poverty in this country.[40] It is submitted that, overall, such a shift in energy usage could result in a solution that is at the same time environmentally, socially and economically favourable, and could contribute to the establishment of a green economy for South Africa.

For all its proclaimed benefits, renewable energy is a costly alternative to fossil fuels[41] and there is an immense need for international support in funding and sharing of technology.[42] However, South Africa cannot afford to sit back and simply wait for this support, but must actively start implementing those strategies and policies that are already in place. It is submitted that if implementation is delayed, the cost will be more than pecuniary.

In order to stimulate an environment within which the operation and growth of the renewable energy sector could be facilitated, an effective legal framework is needed. Such a framework should encompass the integration of renewable energy into the current power system, and simultaneously provide more opportunities for independent producers, whilst protecting the jobs and livelihoods of those making their living from

37 SARi *Progress in renewable energy policies* 8.
38 NCCRWP 37.
39 According to South African Government Information http://www.info.gov.za/speeches/2010/10051909251001.htm, this is "one of the top five priorities of (the South African) government."
40 SARi *Progress in renewable energy policies* 8; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7; South African Government Information http://www.info.gov.za/speeches/2010/10051909251001.htm; Edkins, Marquard and Winkler *South Africa's renewable energy policy roadmaps* 2; Agama Energy *Employment Potential of Renewable Energy in South Africa* ii.
41 *White Paper on Renewable Energy* viii, 9, 27.
42 NCCRWP 6, 15, 43, 44; *Draft Integrated Energy Planning Report* 2.

fossil fuels. The law must also aim to provide equitable access to renewable energy, eliminating the inequalities all too often experienced in South Africa.[43] The legal framework should include the creation and regulation of licensing measures, structures for pricing and tariffs, and should set both supply and demand goals, in order to promote and support the effective large-scale deployment of renewable energy, all of which must be implemented by means of cooperative governance.[44]

The question that can be formulated out of this background, and which will guide this research is: Considered in the context of the green economy, what is the legal framework in South Africa that applies to the promotion of renewable energy and to what extent does this framework promote and support the deployment of renewable energy?

The discussion is structured as follows:

Section 2 of this work will clarify what is meant by the concept of green economy, both in the international and the South African context. It will explain why a green economy is important and what is needed to achieve this in South Africa. This section will also determine the extent of the developments, if any, already made in this area and will then touch on the rationale behind using renewable energy in the drive for a green economy.

Section 3 will look at the meaning of renewable sources and energy generation from such sources. It will also consider the need for renewable energy in the South African context, and the possible advantages for the economy and for the socio-economic situation in this country. All renewable sources are not suitable in every context, and therefore this section will determine what options are available for South Africa. It will also consider the possibility of regional cooperation in these issues. However, this

43 According to US Energy Information Administration 2013 http://www.eia.gov/countries/cab.cfm?fips=SF, 2009 saw only about 55% percent of the population in rural areas having access to electricity, while the percentage rose to 88% for urban populations.

44 *White Paper on Renewable Energy* 9, 33, 41; Glazewski *The Legal Framework for Renewable Energy in South Africa* 4.

research takes place in the legal context, and this section will therefore not attempt to set out the science and geographical position regarding renewable energy. It will simply consider the context within which a legal framework is needed.

Section 4 will investigate the current legal framework in South Africa in order to determine whether the existing legislative measures are sufficient, and whether instruments regulating incidental issues, such as energy, environmental aspects and the economy, could be used in the renewable energy sector, and if so, whether these measures would need to be adapted; and whether we will need new instruments to facilitate the deployment of renewable energy in the drive towards a green economy for South Africa.

Section 5 will conclude the discussion and make recommendations concerning where the South African legislation could be adapted to regulate the renewable energy usage in the country, and where new instruments might be needed.

The research methodology takes the form of a literature study, which includes an analysis of relevant text books and law journals, but mainly focuses on the legal instruments and policies applicable to the use of renewable energy and their role in a transition to a greener South African economy. The sources consulted in this study can be grouped into the following categories:

- environmental policies and laws, including the *National Environmental Management Act* 107 of 1998 (hereinafter NEMA) and the relevant specific environmental management acts (hereinafter SEMAs);
- energy policies and laws, such as the *National Energy Act* 34 of 2008, the *White Paper on Renewable Energy,* 2003 and the Integrated Resource Plan 2010-2030;
- climate policies and laws, such as *the United Nations Framework Convention on Climate Change*, 1992 and the *Kyoto Protocol to the United Nations Framework*

Convention on Climate Change, 1997, as well as the *National Climate Change Response White Paper*, 2011; and

- fiscal instruments, which include renewable energy feed-in tariffs (REFIT) and the Renewable Energy Independent Power Producers Procurement Programme (hereinafter REIPPPP).

2 Transitioning to a green economy in South Africa

There has been a shift internationally towards a so-called green economic model. This section will briefly set out what such an economy entails, and will explain what it could mean in the South African context. It will determine what is needed to create an enabling environment for the large scale deployment of renewable energy in South Africa, and the progress already made to that effect. It will also be shown that the move towards a green economy is directly linked to a shift to a lower carbon economy, which justifies the use of renewable energy as a driving factor.

2.1 Sustainable development

For a long time the buzz-word in environmental affairs has been sustainable development. This term is defined in the *World Commission on Environment and Development: Our Common future*, 1987, which is generally known as the Brundlandt Report,[45] as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs." In order to achieve this, the human actions and their reliance and impacts on the environment need to be managed:

> In a quest for sustainable development the goal of environmental management may be said to be: 'to stretch what nature provides to the optimum and maintain that expansion indefinitely without environmental breakdown, in order to maximise human well-being, security and adaptability.'[46]

The world has been trying to achieve such a state of sustainable development, but unfortunately, many have been shying away from these efforts, opting instead for a "business-as-usual" type of approach, which often has a less adverse effect on one's pocket in the short term. However, in the long run, "sustainable business practices tend

45 WCED *Our Common Future* 1987; Brits *The regulatory regime for bio-fuels in South Africa* 21.
46 Barrow *Environmental Management for Sustainable Development* 11.

to pay for themselves and frequently turn a profit."[47] Throughout the last few years, however, we have started to realise that a different strategy, or at least a shift in focus, is needed. Consequently, the world has seen the rise of a new economic model focused on development of the economy and social welfare with limited damage to the environment, which usually goes hand in hand with economic growth. This so-called green economic model was formed in response to a pressing need for a growth plan that is both environmentally and economically sustainable.[48] In section one, a description of a green economy was provided as introduction, saying that it encompasses aspects of economic development, social protection and conservation of the natural environment and that these aspects are interrelated and cannot be separated from one another.[49]

The drive towards a green economy has been escalated by a growing mistrust of the current economic dispensation; a situation which has been aggravated by the instability of the global markets in recent years.[50] The search for greener pastures has not, however, only been fuelled by negative occurrences, but also by an increasing awareness that we have other options – even of a whole new economic system – one where economic growth can be decoupled from the usual over-exploitation of natural resources and damage to the environment, and where social equality is of paramount

47 Sneirson 2011 Wake Forest Law Review 543; Friederich Ebert Stiftung Date Unknown http://www.fes-sustainability.org/en/discussions/green-economy-sustainable-concept.

48 *Report of the United Nations Conference on Sustainable Development*, 1-2; DBSA *Programmes in support of transitioning South Africa to a green economy* 6. The Global Green Deal of UNEP emphasises this need.

49 See section 1 of this work on pg 4; *Green Economy Summit Discussion Document* 64; DEA 2012 http://www.environment.gov.za/?q=content/projects_programmes/greeneconomy/about; *Report of the United Nations Conference on Sustainable Development* 1-2.

50 These instabilities are evident in the world-wide financial crisis and ensuing recession of 2008-2010, which followed an economic boom in the years 2002-2007, as well as the rise and fall of the housing market. See in this regard Hammond 2013 *Global instability the new normal* http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11126125; Verick and Islam *The Great Recession of 2008-2009: Causes, Consequences and Policy Responses* 3, 9, 12. Market instability can also be observed in the fluctuating prices of commodities, such as gold and silver. In this regard, see Clark 2013 http://goldstockstoday.com/2013/07/telegraphing-the-turnaround-in-gold/.

importance.[51] Even instability itself can be an engine for growth, as it creates a climate for innovation, which is a perfect fit for the green economic paradigm.

2.2 The international context

Seeing that the concept of a green economy has an international inclination, it is important to determine the definition ascribed to it by the international community. According to the United Nations Environment Programme (hereinafter UNEP),[52] a green economy "improves human well-being and social equity, while significantly reducing environmental risks and ecological scarcities." This model amounts to being an economy relying less on carbon inputs, and utilising resources efficiently, whilst taking a "socially inclusive" approach. A green economy is said to have enormous potential for the creation of sustainable employment, and therefore the reduction of poverty. Investments from both the public and private sectors should be directed towards curbing pollution and carbon emissions in particular, attaining optimal efficiency from energy resources and limiting negative impacts on ecosystem products and services, which will therefore result in expanded employment opportunities and bigger earnings.[53]

A green economy is not a replacement for, or an alternative to sustainable development. Rather, it creates a climate within which sustainable development can take place. According to UNEP[54] "there is now a growing recognition that achieving sustainability rests almost entirely on getting the economy right." For this reason, nations are encouraged to take part in a Global Green New Deal. With this initiative, new jobs would be created in green sectors and individual economies could be developed in a sustainable and inclusive manner, all adding to a transfer to a green

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51 UNEP *Towards a Green Economy* 1; DBSA *Programmes in support of transitioning South Africa to a green economy* 5-7; UNEP *The Business Case for the Green Economy* 36.

52 UNEP *Towards a Green Economy* 2.

53 UNEP *Towards a Green Economy* 2, 5. Risking repetition, it is crucial to point out again that a green economy is, at its very essence, a low-carbon economy, and it can be clearly seen that all the steps taken towards a green economy also bring forth a move towards a low carbon situation.

54 UNEP *Towards a Green Economy* 2.

global economy. This process could inadvertently also bring us a step closer to the fulfilment of the Millennium Development Goals (hereinafter the MDGs).[55]

2.3 The South African context

Although it is important to determine the meaning attached to the idea of a green economy in the international context, the concept has to find meaning on a nation scale as well, which necessitates the understanding of the extent and constraints of the idea from the South African perspective. The definition formulated by the Department of Environmental Affairs (hereinafter DEA)[56] explains a green economy as "a sustainable development path based on addressing the interdependence between economic growth, social protection and natural ecosystems." It is proposed that this definition is very much identical to that of sustainable development; it is a pity that the DEA does not advocate a low-carbon approach.

Upon enquiry into the South African *Green Economy Summit Discussion Document*,[57] one finds a green economy depicted as:

> a system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities.

55 UNEP *Towards a Green Economy* 2; South African Government Information 2011 http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=23648&tid=50584; Agama Energy *Employment Potential of Renewable Energy in South Africa* x. According to UN Date Unknown *We Can End Poverty: Millennium Development Goals and Beyond 2015* http://www.un.org/millenniumgoals, the MDGs include eradication of extreme poverty and hunger; achievement of universal primary education; promotion of gender equality and empowerment of women; reduction of child mortality; improvement of maternal health; combating HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and global partnership for development.

56 DEA 2012 http://www.environment.gov.za/?q=content/projects_programmes/greeneconomy/about.

57 *Green Economy Summit Discussion Document* 5.

This definition's acknowledgement of the need to protect future generations has a strong temporal aspect, in that it directly incorporates the basic idea of inter-generational equity as is found in the Brundlandt Report. This emphasises the fact that a green economy is not a replacement of the idea of sustainable development, but rather builds on the progress made in terms thereof.

What does a green economy look like in simple terms? In essence, it encourages growth and development of the economy, without the usual cost to the environment and natural resources. One of the distinguishing features of a green economy is a green investment spurt, brought about by policy reforms. This drives a restructuring of businesses and infrastructure and sets the stage for more efficient production and utilisation of resources. A restructuring of this sort allows for a densification of green market sectors, and could create better jobs, lessen the impacts of production processes on the environment and could cut GHG emissions dramatically.[58] All things considered, a green economy sounds like the ideal solution to a number of the problems experienced in South Africa, particularly in the socio-economic sphere. However, getting from theory to practice will not be an easy task, and in order to successfully green the economy, we will need to employ existing instruments, as well as invest in new ones.[59]

It is important to have an inclusive definition of a green economy, but before the concept can really mean anything, it must be included in the national development strategy. According to UNEP,[60] this strategy must create a so-called level playing field by introducing equal opportunities for greener products. National policies and instruments need to create and facilitate a transitional climate, and therefore, national regulatory instruments and state subsidies and incentives must align with international protocols and "legal infrastructure" regarding trade and assistance issues in particular. Some strategies that could be used to achieve this enabling environment are:

58 *Green Economy Summit Discussion Document* 5, 62; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7.
59 *Green Economy Accord* 3.
60 UNEP *Towards a Green Economy* 1-2.

> changes to fiscal policy, reform and reduction of environmentally harmful subsidies; employing new market-based instruments; targeting public investments to 'green' key sectors; greening public procurement; and improving environmental rules and regulations, as well as their enforcement.[61]

This is all accomplished by way of law. Embellishing on these endeavours, there are also prospects for investment in the international market structures, for an increase of trade opportunities and for an enhancement of international cooperation.[62] Importantly, however, each nation's path towards a green economy will differ, since countries find themselves at varying stages of development, and have a unique range of what UNEP[63] refers to as "natural and human capital."

The idea of a green economy is a new one in South Africa, and therefore the country does not have any legislative provisions expressly dealing with a green economy as of yet. However, recent policy developments have begun considering this concept. One of the most significant developments to date is the Green Economic Accord, which was signed by various South African parties on 17 November 2011. It is described as "one of the most comprehensive social pacts on green jobs in the world."[64] Among its aims is to generate 300 000 job opportunities by the year 2020. The accord also contains various commitments to increase the relay of renewable energy into the national electricity grid and to advocate the use of solar water heaters by means of so-called mass installation and rebates. Eskom is driving a solar water-heating project, committing specifically to the installation of one million units by 2014. As a way of incentivising the use of solar-powered geysers, sizeable rebates are awarded to consumers who switch from electric to solar geysers.[65] Also in the pipeline is a 5 000 MW solar park planned for the Northern Cape. On a somewhat smaller scale, Eskom is currently building a 100 MW

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61 UNEP *Towards a Green Economy* 1-2.
62 UNEP *Towards a Green Economy* 2.
63 UNEP *Towards a Green Economy* 4; *Report of the United Nations Conference on Sustainable Development*, 10.
64 South African Government Information 2011 http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=23648&tid=50584.
65 South African Government Information 2011 http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=23648&tid=50584.

plant in the same area, and a third small plant is planned for Robben Island.[66] In addition, the parties to the Green Economy Accord committed themselves to action in: increasing the rate of green investment; reducing the reliance on and emissions from coal, developing the use of biofuels, developing private and commercial use of public transport, advancing energy efficiency, reducing and recycling waste materials, expanding access of the poor to electricity, localisation of green economic activities and related skills development, as well as international cooperation.[67] Although South Africa has been sluggish to join the international drive towards a green economy, encouragingly, the country is at the forefront of African efforts to increase the development and use of renewable energy; for example, it is the first African nation to institute a feed-in tariff on wind energy.[68]

Relevant to the pursuit of a green economy, especially with reference to renewable energy, is the reality of climate change, and for this reason:

> [we] cannot separate climate change responses from our goals of pursuing development and poverty eradication … Pursuing the green economy must be linked to our overall agenda of pursuing employment creating growth, and inclusive growth that improves the lives of our people.[69]

The Green Economy Accord[70] accurately recognises that the reality of climate change generates new economic opportunities. There is potential in sectors such as manufacturing and installation of renewable energy products, energy efficiency,

66 SouthAfrica.info 2010 http://www.southafrica.info/business/economy/infrastructure/energy-111010.htm.

67 *Green Economy Accord* 3-4.

68 Parker 2011 http://mg.co.za/article/2011-11-17-sas-new-green-economy-accord-met-with-scepticism; SouthAfrica.info 2010 http://www.southafrica.info/business/economy/infrastructure/energy-111010.htm.

69 South African President Jacob Zuma at the launch of the COP 17 flagship solar power plant in Hazelmere, KwaZulu-Natal, as quoted by SouthAfrica.Info 2011 http://www.southafrica.info/cop17/greenjobs-051211.htm.

70 The Green Economy Accord was concluded between role players from government, business, trade unions and the community.

recycling, transportation and technology development.[71] All of these sectors contain prospects for job creation and investment.[72]

Although the Green Economy Accord contains a few good policy measures, the overall feeling about this agreement is that it does not bring anything new to the table. According to this viewpoint, the agreement mostly replicates and recycles existing initiatives.[73] This creates some doubt as to whether South Africa will be able to achieve previously failed policy goals this time around. However, alongside the doubt regarding South Africa's track record of delivering on promises, there are also positive aspects to be found in the renewed commitment that is the Green Economy Accord. One such advantage is that it contains commitments from a variety of stakeholders. Such buy-in is imperative to the success of any economic transition.[74] It is clear, glaringly so, that the country's targets regarding job creation depend largely on the localisation of actions in these spheres. Only if we can succeed in this, will we be able to ensure that these opportunities bring about the desired and potential benefits.[75]

Other policy documents that have a bearing on South Africa's move towards a green economy include the New Growth Path, the Integrated Resource Plan 2010, the NCCRWP, the Industrial Policy Action Plan 2, the Long-Term Mitigation Strategy and the Medium-Term Strategic Framework.[76]

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71 *Green Economy Accord* 1-2.

72 *Green Economy Accord* 2.

73 Parker 2011 http://mg.co.za/article/2011-11-17-sas-new-green-economy-accord-met-with-scepticism.

74 Parker 2011 http://mg.co.za/article/2011-11-17-sas-new-green-economy-accord-met-with-scepticism; DEA 2012 http://www.environment.gov.za/?q=content/projects_programmes/greeneconomy/about.

75 *Green Economy Accord* 2; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7.

76 DBSA *Programmes in support of transitioning South Africa to a green economy* 5. Unfortunately, due to space constraints, all of these policy documents cannot be discussed in this work.

It is important to realise that South Africa's gateway to a greener economy does not lie only in alternative forms of energy, but also in energy-efficiency measures. By way of illustration: government estimates that simply retrofitting government-owned buildings with low-energy lighting will reduce annual electricity costs by about $845 million.[77] A big contribution can also come from introducing more efficient techniques to utilise the country's coal reserves, which are inexpensive and readily available.[78] Because of this need for a combined effort between cleaner energy and energy efficiency, the Green Economy Accord will be employed in conjunction with the National Energy Efficiency Strategy.[79]

2.4 The green economy and renewable energy as a driving factor

In an article featured in the New York Times, Krugman[80] makes the statement that in order to "avoid that apocalypse," 'that apocalypse' being the detrimental effects of climate change, "we have to wean our economy from the use of fossil fuels, coal above all." He considers the question whether GHG emissions can be significantly reduced without resulting in an economic devastation. After weighing up the different scenarios arising from drastic cuts and business-as-usual in the alternative, he comes to the conclusion that we simply cannot afford not to act drastically and immediately. UNEP[81] is of the opinion that "a green economy grows faster than a brown economy[82] over time, while maintaining and restoring natural capital," making a shift towards such an economy an ideal opportunity for healthy and sustainable economic growth.

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77 South African Government Information 2011 http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=23648&tid=50584.

78 SouthAfrica.info 2010 http://www.southafrica.info/business/economy/infrastructure/energy-111010.htm; *Draft Integrated Energy Planning Report* 2.

79 South African Government Information 2011 http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=23648&tid=50584.

80 Krugman 2010 http://www.nytimes.com/2010/04/11/magazine/11Economy-t.html?_r=1&pagewanted=all.

81 UNEP *Towards a Green Economy* 23.

82 One which relies heavily on the use of fossil fuels.

In section one above, the groundwork was laid for the reasoning that carbon emissions from the energy sector have a significant detrimental impact on the environment and on the exacerbation of climate change. An economy needs energy in order to grow, and currently, South Africa is getting most of that energy from fossil fuels. Although we cannot afford not to grow, we also cannot afford to simply carry on as usual. We therefore have to look for new alternatives to supplement and begin to replace our reliance on fossil fuels. Renewable energy provides us with an answer. Even though we cannot obtain all our energy needs from renewables, diversifying the energy mix will be of significant value.

Amongst others, a green economy:

> aims to increase access to services and infrastructure as a means of alleviating poverty and improving overall quality of life, and addressing energy poverty is a very important part of this transition.[83]

In studying the picture of the energy situation in Africa, specifically, one can see that the majority of low-income households spend large amounts on kerosene lighting. This form of energy holds many disadvantages, such as being inefficient and expensive, and in addition, it poses a risk to the health and safety of users.[84] Many households also use traditional biomass and coal for cooking purposes. This results in indoor air pollution, which leads to a tragic number of premature deaths annually.[85] Instead:

> renewable energy technologies and supportive energy policies promise to make a significant contribution to improving living standards and health in low-income areas, particularly in off-grid situations. Cost effective solutions include clean biomass and off-grid solar photovoltaics, with low operating costs and flexible, small-scale deployment options.[86]

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83 UNEP *Towards a Green Economy* 11.
84 UNEP *Towards a Green Economy* 12.
85 UNEP *Towards a Green Economy* 12; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7; Barnard 2012 *PELJ* 207.
86 UNEP *Towards a Green Economy* 12.

The green economy stretches much wider than the use of renewable energy, but renewable energy has the potential to play a significant role in facilitating a just transition to a lower carbon and greener economy in South Africa.

2.5 Summary

Although there is keen awareness of the concerns for the well-being of present (and especially) future generations, the general and often selfish mentality remains that we need to "stretch what nature provides to the optimum..."[87] Sadly, this frequently comes at a cost to the very environment that we are so dependent upon. It is submitted that this is the root of many, if not most, of the ecological predicaments observed today. A green economy recognises that social well-being is inextricably linked to the healthy condition of the economy and the environment.[88] It was shown above that such an economy holds great potential for job creation, and concomitant with this, reduction of poverty, making this an ideal solution to some of South Africa's many socio-economic problems. In addition, it relies less on carbon inputs, creating a healthier and cleaner environment.

At this point, it is important to highlight the fact that the above discussion only considers the potential benefits of a green economy. There are, however, serious concerns and criticisms to take note of in order to formulate a balanced view on the issue. Barbara Unmüßig,[89] is of the opinion that the current concept of a green economy falls short of addressing the real need. She feels that, if we are to adequately protect our environment and those who are dependent upon it (now and in the future), simply adding green principles to the current market recipe will be insufficient. Instead, we must rethink the very "fundamentals of our economy." Other concerns include the fear that a green economy will once again widen the chasm of inequality between developed

87 Barrow *Environmental Management for Sustainable Development* 11.
88 UNEP *Towards a Green Economy* 2.
89 Barbara Unmüßig is an active environmentalist and co-president of the Heinrich Böll Foundation. Schattenblick 2012 http://www.boell.org/web/138-Barbara-Unmuessig-Critique-Green-Economy-Interview.html.

and developing countries. It is also believed that too much is expected of a green economy, and that it is somehow believed to provide a magic cure for the current problems faced. Some feel that the green economic model does not force nations to move beyond business-as-usual. The aspect that is drawing out the most criticism is the fact that a green economy seeks to "reconcile the capitalist production-consumption model with the environment," and in so doing, it still works along the lines of typical capitalist thinking: it seeks to "produce more, and to create more needs to consume more." The reality, however, is that this planet contains a finite quantity of resources, and for this reason, unconstrained growth is simply not possible.[90] At some point, the structure of the economic paradigm will have to be reconsidered.

90 Friederich Ebert Stiftung Date Unknown http://www.fes-sustainability.org/en/discussions/green-economy-sustainable-concept.

3 Renewable energy in South Africa: the rationale and options

Before considering the advantages that energy generation from renewable sources can have for the South African socio-economic sphere and environment, it is necessary to determine the nature of renewable energy and what energy generation from such sources means. This section will consider the availability of specific sources in the South African context, as well as the environmental impacts that could flow from the large-scale exploitation of those resources for energy purposes. The above aspects will be examined in an attempt to contextualise the need for a legal framework to facilitate and regulate the increased and more effective implementation of renewable sources in South Africa.

3.1 Delineation of renewable energy and renewable energy generation

The term renewable energy does not refer to the renewal of energy as such, but rather to the renewal of the levels of energy potential of a source.[91] The use of renewable energy sources entails deriving energy "from on-going natural processes, such as sunlight, wind, flowing water (hydropower) and biological processes such as anaerobic digestion, and geothermal heat flow."[92] In other words, it captures and uses energy that is already in existence, in contrast to the energy that must be generated through the burning of fossil fuels.[93]

The definition of renewable energy, as found in the *White Paper on Renewable Energy*,[94] reads as follows:

> Renewable energy harnesses naturally occurring non-depletable sources of energy, such as solar, wind, biomass, hydro, tidal, wave, ocean current and geothermal, to produce electricity, gaseous and liquid fuels, heat or a combination of these energy types.

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91 Strydom and Surridge "Energy" 775.

92 Du Toit 2010 *The Sustainable Energy Resource Handbook* 18.

93 Du Toit 2010 *The Sustainable Energy Resource Handbook* 18; Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 135.

94 *White Paper on Renewable Energy* 1.

A characteristic experienced with some forms of renewable energy, such as wind and solar energy, is intermittency. In the case of other sources, such as biomass and hydro, there is a seasonal fluctuation. However, these barriers can be overcome by employing a combination of sources, and drawing from a specific source as the supply allows.[95]

Unfortunately, when compared to electricity generation from fossil fuels, the initial or start-up costs for renewable energy systems are high.[96] When viewed over a period of time, however, the financial implications are positive. In addition, as renewable technology develops, and as the demand for these products grows, the costs will decrease, making cleaner energy options more accessible.[97] Another factor to keep in mind when comparing relative costs of energy from fossil fuels and renewable sources is that the former does not include the costs to the environment and to humans themselves. For a true reflection, one must take into consideration the environmental costs that are associated with energy production and use, including pollution and GHG emissions and social health.[98]

3.2 The need for renewable energy

South Africa's energy needs are, and have always been, met predominantly by the use of fossil fuels, and in particular, by coal.[99] The existing coal-fed electricity grid extends to millions of consumers from all walks of life.[100] This heavy reliance on coal is explained by the fact that, in South Africa, it is available in abundance and that electricity

95 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 135-136.

96 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 119, 127; Barnard 2012 *PELJ* 208.

97 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006)127.

98 Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7; Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 81; Agama Energy *Employment Potential of Renewable Energy in South Africa* 1.

99 *White Paper on Renewable Energy* 3; Strydom and Surridge "Energy" 766.

100 *White Paper on Renewable Energy* 3, vii.

generation from coal is efficient and takes place at a low-cost.[101] In the past, the competition of low-cost electricity has always hampered the development of a sustainable market for renewable energy in South Africa.[102] However, the fossil fuels on which we so dearly depend are being depleted at an unsustainable rate.[103] Studies show that around 50% of existing oil and gas deposits have already been exhausted.[104] The remaining deposits are becoming ever more difficult to reach, since they are located deeper underground. This means that they are obtained at higher cost and effort. Moreover, many of these deposits are found in pristine areas with a high environmental value, which of course gives rise to a host of environmental issues regarding authorisations and conservation.[105]

Another variable to add to the current energy equation in South Africa is the issue of emissions. Notwithstanding the availability of fuel sources and the cost of power generation, the realities of climate change require that we start looking at the long-term effects of our excessive use of fossil fuels for energy purposes.[106] According to the *White Paper on Renewable Energy*,[107] South Africa's per capita CO_2 emissions are amongst the highest in the world; this is a problem which needs to be addressed urgently. In order to be a responsible global citizen, the country must contribute to the solution for climate change, rather than add to the dilemma thereof. South Africa must now find a balance between meeting the energy needs of the country (which includes providing equitable access to electricity, and providing it at affordable rates) and reducing its emissions.[108]

101 Strydom and Surridge "Energy" 766, 769.
102 Du Toit 2010 *The Sustainable Energy Resource Handbook* 20.
103 Strydom and Surridge "Energy" 768, 769; SANEA 2010 http://www.sanea.org.za/MediaCentre/SANEATalkingEnergy/2010/April/12.asp
104 Du Toit 2010 *The Sustainable Energy Resource Handbook* 19; SANEA 2010 http://www.sanea.org.za/MediaCentre/SANEATalkingEnergy/2010/April/12.asp.
105 Du Toit 2010 *The Sustainable Energy Resource Handbook* 19.
106 Strydom and Surridge "Energy" 791-792.
107 *White Paper on Renewable Energy* 3.
108 *White Paper on Renewable Energy* 3.

The steeply-rising electricity costs and worrying emission levels, as well as the need for poverty alleviation and sustainable development are some of elements driving the shift towards alternative forms of energy.[109] Unfortunately, however, it seems that government's thinking with regard to the continued use of coal as a main source of energy for the next few decades has remained unchanged. Kidd[110] quotes the Minister of Energy Affairs on a remark she made in the budget speech she delivered in 2010:

> Working together with the Department of Science and Technology and through SANEDI (our energy research entity), we will find home-grown scientific answers to the issue of carbon capture and storage as well as *using our abundant coal reserves to produce clean forms of energy to reduce greenhouse emissions*.[111]

Kidd[112] is, understandably so, highly critical of such thinking. We are living in a time where strong leadership is needed from government sectors in finding solutions in a new forum altogether. That being said, however, all the indicators show that, in the short and medium term, coal will remain our biggest source of energy. For this reason, it is very important that new cleaner technologies are developed for the use of fossil fuels.[113]

3.3 Available options

In addition to the above-mentioned problems relating to the intensive use of fossil fuels, these fuels also have a serious negative impact on the environment and the costs to remedy the pollution or environmental damage caused by them are high. The damage caused by renewable sources is significantly less; a fact which in itself necessitates the serious consideration of the deployment of renewable sources. In spite of this, and regardless of the reality that these renewable sources could genuinely offer a

109 Du Toit 2010 *The Sustainable Energy Resource Handbook 20;* Brits *The regulatory regime for bio-fuels in South Africa* 3.
110 Kidd *Environmental Law* 328.
111 2010 Budget Speech by Ms Dipuo Peters, Minister of Energy, 20 April 2010 at 5.
112 Kidd *Environmental Law* 328.
113 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) viii.

sustainable solution to the current fossil fuel-related problems this country experiences, South Africa's wealth of renewable sources is, to a large extent still untapped.[114]

Various factors need to be taken into consideration when determining the viability and potential value of harnessing a particular renewable source for energy purposes. Besides the availability of the resource, some of the main considerations include the location and extent of the demand, quality of fuel produced from the specific resource, the system of conversion used, as well as the costs regarding conversion and the costs of transport.[115] It must also be kept in mind that even though renewable energy is more environmentally friendly than traditional (fossil) fuels, no electricity generating activity can take place without some form of impact on the environment.[116] Taking the above-mentioned factors into consideration, some of the most viable renewable resources in South Africa are solar, solar photovoltaic, biomass, hydro, wind, ocean energy and biofuels.[117] For the sake of comprehensiveness, these sources will now be described briefly. It is in no way, however, an attempt at a scientific discussion or analysis of the viability of the different options.

3.3.1 Solar

Undoubtedly, the sun is one of the resources that South Africa has in abundance. The amounts of solar radiation experienced here are some of the highest in the world,[118] with an average of around 220 W/m^2 every day. Some areas experience between 5000 and 6000 Wh/m^2 every day.[119] For this reason, the potential for solar power in South

114 *White Paper on Renewable Energy* vii.
115 *White Paper on Renewable Energy* 12.
116 Strydom and Surridge "Energy" 776-778.
117 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1; *White Paper on Renewable Energy;* Du Toit 2010 *The Sustainable Energy Resource Handbook 20;* Brits *The regulatory regime for bio-fuels in South Africa* 22.
118 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1.
119 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 50.

Africa clearly is enormous. In spite of this, however, solar energy is still used to supply only about 10% of energy needs in the country.[120]

Solar energy is mostly used in rural energy programmes for communities that do not have access to grid energy options, and is specifically applied in the form of solar water heating.[121] Solar water heaters are usually black to allow optimum absorption of infra-red radiation. This radiation heats the water directly.[122] Efficiency is mainly dependent on the size of a specific heater. Currently, solar water heaters are relatively expensive, with a comparatively long payback period.[123] However, as with most other products, mass production and installation will drastically lower the price of these heaters.[124]

It appears that solar power is the form of renewable energy that has the lowest environmental impact. While there are negligible negative environmental impacts from the use of solar panels or other solar heating systems, environmental concerns about the use of such solar technologies relate to the production phase of the components, which are mostly made from heavy metals and glass, as well as the eventual disposal thereof. Education about proper disposal is crucial, especially in poor rural areas where these technologies are used on a large scale and where the users are not always aware of the dangers of the materials.[125]

3.3.2 Solar Photovoltaic

This type of energy is also derived from the sun, but instead of using the sunlight directly, it is converted into direct current electricity, which is then stored in lead-acid batteries for later use. Efficiency fluctuates between around 6% and 45%, depending on the type of cell used. Electricity derived from photovoltaic cells is once again found mostly in rural areas not connected to the national grid. Photovoltaic batteries are a safe

120 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1.
121 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1.
122 Strydom and Surridge "Energy" 776-777.
123 According to Glazewski, this payback period is around 5 years.
124 Strydom and Surridge "Energy" 776-777.
125 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 95.

and dependable technology that provides clean electricity. However, it is currently still more expensive than electricity generated from coal. Although it is a cleaner form of generation, and the operation or use thereof does not result in pollution,[126] photovoltaic electricity is not free from environmental impacts. Since it includes the manufacture, and later also the disposal of batteries, the process includes the disposal of heavy metals, and sufficient care must be taken to handle those metals in an environmentally acceptable manner.[127]

3.3.3 Biomass

Biomass accounts for roughly 10% of the national energy consumption. Biomass is a grouping of resources that includes wood and wood waste, such as pulp, bark and sawdust, as well as animal dung, charcoal and bagasse (husks) and is, for the most part, used in rural communities. According to Glazewski,[128] around 60% of household energy needs in South Africa are met through use of biomass.

Although biomass is mostly consumed in the household sector, some industries do make use of this resource. This is mainly true for the sugar refining industry, which uses bagasse, and pulp and paper industries, which use sawdust and bark to generate heat and steam. These contributions are significant,[129] and have the additional benefit of reducing the amounts of waste produced in these industries.

Wood is often harvested in an unsustainable manner.[130] If a renewable source is harvested or consumed at a rate that exceeds the rate of regeneration of that resource, its supply will eventually run out. Therefore, in order to protect vegetation in rural areas, reforestation initiatives have to be introduced and the use of biomass has to be

126 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 95.
127 Strydom and Surridge "Energy" 777.
128 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1.
129 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 58.
130 This can be seen particularly with the harvesting of firewood, although other forms of vegetation are also under threat of unsustainable use.

supplemented by other sources. Unfortunately, this is only a partial solution. The carbon content of new forests is much lower than that found in old, established forests, and therefore, the need to rehabilitate forests and woodlands slows the achievement of climate change mitigation targets.[131]

3.3.4 Hydro

Currently, only about 1% of the electricity in South Africa is generated from hydro-electric power. This is despite the fact that hydro-power is the oldest and most established source of renewable energy and that this country lends itself to small scale hydro-electricity generation.[132] Hydro-power is generated when stored water is released from a dam. The falling or moving water drives turbines, which in turn drive electricity generators. This process therefore converts gravitational energy into usable electricity.[133]

Compared to the use of fossil fuels, the generation of electricity by way of hydro-power seems to have little or no environmental impact. However, it is in no way an environmentally-neutral process. The damming of water for the use in hydro-schemes inevitably leads to local flooding, interference with ecosystems and habitats, and the accumulation of silt. All this has serious consequences for the entire linear river ecosystem. In addition, decaying vegetation (caused by the flooding in new areas) leads to the emission of methane (a GHG, which is much stronger than CO_2).[134]

3.3.5 Wind

Wind is caused by a combination of factors, including the heating of the earth by the sun, the earth's uneven surfaces and rotation.[135] Wind turbines harness the wind and

131 Strydom and Surridge "Energy" 777.
132 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1.
133 Strydom and Surridge "Energy" 778.
134 Strydom and Surridge "Energy" 778.
135 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1; National Geographic 2013 http://greenliving.nationalgeographic.com/positive-negative-wind-energy-2715.html.

convert it into usable electricity. The efficiency of turbines generally depends on the size of the blades and the wind speed experienced, and can also be influenced by the type of system used, whether the blades rotate vertically or horizontally.[136] When considering a wind farm, the area where it is situated makes all the difference. Generally, the highest wind speeds in South Africa are found in the coastal regions.[137] However, the optimal efficiency of electricity generation is reached at wind speeds of 10 metres per second.[138]

Some of the biggest environmental issues consequent to wind farms are the clearing of vegetation, visual impacts and noise, but also include flight patterns of birds and electromagnetic interference. No CO_2 is emitted during the generation of electricity. The only emissions arise during the production and maintenance of turbines.[139]

3.3.6 Ocean energy

Various ocean energy systems have developed in an attempt to harness the considerable wealth of energy found in the world's oceans. Such technologies are still in their developing phase, however, and in South Africa specifically, there is still a long way to go before there can be any commercial dependency on ocean energy. In our context, tidal and wave technologies seem to have the most potential, but both are as yet undeveloped and underutilised.[140]

Tidal energy is predictable and has periodic ebbs and surges. The most-used models for tidal energy systems are dams built in bay areas; the water flows into the storage area as the tide rises, and is then used to generate electricity in the same manner as is

136 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1; Strydom and Surridge "Energy" 777.

137 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 51.

138 Strydom and Surridge "Energy" 777.

139 Strydom and Surridge "Energy" 777; Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 95; National Geographic 2013 http://greenliving.nationalgeographic.com/positive-negative-wind-energy-2715.html.

140 Strydom and Surridge "Energy" 778.

found in conventional hydroelectric systems. Unlike tides, wave energy is variable, but weather forecasts can help pinpoint the optimal conditions.[141] Different models are available for the collection of energy from waves, but are generally sea-based, and range from using horizontal ocean current movement to the vertical motion of wave action.[142]

The impacts of sea-based ocean energy systems are minimal, with insignificant visual and noise impacts, and sedimentary build-up is manageable. Tidal and wave systems are usually installed in areas with high levels of energy, i.e. tide or wave activity, which are usually not optimally supportive of aquatic life, and will therefore not have a serious impact on the area's ecosystem. In the case of tidal barrages, or dams, the impacts are more tangible, and silt accumulation is a bigger problem than in the case of sea-based systems.[143]

3.3.7 Biofuels

Biofuels are liquid fuels derived from plant or organic matter, and can be used to substitute or supplementing liquid fossil fuels. This results in a cleaner, healthier source of energy that has a less adverse impact on the environment. It must be kept in mind, however, that the biofuel industry is not environmentally neutral. Environmental impacts include soil erosion and alterations in ecosystems, water pollution, and threats to food security.[144] The last-mentioned issue can be minimised by avoiding the use of staple foods for biofuel production, although this eliminates much of the supply for production.[145]

141 Jan, Carey and Robinson "Geothermal and ocean energy" 388.
142 Huckerby "Development of Marine Energy in the Global Context".
143 Huckerby "Development of Marine Energy in the Global Context".
144 Strydom and Surridge "Energy" 777-778; Brits *The regulatory regime for bio-fuels in South Africa* 3.
145 Strydom and Surridge "Energy" 778.

3.4 Regional cooperation

Regional cooperation is in the broader interest of Southern African countries. In some nations a specific renewable source abounds, but that country then lacks the resources to harness it, whereas other nations might have the capacity to develop energy production from renewable sources, but lack the sources themselves.[146] Trans-boundary and "cross-jurisdictional" efforts are required in order to enable proper and effective planning and allocation.[147]

As an example: South Africa does have the potential for hydroelectric power, but it is small in comparison with the enormous potential of Southern African countries if regional cooperation can be achieved. According to the *National Development Plan*,[148] the sub-Saharan region has high potential for the expansion and deployment of solar and hydro-energy, as well as the production of biofuels. Winkler[149] is of the opinion that the region has the potential for the generation capacity of around 70 800-134 800 MWe. A good example of the potential of regional cooperation in sub-Saharan Africa is the Great Inga Project.[150] Optimal regional cooperation will, however, require policy formulation and will not happen overnight. Care will have to be taken that one country does not exploit other "weaker" nations, and that the allocation and distribution of energy is fair. It is also essential that the carrying capacity of resources is not exceeded in the spirit of conquering new prospects at all cost.[151]

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146 African Unification Front date unknown *Africa-Wide Energy Policy is Crucial for Growth* http://www.africanfront.org/energy.php.

147 African Unification Front date unknown *Africa-Wide Energy Policy is Crucial for Growth* http://www.africanfront.org/energy.php.

148 *National Development Plan: Vision for 2030*, (2011) 65.

149 Winkler (ed) *Energy policies for sustainable development in South Africa - Options for the future* (Energy Research Centre, University of Cape Town 2006) 50.

150 South African Government News Agency 2013 *SA, DRC meet to finalise Grand Inga Project Treaty* http://www.sanews.gov.za/south-africa/sa-drc-meet-finalise-grand-inga-project-treaty. In terms of this project, a hydropower system with a generation capacity of around 40 000MW will be developed on the Congo River in the Democratic Republic of Congo. This renewable energy project will supply hydroelectricity to various nations in the SADC region, including South Africa. The Great Inga Project has the potential to contribute positively to regional climate mitigation efforts and the energy security situation.

151 African Unification Front date unknown *Africa-Wide Energy Policy is Crucial for Growth* http://www.africanfront.org/energy.php.

3.5 Summary

It is important to keep in mind that even though renewable energy is derived from ongoing natural processes that cannot be exhausted per se, it does not mean that we can exploit them in an unconstrained fashion. Renewable energy is derived from "an energy resource that is replaced by a natural process at a rate that is *equal to or faster than the rate at which that resource is being consumed*."[152] This means that if these sources are used unsustainably, such exploitation will, in itself, have a serious impact on the environment and ecosystems. An example of such a situation can clearly be seen in the use of wood for energy in poor rural communities. These communities derive the majority of their energy from burning firewood, which is, for the most part, harvested unsustainably.[153] The *White Paper on Renewable Energy*[154] predicts that the woodlands will be destroyed if the current trend continues. This means that we will lose a critical part of our ecosystems, and in addition, the communities depending on those woodlands will run out of firewood. Clearly, such a scenario would be disastrous.

For the most part, the communities currently relying on renewable forms of energy are located far away from the electricity grid. If used sustainably, and in some form of combination of sources,[155] it is clear that the use of renewable energy produces many advantages, including job creation and therefore improved economies in the affected communities, better service provision, better health, energy security and generally "better, cleaner and healthier energy services."[156]

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152 Du Toit 2010 *The Sustainable Energy Resource Handbook* 18.
153 *White Paper on Renewable Energy* 3. These fires are also a large contributor to air pollution.
154 *White Paper on Renewable Energy* 3.
155 *White Paper on Renewable Energy* 3.
156 Du Toit 2010 *The Sustainable Energy Resource Handbook* 46; *White Paper on Renewable Energy* 3; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7; Agama Energy *Employment Potential of Renewable Energy in South Africa* x, 1.

4 The South African legal framework

It must be kept in mind that international, as well as regional, legal instruments influence the content of local laws and policies. However, these instruments have a limited direct impact on our national framework. Rather, they have a trickle-down effect, by facilitating legal developments at a national level. For this reason, and in order to keep to the focus of the study, such international and regional instruments will not be studied in this dissertation.

The national framework must create an enabling environment that facilitates a green economic inclination and specifically encourages the use of renewable energy as a factor to drive such an inclination. The *Constitution of the Republic of South Africa*, 1996 (hereinafter the Constitution) provides that every person has the fundamental right to an environment that is not harmful to their health or well-being.[157] Clearly, this ideal will not be achieved any time soon, but it does place the responsibility on government to take positive action to create an enabling environment wherein environmental impacts are regulated effectively. This is a good foundation for a legal framework that is focused on promoting the cause of renewable forms of energy. However, crucial as such a foundation may be, it must be kept in mind that the shift towards greater usage of renewable energy does not take place in a vacuum, but rather as a driving factor for a greener economy in this country. The success of an increased deployment of renewable energy is therefore dependent on an integrated structure of legislative and policy support regulating environmental, energy, fiscal and other aspects. An investigation into the existing legal framework of South Africa now follows, in order to determine how suitable this framework currently is, and to determine whether a progressive reliance on renewable energy would require a revision of those structures already in place, or whether it would require the addition of new legal instruments altogether. Unfortunately, the scope of this work does not lend itself to review all applicable policies and laws, and

157 S 24. See also Strydom and Surridge "Energy" 797; Glazewski *The Legal Framework for Renewable Energy in South Africa* 8.

some instruments will simply be mentioned in passing, while the more important selection will be looked at in greater depth.[158]

4.1 Environmental framework

4.1.1 National Environmental Management Act 107 of 1998

NEMA builds on the environmental right afforded by section 24 of the Constitution. The preamble of this act provides that:

> ...everyone has the right to have the environment protected, for the benefit of present and future generations, *through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social developmen*t...[159]

NEMA does not deal with sector specific issues, but rather creates a framework of principles which must be upheld across the board and according to which environmental management in the country must take place. Due to its generic nature, the provisions in the Act that do deal directly with aspects of renewable energy are limited, and although the general provisions of NEMA will be relevant in all matters concerning the environment, section 2(4) does list some factors regarding sustainable development that will be specifically applicable. The growth and improvement of renewable technologies and that entire industry should epitomise the idea of sustainable development, and therefore, these factors need to be taken into consideration throughout any process or activity utilising renewable energy.

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158 It is also important that the legal framework regulating energy must consider both demand and supply side management factors. The first-mentioned includes regulating and minimising the demand for energy, for example by making use of geyser blankets and green building techniques. The last-mentioned includes managing the types of resources being used to supply the energy. Due to limited space, this work will only consider supply-side management factors.

159 Own emphasis.

Considering that development is essential for both present and future generations, and that energy is an invariable requirement for development, those resources that are of a non-renewable nature must be used responsibly, and the consequences of their depletion cannot be ignored.[160] Taking this a step further, it is also vital that the use of renewable sources for energy purposes be explored with more earnest, and that the country invests in the development and improvement of technologies for such purposes. However, this must be done with caution in order to ensure that the exploitation of these resources does not exceed the capacity of the ecosystems they are found in to absorb that loss. The very nature of renewable sources entails that they have the ability to regenerate, but if the source is exploited at a rate faster than that at which it can renew itself, the integrity of that ecosystem is compromised.[161] All attempts to develop renewable sources must therefore be made cautiously, since our understanding about the full effect of our actions and decisions on the environment, especially in the long run, is limited. For this reason, NEMA requires that "negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied."[162]

Essentially, NEMA itself does not regulate the exploitation of renewable natural resources for energy purposes, but any such projects will have to comply with permit or licensing requirements. The most important is the obligation, in terms of section 24 of NEMA, to acquire an environmental authorisation.[163] Without such an authorisation, no project or development may commence. Besides this requirement, NEMA also lays down, *inter alia*, the principles of sustainable development, responsible and precautious exploitation of resources, as well as liability for environmental harm caused, and provides a framework for more detailed legislation that deals with particular environmental sectors.[164]

160 S 4 (a) NEMA; Glazewski *The Legal Framework for Renewable Energy in South Africa* 8.
161 S 2(4)(vi) NEMA.
162 S 4 (a) NEMA; Glazewski *The Legal Framework for Renewable Energy in South Africa* 8.
163 As seen in the EIA regulations; Diemont, Nowak and Van der Poel *Section 28* 596.
164 Strydom and Surridge "Energy" 798.

4.1.2 Environmental Impact Assessment Regulations

Kidd and Retief[165] describe environmental assessments to be a "critical component of modern environmental management." This is no different when it comes to issues regarding renewable natural energy resources. Environmental assessment is also a key to unlocking the goal of sustainable development, making it extremely relevant to this discussion, regardless of the fact that the 2010 Environmental Impact Assessment (hereinafter EIA) Regulations do not make specific mention of renewable energy. However, many of the items listed in these regulations are generic processes, and any project relating to electricity generation from renewable sources would therefore have to comply with these regulations. The regulations require either a basic assessment,[166] full environmental impact assessment[167] or scoping and environmental impact assessment[168] to be done, depending on the activity or the scale of the planned operations.

One of the above assessments will need to be undertaken: before commencing operations for the construction of facilities for electricity generation;[169] for the transmission and distribution of electricity;[170] the development of vacant land;[171] and for the expansion or decommissioning of existing electricity generation or storage facilities.[172] Another item listed in the regulations is the "construction of masts and towers," but this is mentioned in the context of "telecommunication or broadcasting or radio transmission purposes."[173]

165 Kidd and Retief "Environmental Assessment" 971.
166 GN R544 in GG 33306 of 18 June 2010 (hereinafter Listing Notice 1).
167 GN R546 in GG 33306 of 18 June 2010 (hereinafter Listing Notice 3).
168 GN R545 in GG 33306 of 18 June 2010 (hereinafter Listing Notice 2); Listing Notice 3.
169 Listing Notice 1; Listing Notice 2.
170 Listing Notice 1.
171 Listing Notice 1; Listing Notice 2.
172 Listing Notice 1.
173 Listing Notice 3.

This requirement is also true for the construction or expansion of waterways and dams,[174] water storage facilities[175] or water reservoirs for bulk supply.[176] Other scenarios where a form of EIA assessment will be required before commencement of an activity include "construction or earth moving activities in the sea, an estuary or within the littoral active zone;"[177] construction on coastal public property[178] and the removal from or depositing of sand, rock, gravel and so forth into a body of water, such as an estuary or watercourse.[179]

Besides NEMA, there are a few sector-specific laws that would be applicable to the deployment of renewable energy on a large scale. A brief look will now be taken at these Specific Environmental Management Acts (hereinafter SEMAs).

4.1.3 National Water Act 36 of 1998

This act regulates water resource management and protection, as well as water usage. In terms of the Act, all "water uses" broadly defined to include activities which remove water from a water resource, store or accumulate water and obstruct or redirect water flow are required to be licensed.[180] In terms of this definition, it is clear that any electricity generation process that involves such activities will have to be licensed.[181]

Although this act provides for the regulation of the use of water resources in certain activities, it does nothing to encourage the employment of such sources for energy purposes. While South Africa needs to carefully monitor and protect its water resources, being a water-scarce country, it must also consider the pressing need for new energy options and the potential of water sources to provide exactly that.

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174 Listing Notice 1; Listing Notice 2.
175 Listing Notice 1.
176 Listing Notice 3.
177 Listing Notice 1; Listing Notice 2.
178 Listing Notice 1.
179 Listing Notice 1.
180 Ss 4, 21 (a-c) *National Water Act*; Glazewski *The Legal Framework for Renewable Energy in South Africa* 9.
181 Glazewski *The Legal Framework for Renewable Energy in South Africa* 9.

4.1.4 National Environmental Management: Air Quality Act 39 of 2004

The *National Environmental Management: Air Quality Act* 39 of 2004 (hereinafter NEM:AQA) endeavours to protect the air quality experienced in South Africa,[182] so that we can enjoy an environment that is safe and healthy,[183] and to prevent air pollution and the degradation of our ecosystems.[184] As with all the SEMAs, it also aims to get us closer to the ever-important aspiration of sustainable development.[185] All indications are that the promotion of renewable energy usage will help to achieve these goals.

However, in order to make this possible, progressive action is required. Targets and emission ceilings will require constant revision, and protective measures will have to be adapted as different needs arise. This being said, the inherent nature of a renewable energy production process means that usually, there will be little or no impacts on ambient air quality during the operational phase, with the largest impacts occurring during the construction and perhaps the decommissioning stages of the project. As is the case with NEMA, the general requirements of this Act will be relevant to renewables, but besides the need for authorisations, NEM:AQA will not have any specific further application.

4.1.5 National Environmental Management: Integrated Coastal Management Act 24 of 2008

The purpose of the *National Environmental Management: Integrated Coastal Management Act* 24 of 2008 (hereinafter NEM:ICMA) is to preserve the integrity of South Africa's coastal environment and to recognise and retain the characteristics and features of our coastal landscapes and seascapes, whilst keeping in mind the three facets of sustainable development: making sure that development does occur, in a

182 S 2(a)(i) NEM:AQA.
183 S 24 Constitution.
184 S 2(a)(i)-(ii) NEM:AQA
185 S 2(a)(iii) NEM:AQA.

manner that the natural environment can maintain, and that the progress sought is justifiable when considering the social and economic factors within the coastal area.[186]

Any activity related to the exploitation of renewable sources will have to comply with the requirements of NEM:ICMA, as well as with the specific coastal management programmes and coastal planning schemes of the area in question. This act is applicable to all activities taking place in the coastal areas of South Africa, including any renewable energy generation scheme, but is specifically relevant when it comes to the generation of hydro and ocean-derived energy, where the exploitation of these sources must, due to their very nature, take place on or near the ocean or watercourses, and which therefore often require the construction in or development of areas protected by the Act. This being said, NEM:ICMA contains no direct reference to renewable energy or the harvesting of such sources in coastal areas.

4.1.6 National Environmental Management: Waste Act 59 of 2008

Quite predictably, NEMWA aims to regulate waste practices and to protect the environment against the effects of waste and pollution. The Act recognises that cleaner technologies, as well as "cleaner production and consumption practices" play a crucial part in reaching these goals.[187] As a first measure, the Act attempts to minimise the generation of waste (if it cannot be avoided altogether), to re-use, recycle or recover that which is produced, and to consider the treatment and disposal of waste only if it is the last available option. The use of renewable sources for energy purposes meets these criteria to the letter. Renewable energy sources have lesser contaminating impacts on the environment and on human health than do conventional fossil fuels, and the use of such sources results in smaller waste volumes being produced. In the second place, NEMWA recognises that waste can in some cases be applied as a resource.[188] This immediately brings to mind some of the country's waste-to-energy projects, of

186 Preamble NEM:ICMA.
187 Preamble; s2 *NEMWA*.
188 Preamble; s2 *NEMWA*.

which the Marianhill project in KwaZulu-Natal is probably the best known, and certainly amongst the most successful.[189]

Schedule 1 to NEMWA lists categories of activities which require a waste management license and which are equivalent to those listed in the EIA regulations. Category A activities require a basic assessment. Of specific relevance for renewable energy purposes is item 11, which requires a basic assessment and waste management license for "the processing of waste at biogas installations with a capacity for receiving five tonnes or more per day of animal waste, animal manure, abattoir waste or vegetable waste, including the construction of a facility and associated structures and infrastructure for such processing animal manure and abattoir waste."[190] Category B lists activities which require an environmental impact assessment.[191] This will also be applicable to any activity relating to renewable energy generation or usage.

4.1.7 National Environmental Management: Biodiversity Act 10 of 2004

This act deals with, amongst others, the regulation of practices using "indigenous biological resources" and attempting to ensure and safeguard the sustainability of both the project and the resource pool.[192] To this effect, any electricity generation-related activity using renewable sources will have to comply with the generic requirements of NEMBA, as well as permit conditions that may be required in terms of the Act, although these requirements are perhaps related most closely to the growing and harvesting of plant materials for the production of biofuels.

189 See generally Landfill Conservancies 2010 *Marianhill Landfill Site Conservancy* http://landfillconservancies.com/mlc_about.htm; The Young Foundation 2011 *A Dump with a Difference: The Future of Landfills in South Africa* http://findingwhatworks.org/2012/01/28/a-dump-with-a-difference-the-future-of-landfills-in-south-africa/.

190 Schedule 1, Category A (item 11) NEMBA.

191 Schedule 1, Category B NEMBA.

192 S 2(a)(ii) NEMBA.

4.2 Energy framework

4.2.1 White Paper on the Renewable Energy Policy of the Republic of South Africa, 2003

One of the early initiatives the country has taken regarding energy supply options came in the form of the *White Paper on the Renewable Energy Policy of the Republic of South Africa*, (hereinafter the *White Paper on Renewable Energy*), which was gazetted in 2003. The White Paper states that:

> Government's overall vision for the role of renewable energy in its energy economy is: *an energy economy in which modern renewable energy increases its share of energy consumed and provides affordable access to energy throughout South Africa, thus contributing to sustainable development and environmental conservation*.[193]

Another important focus of the *White Paper on Renewable Energy* is to attract and stimulate investments in the renewable energy sector.[194] It furthermore highlights that, in order to succeed in creating an environment which facilitates an increased reliance on renewable energy, South Africa will have to focus its attention on integral aspects, such as the quality and aim of its fiscal and legal instruments, and the enforcement thereof, developments in and improvements to technology, capacity building, as well as increasing education and raising awareness about renewable resources and the benefits and opportunities they hold.[195]

The *White Paper on Renewable Energy* set the goal of obtaining 10 000 gigawatt hours (GWh) (or 0.8 Mtoe) of South Africa's energy from renewable sources by 2013. Most of

193 *White Paper on Renewable Energy* 1; Glazewski *The Legal Framework for Renewable Energy in South Africa* 4; Diemont, Nowak and Van der Poel *Section 28* 591-592.

194 Diemont, Nowak and Van der Poel *Section 28* 591-592.

195 S 8 *White Paper on Renewable Energy*; Glazewski *The Legal Framework for Renewable Energy in South Africa* 4.

this supply was scheduled to be produced from wind, solar and biomass sources, as well as small-scale hydroelectric generation.[196]

4.2.2 National Energy Act 34 of 2008

Glazewski[197] anticipated that the *National Energy Act*[198] (hereinafter the *Energy Act*) would bring significant changes, creating a more coalesced legislative framework regarding energy in South Africa, and that essentially, the Act would become the foundation of this legislative landscape. In contrast to this positive viewpoint, Strydom and Surridge[199] had some doubts about how effective the Act[200] would be. They based their concerns on the fact that the Energy Efficiency Strategy of 2005, which was the pre-emptor of the *Energy Act*, highlighted how few energy efficiency measures had been undertaken, despite their availability, and also showed that the government did not have the "capacity to undertake energy-efficiency programmes." They go on to state the following:

> This ... has a debilitating influence on governance in general, and it is a factor that will certainly raise questions about the envisaged contribution the implementation of the National Energy Bill can make with regard to its rather crucial transformation[201] of the energy sector in South Africa.

The above represent diverse views, expressed before the enactment of the *Energy Act*. In order to determine which of the above predictions were most accurate, and to evaluate the effectiveness of this piece of legislation, a brief look will now be taken at

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196 S 5 *White Paper on Renewable Energy*; Glazewski *The Legal Framework for Renewable Energy in South Africa* 4; Diemont, Nowak and Van der Poel *Section 28* 591-592.

197 Glazewski *The Legal Framework for Renewable Energy in South Africa* 9.

198 At the time, the *National Energy Bill*.

199 Strydom and Surridge "Energy" 799.

200 At the time, the *National Energy Bill*.

201 This "transformation" specifically refers to transformation regarding the continuity and diversity of energy supply. The promotion of renewable energy sources plays a significant role in obtaining both objectives, but if the government does not have the capacity to implement these measures it is all to no avail, and so the question of the effectiveness of this piece of legislation is perhaps not an entirely misguided concern.

what it is actually achieving, as well as some of the shortcomings experienced in this legal sector.

One of the main purposes of the Act is to attend to the availability and multiplicity of energy options, as well as to the sustainability thereof.[202] This inclusion of the need for expanding the array of available energy options is encouraging, since it is crucial that efforts be made to increase the diversity of energy resources for both grid and off-grid options in South Africa, and at the same time, that proper attention is given to the sustainability of these efforts. What is furthermore encouraging is that an important objective of the *National Energy Act* is the commercialisation of technologies related to energy generation,[203] which will have the effect of making such technologies more widely available and increasingly affordable to the broader public. Section 5 reiterates this by saying that these "diverse energy resources" must be reasonably priced.[204] The concept is taken even further by section 2, which provides that one of the aims of the Act is to "facilitate energy access for improvement of the quality of life of the people of the Republic."[205] This highlights an important aspect, namely that it defeats the purpose if new energy resource options and technologies are being explored and developed, but the population cannot afford to buy into them or make use thereof. This is an especially pressing matter for poor households where the need for cleaner and more affordable energy options is so much more tangible and immediate. It is in exactly such circumstances where government initiatives, for example with tax incentives or procurement programmes, play an important role.[206]

In listing its aims, the *Energy Act* states that the above must all be done whilst keeping in mind that it is necessary to uphold the principles of good environmental management, and that, in addition, the various economic sectors are interrelated and must be treated accordingly.[207] This once again clearly indicates the value attached to the sustainable

202 Long title; s 2(b) *Energy Act*; Barnard 2012 *PELJ* 228.
203 S 2(j) *Energy Act*.
204 Long title; s 5(1) *Energy Act.*
205 *Energy Act* s 2(i).
206 *Energy Act* s 5(1).
207 Long title *Energy Act*.

development of the South African economy, and also raises the issue that the *National Energy Act* cannot be regarded in isolation, but rather will have to be read and applied alongside the various environmental acts, as well as applicable economic or financial instruments.[208]

Although the *Energy Act* deals with the energy sector in more general terms, one of its specific aims is to increase the volume of renewable energy produced and consumed by the country.[209] Section 2 of the *Energy Act* requires the Minister to publish an annual analysis of the energy supply and demand patterns experienced in the past year. Each analysis must further anticipate what those patterns are likely to do over a minimum period of 20 years, and then rework those patterns based on the various supply and demand options.[210] This requirement indicates that the department intends to keep its finger on the pulse, so to speak, and to monitor the supply and demand patterns in order to enable it to plan and adjust timeously to changes in the supply and demand landscape. In addition, the *Energy Act* creates the South African National Energy Development Institute,[211] which has as one of its functions to advance research and innovation in energy-related matters and technologies. All forms of energy are targeted by the Institute, except for nuclear power, which is excluded on the basis that it is regulated in sector-specific legislation.[212]

The *Energy Act* contains many positive considerations, which shows that the department is thinking along the right lines, and is aware of the important issues relating to the South African energy landscape. The Act also did focus the efforts regarding energy supply and production in the country, but now the single biggest downfall is the implementation thereof.

208 S 2(l) *Energy Act*; Barnard 2012 *PELJ* 222.
209 Long title *Energy Act*. This is one of the few direct mentions made of renewables in the Act.
210 *Energy Act* s 2(5).
211 *Energy Act* s7(1).
212 *Energy Act* s7(2).

4.2.3 Integrated Energy Plan

The *Energy Act* requires the Minister to formulate an *Integrated Energy Plan*. Every year, this plan must be reviewed and updated.[213] The Draft 2012 Integrated Energy Planning Report[214] considers the various strategies or policies regarding, amongst others, air and water quality management, electricity and energy infrastructure, as well as efforts within the energy sector to mitigate the effects of greenhouse gases,[215] which are all also important focuses of the Act. In addition, the *Integrated Energy Plan* aims to facilitate the objectives of sustainable development using, as far as possible, local resources, whilst attempting to minimise the traditional impacts of energy generation processes on the environment and on society. Another key focus of the *Integrated Energy Plan* is to increase the economic viability of the use of local resources for energy purposes.[216] However, in order to achieve this objective, the various options for energy supply must be explored, and the different technologies using those supply options must be fine-tuned to the specific requirements and characteristics of each resource.[217]

4.2.4 Integrated Resource Plan for Electricity 2010-2030

The *Integrated Resource Plan for Electricity 2010-2030* (hereinafter IRP) "is a living plan," and as circumstances change, it must be adapted in order to remain relevant.[218] It is a comprehensive study of various energy scenarios and options for South Africa in the period leading up to 2030. Some of the most important considerations of the IRP include security of supply, CO_2 emission reductions as per the climate discussions of the UN, uncertainty regarding "costs, operability, (and) lead time to build" new generation technologies, ensuring local input and job opportunities, water shortages, and regional cooperation and development.[219]

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213 S 6(1) *Energy Act*.
214 GN512 in GG 36690 of 24 July 2013.
215 S 6(3)(a) *Energy Act*.
216 *S* 6(4) *Energy Act*; Glazewski *The Legal Framework for Renewable Energy in South Africa* 4.
217 *S* 6(6)(b)-(c) *Energy Act*; Glazewski *The Legal Framework for Renewable Energy in South Africa* 4.
218 IRP 7.
219 IRP 7-8.

The Department of Energy (hereinafter DoE) is adamant that in the midst of the restructuring processes in terms of the IRP, security of energy supply cannot be allowed to slip, but at the same time, affordability is viewed as being a "key consideration."[220] In order to ensure that these targets are met, firm and immediate government commitment is required. The IRP considers the lead times and commitments needed for the different technologies, as well as the need for grid extensions and the various risks associated with the proposed technologies. It also recognises that, by diversifying the pool of energy resources, the risks inherently linked to an expanding power-supply system and increasing energy demand are mitigated.[221]

It is encouraging that the IRP plans to extend the contribution from renewables to an additional 17.8 GW[222] by 2030, which will be made up of around 8.4 GW each of wind energy and solar photovoltaic power, while 1 GW will be comprised of concentrated solar power and other renewables.[223]

4.2.5 Gas Act 48 of 2001

This act makes no mention of either cleaner gases or renewable energy considerations, and no reference to environmental aspects can be found in the license conditions that need to be complied with under this act.[224]

4.2.6 Electricity Regulation Act 4 of 2006

The *Electricity Regulation Act* repealed the *Electricity Act* 41 of 1987. This new act contains no reference to renewable energy resources, and will therefore only be generically applicable to processes employing such sources. The Act focuses, *inter alia*,

220 IRP 13.
221 IRP 17-18.
222 IRP 6.
223 Diemont, Nowak and Van der Poel *Section 28* 593-594.
224 Glazewski *The Legal Framework for Renewable Energy in South Africa* 7; Strydom and Surridge "Energy" 804-805.

on stabilising the country's energy supply, whilst at the same time promoting supplier competition and more competitive market options by encouraging a widening of the resource pool utilised. It also has the aim of ensuring that the industry is sustainable and efficient.[225] It is submitted that renewable energy has a unique potential to meet every one of the above goals.

4.2.7 Petroleum Products Act (120/1977): Regulations regarding the mandatory blending of biofuels with petrol and diesel[226]

The regulations issued in terms of the *Petroleum Products Act* 120 of 1977 aim to control matters regarding the blending of either bio-ethanol with petroleum petrol or the combining of biodiesel and petroleum diesel in order to create a biofuel product that can be sold on the South African market.[227] The blending of biofuels into the normal fuel mix is mandatory.[228] The resulting increase of biofuel usage will automatically lead to a decline in quantities of fossil fuel consumed. These regulations therefore have the potential to boost the usage of renewables in the form of biofuels, and to decrease emissions derived from fossil fuel combustion. Regulation 3(3) reveals that the prices of biofuels are regulated, and that when a licensed petroleum manufacturer acquires such fuels, it must pay this predetermined price. This provision offers an element of security for producers of biofuels.

In order to introduce another measure of control in the industry, the regulations require that the Controller of Petroleum Products has a monthly record of the volumes of biofuels purchased by specific petroleum manufacturers, the amounts blended and a break-down of the specific biofuel manufacturers from which these fuels where obtained, as well as the specific volumes obtained from each.[229]

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225 S 2(*b*), (*e*) and (f) *Electricity Regulation Act*; Strydom and Surridge "Energy" 800.
226 GN R671 in GG 35623 of 23 August 2012.
227 Regulation 2.
228 Regulation 4(1). The only allowable exception would be when the manufacturer can show that it has insufficient quantities of petrol or diesel to blend with the volume of biofuels being sold.
229 Regulation 5.

4.2.8 Biofuels Industrial Strategy of the Republic of South Africa, 2007

The *Biofuels Industrial Strategy of the Republic of South Africa*, 2007 (hereinafter the *Biofuels Strategy*) aims to develop the possibilities for using biofuels to supplement the industry currently based overwhelmingly on petroleum fuel products. This may contribute towards a cleaner, more sustainable renewables-orientated energy framework, and since the agricultural aspect of biofuels is labour-intensive, it may result in the creation of new employment opportunities.[230] The intended starting date of South Africa's mandatory blending of biofuels is October 2015. From there, the *Biofuels Strategy* intends to affect "a 2 per cent penetration level of biofuels in the (national) liquid fuel supply within five years."[231] The *Biofuels Strategy* proposes that sugar cane and sugar beet be used for the production of Bioethanol, whereas sunflower, canola and soya beans are considered for the production of Biodiesel. These crops were selected for the reason that they will have a less serious impact on food security, as opposed to others. [232]

In the excitement surrounding the introduction of biofuels on a large scale, and the possibilities contained in such a deployment, it should be kept in mind that food security (which is already under much pressure) must be monitored carefully.[233] The prospect of food security being jeopardised as a result of biofuel production is a topic of heated

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230 Strydom and Surridge "Energy" 805; Brits *The regulatory regime for bio-fuels in South Africa* 4; SouthAfrica.info 2013 *SA to blend biofuels from 2015* http://www.southafrica.info/business/trends/newbusiness/biofuels-011013.htm#.UmEhMtKBnp8; Payne 2013 *Biofuel firms' perseverance set to pay off* http://mg.co.za/article/2013-04-05-00-biofuel-firms-perseverence-set-to-pay-off. kan dalk hierdieweer uithaal. Gebruik dit net hier en dit vat spasie.

231 Strydom and Surridge "Energy" 805; CI:GRASP Date Unknown http://cigrasp.pik-potsdam.de/countries/833900607/energy_profile; SouthAfrica.info 2013 *SA to blend biofuels from 2015* http://www.southafrica.info/business/trends/newbusiness/biofuels-011013.htm#.UmEhMtKBnp8.

232 *Biofuels Strategy* 3; Strydom and Surridge "Energy" 805; CI:GRASP Date Unknown http://cigrasp.pik-potsdam.de/countries/833900607/energy_profile; SouthAfrica.info 2013 *SA to blend biofuels from 2015* http://www.southafrica.info/business/trends/newbusiness/biofuels-011013.htm#.UmEhMtKBnp8. It is for this reason that maize has been excluded from this initiative, as it is considered to be a staple food in South Africa.

233 Brits *The regulatory regime for bio-fuels in South Africa* 4, 34.

debate, one which will most likely continue *ad infinitum*.[234] However, in the *Biofuels Strategy*, it was argued that the 2% penetration level is viable without putting food security at risk.[235]

4.3 Climate framework

4.3.1 National Climate Change Response White Paper, 2011

The NCCRWP gives serious attention to the threat that is climate change, and recognises South Africa's duty, as a responsible global citizen, to contribute towards the efforts of combating this phenomenon. The White Paper highlights the importance of both mitigation and adaptation efforts in the energy sector, which largely consist of emission reductions.[236]

Because of the irreplaceable role of energy supply in the country's economic, as well as social development, curtailing energy production for the sake of mitigating climate change will not provide a sustainable solution. Rather, efforts must be made in increasing energy efficiency, and this must be supplemented by an amplified dependence on renewables to feed the country's energy needs.[237] The NCCRWP sets out various strategic priorities, which include risk reduction and management, research and development of new technologies and the promotion of behavioural changes, amongst others.[238] It also introduces a host of Near-term Priority Flagship Programmes which revives old programmes, and also creates new initiatives to engage those areas that hold potential for accomplishing mitigation or adaptation goals. One such programme is the Renewable Energy Flagship Programme. It functions in congruence

234 Strydom and Surridge "Energy" 805-808. Brits *The regulatory regime for bio-fuels in South Africa* 4, 34.
235 *Biofuels Strategy* 3, Brits *The regulatory regime for bio-fuels in South Africa* 4.
236 NCCRWP 26; Strydom and Surridge "Energy" 791-792.
237 NCCRWP 26.
238 NCCRWP 14-15.

with the IRP2010, attempting to reach the renewable energy targets set by that Plan, amongst others, by making use of local technologies and manufacturing capacity.[239]

Furthermore, all sectors of government (and all state-owned utilities such as Eskom) are required to revise the legislation, policies and plans falling within their jurisdictions, in order to ensure that they are fully aligned with the NCCRWP, which revision must be done within a period of two years after its publication.[240]

4.4 Fiscal framework

Although the use of renewable energy holds many advantages for the economy, social sphere and the environment alike, this industry is still in its infant stages, and therefore requires much development and investment, both of which need strong political drivers. Glazewski[241] is of the opinion that, in order to secure investment in renewable energy and to reach a point where it becomes an affordable, competitive and sustainable substitute for the traditional fossil fuel sources, the government needs to implement "a phased and innovative approach."

Fossil fuel industries have enjoyed government subsidies for years. It is estimated that approximately R71.1 billion worth of subsidies have been awarded, mostly in relation to fossil fuels. In stark contrast, renewable energy has been considered expensive and unreliable, and as a result has never been given a fair chance. Clearly, this does not provide the much-needed boost to the renewable energy sector, resulting instead in an unequal economic arena. In fact, the hefty capital outlay related to renewables is one of the biggest stumbling blocks to their increased inclusion amongst viable grid options.[242]

239 NCCRWP 31.
240 NCCRWP 6.
241 Glazewski *The Legal Framework for Renewable Energy in South Africa* 4.
242 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 22; Agama Energy *Employment Potential of Renewable Energy in South Africa* 6.

4.4.1 Renewable energy feed-in tariffs

In 2009 the Minister of Minerals and Energy issued the New Generation Capacity Regulations[243] in terms of the *Electricity Regulation Act*, which dealt with so-called renewable energy feed-in tariffs (hereinafter REFIT).[244] Essentially, the REFIT system is an instrument which ensures that operators of renewable energy are compensated fairly and at consistent, predetermined rates. This remuneration is calculated per kWh of electricity relayed onto the national grid. Those costs not covered by the feed-in tariffs are initially covered by consumers; however, as the market for renewable energy grows, and these resources increasingly infiltrate the grid, the initial prices are reduced. Feed-in tariffs would play an important role in founding and securing the market and demand for renewable energy and in creating an even "playing field" for cleaner energy products.[245] The resources initially included in the REFIT programme were wind energy, landfill gas, small-scale hydro and concentrated solar power (hereinafter CSP) with storage. These were later joined by solar photovoltaic, biomass and biogas and CSP without storage, amongst others.[246]

This being said, the Constitution requires that any procurement process be dealt by way of bidding, which is "fair, equitable, transparent, competitive and cost-effective."[247] Bidding, or tender procedure, is also regulated in terms of the *Preferential Procurement Policy Framework Act* 5 of 2000 (hereinafter the *Procurement Act*), which determines that the two deciding factors in an assessment of tenders/bids should, in the first instance, be the tendered price, and secondly, adherence to the requirements of broad-based black economic empowerment.[248] For this reason, it has been argued that a

243 GN R1130 in GG 33819 of 30 November 2010.
244 Diemont, Nowak and Van der Poel *Section 28* 593.
245 Glazewski *The Legal Framework for Renewable Energy in South Africa* 4; Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 22.
246 Diemont, Nowak and Van der Poel *Section 28* 594.
247 Constitution s 217(1).
248 S 2(1) *Procurement Act;* Diemont, Nowak and Van der Poel *Section 28* 595.

scheme, such as REFIT, which is based on predetermined tariffs or levies, must give way to a more competitive process.[249]

4.4.2 Renewable Energy Independent Power Producers Procurement Programme

The 2009 regulations, and the REFIT system, have since been replaced by the Electricity Regulations on New Generation Capacity[250] of 2011. The last-mentioned regulations introduced a Renewable Energy Independent Power Producers Procurement Programme (hereinafter REIPPPP).[251] REIPPPP is a government initiative to increase the reliance on renewable energy sources, and to encourage and strengthen the country's renewable energy sector.[252] In terms of this programme, independent producers are given the opportunity to bid for generation projects. In this way, buy-in from outside Eskom is ploughed into the renewable sector, and the amount of energy produced from clean sources is increased. The technologies included in this programme are onshore wind (with a probable generation capacity of 1 850 MW), concentrated solar thermal (with a likely capacity of 200 MW), solar photovoltaic (1 450MW), biomass solid (12.5 MW), biogas (12.5 MW), landfill gas (25 MW) and small hydro (75 MW).[253]

The department recognises that South Africa has great potential and opportunity for renewable energy[254] and yet, it has set the target of energy to be produced in terms of the REIPPPP at a mere 3 725 megawatts (MW).[255] This is despite the fact that the IRP aspires towards 17.8 GW.[256] In addition, the programme does not focus on increasing

249 Diemont, Nowak and Van der Poel *Section 28* 595.
250 GN R399 in GG 34262 of 4 May 2011.
251 Diemont, Nowak and Van der Poel *Section 28* 593.
252 DoE 2012 http://www.ipprenewables.co.za/.
253 DoE 2012 http://www.ipprenewables.co.za/.
254 DoE 2012 http://www.ipprenewables.co.za/.
255 This is only 9% of the total foreseeable capacity. Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 21; DoE 2012 http://www.ipprenewables.co.za/.
256 IRP 6.

general access to electricity, but only on securing the energy supply, while renewable energy can, in fact, provide a solution to both.[257] According to Greenpeace:[258]

> this limitation ... will not only make curbing the country's CO_2 emissions almost impossible, but it will also create many social problems including health impacts and substantial water wastage and environmental pollution.

Even though REIPPPP aims to attract more external buy-in, it unfortunately shifts the task of increasing the renewable energy from government to the private sector, thereby creating room for government to evade its own obligations in this regard.[259] What is more, the "New Generation Regulations" determine that only renewable energy that is produced in terms of REIPPPP may be purchased by consumers.[260] REIPPPP is an open programme, but according to the South African Independent Power Producers Association (SAIPPA) "there are regulatory barriers that make it difficult to enter,"[261] and additionally, the costs of participating in REIPPPP are high, effectively only allowing the bigger renewable energy production schemes that can obtain financial aid from corporate and international sources to become involved. This in turn negatively affects the principle of consumer choice.[262]

Although REIPPPP is a step in the right direction, it leaves much to be desired. Greenpeace[263] makes the following (it is submitted very accurate) statement: "If South Africa is indeed serious about investing in renewable energy then it is critical that state owned utility Eskom urgently begins to shift its investments from coal to renewable energy on a far larger scale."

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257 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 7, 21.
258 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 7.
259 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 21.
260 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 7.
261 US Energy Information Administration 2013 http://www.eia.gov/countries/cab.cfm?fips=SF.
262 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 21-22; US Energy Information Administration 2013 http://www.eia.gov/countries/cab.cfm?fips=SF.
263 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 21.

Even though the *Electricity Regulation Act* and the Electricity Pricing Policy of the South African Electricity Supply Industry[264] provide for open access to the national transmission network and the electricity supply industry, the dominating presence of Eskom has in reality made it difficult for independent power producers to successfully enter the market. This is no surprise, however, considering that approximately 95% of the country's electricity is being generated (or imported) by Eskom, it is the only transmission licensee and also controls the so-called system operation functions.[265] This means that, amongst other things, Eskom decides which generators to use, and controls the generation, as well as the subsequent distribution of that energy.[266] It also determines how the grid is designed and managed, and currently, the design caters specifically for its own needs.[267] For the reasons mentioned above, it is crucial that in order for South Africa to move away from a carbon-intense electricity industry and to reach its goals relating to climate change mitigation and dependable supply, the electricity supply grid cannot be under Eskom's exclusive control.[268]

In 2011 a new bill, which plans to restructure the electricity supply industry, was published for comment. If passed, the Independent System and Market Operator Establishment Bill would establish an autonomous operator, which would take over from Eskom functions such as the purchasing and transmission of electricity.[269] This would be a very necessary step in the right direction, and would enable a smoother and quicker transition to a cleaner and more stable energy grid.

264 GN R1398 in GG 31741 of 19 December 2008.
265 Kruger *The Sustainable Energy Resource Handbook "The South African Wholesale Market For Electricity: Requirements For Renewable Energy Uptake"* 31; Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 18.
266 Kruger *The Sustainable Energy Resource Handbook "The South African Wholesale Market For Electricity: Requirements For Renewable Energy Uptake"* 31; Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 18.
267 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 18.
268 Greenpeace *Powering the Future: Renewable Energy Roll-out in South Africa* 18.
269 Diemont, Nowak and Van der Poel *Section 28* 595.

4.5 Summary

Over the last few years, there have been some important developments in the policy and regulatory framework regarding alternative sources of energy, amongst which the ones considered above are some of the most crucial. They have acted to bring about some integration in the provisions regulating energy, and specifically, renewable energy,[270] and have created some excellent opportunities for investment.[271] It must be noted, however, that this section by no means mentioned all of the instruments that might somehow come into play when dealing with the deployment of renewable energy.

The next section will evaluate the discussion in this work as a whole, and will note on the possible barriers to an effective deployment of renewable energy on a large scale. It will then come to a conclusion on whether the South African legal regime is sufficiently geared towards enabling the intensified drive towards a green economy relying on the use of renewable energy sources, and whether new instruments are required to create and set the stage for such a change. Finally, recommendations will be made on the issue.

270 Glazewski *The Legal Framework for Renewable Energy in South Africa* 1; Diemont, Nowak and Van der Poel *Section 28* 590.

271 Diemont, Nowak and Van der Poel *Section 28* 591.

5 Conclusion

In order to set the stage for the discussion in this paper, a brief look was taken in section 1 at the threat that is climate change, which is causing massive changes in weather conditions globally, and along with it, increasing food-shortages, biodiversity losses and human mortalities, to name but a few. The recognised scientific opinion is that anthropogenic factors, specifically GHG emissions, are the biggest contributors to this state of affairs. It was seen that around 80% of the world's energy needs are met by the combustion of fossil fuels, which gives off GHG emissions in the form of CO_2. Besides the destructive impacts fossil fuels have on the very environment that we are dependent upon, these resources are also being depleted at a rate that will create large-scale energy crises if not supplemented and eventually replaced by other sources.[272] The above arguments result in a more-than-sufficient rationale for increasing renewable energy usage in this country.

It was subsequently shown in section 2 of this work that there is an international tendency towards the idea of a green economy, which seeks alternatives to a carbon-based energy culture and aspires to facilitate economic growth driven by practices and products that do not have an adverse impact on the environment or on the ability of future generations to develop and live well.[273] By greening the economy, South Africa will be much closer to reaching the Millennium Development Goals. Furthermore, it was seen that a green economy does not replace the more familiar concept of sustainable development, but rather that it expands the aims that sustainable development endeavours to meet, and creates a framework wherein sustainable development can be achieved. A green economy is to a large extent characterised by green investment spurts, which are driven by policy reforms.[274] In South Africa too, existing, as well as

272 Strydom and Surridge "Energy" 768, 769; Du Toit 2010 *The Sustainable Energy Resource Handbook* 19; SANEA 2010 http://www.sanea.org.za/MediaCentre/SANEATalkingEnergy/2010/April/12.asp.

273 DBSA *Programmes in support of transitioning South Africa to a green economy* 6. The UNEP Global Green Deal of 2009 emphasises this need.

274 *Green Economy Summit Discussion Document* 5, 62.

new instruments and incentives will have to be employed in order to drive and regulate a greener economy.[275]

In section 3, it was submitted that renewable energy holds the key to shifting the South African economy as a whole towards green practices. One of the biggest driving factors for renewable energy includes the fact that it is derived from resources that are essentially inexhaustible (when used conscientiously), and have the capacity to regenerate themselves. The cost to the environment is also tangibly less in comparison with that of fossil fuels. The renewable options that are considered to be potentially viable energy sources in South Africa include solar, solar photovoltaic, biomass, small-scale hydro, wind, ocean energy and biofuels.

However, for all the benefits it offers, a transition to a green economy cannot take place in a vacuum. A sufficient legal framework is needed to regulate and drive the transition, and section 4 analysed the current South African legislative regime in order to determine whether it is suited for steering the economy towards this transition. On investigation, it was seen that there are many laws that would be at least indirectly applicable to the development of energy practices. NEMA, for example, is the umbrella law that governs all environmentally-related practices in the country, while the various SEMAs relate to different aspects, such as water, waste, air quality, etc. These acts lay the foundation for any initiative the country embarks on. Moreover, the *National Energy Act* will play a crucial role in creating opportunities and driving a change in energy production and usage patterns. These are just some of the bigger legislative role-players in the energy landscape. In addition, there are multiple policies and plans that include some form of reference to renewable energy or cleaner energy products. Some of the more important of these include the *White Paper on the Renewable Energy Policy of the Republic of South Africa*, the *Integrated Energy Plan*, the IRP, the NCCRWP, and the *Renewable Energy Independent Power Producers Procurement Programme.*

275 *Green Economy Accord* 3.

In retrospect, the question this research had to answer was twofold. Its first prerogative was to determine what the South African legal framework relating to a possible promotion of renewable energy currently comprises. However, although the information makes for interesting reading, the research question requires for this to be taken one step further and that this framework be evaluated to determine whether it sufficiently promotes and supports a large-scale investment in, and development of a renewable energy sector.

5.1 Current legislative framework: Positive aspects

One of the most important aspects of the South African legal framework, when analysed in view of this discussion, is the fact that the Bill of Rights includes the idea of sustainable development. *BP Southern Africa (Pty) Ltd v MEC for Agriculture, Conservation, Environment and Land Affairs*[276] was a landmark decision in which the South African court emphasised the importance of an inclusive focus on economic, social and environmental factors. ... Claassen J made the following observation:

> The concept of 'sustainable development' is the fundamental building block around which environmental legal norms have been fashioned, ...and is reflected in s 24(b)(iii) of the Constitution. …Pure economic principles will no longer determine, in an unbridled fashion, whether a development is acceptable. Development, which may be regarded as economically and financially sound, will, in future, be balanced by its environmental impact, taking coherent cognisance of the principle of intergenerational equity and sustainable use of resources in order to arrive at an integrated management of the environment, sustainable development and socio-economic concerns. By elevating the environment to a fundamental justiciable human right, South Africa has irreversibly embarked on a road, which will lead to the goal of attaining a protected environment by an integrated approach...[277]

The principle of sustainable development has been woven into the very fibre of South African environmental law and policy, and regulates all usage of natural resources and

276 *BP Southern Africa (Pty) Ltd v MEC for Agriculture, Conservation, Environment and Land Affairs* 2004 (5) SA 124 (W) (hereinafter the *BP* case); Glazewski *The Legal Framework for Renewable Energy in South Africa* 1.

277 The *BP* case at 33.

all actions that might impact on natural resources. In addition, this principle also influences the *National Energy Act*.[278] This in itself is an important victory for renewables, since this act is the main regulator of the energy sector in the country. The inclusion of sustainability considerations can clearly be seen in the fact that the Act aims to diversify the energy resources relied on, and looks to increase commercial and investment support in renewable technologies and resources, etc.[279] It is important to keep in mind, however, that although a green economy develops the idea of sustainable development to some extent,[280] these are still two separate concepts, and the fact that sustainable development is dealt with in some detail in our legislation does not detract from the importance of including the specific goals and principles of a green economy in the relevant regulatory instruments.

The current legal framework contains all the elements that might be needed to drive a more intensive use of renewables in the energy sector, such as financial tools and incentives; the principles of environmental management and sustainability; national targets relating to issues such as job creation, alleviating poverty and increasing household access to electricity, especially in rural and remote areas; and healthier energy practices.

A green economy fuelled by renewables presents many opportunities for South Africa. Besides the immense benefit of cutting GHG emission levels, it promises to open up new trade and investment opportunities in the renewable energy sector.[281] This, in turn, could greatly increase the nation's economic competitiveness in the international arena. The shift towards a renewable energy-based economy would hone greener energy generation.[282] As already pointed out, such a transition could also lead to immense job creation,[283] which would help to alleviate the extreme poverty experienced in this

278 Glazewski *The Legal Framework for Renewable Energy in South Africa* 13.
279 Long title, ss 2(b), (j), 5(1) *Energy Act*.
280 UNEP 2011 *Towards a Green Economy* 2; *Green Economy Summit Discussion Document* 5, 64.
281 SARi *Progress in renewable energy policies* 8.
282 NCCRWP 37.
283 This is "one of the top five priorities of (the South African) government." (South African Government Information http://www.info.gov.za/speeches/2010/10051909251001.htm); Gets

country.[284] The fact that a green economy is being discussed and considered by the DEA[285] (even though it has not been formally included in legislation) is therefore a positive sign.

5.2 Current legislative framework: challenges

Although the last few years have seen significant developments in the uptake of renewable energy, one must keep in mind that the object is not to simply supplement or widen the grid selection, or even to create more options for consumers, but rather to create a viable and sustainable alternative to fossil fuels and thereby shift the South African economy as a whole towards greener practices. Sadly, one of the biggest shortfalls in the large-scale deployment of renewables as a driving factor in an overall transition to a greener South African economy, is the fact that there seems to be a shortage when it comes to political will. The fact of the matter is that if dedicated political support is lacking, an initiative of such proportions simply cannot succeed. Suitable polices, laws and programmes are needed in order to set the stage for a successful and competitive industry for renewables, and only by way of government commitment can the obstacles to such an industry be effectively removed.[286] In the light of this, one cannot help but wonder whether the government has committed enough to the renewables cause, and why so many resources and efforts are going into the building of new coal-driven power stations when there is a pressing need to progress towards cleaner fuel options.[287] It is also an undeniable fact that Government commitment is a huge driver for investment; without it, investor confidence dwindles. Consequently, another factor inhibiting the large-scale deployment of renewable energy is the absence

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Powering the Future: Renewable Energy Roll-out in South Africa 7; Agama Energy *Employment Potential of Renewable Energy in South Africa* x.

284 SARi *Progress in renewable energy policies* 8; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7.

285 DEA 2012 http://www.environment.gov.za/?q=content/projects_programmes/greeneconomy/about; *Green Economy Summit Discussion Document Green Economy Accord.*

286 Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7; DBSA *Programmes in support of transitioning South Africa to a green economy 3*6.

287 See discussion in section 1 above.

of "ambitious policy that would encourage investment."[288] Therefore, in order to boost confidence, policies and programmes must be set in place to attract and capture the attention of potential investors. This once again relies on the matter of political resolve.[289] Another factor that must be considered is that of increased efforts at cooperation between the government and players from the private sector.[290]

The South African market for fossil fuels, and in particular coal, has been driven by government subsidies for decades.[291] In stark contrast to this, the high cost involved in renewable energy production, especially in the initial stages of such projects, is still another very real challenge to the renewables industry. In comparison, coal is still a more affordable option. Although some tax incentives and other financial instruments have been introduced,[292] financial incentives for buying into renewables are still insufficient. These factors inevitably lead to slower uptake and less consumer buy-in. Glazewski is of the opinion that in order to boost the market for renewables and level the playing field:

> consideration needs to be given to financial incentives to accommodate small-scale renewable energy enterprises in the context of the stranglehold which the big power utilities currently enjoy.[293]

Although some of the regulatory instruments considered in this study set targets regarding renewable energy, it is not always clear what the penalties or consequences will be if those targets are not met.[294] This causes uncertainties, which eventually slow

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288 CI:GRASP Date Unknown http://cigrasp.pik-potsdam.de/countries/833900607/energy_profile; Glazewski *The Legal Framework for Renewable Energy in South Africa* 14; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7.

289 Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 32; DBSA *Programmes in support of transitioning South Africa to a green economy 3*6.

290 CI:GRASP Date Unknown http://cigrasp.pik-potsdam.de/countries/833900607/energy_profile.

291 Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7; Agama Energy *Employment Potential of Renewable Energy in South Africa* 6.

292 Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 22.

293 Glazewski *The Legal Framework for Renewable Energy in South Africa* 14.

294 Glazewski *The Legal Framework for Renewable Energy in South Africa* 14.

the transition of the country's energy supply from mainly coal to renewables.[295] However, according to the South African National Energy Association (hereinafter SANEA), the National Energy Regulator is working to "clean up the legislation," which will hopefully help to bring certainty and attract investment in the private sector.[296] In 2010 Eskom was granted a loan from the World Bank, which loan was partially applied to finance wind and solar energy projects.[297] It is hoped that such financial injections into the renewables sector will somehow boost confidence in South Africa's ability to transition successfully towards a greener economy based on renewable energy input and consumption.

The Renewable Energy Centre of Research and Development (hereinafter RECORD) is of the opinion that "prospects for renewable energy generation in South Africa are increasingly positive given a supportive policy and legislative framework..."[298] However, if this framework is truly supportive, what is standing in the way of a large-scale deployment of renewable energy and a corresponding transition towards a green economy? It is conceded that there are numerous policies and laws across various sectors that regulate issues relating to renewable energy generation,[299] but it is submitted that this is one of the reasons for the delay. A truly supportive framework should be easily understandable and should make compliance straightforward. It is respectfully submitted that the current applicable legislative framework is not user-friendly at all, since the regulation of renewable energy and green economic factors is a scattered effort, with various laws and policies regulating different aspects. This causes

295 Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7; CI:GRASP Date Unknown http://cigrasp.pik-potsdam.de/countries/833900607/energy_profile.

296 SANEA 2010 http://www.sanea.org.za/MediaCentre/SANEATalkingEnergy/2010/April/12.asp; DEA 2012 http://www.environment.gov.za/?q=content/projects_programmes/greeneconomy/about.

297 SANEA 2010 http://www.sanea.org.za/MediaCentre/SANEATalkingEnergy/2010/April/12.asp; CI:GRASP Date Unknown http://cigrasp.pik-potsdam.de/countries/833900607/energy_profile; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 23.

298 Renewable Energy Centre of Research and Development 2012 *About* http://www.record.org.za/about.

299 Glazewski *The Legal Framework for Renewable Energy in South Africa* 9.

overlapping of some efforts, while at the same time, gaps could result. Glazewski[300] even goes as far as calling the current renewable energy framework "uncoordinated." Similarly, SANEA[301] is of the view that the delays experienced in a large-scale introduction of renewable energy in South Africa are not the result of a lack in respect of resource potential or technology, but due to the current legal framework. Chairman Brian Statham made the statement that "there are a number of gaps in the legislation, and until these are filled the use of renewable sources will be hampered."[302] Considering the nature of renewable energy, and the fact that it affects multiple sectors, it is understandable that one act does not deal inclusively with the environmental, energy, financial and other aspects of renewable energy. However, even managing the various forms of renewables "under one institutional roof" would be a significant step towards coordination and clarity.[303] Currently, there are a host of legislative requirements that need to be followed, which requirements are prescribed in terms of various applicable laws and are regulated by different government departments. It is submitted that all the obligations regarding the different aspects of projects ought to be streamlined, and simplified. This would be in line with NEMA, which calls for synchronisation of efforts by government departments and for the coordination of environmental laws and policies.[304]

5.3 Recommendations

Taking the above into consideration, the following recommendations are proposed:

Government must undergo a mind-shift regarding energy sources and supply, and instead of viewing renewables as a minor supplement to the energy grid, should commit to a large-scale drive. With the arguments for a green economy in mind, it is submitted

300 Glazewski *The Legal Framework for Renewable Energy in South Africa* 13. These same sentiments are echoed in DBSA *Programmes in support of transitioning South Africa to a green economy* 35-36; Müller "Environmental Governance in South Africa" 68.
301 SANEA 2010 http://www.sanea.org.za/MediaCentre/SANEATalkingEnergy/2010/April/12.asp.
302 SANEA 2010 http://www.sanea.org.za/MediaCentre/SANEATalkingEnergy/2010/April/12.asp.
303 Glazewski *The Legal Framework for Renewable Energy in South Africa* 14.
304 NEMA s 2(l).

that opportunities and financial and economic incentives must be created for the bulk of the manufacturing of equipment and technology to be done in South Africa. This will lower overall costs related to renewable energy generation, in addition to having the effect of stimulating investment.

The energy sector is in dire need of a decentralisation of power. Currently, Eskom has a monopolising presence, in that it generates or imports approximately 95% of the country's electricity, is the only transmission licensee and controls the system operation functions.[305] Decisions regarding which generators to use, grid design and management, as well as the actual generation and subsequent distribution of energy, are taken by Eskom.[306] This current concentration of power and authority in this state-owned entity does not stimulate or encourage investment from external sources.[307] Such a decentralisation of power will also improve access to the national electricity grid by independent power producers. In addition, Eskom should increase its own attention to and investment in the field of renewable energy.[308]

In a time where there is a demand for more generation capacity to meet the growing energy needs of the country, as well as an internationally rising concern regarding the causes and repercussions of climate change, the South African government must commit more resources towards renewable energy research and generation instead of looking to revive decommissioned coal power stations and continually investing in new coal technologies.[309] Considering all the advantages offered by renewable energy, and the wide availability thereof, it is recommended that government should focus on such sources instead of looking for solutions almost exclusively in coal and even nuclear

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305 Kruger 2010 *The Sustainable Energy Resource Handbook* 31; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 18.

306 Kruger 2010 *The Sustainable Energy Resource Handbook* 31; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 18.

307 See discussion under 4.4.2 above.

308 Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 8; CI:GRASP Date Unknown http://cigrasp.pik-potsdam.de/countries/833900607/energy_profile.

309 Odendaal 2013 *Engineering News;* Eskom 2013 http://www.eskom.co.za/c/359/medupi/; Eskom 2013 Kusile *Power Station Project* http://www.eskom.co.za/c/360/kusile/; Gets *Powering the Future: Renewable Energy Roll-out in South Africa* 7.

energy. Renewables have the enormous potential to bring about a widespread energy revolution and thereby to launch the country into a cleaner and more sustainable "green" economy, whilst creating numerous job opportunities. Due to the high start-up costs of renewable generation, government support is critical in establishing facilities and projects. However, once these projects are up and running, the only substantial expenditures are for maintenance and eventual decommissioning purposes, and therefore, the operational costs are much lower than those in energy generation from fossil fuels.

Legal principles must be implemented efficiently and with consistency. Unfortunately, this is not always descriptive of the situation in South Africa. This is a general problem experienced across various sectors, and therefore attention will also have to be given thereto in the arena of renewables and a green economy.

In conclusion, a nation's legal framework must be well-suited to that country's nature and its specific needs. South Africa is a developing country, one which experiences manifold challenges across social, economic and environmental spheres, and therefore the legal framework must be appropriately sensitive to these conditions. It is submitted that what the South African regulatory landscape needs in order to enable a flourishing renewables market, is a well-structured framework that simplifies the processes and the understanding thereof and makes compliance straightforward. Taking into consideration the needs and goals of this nation, it is of utmost importance to distil into the regulatory framework values, such as economic growth, access to energy, job creation and poverty alleviation, as well as environmental protection and overall sustainability of efforts.

> Today's choices about how energy is produced and used will determine the sustainability of the future energy system and consequently of socio-economic progress.[310]

310 *Draft Integrated Energy Planning Report* 2.

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