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GENERAL NOTICE

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NOTICE 382 OF 2009



**South Africa Renewable  
Energy Feed-in Tariff (REFIT)**

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**Regulatory Guidelines 26 March 2009**

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## **Glossary of Terms And Abbreviations**

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### **GLOSSARY**

#### **AREA LOAD CONTROL CENTER**

A function responsible for the operational control of the electricity network and dispatch of the generations in a defined load control area

#### **AVOIDED COST**

Avoided Cost is the marginal cost for the same amount of energy acquired through another means such as the construction, finance and operation of new efficient generation facility or purchase from an alternate supplier.

#### **CABEERE**

A joint project between the Governments of South Africa and Denmark, CaBEERE aimed at building capacity in energy efficiency and renewable energy.

#### **CENTRALLY DISPATCHED GENERATION UNIT**

The expected energy produced by the unit can be determined ahead of time (hour, day, week, etc) and the energy output of the unit can be controlled by the area load control centre. The unit can be placed in an appropriate place in the priority loading order and the expected energy calculated.

#### **COGENERATION**

Cogeneration is the simultaneous generation of electricity and useful thermal energy (heat) at a single plant. This occurs either through the use of thermal energy during electricity generation or via the use of waste energy for electricity during heating processes. Cogeneration is also referred to as combined heat and power (CHP). In a South African context, cogeneration can also refer to the production of electricity as a by product of an industrial process, without the need for a combined heat and power system to necessarily be in place.

#### **DISTRIBUTION**

Distribution refers to the conveyance of electricity through a Distribution System.

#### **TRANSMISSION**

Transmission refers to the conveyance of electricity through a Transmission System.

**DISTRIBUTION SYSTEM**

An electricity network consisting of assets operated at a nominal voltage of 132 kV or less.

**TRANSMISSION SYSTEM**

An electricity network consisting of assets operated at a nominal voltage of above 132 kV.

**DISTRIBUTOR**

A Distributor is a legal entity that owns or operates/distributes electricity through a Distribution System. This includes Eskom, municipalities and private distributors.

**TRANSMITTER**

A Transmitter is a legal entity that owns or operates/distributes electricity through a Transmission System. This includes Eskom, municipalities and private transmitters.

**EMBEDDED GENERATORS**

A legal entity who operates a unit, other than a co-generator, that is not connected to the TS.

**GIGA WATT HOUR (GWh)**

An energy unit in which electricity consumption is measured. 1 GWh = 3,600 GJ (Gigajoule) (Joule, unit of energy).

**GREENHOUSE GAS**

Gases primarily carbon dioxide, methane, and nitrous oxide in the earth's lower atmosphere that trap heat, thus causing an increase in the earth's temperature and leading towards the phenomenon of climate change.

**INDEPENDENT POWER PRODUCER (IPP)**

IPPs are defined as typically limited-liability, investor owned enterprises that generate electricity either for bulk sale to an electric utility or for retail sale to industrial or other customers with certain conditions.

**NATIONAL INTEGRATED RESOURCE PLAN (NIRP)**

The NIRP is a least cost plan that assesses a variety of demand and supply side options to meet customer electricity needs under environmental and social

considerations

#### **NATIONAL TRANSMISSION COMPANY (NTC)**

The South African legal entity licensed to execute the national transmission responsibility. It consists of a System Operator and a national transmission network service provider.

#### **PRODUCER SURPLUS**

Producer surplus is the difference between the total income derived from the sale of a product and the costs involved in its production. In the context of REFIT, this refers to the potential surplus as a result of differences in the cost of production due to the varying sizes and scales of technology adopted. For small scale projects, producer surplus will be low, for larger scale projects producer surplus will be higher. The potential for a producer surplus is balanced against the need to develop a non-complex and simple to implement mechanism.

#### **REFIT**

Renewable Energy Feed-In Tariff: a mechanism to promote the deployment of renewable energy that places an obligation on specific entities to purchase the output from qualifying renewable energy generators at pre-determined prices.

#### **RENEWABLE ENERGY** (from White Paper on Renewable Energy, 2003, DME)

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

**Solar energy** can be used to generate electricity; heat water; and to heat, cool and light buildings. For example, photovoltaic systems capture the energy in sunlight and convert it directly into electricity. Alternatively, sunlight can be collected and focused with mirrors to create a high intensity heat source that can be used to generate electricity by means of a steam turbine or heat engine.

**Wind energy** uses the naturally occurring energy of the wind either directly as in windmills or to generate electricity, and can be used, for example, to charge batteries or pump water.

Large modern wind turbines operate together in 'wind farms' to produce

electricity for utilities. Small turbines are used to meet localised energy needs.

**Biomass energy** (from organic matter) can be used to provide heat, make liquid fuels, gas and to generate electricity. Fuelwood is the largest source of biomass energy, generally derived from trees. However, fuelwood is used unsustainably when new trees are not planted to replace ones that are used. Fuelwood derived unsustainably cannot be properly defined as renewable. However, as is practised in many parts of the world, when fuelwood is planted and harvested sustainably, it is renewable. Other types of biomass include plants, residues from agriculture, food production, animal feed production or forestry, and organic components in municipal and industrial wastes. A major source of renewable electricity in many parts of the world derives from agricultural and animal waste, either through direct combustion, or through the production of biogas (anaerobic digestion of agricultural or animal wastes) to generate methane which, in turn, is combusted to generate electricity (and often heat and electricity – i.e. cogeneration). Landfill gas is considered to be a biomass source.

**Bio-fuels** in liquid form can be produced from the conversion of biomass and used, for example, for transportation. The two most common bio-fuels are ethanol and bio-diesel. Fermenting any biomass that is rich in carbohydrate, such as maize, makes ethanol. Bio-diesel is made using vegetable oils, animal fats and algae.

**Hydropower** uses the movement of water under gravitational force to drive turbines to generate electricity.

**Wave power, tidal power and ocean currents** can be used to drive turbines to generate electricity. Technologies to harness these forms of power are presently being developed to the stage of commercialisation.

**Geothermal** activity in the earth's crust derives from the hot core of the earth. Examples are the natural geysers and hot water sources employed for power generation and space heating or using deep hot dry rock as heat exchangers by pumping water through the natural rock fissures to produce steam for power generation.

**REDS**

Regional Electricity Distributors are proposed to be established through an Electricity Supply Industry restructuring bill which will combine Eskom Distribution and South Africa's municipal suppliers into six regional electricity distributors.

**SELF – DISPATCHED GENERATION UNIT**

The expected energy output of the unit **cannot be determined** ahead of time (hour, day, week, etc) due to the intermittent nature of the primary energy input (wind, solar, water) and **the energy output of the unit cannot be controlled** by the area load control centre.

**SOUTH AFRICAN DISTRIBUTION CODE**

The South African Distribution Code was approved by the grid Code Secretariat in September 2007 and comprises the following codes:

- Distribution Information Exchange Code
- Distribution Metering Code
- Distribution Network Code
- Distribution System Operating Code
- Distribution Tariff Code

**SOUTH AFRICAN GRID CODE (SAGC)**

The Grid Code is intended to establish the reciprocal obligations of industry participants around the use of the TS and operation of the interconnected power system (IPS).

**TARIFF EQUALISATION**

The process whereby the amount of financial subsidy required for implementation of a feed-in tariff is borne by all Eskom electricity customers through existing 'pass-through' arrangements which are currently in place for IPPs.

**TRANSMISSION SYSTEM (TS)**

The TS consists of all lines and substation equipment where the nominal voltage is above 132 kV. All other equipment operating at lower voltages are either part of the Distribution System or classified as transmission transformation equipment.

**WATT**

1 Joule per second of energy consumption or dissipation (1 MW = 1,000,000 W).

**ABBREVIATIONS**

|                 |  |
|-----------------|--|
| BEE             | Black Economic Empowerment                           |
| CDM             | Clean Development Mechanism                          |
| CEF             | Central Energy Fund                                  |
| CO <sub>2</sub> | Carbon Dioxide                                       |
| CHP             | Combined Heat and Power (co-generation)              |
| DME             | Department of Minerals and Energy                    |
| DPE             | Department of Public Enterprises                     |
| DTI             | Department of Trade and Industry                     |
| EDC             | Energy Development Corporation                       |
| EIA             | Environmental Impact Assessment                      |
| ESI             | Electricity Supply Industry                          |
| Eskom           | The national regulated electricity utility           |
| FIT             | Feed-In Tariff                                       |
| GW              | Giga Watt  |
| GWh             | Giga Watt Hour                                       |
| IPP             | Independent Power Producer                           |
| MTOE            | Million Tons of Oil Equivalent                       |
| MW              | Mega Watt  |
| MYPD            | Multi Year Price Determination                       |
| NERSA           | National Energy Regulator of South Africa (also NER) |
| NIRP            | National Integrated Resource Plan                    |
| PNCP            | Pilot National Cogeneration Programme                |
| PPA             | Power Purchase Agreement                             |
| PV              | Photovoltaic   |
| PWG             | Project Working Group                                |
| RED             | Regional Electricity Distributor                     |
| RE              | Renewable Energy                                     |
| REFIT           | Renewable Energy Feed-In Tariff                      |
| REFSO           | Renewable Energy Finance and Subsidy Office          |
| REPA            | Renewable Energy Purchasing Agency                   |
| RSA             | Republic of South Africa                             |
| SANERI          | South African National Energy Research Institute     |
| SARS            | South African Revenue Service                        |
| TOR             | Terms of Reference                                   |
| TREC            | Tradable Renewable Energy Certificate                |
| TWh             | Terawatt Hour  |
| WACC            | Weighted Average Cost of Capital                     |

## 1 Introduction

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Grid connected renewable energy is currently the fastest growing sector in the global energy market. Installed global wind capacity at the start of 2008 is in the order of 90GW, with total world installed capacity having doubled since 2004. India, China, the United States, Spain and Germany together added over 20GW of wind power in 2007. China and India each are currently installing wind electricity in excess of 1GW per annum and both have targets of achieving over 10GW by 2015. The capacity of grid connected solar PV has also quadrupled from an installed capacity of 2GW in 2004 to approaching 8GW at the end of 2007. Commercial-scale solar thermal power plants are also under construction in countries such as the US and Spain. Targets for the promotion of renewable energy now exist in more than 58 countries, of which 13 are developing countries.

The renewable energy industry is now a major economic player, with the industry employing over 2.5 million people worldwide. Renewable energy companies have grown significantly in size in recent years, with the market capitalisation of publicly traded renewables companies doubling from \$50 billion to \$100 billion in just two years (2005-7).

South Africa has a high level of renewable energy potential and presently has in place targets of 10,000 GWh of renewable energy by 2013. To contribute towards this target and towards socio-economic and environmentally sustainable growth, and kick start and stimulate the renewable energy industry in South Africa, there is a need to establish an appropriate market mechanism.

Feed-in Tariffs (FIT) are, in essence, guaranteed prices for electricity supply rather than conventional consumer tariffs. The basic economic principle underpinning the FITs is the establishment of a tariff (price) that covers the cost of generation plus a "reasonable profit" to induce developers to invest. This is quite similar to the concept of cost recovery used in utility rate regulation based on the costs of capital.

Under this approach it becomes economically appropriate to award different tariffs for different technologies. The price for the electricity produced should be set at a level and for a period that provides a reasonable return on investment for a specific technology. The tariff should also be certain and long term enough to

allow for project financing to be raised by the project.

To induce continued and long term investment in the sector the FIT should provide a stable price benchmark for renewable energy projects on which investors can make project development decisions.

Counterbalancing the objective of providing a reasonable return on capital for developers is the need to maximise economic efficiency and minimise consumer costs. This implies the need to minimise producer surplus – the situation where a producer is receiving a return greater than their costs of generation. It is accepted that there will be some producer surplus within any FIT system but by matching the tariff schedule reasonably closely to the costs of production per technology this surplus can be minimised.

Aside from the economic principles underlying the setting of FITs, the tariff approach should also be administratively simple to allow for effective management of the system.

Feed-in tariffs to promote renewable energy have now been adopted in over 36 countries around the world, including Spain and Germany and a number of states in the US, and also including developing nations such as Turkey, Thailand, Sri Lanka, Nicaragua, Indonesia, Ecuador, China, Brazil, Argentina and most recently Kenya.

The establishment of the Renewable Energy Feed-In Tariff (REFIT) in South Africa will provide an excellent opportunity for South Africa to increase the deployment of renewable energy in the country and contribute towards the sustained growth of the sector in the country, the region and internationally.

These guidelines have been developed by NERSA in response to national policy direction. The guidelines establish the institutional framework, the role of the key players and the tariff conditions. Further details on the motivation and explanations behind the specific guidelines can be found in the Explanatory Memorandum in Appendix 3. These are arranged by section in line with the main guidelines for ease of reading.

## 2 Purpose

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- 2.1 The purpose of these Guidelines is to set out the regulatory framework for initiating tariffs and licensing conditions for a self-sustaining market for grid connected renewables in South Africa, in accordance with Government policy, through a Renewable Energy Feed-In Tariff, hereinafter referred to as REFIT.
- 2.2 The REFIT will support the Government's 10,000 GWh 2013 Renewable Energy Target and deliver sustained long term growth in order to promote competitiveness for renewable energy with conventional energies in the medium and long term.
- 2.3 Renewable energy is recognised internationally as a major contributor in protecting our climate, nature, and the environment as well as providing a wide range of environmental, economic and social benefits that will contribute towards long term global sustainability.

## 3 Scope and Objective

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### *Scope of Guidelines*

- 3.1 In fulfilling the purpose specified in Section 2, these Guidelines set out the rules and requirements for the application and issuing of licences for renewable energy project developers under REFIT, the tariff structures for the specified technologies to be supported, and the responsibilities and obligations for the key parties involved.
- 3.2 Under the National Energy Regulator Act, 2004 (No. 40 of 2004), the National Energy Regulator of South Africa (hereinafter referred to as the 'Regulator') has the mandate to determine the prices at and conditions under which electricity may be supplied by licence.
- 3.3 These Guidelines are governed by the National Energy Regulator Act, 2004 (No. 40 of 2004), Electricity Regulation Act, 2006 (No. 4 of 2006) and all subsequent relevant Acts of Amendment.
- 3.4 These Guidelines are to be applied in conjunction with Generation Licence application procedures.

**Objective of the REFIT**

- 3.5 To fulfil the Purpose as laid out in Section 2, the specific objectives and key principles of the REFIT are to:
- i. create an enabling environment for renewable electricity power generation in South Africa;
  - ii. establish a guaranteed price for electricity generated from renewables for a fixed period of time that provides a stable income stream and an adequate return on investment;
  - iii. create a dynamic mechanism that reflects market, economic and political developments;
  - iv. provide access to the grid and an obligation to purchase power generated;
  - v. establish an equal playing field with conventional electricity generation;
  - vi. create a critical mass of renewable energy investment and support the establishment of a self sustaining market.
- 3.6 The initial phase of the REFIT is aimed at kick starting and stimulating the renewable energy sector and has therefore been designed to be simple and streamlined. Future phases may add more technologies, bands within technologies, and incentives for projects in different geographical areas.

**4 Purchase Obligation**

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- 4.1 Eskom Single Buyer Office shall be appointed as the Renewable Energy Purchasing Agency, hereinafter referred to as REPA
- 4.2 The appointment of Eskom as REPA is in line with the Electricity Regulation Act 2006 whereby NERSA has the right to make any licence subject to conditions. These conditions include the types of energy sources from which electricity may be generated, bought or sold. This appointment is also in line with the 'Statement on Cabinet Meeting of 05 September 2007' whereby Eskom is designated as the single buyer of power from Independent Power Producers (IPPs) in South Africa.
- 4.3 For projects awarded licences by the Regulator under REFIT, REPA is obliged to purchase the power, subject to fulfilment of all necessary licence

conditions.

- 4.4 With the aim of supporting the wider green electricity market and ensuring flexibility in the market, renewable energy IPPs are permitted to sell power direct to buyers wishing to purchase renewable energy outside of the REFIT mechanism, subject to fulfilment of necessary licence conditions.
- 4.5 The financial subsidy required to offset the difference in the cost of energy purchased under REFIT and the Avoided Cost will be borne by all Eskom electricity customers through existing 'pass-through' arrangements for costs of independent power production.

## **5 Renewable Energy Power Generator Qualification Criteria**

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- 5.1 Renewable energy shall mean naturally occurring non-depletable sources of energy, such as solar, wind, biomass, hydro, tidal, wave, ocean current, and geothermal. These sources can be harnessed to produce electricity, gaseous and liquid fuels, heat or a combination of these energy types.
- 5.2 A Qualifying Renewable Energy Power Generator (hereinafter referred to as the 'RE Generator') shall be defined as new investments in electricity generation using the following technologies:
  - i. Landfill gas power plant;
  - ii. Small hydro power plant (less than 10MW);
  - iii. Wind power plant;
  - iv. Concentrating Solar Power (CSP) plant.
- 5.3 Qualification of other renewable energy technologies will be considered for inclusion in six months time.
- 5.4 All RE Generators under REFIT require a Generation Licence issued by NERSA under the Electricity Regulation Act 2006.
- 5.5 Specific licence conditions for RE Generators will include:
  - i. reporting requirements on the amount of renewable energy generated and non-renewable energy;

- ii. monitoring and verification to ensure the credible production of renewable energy;
  - iii. termination conditions for non-compliance on the production of renewable energy.
- 5.6 Electricity produced by the RE Generator under REFIT will be sold to REPA subject to issuance of a Generation Licence.
- 5.7 REFIT only includes power generation from generators connected to the Transmission System and Distribution System and excludes off-grid power generation.
- 5.8 Qualifying plant shall also include project modernisation, repowering, expansion and additional capacity of existing sites for plant defined in Section 5.2. Only the additional capacity shall be deemed qualifying. Additional capacity generation shall be metered separately from existing generation through a dedicated power meter in accordance with the South African Grid Code.

## **6 Application Process**

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- 6.1 Applications to qualify as an RE Generator shall be made to the Regulator in conjunction with the application for a licence to generate electricity in terms of Section 11 of the Electricity Regulation Act, No. 4 of 2006.<sup>1</sup>
- 6.2 Applicants are required to state the specific REFIT technology and tariff category.
- 6.3 The agreed tariff will be set according to the base year in which the Generation License for the RE Generator is issued by the Regulator.
- 6.4 Approval of qualification for the REFIT shall be defined in the Generation Licence. This will specify the technology, the tariff approved, duration of the REFIT and other specific licensing conditions.

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<sup>1</sup> Application forms for a Generation Licence are provided on [www.nersa.org.za](http://www.nersa.org.za). Details on the application process are provided in Sections 11, 12, 13 and 14 of the Electricity Regulation Act 2006.

## **7 Tariffs**

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- 7.1 REFIT will apply to each technology category specified in section 5.2 and any additional technology categories add in future years.
- 7.2 The tariff schedule for the period 2009 is set out in Appendix 1.
- 7.3 Licensees awarded these tariffs will have them adjusted for inflation using the CPI or another suitable inflation index once per annum.
- 7.4 The Regulator will monitor uptake, taking into account the impacts of each REFIT in an annual tariff review. This will take place as part of the annual monitoring and review (Section 11).
- 7.5 A full tariff review will take place every year for the first five year period of implementation and every three years thereafter. The resulting tariffs will only be applicable to new projects.
- 7.6 Following the completion and end of the duration of the contracted REFIT tariff, the Generator shall be required to negotiate tariffs under market conditions applying at the time.

## **8 Rights and Obligations of Qualified Renewable Energy Power Generators**

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- 8.1 For RE Generators connecting to a Distribution System (i.e. "Embedded Generators") the provisions of the South African Distribution Code shall apply. For RE Generators connecting to the Transmission system the South African Grid Code applies. As defined in Section 8.4.1 of the Distribution Network Code, Embedded Generators of a nominal capacity greater than 10 MVA are subject to Section 3.1 of the Transmission Network Code.
- 8.2 RE Generators shall be guaranteed access to Distribution and Transmission networks subject to Section 8.1.
- 8.3 The connection can be to either Transmission or Distribution voltage networks, as appropriate.
- 8.4 The cost of connecting to the grid at the appropriate voltage level, ie the

shallow connection, shall be borne by the RE Generator in accordance with the Distribution/Transmission Tariff Code. Such costs may be financed by the Distributor/Transmitter in accordance with Section 12 of the Distribution /Transmission Tariff Code.

- 8.5 All RE Generators have the responsibility to ensure power production is from credible renewable energy sources. Failure to provide credible evidence on renewable energy power generation or evidence to prove that power was not produced from non-renewable sources could lead to the termination of the Generation Licence.

## **9 Rights and Obligations of the Regulator**

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- 9.1 The Regulator is responsible for the administration of the REFIT.
- 9.2 The Regulator shall act as the overall authority for verification of the electricity production from renewable energy sources. Inspection shall be carried out by REPA.
- 9.3 The Regulator shall maintain a database of qualifying renewable energy producers.
- 9.4 To prevent over subscription of REFIT, the Regulator shall be permitted to bring in capacity limits on specific technologies in the future.
- 9.5 The Avoided Cost amount for each year shall be established by the NERSA and published to enable REPA to calculate the total cost of the REFIT.

## **10 Rights and Obligations on the Renewable Energy Purchasing Agency (REPA)**

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- 10.1 REPA shall be obliged to enter into a PPA with RE Generators and make payment for renewable energy generated and supplied to the Distribution System and Transmission System under the REFIT.
- 10.2 Any wheeling charges incurred in purchasing power under the REFIT shall

be at the cost of REPA.

- 10.3 REPA shall be obliged to record the total annual cost of power purchased under REFIT including Wheeling Charges, calculate the difference with the cost of the same quantity of power produced at Avoided Cost, and to pass on this cost to consumers using existing 'pass through' arrangements.
- 10.4 The REPA has the right and the obligation to inspect RE Generators to verify production of renewable energy. For RE Generators with an installed capacity greater than 10MW, this shall be carried out annually by REPA. Below 10MW, this shall be carried out by random sampling.

## **11 Monitoring, Reporting and Review**

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### ***Regulator***

- 11.1 The Regulator shall be responsible for overall monitoring and review.
- 11.2 Data on the energy purchased under REFIT per technology band and the total cost of the REFIT shall be gathered and maintained by the Regulator through REPA.
- 11.3 The Regulator shall liaise with REPA and the National Control Centre to monitor dispatch issues arising from the connection and generation of power under REFIT.
- 11.4 By 1<sup>st</sup> June every year after the implementation of these guidelines, the Regulator shall publish a summary report on the progress achieved. This report shall include the following:
- i. Progress on the 2013 Renewable Energy Target and future national renewable energy targets;
  - ii. Update on the market introduction of the qualifying technologies including number of applications received, number of applications approved and number of projects implemented, detailing technology, size and geographic location;
  - iii. Financial impacts of the REFIT including the additional overall cost to electricity consumers and average percentage increase on electricity prices;

- iv. Changes or additions in qualifying technologies.

11.5 Every year after the implementation of these guidelines, the Regulator shall publish a report on the progress achieved. This report shall include the following in addition to the requirements in Section 11.4:

- i. Cost development and learning effect resulting from the market expansion of the technologies.

#### ***RE Generators***

11.6 RE Generators are required to adhere to the South African Grid Code and South African Distribution/Transmission Grid Code regarding planning information, operational information and post-dispatch information.

11.7 In addition to the monitoring and reporting requirements under the Generation Licence conditions, RE Generators are obliged to submit annual renewable energy power generation reports to the Regulator by 1st February of the following year. The report shall detail:

- i. The net maximum capacity of the renewable energy generation (MW);
- ii. The renewable energy sent out by the RE Generator (MWh);
- iii. Comments and feedback on the progress and success of the REFIT from the perspective of the RE Generator.

#### ***REPA***

11.8 REPA shall monitor and report on power production by RE Generators to the Regulator.

11.9 By 30<sup>th</sup> November each year, REPA in conjunction with the Regulator shall be required to prepare a projection on the estimated take up of new connections and power generation for the following year.

11.10 By 31<sup>st</sup> March each year REPA shall be obliged to report to the Regulator the cost of the energy purchased under REFIT over and above Avoided Cost and all additional costs associated with the implementation of REFIT, including Wheeling Charges and costs incurred in the management and implementation of REFIT by REPA.

## **12 Resolution of Disputes and Remedies**

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12.1 Any disputes arising out of these guidelines will be resolved according to Chapter V of the Electricity Regulation Act, 2006 (including the Regulations).

## Appendix 1: Tariff Schedule

Table A1.1: Full tariff schedule – 2009 (c/kWh)

| PARAMETER  | UNITS                  | WIND          | SMALL HYDRO   | LANDFILL GAS<br>METHANE | CONCENTRATED<br>SOLAR PLANT<br>(CSP),<br>PARABOLIC<br>TROUGH WITH<br>STORAGE (6 hrs<br>per day) |
|--|------------------------|---------------|---------------|-------------------------|---|
| Capital cost: engineering<br>procurement & construction<br>(EPC) | \$/kW                  | 2000          | 2600          | 2400                    | 4700  |
| Land cost  |                        | 5%            | 2%            | 2%                      | 2%  |
| Allowance for funds under<br>construction (AFUC)                 |                        | 4.4%          | 10.6%         | 4.4%                    | 4.4%  |
| Tx/Dx integration cost   |                        | 3%            | 3%            | 3%                      | 3%  |
| Storage (CSP)  |                        | -             | -             | -                       | 8%  |
| <b>TOTAL INVESTMENT COST</b>                                     | <b>\$/kW</b>           | <b>2255</b>   | <b>3020</b>   | <b>2631</b>             | <b>5545</b>   |
| Fixed O&M  | 2009\$/kW/yr           | 24            | 39            | 116                     | 66  |
| Variable O&M   | 2009\$/kWh             | 0             | 0             | 0                       | 0   |
| Economic life  | years                  | 20            | 20            | 20                      | 20  |
| WACC   |                        | 12%           | 12%           | 12%                     | 12%   |
| Plant lead time  | years                  | 2             | 3             | 2                       | 2   |
| Fuel type  |                        | renewable     | renewable     | renewable               | renewable   |
| Fuel cost  | \$/10 <sup>6</sup> BTU | 0             |               | 1.5                     | 0   |
| Fuel cost  | \$/kWh                 | -             | 0.00106       | -                       | -   |
| Heat rate  | BTU/kWh                | -             | -             | 13500                   | -   |
| Assumed load factor  |                        | 27%           | 50%           | 80%                     | 40%   |
| <b>Levelised cost of electricity<br/>production</b>              | <b>\$/kWh</b>          | <b>0.1247</b> | <b>0.0940</b> | <b>0.0896</b>           | <b>0.2092</b>   |
| Exchange Rate R/\$   | ZAR/\$                 | 10            | 10            | 10                      | 10  |
| <b>Levelised cost of electricity<br/>production</b>              | <b>R/kWh</b>           | <b>1.247</b>  | <b>0.940</b>  | <b>0.896</b>            | <b>2.092</b>  |

## Appendix 2: REFIT Explanatory Memorandum

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### 1: Introduction

#### Background

##### *The Benefits of Renewable Energy*

The generation of electricity from renewable energy in South Africa offers a number of socio-economic and environmental benefits. These benefits include:

*Increased energy security:* The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of supplementing the power available, particularly the role of cogeneration technologies in providing additional base load or peak load support. In addition, given that renewables can often be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, whilst reducing expensive transmission and distribution losses. Grid connected renewable energy can also provide an important source of backup power to critical installations such as emergency services, traffic lights and security apparatus in the event of a centralised power failure. Support in this regard includes the continued operation of key facilities such as social services centres, schools, clinics, telecommunications, and small businesses and other such facilities vital for poverty alleviation and socio-economic development.

*Resource saving:* Conventional coal fired plants are a major consumer of water during their requisite cooling processes. It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres, where compared with wet cooled conventional power stations. This translates into a revenue saving of R26.6 million. As an already water stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly as the detrimental effects of climate change on water availability are experienced in the future.

*Exploitation of our significant renewable energy resource:* At present, valuable national resources, ranging from biomass by-products and solar insolation through to tidal currents, remain largely unexploited. The use of these energy

flows will not only strength energy security through the development of a diverse energy portfolio, but reduce price shocks associated with conventional fuels.

*Pollution reduction:* The release of oxides of nitrogen and sulphur is a major by-product of fossil fuel burning for electricity generation. NO<sub>x</sub> and SO<sub>x</sub> have a particularly hazardous impact on human health, contributing to the formation of smog and exacerbating the spread of respiratory illness, as well as contributing to the development of acid rain and ecosystem degradation.

*Climate friendly development:* The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner, contributing to the mitigation of climate change through the reduction of greenhouse gas emissions. South Africa as a nation is estimated to be responsible for 1% of global GHG emissions and is currently ranked 9<sup>th</sup> worldwide in terms of per capita CO<sub>2</sub> emissions. The development of proper incentives to promote renewable energy is a key component in taking ambitious actions to mitigate climate change, an objective put forward by the South African delegation to the Bali Conference of the Parties in December 2007.

*Support for international agreements and enhanced status within the international community:* The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.

*Employment creation:* The sale, development, installation, maintenance and management of renewable energy facilities has significant potential for job creation in South Africa, particularly given that many of these technologies are labour intensive in comparison to their conventional counterparts. It is estimated that the achievement of the targets within the Renewable Energy White Paper will result in an additional 20,500 jobs being created, both directly and indirectly, in comparison to the development of conventional coal based technologies. In addition, the development of renewable energy beyond the 10,000GWh target holds further employment benefits and would maximise the number of jobs created per TWh.

*Acceptability to society:* Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem

health and climate friendly development. Increasing awareness amongst national leaders and general populations alike of the importance of playing at least some part in combating climate change, highlights the role of renewable energy in supporting energy futures that are considered socially acceptable and just to future generations.

*Support to a new industry sector;* The development of renewable energy offers the opportunity to establish a new industry within the South African economy. The development of this industry also makes available a variety of export and service led commercial opportunities, not simply in South Africa but within Sub-Saharan Africa also.

*Protecting the natural foundations of life for future generations:* Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change; thereby securing the natural foundations of life for generations to come.

#### ***South African Experience in Renewable Energy Development***

At present, South Africa is some way off from exploiting the diverse gains from renewable energy and from achieving a considerable market share in the renewable energy industry. South Africa's electricity supply remains heavily dominated by coal based power generation, with the country's significant renewable energy potential largely untapped to date. Currently, a significant contribution of renewable energy to primary energy supply occurs though the use of traditional biomass (resulting in large-scale indoor air pollution and often occurring through unsustainable deforestation practices).

South Africa is blessed with high levels of renewable energy potential, including an abundant wind resource (particularly strong along coastal areas), amongst the highest levels of solar radiation in the world and excellent potential for the use of pulp and paper, bagasse and other biomass by-products in energy generation. For example, it is estimated that biomass by-products alone could provide in excess of 12,900 GWh of electricity per annum. The Darling Wind Farm, the first Independent Power Producer in South Africa, has also recently signed a power purchase agreement to supply green electricity to the City of Cape Town, with the facility supplying 5.2MW of power in its first phase. The DME has also established a Renewable Energy Finance and Subsidy Office (REFSO) which manages the

provision of a one-off capital grant to projects employing proven renewable energy technologies with a maximum capital cost of less than R100 million.

Within a policy framework, the development of renewable energy in South Africa is supported by the White Paper on Renewable Energy (November 2003), which has set a target of 10,000 GWh renewable energy contribution to final energy consumption by 2013. The target is to be achieved primarily through the development of wind, biomass, solar and small-scale hydro. DME's macro-economic study of renewable energy, developed under the now completed Capacity Building in Energy Efficiency and Renewable Energy (CaBEERE) project, has established that the achievement of this target would provide a number of economic benefits, including increased government revenue amounting to R299 million, increased GDP of up to R1 billion per year and the creation of an estimated 20,500 new jobs. In addition, the development of renewable energy beyond the 10,000 GWh target holds further employment benefits and would maximise the number of jobs created per TWh.

### **Mechanisms for Promoting Renewable Energy**

#### ***Different Mechanisms Considered***

Three broad categories of mechanisms for delivering a sustainable renewable energy market in South Africa have been considered by DME and NERSA, namely:

1. Mandated targets or a renewable energy obligation or renewable energy portfolio standard
2. Tendering systems
3. Guaranteed pricing or feed-in tariffs

Under mandated targets for renewable energy, also referred to as a renewables obligations or renewable energy portfolio standard, governments stipulate that a certain share of grid connected electricity capacity must be derived from renewable energy. Mandated targets tend to be more effective in liberalised electricity markets and economies with established renewable energy industries. Internationally, mandated targets have been less effective than feed-in tariffs in promoting renewable energy and in achieving renewable energy targets.

Under a tendering system, potential renewable energy developers bid either for power purchase agreements, or for access to a renewable energy fund, on a competitive basis. Tendering systems tend to favour established businesses and can allow existing companies to keep potential competitors out of the market by bidding low on projects, regardless of whether or not the company has any intention or ability to actually build the renewable energy project.

Under a feed-in tariff, renewable energy developers receive a set price for the electricity generated. This provides considerable market certainty to investors and has been effective worldwide in promoting renewables and developing an indigenous renewable energy industry. In the South African context, with a lack of competitive markets or established renewables industry, the feed-in tariff system is preferred as the most effective means for creating sustainable market conditions for the growth of a renewable energy industry.

#### ***Advantages of a Feed-In Tariff***

The benefits of adopting a feed-in tariff (FIT) are summarised below:

- The penetration of renewable energy into the market largely hinges on investment security. With a FIT, the risk premium required by investors can be minimised by the high level of price security in the system. Tariffs provided are high enough to cover investment costs and provide a reasonable rate of return.
- FIT have a strong track record, having proven to be successful internationally.
- The use of FITs improves access to finance for developers, which in turn promotes the development of an indigenous renewable energy industry. The development of a robust industry in turn encourages job creation and opens up opportunities for black economic empowerment and the integration of historically disadvantaged people during industry initiation and expansion.
- The long term certainty provided stimulates investment in relevant technology, training and building capacity
- A FIT mechanism is characterised by low (to medium) administration and transaction costs. The costs to society of the mechanism are also low in the short, medium and long term, and result in a number of ancillary

benefits.

- In the long term, establishment of a renewables industry sector drives down the cost of renewable energy power generation due to learning effects and the development of institutional expertise. This renders renewables more competitive with conventional technologies whilst driving down costs for consumers.
- Opportunities available within the sector to refurbish and extend current facilities such as bagasse and hydro generation facilities can be more easily exploited, with concurrent benefits for improved quality and security of electricity supply.
- The price security of a FIT encourages the promotion of a wide portfolio of technologies and provides opportunities for new operators to make a sizeable contribution to the generation mix.

#### ***Further Drivers for the Development of Feed-In Tariff***

The development of a FIT is motivated by a number of drivers, not least of which are the various socio-economic and environmental benefits of renewable energy highlighted above. Additional locally relevant drivers assessed and considered in the development of a FIT include:

- Government's stated target of a 10,000 GWh contribution to final energy demand in 2013 from renewable energy. Currently the achievement of this target is lagging behind and substantive measures are required to achieve these objectives.
- Uncertainty regarding current support mechanisms, such as the provision of a one-off capital subsidy to renewable energy projects, and their ability to facilitate effective market entry for new developers, and whether the current mechanisms are sufficient to achieve the national renewable energy target.
- The current and ongoing electricity shortages which are expected to continue for the medium term as the economy and demand for energy grows, and new generation capacity is under development. The introduction of additional generation capacity to the grid is a high priority, but requires the provision of an environment conducive to investment.
- The development of the Pilot National Cogeneration Programme (PNCP), including the potential addition of a further 5,000 MW to the national grid as part of the initial bidding session.

- The need for a regulatory framework to promote the deployment of renewable energy, particularly to ensure a stable income stream for renewable energy investments.
- Provision of regulatory support to renewables by NERSA in a variety of areas including the 'Policy Framework for Renewable Energy Independent Power Producers' and the modelling of scenarios with the cumulative renewable energy target in the third National Integrated Resource Plan (NIRP3). The development of a FIT is supported and informed by these policy and planning frameworks, and in turn, realises the renewable energy investments envisaged by these frameworks.

### ***Key Principles of the FIT***

There are a number of important elements to a good renewable energy feed-in tariff. These elements include:

- Providing tariffs for all potential developers;
- Ensuring financial security;
- Removing barriers to grid connection;
- Developing an appropriate and streamlined administrative and application process;
- Ensuring public acceptance of the FIT mechanism;
- Limiting and moderating producer surplus.

Initial stakeholder consultation for the FIT emphasised the need for simplicity in the early stages. It was agreed that in order to kick start the process it was necessary to develop simple and easy to implement guidelines. While this may prevent some projects from happening in the initial stages, for example due to their small size outweighing the transaction costs and complexities of applying for a generation licence and finalising a PPA, or due to the price not taking into account certain features, for example technological or geographical, in the long run, enabling a fast track and simple system to be put in place will provide support and impetus for the renewable industry as a whole.

It has been proposed that this initial phase be reviewed every year for the first five-year period of implementation and every three years thereafter and a programme be developed to establish full legislation for the REFIT. Legislation is standard practice international to establish feed-in tariffs and would enable the process to

be all encompassing.

The key principles which under pin the establishment of the Renewable Energy Feed in Tariff (REFIT) in South Africa include:

- i. Guaranteed access to the National Grid;
- ii. Guaranteed purchase price for a fixed duration;
- iii. An obligation to purchase and to discharge the power generated;
- iv. Burden sharing of the additional cost throughout electricity consumers;
- v. A dynamic mechanism that reflects market, economic and political developments;
- vi. for new projects as a result of learning effects and cost reductions;
- vii. The potential to set a cap on the maximum available subsidy per year;
- viii. A willing seller, willing buyer approach still applies.

## **2: Purpose**

Under its mandate to determine the prices and conditions under which electricity prices may be supplied by a licensee through the National Energy Regulator Act, 2004 (No. 40 of 2004) and Electricity Regulation Act, 2006 (No. 4 of 2006), and in line with the White Paper on Renewable Energy 2003, NERSA has developed these guidelines to establish and implement a Renewable Energy Feed in Tariff (REFIT).

## **3: Scope and Objective**

### ***Mandate of NERSA***

The National Energy Regulator Act No. 40 of 2004<sup>2</sup> as read with the Electricity Regulation Act 4 of 2006<sup>3</sup> sets out the mandate of the National Energy Regulator (NERSA).

The Electricity Regulation Act establishes the national regulatory framework for the electricity supply industry and provides that NERSA is the custodian and enforcer of this regulatory framework.

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<sup>2</sup> Section 4(1) c

<sup>3</sup> Section 4

NERSA's functions can be categorized as follows:

**(i) Licensing**

NERSA must consider applications for:

- a. the operation, transmission and distribution facilities;
- b. the import and export of electricity; and
- c. trading of electricity.

Having considered these applications, NERSA may then issue licenses for these. In instances where persons are not required to hold a license, NERSA should register these persons.

**(ii) Regulation of Tariffs<sup>4</sup>**

NERSA must regulate prices<sup>5</sup> and tariffs<sup>6</sup>.

**(iii) Implementation of Policy<sup>7</sup>**

In order to regulate the industry further, NERSA duties include issuing rules designed to implement:

- a. the national government's electricity policy framework;
- b. the integrated resource plan; and
- c. the Electricity Regulation Act.

**(iv) Information System<sup>8</sup>**

NERSA must establish and manage:

- a. monitoring and information systems; and
- b. a national information system.

In addition, NERSA must co-ordinate the integration of these systems with other relevant information systems.

**(v) Compliance<sup>9</sup>**

As the Regulator, NERSA's role is to enforce performance and compliance, and

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<sup>4</sup> Section 4(a)(ii) of the Electricity Regulation Act 2006

<sup>5</sup> The Electricity Regulation Act defines price as a charge for electricity

<sup>6</sup> The Electricity Regulation Act defines tariff as a charge for electricity

<sup>7</sup> Section 4(a)(iv) of the Electricity Regulation Act 2006

<sup>8</sup> Section 4(a)(v) of the Electricity Regulation Act 2006

<sup>9</sup> Section 4(a)(vii) of the Electricity Regulation Act 2006

take appropriate steps in the case of non-performance. In order to do this, NERSA may undertake investigations and inquiries into the activities of licensees.

**(vi) Mediation of Disputes<sup>10</sup>**

NERSA must mediate disputes between generators, transmitters, distributors, customers or end users.

Under this mandate, it is therefore interpreted that NERSA is authorised to establish guidelines for the implementation of a renewable energy feed-in tariff.

These guidelines are to be used in conjunction with the relevant legislation and regulations already in place, including the Energy Regulator Act 2004, the Electricity Regulation Act 2006, Generation Licence application procedures, and transmission and distribution grid codes.

The overall objectives of the REFIT are to achieve national renewable energy generation targets by establishing an equal playing field with conventional electricity generation. This fiscal and financial support mechanism will allow renewable energy to compete with fossil fuel-based technologies. It is generally accepted that coal-based generated electricity does not fully account for the future escalated cost of conventional electricity generation, for adverse social and environmental impacts, as well as reduced transmission and distribution costs associated with renewable energy sources as a result of embedded generation.

#### **4: Purchase Obligation**

Without a fully fledged market being in place in South Africa for the buying and selling of renewable energy, there needs to be a mechanism and an obligation on an appropriate institution to purchase the electricity generated. A single buyer approach is proposed as the most appropriate model in line with the aim to keep the process simple and avoid complexity in its initial phases and also due to the emerging status of the renewables market and private sector participation in the electricity sector in the country. A single buyer model is also tried and tested in many other countries implementing a feed-in tariff.

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<sup>10</sup> Section 4(b) of the Electricity Regulation Act 2006

In terms of whether NERSA can impose a legal obligation on Eskom to be the purchase authority, this can be done through Eskom license conditions.

Section 15 of the Electricity Regulation Act allows for NERSA to insert license conditions that relate:

- a. the duty or obligation to trade, or to generate, transmit or distribute, electricity<sup>11</sup>;
- b. the persons from whom and to whom electricity must or may be bought or sold<sup>12</sup>;
- c. the types of energy sources from which electricity must or may be generated, bought or sold<sup>13</sup>.

Section 17 of the Electricity Regulation Act allows for the variation of license conditions or inclusion of additional license conditions:

- a. on application by the licensee;
- b. with the permission of the licensee;
- c. upon non-compliance by a licensee with a license condition;
- d. if it is necessary for the purposes of this Act; or
- e. on application by any affected party.

Considering Eskom's support for renewable energy development and their engagement with NERSA on this matter it is proposed that Eskom's license condition can be amended, with the permission of Eskom, due to the need to promote the use of diverse energy sources and energy efficiency<sup>14</sup>

In addition, according to the 'Statement on Cabinet Meeting of 05 September 2007', Cabinet resolved that Eskom be designated as the single buyer of power from Independent Power Producers (IPPs) in South Africa. Eskom will be responsible for ensuring that adequate generation capacity is made available and that 30% of the new power generation capacity is derived from IPPs.

The details and full impacts of the Cabinet Decision are still to be developed with regard to the obligations and rights of Eskom. If Eskom is only obliged to buy

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<sup>11</sup> Section 15(1)(m) of the Electricity Regulation Act 2006

<sup>12</sup> Section 15(1)(q) of the Electricity Regulation Act 2006

<sup>13</sup> Section 15(1)(r)

<sup>14</sup> This is listed in section 2(e) of the Act as one of the objects of the Act

power from IPPs, this still permits IPPs to sell to other buyers. However, if Eskom has the right to be the single buyer, then this may restrict sales to buyers in the green market. In addition, even if Eskom has the right to be the single buyer, they still may not be interested in purchasing electricity from small renewable energy generators, having indicated a cut off at a certain minimum capacity for generators. Nevertheless, Eskom is the most appropriate vehicle at this moment in time to purchase renewable energy generator power.

A Renewable Energy Purchasing Agency (REPA), with Eskom appointed to initially manage and implement this entity, allows for the establishment of a single purchasing obligation, but at the same time future proofs the system for wider expansion and restructuring of the Electricity Supply Industry (ESI). Based on the establishment of a REPA; at a later stage this entity could be transferred to a separate body if required. In the future, once the REDs have been established, there may be a need to revise the structure of the REFIT and allow the REDs to also purchase renewable energy. This can be further developed in the detailed legislation, regulations and guidelines for the establishment of the REDs and the transfer of responsibility from Eskom.

It is considered important to attempt to maintain some form of separation from other parts of the Eskom business, due to the fact that Eskom Generation would also be applying for a REFIT and therefore there could be a perceived conflict of interest.

The purchase of power from small projects may not be in the interest of Eskom, which is more inclined to develop large power projects, however it is necessary that the purchase obligation applies to all projects. In the REFIT's initial stages, whilst a renewable energy industry is being established, it is expected that there may be a number of small projects introduced as industry tests the market. In addition, there is lot of interest from small developers and individuals looking at getting involved with renewable energy, creating greater awareness and economic activity in this area.

The interpretation of the Cabinet Decision on the Single Buyer in relation to REFIT also indicates that this should not restrict private developers from generating renewable energy and selling this outside of this programme to other parties.

### ***Tariff Equalisation – Cost Pass Through***

The distribution of the additional costs of renewable energy power generation is a key factor in the establishment of the REFIT. The overall benefits are considered to be passed on to the whole nation, whilst the liabilities of not investing in renewable energy will impact nationally, regionally and globally. However, this has to be balanced with the development needs of the country and the present economic and social inequity.

The additional costs of purchasing power under REFIT above Avoided Costs shall be passed on to all Eskom consumers under existing "pass-through" arrangements which are currently in place for IPPs. This will enable greater simplicity in the implementation of the programme and avoids disrupting existing tariff programmes.

It is noted that the distribution of costs for the REFIT only applies to Eskom consumers and it excludes municipalities that generate and distribute their own power to consumers within their boundaries. This has been excluded both to ensure simplicity but also due to outstanding debates on the legalities regarding the Regulator's involvement in Municipal Distribution. For those municipalities that purchase power from Eskom, the additional cost will therefore be passed on. However, to create a system that passes this cost on directly to cover every single consumer would add much greater complexity and costs in its management. In addition, Municipal generation is only 0.5% of the total national generation capacity. All of the power purchased from Eskom will include the cost contribution for REFIT and therefore the impacts from municipal generation is considered minimal.

In order to calculate the cost of implementing REFIT and therefore the additional cost of generation from renewable energy in the country, there is a need to calculate and disclose the Avoided Cost of generation in the country on an annual basis.

### **5: Renewable Energy Power Generator Qualification Criteria**

The criteria and technology choice have been established through the Renewable Energy White Paper Policy of 2003.

Other REFIT qualifying technologies will be considered for inclusion in six (6) months time after the approval of the REFIT phase one as this is the starting point not the end point of the REFIT development.

Concentrating Solar was included in the technology choice due to recent activities in the country in the development of concentrating solar power generation plant.

For RE Generators that intend to generate power for consumption on site, but are connected to either the Transmission System or Distribution System, the REFIT will only apply to renewable power that is exported and purchased by REPA. The renewable power generated shall be metered through a dedicated power meter in accordance with the South African Grid Code.

During initial stakeholder discussions in the development of the REFIT, the underlying message was to maintain simplicity. A simple REFIT will be easy to implement quickly - the greater the complexity of the REFIT the more chance of delays or confusion in its implementation.

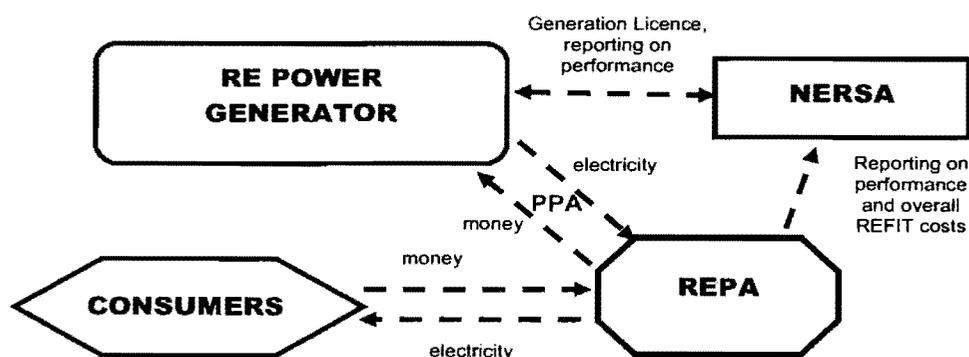
It was suggested by some stakeholders that a single REFIT could be applied for all technologies for even greater simplicity, however it was accepted that a single REFIT would provide excessive benefits for some technologies while leaving others marginal or just outside of the scope and not financially viable.

In highly developed electricity markets with larger and more established renewable energy sectors, more complex feed-in tariffs are appropriate. This would include greater scope for addressing size of installation, geographical value of renewable energy, local generation, year of plant operation, operational season etc. It is recommended that once the first phase of the REFIT is up and running, the second phase can begin to address some of these issues, building on the lessons learned from the first phase.

Small scale hydro is defined as 1-10MW. It is not expected that projects below 1MW (mini, micro and pico) will apply for the REFIT during the initial phases, due to the high transaction costs incurred in applying for licences, negotiating PPAs etc.

## 6: Application Process

Figure A3.1 provides an overview of the REFIT structure and process:



**Figure A3.1: REFIT Structure and Process Outline**

Project developers will be required to make an application to NERSA to qualify for the REFIT subsidy as part of the Generation Licence application. A Qualified RE Generator under REFIT also needs to fulfil all of the obligations under a standard Generation Licence application. The application for a license to generate electricity is available on the NERSA website.

The issue of a simplified methodology and fast-tracking for small producers (e.g. <10MW) was considered, however, according to the Electricity Regulation Act 2006, all generators of electricity that are connected to the grid must apply for a Generation Licence, which has set criteria and procedures. It is proposed that Phase II of the REFIT addresses this issue to widen the scope of the REFIT and support small scale power producers. This could be developed as a specific legislation or amendments to existing legislation.

## 7: Tariffs

The tariffs under the REFIT Guidelines have been established through the Levelised Cost of Electricity calculated for discount rate 12%.

The FIT were adjusted using the latest publicly available international cost and performance data for renewable energy sources and the screening curves (levelised cost) model of the National Integrated Resource Plan 3 (NIRP3):

| Technology         | Unit  | REFIT |
|--------------------|-------|-------|
| Wind               | R/kWh | 1.25  |
| Small hydro        | R/kWh | 0.94  |
| Landfill gas       | R/kWh | 0.90  |
| Concentrated solar | R/kWh | 2.10  |

## 8: Rights and Obligations of Qualified Renewable Energy Power Generators

Guaranteed access to the network and guaranteed dispatch rights are essential components of the REFIT. However in line with this, RE Generators are obliged to adhere to national standards for connection, operations and reporting under the South African Grid Code and the South African Distribution Code as appropriate.

RE Generators situated within a municipality distribution area will be viewed as an Eskom supply point in addition to any other supply points where the Distributor receives power from Eskom.

A key factor within REFIT is to ensure that the power generated is from credible renewable sources of energy. It has been proposed that verification is carried out by REPA on an annual basis. However, it would not be viable to inspect every small plant, therefore a cut off of 10MW has been set, below which random sampling is carried out. Although it is theoretically possible that some unscrupulous generators may get away with claiming REFIT for non-renewable power generation, it is believed that the threat of termination of the Generation Licence is sufficient to deter this.

## 9: Rights and Obligations of the Regulator

The Regulator shall have overall responsibility for the REFIT and for ensuring its smooth implementation and monitoring, although the day to day activities will be the responsibility of REPA.

Should take up of the REFIT be exceptionally high, either overall or in a particular technology, the Regulator will be permitted to set a capacity limit on each technology to prevent over subscription and therefore avoiding excessive consumer price increases.

### **10: Rights and Obligations of the Renewable Energy Purchasing Agency (REPA)**

REPA will be the institution responsible for handling the day to day operations of the REFIT in terms of purchasing power, monitoring the performance of RE Generators and passing through the cost to consumers.

Projections of REFIT take up for the following year by NERSA and REPA for both monitoring and also calculating the tariff pass-through will be based on estimations from actual applications received and commissioning dates. Due to the average EPC lead time of three years, REPA will be able to make fairly accurate projections of when the RE Generators will come on line. Applicants will have been required to state generation capacity, availability, and any seasonality issues.

The projections will be made by REPA prior to the year in question and will be reconciled and equalised the following year.

### **11: Monitoring and Review**

The monitoring and review of the REFIT are critical for its long terms success and for the establishment of a more comprehensive and robust second phase.

This monitoring will ensure that the REFIT is in harmony with future energy policies and targets and with national climate change targets and objectives. The monitoring will assist in reviewing the total renewable energy contribution in the country and will assist DME in the development and monitoring of long term renewable energy targets.

## **12: RESOLUTION OF DISPUTES**

The resolution of disputes and resolution is defined as per the Electricity Regulation Act 2006.

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