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**PARLIAMENT**  
OF THE REPUBLIC OF SOUTH AFRICA

# **A Conference paper on Renewable Energy Policies in South Africa**

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## INTRODUCTION

- Energy sector appears to be getting substantial attention, because energy is a requirement for social and economic development.
- Energy sector contributes immensely to Green House Gases emissions and climate change.
- There is now a renewed interest in the renewable sources of energy because they are considered low carbon estimates to fossil fuels.

## ENERGY SECTOR OUTLOOK IN SOUTH AFRICA

- Eskom generates 95 per cent of South Africa's electricity from coal fired stations
- South Africa is endowed with coal. In 2007 South Africa coal production totalled 244 986 million tonnes and consumed 170 500 million tonnes
- The Country is rated 5<sup>th</sup> out of 65 of the world's greatest producers of coal.
- Overcapacity, cheap electricity, rapid growth in the economy during the post apartheid era and massive rural electrification led to severe constraint in electricity generation that led Eskom load shedding in 2008.
- Department of Minerals and Energy then came up with a National Response to South Africa's electricity shortage policy document.
- The plan included demand and supply intervention measures to counter electricity shortages.

- Supply side measures included meeting current demand by diversifying energy mix through development of renewable energy.
- South Africa has a highly developed synthetic fuels industry and offshore natural gas. SASOL has a capacity of 150 000 barrels per day and Petroleum Oil and Gas Corporation of South Africa (PetroSA), with a capacity of 50 000 barrels per day.
- Multinational companies, including BP, Shell, Caltex, Engen and Total participants in the downstream petroleum markets.
- Electricity and petroleum industries are regulated by an independent regulator called National Energy Regulator of South Africa.

# RENEWABLE ENERGY POLICIES

## White Paper on Energy Policy of 1998

- The national energy policy of South Africa is contained in the White Paper on Energy Policy that was published in 1998.
- The policy has five objectives for energy sector which are: increased access to affordable energy services; improving energy governance; stimulating economic development, managing energy related environmental impacts and **securing diversity through diversity**.
- The fifth objective addresses the need to provide alternative sources of energy including renewable. It recognises the potential of renewable energy in securing supply through diversity

- The White Paper further noted that Government should not only increase its capacity to address the need of the day, but also improve long term issues, such as development of renewable energy resources to achieve a more sustainable mix.

### **White Paper on Renewable Energy Policy of 2003**

- Subsequent to White Paper on Energy policy, Government released a White Paper on Renewable Energy in 2003.
- This White paper fosters the uptake renewable energy in the economy
- The Policy has a number of objectives, that include: ensuring that equitable resources are invested in renewable technologies; directing public resources for implementation of renewable energy technologies; introducing suitable fiscal incentives for renewable energy and; creating an investment climate for the development of renewable energy sector.

- Renewable Energy White Paper of 2003 set a target of 10 000 GWh to be generated from renewable energy by 2013.
- The target was reviewed during the renewable energy summit of 2009 held in Pretoria.
- The summit raised the issue over the slow pace implementation of renewable energy projects and the risks of South African economy of committing national investments in the energy infrastructure to coal technologies. Other issues raised include potential large scale roll out of solar water heaters and enlistment of Independent Power Producers to contribute to the diversification of energy mix.
- The objectives of white paper of renewable energy are considered in six focal areas, namely: financial instruments; legal instruments; technology development; awareness raising; capacity building and education; market based instruments and regulatory instruments.

a) Financial instruments

- These ensures that equitable national resources are invested in renewable technologies
- Introduces sustainable financing mechanisms for delivering renewable energy systems and fiscal incentives. e.g. Eskom Incentive Scheme for solar water heaters, Renewable Energy Finance Subsidy Office (REFSO) and tax incentives for energy efficiency

b) Legal instruments

- These are developed in order to ensure appropriate legal and regulatory framework for pricing and tariff structures e.g. Renewable Energy Feed In Tariff (REFIT) introduced by NERSA in 2009

c) Technology development

- This promote the development and implementation of appropriate standards, and guidelines for the appropriate use of energy technologies and research.

d) Awareness raising, capacity building and education

- This instrument promote knowledge of renewable energy through dissemination of information

e) Market Based Instruments

- Developed to subsidise renewable electricity generation, pollution taxes, finance energy efficient housing and appliances. Examples of initiatives in this regard are as follows: REFSO, Renewable Energy Market Transformation Programme (REMP) and Tradable Renewable Energy Certification (TREC)

f) Regulatory instruments

These instruments give effect to legal prescripts by setting targets for renewable electricity generation, commercial building codes, household appliance labelling etc

## Energy Act of 2008

- In 2008 the Energy Act was enacted.
- The purpose of the act is ensure that diverse energy resources are available, in sustainable quantities and at an affordable prices and to provide for integrated energy planning, increased generation and consumption of renewable energies, contingency energy planning, holding of strategic fuel stocks and carriers, provide appropriate energy infrastructure, data on energy demand, supply and generation and also establish institutions responsible for energy research.

## **RENEWABLE ENERGY POLICY INSTRUMENTS IN SOUTH AFRICA**

- Policy instruments give effect to renewable energy legislations and policies objectives.

### **National Integrated Energy Plan (IEP)**

- The Integrated Energy Plan outlines the direction and steps to be taken by South Africa to meet its energy needs.
- The plan declares South Africa's continued reliance on coal, but also uses modeling to forecast which energy sources can be used most effectively to meet demand.
- The plan advocates diversification of energy sources, including renewables, as well as fuel switching to improve energy efficiency. It is a requirement for South Africa to develop Integrated Energy Plan (IEP) as per the Energy Act of 2008.

## Renewable Energy Market Transformation (REMT)

- World Bank has funded Renewable Energy Market Transformation (REMT) project of the Department of Environment (DoE), which is hosted by Development Bank of South Africa.
- This project aims to remove and reduce the implementation costs of renewable energy technologies in the country, with a focus on power generation and solar water heaters.
- The project aims to assist the Country to meet its 2013 renewable energy targets through supporting DoE to develop regulatory and policy framework for renewable energy, and develop institutional and finance support within the economy to promote uptake of renewable energy.

## Renewable Energy Feed in Tariffs (REFIT)

- REFIT is a mechanism that promotes and obliges specific entities to purchase power output from qualifying renewable energy generators at predetermined prices.
- Eskom's "Single Buyer Office" is to be appointed as the Renewable Energy Purchasing Agency (REPA), the exclusive buyer of power under the REFIT programme.
- Generators participating in the REFIT scheme are required to sell power generated by renewable technologies to Eskom as the REPA under a Power Purchase Agreement, and are entitled to receive regulated tariffs, based on the particular generation technology.
- NERSA is tasked with the administration of the REFIT programme, including setting the tariffs and verifying that generation is genuinely from renewable energy sources.

## Tradable Renewable Energy Certification (TREC)

- TREC System has been developed consistent with the EU RECs.
- TREC is an electronic record that verifies the origin of energy by the registered renewable energy entity; it refers to green certificate or green tags. It is another revenue stream for renewable energy Independent Power Producers (IPPs).
- Major advantage of TREC is that, apart from extra income stream, certificates can be traded worldwide and separately from the electricity grid infrastructure.
- The DoE completed a feasibility study on TRECs in March 2007.
- Consultation meetings with stakeholders in all provinces were conducted in April and May 2007. The aim of these meetings was to determine the extent to which other market participants would like to contribute towards the formation of the South African National Tradable Renewable Energy Certificate Team (SANTRECT).

- In March 2008 the SANTRECT was formed by the DoE with an aim to facilitate and coordinate the establishment of Issuing Body (IB) as Non-Profit Organisation (NPO) that will be responsible for registering, issuing, transfer and redeem certificate in South Africa.

### **Renewable Energy Finance Subsidy Office (REFSO)**

- The DoE has established the Renewable Energy Finance and Subsidy Office (REFSO), whose mandate includes: management of renewable energy subsidies; and offering advice to developers and other stakeholders on renewable energy finance and subsidies. This includes information on the size of awards, eligibility, procedural requirements, and opportunities for accessing finance from other sources.
- Since the establishment of REFSO, six projects with a total installed capacity of 23.9 MW have been subsidised. Three of these projects are small scale hydro, biogas to electricity project, wind energy and landfill gas to electricity.

## **REFSO finance options**

- Grants for feasibility studies;
- Short-term finance;
- Long-term finance:
- Export credits and soft loans;
- Equity or loans; and
- Purchase of carbon emission reduction credits

## Biofuel Industrial Strategy

- Biofuels Industrial Strategy addresses policy, regulations and incentives for biofuels.
- Biofuels strategy aims to achieve a biofuels average market penetration of 4.5 per cent, of liquid road transport fuels (petrol and diesel) in South Africa by 2013, which is achievable without excessive support by utilising surplus agricultural capacity.
- The fuel levy exemption on biofuel and support mechanism should continue and be adjusted, if necessary to assist the target being achieved.
- Until this target is achieved, licensed biofuels producers will have a linked licence condition for petroleum wholesalers to accommodate qualifying production volumes at Basic Fuel Price (BFP) or import parity price.

## **Demand Side Management Subsidy Solar Water Heater Programme**

- Eskom together with the Government has developed a programme to have a mass roll out of solar water heaters over the next three years. The current cost of a solar water heater unit is perceived to be unaffordable and prohibitive (estimated cost is between R7 000 and R20 000).
- To eliminate these barriers, Eskom will be providing a subsidy of 50 per cent. Potential savings of the programme is 650 MW.

## **Traffic lights and public lighting**

- All traffic lights and public lights will be converted to solar power with a battery backup.
- Project will cost approximately R400 million and will be another opportunity for employment creation and skills development.

# GRID CONNECTED RENEWABLE ENERGY PROJECTS

## Bethlehem Hydro

- The potential to generate power in the As River using the outflow from Lesotho Highlands Water project was first identified in 1999.
- The As River has an average (guaranteed) flow, which is artificially regulated, from Lesotho Highlands.
- The water flows via the As River over the distance of approximately 300 Km to Johannesburg where it is used for drinking purpose.
- Bethlehem Hydro (Pty) Ltd is the developer, owner and operator of 3.9 MW of hydro powered independent power plants (IPP) from two sites.
  - 2.2 MW - run of river site located on the As River with a flow rate of 26 cubic meter per second and a head of approximately 15 m and;

- 1.7 MW – located at the existing Dam wall of the Saulpoort Dam with a head of 10 - 12 m and a flow rate of 26 cubic meters per second.
- Annual power production is expected to be 28.6 GWh. Grid connection will be through dedicated power lines to substations in the town of Bethlehem.

## **Tongaat Hullet Sugar Biomass**

- The Tongaat - Hullet Group owns the bagasse power generation facilities installed at their Maidstone, Amatikulu and Felixton Mills.
- Boiler Plant: Standard thermal cycle steam boilers with turbo alternators operating in backpressure mode. The exhaust steam is used for processing sugar.
- Installed capacity: 72 MW
- Export capacity available: 8.5 MW

- About 80 per cent of the installed capacity is renewable energy and the other 20 per cent is usually coal, which is used to balance the fuel needs in case where the bagasse is used as a product for paper manufacture or animal feed.

### **Friedenheim Hydro**

- Developed by Friedenheim Irrigation Board as a 2.5 MW run of river hydro powered IPP.
- The electricity generated is used to drive 4 x 300 Kw electrically driven water pumps for Friedenheim Irrigation Scheme's own use, the rest of electricity (93 per cent) is available for sale.
- The Friedenheim hydro plant is located in the Crocodile River near Nelspruit in Mpumalanga Province of South Africa. It has been in operation since 1988.

## Eastern Cape Wind Farm

- The project is being developed on an industrial site with good grid connection. Initially Nelson Mandela Metropolitan Council will purchase the power. In addition a number of consumers in the area have expressed an interest in purchasing a portion of their energy from renewable sources.
- The project will most likely be developed in two phases:
  - 15 MW in Phase One
  - 15 MW in Phase Two

## Durban (eThekweni) Landfill

- The project comprises two complementary components as follows:
  - a) Extraction, collection and flaring of methane from three landfill sites and;
  - b) Generation and supply of electricity to the municipal grid.
- The Durban (eThekweni) municipality plans to generate electricity from rubbish, at the same time reducing green house gas emissions.
- The project will capture methane rich landfill gas from three landfill sites to provide fuel for the production of 10 MW of electricity. The gas is captured by sinking wells up to 40m deep in the landfill waste sites.

## Darling Wind Farm

- The project is to be developed into two phases:
  - Phase one comprises four 1.3 MW wind turbines producing 5.2MW of electricity from wind power.
  - Phase two comprises a further six 1.3 MW wind turbines making a total installed capacity of 13 MW.
- The gentle consistency of strong winds over the hills of the Swartland landscape provides an ideal opportunity to build the wind farm to generate electricity.

## Conclusion

- Instruments emanating from White Paper on Renewable Energy Policy are fairly new, and hence the slow pace of implementation in renewable energy.
- Constraints in renewable energy sector include, among other, the following: inadequate research and development, limited funding instruments, low electricity tariffs, lack of technical capacity.
- Cheap electricity available in South Africa is a further barrier to the implementation of renewable energy technologies which are expensive.
- Support funding options such as REFSO, CDM, TREC and other development finance institutions that fund renewable energy projects need to be strengthened as they are still at their infancy.
- These measures are not yet legally mandated by regulations or laws.
- At this point in time, there are no uniform mandatory targets established that must be achieved from each technology over time.

- Reliance upon a state controlled monopoly with little private initiatives on renewable energy power generation. However, enabling frameworks are underway to encourage greater uptake of renewable energy technologies. Massive roll out of solar water heaters to reduce load on the electricity grid is being implemented by the Department of Energy and Eskom.

Thank you