NERSA Consultation Paper

Renewable Energy Feed - In Tariff

December 2008

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ABBREVIATIONS

DME	Department of Minerals and Energy
ESD	Energy for Sustainable Development
EIA	Environmental Impact Assessment
FIT	Feed – In Tariff
IPP	Independent Power Producers
NERSA	National Energy Regulator of South Africa
PDG	Palmer Development Group
PPA	Power Purchase Agreements
REFIT	Renewable Energy Feed – In Tariff
REPA	Renewable Energy Purchasing Agency
RE	Renewable Energy

1. INTRODUCTION AND BACKGROUND

South Africa has a high level of renewable energy potential and presently has in place a target 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.

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.

The Renewable Energy Feed-in Tariff (REFIT) study of NERSA was commissioned in June 2007. The objective of the study is to develop an appropriate regulatory framework for implementing a feed in tariff mechanism for achieving the Government's 10 000GWh renewable energy target by 2013 and sustaining growth beyond the target date.

The regulatory framework guidelines consist of the following main sections:

1) Purchase Obligation
2) Renewable Energy Power Generator Qualification Criteria
3) Tariffs
4) Rights and Obligations of Qualified Renewable Energy Power Generators
5) Rights and Obligations on the Regulator
6) Rights and Obligations on the Renewable Energy Purchasing Agency (REPA)

7) Monitoring, Reporting and Review
8) Termination
9) Resolution of Disputes and Remedies

2. SOUTH AFRICAN RENEWABLE ENERGY FEED – IN TARIFF (REFIT)

2.1 Purchase Obligation

Eskom Distribution shall be appointed as the Renewable Energy Purchasing Agency, hereinafter referred to as REPA, through amendments to their Distribution Licence.

The appointment of Eskom Distribution 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.

For projects awarded licences by the Regulator under REFIT, REPA is obliged to purchase the power, subject to fulfillment of all necessary licence conditions.
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 fulfillment of necessary licence conditions.

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.

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.

Any wheeling charges incurred in purchasing power under the REFIT shall be at the cost of REPA.

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.

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.

The Regulator shall be responsible for the overall monitoring and review.
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.

It is proposed that this is expanded to full PPA to remove the delays and costs involved in bilateral arrangements and the development of individual PPAs, especially for small power.

2.2 Qualifying principles for Renewable Energy Feed – In Tariff

The qualifying principles for Renewable Energy Power Feed – in Tariff projects have been established by NERSA in response to national policy direction, in the Draft report entitled '***Renewable Energy Feed -In Tariff Guidelines***', available in **Appendix A**.

In order for a project to qualify as Renewable Energy, the electricity should be produced by means of 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.

A qualifying Renewable Energy Power Generator shall be defined as a new investment 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 plant.

Biomass Pulp and Paper and Sugar Bagasse power generation have been excluded from the initial REFIT, due to their inclusion in the Pilot National Cogeneration Programme (PNCP). Having the technology appear in both programmes could create confusion with potential developers.

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

Qualification of other renewable energy technologies may be included in the subsequent years subject to the annual programme review.

All RE Generators under REFIT require a Generation License issued by NERSA under the Electricity Regulation Act No 4 of 2006.

Specific license 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.

Electricity produced by the RE Generator under REFIT will be sold to REPA subject to issuance of a Generation License.

REFIT only includes power generation from generators connected to the Transmission System and Distribution System and excludes off – grid power generation.

Qualifying plant shall also include project modernisation, repowering, expansion and additional capacity of existing sites for plant. 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.

Additional capacity for modernized subsequent hydro power plant with an installed capacity up to a maximum of 50MW shall qualify as renewable energy if the plant is modernised subsequent to 1 April 2008 and the modernisation has resulted in an increase in the electrical energy of at least 15%.

2.3 REFIT

The tariffs under the REFIT Guidelines have been established through the development of a bespoke spreadsheet – based tariff model that analyses and quantifies the key policy framework decisions. The key data input for the REFIT is based on DME's Macro Economic Study[1] as well as additional data provided from the NIRP3 process for Concentrating Solar Technology.

[1] *Economic and Financial Calculations and Modeling for the Renewable Energy Strategy Formulation,* Final Report, February 2004, Department of Minerals and Energy Pretoria, Capacity Building in Energy Efficiency and Renewable Energy Report No. 2.3.4 – 19. The levelised costs for renewable energy technologies established in this study were adjusted upwards to take into account high inflation in the price of commodities such as steel since 2004. In addition, a discount rate of 12% was used instead of that of

The tariff schedule for the period 2008 to 2013 has been set out along with tariff period and rate digression as illustrated in Tables 2 and 3 below:

Table 2: Full tariff schedule – 2008 to 2013 (c/kWh)

Technology Type	2008	2009	2010	2011	2012	2013
Wind	65.48	63.87	62.31	60.78	59.29	57.84
Hydro	73.76	73.34	72.92	72.51	72.10	71.69
Landfill gas	43.21	42.71	42.21	41.72	41.23	40.75
Concentrating solar	60.64	60.03	59.43	58.84	58.25	57.67

Note: These tariffs are in constant Rand 2008 and will be indexed on the basis of an appropriate regulatory index

Table 3: Tariff duration and rate degression

Technology Type	Years	Rate Degression (%)
Wind	15	2.45
Hydro	15	0.57
Landfill gas	15	1.16
Concentrating solar	15	1.00

International Tariff comparison was carried out as a review of the proposed REFIT compared to feed – in tariff in other countries. The table below provides a summary of the relevant tariffs. The review focuses on Wind and Hydro as this was the most readily available and compared data. The data for Kenya was sourced from the national Feed – in Tariff policy from March 2008. All other data is provided from the following link: *http://www.wind-works.org/FeedLaws/TableofRenewableTariffsorFeed-InTariffsWorldwide.html* This review was updated in July 2008.

Table 4: International Tariff Comparison

First Year Renewable Tariffs in US$/kWh		
	Wind	Hydro
Austria	0.119	

10% used in the Macro Economic Study. The intention is to provide a FIT that encourages rapid development of renewable energy in South Africa, so a more generous discount rate was regarded to be appropriate.

Brazil	0.087	0.061
Czech Republic	0.136	
France	0.132	0.086
Germany 2008	0.126	0.116
Minnesota C-BED	0.048	
Ontario	0.108	0.108
Portugal	0.124	0.129
Spain (2007 RD)	0.119	
Turkey	0.079	
Kenya	0.090	0.08-0.12
SOUTH AFRICA	**0.083**	**0.093**

As can be seen from the above table, the tariffs proposed in Table 2 above are close to international standards. This provides confidence in the data analysis processed.

2.4 Methodology for calculation of Renewable Feed – In Tariff (REFIT)

The 'Economic and Financial Calculations and Modelling for the Renewable Energy Strategy Formulation" report from the DME formed the basis for deciding on how an IPP portfolio should be structured, together with inputs from the study team and appointed consultants.

This study established the levelised costs in c per kWh for a range of renewable energy technologies and it was agreed that the costs developed in this study would be used in the FIT work.

The Renewable Energy Feed – In Tariff pricing model developed by two consultants ESD and PDG has the following objectives:

- Create an enabling environment for renewable electricity power generation in South Africa;
- 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;
- Create a dynamic mechanism that reflects market, economic and political developments;
- It meets a user specified renewable energy targets for 2013;
- It allows for a separate tariff set per technology
- It also meets a single national Renewable Energy Target.

The model is arranged as a least-cost model to meet a user-specified renewable energy target for 2013, based on a specified set of RE technology supply curves. The model is currently set-up to run over 15 years, to 2022, and to meet the national RE target. The model (and the FIT itself) therefore runs beyond 2013 as

the majority of RE projects will have project lives beyond the 2013 target date. The model runs in real terms and hence the tariffs ongoing are not inflation adjusted.

A specified avoided cost of conventional power generation is assumed in the model for calculating the impact on consumers. No reliable data on avoided costs was available at the time of modelling, and so an avoided cost of 35 c/kWh for conventional power generation was assumed.

Full details of the model and assumptions used in the calculation of the tariffs are provided in **Appendix B** to this paper. The Excel model is illustrated in **Appendix C.**

2.5 Evolution of REFIT qualifying principles

A full tariff review will take place every three years to assess the uptake, major technology developments and the need to revise future tariffs.

By 1st of June every year after the implementation of REFIT 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.

By 1st of June every three years after the implementation of REFIT guidelines, the Regulator shall publish a report on the progress achieved. This report shall include the following in addition to the requirements in Section 13.

i. Cost development and learning effect resulting from the market expansion of the technologies;
ii. Proposed adjustments in tariffs, duration periods and degression rates for new installations.

2.6 Proposed Licensing process

Licensing is critical to early commissioning of the Renewable Energy Generation projects and is seen as requiring fast-track approach.

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

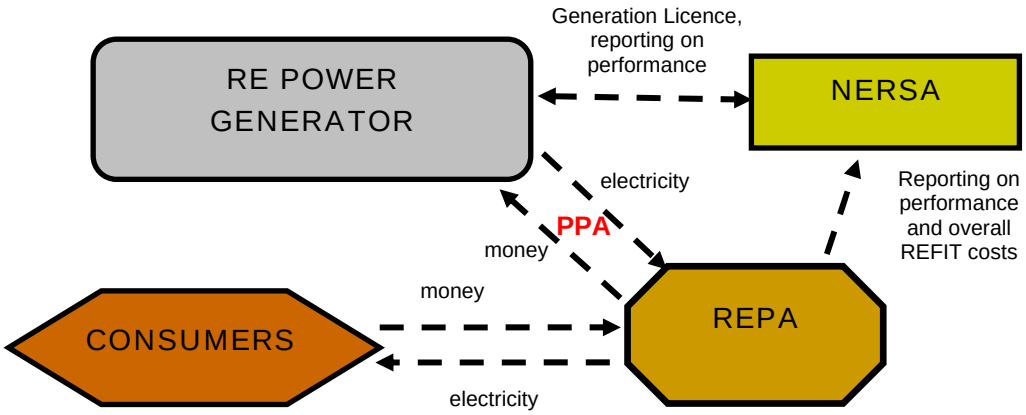

Fig 1: REFIT structure and process

The proposed process in terms of the Electricity Regulation Act No 4 of 2006 for RE facilities is summarized in Table 3 below:

Project developers will be required to make an application to NERSA to qualify for the REFIT subsidy as part of the Generation License application. A qualified RE Generator under REFIT also needs to fulfill all of the obligations under a standard Generation License application illustrated in **Appendix D.**

2.7 Way Forward

In order to kick start the process it was necessary to develop simple and easy implementation 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 license and finalizing 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 and simple system to be put in place will provide support and impetus for the renewable industry as a whole.

Further the emerging long-term framework should be considered in the context of the recent designation of Eskom as the single buyer of the power produced by Independent Power Producers (IPP) in South Africa. The 6000GWh will be divided between Eskom (40%) and IPP (60%).

In that context and in line with the Renewable Energy Feed – in Tariff guidelines it is proposed that

a) Eskom Distribution License conditions be modified so that they become the purchase authority;

b) A Renewable Energy Purchasing Agency (REPA), with Eskom Distribution 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 Distribution.

c) Independent Power Producers will have to follow the RE Generation application process.

3. STAKEHOLDERS INPUTS REQUESTED

Stakeholders are requested to provide comments on the following:

1. Renewable Energy Feed – In Tariff

2. Adequacy of the assumptions used in the pricing model

3. Any other comments or proposals to the Energy Regulator related to the Renewable Energy Feed – in Tariff guidelines

4. NERSA PROCESS FOR APPROVAL OF REFIT

The following process and timelines have been served to the Energy Regulator for approval of the Renewable Energy Feed – In Tariff guidelines:

Table 6: Timelines for approval of cogeneration guidelines

TIMELINES FOR APPROVAL OF RENEWABLE ENERGY FEED IN TARIFF	
ITEM/ACTIVITY	**ACTUAL/TARGET DATE**
1.Completion of the consultation paper	30-10-08
2.Electricity Subcommittee meeting approves process, timelines and consultation paper	10-12-08
3. Publication of NERSA consultation paper and invitation for written public comments	15-12-08
4. Deadline for submitting written public comments to NERSA	15-01-09
5.Closing date for registering to attend and/or present at the Public Hearing	15-01-09
6. Public Hearing	**05-02-09**
7.Electricity subcommittee consider recommending to the Energy Regulator	25-02-09
9. Energy Regulator approval of the Renewable Energy Feed – In Tariff	09-03-09

These dates are still indicative pending the approval of the NERSA schedule of meetings for 2009.

Stakeholders are invited to comment on the NERSA Renewable Energy Feed – In Tariff Consultation paper and the comments should be sent to the following: Mr Sibusiso Zungu at 526 Vermeulen Street, Kulawula House, Arcadia, Pretoria or PO Box 40343, Arcadia 0007 Pretoria, or email at *refit2008@nersa.org.za*. The consultation documents will be available on the NERSA Web site: *www.nersa.org.za*

The deadline for submission of comments on the Renewable Energy Feed – In Tariff is 15 January 2009.

APPENDIX A: RENEWABLE ENERGY FEED – IN TARIFF GUIDELINES

Available as a separate publication on NERSA Web site *http://www.nersa.org.za/SectionsDocuments.aspx?Section=3&Doc=15*
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APPENDIX B: MEMO ON ADDITIONAL PROGRAM ACTIVITIES: DETAILED TARIFF REVIEW

Available as a separate publication on NERSA Web site *http://www.nersa.org.za/SectionsDocuments.aspx?Section=3&Doc=15*

APPENDIX C: REFIT model

Available as a separate publication on NERSA Web site
http://www.nersa.org.za/SectionsDocuments.aspx?Section=3&Doc=15

APPENDIX D: GENERATION LICENSE APPLICATION

Available as a separate document publication on the NERSA Web site:
http://www.nersa.org.za/UploadedFiles/ElectricityDocuments/Electricity%20Licence%20Application.pdf