The Role of Market Based Instruments to Promote Renewable Energies - A Critical Legal Comparison Between South Africa's REBID and Germany's REFIT Scheme

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Abstract

Climate change and greenhouse gas emissions are environmental problems facing the worldwide community. In this context the generation of renewable energy became a global objective in order to mitigate emissions and to combat climate change. South Africa and Germany, the two compared countries, differ from each other significantly. South Africa is a developing country with the highest emissions on the African continent and a small progress in renewable energy generation. Germany is one of the most industrialised countries worldwide using renewable energy successfully since a couple of years. But there is one key similarity - the two countries follow the same aim of increasing renewable energy generation in the future in order to contribute to the global approach to mitigate climate change and to promote a worldwide green economy. In this context market-based instruments became important financial incentives in global policy to stimulate the generation of renewable energies through different policy incentives. Germany as one of the most successful countries in renewable energy generation aims to promote its renewable energy development through a renewable energy feed-in tariff (REFIT), which is considered to be one of the most effective financial incentives and thus is a widely used market-based instrument to promote renewable energies worldwide. South Africa also planned to benefit from the advantages of a REFIT when the country released a policy based on a REFIT in 2009. However, the implementation failed. Instead, South Africa decided to implement a bidding-by price scheme (REBID) to promote its renewable energy generation, which was implemented in 2011. The thesis seeks to critically compare the South African and the German policy and legal framework in the context of renewable energy generation in order to legally analyse the differences and specific advantages and disadvantages of the two utilized support mechanisms in the respective national context. The thesis aims to find answers why the South African renewable energy market is - despite of phenomenal conditions for electricity generation from renewables, in particularly from wind and solar sources - not yet developed successfully. Germany on the other hand has less beneficial conditions, but is nevertheless considered to be one of the most successful countries worldwide in promoting its national renewable energy generation. The question arises whether its choice of renewable energy support instrument is largely responsible for this success. As the South African renewable energy market is still highly expandable in the future, the country should aim at finding the most successful and effective solution for stimulating this seminal market. In this context lessons could be drawn from Germany's renewable energy development.

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List of Abbreviations

BimSchG	Bundesimmissionsschutzgesetz (Federal Immission Control Act)
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit)
CSP	Concentrated Solar Power
DEA	South African Department of Environmental Affairs and Tourism
DoE	South African Department of Energy
DME	South African Department of Minerals and Energy
EEA	European Environmental Agency
EnergieStG	Energiesteuergesetz (Energy Tax Act)
EEG	Erneuerbare-Energien-Gesetz (Renewable Energy Sources Act)
EIA	U.S. Energy Information Agency
EnWG	Energie-Wirtschaftsgesetz (Energy Industry Act)
Et al.	Et alli – and others
EU	European Union
GWh	Giga Watt hours
IPP	Independent Power Producer
KWh	Kilo Watt hours
MBI	Market-Based Instrument
MBIs	Market-Based Instruments
NERSA	National Energy Regulator of South Africa
NFFO	Non-Fossil Fuel Obligation
PPA	Power Purchase Agreement
PV	Solar photovoltaic
REBID	Renewable Energy Bids
REFIT	Renewable Energy Feed-In Tariff
REIPP	Renewable Energy Independent Power Producer
RFP	Request for Proposals
SA	South Africa
StromStG	Stromsteuergesetz (Electricity Tax Act)
TWh	Tera Watt hours
UNFCCC	United Nations Framework Convention on Climate Change
U.K.	United Kingdom
WHG	Wasserhaushaltsgesetz (Federal Water Act)

Chapter 1: Introduction

1.1 Scope and context of the dissertation

Over the past 10 to 15 years there has been a clear global transition towards the implementation and utilization of renewable energy sources. Thus, renewable energies nowadays account for an estimated 10 per cent of global energy consumption and 19 per cent of the world's electricity generation.[1] The reason for this shift is to be found in global concerns about the use of fossil fuels as the primary energy source and its associated emissions of greenhouse gases that are responsible for climate change and environmental pollution. By contrast, renewable energies have the potential to offer many environmental, economic and social benefits to the global society. In particular, renewable energies can diversify energy sources and limit the use of fossil fuels.[2] Thus the transition towards renewable energy improves the reduction of greenhouse gas emissions and the mitigation of climate change.[3] It is accordingly not surprising that several countries have entered into international agreements which try to limit the use of fossil fuels as well as to set binding targets for the implementation of renewable energies.[4] This has driven an enormous growth of renewable energy generation worldwide.[5]

The environmental advantages of renewable energies in comparison to conventional energy have resulted in increased support for renewable energy sources among many public authorities. Renewable energies are generally considered to be more expensive than fossil fuels. To still ensure the continued transition of renewable energies worldwide, government involvement using market-based instruments (MBIs) has become essential to support competition with conventional energy sources.[6] There are several different reasons to support the implementation of

[1] U.S. Energy Information Agency (EIA) 'Frequently asked questions' (2013) *http://www.eia.gov/tools/faqs/faq.cfm?id=527&t=1* (accessed 19.03.2013).
[2] Winkler 2005 (33) *Energy Policy* 28.
[3] Winkler 2005 (33) *Energy Policy* 28.
[4] Two main agreements in the field of climate change are the United Nations Framework Convention on Climate Change (UNFCCC) which entered into force in 1994 and which deals as a global framework, UNFCCC (1992) *http://unfccc.int/resource/docs/convkp/conveng.pdf* (accessed 15.05.2013) and the Kyoto Protocol which entered into force in 2005 and which sets detailed commitments in the field of greenhouse gas reduction, Kyoto Protocol to the UNFCCC (1998) *http://unfccc.int/resource/docs/convkp/kpeng.pdf* (accessed 15.05.2013).
[5] Sebitosi & Pillay 2008 (36) *Energy Policy* 3312.
[6] Menanteau et al. 2003 (31) *Energy Policy* 800; Abrahams *The key requirements for the establishment of a successful renewable energy manufacturing hub in Atlantis* (2012) 1.

renewable energies. In the past, energy security was one of the main drivers for promotional schemes within the energy sector. Nowadays the increasing environmental awareness related to climate change and concerns about the sustainability of the utilisation of fossil fuels form the main reasons for the promotion of renewable energy sources by MBIs.[7] Thus, a variety of different support schemes have become the basis for the competitive market position of renewable energies.

South Africa and Germany - two countries that stimulate their renewable energy sector with MBIs shall be analysed to compare two main support schemes in this area. While Germany stimulates its renewable energy market with the so-called renewable energy feed-in tariff (REFIT), South Africa switched from this REFIT scheme to a bidding by price procedure (REBID) to support its renewable energy generation.

South Africa's theoretical potential for renewable energy generation is enormous, in particular its potential for solar and wind energy. However, the country has significant problems in converting these resources into economically usable forms of energy.[8] In 2003, the erstwhile South African Department of Minerals and Energy (DME)[9] published a *White Paper on Renewable Energy,* in which renewable energy is defined 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'.[10] It sets a target of 10,000 GWh to be generated from renewable energies by 2013, which accounts for about 4 per cent of total electricity generation.[11] This target seems impossible to achieve this year if one considers that in 2011, 93 per cent of South Africa's electricity generation was using coal.[12] The country was rated as the 7th largest producer of coal in the same year[13] and Eskom,

[7] Van Dijk et al. 2003 *Renewable Energy Policies and Market Developments* 7.
[8] Winkler 2005 (33) *Energy Policy* 28.
[9] The DME has now changed its name into „Department of Energy" (DoE).
[10] South African Department of Minerals and Energy (DME) 2003 *White Paper on Renewable Energy* 1.
[11] *White Paper on Renewable Energy* 25; McNair & Dodd *Project Finance International* (28.10.2012) 46.
[12] World Coal Association 'Coal Statistics' (2011) *http://www.worldcoal.org/resources/coal-statistics/* (accessed 18.03.2013).
[13] World Coal Association 'Coal Statistics' (2011) *http://www.worldcoal.org/resources/coal-statistics/* (accessed 18.03.2013).

South Africa's leading energy provider,[14] still generated 90 per cent of South Africa's electricity from coal-fired power stations in 2012.[15]

To increase renewable energy generation in South Africa, the National Energy Regulator of South Africa (NERSA) promulgated the *Renewable Energy Feed-in Tariff (REFIT) Regulatory Guidelines* in 2009.[16] This MBI aimed at promoting investment in the renewable energy market by implementing a guaranteed price over a defined time (in South Africa it was anticipated to run over 20 years) for electricity generated from renewable energy sources.[17] Feed-in tariffs have been implemented in a large number of countries, in particular in many European countries including Germany, and have been proven to stimulate the implementation of renewable energies in a successful way.[18]

The implementation of the REFIT mechanism has been problematic in South Africa and the Department of Energy (DoE) eventually disbanded the REFIT programme in favour of a renewable energy bids (REBID) mechanism. In terms of the REBID scheme, independent power producers (IPPs) are invited to bid for the development of renewable energy projects. The least cost bidder, who also fulfils all technical requirements, is awarded and signs a power purchase agreement (PPA), which guarantees a fixed price over a certain period of time. Even if from a short-termed point of view, the REBID system seems to be more successful than the previous REFIT system in South Africa at the moment, the long-term sustainability of the system is quite questionable for several reasons.[19]

Renewable energy will also play a significant role in Germany's future energy supply. Germany has set the target for renewable energies to account for 60 per cent of total energy consumption by 2050 and at least 80 per cent in the electricity

[14] Eskom generates approximately 95% of the electricity used in South Africa, *http://www.eskom.co.za/c/40/company-information/* (accessed 20.03.2013).
[15] Eskom 'Electricity technologies' *http://www.eskom.co.za/c/37/electricity-technologies/* (accessed 20.03.2013).
[16] National Energy Regulator of South Africa (NERSA) *South Africa Renewable Energy Feed-in Tariff (REFIT), Regulatory Guidelines* (2009); Odeku et al. 2011 (11/2) *Sustainable Development Law and Policy* 45.
[17] NERSA *REFIT Regulatory Guidelines* (2009); Odeku et al. 2011 (11/2) *Sustainable Development Law and Policy* 45-46.
[18] Van Dyk & Pollastrini 2011 *Energylaw* 71.
[19] Masondo 2011 *Energylaw* 73.

sector.[20] On 30 June 2011, the German Government adopted a comprehensive package of policy and legal measures to implement this transition its national framework. In particular, this package included the amendment of the *Renewable Energy Sources Act ('Erneuerbare-Energien-Gesetz – EEG),*[21] which supports Germany in continuing its successful development in renewable energy generation. The EEG is based on a REFIT, as it exists in many other European countries and as it was planned in South Africa until 2011 as well. This REFIT mechanism works very successful in Germany and appears to be also the preferred alternative worldwide amongst the different types of MBIs in the field of renewable energy promotion.[22]

1.2 Purpose of the dissertation

As the generation of renewable energies is generally recognised as one of the most important worldwide projects for the near future due to its positive impact on the global sustainable development and climate change,[23] the successful promotion of renewable energies by policy and legal instruments is a necessity. This dissertation aims sat comparing two different renewable energy support mechanisms - namely the REBID scheme in South Africa and the REFIT scheme in Germany. There are different rationales justifying the choice of these two countries for a comparative analysis.

South Africa on the one hand is a country with great renewable energy potential, in particular solar and wind energy.[24] Nevertheless there has been no substantial progress in implementing and using its renewable energy potential in the last years. Political, economic and legal barriers made it difficult to develop a successful renewable energy system.[25] Thus South Africa still heavily relies on its huge coal reserves instead of considering renewable energies as primary energy source of the future. In contrast, Germany as one of the most developed countries with regard to

[20] *Progress report under Article 22 of Directive 2009/28/EC on Promotion of the Use of Energy from Renewable Sources* 6.
[21] Act on granting priority to renewable energy sources (Renewable Energy Sources Act) – Gesetz für den Vorrang Erneuerbarer Energien (Erneuerbare-Energien-Gesetz – EEG) 2000, last amended 2011 *http://www.erneuerbare-energien.de/fileadmin/Daten_EE/Dokumente__PDFs_/eeg_2013_bf.pdf.*
[22] Jacobs 2010 *renewable energy focus* 30; Krajačić et al. 2011 (39) *Energy Policy* 1411.
[23] Barnard 2012 (15/2) *PELJ* 207; Bugaje 2006 (10) *Renewable and Sustainable Energy Reviews* 604.
[24] Bugaje 2006 (10) *Renewable and Sustainable Energy Reviews* 605.
[25] Krupa & Burch 2011 (39) *Energy Policy* 6255.

its renewable energy generation does not have comparable natural renewable energy resources as South Africa to exploit. Nevertheless, from Germany's total electricity production in 2012, already 22,9 per cent was generated from renewable energies.[26]

This leads to the question why these differences in these two countries exist. One main reason can be seen in the different types of MBIs to support the utilisation of renewable energies in South Africa and Germany. Besides the political and economic conditions of the two countries - South Africa as a developing country on the African continent and Germany as a well developed and industrialised country in Europe - have to be considered. While contrasting the South African and the German policy and legal framework on renewable energies one has to analyse whether the current energy promotion strategy (REBID) is the most workable mechanism to realize renewable energy generation in South Africa, or whether a REFIT mechanism as it exists successful in Germany and many other jurisdictions, could be a progressive alternative, not only for European but also for developing countries. In this analysis it is interesting to examine the reasons and consequences of the shift from the REFIT to the REBID scheme in South Africa and its future prospects.

Even if the field of MBIs within the renewable energy market is broad and comprehensive, the scope of this comparative analysis has to be delimited. Hence, the dissertation only evaluates South Africa's and Germany's renewable energy generation regimes and the related analysis of their support mechanisms in this field - namely the REFIT and REBIT schemes.

Thus, the key purpose of the dissertation is to critically explore the question whether South Africa's REBID scheme provides a more viable regime for promoting the development of the country's renewable energy generation sector than a REFIT scheme such as that adopted in Germany.

1.3 Outline of the dissertation

Chapter 2 provides the theoretical background of MBIs to promote renewable energy generation by discussing the role and prerequisites of MBIs generally as well as in

[26] Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit – BMU) 'AG Energy balances (Energiebilanzen)' (3/2013) *http://www.unendlich-viel-energie.de/uploads/media/AEE_Strommix_Deutschland_2012_mrz13.pdf* (accessed 10.06.2013).

the specific context of renewable energies. After setting the context of MBIs in general, the main support mechanisms within the renewable energy generation sector are explored. Thereafter, the chapter provides a more detailed analysis of the two specific MBIs, which are in operation in South Africa's and Germany's renewable energy regimes, namely the REBID and REFIT schemes. This analysis comprises of the theoretical foundations and origins of the REBID and REFIT mechanisms, their nature and form, their necessity and desirable prerequisites for implementation respectively their theoretical benefits and disadvantages.

Following this theoretical overview of the two mechanisms, chapter 3 provides a comprehensive overview of South Africa's contemporary experimentation with the REBID and REFIT schemes in the context of its renewable energy generation. Chapter 4 then provides an analysis of Germany's experimentation with its REFIT mechanism. Both chapters will be structured in the same way in order to compare the two countries critically. Thus the chapters will first provide an overview of the current energy sectors of the two countries, followed by an exploration of the relevant policies and laws in the context of renewable energy implementation. Both chapters conclude with an overview of the forms and nature of the REBID and REFIT mechanisms in South Africa and of the REFIT model in Germany.

Chapter 5 contains a comprehensive critical and comparative review of the two MBIs, which are in operation in the renewable energy generation sector of the two countries - namely the REBID mechanism in South Africa and the REFIT scheme in Germany. This comparative critical analysis is structured under a series of themes, which have been identified as essential elements or factors informing the successful implementation of MBIs generally. In doing so, the chapter seeks to draw lessons from Germany's REFIT scheme which could inform the possible reform of South Africa's REBID mechanism.

Chapter 6 concludes by summarising the main findings of the dissertation.

Chapter 2: Theoretical context of marked-based instruments to promote renewable energy generation

2.1 Market-based instruments as regulatory mechanisms in environmental law and policy

The use of market-based instruments (MBIs) is gaining worldwide acceptance as a regulatory mechanism in environmental law and policy to achieve environmental protection goals.[27] The adoption of MBIs can result in a higher efficiency in the environmental context than traditional regulatory concepts, because these traditional tools are considered as not sufficiently in the environmental context.[28]

2.1.1 What are MBIs?

MBIs can broadly be seen, referring to *Stavins,* as instruments that influence behaviour through market signals in order to achieve specific environmental goals.[29] In the South African context the National Treasury defined in their *Draft Policy Paper on a Framework for considering market based instruments to support environmental fiscal reform in South Africa* MBIs as a range of policy measures that use the price mechanism in order to correct environmentally-related market failures.[30]

In this context one has to consider the common market mechanisms. In general markets provide an efficient means of allocating scarce resources by themselves. Through a price mechanism the markets provide a strong incentive to all members of the economy to optimise the use of resources to support businesses in becoming more productive and efficient.[31] In reality it appears that markets can be imperfect or fail. One refers to market failure as when freely functioning markets produce prices

[27] Not only the use of MBIs is increasing, but one can see a shift towards alternative instruments in general, such as incentive based tools and self-regulation, Kidd *Environmental Law* (2011) 268; 280.
[28] Whitten et al. 'An Overview of Market-Based Instruments and Environmental Policy in Australia' *http://www.ecosystemservicesproject.org/html/publications/docs/MBIs_overview.pdf* (accessed 02.04.2013).
[29] Stavins 'Experience with Market-Based Environmental Policy Instruments' in Mäler & Vincent *Handbook of Environmental Economics: Volume 1* 358; Stavins 'Market-Based Environmental Policies' in Portney & Stavins *Public Policies for Environmental Protection* 31.
[30] National Treasury *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa* 1.
[31] *Draft MBI Policy* 7-8.

that do not reflect the real costs or benefits of a specific activity to society.[32] In the environmental context, it has been shown that environmental problems to a large extent arise from incorrect pricing of environmental goods and services.[33] Where markets fail to value these environmental goods and services, any form of government intervention is imperative in order to incorporate them more easily into the market and into decision-making processes.[34]

One effective option of government intervention is the use of MBIs, which try to correct environmentally related market failures, by internalising environmental costs and benefits within the price mechanism.[35] In contrast to this economic incentive approach, the conventional way is the so-called command and control approach, which sets standards and regulations and which predominantly works through a legal or administrative framework.[36] These mechanisms are considered to be not as flexible and dynamic in achieving environmental goals.[37]

2.1.2 Theoretical prerequisites for ensuring the success of MBIs

It is general opinion that the use of MBIs can effect the environment positively and can therefore be a very beneficial strategy to improve environmental protection.[38] Nevertheless it is difficult to prove such effectiveness in general but one has to assess every individual MBI individually. In this context, the South African National Treasury specified a number of criteria for assessing environmentally-related tax instruments, which can however be taken into consideration for assessing the appropriateness of other MBIs.[39] These theoretical prerequisites for ensuring the success of MBIs will be presented here in order to refer to them later in this dissertation to compare South Africa's and Germany's different renewable energy

[32] Department of Environmental Affairs and Tourism (DEA) *Research Report 6: International Experience with Market Based Instruments* (1994) 5.
[33] European Environment Agency (EEA), *Technical report no 8/2005: Market-based instruments for environmental policy in Europe* 12.
[34] Paterson 2006 (9/3) *PELJ* 90; *Draft MBI Policy* 22; *Draft MBI Policy* 22.
[35] *Draft MBI Policy* 22; Paterson 'Incentive-based Measures' in Paterson A & Kotzé L J *Environmental Compliance and Enforcement in South Africa* (2009) 298.
[36] DEA *International Experience with MBIs* 6.
[37] Stavins in *Handbook of Environmental Economics* 358; Paterson *Incentive-based Measures* (2009) 307.
[38] Paterson *Incentive-based Measures* (2009) 239.
[39] *Draft MBI Policy* 56.

support schemes on the basis of these generally accepted characteristics.[40] The criteria specified by the National Treasury are environmental effectiveness, revenue generation[41], public support, legislative aspects, technical and administrative viability, competitiveness, distributional impacts and policy alignment.[42]

To be environmental effective,[43] a successful economic instrument should be linked to a clear environmental objective. Furthermore the best design for the specific MBI shall be chosen to make it as effective as possible.[44]

The criterion revenue generation refers to MBIs, which generate revenue through taxes and charges.[45] These taxes and charges are an important means in environmental policy to raise revenue and to provide incentives for environmental protection.[46] Main challenges in the context of finding an appropriate tax level and design is the aim not to overburden the economy,[47] and the question of whether revenues should be earmarked, partial earmarked or not tied to specific purposes.[48]

A further prerequisite is the public support for a new MBI in order to gain legitimacy and general acceptability.[49] To achieve public support for a MBI it is important to engage all relevant stakeholders in the process,[50] and to design an instrument, which is simple, understandable and transparent for the public.[51]

Furthermore, legislative aspects are substantial for the success of MBIs. An existing coherent legal framework has to provide a basis for the integration of new regulations and amendments in the field of a specific MBI.[52]

[40] There can also be found slightly different criteria, see DEA *International Experience with MBIs* 8-11.
[41] The *Draft MBI Policy* refers to taxes as MBIs and therefore specified the criterion as tax revenue, 59-60; Here I refer to this criterion as revenue generation because it shall apply to all different types of MBIs.
[42] *Draft MBI Policy* 56-64.
[43] This criterion is also used by the DEA *Research Report 11: An assessment of market based instruments: Suitability for environmental management in South Africa* (1996) 9.
[44] *Draft MBI Policy* 59.
[45] For instance carbon taxes in the climate change context.
[46] EEA *MBIs for environmental policy in Europe* 40.
[47] *Draft MBI Policy* 59.
[48] Paterson *Incentive-based Measures* (2009) 333; *Draft MBI Policy* 59.
[49] DEA *An assessment of MBIs*10.
[50] *Draft MBI Policy* 60; EEA *MBIs for environmental policy in Europe* 146.
[51] EEA *MBIs for environmental policy in Europe* 146.
[52] Paterson *Incentive-based Measures* (2009) 331.

Besides, for the success of a MBI, technical and administrative aspects of its implementation are important but very challenging.[53] These requirements refer to the design of the specific MBI. The previous experience has shown that flexibility and simplicity are important aspects with regard to the implementation of a MBI.[54] Regarding flexibility, it is important that the design of the MBI allows for a broad set of compliance alternatives. Regarding simplicity, it is important that the rules and methods are clear and unambiguous so as to provide certainty, which in turn leads to price stability and investor confidence.[55]

As MBIs can have a negative impact on the competiveness of specific industry sectors, it is important to minimise these adverse competitive impacts.[56]

To ensure the success of MBIs, one has to assess the potential economic burden a MBI may have on different income groups together with the expected environmental benefits. These distributional impacts have to be equitable and the lower income groups should not be unreasonably affected. Unacceptable distributional effects have to be compensated.[57]

A further prerequisite is the alignment of MBIs to other policy objectives. This policy alignment requires giving consideration to environmental policy goals as well as to social and economic objectives when creating new MBIs.[58]

2.2 MBIs as support mechanisms in the context of renewable energies

As MBIs have been generally accepted as instruments to promote environmental protection goals, the use of these instruments have also been expanded into renewable energy law and policy.

2.2.1 The global shift towards MBIs to promote renewable energy generation

Energy is currently one of the main policy priorities worldwide. In this context the introduction of renewable energy technologies and their increased use in global

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[53] *Draft MBI Policy* 61.
[54] Stavins in *Handbook of Environmental Economics* 416.
[55] Stavins in *Handbook of Environmental Economics* 417.
[56] *Draft MBI Policy* 62-63.
[57] *Draft MBI Policy* 63-64.
[58] In South Africa in particular one has to consider challenges like job creation, poverty alleviation and the supply with basic services such as electricity, water and sanitation: *Draft MBI Policy* 64.

energy markets became more important over the last decades. The reasons for such a worldwide support shifted over time.[59] The oil crises in the 1970s led to a demand for alternative energy sources to ensure energy security. Later concerns about the sustainability and environmental impacts of fossil fuels became the main driver for the further implementation of renewable energy sources. Nowadays the main priority in renewable energy law is to be found in environmental motivations related with climate change.[60] However, the initial high costs associated with renewable energy generation hinder direct competition with existing technologies on the energy market.[61] In order to ensure the further development of technologies in the renewable energy sector, government intervention, at least in the emergence phase, is required.[62] Several renewable energy technologies have not yet reached an adequate level of economic performance and thus cannot compete directly with conventional technologies.[63] Hence, support measures in the renewable energy market have become essential and will remain important policy objectives in the future. The reason for this is the fact that existing technologies have benefited already from mass production and learning effects, whereas many renewable energy technologies are not generated sufficiently yet.[64]

MBIs are one main approach to overcome these economic difficulties. By correcting market imperfections, MBIs seek to stimulate innovation and investment in this sector.[65]

Indeed one could argue that the liberalisation of electricity markets, already tested in a number of countries[66], may be a solution. In this case consumers can purchase green electricity directly from the supplier for environmental reasons such as clean air and climate stability. Unfortunately, even if green electricity gains more and more

[59] Van Dijk et al. 2003 *Renewable Energy Policies and Market Developments* 7.
[60] Van Dijk et al. 2003 *Renewable Energy Policies and Market Developments* 7.
[61] *White Paper on the Renewable Energy Policy for the Republic of South Africa* (2004).
[62] Menanteau et al. 2003 (31) *Energy Policy* 800.
[63] Menanteau et al. 2003 (31) *Energy Policy* 799-800.
[64] Menanteau et al. 2003 (31) *Energy Policy* 799-800.
[65] Paterson *Incentive-based Measures* (2009) 331; Johansson & Turkenburg 2004 (8/1) *Energy for Sustainable Development* 18.
[66] For instance Germany, United States, Netherlands.

attraction to an increasing number of supporters, most consumers still don't want to pay a higher price for renewable energy.[67]

Thus, support schemes for renewable energies form the basis for its current market position and will remain necessary to improve new technologies in this field and to bring renewable energies on a competitive level with conventional energy technologies. Without such incentive measures the existing market forces would limit the diffusion of renewable energy sources in only a few market niches.[68]

2.2.2 The main MBIs within the renewable energy generation sector

Probably the most efficient and at the same time simplest ways to establish a fair competition between energy technologies is the correction of market failures by implementing an environmental tax.[69] Such an MBI would stimulate investment into technological innovation as well as changes in consumer behaviour.[70] But taxes are often not the most practicable measure. First, they may be not sufficient in supporting dynamic learning processes. These processes however are necessary to reduce costs.[71] Moreover, taxes are often not politically accepted in societies.[72] Thus different support schemes in the renewable energy sector aim to stimulate technical change and learning processes to bring costs down to a level on which economical competition is possible.[73]

Within the different policy instruments in the renewable energy market one first has to distinguish between supply and demand approaches. The investment and production phase of renewable energy projects define the supply and cost of renewable energy, thus the renewable energy generation. The demand for renewable energy is affected by mechanisms related to energy consumption.[74] This thesis only deals with renewable energy generation, thus with support schemes targeting the energy supply.

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[67] Menanteau et al. 2003 (31) *Energy Policy* 801.
[68] Menanteau et al. 2003 (31) *Energy Policy* 800.
[69] Paterson *Incentive-based Measures* (2009) 299.
[70] Stavins in *Handbook of Environmental Economics* 416; Menanteau et al. 2003 (31) *Energy Policy* 800.
[71] Menanteau et al. 2003 (31) *Energy Policy* 800.
[72] Menanteau et al. 2003 (31) *Energy Policy* 800.
[73] Menanteau et al. 2003 (31) *Energy Policy* 800.
[74] Van Dijk et al. 2003 *Renewable Energy Policies and Market Developments* 11.

A further distinction between the supply approaches is made between price-based mechanisms and quantity-based mechanisms. These two approaches both aim at promoting renewable energy generation, but on a different basis. Within the price-based approach, the price is set and the market itself finds the quantity. [75] Within this approach, generators of electricity from renewable energy sources get financial support either by subsidies per kW capacity installed or by payment per kW produced and sold.[76]

There are different support schemes within this approach. On the one hand there are mechanisms based on investment, which means that financial support is provided by investment subsidies, tax credits or soft loans. These investment-based strategies can help to overcome the barriers of high initial investment costs within the energy sector. In particular less economic renewable energy technologies are stimulated, mostly by means of the fiscal system of a country.[77]

On the other hand there are mechanisms focused on the energy generation itself. The financial support in this field of instruments is a fixed regulated feed-in tariff or a fixed premium.[78] While for feed-in tariffs the total feed-in price is fixed, for premium mechanisms the amount, which has to be added to the electricity price, is fixed.[79]

Within the quantity-based approach, the quantity is set and the market defines the price.[80] This means that governments fix a certain quantity of renewable energies that has to be provided by different market actors.[81] Main renewable energy support mechanisms within this approach are quota-based instruments as well as bidding procedures.[82]

[75] Haas et al. 2004 (32) *Energy Policy* 834.
[76] Haas et al. 2004 (32) *Energy Policy* 834.
[77] Van Dijk et al. 2003 *Renewable Energy Policies and Market Developments* 12.
[78] Usually per unit of generating capacity, Haas et al.2011 (15) *Renewable and Sustainable Energy Reviews* 1011.
[79] Van Dijk et al. 2003 *Renewable Energy Policies and Market Developments* 12; Haas et al.2011 (15) *Renewable and Sustainable Energy Reviews* 1011.
[80] Haas et al 2004 (32) *Energy Policy* 834.
[81] Haas et al 2004 (32) *Energy Policy* 834.
[82] Ecorys 'The role of market-based instruments in achieving a resource efficient economy' 9 (2011) *http://ec.europa.eu/environment/enveco/taxation/pdf/role_marketbased.pdf* (accessed 10.03.2013).

2.2.3 Two specific MBIs in detail: The REFIT and REBID mechanisms

Two main support mechanisms within the renewable energy sector are the REFIT (Renewable Energy Feed-In Tariff) and REBID (Renewable Energy Bids) schemes.

2.2.3.1 The REFIT scheme

(1) Nature and Form

In addition to the classical tax and investment incentives, the most frequently used support schemes in the renewable energy sector are feed-in tariffs (FITs). Today, FITs exist in many countries, including many European, African, American and Asian countries.[83]

As price-based instruments, FITs stimulate investment into renewable energies by setting a long-term guaranteed purchase price for renewable energy electricity and a purchase obligation.[84] Thus, on the one hand the purchase obligation pledges the grid operator to buy all renewable electricity in his area, and on the other hand a guaranteed a fixed price per unit of produced electricity is guaranteed to the renewable energy producer. This tariff is then warranted for a long period of time of usually 15 to 20 years to support investment security and cost amortisation.[85]

(2) Historical background

The world's first FIT was regulated in California under the *Federal Public Utility Regulatory Policies Act (PURPA)* in 1978.[86] This support scheme in the electricity sector underpinned the Californian wind energy development under which about 15.000 wind turbines have been installed in the early 1980s.[87]

In December 1990 Germany was the first country, which adopted a nationwide FIT legislation with its *Stromeinspeisungsgesetz (StrEG).*[88] With the worldwide literal translation into English as the 'Electricity Feed-In Law' the feed-in model was born.

[83] Jacobs 2010 *renewable energy focus* 29.
[84] Ackermann et al. 2001 (22) *Renewable Energy* 198.
[85] Ackermann et al. 2001 (22) *Renewable Energy* 198.
[86] *Federal Public Utility Regulatory Policies Act (PURPA)* 1978.
[87] Union of Concerned Scientists 'Clean Energy' *http://www.ucsusa.org/clean_energy/smart-energy-solutions/strengthen-policy/public-utility-regulatory.html* (accessed 10.04.2013).
[88] *Electricity Feed-In Law – Gesetz über die Einspeisung von Strom aus erneuerbaren Energien in das öffentliche Netz (Stromeinspeisungsgesetz – StrEG).*

It implied that electricity was being 'fed in' to the grid. The German legislation contained an obligation for grid operators to buy renewable energy at a fixed price.[89] With these provisions, the REFIT model became famous and initially had been adopted hereinafter in Denmark and Spain.[90] Today, the REFIT scheme is the most common used support instrument for renewable energy generation worldwide.[91]

(3) Benefits

FITs are considered to be a relatively simple instrument of providing incentives for the further development of renewable energy generation.[92] One can refer to many countries in which the renewable energy sector would not have succeeded without a REFIT model.[93] One main reason for the success of this measure is the long-term planning security independent power producers (IPPs) are provided with. Feed-in tariffs are usually defined and fixed for 15-20 years. Thus, renewable energy producers have an income security for a long period, which leads to increased innovation and investment in renewable energy technologies.[94]

This income security has also positive effects on the market role of small producers within the energy sector, as the financial support encourages not only large energy industries, but also homeowners, landowners, farmers or small business owners to participate as an energy producer, who get the profitable option to sell their renewable power.[95] Considering the fact that renewable energy production is generally capital-intensive and has high up-front costs, the fixed pricing mechanism allows to obtain bank financing for investment in renewable energy production.[96] This makes the REFIT a support scheme, which stimulates a comprehensive investment into renewable energy generation.

(4) Disadvantages

[89] Lipp 2007 (35) *Energy Policy* 5482.
[90] Couture et al. 'Feed-in tariff guide' 2010 NREL Report, *http://www.nrel.gov/docs/fy10osti/44849.pdf* (accessed 02.05.2013).
[91] Lipp 2007 (35) *Energy Policy* 5489.
[92] World Future Council *Feed-in Tariffs* 6.
[93] One of the best examples is Germany, as the innovator of the feed-in model in the renewable energy sector.
[94] Coture & Gagnon 2010 (38) *Energy Policy* 955.
[95] Coture & Gagnon 2010 (38) *Energy Policy* 955.
[96] Meyer 2003 (31) *Energy Policy* 668.

One finds some shortcomings of the system. One main criticism against the REFIT instrument is the typical consistence of defined tariffs on the same level without any reduction in accordance with the technological development.[97] This aspect can on the one hand positively impact investment security. But on the other hand the REFIT scheme becomes relatively inflexible referring to market and technology developments, as far as the tariffs are not adjusted after a period of time.[98]

One of the main problems however, seems to be the increase of electricity prices evoked by a REFIT. As the costs for the guaranteed renewable energy price cannot be covered by the state itself, they are generally transferred into user charges or levies to divide the costs.[99] These additional costs, passed on to the society, have in particular being considered in developing countries, where economic impacts will have more adverse effects than in industrialised countries.[100]

Another issue is the impact on the market itself. As a fixed price level does not conform to traditional market principles[101] one refers to it as a cross subsidy.[102] This cross subsidy is a significant market interference and changes the market structure in the energy sector.[103]

Another difficulty facing the REFIT scheme is the fact that it provides limited incentives for cost reduction of renewable energy generation.[104] As the price is fixed for a certain period of time, the incentive to reduce costs of production below the initial level and investing in innovation is little. That leads to the problem that renewable energy generation costs are usually higher in countries, which use the REFIT promotion instrument.[105]

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[97] Meyer 2003 (31) *Energy Policy* 668.
[98] Meyer 2003 (31) *Energy Policy* 668.
[99] As for example in Germany, Meyer 2003 (31) *Energy Policy* 668.
[100] Haselip ‚FIT for use everywhere? Assessing experiences with renewable energy feed-in tariffs' in Haselip et al (eds.) *Diffusion of renewable energy technologies: case studies of enabling frameworks in developing countries (UNEP Risoe Centre Technology Transfer Perspectives Series*) (2011) 94.
[101] As the fixed tariffs for renewable energy electricity is higher than the normal wholesale prices.
[102] Meyer 2003 (31) *Energy Policy* 668.
[103] For this reason the quota mechanism catches on in many European countries as it is considered to be more compatible with the electricity market, Mendonça 2007 *Renewable Energy Focus* 61; Tasmania Department of Infrastructure, Energy and Resources 2008 *Feed-in Tariffs, Discussion Paper* 19.
[104] Ackermann et al. 2001 (22) *Renewable Energy* 199.
[105] Ackermann et al. 2001 (22) *Renewable Energy* 199.

2.2.3.2 The REBID scheme

(1) Nature and form

In terms of renewable energy bids, independent power producers (IPPs) are invited to bid for the development of renewable energy projects.[106] In this competitive bidding process, the regulator defines a specific market for a certain amount of electricity produced from renewable energy sources. To allocate this amount, a competition is organised between renewable energy producers. The least cost bidder, who also fulfils all technical requirements, is awarded and signs a power purchase agreement (PPA), which guarantees a fixed price over a certain period of time.[107] The renewable energy producer bids under different technology sectors such as wind or solar energy.[108] The regional electricity companies are then obliged to purchase the renewable energy electricity from the selected energy producers.[109]

(2) Historical background

The bidding mechanism is based on the so-called *Non-Fossil Fuel Obligation (NFFO)*[110], introduced in the United Kingdom in 1990 to promote renewable energy technologies on the one hand and to pay costs of nuclear assets on the other hand. Through the NFFO, the U.K. government established five competition rounds between 1990 and 1999 in order to achieve around 3 per cent renewable energy generation of the total national electricity supply. The projects that were able to generate electricity at the lowest price were selected to sign an independent power purchase agreement. The twelve regional electricity companies were then obliged to buy the total produced power from the selected renewable energy producers for the determined price. The difference between the determined price and the selling price, which represented the state subsidy to renewable energy generation, was reimbursed using the fund from the U.K.'s Fossil Fuel Levy.[111] The renewable energy bidding scheme was born.[112]

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[106] Menanteau et al. 2003 (31) *Energy Policy* 802.
[107] Menanteau et al. 2003 (31) *Energy Policy* 802.
[108] Ackermann et al. 2001 (22) *Renewable Energy* 200.
[109] Menanteau et al. 2003 (31) *Energy Policy* 802.
[110] *Non-Fossil Fuel Obligation (NFFO)* 1990.
[111] Butler & Neuhoff 2008 (33) *Renewable Energy* 1855.
[112] Lipp 2007 (35) *Energy Policy* 5489.

Similar systems to the NFFO programme existed in France within the *Ecole 2005 programme* introduced in 1996 to stimulate wind energy and in California within the *New Technologies Account Auction* promulgated in 1998.[113]

(3) Benefits

REBID's key benefitis its ability to reduce costs for renewable energy development. Through the bidding process, the projects with the lowest price are selected, what over time leads to a successful cost reduction of renewable energies because it drives down the per kWh price of renewable electricity that was bid within each technology sector.[114] That is one of the main reasons why the REBID mechanism is considered to be a successful renewable energy support scheme particularly in developing countries, in order to make renewable energies competitive with other energy sources in their markets.[115]

Another advantage can be seen in the stimulation of innovation in the renewable energy sector influenced by competition.[116] Competition always has the effect that companies try to develop the best technologies to the cheapest available prices in order to compete in the free market. This innovation brings benefits for the future sustainability of renewable energy sources and technologies as they can compete with conventional energy sources and technologies.[117]

Compared to the REFIT scheme, the market intervention within this support scheme is relatively low as the REBID mechanism mainly promotes competition in the renewable energy sector.[118] This is due to the fact that a REBID doesn't guarantee a fixed price paid for renewable energy sources but instead the market determines the price itself.[119] Such a low intervention compared to other support schemes can

[113] Ackermann et al. 2001 (22) *Renewable Energy* 200.
[114] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[115] Tasmania Department of Infrastructure, Energy and Resources 2008 *Feed-in Tariffs, Discussion Paper* 19.
[116] Pegels ‚Pitfalls of policy implementation: The case of the South African feed-in tariff' in Haselip et al (eds.) *Diffusion of renewable energy technologies: case studies of enabling frameworks in developing countries (UNEP Risoe Centre Technology Transfer Perspectives Series)* (2011) 104.
[117] Johansson & Turkenburg 2004 (8/1) *Energy for Sustainable Development* 14.
[118] Menanteau et al. 2003 (31) *Energy Policy* 802; Ackermann et al. 2001 (22) *Renewable Energy* 200.
[119] Menanteau et al. 2003 (31) *Energy Policy* 802.

generally be seen as a positive approach referring to the overall objective of free and independent market systems.

(4) Disadvantages

Negative can be seen the fact that the price competition in particular favours large and already well-established and integrated renewable energy producer instead of small domestic developers.[120] Reason is to be found in the fact that it is often easier for large-scale and international industries to reduce costs and thus to bid lower prices because of their size and experience. In contrast, small and local renewable energy producer are often not able to compete in this price segment.[121] Thus the REBID mechanism is often considered to not creating a successful domestic infrastructure of renewable energy producers.[122] Thus the economic benefits, usually provided by renewable energy development, are on average lower than in countries, which regulate their renewable energy system with a feed-in model.[123]

Another significant shortcoming of bidding policies is the fact that a large number of renewable energy projects, which won a bidding process, are finally not developed.[124] Often the reason for this is to be found in the competitive character of the REBID scheme as producers often bid very low prices in order to block out other companies without actually having the ability to enforce the project.[125] Besides in many cases the prices are too low to realise a project. Thus bidders often realise that they are not able to enforce the project, as it would be economically not feasible.[126]

In comparison to the above-discussed REFIT model, the risk reduction within the bidding scheme is much lower.[127] The bidding scheme consists of a number of bidding rounds in which every company has to try to win the competition for financial incentives each time again. Thus the REBID scheme has no high and constant investment security for a long period.[128]

[120] Wiser et al. *Renewable Energy Policy Options for China* (2002) 11.
[121] Wiser et al. *Renewable Energy Policy Options for China* (2002) 11.
[122] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[123] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[124] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[125] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[126] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[127] Lipp 2007 (35) *Energy Policy* 5483.
[128] Mitchell et al. 2006 (34) *Energy Policy* 300-304.

The very low electricity prices, which indeed can be seen as a benefit, can also have adverse effects. In a free market, the energy prices should reflect the actual prices in order to make goods competitive over the long-term.[129] This is however not expected in the case in which goods, through subsidies, are that low that they could never succeed on the market without government intervention.[130] But in the end this is the main objective: To make renewable energy sources and technologies able to compete in a free market without any support and intervention. It is questionable whether the decrease of prices to this extent is a sustainable way for the future.[131]

Actually one can find a number of benefits as well as disadvantages for the different support schemes, which are all arguable, depending on the main objective and main difficulties of a specific jurisdiction. Thus, it makes more sense to discuss the advantages and disadvantages of different support schemes within the different jurisdictions. As every country has its own conditions and challenges, one has to find a support scheme, which is best suitable for the specific jurisdiction.

Chapter 3: South Africa's experimentation with REFIT and REBID

South Africa as the largest single economy in sub-Saharan Africa has the highest carbon dioxide emissions in Africa and its economy is very highly carbon intensive.[132] Furthermore, South Africa is extremely vulnerable and exposed to climate change impacts due to their socio-economic and environmental context.[133] The South African government indicated that it wishes to reduce its greenhouse gas emissions by 34 per cent compared to business as usual by 2020 and 42 per cent by 2025.[134] Renewable energy generation is a key instrument in delivering this objective. A look at the South African energy generation sector as well as its policy and legal framework in the field of renewable energy generation illustrates South Africa's approach to support renewable energy generation.

[129] Le Fol *Renewable Energy Transition for a sustainable future in Namibia* (2012) 10.
[130] Le Fol *Renewable Energy Transition for a sustainable future in Namibia* (2012) 10.
[131] Le Fol *Renewable Energy Transition for a sustainable future in Namibia* (2012) 10.
[132] Tyler et al. 2013 *Climate and Development* 2.
[133] *National Climate Change Response White Paper* (2011) 8-9.
[134] *National Climate Change Response Green Paper* (2010) 6.

3.1 Overview of South Africa's energy generation sector

3.1.1 Structure of South Africa's energy sector

The South African energy sector relies mainly on its large-scale and energy-intensive mining industry. The country has large coal deposits, which are used predominantly for its energy needs, in particular in the electricity sector. In 2010, almost about 70 per cent of South Africa's total energy supply came from coal, 19 per cent from crude oil and the remaining 10 per cent from nuclear, gas and renewable energy sources. [135]

The highest amount of energy in South Africa is used for its electricity sector. The electricity sector is dominated by Eskom, a state-owned electricity-supply enterprise.[136] Eskom produces about 95 per cent of South Africa's electricity and also owns and operates the national transmission system. About 86 per cent of the electricity is generated from coal, followed by nuclear energy (5 per cent); renewable energy however accounts for only about 1 per cent of electricity generation.[137]

Until 2008, South Africa had the lowest electricity prices worldwide at about R 0,25/kWh. In late 2007 and early 2008, the country experienced a power crisis with several blackouts as a result of a growing economy and a growing electricity demand without the construction of any new power plants.[138] To finance new projects by Eskom, South Africa had exposed dramatic price increases since 2008.[139] Nevertheless, South Africa's electricity prices are still among the lowest worldwide.[140] This shows that the South African electricity sector faces several

[135] EIA 'South Africa Analysis Brief' (2013) *http://www.eia.gov/countries/analysisbriefs/South_africa/south_africa.pdf* (accessed 19.05.2013); DoE 'Digest of South African Energy Statistics' (2009) 2 *http://www.energy.gov.za/files/media/explained/2009%20Digest%20PDF%20version.pdf* (accessed 19.05.2013).
[136] Eskom 'Company information' *http://www.eskom.co.za/c/40/company-information/* (accessed 20.03.2013).
[137] Cigrasp 'Energy Profile: South Africa' (2012) *http://cigrasp.pik-potsdam.de/countries/833900607/energy_profile* (accessed 15.05.2013).
[138] Edkins et al. *South Africa's renewable energy policy roadmaps, Final report* (2010) 1-2.
[139] For the years 2008/2009, NERSA approved a price increase of 27,5 %, in 2009/2012 there was a price increase of 31,3 % and about 25 % each subsequent year till 2012/2013, EIA 'South Africa Analysis Brief' (2013); Edkins et al. *South Africa's renewable energy policy roadmaps, Final report* (2010) 1-2.
[140] In 2011 only Canada provided cheaper electricity than South Africa and became thereby the cheapest provider of electricity worldwide, Saylor & Agilonu & Pichard 'Restructuring the South African Power Industry' 2011 *Power (www.powermag.com)* 66.

problems. First one finds an electricity undersupply, in particular if one considers the further economic development of the country and the increasing energy demand.[141] To increase electricity supply, Eskom already recognised that the energy infrastructure has to be extended and new power plants have to be constructed. However, Eskom is already dramatically underfunded, so that a further price increase of electricity tariffs in order to manage the development of the energy sector is expected.[142] Apart from these socio-economic problems, the South African energy sector is facing significant environmental problems caused by using coal as its primary energy source.[143]

The promotion of renewable energy generation can provide a comprehensive solution.[144] Even if South Africa has a high resource potential, especially for solar and wind technologies, there has been so far little progress in the deployment and diversification of renewable energies, as there are still central barriers to overcome.

3.1.2 Barriers to renewable energies

The main barriers to renewable energies in South Africa are to be found in the nature of the national energy system and in economic challenges facing renewable energy technologies in the country.[145]

South Africa's energy system has its roots in the Apartheid period in which the independence from external energy supply was politically necessary. Research in the national energy system has therefore concentrated mainly on fossil fuels, in particular coal.[146] Thus in the electricity as well as in the fuel sector, coal was used as primary energy source. Furthermore, the two main energy providers Eskom

[141] Pegels 2010 (38) *Energy Policy* 4947.
[142] Pegels 2010 (38) *Energy Policy* 4947; Pegels 'Prospects for Renewable Energy in South Africa, Mobilizing the private sector' Discussion Paper 23/2009,13 *http://www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/(ynDK_contentByKey)/ANES-7YUG28/$FILE/DP%2023.2009.pdf* (accessed 28.04.2013); Burkhardt 'Eskom to Raise S. Africa Power Price 8% Annually for 5 Years' Bloomberg (28.2.2013) *http://www.bloomberg.com/news/2013-02-28/south-africa-s-eskom-to-raise-power-prices-8-a-year-for-5-years.html* (accessed 05.06.2013).
[143] Eskom actually plans to expand coal-fired electricity capacity in order to meet the growing demand, EIA 'South Africa Analysis Brief' (2013).
[144] Pegels *Prospects for Renewable Energy in South Africa* 13
[145] Pegels *Prospects for Renewable Energy in South Africa* 11.
[146] Johansson & Turkenburg 2004 (8/1) *Energy for Sustainable Development* 14.

(electricity supplier) and Sasol (fuel supplier) mainly concentrated in their research on the cheapest energy source, which is coal in South Africa.[147]

Renewable energy technologies however, are not well developed yet.[148] Reason for this is to be found on the one hand in the monopolistic position of the South African energy providers, in particularly Eskom and Sasol who do not invest in innovations in new technologies such as renewable energies.[149] On the other hand it lacks in private investment into renewable energy technologies due to high risk and cost factors of renewable energy projects in South Africa. The high investment risk results mainly from a lack in experience and consistency.[150] Thus the problems and difficulties such a new technology would face under South African conditions are unclear. Apart from that an ambiguous policy and legal framework can result in uncertainty among potential project developers.[151] The shift from REFIT to REBID in South Africa resulted in such an uncertainty.[152]

Another barrier for renewable energies in the South African energy sector is the competitive cost of renewable energy technologies. As discussed above, the average electricity price in South Africa is, even though there has been a significant price increase since 2008, very low compared to other countries around the world.[153] The average electricity price in 2013 is ZAR 0,655 per kWh, which is approximately equivalent to EUR 0,05 per kWh.[154] In Germany for instance, the average electricity price in 2013 is EUR 0,15 per kWh.[155] The main reason for this are the high costs for electricity production, in particular from renewable energies.[156] The cost of electricity production from wind lies for example between EUR 0,05 and EUR 0,10 per kWh. The production of solar electricity actually costs between EUR 0,28 and

[147] Pegels 2010 (38) *Energy Policy* 4948.
[148] Johansson & Turkenburg 2004 (8/1) *Energy for Sustainable Development* 14.
[149] Pegels *Prospects for Renewable Energy in South Africa* 11.
[150] Johansson & Turkenburg 2004 (8/1) *Energy for Sustainable Development* 14.
[151] Pegels *Prospects for Renewable Energy in South Africa* 11.
[152] Pegels *Prospects for Renewable Energy in South Africa* 11.
[153] Deloitte 'The Economic Impact of Electricity Price Increases on Various Sectors of the South African Economy' (2011) 37-53 *http://www.eskom.co.za/content/Economic%20Impact%20of%20Electrcity%20Price%20Increases%20Document~1.pdf* (accessed 10.05.2013).
[154] Eskom 'Tariffs and charges 2013' *http://www.eskom.co.za/c/53/tariffs-and-charges/* (accessed 05.07.2013).
[155] Statista 2013 'Electricity prices (Industriestrompreise) in Germany' *http://de.statista.com/statistik/daten/studie/252029/umfrage/industriestrompreise-inkl-stromsteuer-in-deutschland/* (accessed 25.06.2013).
[156] Pegels *Prospects for Renewable Energy in South Africa* 11.

EUR 0,39 per kWh.[157] This makes wind energy competitive with conventional energy sources, whereas solar energy can only exist in the German electricity sector because of financial support schemes.[158]

This comparison with German electricity prices shows the challenge for the implementation of renewable energies in South Africa, where electricity prices are still very low.[159]

Overall, the South African energy sector is facing several challenges resulting in a number of barriers to renewable energy generation. Electricity shortages in 2008 and the national aim at reducing greenhouse gas emissions, led to South Africa identifying renewable energy as a crucial element to satisfy the national future energy needs.[160] One of the main challenges in this context is the provision of a clear and solid policy and legal framework.

3.2 Overview of South Africa's policy framework relating to renewable energy generation

South Africa's policy makers have implemented a number of policies, which promote domestic energy generation. Many of these policies support the use of MBIs. The most relevant policies in the energy, environmental and fiscal policy sectors are reviewed shortly in the following part. It turns out that South Africa increased its political focus on renewable energy generation and its use of MBIs in this policy area.

[157] Wikipedia 'Cost of electricity by source (in 2010)' *http://en.wikipedia.org/wiki/Cost_of_electricity_by_source* (accessed 25.05.2013).
[158] Pegels *Prospects for Renewable Energy in South Africa* 11.
[159] Deloitte 'The Economic Impact of Electricity Price Increases on Various Sectors of the South African Economy' (2011) 37-53.
[160] Becker & Fischer 'Promoting Renewable Electricity Generation in Emerging Economies' (2012) 12 *http://www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/(ynDK_contentByKey)/ANES-8VEC8P/$FILE/DP%209.2012.pdf* (accessed 28.04.2013).

3.2.1 Energy policies

3.2.1.1 White Paper on the Energy Policy of the Republic of South Africa

In 1998, the former Department of Minerals and Energy (DME) published the *White Paper on the Energy Policy of the Republic of South Africa (Energy White Paper)*.[161] The policy contains the key challenges facing the national energy sector and identifies five objectives. These are: 'increasing access to affordable energy services';[162] 'improving energy governance';[163] managing energy related environmental impacts'[164] stimulating economic development';[165] and 'securing supply through diversity'.[166]

The last objective addresses the need to provide alternative energy sources including renewable energy sources.[167] It recognises South Africa's high potential of renewable energies and concedes that there has been only a marginal development and implementation of renewable energy technologies in the country.[168] Renewable energies are considered to contribute towards a long-term sustainable energy future. Such a sustainable energy future contains, according to the *Energy White Paper*, social, health and environmental impacts, including the reduction of greenhouse gases to address the challenges of climate change.[169]

The *Energy White Paper* further contains a section about fiscal and pricing issues in which the use of fiscal mechanisms is recognised to be very effective for achieving energy policy objectives.[170] MBIs such as income taxes, fuel and energy levies or subsidies are mentioned for the promotion of environmental goals.[171]

Altogether the *Energy White Paper* of 1998 paved the way for further policy development in the renewable energy sector, as it considers the implementation of

[161] DME *White Paper on the Energy Policy of the Republic of South Africa* (1998).
[162] *Energy White Paper* 23-24.
[163] *Energy White Paper* 24-25.
[164] *Energy White Paper* 26-27.
[165] *Energy White Paper* 25-26.
[166] *Energy White Paper* 27.
[167] *Energy White Paper* 27.
[168] *Energy White Paper* 79.
[169] *Energy White Paper* 92-93.
[170] *Energy White Paper* 101.
[171] *Energy White Paper* 101-106.

renewable energies in South Africa as a necessary means in order to achieve a sustainable and environmentally friendly development of the country.[172]

3.2.1.2 Integrated Energy Plan for the Republic of South Africa

On 19 March 2003, the Department of Minerals and Energy released the *Integrated Energy Plan for the Republic of South Africa (Integrated Energy Plan).*[173] With this policy the government seeks to ensure the adoption of an integrated resource planning approach for large investment decisions by energy suppliers.[174] In this context the paper first describes and analyses South Africa's energy sector in order to subsequently develop an integrated energy plan. Within this plan, coal remains the dominant primary energy source. However, the importance of diversifying energy sources, especially renewable energies, is seen as well.[175] Several reasons for the stimulation of renewable energies are mentioned. It becomes nevertheless apparent that the higher costs of renewable energy are still seen as a barrier to implement them on a large-scale basis in the South African energy sector.[176] For this problem no further ideas for financing are made, in particular no MBIs to support the development of renewable energies in South Africa are mentioned. Instead the predominant reliance on coal is seen as the right way of integrated resource planning in South Africa. This is surprising if one takes into account the *White Paper on Renewable Energy Policy,* which follows a different approach referring to renewable energy development in the country.

3.2.1.3 White Paper on the Renewable Energy Policy of the Republic of South Africa

Subsequent to the *Energy White Paper*, the government released a *White Paper on the Renewable Energy Policy of the Republic of South Africa (Renewable Energy White Paper)*[177] in 2003. The policy paper sets out the government's overall vision for the role of renewable energies in the national energy sector which is 'an energy economy in which modern renewable energy increases its share of energy consumed

[172] *Energy White Paper* 79.
[173] DME *Integrated Energy Plan for the Republic of South Africa* (2003).
[174] *Integrated Energy Plan* 4.
[175] *Integrated Energy Plan* 25.
[176] *Integrated Energy Plan* 25.
[177] DME *White Paper on the Renewable Energy Policy of the Republic of South Africa* (2003).

and provides affordable access to energy throughout South Africa, thus contributing to sustainable development and environmental conservation'.[178]

To realise this vision, the paper includes a promotion strategy, including the provision of sufficient incentives for industries to generate renewable energies. [179] The *Renewable Energy White Paper* sets therefore a target of 10.000 GwH of final energy consumption to be generated from renewable energy by the year 2013. This accounts for approximately 4 per cent of total energy consumption, which is equivalent to replacing two units of Eskom's combined coal-fired power stations (2 x 660 MW).[180]

To overcome the expected initial high capital costs and to increase the commercialisation of renewable energy technologies in the South African energy market, government funding through MBIs are seen as a catalyst. As possible financial and fiscal measures the policy paper cites budgetary allocation, subsidies, levies, tax rebates and other incentives as examples.[181] It refers to renewable energy support measures in different countries, such as feed-in tariffs, Renewable Portfolio Standards or Renewables Obligation Standards and shortly discusses advantages and disadvantages of these mechanisms.[182] However, the policy does not provide a final determination of the best suitable support scheme for South Africa.[183] Nevertheless, the *Renewable Energy White Paper* forms the most important policy basis for the implementation of a renewable energy support mechanism in South Africa.

3.2.1.4 Integrated Resource Plan for Electricity 2010-2030

In May 2011, the Department of Energy (DoE) released the Integrated Resource Plan for Electricity 2010-2030 (Integrated Resource Plan - IRP)[184]. This Integrated Resource Plan functions as a 'living plan', which means that it is not permanently fixed but instead is expected to be continuously revised and updated on the basis of changing circumstances.[185] The overall electricity-planning objective within this

[178] *Renewable Energy White Paper* 1.
[179] *Renewable Energy White Paper* 2-3.
[180] *Renewable Energy White Paper* 25.
[181] *Renewable Energy White Paper* 27.
[182] *Renewable Energy White Paper* 29.
[183] *Renewable Energy White Paper* 29.
[184] DoE *Integrated Resource Plan for Electricity 2010-2030* (2011).
[185] *Integrated Resource Plan* 7.

policy is to ensure sustainable development by considering technical, economic and social constraints.[186] In the context of renewable energy development the IRP emphasises the important role of renewable energy in the future electricity generation of South Africa. Thus the IRP sets the high objective of allocating 42 per cent of new generation capacity to renewable technologies in 2030.[187] However, the renewable energy commitments within the whole IRP are based on the REFIT system as this mechanism was still expected.[188]

3.2.2 Environmental policies

3.2.2.1 White Paper on Environmental Management Policy for South Africa

One of the first important environmental policies in which renewable energies were mentioned was the *White Paper on Environmental Management Policy for South Africa (Environmental Management Policy)* of 1998.[189] It was aimed at implying an overarching environmental framework policy, which applies to all government institutions and to all activities that impact on the environment.[190] The Government's new vision for environmental management in South Africa entails a system aimed at achieving sustainable development.[191] One key factor to reach environmental sustainable development is the promotion of renewable energies.[192] Furthermore, the policy paper promotes the implementation of MBIs as a regulatory method.[193]

3.2.2.2 National Strategy for Sustainable Development and Action Plan (NSSDI) 2011-2014

In November 2011, the Cabinet approved the *National Strategy for Sustainable Development and Action Plan (NSSDI) 2011-2014 (National Strategy and Action Plan)* to provide a policy concept for a sustainable development in South Africa.[194] The policy identifies five strategic key priorities, of which two, 'Priority 3 - Towards

[186] DoE 'Integrated Resource Plan Overview' *http://www.energy.gov.za/files/irp_frame.html* (accessed 15.05.2013).
[187] *Integrated Resource Plan* 15.
[188] *Integrated Resource Plan* 65.
[189] DEA *White Paper on Environmental Management Policy for South Africa* (1998).
[190] *Environmental Management Policy* 10.
[191] *Environmental Management Policy* 13.
[192] *Environmental Management Policy* 34.
[193] *Environmental Management Policy* 81.
[194] DEA *National Strategy for Sustainable Development and Action Plan (NSSDI) 2011-2014* (2011).

a green economy' and 'Priority 5 - Responding effectively to climate change' are relevant for the renewable energy sector in South Africa.[195] Priority 3 contains, amongst other planned interventions, the diversification of energy sources, the encouragement of investment in renewable energies and active support for local renewable energy technology industries.[196] Priority 5 focuses on renewable energies in more detail. It highlights that the overall goal of reducing greenhouse gases shall be achieved by reducing the dependency on coal in the national energy sector. In this context the 10 000 GwH objective of renewable energy contribution till 2013, which was already set in the *Renewable Energy White Paper of 2003*, is repeated here and makes clear that the South African Government still attaches great importance to the implementation of renewable energies.[197] In this context, the use of MBIs is explicitly mentioned for promoting behaviour changes in favour of a low-carbon economy. In particular, the Renewable Energy Feed-in Tariff (REFIT) is seen as an effective mechanism to promote the deployment of renewable energy and is regarded as an advantageous MBI to stimulate the renewable energy sector in South Africa.[198]

3.2.2.3 National Climate Change Response White Paper

In 2011, the Department of Environmental Affairs (DEA) launched the *National Climate Change Response White Paper (Climate Change White Paper).*[199] The *Climate Change White Paper* identifies greenhouse gas mitigation areas and opportunities, in particular an increased investment into renewable energy programmes.[200] This programme is called the Renewable Energy Flagship Programme and again the use of MBIs is considered to promote renewable energy investments.[201] However, apart from the mention of a carbon tax option for South Africa[202] as a MBI to stimulate behaviour changes, no other MBIs, which could be used in the renewable energy sector, are mentioned.[203]

[195] *National Strategy and Action Plan* 23-27; 32-34.
[196] *National Strategy and Action Plan* 25.
[197] *National Strategy and Action Plan* 32.
[198] National Strategy and Action Plan 32; 34.
[199] DEA *National Climate Change Response White Paper* (2011).
[200] *Climate Change White Paper* 26.
[201] *Climate Change White Paper* 31;40.
[202] National Treasury *Reducing Greenhouse Gas Emissions: The Carbon Tax Option* (2010).
[203] *Climate Change White Paper* 40.

3.2.3 Fiscal Policies

3.2.3.1 Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa

In April 2006, the National Treasury released the *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa (MBI Draft Policy Paper)*. In this policy MBIs are recognised as regulatory measures to achieve environmentally related goals.[204] MBIs are defined as a 'group of policy instruments that seek to correct environmentally-related market failures through the price mechanism' and are regarded to be more effective as regulatory or command- and control measures in addressing certain environmental goals. [205] Even if the policy paper explicitly does not aim at providing a comprehensive analysis of the entity of South Africa's environmental challenges, which could be addressed with MBIs, the National Treasury discusses the importance of renewable energy development in South Africa in order to address climate change and air pollution.[206]

The MBI Draft Policy Paper can be considered to be a very important policy approach in the South African environmental as well as fiscal policy context, as it is the first policy that provides a comprehensive framework for MBIs in general. In particular the above-discussed evaluation criteria of MBIs can be seen as a beneficial way to support the efficient use of MBIs in the environmental context

3.2.3.2 Carbon Tax Policy Paper

In May 2013, the National Treasury published a *Carbon Tax Policy Paper: Reducing greenhouse gas emissions and facilitating the transition to a green economy (Carbon Tax Policy Paper)*. It was an update of the previous *Carbon Tax Discussion Paper* of 2010[207]. The document seeks to find the most effective carbon tax option for South Africa, as carbon taxation is considered to be one of the most effective measures to mitigate greenhouse gas emissions.[208] The MBI aims at stimulating behaviour

[204] *MBI Draft Policy* 1.
[205] *MBI Draft Policy* 2.
[206] *MBI Draft Policy* 1; 17.
[207] National Treasury *Reducing Greenhouse Gas Emissions: The Carbon Tax Option* (2010).
[208] *The Carbon Tax Option* (2010) 7.

changes among consumers and producers in order to achieve a less energy-intensive and lower carbon-emitting economy.[209] The *Carbon Tax Policy Paper* deals, apart from providing details of the proposed carbon taxation, with renewable energy as a contribution to effort to diversify South Africa's energy mix.[210]

The implementation of a carbon tax in South Africa emphasises the role a green and less-carbon intensive economy plays for the country. As a carbon tax is considered to be one of the most effective MBIs in the context of climate change, the implementation of carbon taxing in South Africa can be seen as a significant step to mitigate greenhouse gases.

3.2.4 Interim finding

The above-mentioned policies are only an extract of South Africa's important policies, which deal with the implementation of renewable energies. Further policies which deal with renewable energies are for instance the *Energy Security Master Plan for Electricity* of 2007[211], the *Industrial Policy and Action Plan* of 2010[212], the *New Growth Path* of 2010[213] and the 2013 *National Development Plan 2030*[214]. IT turns out that relevant policies in the context of renewable energy generation can be found in different policy fields, such as in environmental, energy and also fiscal policies. This comprehensive approach highlights the important role, renewable energies already play in the South African system. In particular support mechanisms such as the REFIT or REBID mechanism can find their basis in the national comprehensive policy, as MBIs are seen all over as beneficial measures to promote the renewable energy deployment in South Africa.

3.3. Overview of South Africa's legal framework relating to renewable energy generation

The above-mentioned policies in the context of renewable energy generation are based on a coherent legal framework. However, there is no statute which functions

[209] *National Climate Change Response White Paper* 40.
[210] *Carbon Tax Policy Paper* (2013) 17.
[211] DME *Energy Security Master Plan for Electricity* (2007).
[212] Department of Trade and Industry *Industrial Policy Action Plan (IPAP) 2012/13 – 2014/15* (2010).
[213] Economic Development Department *Framework of the New Economic Growth Path* (2010).
[214] National Planning Commission *National Development Plan 2030: Our future – make it work* (2013).

as an umbrella by providing an overarching legal framework for renewable energies in South Africa. Rather one finds legal provisions in the context of renewable energies in a disparate set of laws, in particular in the environmental and energy context.[215] Within this legal framework, this section concentrates on the most important laws relating to renewable energy generation, in particular provisions forming the basis for support schemes such as the REFIT and REBID models.

3.3.1 Energy laws

3.3.1.1 Electricity Regulation Act

The *Electricity Regulation Act*[216] established a national regulatory framework for the electricity supply industry and for governing the generation, transmission, distribution, trading and import and export of electricity.[217] Main object of the Act is the achievement of an efficient, effective, sustainable and orderly development and operation of electricity supply in South Africa.[218]

For the development of renewable energy facilities, chapter 3 of the Act provides regulations referring electricity licences and registration, which have to be considered. Apart from that section 46 plays an important role as here one finds a number of provisions in the context of new generation capacity. The provision empowers the Minister of Energy to determine, in consultation with NERSA as the defined energy regulator, when new generation capacity is needed, which energy sources shall be used for the generation of electricity and that the produced electricity may only be sold to persons or in a way determined by the Minister of Energy. Apart from that the Minister has to choose a tendering procedure for new generation capacity, which is fair, equitable, transparent, competitive and cost-effective.[219]

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[215] Glazewski 'The Legal Framework for Renewable Energy in South Africa' 2005 *http://www.un.org/esa/sustdev/sdissues/energy/op/parliamentarian_forum/glazewski_re_sa.pdf* 1 (accessed 10.05.2013).
[216] *Electricity Regulation Act No. 4 of 2006.*
[217] *Electricity Regulation Act No. 4 of 2006* Preamble.
[218] *Electricity Regulation Act* section 2.
[219] *Electricity Regulation Act* section 46.

In 2008 the *Electricity Regulation Amendment Act* was published, providing inter alia the extension of the Minster's powers to make regulations.[220] Then on 19 December 2011, an *Electricity Regulation Second Amendment Bill* was published for comment.[221] It contains changes referring the role of NERSA, including licensing powers for the construction and operation of generation facilities.[222] However until now these amendments haven't come into effect yet and it is still unclear when this will happen.

More important however were two regulations promulgated in terms of the *Electricity Regulations Act*, namely the *Electricity Regulations on New Generation Capacity* of 5 August 2009[223] and of 4 May 2011[224]. The 2009 regulations contain provisions referring a procurement programme for renewable energies. However one finds two different mechanisms for such procurement. On the one hand the bidding process under an IPP bid programme is described in section 5, on the other hand a REFIT programme is explained in section 7. Even if in 2009 the implementation of the REFIT model was already determined by NERSA, the regulations, published by the Department of Energy in 2009, were already ambiguous and unclear referring the question whether a REFIT or a REBID model should be implemented for the support of renewable energy developments. And if one considers the formulation of the regulations, it becomes clear that already in 2009, even if NERSA just at that time published the *REFIT Regulatory Guidelines*, the Department of Energy preferred a REBID system as national support mechanism for renewable energies. This emphasises the wording in section 5 and 7, as section 7 states that 'notwithstanding the provisions of regulations 5 [which is the provision about the IPP bid programme] the Minister may determine that the REFIT programme must be used to meet the required new generation capacity'. This formulation shows that the DoE when publishing the regulations assumed that the REBID model instead of the REFIT model would have been implemented.[225]

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[220] *Electricity Regulation Amendment Act No. 28 of 2007*.
[221] *Electricity Regulation Second Amendment Bill , Notice 905 of 2011*.
[222] *Electricity Regulation Second Amendment Bill* section 4; Diemont et. al. 'Renewable Energy' 643.
[223] DoE *Electricity Regulation Act, 2006: Electricity Regulations on New Generation Capacity* (2009).
[224] DoE *Electricity Regulation Act No. 4 of 2006: Electricity Regulations on New Generation Capacity* (2011).
[225] This is my own assumption.

The *Electricity Regulations on New Generation Capacity* released in May 2011 repealed the 2009 regulations in which no clear decision was made between a REFIT and REBID mechanism. The 2011 regulations however fully support the IPP bidding programme called the IPP Procurement Programme.[226] Thus, even if in May 2011 everybody was waiting for the implementation of the REFIT model by NERSA, the Department of Energy decided to promulgate the REBID scheme as support mechanism for the renewable energy sector in South Africa. Thus, these regulations from May 2011 have an important role for the renewable energy sector as they abandon the REFIT model and instead announce the REBID mechanism as effective.

Two days later on 6 May 2011 the *Electricity Regulations on the Integrated Resource Plan 2010-2030 (IRP 2010)* were released in terms of the *Electricity Regulation Act* of 2006.[227] These Regulations determine a new generation capacity of renewable energies of 17,8 GW, which means a 9 per cent share of renewable energies in the total energy mix until 2030[228]

On 3 August 2011, the Department of Energy released a *Request for qualification and proposals for new generation capacity under the IPP Procurement Programme* in terms of the *Electricity Regulations Act* of 2006.[229] This regulation contains further information about the IPP Programme and the bidding mechanism. As the REBID instrument is analysed in the next section, a further discussion will be provided there.

3.3.1.2 National Energy Act

The *National Energy Act* of 2008 is the central legislation regulating the energy sector in South Africa.[230] It gives effect to the *Energy White Paper* and the *White Paper on Renewable Energy*. Main objective is to ensure the availability of diverse energy resources to the South African economy and to provide for energy planning. Within this energy planning the increased consumption and generation of renewable

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[226] *Electricity Regulation on New Generation Capacity* (2011) section 7.
[227] *Electricity Regulation Act No. 4 of 2006: Electricity Regulations on the Integrated Resource Plan 2010-2030* 6 May 2011.
[228] *Electricity Regulations on the IRP 2010* 6.
[229] DoE *Request for Qualification and Proposals for New Generation Capacity under the IPP Procurement Programme* (3 August 2011).
[230] *National Energy Act No. 34 of 2008*.

energies is aimed for.[231] In this context section 19 empowers the Minister of Energy to make regulations referring the minimum contribution of renewable energies to the national energy supply, the nature of the sources that may be used in this context and regulations concerning measures and incentives designed to promote the production, consumption, investment, research and development of renewable energy.[232]

3.3.2 Environmental laws

Renewable energy projects are subject to a number of regulatory and permit requirements under the South African environmental law. [233] Furthermore, the development of new projects has to comply with land use planning law. The full consideration of these environmental laws falls however outside the scope of the dissertation.

3.3.3 Fiscal laws

Certain tax incentives have been introduced to stimulate the renewable energy industry in South Africa. Thus the *Income Tax Act* of 1962[234] contains tax allowances for companies investing in renewable energy technologies,[235] a specific deduction for the cost of machinery and implements used by the taxpayer for the generation of renewable energy[236] and special tax reductions for the purchase of new or unused lines or cables for the transmission of power.[237]

3.3.4 Interim finding

The short analysis of South Africa's legal framework referring to its renewable energy development shows that one finds provisions in different areas of national law, such as in environmental, energy and fiscal regulations. On the one hand this demonstrates the importance of renewable energies, as the different policy sectors

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[231] *National Energy Act* Preamble.
[232] *National Energy Act* section 19.
[233] The most important environmental law in this context is section 24 of the *National Environmental Management Act No. 107 of 1998 (NEMA).* Subsequent environmental legislation in this context is the *National Water Act No. 36 of 1998,* the *National Environmental Management Act: Air Quality Act No. 39 of 2004,* the *National Environmental Management Act: Waste Act No. 59 of 2008* and the *National Environmental Management Act: Biodiversity Act No. 10 of 2004.*
[234] *Income Tax Act No. 58 of 1962*.
[235] Section 12 B and 12 D *Income Tax Act*.
[236] Section 12 B *Income Tax Act*.
[237] Section 12 D *Income Tax Act*.

work together in order to promote the development of renewables in the country. On the other hand this fragmentation of South Africa's legal framework can be seen as a shortcoming, as the application of different laws and the linked competence of different departments lead inevitably to delays in decisions and project developments as well as to conflicting objectives and opinions. In the future one should aim at providing a coherent overarching renewable energy framework, which embraces the different sectors that are affected by renewable energies.

3.4 South Africa's Renewable Energy Feed-In Tariff (REFIT)

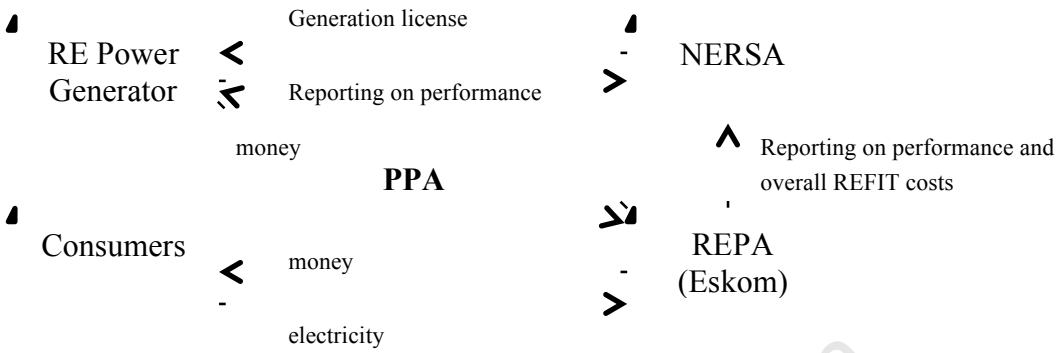
In 2003, the *White Paper on Renewable Energy* was published and set a target of 10.000 GWh of renewable energy to contribute to the total energy consumption by 2013, which accounts for about 4 % renewable energy generation.[238] In order to achieve this target, in March 2009, the national energy regulator NERSA announced the long-awaited *Renewable Energy Feed-in Tariff (REFIT) Regulatory Guidelines (REFIT Regulatory Guidelines)* as a national support scheme for renewable energies.[239]

NERSA aimed at establishing a FIT that covers the cost of generation plus a 'reasonable profit' to stimulate developers to invest in renewable energy technologies.[240] The South African REFIT scheme determined the price for generated renewable energy produced by registered renewable energy independent power producers (IPPs) which was to be paid by the Eskom Single Buyer Office, which was to be appointed by NERSA as the Renewable Energy Purchasing Agency (REPA) in line with the *Electricity Regulation Act* 2006. The independent power producers under REFIT would have required a generation licence. This Licence was to be issued by NERSA under the *Electricity Regulation Act* 2006. Between the IPPs and Eskom, functioning as the REPA, a power purchase agreement (PPA) was to be signed about the purchase and sale of renewable electricity. Eskom would have been subject to a power purchase obligation for projects licensed by NERSA, dependent

[238] Odeku et al. 2011(11/2) *Sustainable Development Law & Policy* 45.
[239] NERSA *Africa Renewable Energy Feed-in Tariff (REFIT), Regulatory Guidelines* (2009); Odeku et al. 2011(11/2) *Sustainable Development Law & Policy* 45.
[240] NERSA*South Africa Renewable Energy Feed-in Tariff (REFIT), Draft Guidelines* (2008) 1.

on the fulfilment of all necessary license conditions. The financial burden for the fixed tariffs would have been imposed on all Eskom electricity customers. [241]

Figure 1: REFIT Structure and Process Outline



Source: National Energy Regulator of South Africa (NERSA) *South Africa Renewable Energy Feed-in Tariff (REFIT), Regulatory Guidelines* (26 March 2009) Appendix 2.6.

NERSA aimed at providing different tariffs for the different technologies and tariffs, which were to be set on a level that provided a reasonable return to ensure investment into the specific technologies. The tariffs should have been certain and for a long enough period of time to allow project financing development decisions for specific investments into renewable energies.[242]

Thus the REFIT scheme provided a basic structure and set proposed tariffs for four renewable energy technologies: Landfill gas; Small hydro; Wind and Concentrated Solar Power Trough with six hours of storage. In the beginning when NERSA planned the first tariff schedule for the years 2008-2013, the tariff rates were to be rather low.[243]

Table 1: Tariff schedule 2008-2013 in ZAR c/kWh

	2008	2009	2010	2011	2012	2013	Annual Rate Degression (%)
Wind	65,48	63,87	62,31	60,78	59,29	57,84	2,45
Small hydro	73,76	73,34	72,92	72,51	72,10	71,69	0,57
Landfill gas	43,21	42,71	42,21	41,72	41,23	40,75	1,16
Solar power	60,64	60,03	59,43	58,84	58,25	57,67	1,00

[241] NERSA *REFIT Regulatory Guidelines* (2009) para 4.
[242] NERSA *REFIT Regulatory Guidelines* (2009) para 1.
[243] Pegels *Prospects for Renewable Energy in South Africa* 17.

Source: NERSA 'consultation paper: Renewable Energy Feed-In Tariff' *http://www.nersa.org.za/Admin/Document/Editor/file/NERSA%20REFIT%20%20consultation%20paper%2002%20Dec%202008.pdf* (2008) 8.

Besides, the tariffs were to be subject to an annual degression. The planned rates were to be guaranteed for 15 years.[244]

If one considers initial calculations according to which renewable energy investments are considered to take a time period of about 25 to 30 years,[245] the scheduled tariff duration of 15 years can be considered to be too short. The short period of time and the low tariff rates led to project developers not seeing any chance for profitable projects on the basis of the low rates, so that NERSA decided to raise the rates considerably.[246]

Finally in March 2009, NERSA announced the revised REFIT programme within the *REFIT Regulatory Guidelines*. In these guidelines the first REFIT phase included the same four technologies as mentioned above with the following increased tariff rates:

Table 2: Tariff schedule 2009 in ZAR R/kWh (REFIT Phase 1)

Technology	**REFIT**
Wind	1,25
Small hydro	0,94
Landfill gas	0,90
Solar power	2,10

Source: NERSA *REFIT Guidelines* (2009) para 7.

The tariffs were to be guaranteed for 20 years without any degression. According to the guidelines, the tariffs would have been reviewed every year for the first five-year period of implementation and every three years thereafter so that an adjustment of tariffs to the specific market development would have been possible.[247]

[244] NERSA *Consultation paper: Renewable Energy Feed-In Tariff* (2008) 8.
[245] Pegels *Prospects for Renewable Energy in South Africa* 17-18.
[246] NERSA *REFIT Regulatory Guidelines* (2009).
[247] NERSA *REFIT Regulatory Guidelines* (2009) para 7.5.

After the implementation of the *REFIT Regulatory Guidelines*, NERSA issued a consultation paper for the second REFIT phase in July 2009[248] and requested comments from stakeholders and the public concluding in a public hearing on the 3rd of September 2009 on REFIT Phase 2.[249] This new approach added further renewable energy technologies to the REFIT mechanism such as Solar PV, Biomass, Concentrated Solar Power Trough without storage and Concentrated Solar Power Tower with six hours of storage.[250] For these new technologies NERSA defined the following tariff rates:

Table 3: Tariff schedule 2009 in ZAR R/kWh (REFIT Phase 2)	
Technology	**REFIT**
Concentrated Solar Power (CSP) trough without storage	3,14
Large scale grid connected PV systems (≥ 1 MW)	3,94
Biomass solid	1,18
Biogas	0,96
CSP Tower with storage of 6 hours per day	2,31
Source: National Energy Regulator of South Africa (NERSA) 'Renewable Energy Feed-In Tariffs Phase II'*http://geosun.co.za/wp-content/uploads/2012/07/REFIT-II-Oct-2009.pdf* (29 October 2009).	

The defined tariff rates were well received by investors and environmental organisations when introduced by NERSA.[251]But NERSA not only defined detailed tariff rates and a basic structure, but also precise rules on selection criteria for renewable energy projects under the REFIT programme in line with the *Electricity Regulation Act No.4 of 2006*.[252]Relating to these defined regulatory rules, the IPP had, amongst others, to prefer a plant location and technology that contributed to local economic development, to comply with legislation in terms of the advancement of historically disadvantaged individuals[253] and to prefer small distributed over centralised generators.[254]

[248] NERSA *Consultation Paper: Renewable Energy Feed-In Tariff Phase 2* (2009).
[249] NERSA *Renewable Energy Feed-In Tariffs Phase II* (2009) 3.
[250] NERSA *Renewable Energy Feed-In Tariffs Phase II* (2009) 1.
[251] Pegels *Prospects for Renewable Energy in South Africa* 18.
[252] NERSA *Rules on Selection Criteria for Renewable Energy Projects under the REFIT Programme* (2010).
[253] *No 53 of 2003: Broad-Based Black Economic Empowerment Act, 2003*.
[254] NERSA *Rules on Selection Criteria for Renewable Energy Projects under the REFIT Programme* 3.

Such selection criteria, in particular the 'advancement of historically disadvantaged individuals' in terms of the *Broad-Based Black Economic Empowerment Act* of 2003[255] was exceptional for feed-in tariff regulations.[256] Reason for this provision was to be found in the historical development of the country and to remedy the inequality caused by the apartheid era and to distribute wealth across a broad spectrum of the South African society.[257]

The preference of a plant location that contributed to local economic development illustrated the overarching objective of the REFIT programme to support the socio-economic development. In this context the impact on deployment and local development ought to be assessed.[258]

In March 2011 NERSA proposed again new tariffs in a consultation paper in which the 2009 feed-in tariffs were reviewed.[259] The paper proposed a substantial decrease of the REFIT rates compared with those of 2009.[260] The new proposed tariffs had been between 10,1 and 41,3 per cent lower compared with the rates approved and promulgated in 2009.[261] Reason for this cut of tariffs had been, referring to NERSA, an annual economic review of financial parameter such as costs of debts or the inflation rate, which would have had shown that renewable energy power generation in 2011 was cheaper than the years before.[262]

However, the substantial tariff decreases within the short period of about one and a half years[263] caused surprise and reservation in the industry and in particularly among renewable energy developers.[264]

[255] *Broad-Based Black Economic Empowerment Act* No. 53 of 2003.
[256] NERSA *Rules on Selection Criteria for Renewable Energy Projects under the REFIT Programme* 13.
[257] Renewable Energy Ventures Ltd 'Powering Africa through feed-in tariffs, Advancing Renewable Energy to meet the continent's electricity needs'(February 2013) 57 *http://www.worldfuturecouncil.org/fileadmin/user_upload/PDF/Feed_in_Tariff/Powering_Africa_through_Feed-in_Tariffs.pdf* (accessed 10.05.2013).
[258] NERSA *Rules on Selection Criteria for Renewable Energy Projects under the REFIT Programme* 13.
[259] NERSA) *Consultation Paper: Review of Renewable Energy Feed-In Tariffs* (March 2011).
[260] Creamer 'Nersa moves to cut Refit tariffs just as SA promises to boost renewables' in Engineering News Online (22.03.2011) *http://www.engineeringnews.co.za/print-version/nersa-moves-to-cut-refit-tariffs-just-as-sa-promises-to-boost-renewables-2011-03-22* (accessed 15.05.2013).
[261] NERSA *Consultation Paper: Review of Renewable Energy Feed-In Tariffs* 25.
[262] NERSA *Consultation Paper: Review of Renewable Energy Feed-In Tariffs* 22-23
[263] October 2009 (REFIT II Phase to March 2011).

3.5 South Africa's Bidding on Price Mechanism (REBID)

On 3 August 2011, in line with the *Integrated Resource Plan (IRP),* the Department of Energy released a *Request for Qualification and Proposals (RFP) for new generation capacity under the Renewable Energy Independent Power Producers Procurement Programme (REIPPP)*, a policy in favour of a bidding on price mechanism.[265]

The *RFP* aims to procure 3725 megawatts renewable energy from independent power producers by 2016 and to contribute towards environmentally and socio-economic sustainable growth, job creation and the stimulation of the renewable energy industry in South Africa.[266] The *RFP* thus implies the formal invitation to bidders to submit their detailed bid responses for the supply of renewable energy to the buyer. The *RFP* already specifies two different programmes, namely the *IPP Procurement Programme* which shall procure 3625 megawatts renewable energy and the *Small Projects IPP Procurement Programme* procuring 100 megawatts. The *IPP Procurement Programme* has to have a minimum installed capacity of 1 megawatt and a maximum installed capacity per specific renewable energy technology.[267] The *Small Projects IPP Procurement Programme* on the other hand must have a minimum installed capacity of 1 megawatt and a maximum installed capacity of 5 megawatts. Reason for this separation is the governmental intention to give smaller project developers the chance to participate in the programme by providing a simpler designed programme for them with less requirements and a cheaper participation opportunity.[268] However until now, the *Small Projects IPP Procurement Programme* is still not fully implemented. Even if the Department of Energy already has released several documents referring the process and

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[264] Creamer 'Wind developers slam Nersa move to slash Refit rates' in Engineering News Online (23.03.2011) *http://www.engineeringnews.co.za/article/wind-developers-slam-nersa-move-to-slash-refit-rates-2011-03-23* (accessed 15.05.2013).
[265] DoE *Request for Qualification and Proposals (RFP) for new generation capacity under the Renewable Energy Independent Power Producers Procurement Programme (REIPPP)* 2011.
[266] DoE 'Fact sheet for the media briefing session on 31 August 2011 re the Renewable Energy Independent Power Producer (IPP) Programme' (2011) 1, *http://www.info.gov.za/speeches/docs/2011/reippp.pdf* (accessed 15.05.2013).
[267] On-shore wind 140 MW, concentrated solar power 100 MW, solar photovoltaic 75 MW, biomass 10 MW, biogas 10 MW, landfill gas 10 MW and small hydro 10 MW: DoE *Fact sheet REIPPP* 2.
[268] DoE *Fact sheet REIPPP* 2.

participation conditions[269], the final implementation of the refined programme is expected in October 2013.[270]Similar to the *IPP Procurement Programme*, the *Small Projects IPP Procurement Programme* will also contract new renewable energy generation capacity each year until 2020.[271]

The *RFP* qualifies a number of technologies that can be selected under the scheme and also defines the specific renewable energy allocations per technology as follows:

Table 4: RFP renewable energy allocations per technology

Technology	**Megawatt**
Onshore wind	1850 MW
Concentrated solar power	200 MW
Solar photovoltaic	1450 MW
Biomass	12,5 MW
Biogas	12,5 MW
Landfill gas	25 MW
Small hydro (≤ 10 MW)	75 MW
Small projects utilising any onshore wind, solar photovoltaic, biomass or biogas technologies which have a maximum installed capacity of 5 MW	100 MW

Source: Department of Energy (DoE) *Request for Qualification and Proposals for New Generation Capacity under the IPP Procurement Programme*, 3 August 2011.

The *RFP* sets out the terms and procedures for renewable energy procurement: Bidders are required to define the price for renewable energy to be paid by the buyer. The offered price has to be within the applicable tariff determined in the procurement documentation. The structure of the programme is designed on the basis of five bid submission phases in order to allow potential project developers to adapt

[269] DoE *Request for Information and Comments on the Request for Qualification and Proposals for New Generation Capacity under the Small Projects IPP Procurement Programme: Issued to Interested Parties and Potential developers of Energy Projects: Small Projects Renewable Energy IPP Procurement Process* (2012); DoE *Request for Qualification and Proposals for new Generation Capacity under the Small Projects IPP Procurement Programme* (14.06.2012).
[270] Afribiz 'South Africa's Energy Sector Small Independent Power Producers Program comes online this year' (11.05.2013) *http://www.afribiz.info/content/south-africas-energy-sector-small-independent-power-producers-program-comes-online-this-year* (accessed 15.05.2013).
[271] DoE *Small Projects IPP Procurement Programme* (14.06.2012).

to the current market and to participate in different bidding windows.[272] Until now, two bidding rounds are already completed, the third final bid submission date is the 19 August 2013.[273] However that was not the initial time schedule. In 2011 the Department of Energy planned to finish the fifth bidding round already on 13 August 2013.[274]

To be considered in the bidding procedure, bidders have to comply with a number of technical requirements defined in several schedules and appendices within the *RFP*.[275] Apart from that, the prices offered in the bidding rounds by potential project developers are scored and ranked relating to every specific technology and in accordance with the *Economic Development Policy (EDP).* This policy is concerned with topics such as job creation, socio-economic development, local content through for instance increased local manufacturing and BBBEE requirements such as the participation of historically disadvantaged citizens in enterprise developments.[276] Within the evaluation of qualifying bids, the price accounts for 70 per cent and the economic development requirements for 30 per cent of the final score.[277] The chosen bidders finally enter into an Implementation Agreement with the Department of Energy as well as into a Power Purchase Agreement and Connections Agreement with the municipal distributor, generally Eskom.[278] Once a project developer is appointed preferred bidder, he needs a generation licence from NERSA under the *Electricity Regulation Act* in order to operate the renewable energy generation facility in compliance with the law.[279]

Renewable energy bids under the *RFP* have to be accompanied by a financial bid guarantee when submitting. This guarantee must have the form of a bank guarantee for an amount of ZAR 100 000 (one hundred thousand Rand) per megawatt of

[272] DoE 'Renewable Energy Independent Power Producer Procurement Programme Online Information' *http://www.ipprenewables.co.za/* (accessed 15.05.2013).
[273] DoE 'REIPP Programme Online Information' *http://www.ipprenewables.co.za/* (accessed 15.05.2013).
[274] Norton Rose Fulbright 'South Africa Renewable Energy IPP Request for Proposals' August 2011 *http://www.nortonrosefulbright.com/knowledge/publications/54959/south-africa-renewable-energy-ipp-request-for-proposals* (accessed 20.05.2013).
[275] DoE 'REIPP Programme Online Information' *http://www.ipprenewables.co.za/* (accessed 15.05.2013).
[276] Tait *The potential for local community benefits from wind farms in South Africa* (2012) 26-35.
[277] Tait (2012) 26-35.
[278] Tait (2012) 26-35.
[279] DoE 'REIPP Programme Online Information' *http://www.ipprenewables.co.za/* (accessed 15.05.2013).

installed capacity for the proposed renewable energy project. Apart from that each prospective bidder has to pay a non-refundable fee of ZAR 15 000 (fifteen thousand Rand) prior to accessing the *RFP*. Besides every bidder has to complete a registration form which is available online. Without completing this registration form and paying the required fee the Department of Energy shall not communicate with the potential bidders.[280]

In the first bidding phase investors showed great interest in the bidding procedure. The Department of Energy received 53 bids that fulfilled the technical and economical requirements.[281] 28 were finally admitted to the scheme. In the second window 79 bids were received, of which 51 met the qualification criteria and of which 19 were finally selected as preferred bidders.[282] However, in total the Department of Energy actually received 270 requests for tender documentation in the first bidding window and 180 applications in the second window.[283] The first two bidding phases already allocated 2460 megawatt of renewable energy. That means that referring to the initial *RFP* from August 2011, there would remain approximately 1185 megawatt to be contracted in the third round. However on 29 October 2012, the Department of Energy announced that it is planned to procure a further 3200 megawatt of renewable energy capacity between the years 2017 and 2020, in addition to the 3725 megawatt procuring until 2016.[284]That means that for the remaining 3 bidding windows a further capacity of 4385 megawatt can be procured.

Chapter 4: Germany's experimentation with REFIT

Germany is the largest economy in Europe (without Russia), Europe's largest energy consumer and the seventh largest in the world. Besides Germany is the sixth largest carbon dioxide emitter worldwide.[285] On the international level under the Kyoto

[280] Tait (2012) 26-35.
[281] Becker & Fischer *Promoting Renewable Electricity Generation in Emerging Economies* (2012)14.
[282] NERSA 'Public hearings: NERSA approves 19 licenses for window2 of the REIPP Procurement Programme' (VII/I) 2013 *Official Newsletter of the National Energy Regulator of South Africa* 10.
[283] Smit 2013 *Energize RE: Renewable Energy Supplement* 38.
[284] DoE 'Request for Proposals for the Independent Power Producer Programme, Window 1 Financial Close: Fact Sheet' (29.10.2012) *http://www.energy.gov.za/IPP/Fact%20sheet%20-%20on%20IPP%20Announcement%20-%2029Oct2012.pdf* (accessed 20.05.2013).
[285]EIA Data of 2009 'World carbon dioxide missions data by country' *http://www.guardian.co.uk/news/datablog/2011/jan/31/world-carbon-dioxide-emissions-country-data-co2#data* (accessed 10.05.2013).

Protocol of 1997, the European Union with its 15 member states at the time, made a binding commitment of an 8 per cent reduction compared with 1990 levels, shared among the individual countries. For Germany a reduction of 21 per cent till the end of the first commitment period from 2008 to 2012 was determined.[286] Germany clearly exceeded these targets. By the end of 2010 the country's greenhouse gas emissions had already been reduced by almost 25 % under 1990 levels.[287] In comparison to that, the global total emissions of industrialised countries, which have signed the Kyoto Protocol, only have been reduced by 6,1 per cent between 2008 and 2012 and worldwide emissions rise every year.[288] Germany's further objectives in climate policy are a 40 per cent reduction of greenhouse gas emissions by 2020 under the 20-20-20 framework of the European Union.[289] One measure to meet these targets is the successful use of renewable energies as energy source in Germany. Reason for this success is mainly Germany's policy and legal framework relating to renewable energy generation, in particular its very successful feed-in tariff under its *Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz – EEG)*.[290] Apart from that one also has to consider European policies and law. However, the full consideration of these laws falls outside the scope of this dissertation, as mainly the REFIT and REBID systems are critically reviewed. Thus in the following section provides only a short overview of Germany's energy generation sector and its policy and legal framework relating to renewable energy generation.

[286] Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit – BMU) ‚Kyoto Protocol' *http://www.bmu.de/en/topics/climate-energy/climate/international-climate-policy/kyoto-protocol/* (accessed 09.06.2013).
[287] Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit – BMU) ‚Kyoto Protocol' *http://www.bmu.de/en/topics/climate-energy/climate/international-climate-policy/kyoto-protocol/* (accessed 09.06.2013).
[288] Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit – BMU) ‚Kyoto Protocol' *http://www.bmu.de/en/topics/climate-energy/climate/international-climate-policy/kyoto-protocol/* (accessed 09.06.2013).
[289] BMU 'Klimaagenda 2020: Der Umbau der Industriegesellschaft' *http://www.bmu.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/hintergrund_klimaagenda.pdf* (accessed 09.06.2013).
[290] Act on granting priority to renewable energy sources (Renewable Energy Sources Act) – Gesetz für den Vorrang Erneuerbarer Energien (Erneuerbare-Energien-Gesetz – EEG) *http://www.erneuerbare-energien.de/fileadmin/Daten_EE/Dokumente__PDFs_/eeg_2013_bf.pdf.*

4.1 Overview of Germany's energy generation sector

As a large energy consumer, Germany still relies heavily on imports in order to meet the majority of its national energy demand.[291] Thus 70 per cent of Germany's energy demand is covered by imports. Nevertheless Germany is known for its diverse energy mix as Germany's electricity generation is based on a number of different energy sources. The electricity generation in 2012 for example accounted for 618 TWh.[292] 45 per cent of this amount came from coal, 16 per cent from nuclear energy, 11 per cent from gas, 6 per cent from other energy sources and 22 per cent from renewable energies.[293]

Germany is one of the largest refiners of crude oil worldwide and exports most of it into other countries. On the other hand Germany has no liquefied natural gas terminals, which makes it necessary to import gas, mainly from Russia, Norway and the Netherlands.[294] In 2011, Germany was the sixth largest nuclear energy generator worldwide and in the past, the country was an important exporter of nuclear technology. However in March 2011, following the Fukushima accident, the German government under Angela Merkel closed eight reactors in 2011 and decided further to close German's nine remaining nuclear reactors before the year 2022.[295]

Although Germany had huge coal reserves, in particular in its western part, the role of coal in the country's energy mix has been decreasing steadily in the last decades. Since 2011 however, after the Fukushima accident, the use of coal has increased again since it is needed as a substitute for nuclear power in Germany's electricity generation mix. Thus in 2011, Germany was still the world's eight largest producer of coal.[296]

Germany is known for its successful renewable energy implementation and the country is worldwide leading in a number of categories of renewable energy use. In 2011 Germany was Europe's largest producer of non-hydro renewable electricity,

[291] EIA 'Country Analysis Note: Germany' (Last Update March 2013) *http://www.eia.gov/countries/country-data.cfm?fips=GM* (accessed 10.05.2013).
[292] TWh=Terawatt hour = 1 Milliard KWh.
[293] Renewable Energy contains of 4,5 % solar energy, 3,4 % hydro power, 6,6 % biomass and 7,4 % wind energy, BMU 'AG Energy balances (Energiebilanzen)' (3/2013) *http://www.unendlich-viel-energie.de/uploads/media/AEE_Strommix_Deutschland_2012_mrz13.pdf* (accessed 10.06.2013).
[294] EIA *Country Analysis Note: Germany*.
[295] EIA *Country Analysis Note: Germany*.
[296] EIA *Country Analysis Note: Germany*.

biofuels, in particular biodiesel and wind energy. Apart from that, Germany was the largest global solar electricity producer.[297] There was a fast development within Germany's renewable energy market, if one considers that in 1990, the year before implementing the *Renewable Energy Sources Act*, only 3,1 per cent of the total electricity generation was from renewables, whereas in 2012 already 22,9 per cent came from renewable energy sources.[298]

Main reason for such a successful renewable energy deployment is not the natural good conditions of Germany's renewable energy opportunities, but rather a successful policy and legal framework, designed to support the renewable energy implementation in the country.

4.2 Overview of Germany's policy framework relating to renewable energy generation

The generation of renewable energies became more and more important over the last decade. That's why Germany has managed to establish an own renewable energy field in its national policy. Within this field, policies deal with renewable energies in the context of climate change as well as in the context of energy supply security and a sustainable development of the country. However, similar to South Africa one also finds renewable energy relating policies in other policy areas such as environmental and fiscal policies. The following section aims at specifying and discussing the most important policies in the context of renewable energies.

4.2.1 Energy policies

In 1974 the Federal Ministry of Education and Research began with the promotion of wind energy due to the so-called 'Large-scale wind plant project'. Even if the project failed, it was the beginning of a new policy era.[299] Since the introduction of the *Electricity Feed-In-Law*, renewable energies have become integral part of Germany's Energy policy.

[297] EIA *Country Analysis Note: Germany*.
[298] BMU 'Development of electricity generation from Renewable Energies 1990-2012' (2/2013) *http://www.unendlich-viel-energie.de/uploads/media/AEE_Entwicklung_EE-Stromerzeugung_1990-2012_Feb13_01.pdf* (accessed 10.05.2013).
[299] Große-Windenergie-Anlage Project (GROWIAN) – Large-scale wind plant project, Bechberger & Reiche 2004 (VIII/1) *Energy for Sustainable Development* 49.

4.2.1.1 Integrated Energy and Climate Programme

In August 2007, the German Government adopted the *Integrated Energy and Climate Programme*, which has been implemented into law in two packages, the first in December 2007 and the second in June 2008.[300] *The Integrated Energy and Climate Programme* aims at doubling previous climate protection efforts. As in 2007, Germany had already achieved an 18 per cent greenhouse gas emission reduction compared to 1990 levels, it seeks to achieve a 36 per cent reduction or even more until 2020.[301] Apart from that, the policy aims at promoting Germany as an industrial and investment location. In this context renewable energies are seen as an opportunity to reduce Germany's dependence on energy imports, which referring to the *Integrated Energy and Climate Programme*, contributes to an improvement in industrial and economic development of the country.[302] Apart from these general objectives the policy contains a number of significant amendments to the German renewable energy market. On the one hand an amendment of the *Renewable Energy Sources Act* is discussed in order to increase the share of renewables in the national energy sector from 13 per cent (2007) to 25-30 per cent in 2020. On the other hand the policy aims at implementing the *Renewable Energies Heat Act*[303] in order to use renewable energies in the heat sector.[304] Finally the programme gives a signal for the Climate Change Conference in Bali in the same year, by emphasising the need of an increased development of renewable energies worldwide. A global transformation would be necessary to tackle climate change challenges.[305] With this policy programme Germany demonstrates that climate protection can be implemented in a number of different sectors in a viable way.[306]

[300] Integrated Energy and Climate Programme – official translation of 'Integriertes Energie- und Klimaprogramm' (23.08.2007) *http://www.bmu.de/fileadmin/bmu-import/files/english/pdf/application/pdf/hintergrund_meseberg_en.pdf* (accessed 05.05.2013).
[301] *Integrated Energy and Climate Programme* 1;8.
[302] *Integrated Energy and Climate Programme* 2.
[303] *Renewable Energies Heat Act* (Erneuerbare-Energien-Wärmegesetz – EEWärmeG) 2008.
[304] *Integrated Energy and Climate Programme* 4.
[305] *Integrated Energy and Climate Programme* 13.
[306] *Integrated Energy and Climate Programme* 14.

4.2.1.2 Energy Concept 2050: Energy Concept for an Environmentally Sound, Reliable and Affordable Energy Supply

In September 2010 the German Government released its *Energy Concept 2050*, which includes the national energy policy until 2050.[307] The policy paper contains nine key elements, of which the first one deals with renewable energies as a cornerstone of future energy supply (Section A). General goal of the *Energy Concept 2050* is to secure a reliable, economically viable and environmentally sound energy supply. For achieving this objective, Germany has to become, referring to the *Energy Concept 2050*, one of the most energy-efficient and greenest economies worldwide while on the same time the country has to aim for ensuring a high energy security, effective and environmental climate protection and competitive energy prices.[308] This is the first German policy aiming at providing a long-term overall strategy for the period up to 2050.[309] Renewable energy generation as the key element of the *Energy Concept 2050* is described in detail, for instance approaches for a cost-efficient expansion of renewable, an expansion of wind farming and a sustainable and efficient use of bioenergy.[310] This policy roadmap for 40 years demonstrates that Germany aims at ensuring an economically and environmentally friendly energy supply for present and future generations. Such long-term plan affects a number of different measures and a number of policy areas, which are in close connection to each other. It has been a large step for Germany towards an energy policy paper, which aims at considering these different policy areas in a single energy concept until the year 2050.

4.2.1.3 Germany's Energy Transformation ('Energiewende')

On the basis of the *Energy Concept 2050*, the German government adopted an extensive package of legislation in June 2011 in order to initiate the so-called '*Energiewende'*. There is no proper translation of the term *'Energiewende'*, but it often is translated as 'Energy Revolution', 'Energy turnaround' or 'Energy

[307] Energy Concept for an Environmentally Sound Reliable and Affordable Energy Supply – official translation of 'Energiekonzept für eine umweltschonende, zuverlässige und bezahlbare Energieversorgung'(28.09.2010) *http://www.bmu.de/fileadmin/bmu-import/files/english/pdf/application/pdf/energiekonzept_bundesregierung_en.pdf* (accessed 15.05.2013).
[308] *Energy Concept* 3.
[309] *Energy Concept* 3.
[310] *Energy Concept* 7-10.

transformation'.[311] The word *'Energiewende'* has even made it into the English language, as the policy shift in Germany had been a novelty in international energy policy.[312] The notion describes the shift towards an era of renewable energies and energy efficiency in Germany by restructuring the whole energy system. The German Government considers this restructuring to be a fundamental and ethic decision for the country.[313] This decision is combined with a corresponding package of measures entitled *'The path to the energy of the future – reliable, affordable and environmentally sound'*.[314] Key element of this package is the establishment of an electricity market in which renewable energies are primarily used. Therefore, a number of policy and legal measures had to be implemented on the basis of this restructuring policy, such as an important amendment to the *Renewable Energy Sources Act* to guarantee a cost-efficient expansion of renewables, an increase of competition through market transparency, a compensation for energy-intensive companies and a funding mechanism for renewable energy developers.[315] These measures are only an extract, as the policy package contains a large amount of policy and legal changes. Some important ones, such as the amendment of the *Renewable Energy Sources Act* will be discussed in detail in the next section within Germany's legal framework. But even the short overview shows that this policy programme was a major step in the renewable energy development of the country.[316] This policy approach intensified Germany's leading position in the global renewable energy development, as no other country in the world decided for such a radical policy shift in the context of climate change and renewable energy implementation, yet.[317]

[311] Graupner 'What exactly is Germany's "Energiewende"?'DW Topstories (2013) *http://www.dw.de/what-exactly-is-germanys-energiewende/a-16540762* (accessed 15.06.2013).
[312] Graupner 'What exactly is Germany's "Energiewende"?'.
[313] BMU 'General Information: transformation of our energy system' 2011 *http://www.bmu.de/en/topics/climate-energy/transformation-of-the-energy-system/general-information/* (accessed 20.05.2013).
[314] The path to the energy of the future – reliable, affordable and environmentally sound - Official translation of 'Der Weg zur Energie der Zukunft – sicher, bezahlbar und umweltfreundlich' (06.06.2011) *http://www.bmu.de/en/topics/climate-energy/transformation-of-the-energy-system/resolutions-and-measures/the-path-to-the-energy-of-the-future-reliable-affordable-and-environmentally-sound/* (accessed 09.05.2013).
[315] Energy Transformation *http://www.bmu.de/en/topics/climate-energy/transformation-of-the-energy-system/resolutions-and-measures/the-path-to-the-energy-of-the-future-reliable-affordable-and-environmentally-sound/* (accessed 09.05.2013).
[316] Financial Times Germany 'Die Welt lernt aus Deutschlands Atomausstieg' (18.10.2012) *http://www.ftd.de/politik/international/:energiewende-die-welt-lernt-aus-deutschlands-atomausstieg/70106128.html* (accessed 18.05.2013).
[317]

4.2.2 Environmental policies

Environmental policies deal with topics such as climate change and greenhouse gas emission reduction since the beginnings of the eighties.[318] When Germany signed the *UNFCCC* in 1992 and the *Kyoto Protocol* in 1997,

With the signing of the UNFCCC in 1992 and the Kyoto Protocol in 1997, the country committed to mitigate greenhouse gases and to promote its renewable energy generation. In this context, Germany released a number of environmental policies, aiming at implementing international commitments into national policy.

4.2.2.1 National Climate Protection Programme

The German Government implemented a *National Climate Protection Programme* in the years 2000 and 2005.[319] Main objective of the two policy papers is an emission reduction. In the 2000 policy a carbon dioxide emission reduction of 25 per cent compared to 1990 levels within the years 2000 to 2005 was aimed at. Besides the policy aims at a total emission reduction of the six emissions defined in the *Kyoto Protocol* of 21 per cent in accordance with the commitments made in the *Kyoto Protocol*.[320] However these objectives of emission reduction within Germany's climate change initiative was nothing new. An innovation in the *National Climate Protection Programme* is however the mention of clear measures within the energy sector to achieve the emission reduction objectives. Thus the Government set the high target of doubling the amount of renewable energies until 2010 and a further, but not yet determined increase of renewable energy share after the year 2010.[321]

In 2005, the second *National Climate Protection Programme* was released. This policy programme is based on the 2000 paper and gives an overview of the measures and combined emission reduction in the years 2000 to 2005 in order to define a

[318] Deutsche physikalische Gesellschaft 'Klimaschutz und Energieversorgung in Deutschland 1990-2020' (2005) 1-5 *https://www.dpg-physik.de/dpg/gliederung/ak/ake/studien/energiestudie.pdf* (accessed 15.07.2013).
[319] National Climate Protection Programme – own translation of the ‚Nationales Klimaschutzprogramm' (18.10.2000 and 01.06.2005) *http://www.bmu.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/klimaschutzprogramm2000.pdf; http://www.bmu.de/fileadmin/bmu-import/files/klimaschutz/downloads/application/pdf/klimaschutzprogramm_2005_lang.pdf* (accessed (05.05.2013).
[320] National *Climate Protection Programme 2000* II.
[321] National *Climate Protection Programme 2000* II.

successful programme for the emission reduction until 2012, the end of the first commitment period under the Kyoto Protocol. In particular, the 2005 policy illustrates the increase of renewable energy share in the years 2000 to 2005, which is attributed to the fact that previous policies and the legal implementation of the *Renewable Energy Sources Act* have been very successful.[322] To improve the renewable energy deployment in Germany the policy also states that an international cooperation with other countries will be aimed at in order to improve technologies and to reduce costs.[323]

4.2.2.2 National Sustainable Development Strategy

Another environmental policy, which considers renewable energies as a key factor in the national environmental policy future, is the *National Sustainable Development Strategy (Sustainability Strategy)*, which was published for the first time in 2002 and was newly released regularly until now.[324] In 2002 the *Sustainability Strategy* was presented by the German Government at the World Summit on Sustainable Development in Johannesburg and has been continuously updated, most recently in the *2012 Progress Report*.[325] The strategy shows the importance of sustainable development in Germany's policy, combined with the importance of national energy policy. In this context, one key element of the national future energy supply is the continued rapid expansion of renewable energies. Important is therefore to establish an electricity market that is increasingly based on renewable energy sources. In this context the *Progress Report of 2012* presents the energy package of 2011, which contains inter alia important amendments of the *Renewable Energy Sources Act*. This approach shows the close connection the German Government sees between general sustainable development policies and the further development of the national renewable energy market.

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[322] *National Climate Protection Programme 2005*.
[323] *National Climate Protection Programme 2005*.
[324] National Sustainable Development Strategy – official translation of 'Nationale Nachhaltigkeitsstrategie "Perspektiven für Deutschland" (17.04.2002, last amended 2012) *http://www.bundesregierung.de/Content/DE/_Anlagen/Nachhaltigkeit-wiederhergestellt/2012-06-07-fortschrittsbericht-2012-englisch-barrierefrei.pdf?__blob=publicationFile&v=3* (accessed 10.06.2012).
[325] National Sustainable Development Strategy – official translation of 'Nationale Nachhaltigkeitsstrategie "Perspektiven für Deutschland" (17.04.2002, last amended 2012) *http://www.bundesregierung.de/Content/DE/_Anlagen/Nachhaltigkeit-wiederhergestellt/2012-06-07-fortschrittsbericht-2012-englisch-barrierefrei.pdf?__blob=publicationFile&v=3* (accessed 10.06.2012).

4.2.2.3 German Strategy for Adaptation to Climate Change

On 17 December 2008, the German Government adopted a *German Strategy for Adaptation to Climate Change (Adaptation Strategy)*.[326] The policy creates the only German framework concerning adaptation to consequences of climate change. In contrast to many other policies, this policy does not primarily concentrate on mitigation actions but rather on measures to deal with the negative effects of climate change. The *Adaptation Strategy* aims at complementing the *Sustainability Strategy*, in particular in the context of 'climate and energy'. Within this field the deployment of renewable energy is seen as an important factor.[327] Apart from that, climate change consequences shall be regarded in the renewable energy development. As temperature increase will probably lead to less heating but more cooling necessities for example, the energy market has to be adapted to these changes.[328] The *Adaptation Strategy* shows that Germany considers the gravity of the situation in the context of climate change. Hence, renewable energies are not only seen as an opportunity to mitigate climate change but also to establish an energy market to adapt to climate change consequences. This emphasises the significant role renewable energies play already in Germany and the governmental approaches to use them in a number of different areas in the broad context of climate change.

4.2.3 Fiscal policies

As the implementation of renewable energies is always associated with high costs, the German government aimed at stimulating the renewable energy sector by means of fiscal policies.

[326] German Strategy for Adaptation to Climate Change – official translation of 'Deutsche Anpassungsstrategie an den Klimawandel' (17.12.2008) *http://www.bmu.de/fileadmin/bmu-import/files/english/pdf/application/pdf/das_gesamt_en_bf.pdf* (accessed 04.06.2013).
[327] *Climate Change Strategy* 27.
[328] *Climate Change Strategy* 32-33.

4.2.3.1 Electricity Tax Exemption Policy

In 2008 the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety released a policy paper, defining an exemption for renewable energy generated electricity from the *German Electricity Act*.[329]

4.2.3.2 Market Stimulation Programme (1999-2013)

Another fiscal policy aiming at promoting the renewable energy generation in Germany is the *Market Stimulation Programme*, which started in 1999 and still exists.[330]The programme promotes renewable energy projects in the heat sector by using revenue from Germany's Electricity Tax. From such a financial stimulation particularly small and local companies are benefiting.[331]

4.3 Overview of Germany's legal framework relating to renewable energy generation

Similar to German's policy framework one finds also a legal framework specifically established for the promotion of renewable energies. However, comparable to the South African legal framework, there is no single codification of Germany's renewable energy law, rather one can find provisions relating to renewable energies in various statutes.

4.3.1 Energy law

4.3.1.1 Energy Industry Act

Germany's energy regulation is mainly subject to the *Energy Industry Act*, which was released in 1935 for the first time and was published in a new version in 2005. The last amendment was in 2013.[332] The Act mainly deals with the general structure of the national electricity- and gas markets and aims at regulating the liberalisation

[329] BMU 'Verbesserung der Systemintegration der Erneuerbaren Energien im Strombereich'(2008) *http://www.erneuerbare-energien.de/fileadmin/ee-import/files/pdfs/allgemein/application/pdf/systemintegration_ee.pdf* 24-27 (accessed 15.05.2013).
[330] Market Stimulation Programme - own translation of 'Marktanreizprogramm' (1999) *http://www.erneuerbare-energien.de/fileadmin/ee-import/files/pdfs/allgemein/application/pdf/evaluation_map__2006.pdf* (accessed 10.06.2013).
[331] *Market Stimulation Programme* 9-13.
[332] *Energy Industry Act* – Gesetz über die Elekziträts- und Gasversorgung (Energiewirtschaftsgesetz-EnWG) 2005.

and deregulation of Germany's energy market.[333] On 26 June 2013, the *Energy Industry Act* was amended the last time and Germany's policy shift towards the transformation of the energy system ('Energiewende') was introduced. Thus § 1, which contains the purpose of the *Energy Industry Act*, now states that the main objective of the Act is the establishment of a secure, reasonable priced, consumer-friendly, efficient and environmental sustainable grid-bound electricity- and gas supply, which increasingly is based on renewable energy.[334] This is a new approach, as before there was no association between the Act and Germany's renewable energy implementation. This change shows the current importance of renewable energies for the German electricity and gas sector.

4.3.1.2 Renewable Energy Sources Act

The *Renewable Energy Sources Act* came into force in 2001 and is the most important legislation in Germany referring to Renewable Energies.[335] It replaced the previous *Electricity Feed-in Law* of 1991 in response of the deregulation of Germany's electricity market in 1998. Purpose of the Act is the sustainable development of energy supply and the further promotion of technologies for the generation of electricity from renewable energies.[336] To achieve this objective, the Act contains a REFIT mechanism for the stimulation of renewable energy technologies. As the German feed-in model is analysed in detail in the next section, a detailed discussion of the *Renewable Energy Sources Act* is provided there.

4.3.1.3 Combined Heat and Power Act

The *Combined Heat and Power Act* was released in 2002 and was amended for the last time in 2012 referring to the policy towards an energy transformation (*'Energiewende'*).[337] Purpose of the Act is the increase of electricity generated from

[333] Own translation of § 1 of the *Energy Industry Act*.
[334] Own translation of § 1 of the *Energy Industry Act*.
[335] Act on granting priority to renewable energy sources (Renewable Energy Sources Act) – Gesetz für den Vorrang Erneuerbarer Energien (Erneuerbare-Energien-Gesetz – EEG) 2000, last amended 2011 *http://www.erneuerbare-energien.de/fileadmin/Daten_EE/Dokumente__PDFs_/eeg_2013_bf.pdf.*
[336] *Renewable Energy Sources Act* Section 1.
[337] *Combined Heat and Power Act* (Act on the Retention, Modernisation and Extension of Combined Heat and Power) – Gesetz für die Erhaltung, die Modernisierung und den Ausbauer Kraft-Wärme-Kopplung (Kraft-Wärme-Kopplungsgesetz – KWKG) 2002, last amended 2012.

combined heat and power.[338] For this reason, the Act contains a FIT, compared to the *Renewable Energy Sources Act* for combined heat and power sources. The Act aims at a 25 per cent share of combined heat and power in electricity generation until 2020.[339]

4.3.1.4 Renewable Energies Heat Act

The *Renewable Energies Heat Act* came into force in 2009 and stated that owners of new buildings had to cover part of their heat supply with renewable energies.[340] The Act was also amended in 2012. This 2009 obligation was extended to all existing public buildings undergoing major renovations, as the public sector has to fulfil an exemplary role in using renewables for heat and cold to promote climate change mitigation and greenhouse gas emission reduction.[341]

4.3.2 Environmental law

Germany's environmental law not explicitly refers to renewable energy generation. Rather, similar to the South African environmental law it contains a number of requirements referring to permitting and authorisations for renewable energy projects. Requirements are in particular to be found in the *Federal Immission Control Act*[342] together with its *Immission Control Regulations* and the *Federal Water Act*[343].

4.3.3 Fiscal law

Within Germany's fiscal legislations one finds a number of provisions that support the stimulation of renewable energy generation. Thus the *Energy Tax Act*[344] as well as the *Electricity Tax Act*[345] contains tax exemptions for renewable energy developer. Purpose of these exemptions is the promotion of renewable energy projects.

[338] *Combined Heat and Power Act* §1.
[339] *Combined Heat and Power Act* §1.
[340] *Renewable Energies Heat Act* (Act on the Promotion of Renewable Energies in the Heat Sector) – Erneuerbare-Energien-Wärmegesetz (EEWärmeG) 2009, last amended 2012.
[341] *Renewable Energy Heat Act* Article 3-5a; Nast et. al. 2007 (32) *Renewable Energy* 1127-1135.
[342] *Bundesimmissionsschutzgesetz (BImschG)*1974, last amended 2013.
[343] Wasserhaushaltsgesetz (WHG) 2009.
[344] *Energy Tax Act* – Energiesteuergesetz (EnergieStG) 2006, last amended 2008, Article 50.
[345] *Elecricity Tax Act* – Stromsteuergesetz (StromStG) 1999, last amended 2012, Article 9.

4.3.4 Interim finding

The short overview of Germany's policy and legal framework relating to renewable energy generation shows, that the country has established a successful individual renewable energy framework, in its policy as well as in its legislation. This provides a coherent framework for the development of renewable energy projects. Apart from that, environmental and also fiscal law and policy supports the renewable energy implementation by providing specific provisions for renewable energy developers.

4.4 Germany's Renewable Energy Feed-in Tariff (REFIT)

Germany's feed-in tariff was the first feed-in model that was implemented on a national basis. The beginning of this support scheme is to be found in the *Electricity Feed-in Law* of 1991 and is now contained in the *Renewable Energy Sources Act* which entered into force in 2000 and was amended the last time in 2012.

The 1991 *Electricity Feed-in Law* regulated the price and purchase obligation of electricity generated from specified renewable sources such as hydropower, wind energy, landfill gas, solar energy, sewage gas and biomass. The statute contained the obligation for grid companies to purchase renewable electricity and to pay a fixed feed-in tariff to the producers. For wind and solar power, the tariff was set at 90 per cent of the average electricity consumer price. For electricity produced from other sources, the tariff rates were set at lower rates, depending on the output capacity of these sources.

Table 5: Tariff schedule 1991-2000 under the Electricity Feed-in Law in €ct/kWh

	1991	1994	1997	2000
Wind / Solar	8,49	8,66	8,77	8,23
Biomass < 5 MW, Hydro, sewage and landfill gas	7,08	7,21	7,80	7,32
Hydro, sevage and landfill gas 500-5000kW)	6,13	6,25	6,33	5,95

Source: Sijm 'The Performance of Feed-in Tariffs to Promote Renewable Electricity in European Countries' (2002*) ECN-C--02-083*, 7.

The legislation was very successful, in particular in stimulating wind energy generation, and made Germany to the leading country in generating wind energy.[346]

However the *Electricity Feed-in Law* has not been very successful in promoting other renewable energy sources. In 1998, the share of renewable energy sources in the national total electricity consumption was 5,2 per cent. In 1992 the percentage was 4,3 per cent.[347] Thus there hasn't been a significant increase of renewable energies at that time. That was one main reason[348] for the revision of the *Electricity Feed- in Law* into a new Act in 2000: The *Renewable Energy Sources Act*.

The *Renewable Energy Sources Act* entered into force in April 2000. It retained the regulatory FIT for different energy sources and a purchase obligation for grid companies. However the new Act included a number of major amendments.

One change is the determination of tariff rates.[349] The feed-in tariffs are no longer linked to average consumer prices for electricity but rather the prices are based on the generation costs of the different renewable energy sources. Moreover, geothermal and biomass plants up to 20 MW are included in the support scheme. The FITs are guaranteed for a period of 20 years and include an annual tariff rate degression, depending on the size of installation and the source of energy.[350]

The additional costs are shared equally among all grid companies depending on their amount of delivered electricity. These companies are allowed to transfer the costs to the consumer.[351]

[346] Sijm ,*The Performance of Feed-in Tariffs'* 7.
[347] Sijm ,*The Performance of Feed-in Tariffs'* 8-9.
[348] For several other reasons see Sijm ,*The Performance of Feed-in Tariffs'* 8-9.
[349] Haas et al. 2011 (15) *Renewable and Sustainable Energy Reviews* 1019.
[350] Haas et al. 2011 (15) *Renewable and Sustainable Energy Reviews* 1019.
[351] Sijm ,*The Performance of Feed-in Tariffs'* 9-10.

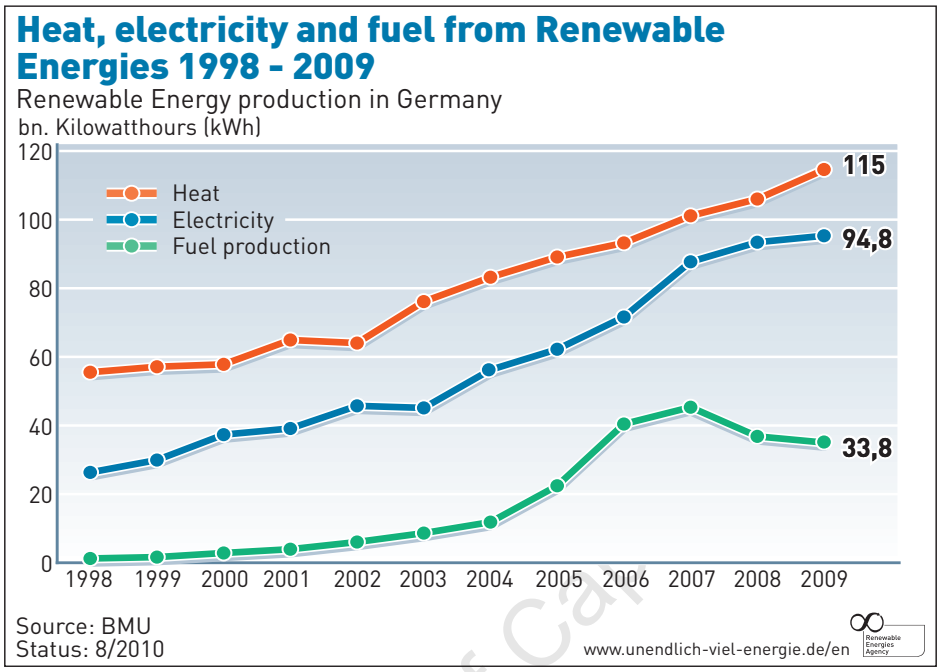
Table 6: Tariff schedule 2000 under the Renewable Energy Sources Act in €ct/kWh					
	0-0,5 MW	**0,5-5 MW**	**5-20MW**	**> 20 MW**	**Annual degression rate in %**
Wind	6,2-9,1[352]	6,2-9,1	6,2-9,1	6,2-9,1	1,5
Biomass	10,2	9,2	8,7	-	1,0
Photo Voltaics	50,6	50,6	-	-	5,0
Geothermal	8,9	8,9	8,9	-	no
Hydro	7,7	6,6	-	-	no
Landfill gas	7,7	6,6	-	-	no
Mine gas	7,7	6,6	6,6	6,6	no
Sewage gas	7,7	6,6	-	-	no
Source: Sijm 'The Performance of Feed-in Tariffs to Promote Renewable Electricity in European Countries' (2002*) ECN-C—02-083*, 7.					

The tariff rates were adapted in the following years, however the structure and content of the *Renewable Energy Sources Act* remained. Within the policy approach of Germany's energy transformation (*'Energiewende'*) the *Renewable Energy Sources Act* was then further amended in 2012. Within this last, but very important amendment, tariff rates increased considerably and several more amendments were included in order to achieve the high renewable energy targets contained in the 2011 policy (*'Energiewende'*).

Table 7: Tariff schedule comparison 2009 and 2012 under the Renewable Energy Sources Act in €ct/kWh			
RE Source	2009	2012	Tariff difference %
Biomass < 150 kW	0,11	0,14	+ 30 %
Geothermal energy	0,16	0,25	+ > 50 %
Offshore wind	0,13	0,15	+ 15 %
Source: Meyer Brown 'The German Renewable Energy Act of 2012' *http://www.mayerbrown.com/publications/the-german-renewable-energy-act-of-2012-12-08-2011/.*			

[352] In the case of wind power the feed-in tariff was determined by location.

Overall, the *Renewable Energy Sources Act* is considered to be one of the most successful promotion schemes in the context of renewable energy generation worldwide.[353] This success can be proven by the increase of electricity and heat production generated from renewables.



Chapter 5: Critical comparison of the South African REBID and the German REFIT mechanism

This thesis set out to compare two MBIs to support renewable energy generation, namely the bidding scheme as implemented in South Africa and the feed-in tariff scheme as implemented in Germany. As mentioned above, South Africa's National Treasury has introduced a number of criteria, which are prerequisites for ensuring the success of MBIs. These nine criteria, discussed in Chapter 2, shall be used here in order to critically assess and compare the REBID and REFIT mechanisms with a view to providing possible reforms to the REBID scheme in operation in South Africa.

[353] Haas et al. 2011 (15) *Renewable and Sustainable Energy Reviews* 1019.

5.1. Environmental effectiveness

The criterion of environmental effectiveness requires the MBI to follow a clear environmental objective as well as to be designed most effectively.[354] The REFIT model is generally considered to be the most effective support scheme in the context of renewable energies, as feed-in tariffs encourage investment and innovation in renewable energy generation worldwide.[355] Clear environmental objective of REFITs is the increase of renewable energy generation in order to promote greenhouse gas emission reduction and to contribute to the international goal of climate change mitigation.[356]

Notwithstanding this overall positive assessment relating to its environmental effectiveness, the REFIT scheme evoked several discussions in South Africa and finally failed as a renewable energy support scheme.[357] This shows that advantages and disadvantages of a specific MBI cannot be generalised as every country provides different policy, legal and economic conditions. In the whole period under REFIT, not even one single purchase agreement between renewable energy producers and Eskom was signed in South Africa.[358] The two-year initial phase was thus not sufficient in making the REFIT scheme to an environmental effective mechanism in South Africa. Reason for this could be found amongst others in the design of South Africa's REFIT.

REFITs are famous as instruments, which guarantee reasonable profits over a long enough period to ensure investment security into renewable energy projects. This contains carefully designed tariff rates which are high enough to stimulate investment but should not generate too excessive profits, as in this case renewable energies would not become competitive with conventional energy sources and the burden for the society would be too high.[359] When NERSA released the first proposed tariff rates in the 2008 consultation paper, the tariffs rates were rather low

[354] *Draft MBI Policy* 59.
[355] Van Dyk & Pollastrini 2011 *Energylaw* 71; Coture & Gagnon 2010 (38) *Energy Policy* 955; Lipp 2007 (35) *Energy Policy* 5482.
[356] Ackermann et al. 2001 (22) *Renewable Energy* 198.
[357] Pegels *Pitfalls of policy implementation* 103.
[358] Pegels *Pitfalls of policy implementation* 103.
[359] Pegels *Pitfalls of policy implementation* 103.

and subject to annual degression.[360] NERSA aimed at designing tariffs that allow project developers to recover the full production costs plus a reasonable profit, in order to stimulate investment into the sector.[361] However, on the basis of these low tariff rates, the potential project developers could not see any scope for reasonable profits.[362] Furthermore, the time frame of fifteen years was rather short for investment planning into new technologies. In particular in countries that predominantly use low-cost primary energy sources, such as coal in South Africa, tariff rates of a functioning REFIT scheme would need to be relatively high in order to compete in the energy market with the cheaper conventional energy sources.[363] Thus it was no surprise, that the first planned tariff rates were too low in the South African context.

Thus in 2009 in the final *REFIT Guidelines*, NERSA raised the tariff rates and contract length considerably and also repealed the annual degression rate. This shift was well received in the South African renewable energy industry, because it highly enhanced investment certainty.[364] This design of a feed-in tariff could have been expected to be very successful for the development of new renewable energy projects. However not even one project has been implemented under the REFIT scheme. Reason is not to be found in a lack of investor interest. The problem was rather the uncertain regulatory framework. On the one hand project developers had difficulties to enter into contracts with Eskom, as they had to wait for standardised power purchase agreements.[365] On the other hand, NERSA changed the REFIT tariffs again in March 2011 and decreased the rates considerably. Some tariff rates were cut by up to 42 per cent and surprised the potential investors. It is not surprising, that such a political behaviour of instability leads to uncertainty between project developers and the industry.[366] As project developers in particularly sought for investment security and policy stability, the way of implementation of the REFIT model was one of the biggest issues in the context of its environmental effectiveness.

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[360] NERSA *Consultation paper: REFIT* (2008) 8.
[361] NERSA *REFIT Draft Guidelines* (2008) 1.
[362] Haselip *FIT for use everywhere?* 94.
[363] Haselip *FIT for use everywhere?* 94.
[364] Pegels *Pitfalls of policy implementation* 104.
[365] Pegels *Pitfalls of policy implementation* 104.
[366] Haselip *FIT for use everywhere?* 93; Creamer 'Trimmed Refit unsuitable for immature SA market - global developer' in Engineering News Online (24.03.2011) *http://www.engineeringnews.co.za/article/trimmed-refit-unsuitable-for-immature-sa-market-global-developer-2011-03-24* (accessed 13.04.2013).

The German REFIT is worldwide seen as a success story in renewable energy generation efforts. Reason is particularly to be found in the relatively high tariff rates, which lead to a high investment security into renewable energies over the last decades. This investment security is also based on the consistency of Germany's policy and legal framework in terms of renewable energy generation.[367]

However, long-term environmental effectiveness of a MBI can only be approved as far as renewable energy technologies will be able to operate in a market without any price support in the future.[368] Rather MBIs in the renewable energy sector shall stimulate new technologies and innovations only for a limited period of time, in which the technologies, because of their costs and lack of experience, cannot yet compete in a free market.[369]

Such a future sustainability, which forms the basis of environmental effectiveness, can however only be proved after a long period of time. The REFIT in Germany had its beginnings in 1991, thus more than 20 years are already gone in which the country increased its renewable energy generation constantly.[370] To incentivise the success of REFITs permanently, feed-in tariffs are usually reduced every year at a predetermined and fixed rate, in order to adapt them gradually to average conventional generation costs.[371] Such a degression rate, which helps to push down energy costs, also exists in Germany and has been increased on an annual basis.[372] It stimulates the competiveness of renewable energies with conventional energy sources and thus improves the environmental effectiveness.[373] In South Africa, the first tariff rates, promulgated by NERSA in 2008 were also subject to an annual degression.[374]The *REFIT Regulatory Guidelines* in 2009 however, did not determine such a degression rate.[375] In terms of the future effectiveness of the support scheme it is questionable whether this approach would have been successful.

[367] Mitchell et al. 2006 (34) *Energy Policy* 300-304.
[368] Haselip *FIT for use everywhere?* 90.
[369] Johansson & Turkenburg 2004 (8/1) *Energy for Sustainable Development* 14.
[370] Haas et al.2011 (15) *Renewable and Sustainable Energy Reviews* 1011.
[371] Haselip *FIT for use everywhere?* 90.
[372] Haas et al.2011 (15) *Renewable and Sustainable Energy Reviews* 1019.
[373] Johansson & Turkenburg 2004 (8/1) *Energy for Sustainable Development* 14.
[374] NERSA *Consultation paper: REFIT* (2008) 8.
[375] NERSA *REFIT Regulatory Guidelines* (2009) para 7.5.

The comparison of the REFIT model in South Africa and Germany shows, that a REFIT cannot be considered to be environmentally effective in general. Rather one has to take into account different REFIT designs and national backgrounds. But not without reason is the REFIT model considered to be the most environmental effective support scheme in the renewable energy context as its success in many countries can be taken as evidence for this.[376] This outcome can be supported by the German development, known as probably the most efficient renewable energy development worldwide.[377]

The REBID model on the other side could be an environmental effective support scheme as well. In the South African context one has to consider the previous success of the instrument. Since the implementation of the IPP Procurement Programme and the subsequent implementation of the REBID scheme, the interest in renewable energy generation has rapidly increased and within the two first bidding windows, 47 renewable energy projects has been implemented in South Africa, whereas under the REFIT system not even one project had been emerged.[378] The third bidding round is currently in progress and it seems as if again new projects can be developed under the programme.[379] It appears as if the REBID model, at least in South Africa, is more effective regarding the development of new projects and thus regarding the generation of renewable energy to mitigate greenhouse gas emissions. But here again it should not be overlooked that the future sustainability of a MBI is decisive to decide over its environmental effectiveness.

In this context the price development within the REBID mechanism can be regarded as a main shortcoming.[380] Indeed, the low prices of electricity resulted by a bidding scheme can have positive impacts on the economic burden for a country's society. In particular in a developing country such as South Africa, the political idea of providing electricity prices as low as possible, is not difficult to understand. However such a price mechanism has to be considered as negative under the

[376] Van Dyk & Pollastrini 2011 *Energylaw* 71; Coture & Gagnon 2010 (38) *Energy Policy* 955; Lipp 2007 (35) *Energy Policy* 5482.
[377] Coture & Gagnon 2010 (38) *Energy Policy* 955; Lipp 2007 (35) *Energy Policy* 5482.
[378] DoE 'REIPP Programme Online Information' *http://www.ipprenewables.co.za/* (accessed 15.05.2013).
[379] DoE 'REIPP Programme Online Information' *http://www.ipprenewables.co.za/* (accessed 15.05.2013).
[380] Butler & Neuhoff 2008 (33) *Renewable Energy* 1861-1862.

question of the future environmental-effectiveness of a support scheme. Too low prices cannot cover the costs of renewable energy generation or at least cannot provide an adequate profit for project developers.[381] Thus, renewable energy sources cannot become competitive.[382] Besides it doesn't support the development of a local renewable energy market, as small local project developers under these low prices cannot compete with large-scale (and usually international) industries, which have more experience and thus can generate at lower prices.[383]

Another criticism of REBID is the missing investment security within the programme.[384] As renewable energy project developers have to participate in a bidding process for every single project, companies cannot calculate for a long period of time. That makes it, in particular for smaller enterprises, difficult to invest in such projects, as the investment security in the context of REBID only exists for the development of one project within one bidding window - if at all.[385]

Thus, on the basis of above discussed benefits and shortcomings of the two schemes, the REFIT scheme can, in accordance with the majority opinion, be seen as the more environmental efficient support instrument, as far as it is designed properly and implemented coherently.

5.2 Revenue generation

Both MBIs are not aimed at generating revenue. Rather both schemes focus on an increased renewable energy generation.[386] The determined tariffs, under the REFIT as well as under the REBID scheme, provide a basis for the purchase prices of renewable energy sources. Thus the margin between the general electricity price and the tariff rate is not used as revenue generation but rather directly accrues to the companies for renewable energy generation.[387]

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[381] Butler & Neuhoff 2008 (33) *Renewable Energy* 1861-1862.
[382] Butler & Neuhoff 2008 (33) *Renewable Energy* 1861-1862; Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[383] Wiser et al. *Renewable Energy Policy Options for China* (2002) 8.
[384] Mitchell et al. 2006 (34) *Energy Policy* 299-304.
[385] One has to take into consideration that not all developers, who take part in a bidding round, finally win the bidding round, Mitchell et al. 2006 (34) *Energy Policy* 300-304; Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[386] Ackermann et al. 2001 (22) *Renewable Energy* 198; 200.
[387] Ackermann et al. 2001 (22) *Renewable Energy* 198; 200.

5.3 Public support

It is important to achieve general acceptability for a MBI, in particular by designing an instrument simple, understandable and transparent for the public and by engaging all relevant stakeholders in the process.[388]

As feed-in tariffs usually lead to higher electricity prices one has to assume that the REBID scheme might receive more public support than a REFIT. Even if in industrialised countries such as Germany, where an electricity price increase is not as incisive for its citizens as in developing countries such as South Africa, it is assumed that even in these countries the public support would be higher for a bidding scheme so far. But not only the instrument itself is important for the public support of a MBI. Rather the design plays an important role. In South Africa, the *REFIT Guidelines* contained selection criteria, which gave reason for concern because of their lack of clarity as they do not provide a catalogue of clear defined rules, but instead only indications for project developers about the selection of their own company for the REFIT programme.[389] Such a lack of clarity might hamper the success of a system because of missing certainty into a political scheme. But also the REBID scheme had some shortcomings referring its public support. In particular the delays in the procurement programme can be seen as a very negative aspect in this context. The dates published in August 2011 for the five bidding rounds could not be complied with, as already the third bidding round is delayed for one year (the submission date for the third phase published in August 2011 was the 20 August 2012 which was revised to the 19 August 2013).[390] Such a delay in political programmes makes it difficult for companies to confide in national policy developments. Furthermore one has to bear in mind that already the surprising shift from REFIT to REBID created uncertainty in the renewable energy industry.[391] To gain general acceptability for a renewable energy support scheme, it is thus inevitable to create certainty referring

[388] *Draft MBI Policy* 60.
[389] Baker 'Governing electricity in South Africa: wind, coal and power struggles' The Governance of Clean Development: Working Paper 015 (July 2011) *http://www.uea.ac.uk/international-development/research/gcd/Baker+2011*(accessed 15.05.2013).
[390] DoE 'REIPP Programme Online Information' *http://www.ipprenewables.co.za/* (accessed 15.05.2013).
[391] Abrahams *The key requirements for the establishment of a successful renewable energy manufacturing hub in Atlantis* (2012) 34.

the design and implementation of a MBI - irrespective of whether a REFIT or REBID scheme is finally implemented.

5.4 Policy alignment

The introduction of a MBI requires considering environmental, social and economic policy goals of a country.[392] As these policy goals differ widely between countries, there is no general answer to the question of policy alignment. In South Africa as a developing country, great importance is attached to policy objectives such as job creation, poverty alleviation and the supply with basic services such as electricity, water and sanitation.[393] Thus one has to aim for finding a MBI that allows for the best achievement of these policies. In this context, the electricity price development plays again an important role. The introduction of a REFIT scheme leads to an electricity price increase, whereas REBID models result in lower electricity prices.[394] Against this backdrop, it has to be assumed that a REFIT model in South Africa would have had more negative impacts on society. In developing countries, where socio-economic goals still play an important role in national policies, the attempt to keeping the costs as low as possible is quite understandable. In this context a bidding scheme can be considered as being preferable with regard to its policy alignment.

In Germany on the other side more attention can be devoted to policy goals such as climate change mitigation and renewable energy development, as the social and economic policy goals differ widely from these in developing countries. Objectives such as poverty alleviation and the supply with basic services have only little importance in practice. Thus in Germany, the policy alignment of a REFIT can be assumed.

5.5 Legislative aspects

The success of a MBI depends amongst others on a coherent legal framework, which supports the introduction of the MBI.[395]

[392] *Draft MBI Policy* 64.
[393] *Draft MBI Policy* 64.
[394] Ackermann et al. 2001 (22) *Renewable Energy* 198; 200.
[395] *Draft MBI Policy* 60.

The REFIT scheme in Germany as well as the REFIT or REBID model in South Africa could be implemented successfully into existing legal frameworks. The overview of South Africa's and Germany's legal framework relating to renewable energy generation has shown, that there exists a coherent legal framework for implementing renewable energies in both countries. Even if neither in South Africa nor in Germany an overarching renewable energy framework consists, the different legal areas such as environmental, energy and fiscal law provide in both countries a coherent legal framework supporting the introduction of a renewable energy support scheme. Against this backdrop, the REFIT as well as the REBID scheme conforms to the specific legal framework in each country.

Furthermore, while designing a MBI, South Africa put emphasis on the compliance with its *Broad-Based Black Economic Empowerment Act*, based on South Africa's historical background. The selection criteria for new developers under REFIT, released by NERSA in February 2010, require amongst others IPPs to contribute to economic development and to comply with the Act. [396] Comparable requirements are now defined in the *REIPP Programme*.[397] Both schemes can therefore be seen as suitable with regard to legislative aspects.

5.6 Technical and administrative issues

The REFIT model is considered to be conceptually very simple and easy to administer. After defining the tariff rates by the Government, the administration process of FITs is easy to manage. [398] REBID models on the other side consist of a number of bidding rounds. Such bidding rounds need an own administration process every time again.[399] In South Africa, each bidding round consists of six different administrative processes. First of all, the DoE releases a notification of the proposed bid submission date. Second, a bidders conference for the specific bidding round is called. Subsequently the bidders have to notify the DoE of required information for the bidding round. Finally the bid submission date is reached. After this bid submission the Doe announces the preferred bidders. At the end the PPAs and

[396] NERSA *Rules on Selection Criteria for Renewable Energy Projects under the REFIT Programme* 3.
[397] Tait (2012) 26-35.
[398] Haselip *FIT for use everywhere?* 90.
[399] DoE *REIPP Programme*.

further required contracts are signed.[400] In terms of this administrative long process it is not surprising that the South African Government hasn't managed to operate the first bidding rounds without delay. Rather already after the third (of five) bidding round there was a delay of about one year.[401]

Another negative technical issue of the REBID scheme are the costs for taking part in the process. In South Africa, developers are required to pay ZAR 15 000 only for the access to the *RFP* without being sure about the results of the bidding process.[402] Even if that amount is not excessive in the context of successful and well-established companies, one has to consider the financial burden of such a fee for small project developers who not yet have much experience in the renewable energy field. And also the amount of ZAR 100 000 per produced megawatt is a high amount with regard to small developers who will have difficulties to finance new projects into new and inexperienced technologies.[403]

Referring to technical and administrative issues, REFIT models can therefore be regarded as being the preferable support scheme in the renewable energy context.

5.7 Distributional impacts

MBIs can have different impacts on different *income* groups. In particular lower income groups should not be unreasonable affected by MBIs.[404] As mentioned above, REFITs usually lead to an increase of electricity prices. These costs typically have to be paid by taxpayers and consumers, thus the society.[405]

In South Africa, NERSA determined, that the financial burden for the fixed tariffs would have been imposed on all Eskom electricity customers.[406] Such a shifting of costs to the society can hamper the success of a new political idea in every country. However especially in developing countries such as South Africa, a considerable increase of costs for electricity customers might lead to negative distributional impacts. As households in developing countries, due to a lower income, generally

[400] DoE *REIPP Programme*.
[401] DoE 'REIPP Programme Online Information' *http://www.ipprenewables.co.za/* (accessed 15.05.2013).
[402] Tait (2012) 26-35.
[403] Tait (2012) 26-35.
[404] Draft MBI Policy 63-64.
[405] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[406] NERSA *REFIT Regulatory Guidelines* (2009) para 4.

spend a higher proportion of their income on electricity, any marginal tariff increase will have greater economic impacts, in particular on low-income households.[407] Thus, it would have been beneficial for the success of the REFIT to consider different funding mechanisms such as centralised national funds or financing from international donors. NERSA however did not mention any other kind of potential financing, but rather only considered the cost responsibility of the electricity customers.[408]

Auction mechanisms such as the bidding mechanism in South Africa are considered to be less cost-intensive as REFIT models. That is one main reason why emerging economies such as South Africa or India shifted from REFIT schemes to REBID instruments.[409] In the South African context it is assumed that the now existing bidding scheme has less distributional impacts because of lower electricity prices.

Tariff increases in a welfare state such as Germany, have only little impact on lower income households. The social system as it exists in Germany anyway pays a basic financial aid to families, which don't have enough income to have a reasonable maintenance.[410] This financial aid includes payment of living, which includes inter alia also the price of electricity.[411] REFITs in industrialised countries, in particular Germany, have therefore no significant distributional impacts.

This demonstrates that it is not possible to analyse the distributional impacts of MBIs, such as the REFIT and REBID model, in general. Rather one has to find a country-specific result. As this thesis aims at finding a suitable support scheme for South Africa's renewable energy market, the question concerning the distributional impacts of the REFIT and REBID scheme can be answered unambiguously. In the South African context, a REBID scheme, as it exists today, has less distributional impacts, than a REFIT model. However, also a REFIT scheme could be suitable in this context, if funding mechanisms are considered.

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[407] Thiam 2011 (39) *Energy Policy* 4287-4288.
[408] NERSA *REFIT Regulatory Guidelines* (2009) para 4.
[409] Becker & Fischer *Promoting Renewable Electricity Generation in Emerging Economies* (2012) 9-14.
[410] Giehle 'Facts about Germany' *http://www.tatsachen-ueber-deutschland.de/en/society/main-content-08/social-security.html* (accessed 25.06.2013).
[411] Bundesagentur für Arbeit 'Sozialhilfe' *http://www.arbeitsagentur.de/nn_26788/zentraler-Content/A07-Geldleistung/A07-Geldleistung/Allgemein/Sozialhilfe.html* (accessed 05.07.2013).

5.8 Competitive impacts

MBIs can have negative economic impacts on specific industrial sectors. These competitive impacts have to be determined in order to minimise the economic effects as far as possible. One could assume that the REBID model in general has less negative competitive impacts compared to the REFIT scheme, as the REBID is explicitly known as competitive bidding instrument. That means basically that companies are in fair competition with each other as the market determines the final tariffs itself.[412] Feed-in tariff schemes on the other side are based on fixed tariff rates defined by governments. That is why FITs are generally regarded as cross subsidies.[413] Such a cross subsidy means a significant market interference including negative competitive impacts.[414]

However, one cannot analyse the competitive impacts in general, but has to consider its country-specific economic impacts again. As mentioned above, the competition mechanism leads to very low tariff rates. This makes it difficult for small, local companies to compete with large international industries with more experience and the opportunity to generate renewable energies at lower prices.[415] And also the high costs for taking part in the bidding process have to be considered as an immense economic burden for small project developers. It might be difficult for these industries to finance new projects and to take part in the renewable energy development of South Africa. Conversely these issues might result in a renewable energy sector consisting mainly of large-scale industrial firms and in particular international industries. At first sight, this development could be evaluated positively as investment of international large-scale industries into the South African energy market could be combined with economic growth and financial stabilisation of the market. In a future perspective however, one has to take into account the negative impacts of such a development. As small local companies will have difficulties to enter the market due to a competition with large international firms, the local

[412] Ackermann et al. 2001 (22) *Renewable Energy* 200.
[413] Meyer 2003 (31) *Energy Policy* 668.
[414] Meyer 2003 (31) *Energy Policy* 668.
[415] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.

development in the context of new technologies and energy generation opportunities will be marginal.[416]

For this reason, the South African Government has decided to implement a specific programme only for small-scale producers of renewable energy. The bidding procedure for this *Small IPP Procurement Programme* shall start in October this year.[417] The programme might help to solve one of the main shortcomings of the REBID mechanism, namely the non-attractiveness of the current IPP Programme for small and local firms due to the above-discussed issues. One has to wait for the desired success of the new programme, as it depends mainly on the interest and opportunity of small local firms to participate in the bidding process.

Until now it is difficult to decide whether the REFIT or the REBID model would have less competitive impacts on the South African energy market, as there is still little experience after three bidding rounds. In general the REBID scheme can certainly be seen as the model with less competitive impacts as it even supports the fair competition between companies. In reality, this competition can however have the above-mentioned negative impacts, which should be taken into consideration.

Chapter 6: Conclusion

The importance of renewable energy generation in the context of climate change and greenhouse gas emission reduction has increased steadily. However, renewable energies not only provide a new opportunity in the context of environmental and climate change goals on national and international levels. Rather, renewable energies can also promote the establishment of national energy markets that are not reliant on fossil fuels or energy imports. These different opportunities in the renewable energy context have been considered worldwide. South Africa and Germany are two countries that realised that the further implementation of renewable energies is an important national policy goal. However, renewable energy generation is more cost intensive than energy production generated by conventional energy sources such as coal or nuclear energy. This is because there has been so far less experience and investment into renewable energy technologies compared to conventional energy

[416] Wiser et al. *Renewable Energy Policy Options for China* (2002) 7.
[417] DoE *Small Projects IPP Procurement Programme* (14.06.2012).

sources. That is why renewable energies cannot yet compete with conventional sources on international energy markets and thus have to be promoted by financial incentives such as MBIs. One can find a number of different support schemes in the context of renewable energies. Germany, known for its successful renewable energy deployment, has implemented a REFIT under the *Renewable-Energy Sources Act*. REFIT schemes are considered by many commentators to be the most efficient support mechanism and thus the most common scheme worldwide.[418]

South Africa also proposed implementing a REFIT scheme but subsequently shifted its orientation to a REBID model, implemented through its *Renewable Energy Independent Procurement Programme (REIPP Programme)*.

The dissertation has sought to compare the two support schemes in the context of the specific policy and legal framework of the two countries, with a view to drawing lessons for a possible reform in South Africa.

The legal analysis has demonstrated that both countries provide, even with differences, a coherent framework for the implementation of MBIs in the context of renewable energies. To further analyse the REFIT and REBID models in the two countries, the criteria defined by South Africa's National Treasury for the assessment of MBIs were taken into consideration. In this context the analysis has shown that both support instruments have a number of advantages but also shortcomings, which have to be considered in the context of each specific jurisdiction. One of the most important factors of a successful MBI is presumably its environmental effectiveness, as this effectiveness in the end leads to the success or failure of an instrument. In terms of this environmental effectiveness, several arguments led to the conclusion that REFIT schemes are more environmental effective than REBID schemes. Evidence of this is provided by the success of a number of FITs in various countries. Apart from that the FIT is also easier to administer, which should be considered when choosing an MBI.

On the other side the REBID mechanism provides several advantages compared to the REFIT model. In particular the price development of electricity within the two

[418] Van Dyk & Pollastrini 2011 *Energylaw* 71; Coture & Gagnon 2010 (38) *Energy Policy* 955; Lipp 2007 (35) *Energy Policy* 5482.

schemes is one important issue that has to be considered. The bidding procedure is known for providing low electricity prices whereas the REFIT system usually leads to significant electricity price increases. This price difference has impacts on the two criteria 'public support' and 'distributional impacts'. In particularly in a developing country such as South Africa price increases can have dramatic impacts on low income-households and thus inevitably on the public support of a policy instrument. Another advantage of the REBID model compared to the REFIT scheme could be seen in its competitive impact, as competition in an energy market supported by a REBID scheme is stimulated, whereas the competition under a REFIT mechanism is disabled. But this is only the general answer to the question of competitive impacts. Considering the impact on local small-scale industries, there are many indications that choosing a REFIT model would have beneficial effects on the development of a local renewable energy market.

In the South African context one has to decide which criteria are the more important objectives for the sustainable development of the country. If more importance is attached to the environmental effectiveness of a support scheme, a REFIT scheme would generally be the better support scheme. If South Africa however places more emphasis on the social-economic development of the country, the implementation of the bidding scheme was an important step to minimise distributional impacts resulting from electricity price increases.

A final decision between the two support instruments depends on a number of further political and legal questions. In any event, South Africa's approach to develop its renewable energy deployment can be seen as a great and positive step towards a lower carbon economy in the combat of climate change. In the end, the success of a renewable energy support instrument not only depends on the structure and key elements of the instrument itself but rather on the way of its political implementation and the national policy and legal framework underlying the project. With this in mind, key element of the further energy policy in South Africa should be therefore the establishment of a solid and stable policy and legal framework in order to provide investment security and to reduce technology risks in the renewable energy sector. On this basis, it can be assumed that the desired success of increasing the national renewable energy generation will be achieved soon. Already today it is

fair to say that South Africa is on the right track to establish a green renewable energy economy.

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