

Policies and Measures for Renewable Energy and Energy Efficiency in South Africa

Background

The South Africa democratic elections held of 1994 initiated a change in government policy across all sectors. With the new government in place, there was an in-depth review of all government policies in order to align them with basic principles of democracy and human rights. The new policy paradigm addressed issues of economic efficiency, access to affordable energy for all and environmental sustainability. This, however, was not an easy task for the newly elected government, especially in view of the economic and infrastructural constraints and challenges.

One of the key challenges that South Africa still faces is for development aspirations to bring on board racial equity, job creation, poverty reduction and economic prosperity while minimising the adverse environmental impacts. For a long period of time the South African energy scenario has been dominated by coal, one of the most carbon intensive fuels and associated with a high emission rate of carbon, responsible for the global environmental threat. While it is recognized that Africa does not contribute

much to total global emissions, South Africa remains a notable exception, with carbon emissions per capita closer to industrialised countries that are the major contributor to this threat. This reason and others necessitate a change in policy framework in order to tailor it to fit the requirements of sustainable development, putting in the development domain issues of economic, environment as well as social development.

Renewable Energy Policy

In 1998 South Africa formulated a new energy policy, significantly different from the pre-1994 one, which provided energy services according to race. Major objectives of the new government policy for the energy sector were spelled out in the 1998 Energy White Paper as:

- 1) Increasing access to affordable energy services.
- 2) Improving energy governance – clarification of the relative roles and functions of various energy institutions within the context of



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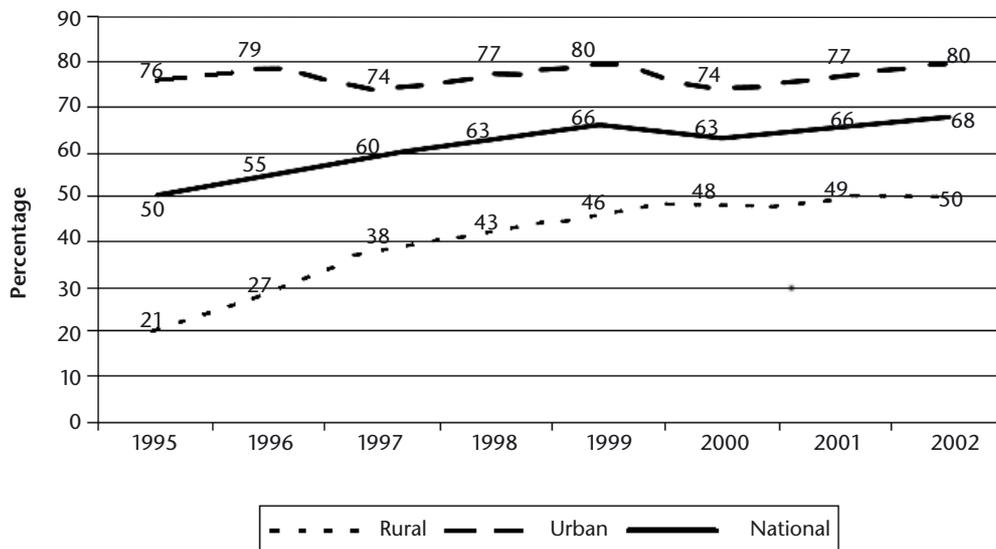


Figure 1
Trends in electrification of households in South Africa: 1995 – 2002

accountability, transparency and inclusive membership, particularly participation by the previously disadvantaged.

- 3) Stimulating economic development – encouragement of competition within energy markets.
- 4) Managing energy-related environmental and health effects – promotion of access to basic energy services for poor households while reducing negative health impacts arising from energy activities.
- 5) Securing supply through diversity – increased opportunities for energy trade, particularly within the Southern African region, and diversity of both supply sources and primary energy carriers.

The new energy policy helped to consolidate programs that were already in place in trying to improve provision of modern energy services to people. This included the National Electrification Program for 1994–1999, targeting to increase electrification level from 36 per cent in 1994 to about 66 per cent nationally by 2001. The target was exceeded, with 2.75 million connections achieved by end of Phase 1 of the Programme. By end of 2001 the National Electricity Regulator (NER) recorded 3.4 million connections.

Renewable energy policy

Recognizing the contribution potential of renewable energy sources to modern energy services in South Africa, the Government in 2003 released the White Paper on Renewable Energy. This had a number of objectives, including ensuring that an equitable level of national resources was 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. The key objectives of the White Paper were considered in the five major facilitative areas given below.

Financial instruments

- To ensure that an equitable level of national resources is invested in renewable techno-

logies, given their potential and compared to investments in other energy supply.

- To set targets for directing of public resources for implementation of renewable energy technologies.
- To extend existing state financial support systems and institutions and introduce sustainable financing mechanisms for delivering renewable energy systems.
- To introduce suitable fiscal incentives for renewable energy.
- To make easy the creation of an investment climate for the development of renewable energy sector, which can attract foreign and local investors.

Legal instruments

- To develop an appropriate legal and regulatory framework for pricing and tariff structures to support the integration of renewable energy into the energy economy and to attract investors.
- To develop an enabling legislative and regulatory framework to integrate independent power producers into existing electricity system.
- To develop an enabling legislative framework to integrate local producers of liquid fuels and gas from renewable resources into their respective systems.

Technology development

- To promote the development and implementation of appropriate standards and guidelines and codes of practice for the appropriate use of renewable energy technologies.
- To support appropriate research and development and local manufacturing to strengthen renewable energy technology and optimise its implementation.

Awareness raising, capacity building and education

- To promote knowledge of renewable energy and increase their use.
- To promote and stimulate renewable energy market through dissemination of information on economic, environmental, social and trade benefits of renewable energy technologies and their applications.

- To persuade institutions to implement training and education programs on renewable energy.
- To actively involve women in decision making and planning on renewable energy activities.
- To improve communication and interaction between government and other institutions on renewable energy policies.

Policies and measures for renewable energy implementation

There is considerable potential for renewable energy sources in South Africa, from solar, wind, biomass, waves and hydro, but the key challenge is to translate this into technical, economic and market realities. Doing this would need careful thinking of policies and measures that could result in optimal tapping of the renewable energy sources, taking into account the prevailing national circumstances.

A number of policies and measures have been proposed by different players, and some of the extensively researched were those put forward in a study that was commissioned to Energy Research Centre (ERC, University of Cape Town) by the Sustainable Energy and Climate Change Partnership (SECCP), a partnership between Earthlife Africa Johannesburg and the World Wildlife Fund of Denmark¹. The policies and measures proposed by ERC centred around attaining three main objectives:

- a portfolio of policies and measures for realising the potential for renewable energy and energy efficiency in South Africa.
- investigating how such policies and measures could form part of an effective climate change response by estimating the potential greenhouse gas (GHG) reductions.
- identifying and making projections of sustainable development impacts related to realising the renewable energy and energy efficiency potential.

With this background, and considering the unique South Africa energy circumstances, a number of policies and measures were proposed, including recommendations on how they could be implemented. The policies and measures were grouped into four main categories, as being market-based instruments, regulatory measures, institutional and legal measures, and voluntary measures, as shown below:

Market based instruments

- Financing energy efficient housing and appliances (bonds and loans),
- Incremental housing subsidy for energy efficiency upgrade in low cost housing,
- Concessionary loans for incremental costs efficient equipment and combined heat and power,
- Production subsidies for renewable electricity generation,
- Pollution taxes,
- Wires charge and additional sources of financing.

Regulatory instruments – targets, codes and standards

- Targets for renewable electricity generation,
- Strengthen commercial building codes,
- Residential building codes,
- Household appliance-labelling and mandatory energy performance standards,
- Commercial and industrial equipment labelling and mandatory energy performance standards,
- Government procurement standards for equipment and upgrading energy efficiency standards in government buildings,
- Compulsory fuel efficiency standards for corporate and institutional fleets,
- Particulate emission control and transport policy,
- Regulatory interventions to promote energy efficiency,
- Green tariffs, trading and renewable electricity.

Institutional and legal environment

- Strengthen the institutional framework for energy efficiency,

¹ This study was undertaken by the Energy Research Centre, University of Cape Town. The team of researchers involved included; Prof. Ogunlade Davidson (Project Leader), Prof. Kevin Bennet, Pierre Mukheibir, Stanford Mwakasonda, JC Nkomo, Randall Spalding-Fecher, Harald Winkler, Rodney Xali, Mark Howells, Alison Hughes and Frances Craigie.

- Renewable energy legislative framework,
- Research, development and demonstration,
- Awareness and education,

Voluntary agreements

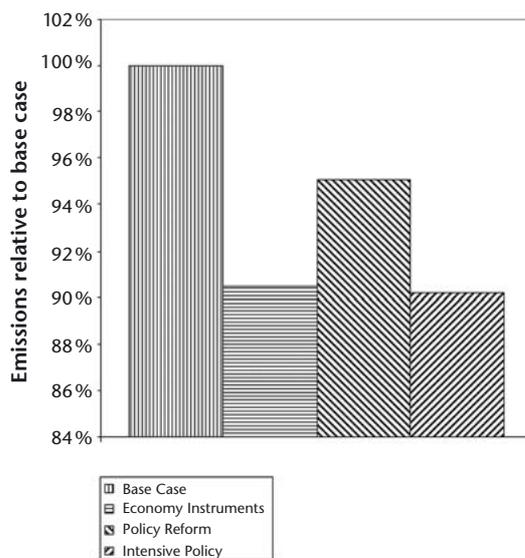
The above policies and measures analysed with reference to three implementation scenarios in order to assess their impact of implementation. Modelling was used on certain aspects of the policies and measures. The three scenarios for implementation were as shown in *Tab. 1*.

Base case	Business as usual government policy, based on Department of Minerals and Energy (DME) official projections and public domain data
Economic instruments	Moderate; focus on economic instruments to correct market failures in relation to RE and EE
Policy reform	Moderate; focus on meeting targets for RE and EE cost-effectively
Intensive policy	Intensive; more focus on promoting RE and EE; stronger weighting of social and environmental concerns

Table 1
Scenarios for implementation of policies and measures for renewable energy and energy efficiency

It was observed that the three implementation scenarios each had benefits and costs across a range of different indicators. In the reduction of GHG emissions for example, setting a renewable energy target of 25% for electricity generation over a 20 year period showed a significant level of lower local pollution (up to 10%), as well as reductions in GHG emissions (6–10%).

Figure 2
Relative emissions of carbon dioxide (cumulative over 20 Years)



After such analysis of different combinations of policies and measures, the following five policies and measures were recommended as priorities:

- 1) Mandatory codes and standards for energy efficient buildings in government, commercial and residential sectors
 - aiming to reduce commercial building energy consumption (excluding lighting)
- 2) Equipment standards for industry and commerce
 - development of mandatory performance standards for industrial equipment as well as a mandatory energy labelling system
- 3) Targets for renewable electricity generation
 - a target of renewable electricity generation providing 15% of total electricity consumption by 2020
- 4) Production subsidies for renewable electricity
 - in order to make renewable electricity competitive
- 5) Pollution tax
 - A tax on air pollutants, levied per mass unit of emissions

Appropriate enabling conditions are an important prerequisite in order for any policies and measures to have the required impact. While recognising the role of market-based instruments, the right place for subsidies to contribute to their effectiveness is also crucial, especially in an immature market like the renewable energy. In any case, there can not be a “one-size-fits all” rule to the applicability of the above mentioned policies and measures. Each country need to make an in depth analysis of the prevailing circumstances before deciding on what to include in the shopping basket for policies and measures for either renewable energy or energy efficiency programs.

References

Borchers, M., N. Qase, T. Gaunt, J. Mavhungu, H. Winkler, Y. Afrane-Okese and C. Thom, 2001, National Electrification Programme Evaluation: Summary Report, evaluation commissioned by the Department of Minerals & Energy and the Development Bank of Southern Africa, Energy and Development Research Centre, University of Cape Town, Cape Town.

Davidson O. & Mwakasonda S., 2003. Electricity Access; Southern Africa Sub-regional Study: South Africa and Zimbabwe. Energy Research Centre, University of Capre Town. South Africa.

DME, 1998, 'White Paper on Energy Policy for South Africa', Department of Minerals and Energy, Government of South Africa, Pretoria.

DME, 2003, White Paper on Renewable Energy. Department of Minerals and Energy, Government of South Africa, Pretoria.

EDRC (Energy & Development Research Centre) 2003. Policies and measures for renewable energy and energy efficiency in South Africa. Prepared for the Sustainable Energy & Climate Change Partnership. Cape Town, EDRC, University of Cape Town.

NER (National Electricity Regulator), 2001, Electricity Supply Statistics for South Africa 2001, National Electricity Regulator, Pretoria, South Africa.

NER (National Electricity Regulator), 2002, Lighting up South Africa. National Electricity Regulator, Pretoria, South Africa.