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National Policies and Strategies on Bioenergy in Africa

Case Study: South Africa

COMPETE

**Competence Platform on Energy Crop and Agroforestry
Systems for Arid and Semi-arid Ecosystems - Africa**

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The Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi-arid Ecosystems – Africa (COMPETE) will establish a **platform for policy dialogue and capacity building** and identify **pathways for the sustainable provision of bioenergy**

- to improve the quality of life and create alternative means of income for the rural population in Africa
- to aid the preservation of intact ecosystems in arid and semi-arid regions in Africa
- to enhance the equitable exchange of knowledge between EU and developing countries

The objective of COMPETE Work Package 6 is to coordinate policy research activities in African countries aimed at facilitating the efficient implementation of improved energy crop and agroforestry systems in order to enhance economic productivity and sustain rural and peri-urban livelihoods. It is also aimed at avoiding adverse environmental and social degradation that could arise from faulty policy development and implementation.

Within the context of the COMPETE Work Package 6 current national and international policies and strategies (including national legal and institutional frameworks) are identified addressing the implementation of improved energy crop and agroforestry systems.

The current case study ‘South Africa’ was elaborated by COMPETE partner CIRPS for a policy report published by the Global Bioenergy Partnership (GBEP).

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National Policies and Strategies on Bioenergy in South Africa

1.0 Introduction

South Africa (SA) relies heavily on domestic coal and imported oil to meet its energy needs (approximately 90%), is well endowed with Renewable Energy sources (RES), although so far they have remained largely untapped.

The contribution of biomass (fuelwood and bagasse) to the country's commercial and non-commercial final energy supply is estimated at 20%, whereby non-commercial biomass sources are mainly from unsustainable use of fuelwood, dung and waste [1]. Fuelwood is the main source of energy in the rural domestic sector (over 65%) [2].

Other sources of biomass include bagasse in the sugar industry, wood, pulp and paper waste in the commercial forestry and paper industries, for in-house heat and electricity generation.

In these industries there is already some heat and power generation taking place and there is potential for upgrading and expansion.

With the sugar mills currently generating a significant amount of power for own use and even limited export, bagasse offers some of the best potential for Independent Power Producers in South Africa using renewable resources.

Transport is the highest-cost component of the South African economy and road transport dominates it. Road transport energy is provided by diesel and petrol, of which 60 % is sourced from imported crude oil, the rest from local coal and natural gas converted into liquid (synthetic fuels) [3].

Ethanol production in 2005 accounted for 390 million litres (from annual world production by country, available at: <http://www.ethanolrfa.org/industry/statistics>). Bioethanol is produced mainly by sugar industry as potable alcohol for local and export markets.

No biodiesel production currently occurs, feasibility studies on biodiesel production from soybeans are under way.

Ethanol trade: SA is becoming an active exporter of ethanol taking advantage of preferential trade arrangements with the EU. Until December 2005, South Africa benefited from the 15% tariff reduction under the Generalised System of Preferences scheme. From January 2006 SA is subject to the full MFN duty.

A more recently explored ethanol based option is ethanol gel, for cooking in cookstoves as substitute of paraffin. Initial market penetration has occurred in South Africa (since 2000) with the establishment of 30,000 litres/month production facilities [4].

2.0 Country Objectives and Drivers

The universal electrification (from the current 70%, based on the National Electricity Regulator (NER) surveys) has been claimed in the President's State of the Nation Speech in 2004, as an important country objective to be reached by 2012. Greater reliance on various types of renewable energy sources has been vowed in that occasion.

The dominant motivation for developing biofuel industry is to stimulate economic growth and create job opportunities.

Other objectives behind the government's interest in bioenergy are the reduction of dependence on imported crude oil, protection of the country against volatility of oil prices, and climate change mitigation.

3.0 Bioenergy Policy by Sub-sector

With the end of Apartheid SA experienced a fundamental change in the energy policy context. It was reflected in the White Paper on Energy Policy (1998) which set the energy policy direction for the country aiming at achieving the following objectives:

- 1) guaranteed access to safe, reliable and affordable energy,
- 2) liberalisation of the energy sector including the transformation of the electricity distribution sector into regional electricity distributors, and
- 3) introduction of greater levels of competition in electricity markets.

The new vision for energy, especially for the liquid fuel industry, identified the opportunity to reconstruct state's assets and redress economic and social power imbalances.

Providing energy services to rural areas for both basic needs and income generating activities, including non-grid electrification and mini-grids, was also emphasised in the *Integrated Sustainable Rural Development Strategy* (ISRDS 2000).

Mandated by the White Paper on Energy Policy, the Department of Minerals and Energy (DME) has elaborated a Draft Energy Efficiency Strategy for South Africa. It sets a national target for energy efficiency improvement of 12% by 2014 together with sectoral targets. In addition, it provides guidelines for energy efficiency interventions to be implemented through a phased approach.

Bioenergy is not specifically addressed as an option for energy efficiency measures, apart from acknowledging the use of improved energy efficient woodstoves as an important energy conservation practice already promoted by the Programme for Biomass Energy Conservation, PROBEC, (a Southern African Development Community regional programme).

Acknowledgment of the potential and benefits from Renewable Energy (RE) applications and their promotion emerges in the *White Paper on Renewable Energy* that sets a target of 10.000 GWh of renewable energy contribution to final energy consumption by 2013. The renewable energy is to be utilised for electricity generation (4% of projected electricity demand), heat and biofuel production.

3.1 Transport

Current National Targets

Voluntary blending targets up to 9% exist since 2006. A 10% blending target has been proposed.

Main Supporting Policies

The development of the biofuels industry is one of three key priority sectors of the government's Accelerated and Shared Growth Initiative for South Africa (Asgisa) which aims to halve unemployment and poverty by 2014 by stimulating economic growth.

In December 2005 an Interdepartmental Biofuel Task team has been established with the aim of developing the industrial strategy of the country's biofuels program.

A Draft Biofuel Strategy has been released and approved by DME in Dec 2006 [5], the presentation and approval of a final document by the Cabinet was scheduled in May 2007, after a broad stakeholder consultation process aimed to include diverse views regarding biofuels. The complexity of the industry and high number of interested parties and diverging positions came out, makes a timely finalisation unlikely.

The Draft Biofuel Strategy outlines government's approach to addressing policy, regulations and incentives for biofuel industry.

It proposes a 4.5 percent use of biofuels in liquid road transport fuels (gasoline and diesel) by 2013, contributing 75% to the national Renewable Energy target (10.000GWh by 2013) with over a billion liters. The proposal should be met with the adoption of national blending specification of 8% for ethanol (E8) and 2% for biodiesel (B2).

The driver to enable these volumes is utilisation of the Petroleum Products Licensing system (Petroleum Products Amendment, Act n.58/2003) that will require the existing petroleum wholesalers to buy biofuels production according to the national market share. The Petroleum Act amendment sets down that volume of licences for biofuel production are delivered according to the percentage of local content and the participation of the Black Economic Empowerment.

The Draft Strategy claims the above requirements could be achieved without excessive support from the Government and by using surplus agricultural capacity (maize and sugar) and expanding production on underused arable land.

Although recognising the need for financial incentives to make the nascent biofuels market competitive with existing fossil fuels, the Government wants to keep its financial support light, leaving to public and private sector funding the task of commercialising the biofuel technology.

Already existing support mechanisms and incentives like the ones described below, will be used and adjusted if necessary, by the government for creating an enabling investment environment.

- Currently 40% fuel levy reduction applied for biodiesel could be extended to bioethanol based on the energy content.
- Renewable Energy Subsidy Scheme recently launched by the Department of Minerals and Energy to support investment in renewables. The subsidy scheme proposed for biofuels in 2006/2007 is a maximum capital subsidy of 16.7 SA¢/l provided for bio-ethanol plants and 27.3 SA¢/l for biodiesel. A limitation of R 100 million total capital project cost applies.
- Tax depreciation for biofuel investments. South Africa currently allows accelerated depreciation of biofuel investments: 50 % in Year 1, 30 % in year 2, and 20 % in Year 3.
- Current agriculture programmes managed by the Department of Agriculture to support small scale farmers and emerging farmers that can be better targeted to biofuel production (support farmers in crop selection, hedging, agricultural methods, research and development, and contract negotiations with biofuels manufacturers), until a stable feedstock supply is established.

Additional support to the creation of the biofuel industry will come from a simple price hedge mechanism for biofuels prices taking into account low and high oil prices, to be established within the existing Equalization Fund. The principle is that it should balance upside benefits to motorists with downside benefits to biofuels producers, without implying additional cost for the state budget. When oil prices exceed \$ 65/bbl, no special incentives for the biofuels industry should be necessary in the longer term and the Fuel Levy reduction could eventually fall away. If the oil price is below \$ 45/bbl, biofuels producers would need some form of additional support. For world oil prices above \$ 65/bbl, the biofuels industry could pay in (back) and slightly reduce pump price increases. Details of the price hedge mechanism for biofuels still need to be developed.

Finally, the Central Energy Fund (CEF), originally created for promoting synthetic fuel production can be extended to the promotion of biofuel.

Government Investment through its Agencies and existing Funds are foreseen for promoting biofuels projects in those underutilised agricultural land (usually very poor areas) where the investment risk is higher. Contribution from the National Empowerment Fund and other specific incentives that may be introduced in future, is encouraged. Following this provision, it has been recently announced that 5 small towns will benefit a R 3.2 billion for biofuel production from different types of feedstocks and managed by local farmers. Funding will come from the Industrial Development Corporation (IDC) and the Central Energy Fund.

Government procurement is also envisaged as an option to provide an alternative or additional market for biofuel (in case of failure by the petroleum sector to reach the proposed target).

The **Minister of Minerals and Energy** is responsible for the governance of the liquid fuels industry in South Africa and for coordination of initiatives from the other Government Departments.

Government has accepted a process of managed liberalisation of the liquid fuels industry, to take place in a ten-year timeframe, with the aim of allowing time for the black empowerment companies to consolidate their positions within the industry

The following other policy initiatives promoting the use of bioenergy for transport exist in South Africa:

- Cleaner Fuels Programme, approved by Cabinet, that aims to reduce emissions and environmental impact, has phase-out leaded petrol and reduced sulphur in diesel to a maximum of 0,05 % (mass) from 2006.
- Climate Change: South Africa ratified Kyoto Protocol in 2002.

Although South Africa is not committed to a specific timeframe to reduce greenhouse gas emissions, it counts on the opportunity to utilise international funding within the Kyoto Protocol framework for the penetration of renewable energy into South Africa's energy mix. Large potential for low cost emission reduction options exist in SA having an energy intensive economy and high dependence on coal for primary energy. The DME has established the Designated National Authority (DNA) to process CDM projects. Biofuels projects may apply for such CDM credits, however bioethanol CDM methodology needs to be further explored.

3.2 Electricity Production

Current National Targets

The White Paper sets a target of 4% of projected electricity demand for 2013 to be reached with contribution from RES.

Main Supporting Policies

In order to reach the above target, the White Paper proposes a strategic Programme of Action to develop SA's RES, particularly for power generation. It recognises the need to create an enabling environment through

- 1) the introduction of fiscal and financial support mechanisms,
- 2) the development of physical infrastructure to link RE supplies into existing grid, and
- 3) the creation of an appropriate legal and regulatory framework to encourage the entry of multiple Independent Power Producers into the current electricity sector and stimulate RE market creation.

The approach envisaged foresees the facilitation of "early win" investments in commercial already proven technologies that can demonstrate the benefits of renewable energy and low level of national subsidies. Foreign investment through Global Environment Facility

and Clean Development Mechanisms is expected as relevant contribution to domestic financial support.

Among the national economic incentives, the government has already started to apply the Renewable Energy Subsidy Scheme, with the objective of developing a sustainable market share of RE. The subsidization is given per unit of installed capacity.

An investigation into appropriate financial and fiscal instruments to stimulate the implementation of RE technologies is ongoing.

According to the White Paper on Renewable Energy [6], a combination of a set-aside, coupled with an investment incentive (subsidies and/or tax credit), could form the basis of utilising renewable energy funding for an initial power generation programme in South Africa. Set-aside is a block of energy supply that is earmarked by law for renewable energy capacity. Potential renewable energy generators tender to provide the block of renewable energy supply. Winning projects receive financial support e.g. subsidy per kWh or a guaranteed fixed electricity tariff.

A decision about which option or combination would be in the best interests of South Africa will be based on a macro-economic analysis and the outcome presented in the Renewable Energy Strategy. The Renewable Energy Strategy will translate the goals, objective set out in the White Paper into a practical implementation plan with indication of the instruments that will be used in South Africa to support of RE deployment.

A mid term assessment is foreseen at the end of 2008, which could bring a revision of the included objectives and provisions, in light of progress made.

The Department of Minerals and Energy has the overall responsibility for renewable energy policy in South Africa in a framework of cooperative governance with other Departments and concerned stakeholders.

The National Energy Regulator (NER) regulates market access through licensing of all producers transmitters, distributors and sellers of energy. It will also regulate the phased introduction of renewable energy generators.

The Central Energy Fund will assist the implementation of renewable energy through the extension of its operational support. Implementing provisions have not been issued yet.

No coordinated national bioenergy research program currently exists although various groups are working of the bioconversion of lignocellulosic biomass as feedstock for biofuels. South Africa recently joined IEA Bioenergy to interact with the liquid biofuel community.

3.3 Heat (Residential/Commercial)

Current National Targets

No official targets exist in SA

Main Supporting Policies

No specific policy addressed to heat generation from biomass has been developed. Heat generation in SA is mainly for industrial use, while indoor heating is primarily supplied by either electricity or gas in the urban areas. Biomass and coal are the predominant space heat sources in other areas.

4.0 Results and Future Challenges

The Policies set by the government aim to create the conditions for the development and commercial implementation of renewable technologies (including bioenergy technologies).

The *White Paper on Renewable Energy* sets a general framework and overall RES target without indicating concrete measures to be used in order to achieve the target. Implementing rules and a Renewable Energies Strategy are called upon to be developed in the future.

The use of bioenergy as transportation fuel has received major attention from the government compared to the other final uses.

The strategy approach envisaged for a biofuel industry development in the country is based on the following key elements:

- 1) Focus on domestic technologies already developed in SA, and local feedstocks, in order to maximise the benefit for the country in term of employment creation and economic growth and BEE participation through the full value chain.
- 2) Mandatory take off of biofuel production to reach a 4,5% target (volume licensed under local content and BEE participation); additional volumes over percentage licensed will be sold on negotiated commercial terms. A 10% blend of ethanol into the petrol is proposed. Oil companies are identified by the Government as the most suited to be licensed for biofuel production under the blending target framework.
- 3) A conducive environment for investments facilitated through a moderate government support (fuel tax reduction, capital investment incentives, Equalisation Fund, streamlined licensing and EIAs requirements) to be phased out once the industry has started and the 4,5% mandatory target is achieved. Trading in carbon credit is seen as an important contribution for financing biofuel projects.

The above approach is contained in the draft strategy and waiting for final approval. Implementation plan and concrete measures will be developed once the draft strategy is finalised.

South African government has started to actively investigate the suitability of different crops, providing support to small-scale farmers, and working on the development of technical standards for biofuels. Meanwhile, farmers and other interested stakeholders are increasingly hopeful about the expansion of the biofuels market. GrainSA, an organization of grain farmers, is supporting a project proposal called Ethanol Africa which would build eight maize-to-ethanol plants. The first of these plants, located in Bothaville, is scheduled to begin production in 2007 with a yield of 155 million litres of ethanol annually.

Maize and sugar (ethanol) as well as soya bean and sunflower (biodiesel) are identified as the potential crop to satisfy the country's biofuel production.

However, South Africa has only 14 percent of its total area available for arable land and irrigation consumes about 60 percent of the national water supply. Surpluses in corn and sugar production occurred in 2004-2005 season showed the possibility of using this surplus for ethanol production to meet more than 5 percent of its gasoline demand. But since then, prices have picked up and successive harvests were poor, due also to the serious drought SA is experiencing.

This led to food security concerns and to a debate still ongoing in the country.

Although industries representatives and farmers are asking for an increase in the level of incentives proposed in the draft strategy it is unlikely that subsidies will be introduced to support the biofuel programme. The country's farming sector underwent a massive cut in state subsidies in the post-apartheid era which is why the Government is concerned that subsidizing biofuels producers would spark an outcry from farmers.

At the moment, **only biodiesel and eco-diesel are exempt from a percentage of fuel levies and taxes**, under specific conditions.

Timing for the proposed 10% blending will be largely determined by the level of support provided by the government which needs to ensure that the level of support is such that the interests of bio-ethanol investors and feedstock providers are balanced with those of fuel consumers and small-scale farmers.

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