



Report Title:

**Survey on the Status of Policy, Institutional and
Regulatory Frameworks of the Electricity Supply
Industry (ESI) in the Southern African
Development Community (SADC) Region**

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**Submitted by:
AECOM International Development**

**Submitted to:
USAID/Southern Africa**

Gaborone, Botswana

June 2008

USAID Contract No. 690-M-00-04-00309-00 (GS 10F-0277P)



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GENERAL ACRONYMS LIST

AFREC	African Energy Commission
AFUR	African Forum of Utility Regulators
BCM	Billion Cubic Meters
BEMP	Botswana Energy Master Plan
BEP	Botswana Energy Policy
CEC	Copperbelt Energy Corporation
COS	Cost of Supply
CPI	Consumer Price Index
DBSA	Development Bank of South Africa
DRC	Democratic Republic of Congo
Dx	Distribution
Energy	Supply of kWh
ESI	Electricity Supply Industry
EDI	Electricity Distribution Industries South Africa
FCT	Fair Competition Tribunal
FUNEL	National Electrification Fund (Fundo Nacional De Energia Eléctrica)
GEN	Generation
IPTL	Independent Power Tanzania Limited
INEL	National Electricity Institute (Instituto Nacional de Electricidade)
IPP	Independent Power Producer
ISO	Independent System Operator
ITC	Independent Transmission Companies
kW	Kilo Watt
kWh	Kilo Watt Hour
LEC	Lesotho Electricity Corporation
MAP	Madagascar Action Plan
MINEA	Ministry of Energy and Water
MMEWR	Ministry of Minerals, Energy and Water Resources
MOTRACO	Mozambique Transmission Company
MU	Municipality
MW	Mega Watt
MWh	Mega Watt Hour
NEP	National Energy Policy
NEPAD	New Partnership for Africa's Development
NEU	National Electricity Utility
NDP	National Development Plan
NDS	National Development Strategy
PEU	Public Enterprises Unit
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PV	Photovoltaic
RED	Regional Electricity Distributor
ROR	Rate of Return
RSA	Republic of South Africa
SADC	Southern Africa Development Community
SAPP	South African Power Pool
SEP	Public Electricity System
STEM	Short Term Energy Market
SWOT	Strengths, Weaknesses, Opportunities and Threats
TSO	Transmission System Operator

Tx	Transmission
USD	United States Dollar
VAT	Value Added Tax
WB	World Bank
WESTCOR	Western Power Corridor Project

UTILITY ACRONYMS LIST

BPC	Botswana Power Corporation.
CEB	Central Electricity Board, Mauritius
EDM	Electricidade de Mocambique.
ENE	Empresa Nacional de Electricidade
EDEL	Empresa de Distribuição de Electricidade
ESKOM	Eskom Ltd, South Africa
ESCOM	Electricity Supply Corporation of Malawi Ltd
JIRAMA	Jiro Sy Rano Malagasy Madagascar
LEC	Lesotho Electricity Corporation
NamPower	Nambia Power Company, Namibia
SEC	Swaziland Electricity Company
SNEL	Société National d'Electricité, DRC
TANESCO	Tanzania Electricity Supply Company Ltd
URA	Utility Regulator Act
ZPC	Zimbabwe Power Company
ZEDC	Zimbabwe Electricity Distribution Company
ZETCO	Zimbabwe Electricity Transmission Company
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	Zambia Electricity Supply Company

REGULATORY AUTHORITIES ACRONYMS LIST

CNELEC	National Electricity Council of Mozambique
ECB	Electricity Control Board, Namibia
ERB	Energy Regulatory Board, Zambia
EWURA	Energy and water Regulatory Authority Tanzania
IRSE	National Electricity Regulator
LEA	Lesotho Electricity Authority
MERA	Malawi Energy Regulatory Authority
NECO	National Electricity Council of Malawi
NER	National Energy Regulator
NERSA	National Energy Regulator of South Africa
ORE	Office of the Electricity Regulator Madagascar
SERA	Swazi Energy Regulation Authority
ZERC	Zimbabwe Electricity Regulatory Commission
RERA	Regional Electricity Regulators Association of Southern Africa

ACKNOWLEDGEMENTS

The team of experts held numerous meetings with SADC National Energy Contact Points (to take care of ministries and departments), SAPP Coordination Centre, Regulators, Utilities, among others. The discussions contributed to the report and we express our sincere appreciation to all the officials for providing information, data and insights that made this status report possible.

The team further acknowledges the distinctive role played by the RERA Secretariat for the logistical support, tireless follow up, feedback and guidance during the data collection, information gathering and report writing process.

EXECUTIVE SUMMARY

The SADC region has been going through rapid economic growth during the past few years, which has resulted in high demand of electricity without any corresponding investment in new generation capacity. This has resulted in the depletion of the excess generation capacity in the region resulting in critical power shortages.

The Regional Electricity Regulatory Association (RERA) has been tasked by the South African Development Community (SADC) Ministers responsible for Energy to assist the region in creating a conducive environment to increase and promote investments in the Electricity Supply Industry (ESI). As part of fulfilling its mandate, RERA carried out a survey with the assistance of the United States Aid for International Development (USAID) Southern Africa Global Competitiveness Hub on the status of Policy and Institutional and Regulatory Frameworks in the SADC ESI for the purposes of comparing, monitoring and benchmarking.

This report is the result of the survey conducted in all of the SADC countries and focuses on the status of government policy, institutional set-up and the associated governing regulatory frameworks in the regional ESI. The survey is also intended as a tool to promote the enhancement and harmonization of the variant frameworks to facilitate investment and trade, and the development of good regulatory practices based on the principles of autonomy, transparency, accountability, non-discrimination, investment promotion and protection, and competition.

ESI policies in the SADC region are generally in line with international practices and trends focusing on independent industry regulation and private sector investment with most also shifting the focus to self-sufficiency.

Whilst policy updates are being done regularly in a few countries, in the majority of countries these are not updated and there are a lot of inconsistencies between what is stated as part of the policy and what is actually implemented. The major constraints to effective implementation of policies are:

1. Lack of capacity in terms of expertise, skills and financial resources;
2. Inadequate institutional sector coordination;
3. Time lag between policy implementation and development of enabling laws, statutory instruments which are part of the regulatory frameworks
4. Inconsistent policy implementation/unofficial policy changes;
5. Lack of effective planning and project implementation;
6. Tariffs regimes which are not sustainable.

All the policies promote private sector participation through Independent Power Producers (IPPs) and Private Public Partnerships (PPPs) although uptake has been minimal except in Mauritius and Tanzania.

All the countries within the SADC region have introduced some form of power sector reform in the past fifteen years. However, most of the reforms have not been successfully completed or implemented. Thirteen out of fourteen SADC member states have enacted new power sector legislation and introduced the possibility of some private sector participation in power. Twelve out of fourteen have introduced some kind of regulatory oversight in the form of energy or electricity regulatory authorities with two states working on institutional set up. Some countries have envisaged fully liberalized markets and

unbundled utilities but none has fully implemented such structures. Regulators are mostly new and need ongoing capacity building.

In all fourteen countries the sector is dominated by national electricity utilities which are vertically integrated and state owned. In cases where private power producers do exist, the national utilities are single buyers effectively diluting many of the policy objectives.

Electricity tariffs are regulated in all countries. Although there are different opinions on whether revenue recovered is sufficient to meet all the operational costs of the utilities or not, it is generally believed that the revenue is sufficient to cover *operational costs*.

Similarly, there are different opinions on whether the current tariffs are *sustainable* and able to provide the right signals for new investments and efficient use of electricity.

The majority of the countries indicated that tariffs are not sustainable and do not give sufficient signals to ensure future investments and efficient use of the commodity.

Rural electrification remains very low (below 10%) except in Mauritius and South Africa. Most rural networks are under-maintained and require rehabilitation. Although there is a shift to expand access to electricity through use of off grid renewable energy resources the uptake is still very low due to high costs. Connection costs to the grid are subsidized in most countries.

State owned utilities dominate the market and most have been corporatized. However, performance management remains a challenge and most utilities have critical skills shortages.

The findings of the survey indicate that there is a lot of progress in policy development and establishment of effective policies and regulatory frameworks. However there is an urgent need to improve in the following areas:

1. Regularly review and update ESI policies in line with regional and international practices. Strategies should be developed to plan and implement projects effectively.
2. The ESI reforms need to be completed in line with adopted policies. This will allow governments and regulators to develop and implement effective regulatory regimes including appropriate performance monitoring systems. Where possible monopolies should be eliminated and industry regulations implemented which ensures or is conducive to a level playing field.
3. Prices and tariffs in the sector should be sustainable. The ESI business units should be ring-fenced to determine true cost of supply whilst reducing inefficiencies. A strategy should be developed to urgently implement cost reflective tariffs in order that the ESI becomes viable.
4. Legal and regulatory frameworks- Develop and harmonize legal and regulatory frameworks that will enable regional trade in modern energy services. This will require strengthening of the regulatory institutions and capacity building of critical sector stakeholders (government and utility personnel).

1. INTRODUCTION

The Regional Electricity Regulators Association of Southern Africa (RERA) was established by the responsible Ministers of Energy of the Southern African Development Community (SADC) as a formal association of electricity regulators at a meeting held in Maseru, Lesotho, on July 12, 2002. RERA is a voluntary organization whose members are the regulatory institutions responsible for regulating the electricity supply industry (ESI) in the different SADC countries. The Association was established in terms of the SADC Protocol on Energy (1996), the SADC Energy Co-operation Policy and Strategy (1996), the SADC Energy Sector Action Plan (1997), the SADC Energy Activity Plan (2000) and in pursuit of the broader initiative of the New Partnership for Africa's Development (NEPAD) and the African Energy Commission (AFREC).

RERA was officially launched in Windhoek, Namibia on September 26, 2002 and its mission is to facilitate harmonization of regulatory policies, legislation, standards and practices and to be a platform for effective cooperation among electricity regulators within the SADC region.

As part of its multi-year Strategic Plan covering the period 2008 – 2010, RERA intends to focus on the following broad priority areas:

- i) Improve the regional investment climate in the electricity sector;
- ii) Develop an enabling regulatory environment for access to and operation of a viable electricity market in the SADC countries; and
- iii) Enhance the capacity, image, credibility and performance of RERA.

In order to monitor pertinent developments in the SADC countries in relation to each of the above mentioned priority focus areas, RERA intends to carry out annual surveys in the different SADC countries for comparison and benchmarking of performance. This report is the result of the first such survey conducted in all of the SADC countries and focuses on the status of government policy in the ESI, the institutional set-up of the ESI and the associated governing regulatory frameworks.

2. BACKGROUND AND CONTEXT

The development and implementation of sound policy, institutional and regulatory frameworks are critical to the effective and sustainable delivery of infrastructure services in the region. From a policy perspective, governments expect a regulatory regime that ensures efficient development of a sector and fulfillment of social and political goals. Investors expect a stable and fair regulatory system that ensures a fair rate of return, given the perceived risks and the opportunities to be earned elsewhere. Consumers expect protection from market power abuse and mechanisms to participate effectively in the formulation of policy and regulatory processes. Hence regulatory frameworks need to strike a delicate balance between the interests of consumers and investors in a fair, transparent and sustainable way, while ensuring sustainability of the industry and providing incentives for efficiency.

The current situation in the SADC is that there are different policy and regulatory frameworks in the regional countries. Successful regional integration of electricity systems requires clear and aligned policies, institutional and regulatory frameworks to facilitate public and private sector participation and investment in the ESI, cross-border

transactions, conducive regional systems and market operations, and a uniform system of tariffs for use of regional transmission infrastructure. The development of facilitating frameworks is also essential to harmonizing and creating market structures that remove barriers to trade and attract investment in the ESI.

Regional governments are looking more and more towards private participation in new generation and transmission projects as a means to help address the current regional power crisis. To date, very few significant private sector or public/private sector projects have been realized and it is highly unlikely that this will become reality to any large extent where policies are not conducive to investment, where regulatory frameworks are not aligned or restrictions in cross-border trade in electricity exist.

The annual surveys being contemplated by RERA are intended to document the status of policy and the institutional and regulatory frameworks in the SADC region for purposes of comparing, monitoring and benchmarking of the regional countries. Apart from comparing, monitoring and benchmarking, the survey is also intended to promote the enhancement and harmonization of the variant frameworks to facilitate investment and trade, and the development of good regulatory practices based on the principles of autonomy, transparency, accountability, non-discrimination, investment promotion and protection, and competition.

3. OBJECTIVES

The main objective of the survey was to get a snap shot of the status of the current policy, institutional and regulatory frameworks in the SADC ESI. This will be continued with in future for purposes of comparing, monitoring and benchmarking the development of ESI policy, institutions, investments and regulatory frameworks in the different countries.

4. SCOPE OF WORK

As part of this survey, both qualitative and quantitative indicators were used which required respondents to respond to the following issues:

1. General background about the regulator or any other institution that carries out electricity regulatory functions;
2. Policy framework (including independent power producers (IPP's));
3. Legal Framework;
4. Institutional/industry setup;
5. Regulatory framework;
6. Regulatory process;
7. Tariff adjustments;
8. Third party access;
9. Other regulations;
10. Private participation;
11. Rural service characteristics;
12. Ownership of the utilities; and
13. Selected performance indicators i.e. System maximum demand, connected customers, power trade and access to services.

5. METHODOLOGY

The regional survey involved all fourteen SADC countries. In each country, the target respondents were:

- i) Government, primarily to address policy aspects and/or regulatory aspects if no ESI Regulator exists;
- ii) The regulatory body responsible for ESI regulation; and
- iii) The incumbent state owned utility responsible for the generation/purchase and transmission and (often) distribution of electricity.

Responses were generally good, but sometimes slow to come, with a few institutions either responding partially or not at all. However, this was partly addressed by overlapping responses, for example where a government did not reply to the questionnaire on policy issues the regulator often also responded to the policy related questions with resultant access to the relevant information.

The following table indicates responses received:

Table 1 – Responses received on survey

Country	Department of Energy	Regulator	Utility
Angola	√	√	√
Botswana	√	n/a	√
DRC	√	N/a	√
Lesotho	√	√	√
Madagascar	√	√	√
Malawi	√	√	√
Mauritius	√	n/a	√
Mozambique	√	n/a	√
Namibia	√	√	√
South Africa	Not submitted	√	√
Swaziland	√	n/a	√
Tanzania	√	√	√
Zambia	√	√	√
Zimbabwe	√	√	√

Overlapping responses within countries on some of the questions sometimes differed. For example, regulators often felt that returns of utilities were adequate to ensure viability whilst most of the utilities felt that this was not the case.

Following responses, country reports were compiled for each country. From the country reports, this report is compiled as a summary of the most important findings.

However, it should be noted that for a particular country or issue, the country report must be studied in conjunction with this report to get a complete picture. Country reports are annexed to this report.

6. ELECTRICITY SUPPLY INDUSTRY POLICY

6.1 Regional Policy Summary

The following table is a summary of the status of ESI policy in the different countries:

Table 2 – Status of ESI Policy

Country	ESI Policy in place	IPP Policy	Responsibility for Planning
Angola	√	No	Government

Botswana	X (Draft)	Legislation amended	Government
DRC	√	No	Government
Lesotho	√	No	Government
Madagascar	√ (Madagascar Action Plan)	No formal policy	Government and regulator monitors policy implementation
Malawi	√	Yes	Government and NIRP regulator
Mauritius	√	Yes	Government
Mozambique	√	No	Government
Namibia	√	Yes	Government and state owned utility
South Africa	√	Yes	Government and NIRP assisted by utility and regulator
Swaziland	√	No	Government
Tanzania	√	Yes	Government
Zambia	√	Yes	Central and local Government and state owned utility
Zimbabwe	√	Yes	Government assisted by state owned utility

6.2 Policy formulation and adoption

Policy formulation is centralized and done by governments throughout the region. In countries where formal Energy Policies exist (e.g. White Papers), the policies were generally formulated after stakeholder consultation processes.

6.3 Policy implementation constraints

The following issues were identified as constraints to the successful and/or timely implementation of ESI policy, in no particular order of importance:

- Lack of capacity-experience and skills.
- Lack of financial resources or resources not availed on time.
- Lack of stakeholder buy-in.
- Unofficial policy changes.
- Inconsistent policy implementation.
- Lack of political will.
- Limited implementation capacity.
- Inadequate institutional sector coordination.
- Lack of investor interest.
- Time lags between policy formulation and development of the enabling laws.
- Tariffs-The electricity tariffs are not cost reflective.
- Lack of Prioritization: Energy was not one of the priority sectors in the country hence planning for future energy needs has been lacking.
- Insufficient incentives to attract new investment and private sector participation.
- Lack of awareness of the national policy amongst key stakeholders (policy not communicated to the relevant investors and public).
- Resistance to change.

6.4 Other Issues impacting on policy

Whilst there are many issues that impact on the implementation of policy, two issues that directly relate to the recent electricity power crisis can also be highlighted:

The first is a shift from a regional view of least cost projects to a self sufficiency mindset, with more focus on local in-country generation rather than relying on imports even if these were cheaper. This is primarily as a result of some exporter's inability to fully meet commitments to importing countries, but also to a lesser extent as a result of the transmission constraints experienced in wheeling power on the regional grid. As development of local generation capacity is often not the least cost option, this may very well result in much higher future electricity prices, which in turn may have a negative impact on the competitiveness of the region.

The second is that regional market trading through the Short Term Energy Market (STEM) of the Southern African Power Pool (SAPP) has been suspended since 2007. Most utilities view bilateral contracts as critical at the moment to ensure security of supplies and predictability of prices. Lack of trading in the short term market is viewed as a reflection of the lack of regional excess energy and capacity.

6.5 Planning

In most countries energy planning is the responsibility of government, utility and regulators. However, in most cases there is no clear role differentiation. There are overlaps between various institutions (e.g. government, regulator and utility) and also between planning and implementation.

Most planned projects are too big and ambitious for local country markets with most countries not having the capacity to fund or guarantee loans required to finance these plans.

Respondents also indicated that no one assumes responsibility for important decisions with resultant political consequences and far reaching financial and practical implications.

It was also inferred that project negotiations with governments take too long resulting in eventual breakdown of negotiations and loss of potential investor interests.

It is important to note that the SAPP has had a list of "imminent" power projects which has remained virtually unchanged over the past decade with implementation dates shifting year after year. The lack of project development and implementation skills on the side of governments are viewed as one of the major problems in the region. Also, lack of ability to raise the project finance as most of the power projects are capital intensive.

There has been no major new investment in the SADC ESI despite the:

- Forecast by SAPP indicating diminishing generation surplus capacity, as far back as 1999.
- Two regional investment conferences that took place in Zimbabwe (2001) & Namibia (Sept 2005) focussing on the imminent crisis.
- One round table meeting with investors/ lenders in Republic of South Africa (RSA) (Nov. 2005).

The Development Bank of Southern Africa (DBSA) has indicated that project preparation is critical to investor uptake of projects. Most projects have not been successful as they have not been presented as bankable projects. The DBSA and other international financial institutions have set aside funding to assist project sponsors to develop projects to a bankable level.

It is important to conclude that most countries and/or utilities in the region currently lack the capacity to develop projects to a bankable level and hence the general failure to successfully implement plans.

6.6 General Features of ESI Policies

ESI policies are generally in line with international practices and trends. Whilst policy updates are being done regularly in a few countries, in the majority of countries these are not updated and there are a lot of inconsistencies between what is stated as part of the policy and what is actually implemented. The question can be asked whether policy is actually effectively being used as a tool to guide and implement sector projects and programs, as in some cases there is no correlation between the two. As a general statement some policies also seem to be too ambitious and not realistic given the capacity constraints and the size of the market.

As a conclusion it can hence be noted that whilst policies are generally aligned with international practices, there seems to be no direct correlation between official policy and the practical situation on the ground.

6.7 IPP Policy

Most sector policies promote private sector participation, especially at generation level. A few countries do have well defined IPP policies or frameworks with specific targets that can provide comfort to private investors and address country specific problems. There are also no frameworks to provide clear processes, requirements and conditions for potential investors and issues such as restrictive labor laws, tax regimes, fiscal issues and land tenure lead to project implementation difficulties. It is important to note that there is recognition of this fact in some countries like Namibia, which has taken the initiative to develop aligned frameworks.

7. REGULATORY AND INSTITUTIONAL FRAMEWORK

7.1 Regional Summary

The following Table provides a summary of the existing regional regulatory and institutional framework:

Table 3 – Regional Regulatory and Institutional Framework

Country	Legal Power Sector Reforms (new legislation)	Do Regulators Exist	Sector Organization
Angola	Yes	Yes	Monopoly vertical integrated utilities for Tx and Dx GEN-MU+IPPS
Botswana	Yes (amendments)	No	Monopoly vertical integrated utility
DRC	No	No	Monopoly vertical integrated utility +private regional supply concessions
Lesotho	Yes	Yes	Monopoly vertical integrated utility for Tx and Dx +GEN
Madagascar	Yes	Yes	Monopoly vertical integrated utility +Gen- MU+IPPS

Malawi	Yes	Yes	Monopoly vertical integrated utilities
Mauritius	Yes	No (New regulator expected 2008-9)	Monopoly vertical integrated +IPPS
Mozambique	Yes	Yes	Monopoly vertical integrated utility + IPP+ITC
Namibia	Yes	Yes	Monopoly vertical integrated utility + REDs
South Africa	Yes	Yes	Monopoly vertical integrated utility+Dx Municipalities +ITC +REDs
Swaziland	Yes	No (New regulator expected 2008-9)	Monopoly vertical integrated utility
Tanzania	Yes	Yes	Monopoly vertical integrated utility +IPPs
Zambia	Yes	Yes	Monopoly vertical integrated utility+ IPP+ITC
Zimbabwe	Yes	Yes	Monopoly unbundled utilities +IPPs

Tx Transmission
Dx Distribution
GEN Generation
RED Regional Electricity Distributor
MU Municipality

7.2 Governance and reform

The power sector governance and management is normally the responsibility of a ministry of energy, either as a stand alone ministry or combined with water, natural resources, and minerals and in some countries under the public utilities ministry.

All the countries within the SADC region have introduced some form of power reforms in the past fifteen years. However, most of the reforms have not been successfully completed. Thirteen out of fourteen SADC member states have enacted new power sector legislation and introduced the possibility of some private sector participation in power. Twelve out of fourteen have introduced some kind of regulatory oversight in the form of energy or electricity regulatory authorities with two states working on the institutional set up. Some countries had envisaged fully liberalized and unbundled utilities but most have had resistance to implementation of the approved market structures.

The extent and payoff of the reforms have been limited and in all countries the national utilities retain dominant market positions; serving as single buyers and maintaining own generating plants. No country has fully adopted the 'standard' reform model that is, unbundling, privatizing and wholesale and retail competition. While policies generally all subscribe to market reform, they have not been implemented and are still to achieve the fully desired results of an adequate and efficient industry.

Private sector participation is either temporary or limited to management contracts, or marginal through IPPs that are typically contracted to the state owned national utility.

Electricity sector reform processes were basically initiated in the 1990s with new electricity legislation enacted in most countries aiming at attracting private sector participation in electricity generation and distribution. Most countries established electricity regulators to

regulate the ESI, with South Africa taking the lead in 1994 and Mozambique reestablishing its advisory regulator early in 2008. There is also an ongoing process in most countries aimed at transforming the regulators from electricity regulators to energy regulators and in some cases to multi-sector regulators.

However, there has been no full vertical unbundling of the sector, with all the national power utilities essentially remaining monopolies and keeping the same powers and responsibilities regarding generation, transmission and distribution that they have always had.

As part of reform, most of the power utilities have changed status from *sui generis* statutory bodies to corporates wholly owned by government. Whilst this has brought a change in status and often tax and dividend benefits to the relevant government, it has also led to a removal of more direct government influence and oversight.

The main reason given why most utilities have been corporatized is to enhance efficiency and commercialize them in preparation for eventual privatization. Some of the main reasons include the following:

- ✓ Improve their operational and financial efficiency;
- ✓ Improve service quality rationalization of resources;
- ✓ Raise funds for government through payment of dividends;
- ✓ Contribute to increased access to electricity;
- ✓ Make the sector viable and attractive to new investments; and
- ✓ Prepare them for competition in the sector.

The current status of most corporatized utilities has not changed and respondents have indicated that:

- ✓ There is no significant improvements in terms of service quality, governance and efficiencies;
- ✓ Most of the utilities have only implemented partial unbundling with some even reversing the process;
- ✓ There is no political will to privatize electricity utilities by most governments;
- ✓ Corporatization strategies which are spear headed by utility managers and often inward looking and focused on strengthening the position of the organization relative to other role players; and
- ✓ Whilst remaining vertically integrated, utilities often dominate the market as well being designated the single buyer (and wholesale seller) of electricity.

As a result the region has very dominant utilities most of which do not have strong compacts or performance agreements with their respective governments. Where performance agreements do exist, compliance monitoring is absent or not transparent.

There is clear need for governments to reinforce their structures and build capacity of their sector institutions to enhance their oversight function of the ESI through:

- Conducting cost of supply/service studies to determine actual cost of providing the electricity service based on the deferent energy mixes for the various countries.
- Empowering their regulators (where they exist) so as to ensure that industry is viable whilst protecting the needs of vulnerable groups.
- Competent board members being appointed to the utility boards.
- Address the monopolistic aspects of the ESI without compromising on quality of service e.g.:

- i) Carefully consider the use of the single buyer mechanism and who fulfils that function in order to ensure the incumbent utility does not monopolize the market and restrict access of new entrants on unwarranted grounds.
- ii) Transmission function can remain monopolistic with transparent regulation and fair and equal access for all players to transmission systems.
- iii) Generation should be opened up to allow for IPPs and private public partnerships (PPPs) to participate.
- iv) Where the market is small the industry can remain monopolistic but ring-fenced so as to identify key cost drivers within the power supply chain and address them timely.

7.4 Sector organization

Generally speaking, there are no legal restrictions on joint ownership of the various services and areas of activities, as it is demonstrated by the vertical integrated national power utility, with responsibilities at level of generation, transmission and distribution.

Thus the market model that best describes the structure of the sector in the region is the vertically integrated monopoly where vertical integration exists between the services of generation, transmission and distribution. However, there are nine countries which have more players in the ESI apart from the national utility, mainly in the generation in the form of IPPs, albeit on a small scale. The region also has a few independent transmission companies (ITCs) with limited scope of activity e.g. Mozambique Transmission Company (MOTRACO) and Copperbelt Energy Corporation (CEC). Mauritius and Tanzania have the highest contribution within the energy mix supplied from IPPs. In countries like South Africa, Namibia and Madagascar, etc, the distribution function is provided through local government structures, municipalities, urban and rural councils.

The national power utility in all countries has either been declared or acts as the single buyer of the electricity and sells in bulk, in some cases directly to end consumers and in others to large customers (mines, smelters etc) and municipalities. Utilities are generally not involved in other services such as providing water and gas services. Madagascar is the only country where the utility is also responsible for water supply.

In most countries legislation also allows for private participation in other segments of the power sector. In a number of countries distribution concessions have been awarded in the last couple of years and supply and distribution concessions for small off grid systems.

In all fourteen countries the sector is dominated by national electricity utilities which are vertically integrated. In cases where private power producers exist, the national utilities are single buyers. Effectively the concept of a single buyer linked to utility dominance and monopolies in ownership, use of infrastructure and sales of electricity have meant that no significant IPPs have been established with the exception of Mauritius and Tanzania. No SADC state has fully liberalized or deregulated the electricity supply industry.

7.5 Regulatory framework and processes

Ten out of fourteen countries have established sector regulators. Tanzania is the only country with a multi-sector regulator which includes regulation of water utilities. Two

countries, Swaziland and Mauritius, are in the process of establishing new regulatory institutions.

Mozambique has a different regulatory model (National Electricity Council) with commissioners which form an advisory board with no executive powers except regarding the arbitration of disputes and the monitoring of the performance of industry players. This institution is envisaged to convert to an executive regulatory body in future.

The Democratic Republic of Congo (DRC) does not have a regulator and Botswana is working on various legal and institutional reviews aimed at facilitating the establishment of a multi-sector regulator (water and electricity).

The regulatory institutions remain fairly weak as the most regulators have not been established for long, and are hindered by a lack of capacity and adequate funding. Some of the longer established ones have been plagued by skills flight and lack of autonomy.

Most of the existing regulatory frameworks do not require review or approval of power purchase and sales agreements and it also omits any requirement in terms of regulatory review or approval of imports and exports of electricity.

In most countries the regulatory authorities are responsible for the oversight of the power utilities in the following areas:

- Granting of licenses.
- Approval of tariffs.
- Approving and monitoring investment plans.
- Market oversight and rules (in theory).
- Establishing technical and minimum service levels.
- Monitoring and enforcing compliance with regulation.

Where regulators do not exist, it is the responsibility of the relevant ministries to grant licenses and provide the oversight functions for the ESI. It was highlighted that the major problems faced by regulators are newness and lack of the requisite skills to carry out their full functions. Lack of capacity also affects the government ministries. Importantly, this results in most utilities being self regulating in one form or the other.

In this regard it is important for regulators to constantly evaluate their effectiveness through regulatory impact assessments and outsource special skills which they need for certain tasks like technical audits for compliance monitoring and especially incident investigations. For newly created regulators it is possible, for example, to contract out tariff reviews whilst they are building capacity.

Publication of Results

In most countries the results of tariff reviews, technical investigations, etc, are published using print media, posting the findings or new rates on websites or through electronic media (television and radio).

Appeal process

In most countries appeals are allowed against regulatory decisions with most having established arbitration tribunals, with some others having to appeal to the executive, or to the courts.

7.6. Tariffs and pricing

In all countries, residential and large customers' tariffs are regulated. There generally is no defined capacity threshold (in MW) above which large customers tariffs are unregulated. In practice this happens but this is mostly treated on a case by case basis.

Tariffs and pricing is an area subject to different interpretations and opinions depending on the entity responding to the questionnaire -- government, the regulator or the utility. Generally, utilities feel that tariffs are too low whilst governments and regulators generally believe they are adequate. In some countries it is acknowledged across the board that tariffs are too low or adequate although practically financial reports might be indicating otherwise.

The type of economic regulation methodology used for each of the different segments of the ESI differs. In general, price cap applies for generation while the rate of return applies for the remaining segments, but there are exceptions.

Retail tariffs are indexed on annual basis mainly reflecting the currency depreciation, the inflation, fuel costs and costs of imported equipment and material. Periodic tariff reviews are allowed at least once a year with two countries having multi-year determination frameworks.

Although there are different opinions on whether the revenue is sufficient to cover all the operational costs of the national power utility or not, it is generally believed that the revenue is sufficient to cover *operational costs*. Similarly, there are different opinions on whether the current tariffs are *sustainable* and able to provide the right signals for new investments and efficient use of electricity. The majority of the countries indicated that tariffs ***are not sustainable and do not give sufficient signals to ensure future investments and efficient use of the commodity***.

In most countries, the service is subsidised in one form or the other. About half of the countries have set a target to reach cost reflectivity by 2010/11. Interestingly, only Mozambique and Swaziland indicated that their tariffs are sustainable. This is also confirmed by their annual reports.

The Table below sets out a summary of the tariff regimes in the different countries:

Table 4 – Tariff Regime by Country

Country	Tariff methodology	Revenue sufficient to cover costs	Tariff sustainability	Cost of supply(COS) study /target to reach COS
Angola	ROR for generation and price cap	No	No	No COS has been done no target set
Botswana	Cost + rate of return	Yes	No	Cos not done and target to achieve cost discussions in progress
DRC	Revenue cap	No	No	COS not done
Lesotho	Revenue cap and price cap for supply(not implemented yet)	Yes	Yes	COS in 2003 &2007 and cost reflective tariffs achieved 2008
Madagascar	Price cap(supply)	No	No	COS done 1991 updated

				+ economic cost	
Malawi	Revenue Requirement	Yes	No		2001 target to reach cost reflective 2009 COS done 2005 target reached in 2010
Mauritius	Regulator to determine	Yes	No		COS not done target 2010
Mozambique	ROR	Yes	Yes		COS done 2001 target reached 2004(some aspects not implemented)
Namibia	ROR+ revenue requirement	Yes	No		COS done 2005 target 2010/11
South Africa	Revenue Requirement	Yes(regulator) No (utility)	Yes(regulator) No (utility)		COS done 2005 updated continuously by ESKOM-target 2009/10
Swaziland	Revenue Requirement	Yes	Yes		COS not done
Tanzania	Revenue Requirement	No	No		COS to be done 2008 before next tariff increase
Zambia	Revenue Requirement	Yes	No		COS done 2007 target 2009
Zimbabwe	ROR	No	No		COS done 2004 but not implemented

7.7 Key regulations

Third party access to transmission and distribution networks is allowed in theory in all countries. In practice, there are many barriers to such access, such as lack of a transmission use of system tariff regime, denial of access by the incumbent utility for technical and other reasons, the declared or undeclared single buyer regimes and lack of an independent system operator (ISO). In the few countries that do not have regulators the entities that intervene in access/interconnection terms/fees conflicts are the ministry and the power utility.

There is no country with transmission access controlled by an ISO.

The power utilities can discontinue their services in case of non-payments (in general after 2 to 3 months of non payment). The utilities can also suspend the supply in cases of safety protection of the grid, tampering, etc. In terms of protection of the rights of consumers, the regulators play a very significant role. The Consumer Groups are also relevant in this regard.

There are defined targets or minimum quality of service standards for commercial performance as well as defined targets or minimum quality of service standards for technical performance. However, there are no well defined compliance frameworks for quality standards in most countries.

7.8 Private Sector Participation

In all SADC countries the laws allow for entry by IPPs although contribution of these is still at a very low level, with Mauritius and Tanzania being an exception. Most respondents indicated that the contracts for IPPs that are operational have not been renegotiated. In most countries that have IPPs, they operate under concessions.

Where IPP's do exist they generally only sell to the incumbent utility (as single buyer), with provisions for "take or pay". However, none of the respondents were able to provide the actual levels of energy purchases (MWh per year) committed under these contracts as these are considered confidential.

The following are some of the key issues which potential investors and lenders have indicated need to be addressed by the region before they make significant investments:

1. Ensure adequate cash flows in the sector;
 - Adequate tariff levels
 - Payment discipline by customers
2. Maintain the stability and enforceability of laws and contracts (e.g., Power Purchase Agreement (PPAs));
3. Improved responsiveness by governments and
 - Policy consistency
 - Availability of guarantees from governments (where necessary)
4. Minimize government interference;
 - Independence/autonomy of regulator
 - Ability to exercise effective operational and management control of their investments
 - Effective control over incumbent utility to align with stated policies.

8. RURAL ELECTRIFICATION

The following Table summarizes the rural electrification scenario in the different regional countries:

Table 5 – Rural Electrification

Country	Specialized Rural Electrification Agency/fund	Sources of funding	Policy target for Rural Electrification Rate	Use of Renewable energy sources
Angola	Rural Electrification Fund	Government, donors and sector levies	50% by 2013	22% on site individual power stations
Botswana	No special agency function being carried out by power utility	Government	12.5% increase annually (25% achieved by 2004)	Small PV systems exist and the rest are connected to the national grid.
DRC	No special agency	Government, donors and sector levies	Not provided	No information provided
Lesotho	Rural Electrification Unit	Government	Not provided	No information provided
Madagascar	Rural Electrification Agency and Fund	Government, donors and sector levies	10% by 2011	0.72 MW – Hydro 0.25 MW – Solar PV
Malawi	RE management committee and RE Fund	Government, donors and sector levies	10% by 2010	4.7 MW – Hydro 63 kW – Solar PV

Mauritius	No special agency	No significant Rural Electrification Program	100% achieved in 1981	All systems connected to the national grid
Mozambique	No special agency function being carried out by power utility	Government and power utility	12% by 2009	No information provided
Namibia	No special agency function being carried out by Ministry of Mines & Energy	Government and power utility	25% by 2020	5 -10 isolated systems exist
South Africa	No special agency but Rural Electrification Fund exists	Government and sector levies	100% by 2014	No information provided
Swaziland	No special agency function being carried out by power utility	Government and power utility	100% by 2022	Some solar PV systems exist
Tanzania	Rural Electrification Agency and Fund	Government, donors and sector levies	25% by 2015	20 MW – Small scale hydro 2 MW – Solar PV 0.1 (Other)
Zambia	Rural Electrification Agency and Fund	Government, donors and sector levies	51.6% by 2030	23.75 MW – Hydro 0.41 MW – Solar PV
Zimbabwe	Rural Electrification Agency and Fund	Government, donors and sector levies	Not provided	+10 000 Solar PV systems installed audit required for other systems

8.1 Governance

In most countries, the central government is responsible for rural electrification but eight of the countries have specialized rural electrification agency or have established funds.

In all SADC member states the state-owned utilities have significant responsibilities in rural areas. The involvement of the major utilities in the rural areas is complemented by community based electricity service providers, which have limited responsibilities in this context.

Thus the key roles in rural electrification are played by the government, at central level, the national rural electrification agency or fund, if it exists, and the national power utility. The Government also plays the roles of organizing and providing the funding and regulation of rural electricity services and the utility typically providing the required technical and operational assistance for the rural electricity services.

There are specialized funds covering rural electrification with money being sourced from sector levies, government and donor funding. The main criteria used to prioritize rural electrification projects are based on economic return and population. In a number of countries political influence was mentioned as one other criterion used.

8.2 Policy and Institutional set up

In most SADC countries the levels of electrification are still low especially in rural areas except for Mauritius and South Africa. The lowest rural electrification levels (in countries where statistics were provided) are Malawi and Madagascar which are currently less than 10% electrified. Mauritius achieved 100% national electrification as far back 1981 and South Africa is expecting to achieve 100% by 2014 with national levels currently above 80%.

Connection fees are very high for most rural and poor urban families. In many countries the connection fees are subsidized by government and level of subsidies varies according to needs.

8.3 Rural service characteristics

In most countries the rural system networks are in dire need of rehabilitation as not much maintenance is carried out on the systems due to sub-economic tariffs. There is a significant shift especially in countries which have had recent revision of their energy policy, towards sustainable use of renewable energy for the provision of electricity services. The main incentives provided to encourage the use of renewable energy sources are:

- Custom duty and tax (Value Added Tax - VAT) exemption.
- Low interest rates on loans taken to implement renewable energy projects.

However, these incentives have not had much impact in scaling up the use of renewable energy sources which is often perceived as a “lesser” form of electricity by the intended users.

It is important to note that Mauritius at national level has had significant success in increasing the contribution of renewable energy to the overall electricity supply mix which as of 2007 was over 40% of the total electricity energy supplied.

9. OPERATING ENTERPRISES

9.1 Organization and autonomy

In all the SADC countries the electricity supply industry is still dominated by government-owned electricity supply utilities which are vertically integrated. These utilities have Boards whose members are typically appointed by government ministries responsible for public utilities or energy. Most members of the Boards are appointed from industry, government representatives, public institutions and consumer groups.

Most of the Boards are non-executive and management of the utilities have the responsibility and competence for the hiring of workers, laying-off, setting wages/bonuses and levels of production.

Approvals for investments are done by the Boards and/or government ministries. The setting of prices for the provision of services (tariffs) is approved by regulators where these exist or/and governments. In most countries governments provide subsidies for special projects and protected consumer groups and usage of these funds is done with the approval of utility Boards and governments.

9.2 Monitoring and performance

All public utilities in the SADC region produce annual reports which are public documents and these reports give a summary of both financial and technical performance. Most of the utilities have external independent auditors and follow international financial reporting standards. Four out of 14 countries have performance contracts between government and the power utility. In most utilities performance incentives exist which are used to reward managers and promote them. However, governments do not have effective performance monitoring mechanisms nor penalties for poor performance in place.

9.3 Finance and labor

Most utilities, being corporatized are required to earn a rate of return and to pay dividends. The majority of the utilities are not exempt from any form of taxation and have access to credit at market rates. They have also been granted government guarantees in one form or another. Although utilities should be remunerated for non-commercial activities by the state, this does not always take place.

Most utilities indicated that they have the liberty to appoint and lay-off workers when necessary. However, such actions have to be done within the confines of the Labor Law relevant to each country. All the utilities indicated that their wages/salaries are somewhere between public and private sector levels.

Some utilities contract out activities to the private sector under service contracts mainly in the commercial area (billing, collection and interruption of supply for unpaid consumption), information technology services and security.

There is a high international demand for technical skills in particular those of power market operators, tariff designers and analysts for generation, transmission and distribution, long term planning engineers, technicians, technologists, artisans, operators and project managers. Also, indicated by other utilities are treasury management and management of information technology. These skills impact on the overall efficiency; use of advanced technologies and management tools for generation plant, network operations and maintenance. Most utilities except Zambia Electricity Supply Company (ZESCO), Electricity Supply Company in South Africa (ESCOM) and Swaziland Electricity Company (SEC) are experiencing serious skills shortages.

Strategies being implemented or contemplated to bridge the skills shortage include training programmes and improved skills retention packages.

10. ISSUES AND RECOMMENDATIONS: REGIONAL PERSPECTIVE

10.1 ESI challenges in the region

The following represents a summary of some of the key challenges and issues that the SADC ESI has to grapple with:

- i) National electricity policies that emphasises self-sufficiency and not necessarily least-cost options;
- ii) Aging power infrastructure (assets) – most of the equipment is more than 20 years old and is in dire need of rehabilitation and/or replacement. Aged power systems also tend to have high losses;

- iii) Critical under investment – There has been no significant new investment into the ESI over the last decade although it was forecast as far back as 2000 that the region would run out of excess capacity. Two regional investment conferences have been held since 2000 but no major investments have come to fruition. It is also evident that governments have limited capacity to invest in new generation and reinforce national grids that constitute bottlenecks to regional transmission capacity. Financing of cross-border transmission interconnections and reinforcements has encountered a lot of difficulties;
- iv) Subsidized or sub-economic tariffs – Most tariffs in the region have remained at sub-economic levels and have not been able to provide the right signals for new investments. This has also immensely contributed to poor performance of some utilities and compromises their ability to transact normal commercial activities;
- v) Relatively slow pace of reforms – Most of the countries have implemented some reforms but these have not been concluded and transition periods have been long;
- vi) Evolving regulatory environment – Most regulators are new and with limited capacity relative to their challenges. Most countries have a long way to go in embracing and implementing best practice regulatory principles. In addition, the following problems are often associated with regulators and regulatory practices:
 - Weak and changing regulatory frameworks requiring “negotiation” of key regulatory aspects (i.e. adapting to an ever-changing policy reality);
 - Regulators without necessary minimum skills, capacity and competence;
 - The right of the government (either directly or through instruction to the regulator) to override regulatory decisions (e.g., to change tariffs unilaterally);
 - Unilateral decisions by the regulators undermining project and investment return (e.g. if a regulator is created after an investment was made and the regulator wants to “reopen” or change certain provisions previously agreed);
 - Lack of clarity about the powers of the regulator and that of government, including too wide discretion allocated to the regulator (i.e. lack of clear parameters within which to make a decision leads to reluctance to take difficult or controversial decisions); and
 - Conflicts in policy determination and policy implementation, with regulators drawn into the latter;
- vii) Energy information gap – Lack of an up to-date national and regional energy information system or database that can be used as a important resource by governments, regulators, utilities, investors and other stakeholders for reporting, monitoring and evaluation purposes; and
- viii) Uncoordinated sector planning and development – A regional integrated resource plan (RIRP) for the energy sector is not in place. Even where the regional plans such as the Power Pool Plan are in place, there are no mechanisms to enforce the implementation.

10.2 Recommended Strategies

10.2.1 Policy Framework

In line with the SADC Energy Protocol to which all Member States are signatory, the region needs to work towards the harmonization of national electricity policy frameworks so that complementarities in resources are reconciled with self-sufficiency goals. Essentially, this requires a redefinition of self-sufficiency that puts reasonable emphasis on cross-border supplies. These are often sensitive matters of political judgment, but it is also true that the more the region becomes practically integrated the greater value that will be placed on sustaining the cohesion of the whole.

The governments should provide leadership and drive needed to establish effective and coordinated processes that address key policy issues in an integrated and comprehensive manner.

Governments need to pay greater attention to suitable legislative frameworks in order to guarantee regulatory autonomy/independence and give investors stronger assurance regarding the stability of regulatory frameworks.

Lastly, and perhaps most importantly, stated policies should be adhered to and implemented and not substantially changed without proper stakeholder consultation processes.

10.2.2 Electricity Supply Industry Reform and Growth

Reform of the electricity industry should continue in line with most stated policies and include elements of the following:

- i) unbundling, with, at the very least, separate accounting for the constituent elements of the industry;
- ii) mechanisms to allow competition in generation, where feasible – at the very least, incentives should be developed to stimulate and encourage IPPs and PPPs;
- iii) a neutral entity should coordinate the matching of generation and demand and should institute the necessary technical rules and tariff regimes for access to transmission;
- iv) freedom for buyers and sellers to transact with each other in accordance with established rules; and
- v) a balanced and independent regulatory regime.

10.2.3 Pricing and Tariffs

The basic principle is that electricity utilities need to be financially healthy, charging tariffs to customers that reflect the cost of supply while being held accountable for service quality. At the very least, the average tariff should ensure that the utility is revenue sufficient, which does not exclude cross-subsidies within consumer categories.

Regulators should approach tariff adjustments with the aim of ensuring that the service is sustainable and there are sufficient incentives for system expansion. An autonomous/independent regulator should be expected to make a more balanced decision

than the political leadership which is subject to many social and political pressures. When considering tariff adjustments, a competent regulator should also take into account, not just the purely economic factors, but also broader societal implications.

10.2.4 Regional Integration and Harmonisation

Greater regional integration is critical and should lead to a bigger market and more efficient system, and effective trading and use of reserve capacity. If the SADC region has harmonised frameworks and approaches to investment in the ESI, both local and foreign investors will be looking at a much larger market with reduced risks rather than an individual country in the region. This will create more investor confidence and enhance prospects for investments in the ESI in the region as a whole.

Short to medium term recommendations

Over the shorter term, some investments could be facilitated by addressing the following issues:

1. Uniform policies

Underlying the ESI in any of the regional countries is the policy on which it is based. Whilst individual countries all have their own policies, there is insufficient regional co-ordination and synergy between them. Due to the nature of electricity generation and trade of electricity between countries it is absolutely essential that these policies are aligned and harmonized. This can be facilitated in the following manner:

- Ensuring that SADC regional policies attach sufficient importance and weight to IPP development and private sector development as part of the electricity market structure. For example, the current focus on vertically integrated single buyer regimes could work against effective private sector participation. Fiscal – tax – environmental – and employment issues are also often problematic and need to be addressed urgently.

Such a uniform regional policy should be developed as a matter of urgency. Suitable IPP frameworks need to be developed and adhered to by all regional countries.

- Address gaps in regional ESI policies and forthwith align country policies to the regional policy. Whilst SADC's efforts play a significant role in aligning the ESI policies and resultant planning initiatives being formulated and implemented in the different regional countries, this is of necessity only at a high level. Individual countries in the region also need to take firm decisions and commit to regional policy, e.g. on how the role of the different state-owned utilities should be defined in generation, transmission and distribution, and these should then be aligned to private sector participation.
- Where facilitating policies have been adopted in a country, but for whatever reason have not been executed or been shelved, the reasons for this need to be given and explained to other SADC countries. Pressure should be put on governments and officials to keep to their policies, preferably through objective review mechanisms. Target dates for policy implementation should be set and kept. Assistance, guidance and pressure should be applied to keep individual governments true to their stated policies and to not deviate without proper substantiation.

2. Policy implementation

Once policies are formulated and accepted, they need to be implemented in an orderly and consistent manner. Here the following can be considered:

- Organizations such as the SAPP and RERA can play a significant role in the facilitation, implementation and monitoring of policies. SADC on a regional level may not be able to enforce policies.
- RERA can play a significant role in assisting with this, especially on issues such as¹:
 - i) Facilitation and harmonization of ESI policy, legislation and regulatory frameworks, with particular focus on terms and conditions for access to transmission capacity, clients and cross-border tariffs. RERA could provide input to SADC for consideration, and facilitate regional implementation by its members;
 - ii) Co-operation between regional regulators – making recommendations on issues that affect the economic efficiency of electricity interconnections and electricity trade amongst members which fall outside national jurisdiction.

RERA can be assisted in its mandate both financially and by providing RERA with the necessary professional technical, legal and economic back-up that would lead towards the development of the ESI in line with internationally accepted principles.

- SAPP should continue with its present envisaged short and medium term activities, especially around its mandated SADC activities.

Medium to longer term recommendations

Over the medium to longer term, the following would need to be addressed:

1. Updating of legal and regulatory frameworks

Updating of ESI legal and regulatory frameworks to properly accommodate IPP's and private sector involvement in generation, transmission and supply activities. Presently the following deficiencies exist:

- i) In some of the SADC countries the ESI legislation is very outdated. In countries where more modern legislation is in place, the focus is not necessarily on private sector investment. Via RERA and SAPP the possibility could be investigated to develop "standard" or *pro forma* electricity legislation that would ensure a uniform *regional* electricity framework. This could apply to technical issues, standards as well as regulatory issues. Whilst individual countries would be free to adopt their own legislation, in reality the *pro forma* acts would hopefully serve as the point of departure.
- ii) Establishment of independent, arms length regulators in those countries that do not yet have them and strengthening of the existing regulators. Ongoing assistance and support should be provided to regional regulators to assert their independence and for governments to understand the importance of autonomous decision making in facilitating investment. Organizations such as RERA could be put to good use as a regional source of best practice and would help enhance regulatory objectivity.

¹ As per RERA's stated objectives.

- iii) Following adoption of regional policies on the ESI market structure and the role of the incumbent utilities, the legislation needs to be adopted to reflect the changing role of the national utility and bring IPP's into the regulatory fold.
- iv) The majority of SADC countries do not have detailed and dedicated licensing regimes, licences and codes associated with IPP's and private sector participation been developed. The legislation is mostly of an enabling nature rather than prescriptive with most of the detail largely absent. This is a huge problem as on the surface the legislation and policies seem to be conducive to private sector involvement but underneath there is no real substance. This would need a dedicated and concerted effort, and could be approached via RERA, SAPP or directly with the different regulators/countries. Once again *pro forma* licences, license conditions and codes can be developed and simply be adopted by individual countries. This would go a long way towards ensuring regional uniformity.

2. Ongoing institutional support

Over the longer term, a concerted and consistent effort should be made to support governments and regulators to formulate, review and implement policies. In particular, efforts should be focused on assistance (financial assistance and professional support) to those organizations that will probably make the most difference in getting IPP's and other private sector involvement off the ground. Once policies are accepted and put in place by governments, the task of implementing them will fall on the different government departments and the regulators. In most of the countries, competency and know-how at the implementation level is severely lacking, and it is doubtful if scarce skills can be built up over the short to medium term. Care should be taken that assistance is offered in such a manner that it is sustainable over the longer term.

Other critical strategies to be adopted

- **Improve operational efficiency by utilities** – Do cost of supply studies, ring fence and introduce competition in order to:
 1. Increase operational efficiencies;
 2. Increase collection efficiency; and
 3. Reduce technical losses.
- **Intensify energy conservation/efficiency initiatives** – Adopt appropriate policies and legislation and provide support and incentives to facilitate implementation.
- **Up-scale renewables** – use of on and off grid systems based on renewable technologies to increase access and substitute energy. Renewable targets and standards for installation should be developed.

Selected Regional Performance Indicators²

Table 6 – Installed vs Peak Demand Survey

² Source Southern Africa Power Pool.

This information was obtained from SAPP as most respondents did not submit sufficient data.

No.	Country	Utility	Installed Capacity [MW]	Available Capacity [MW]	2006 Peak Demand [MW]
1	Angola	ENE	742	590	432
2	Botswana	BPC	132	120	473
3	DRC	SNEL	2,442	1,170	993
4	Lesotho	LEC	72	70	101
5	Malawi	ESCOM	305	261	247
6	Mozambique	EDM HCB	307 2,250	2,075	299
7	Namibia	NamPower	393	390	408
8	South Africa	Eskom	42,011	36,208	34,807
9	Swaziland	SEB	51	50	188
10	Tanzania	TANESCO	897	680	567
11	Zambia	ZESCO	1,632	1,630	1,414
12	Zimbabwe	ZESA	1,990	1,825	1,904
		TOTAL	53,224	45,069	41,831

Table 6 – Some key Performance Statistics

UTILTY	(Peak Demand) MW / Employee	Generation Sent Out GWh / Employee	Number of Customers per Employee	Energy Sales per Employee GWh/Employee
ENE	1.095	0.686	36	0.69
BPC	2.076	0.467	73	1.45
SNEL	1.615	1.101	57	0.81
LEC	2.061	0.951	100	0.99
ESCOM	1.046	0.490	56	0.49
EDM	0.995	0.069	130	0.60
NamPower	5.104	1.673	3	3.70
ESKOM	11.721	7.475	127	7.58
SEB	2.629	0.176	82	1.43
TANESCO	1.159	0.756	113	0.77
ZESCO	3.856	2.624	84	2.48
ZESA	3.298	1.348	100	2.01

11. Implementation Plans.

From the strategies set out in section 10, implementation or action plans can be developed. These are summarized in the following Table, also indicating responsibilities and suggested target dates:

Table 7 – Implementation/Action Plans

Short Term Action Plans			
No	Action Plan	Responsible Party	Due By
1	Policy issues	SADC, Individual Governments	Before End 2009
	- Review and prioritize ESI	Supported by SADC	

Short Term Action Plans			
No	Action Plan	Responsible Party	Due By
	policy objectives	Secretariat, RERA and SAPP	
	- Develop policy implementation strategies	Supported by SADC Secretariat, RERA and SAPP	
	- Address cross-cutting issues, e.g. tariff policies, single buyers	Supported by SADC Secretariat, RERA and SAPP	
	- Institute and co-ordinate policy monitoring and review mechanisms	Supported by SADC Secretariat, RERA and SAPP	
2	ESI Industry Structure		End 2010
	- Finalize Industry Reforms, based on policy ³	Individual Countries	
	- Put in place oversight mechanisms ⁴	Regulators, RERA	
	- Effectively govern monopolies or eliminate in sub-sectors where possible	Regulators, RERA	
	- Institute effective industry governance systems, e.g. effective boards of state owned companies	Individual Governments, oversight by Regulators	
	- Ensure policies and legislation ensures a level playing field, e.g. rules for third party access to infrastructure, single buyer divorced from rest of vertically integrated utility	Government and Regulators	
3	Pricing and Tariffs	SADC Regulators, RERA	End 2009
	- Ring fence businesses	Regulators	
	- Do cost of supply studies	Utilities, overseen by Regulators	
	- Adopt cost reflective tariffs	Regulators or Governments -crucial	
	- Develop regional tariff regimes	RERA	

³ Finalize industry reforms in line with policies using a Decision Framework for Sector Reform³ which includes the following steps:-

- ✓ Identify whether the current reforms have achieved any results and if yes 'leave as is' if no proceed to the next step;
- ✓ Select the required set of reforms – this will differ from country to country depending on market size and level of development and competition e.g.:-
 - Review the results of corporatization – has it achieved the desired results – is the utility now viable?
 - Is the regulatory regime which has been set up stimulating competition?
 - Set out plans or roadmap to establish new institutions in line with policy and legislation.

⁴ Development of performance compact, institute independent performance audits, ensure effective regulatory oversight.

Short Term Action Plans			
No	Action Plan	Responsible Party	Due By
4	Legal and Regulatory Frameworks	SADC Governments, Regulators, RERA, SAPP	End 2010
	- Aligned regional legislation to allow for trade	RERA, SADC Governments, Regulators	
	- Cross-border licensing framework	RERA, SAPP	
	- Development of absent regulations that facilitate trade e.g. grid codes, 3 rd party access regimes	Regulators, RERA, SAPP	
5	Strengthening of Regulatory Institutions	Regulators, Governments	End 2011
	-Capacity building		
	- Strategies for attracting, retaining and training of staff		

ANNEXES – COUNTRY REPORTS

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT – ANGOLA

1. Introduction

Angola is presently experiencing unprecedented levels of economic growth, mainly due to high oil prices, a rapidly increasing petroleum production and growth in the production of diamonds and other minerals. The rapid growth of the petroleum and minerals sector, combined with a situation of peace and political stability, provide a much improved outlook for economic growth and social development in Angola over the coming decades. Government is responding to the improved outlook by initiating economic reforms, developing sector strategies and plans and pursuing improvement and expansion of infrastructure services throughout the economy, including the power sector.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

The policy formulation is centralized. However, a comprehensive energy policy as well as an ESI policy framework addressing all related sector issues on a consistent basis is lacking. Though not formally agreed upon, the key government strategy positions are expressed in the “Angolan Electricity Sector Development Strategy”, 2002.

This strategy complements the framework defined by a number of laws and regulations, including:

- The Electricity Act of 1996, followed by the preparation of a set of detailed regulations to accompany the Act.
- Legislation was also approved allowing the transformation of Empresa Nacional de Electricidade (ENE) and Empresa de Distribuição de Electricidade (EDEL) into “public enterprises” in 1998 and 1999, respectively.
- In May 2001 the supply regulations were published, followed by the publication of production and distribution regulations in July 2001.
- March 2002 saw the legal establishment of the Energy Regulator as enabled by the Electricity Act.

2.2 Key policy issues

Although there is no Policy formal adopted, there are established guidelines defining the key sector developments. Some of these guidelines include:

- The generation capacity should be based on use of hydro resources complemented by thermal (The use of thermal should not exceed 30% of the total).
- Prioritize the use of natural gas when possible.
- The adoption of the Single Buyer Model for the ESI.
- There is no defined policy of self sufficiency or cross border trade as the national system is not interconnected with the SAPP system as yet.
- Independence of the regulator and commercial autonomy of the utilities.
- Although the policy promotes private participation, the current commercial and financial set-up is not attractive.
- The existing investment legal framework is perceived as not conducive to promote private investment in the power sector.

2.3 Policy timing and implementation

The *Energy Planning* and the *National Integrated Resource Planning* (NIRP) are the responsibility of the central government. The *obligation to supply* is mainly the responsibility of the two main utilities ENE and EDEL and the local authorities.

With regard to the *rural electrification*, there is an ongoing process for the establishment of a “rural electrification agency” in the short term. Meanwhile the rural electrification is mainly a responsibility of the government at various levels with its implementation being the responsibility of the power utilities.

There is no clear definition in terms of policy horizon, but it can be interpreted as a relative short term horizon (10 years).

The existing policy guidelines have been partially followed and implemented. The main constraints in implementing the policy include the following:

- Limited implementation capacity.
- Poor analysis and weak studies to support the development policies.
- Financial resources not made available on time.
- Inadequate institutional sector coordination.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The Ministry of Energy and Water (MINEA) is the head government organ for the sectors of Energy and Water, being responsible for the development of policies, planning, coordination, supervision and control of the activities related to the rational use of the national energy and hydro-resources. The main functions of MINEA are to:

- promote the execution of policies to be carried out by the Energy and Water sectors;
- create plans for the sector concerning its spheres of action under the regulations of the general planning for the social and economic development;
- establish strategies, promote and coordinate the rational use and profit of energy and hydro-resources, assuring its sustainable development;
- propose and produce legislation that establishes the judicial and legal framework of the activities in the sectors of Energy and Water;
- license and inspect the exploration of services and energy installations; and
- establish norms in order to assure the quality of the services of water and energy supply.

A reform process for the electricity sector in Angola commenced in the mid-1990s by passing of the Electricity Act in 1996 and the consequent modernization of the legal framework, including the promulgation of regulations in a number of areas and the ongoing establishment of the National Electricity Regulator (IRSE) envisaged in the Electricity Act.

This electricity sector reform process was further reinforced on its direction and momentum with the establishment in 2007 of a specific Reform Unit to supervise its implementation. A Reform Master Plan (“The Master Plan”) was adopted, with identification of specified reform activities, priorities, timeframes, responsibilities, budgets and sources of funding (where applicable) and definition of monitoring arrangements to continuously track and assess progress made on the reform agenda.

The need for reform of the electricity sector in Angola is duly recognized by government and all key stakeholders and it results of the following:

- The need to accelerate the process of electrification and improve the access to electricity to the Angolan population, which is expected to contribute to economic growth and poverty alleviation;
- The need to improve quality of supply and service;
- Strengthening of sector entities (performance and financial viability); and
- Securing financial resources for investment in rehabilitation and expansion of the sector - at the lowest cost possible.

3.2 Sector organization

Electricity supply in Angola is primarily the responsibility of the national power utility ENE, GAMEK (the state organization, under the Ministry of Energy and Water, responsible for the coordination and management of hydropower development on the Kwanza River) and the EDEL, the distribution utility for the capital city, Luanda. Local solutions and arrangements exist in certain provinces where ENE does not operate, in such cases involving local authorities as well as private sector participants.

GAMEK is responsible for the operation of the Capanda Hydropower Station with 4x130 MW of installed capacity, 520 MW in total that supplies the northern system (including Luanda). The national power utility ENE is in principle responsible for generation, transmission and distribution throughout the country, with the exception of distribution in the Luanda areas which is the responsibility of EDEL. ENE operates three different power systems, the northern, central and southern systems - each stretching in an easterly direction from the ports of Luanda, Lobito and Namibe, respectively. ENE is responsible for supply in 15 of the country's 18 provinces, while local authorities (sometimes in partnership with private sector players) are responsible for supply in the remaining three provinces.

There are no legal restrictions on joint ownership of the various services and areas of activities as it is demonstrated by the vertical integrated national power utility (ENE), with responsibilities at level of generation, transmission and distribution. Thus the market model that best describes the structure of the sector is a combination of the vertically integrated monopoly and the single buyer model, with the reform process heading towards the adoption of the single buyer model.

The national power utility is only responsible for the electricity supply and it is not involved in providing water and gas services.

The law provides for the possible participation of new private IPPs. An example is the Hidrochicapa Scheme, a 16 MW hydro plant which is Angola's first IPP project, commissioned in 2007. The IPP is a partnership between a Russian company involved in diamond mining (60%) and ENE (40%) on behalf of the Angola government.

The Law also allows for private participation in other segments of the power sector, but there is no example of such initiative so far.

3.3 Regulatory framework and processes

The IRSE was established in 2002 as a separate legal body, with administrative and financial autonomy and with jurisdiction only over the electricity sector. The Decree

provides for the role, mandate and institutional set-up of the IRSE. The key responsibilities of IRSE are stated as follows:

- Monitoring the implementation of the General Electricity Law (Law 14-A96);
- Promote the development of the Public Electricity System (SEP); and
- Protect customers' interests in terms of pricing and quality of supply.

The powers vested with the IRSE are stated as:

- Prepare a proposal for a tariff regulation;
- Prepare a proposal for tariff and price adjustment and submit them to the Tariff Council for opinion;
- Define periodically, within the terms of the tariff regulation and after hearing the government, the prices to be applied;
- Prepare proposals for the quality of supply regulations, after hearing the concessionaire of the national transmission system, other power system concessionaires and the customers association;
- Decide that concessionaires compensate customers when concessionaires violate quality of supply standards; and
- Prepare the proposals for Trading Regulations among operators of the SEP.

In this context, the Regulator has a limited oversight in the following areas:

- Granting licenses.
- Approving tariffs.
- Approving and monitoring investment plans.

Although the regulator was established in 2002, it only became operational in 2006 and is currently in a process of expanding and consolidating the organization. The 2008 budget is estimated at around 1.5 MUSD all funded by the government. The authority to replace the chairman is vested in the Cabinet and only the court has the authority to veto its decisions.

3.4 Tariffs and pricing

Residential and Large Customers Tariffs are regulated. There is no defined capacity threshold (in MW) above which large customers tariffs are unregulated. Whilst there are some cases, these are treated on a case by case basis.

Tariffs in Angola are not cost reflective but the regulator aims at introducing a price cap regulation methodology for transmission and distribution and a Rate of Return methodology for power generation.

Retail tariffs are not indexed and periodic tariff reviews are allowed but there is no clear routine defined.

As the tariffs are not cost reflective, the revenue is not sufficient to cover all the operational costs of the national power utility. The current tariffs are not sustainable and don't provide the right signals for new investments and efficient use of electricity.

3.5 Key regulations

The Third Party Access to transmission and distribution networks is allowed by Law. The entity that has a primary role in access/interconnection terms/fees conflicts is the Regulator. There is no transmission access controlled by an ISO as yet, but the concept of the ISO is now being analyzed with a view of a possible introduction in the near future.

The power utilities can discontinue their services in case of non-payments (in general after 2 to 3 months of non payment). The utilities can also suspend the supply in cases of safety protection of the Grid, Tampering, etc.

In terms of protection of the rights of consumers, both the Regulator and the National Consumer Association are involved on the matter.

There are no defined targets neither for minimum quality of service standards for commercial performance nor for minimum quality of service standards for technical performance. Consequently, there are no defined penalties for non-compliance with quality standards.

4. Rural Electrification

4.1 Governance

The central government is responsible for rural electrification and there is no specialized rural electrification agency established as such yet.

It is estimated that approximately 20 percent of all Angolans have access to electricity. In rural areas, access to modern energy, including electricity supplies, is extremely limited. Thus there is an ongoing process aiming at establishing new institutional arrangements for promotion of rural energy service provision. These arrangements include the establishment of a Rural Energy/Electricity Agency called *Instituto Nacional de Electricidade (INEL)* to manage a rural energy programme, and a Rural Energy/Electricity Fund called *Fundo Nacional De Energia Eléctrica (FUNEL)* to provide capital subsidies and grants to rural energy projects.

In Angola, the National Electricity Institute (INEL) is likely to be an important actor when it comes to expanding access to electricity. The statutes of INEL have just been submitted to the Council of Ministers for approval and hence INEL is not yet in place. However, the role of INEL, as specified in the statutes will be to:

- Promote, undertake and/or to collaborate in studies and projects conducive to the electrification of the country, to the dissemination and promotion of renewable energy, and to the rational use of energy resources in production and consumption of electricity.
- Collaborate in the execution of policies for promotion of electrification.
- Assist local authorities in the realisation of small projects, and in examination and maintenance of isolated electricity grids in rural communities.
- Support licensing and financing institutions in all activities related to production, transmission, distribution, and commercialisation of electricity and to substitute or delegate competencies in specific regions or projects.

The National Electrification Fund (FUNEL) will be an autonomous body. The objectives of FUNEL as formulated in the draft statutes is to:

- Contribute to progressive electrification in the entire country and offer permanent electricity services on terms that are adequate and necessary for consumers and national development by granting credits (soft loans – with banking institutions as intermediaries); and
- Invest in projects for production, transmission and distribution of electricity and by creating incentives for economic agents to be active in the electricity sector.

The major utilities have significant responsibilities in rural areas, in particular the national electricity utility, ENE. The involvement of the major utilities in the rural areas is complemented by community based electricity service providers, which have limited responsibilities in this context.

Thus the key roles in rural electrification are played by the government at central level, and the national power utility, with the government organizing and providing the funding and regulation of rural electricity services and the utility providing the required technical and operational assistance for the rural electricity services.

4.2 Policy and Institutional set up

There is an official policy target for electrification in general (although with significant impact in rural areas) with a target electrification rate of 50 % in total to be achieved by 2013.

There is no typical connection charge for new rural residential customers defined. It is estimated that there is a total of 22 isolated rural electricity systems. However, the information regarding percentage of existing rural electricity systems in need of major rehabilitation, number of individual systems and the total number of people served by existing rural electricity systems is very limited and not reliable.

There is no policy to provide incentives for the use of renewable energy.

5. Operating enterprises

5.1 Organization and autonomy

All the main utilities in Angola, namely GAMEK (now under restructuring), ENE and EDEL are 100% owned by the central government.

The transformation of ENE and EDEL into corporatized state owned enterprise occurred in 1998 and 1999, respectively. Both utilities have a Board of Directors comprised of five members, all appointed by the central government. The Boards are executive, have competence, are responsible for the hiring and firing of workers, setting wages/bonuses, how much to produce as well as who to sell to. In terms of setting prices, approval of investment projects and receipting of a public subsidy and its usage, the central government has a decisive influence.

5.2 Monitoring and Performance

There are no Performance Contracts between the utilities and the government thus there is neither performance based incentive systems, where the payments and promotion of managers are determined by their performance, nor penalties for poor performance of managers.

Although there are no formal performance contracts, the overall performance of the utilities is monitored semi-annually. The utilities have independent external private auditor, appointed by the utility, to audit the accounts. The audit of the accounts is not made public. However, the utility does not follow the International Financial Reporting Standards as yet.

5.3 Finance and labor

The utility is not required to earn a rate of return and it is not required to pay dividends. It is also not exempt from any form of taxation and has access to credit at market rate. In addition, the utilities are not remunerated for non-commercial activities by the state.

In terms of liberty to lay-off workers when necessary, the utility has such liberty but it has to follow and provide due consideration to the pertinent regulations of the Labor Law. With regard to the wages/salaries paid by the utility, they are somewhere in between public and private sector levels.

The utility contracts out activities to the private sector under service contracts mainly in the commercial area (billing and collection), maintenance of equipment, security services and health services.

The utility is experiencing skills shortage, particularly in managerial, technical, financial, HR and project management. Strategies are being implemented or contemplated to bridge the skills shortage including granting scholarship to young people and employees with potential to progress in the professional carrier and recruitment of skilled labor force in the local market.

Performance Indicators

Indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	303	365	397,2	441,2	
Energy generated	<i>GWh</i>	1.995	2.239,6	2.648,7	2.982	
Imports	<i>MW</i>					
Total energy available	<i>GWh</i>	1.901	1636,1	1.843,1	2006,4	
Transmission losses	%					
Distribution losses	%					
Energy sales	<i>GWh</i>	1.901	1636,1	1.843,1	2006,4	
Number of customers	<i>Number</i>	96.918	110.798	143.937	155.114	
Number of employees	<i>Number</i>	4576	4428	4.250	4.347	
Customers/employee	<i>Ratio</i>	21	31	42	46	
Sales/employee	<i>Ratio</i>	0,41	0,45	0,54	0,59	
Total revenue	<i>Local currency</i>					
Total operational costs	<i>Local currency</i>					
Revenue per employee	<i>Ratio</i>					
National electrification rate	%	n.a	n.a	n.a	n.a	n.a
Rate of return on assets	%	n.a	n.a	n.a	n.a	n.a

**Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT – BOTSWANA**

1. Introduction

Botswana is a land locked country in southern Africa sharing common borders with South Africa, Zimbabwe, Zambia and Namibia. It has a total area of 582 000km² and a population of approximately 1.85 million people as of 2007, most of which are settled in the eastern part of the country. The Kalahari Desert covers most of the western part of the country.

Over the past decade, Botswana has undergone rapid economic growth which has resulted in high increase in demand of electricity consumption. Currently, Botswana Power Corporation (BPC) generates, imports and supplies the electricity consumed in the country. The installed capacity is 132MW and maximum demand in 2007 was 474MW. The peak demand is estimated to increase by over 10% over the next three years which will be a major challenge to Botswana which imports 80% of its electricity from the region with 72% coming from Eskom, South Africa. The heavy dependence on imports is a major threat to Botswana's security of supply given the current lack of excess capacity and power crisis which hit South Africa in January 2008.

Botswana has abundant coal resources and also receives more than 3 200 hours of sunshine per annum. There is therefore a lot of potential to generate both thermal and photovoltaic electricity from existing coal reserves and solar energy.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

Over the past years the Botswana Energy Master Plan (BEMP) and successive National Development Plans have guided the developments in the energy sector. Since the formulation of the BEMP in 1985 and its subsequent review in 1996, the energy sector has been facing new domestic and global challenges that require policies and strategies that can facilitate effective and efficient management of the sector.

Such challenges include:

- The need to increase access to modern energy services in rural areas,
- Improving energy service delivery,
- Affordability of energy services especially to the low income groups,
- Exposure to high imports of electricity,
- Potential supply disruptions of petroleum products, and
- Promoting the use of locally available energy resources in a sustainable and environmentally friendly way.

The purpose of the Botswana Energy Policy (BEP), which is currently in draft form, is to support national socio-economic goals such as poverty reduction and industrial development.

The policy formulation is centralized and done by the government. The draft Energy Policy was formulated through stakeholders consultation coupled with a Strength, Weakness, Opportunities and Threats (SWOT) analysis. This policy is currently being reviewed to meet the new challenges.

2.2 Key policy issues

The draft policy covers the following key issues:

- 2.2.1. Self sufficiency – one of the key issues which have been compounded by the recent regional shortages given that Botswana imports about 80% of energy. The main focus is to increase local generation capacity using coal reserves of the country.
- 2.2.2. Least cost energy mix will be used to approve projects.
- 2.2.3. Use of environmentally friendly technologies.
- 2.2.4. Ensure accessible and affordable energy services.

2.3 Policy timing and implementation

- 2.3.1 The *Energy Planning* and the NIRP are the responsibility of the central government.
- 2.3.2 The *obligation to supply* is mainly the responsibility of utility, in this case the BPC.
- 2.3.3 With regard to the *rural electrification*, there is no established “rural electrification agency” as such. Thus rural electrification is mainly a responsibility of the government at various levels with its implementation being the responsibility of the power utility.
- 2.3.4 The planning horizon mainly follows the National Development Plan (NDP), which has been updated twice in the last ten years thus 1997 – 98 and 2003 – 4.
- 2.3.5 Although there is no official energy policy per say the Energy Affairs division has been implementing policies following the BEMP. The main constraints in implementing the policy include the following:
 - Lack of capacity.
 - Limited resources.
 - Institutional framework fragmentation.
- 2.3.6 The private sector participation was not possible because of the Botswana legislation (Electricity Act) but the Act has since been amended in 2007 to allow for IPPs.

3. Regulatory and Institutional Framework

3.1 Governance and reform

- 3.2.1 The power sector governance and management is the responsibility of the Ministry of Minerals, Energy and Water Resources (MMEWR). This Ministry is also responsible for the issuance of licenses for the generation and supply of electricity.
- 3.2.2 Botswana does not have an independent energy regulator, instead MMEWR performs the regulatory function and ensures compliance with quality supply and service standards. To a large extent, the state owned utility, BPC largely regulates itself. It is expected that future legislation will provide for water and energy regulator which will undertake the regulatory functions.
- 3.2.3 With the recent amendment of the legislation (Electricity Act 2007) Botswana has been able to issue a license to a private developer, to develop an independent power in Mmamabula. The development of Mmamabula energy project will turn Botswana into a net electricity exporter with most of the energy being exported to South Africa and other regional members through the SAPP.

3.2 Sector organization

- 3.2.1 Currently the sector is dominated by BPC and the legal restrictions have been removed by the amendment of the Electricity Act 2007. BPC remains the dominate player with responsibilities for level of generation, transmission and distribution.
- 3.2.2 Thus the market model that best describes the structure of the sector is the vertically integrated monopoly where vertical integration exists between the services of generation, transmission and distribution.
- 3.2.3 The national power utility is only responsible for the electricity supply and it is not involved in providing water and gas services.
- 3.2.4 As mentioned, the law now provides for the participation of new private IPPs.

3.3 Regulatory framework and processes

- 3.3.1 The regulatory framework is very weak as the regulator has not been established as yet. As previously indicated, the Ministry carries out the regulatory functions in terms of granting licenses, approving tariffs, approving and monitoring compliance and investment plans, market oversight and rules.
- 3.3.2 However, the Electricity Act states that any company is allowed to export and import electricity provided that it has been registered and granted a license as a concessionaire.
- 3.3.3 As there is no regulator established as such, the regulatory reporting and monitoring mechanisms are not in place.

3.4 Tariffs and pricing

- 3.4.1 All tariffs are regulated and the regulatory methodology used is Rate of Return (RoR) for all the sectors generation, distribution and transmission.
- 3.4.2 Periodic tariffs adjustments are allowed and previously it used to be once in two years, but now they are being allowed as and when import costs change.
- 3.4.3 Although there are different opinions on whether the revenue is sufficient to cover all the operational costs of the national power utility or not, it is understood that the revenue is sufficient for that purpose. Similarly, there are different opinions on whether the current tariffs are sustainable and able to provide the right signals for new investments and efficient use of electricity.
- 3.4.4 The tariffs tend, in general, to reflect the cost of supply for the various categories or classes of utility services.

3.5 Key regulations

- 3.5.1 The Third Party Access to transmission and distribution networks is allowed by Law. In the absence of a regulator the entities that intervene in access/interconnection terms/fees conflicts are the Ministry and the power utility. There is no transmission access controlled by an ISO.
- 3.5.2 The power utility can discontinue their services in case of non-payments (in general after 2 to 3 months of non payment). The utilities can also suspend the supply in cases of safety protection of the Grid, Tampering, etc.

3.5.3 In terms of protection of the rights of consumers, government has a role in this regard; in practice its influence had been limited. The consumer groups are relevant in this regard.

3.5.4 There are defined targets or minimum quality of service standards for commercial performance as well as defined targets or minimum quality of service standards for technical performance. However, there are no defined penalties for non-compliance with quality standards.

4. Rural Electrification

4.1 Governance

4.1.1 The central government is responsible for rural electrification and there is no specialized rural electrification agency established as such.

4.1.2 BPC has significant responsibilities in rural areas, in the implementation of the government rural electrification programs.

4.1.3 Thus the key roles in rural electrification are played by the government, at central level, and the national power utility, with the government organizing and providing the funding and regulation of rural electricity services and the utility providing the required technical and operational assistance for the rural electricity services.

4.1.4 There is no specialized fund covering rural electrification with money being provided by grants and loans and donor funding. There is no specific defined budget, however, the criteria used to prioritize rural electrification projects includes economic return and population.

4.2 Policy and Institutional set up

4.2.1 The national access to electricity was estimated at an average of 34% in 2004 with rural rate at 25% and urban rate at 61%.

4.2.2 There is an official policy target for electrification in general (although with significant emphasis in rural areas) with a target electrification rate increase of 12.5% annually.

4.2.3 The typical connection charge varies from area to area. In some areas, the government will allow a full subsidy and in other areas they will only allow partial subsidy based on the economic activity.

4.2.4 There is only one isolated rural electricity system, which is solar powered. The rest are connected to the national grid system. However, the information regarding percentage of existing rural electricity systems was not provided.

4.2.5 There is no policy to provide incentives for the use of renewable energy. This is still to be developed.

5. Operating Enterprises

5.1 Organization and autonomy

5.1.1 The National Electricity Utility (NEU) is 100% owned by central government. BPC was founded by an Act of Parliament in 1970. It has a Board of Directors comprised of nine members. All Board members are appointed by the central government and there is no representation for employees.

5.1.2 The Board is non-executive and the management has competence and is responsible for hiring of workers, laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects. The setting of prices, receipting of a public subsidy and its usage is done in conjunction with Board and approval of the central government.

5.2 Monitoring and Performance

5.2.1 A Performance Contract did not exist at the time of completing the survey. However, there were some negotiations taking place (May 2008) between the national utility and the government. There is neither performance based incentives nor penalties for poor performance of managers.

5.2.2 There is minimum monitoring which is done by annually submitting an annual report to the Ministry. There is use of external auditors and International Financial Reporting Standards are adhered to.

5.3 Finance and labor

5.3.1 The utility is required to earn a rate of return and is required to pay dividends to the government. It is however exempt from any form of taxation and has access to credit at market rate.

5.3.2 The utility is remunerated for non-commercial activities by the state, although there are cases of exception.

5.3.3 The utility has such liberty to lay-off workers when necessary but it has to follow and provide due consideration to the pertinent regulations of the Labor Law. The wages/salaries paid by the utility are somewhere in between public and private sector levels.

5.3.4 The utility does contract out activities to the private sector under service contracts mainly in the commercial area (billing, human resources, small distribution works).

5.3.5 The utility is experiencing skills shortage in particular in engineers and other professional sectors including Information Technology, etc. This shortage of skills impacts on the overall efficiency and general project implementation.

5.3.6 Strategies being implemented or contemplated to bridge the skills shortage include training programs with participation of most of the staff holding university degrees, formulation of staff attraction and retention strategies are in progress.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	360	394	402	434	473
Energy generated	<i>GWh</i>	935.6	823.1	941.7	977.1	821.5
Imports	<i>GWh</i>	1605.7	1915.2	1898.3	2050.4	2393.6
Total energy available	<i>GWh</i>	2435	2642	2731	2917	3120
System load factor	<i>%</i>	77.1	77.1	76.9	76.8	76.9
System losses	<i>%</i>	11.7	10.4	11.5	10	11
Energy sales	<i>GWh</i>	2150	2366	2416	2626	2777
Number of customers	<i>Number</i>	108,985	122,625	136,216	151,800	166,651
Number of employees	<i>Number</i>	2086	2104	2111	2091	2015
Customers/employee	<i>Ratio</i>	52.2	58.2	64.5	72.6	82.7
Sales/employee	<i>Ratio</i>	1.03	1.12	1.14	1.26	1.38
Total revenue	<i>Local currency (000)</i>	525,239	581,853	633,887	714,809	819,680
Total operational costs	<i>Local currency</i>	444,715	526,693	567,263	752,161	885,152
Revenue per employee	<i>Ratio</i>	251.8	276.5	300.3	341.9	406.8
National electrification rate	<i>%</i>	28	34	38	43	49
Debtors days	<i>Number</i>	44	40	48.6	47	37
Rate of return on assets	<i>%</i>	8.2	7.1	6.1	2.6	21.8

**Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT - DEMOCRATIC REPUBLIC OF CONGO**

1. Introduction

The Democratic Republic of Congo (DRC) is located in central Africa and has nine neighbouring countries. The neighbours are Angola, the Republic of Congo, the Central African Republic, Sudan, Uganda, Rwanda, Burundi, Tanzania and Zambia. It has a population of over 60 million with 80% living in rural areas.

The DRC is on the equator with an area of over two million square kilometres and in the centre is a huge Congo River basin and mostly covered by equatorial forest. The rainfall is high in the region resulting in a very high flow rate of over 40000m³/sec. The Congo River has hydro potential of over 44 000MW at the Inga site. The total hydro potential for the country is around 100 000MW. With over 22 million hectares of forest the fuel wood and charcoal is the major source of energy nationwide as it is free.

Photovoltaic systems are used for lighting and pumping water, refrigeration and communications in rural areas but on a small scale. The potential of wind power is minimal as wind velocities are below 3m/sec. There are over 68 known geothermal sites that could be exploited.

The DRC has coalfields in the northeast of the country and uranium reserves of over 7.4EJ. Oil reserves are estimated over 18EJ. Gas fields have been located in Kivu Lake with estimated potential of over 57 million m³.

The DRC is an exceptionally rich country in terms of energy resources. At the time of the survey, there was some political stability and the economy was growing.

The Société National d'Electricité (SNEL) is the national electricity utility with the monopoly to supply electricity in the DRC and to export.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

The Ministry of Energy is responsible for the energy sector and potable water. The ministry defines the energy policy. Petroleum is the responsibility of Ministry of Hydrocarbons. The energy policy was developed in 2008.

2.2 Key policy issues

The following are the key energy policy issues addressed in the Energy Policy of the DRC:

- Hydro electricity power development
- Solar Energy
- Hydrocarbons
- Biomass
- Natural gas

The issues of national self sufficiency, regional complementarities in resources and cross border trade in energy (imports and exports) are covered in the policy. This is highlighted by the importance which is given to the development of the hydro power potential in the country.

2.3 Policy timing and implementation

Energy planning is the responsibility of the Ministry of Energy and the National Integrated resource plan is the responsibility of the Ministry of Energy assisted by the national power utility, SNEL. The obligation to supply is the responsibility of the national power utility. Government plays the central role in rural electrification; the utility provides the technical assistance and implements projects in conjunction with community service providers.

The policy has aspects which allow for private sector participation or private public partnerships in the ESI. However, details of the policy were not given.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The power sector governance and management is the responsibility of the Ministry of Energy which is also responsible for portable water.

The legal framework in the DRC is unsatisfactory. There is no recent Electricity Act or legislation providing for the legal framework in the ESI.

Since 1986, there has been an investment code regulating foreign investments into the country, but there are no special regulations dealing with investments in the electricity sector or regulation to define the legal framework to provide the necessary guarantees to foreign investors or financiers.

The following table summarizes the existing sector legislation:

Ordonnance-Loi 70-033, May 16, 1970	Government Decree establishing SNEL, the national utility
Ordonnance-Loi 78-176, May 5 1978	Decree setting out charter, basis and objectives of SNEL
Ordonnance-Loi 78-002, January 6 1978	Power of President to appoint members to SNEL

There is no independent regulator in the DRC. However, an investigation into the establishment of an energy regulator is on the cards. The problem of involving the private sector in the ESI is a main concern of government. It is hoped that the legal and regulatory framework will soon be well defined.

3.2 Sector organization

The central government has responsibility to provide the electricity services at generation, transmission, distribution and supply levels. The ESI has not undergone any unbundling. There are no legal restrictions in the joint ownership of generation and transmission, transmission and distribution and generation and distribution. SNEL is a vertically integrated utility responsible for the generation, transmission and distribution in the country. Vertical integration exists between generation and transmission, and transmission and distribution. Thus the market model that best describes the structure of the sector is the vertically integrated monopoly. The national power utility is responsible for the electricity supply and it is not involved in providing water and gas services. There are currently three operators who are involved in generation and distribution and supply.

However, SNEL has the biggest market share and also has the monopoly for electricity transmission. As mentioned above, the law provides for the potential participation of new private IPPs and private public partnerships.

3.3 Regulatory framework and processes

The previously mentioned sector regulatory framework is somewhat weak with the government overseeing virtually all aspects of the industry, such as the granting of licenses, approving tariffs, the establishment of technical and minimum service standards and monitoring and compliance regimes. The government also arbitrates in disputes. There is no independent regulator and the utility is in principle self regulating.

There is a standardized format for reporting operating commercial and financial data to government. The power utilities or service providers have no right to appeal against regulatory decisions. Government does publish its decisions through reports and mass media.

3.4 Tariffs and pricing

All residential and large customers' tariffs are regulated. There is no defined capacity threshold (in MW) above which large customers tariffs are unregulated.

The economic regulation methodology used for review of tariffs is the revenue cap for generation, transmission and distribution. Periodic tariff reviews are allowed. Extraordinary tariff adjustments are allowed for changes in exchange rate and inflation.

Cost reflective tariffs were determined in 2007. However, the current tariffs are not sustainable and able to provide the right signals for new investments and efficient use of electricity. It is not clear whether there is a target to achieve cost reflectivity.

3.5 Key regulations

Given the current weakness in the legal framework it is not clear if third party access to transmission and distribution networks is allowed by law. There is no independent transmission system operator. The ministry of energy will intervene in access, interconnection terms and fees conflicts.

There are no defined targets or minimum quality of service standards for commercial performance however they are defined targets or minimum quality of service standards for technical performance.

3.6 Private Participation

In DRC there are currently incentives in place to attract private sector participation and private public partnerships in the ESI. There are independent power producers with operational contracts. These provide a vertically integrated service and operate through **concessions**. The original contract has not been renegotiated.

Private sector involvement in the electricity sector in DRC is currently limited to private generation plants at several extractive industry concerns in the Katanga region. These plants do not sell power into SNEL's grid. However, efforts are underway to redefine the role of the private sector in DRC's energy sector, including a review of the regulatory framework with a view to encouraging private sector participation, consideration of

strategic public-private partnerships and a restructuring of public enterprises in order to encourage competition.

In the short and medium term, the government is exploring partnerships with the private sector in the rehabilitation of Inga I and II, and in the development of Inga III, a new hydroelectric plant at the same site with a generation capacity of about 3,500 MW. The Project — dubbed the Western Power Corridor Project, or 'WESTCOR' — was launched in 2004 as a collaborative effort between the electricity supply companies of DRC, Angola, Botswana, South Africa and Namibia. Total costs are estimated at about US\$ 5 billion, including well over US\$1 billion in related transmission investments to connect to SADC customers, and will require extensive private sector financing to be financially viable.

The World Bank has provided some US\$90 million equivalent in support for a range of upgrading projects that are currently under implementation:

- About US\$15 million for limited repair and maintenance works at the Inga I and II facilities.
- Strengthening the reliability of the existing 220KV line from Inga to the capital.
- Upgrading the distribution network in Kinshasa and other main towns.
- Rehabilitating the transmission line from Inga to the Zambian border to facilitate increased exports.
- Rehabilitation of small thermal and hydro facilities in Katanga and other towns.

This project will include an integrated set of interventions that will also strengthen the capacity of the Coordination Center of SAPP to manage electricity trade in the sub-region, to remove existing transmission bottlenecks and connect members. The first phase of the Project will, inter alia, make available to the SAPP a significant block of hydro energy from Inga Plans that directly involve DRC including the planned increase in capacity of the very high voltage transmission system in the DRC that connects Inga to SAPP via the Katanga region, as well as increasing the capacity of the transmission corridor from the DRC/Zambia border to Zambia.

4. Rural Electrification

4.1 Governance

The central government is overall responsible for rural electrification and there is no specialized rural electrification agency. Both SNEL and community based service providers have significant responsibilities in rural areas to provide electricity services and technical assistance. Thus the key roles in rural electrification are played by the government, at central level, responsible for organizing and providing the funding and regulation of rural electricity services whilst the utility provides the required technical and operational assistance for the rural electricity services.

The funding for rural electrification is sourced from the government, donors and sector levies. The power utility also budgets and implements some rural electrification projects. The annual budget was not provided however it was stated that the rural projects are prioritized based mainly political reasons.

4.2 Policy and Institutional set up

It was indicated that there is an official policy target for electrification however this target was not provided. The national electrification rates are still very low although this level was not indicated. There is no policy to provide incentives for the use of renewable energy.

5 Operating enterprises

5.1 Organization and autonomy

SNEL is 100% owned by the central government and the company is a state owned enterprise. It has a Board of Directors appointed by the supervising Minister which includes members from management, employee representatives and others.

The Board is non executive and got competence and through its management is responsible for hiring of workers, laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approve individual investment projects. The structure and levels of tariffs are determined by the service provider but approved by government. The government sets up the policy on the subsidy and passes it on to the service provider and its Board to implement. The approval for investments is done by government on recommendations from the board.

5.2 Monitoring and Performance

There is a performance contract which exists between the national utility and the government which operates with a performance based incentive systems where the payments and promotion of managers are determined by their performance. It was indicated that there are penalties for poor performance and managers have been penalized in the past for poor performance.

Performance is monitored on an annual basis. International Financial Reporting Standards are applied with the utility being audited by external auditors appointed by the board. The utility is audited annually and the results are made public. There are no clear performance indicators against which management effectiveness can be evaluated and very little by way of substantive controls imposed on SNEL.

5.3 Finance and labor

The national utility is required to earn a rate of return and expected to pay dividends. It is not clear whether the utility is exempt from any form of taxation as both yes and no boxes were ticked. The utility accesses credit at market rate. The utility does not get remunerated for non commercial activities by the state and it has been granted state guarantees to facilitate access to loans.

The utility has liberty to lay-off workers when necessary subject to applicable labor law. The wages/salaries paid by the national utility, are somewhere in between public and private sector levels. The utility does contract out activities to the private sector under service contracts mainly provision of security services. The utility is experiencing skills shortage. However, these were not specified nor the strategies in place to retain staff or develop capacity for the future.

Performance Indicators
Key indicators for the last 5 years⁵

Indicators	Units	2003	2004	2005	2006	2007
Net Capacity	<i>MW</i>					1170
System maximum demand	<i>MW</i>	994	1012	1012	1027	1027
Energy generated	<i>GWh</i>	6084	6904	6904	6648	7214
Exports	<i>GWh</i>					1322
Imports	<i>GWh</i>					13.8
Total energy available	<i>GWh</i>					
System load factor	<i>%</i>					
Transmission and Distribution Losses	<i>%</i>					6.9
	<i>%</i>					
Energy sales	<i>GWh</i>					5697
Number of customers	<i>Number</i>					422253
Number of employees	<i>Number</i>					6171
Customers/employee	<i>Ratio</i>					
Sales/employee	<i>Ratio</i>					
Total revenue	<i>Local MK</i>					
Total operational costs	<i>Local MK</i>					
Revenue per employee	<i>Ratio</i>					
National electrification rate	<i>%</i>					
Debtors days	<i>Number</i>					
Rate of return on assets	<i>%</i>					

⁵ Statistics from the Southern African Power Pool 2007 Annual Report no statistics were provided.

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI

COUNTRY REPORT – LESOTHO

1. Introduction

Small, landlocked, and mountainous, Lesotho to a large extent relies on remittances from miners employed in South Africa and customs duties from the Southern Africa Customs Union for the majority of government revenue. Completion of a major hydropower facility in January 1998 permitted the sale of water to South Africa and generated royalties for the country. As a mountain country, Lesotho is not abundantly blessed with carbon resources but has considerable hydropower potential in order to meet its own needs and to export power.

Lesotho has recently established the Lesotho Electricity Authority (LEA) as the regulatory oversight body of the ESI.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

In Lesotho, the government is responsible for formulating and adopting policy, with the incumbent state owned utility, Lesotho Electricity Corporation (LEC), and the newly formed section on rural electrification responsible for policy implementation.

2.2 Key policy issues

Lesotho has recently adopted a modern energy policy that addresses ESI issues. Reforms were meant to address the problems of inefficiency and lack of financial resources in the sector. The restructuring entailed commercialization and privatization of the LEC, the establishment of rural electrification structures, making hydropower prices competitive, and the establishment of an independent regulator. The policy was formulated with inputs from key stakeholders. The key energy policy issues addressed in the energy policy have the following policy objectives:

- ESI Restructuring;
- Privatisation of LEC – now a company; and
- Establishment of Independent Regulator.

The policy is continually being updated. For example, LEC has been corporatized (as a company) but as far as policy is concerned, it will probably not be privatized in the manner originally foreseen. The policy also provides for energy conservation and efficiency practices, financial and fiscal incentives and climate change issues.

2.3 Policy timing and implementation

Energy Planning is the responsibility of the central government. The responsibility for *NIRP* is a shared responsibility between central government and local government, with the rural electrification agency also involved. The *obligation to supply* is mainly the responsibility of the national utility, LEC and the rural electrification agency. With regard to *rural electrification*, there is a newly established “Rural Electrification Unit” tasked with this process.

The main constraints experienced in implementing policy include the following:

- Lack of buy-in by stakeholders;
- Lack of resources;
- Lack of investor interest.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The LEA was established in August 2004 and is set up in terms of the Lesotho Electricity Authority Act, 2002 (the LEA Act). The LEA is expected to get funding from licensed electricity operators and a levy paid by electricity customers. However, in the start-up phases it was funded by the government with the assistance of the African Development Bank (AfDB) and the World Bank (WB).

The LEA operates within the context of and regulates the ESI and the meeting of electrification targets as set by the Government of Lesotho.

3.2 Sector organization

LEC is a vertically integrated utility with a monopoly on transmission activities and responsible for supplying the vast majority of electricity in the country as a single buyer. Although the Lesotho Highlands Development project does not fall under LEC, the market model that best describes the structure of the sector is the vertically integrated monopoly where vertical integration exists between the services of generation, transmission and distribution. The national power utility is only responsible for the electricity supply and it is not involved in providing water and gas services.

3.4 Regulatory framework and processes

The regulatory framework is strong with an active and independent regulator, LEA. The formal decision-making powers of the LEA rest with the Board. The Board Members are supported by the Chief Executive and his staff to conduct in-depth analysis and evaluation required to establish a detailed regulatory framework of regulations, licenses, consents and codes together with the underlying policies and principles that govern how the regulated electricity sector operates.

Board Members are required to attend regular meetings of the LEA, and other meetings that may be necessary from time to time. They are not involved in the day-to-day management and functioning of the LEA but are required to consider and approve financial, budgetary and staffing aspects of the LEA. Board Members are appointed by the Minister of Natural Resources.

The LEA Board has, for internal efficiency purposes, established four Board Committees, which generally do a lot of work that the board sittings are not in a position to do. These are: the Audit, Human Resources, Finance and Administration, Customer Services and Pricing and Tariffs Committees.

Board Members have qualifications (university degrees) in the following areas: industry, commerce, law, accountancy, economics, engineering, electricity technology and experience relevant to regulation of the electricity sector.

Use is made of a standardized format to report operating commercial and financial data to the LEA.

The LEA Act requires all persons generating, transmitting, distributing or supplying electricity to do so under the authority of a license granted by the LEA. The licenses contain conditions, which allow the LEA to regulate the licensee's electricity businesses.

The way in which the LEA regulates is through the issue and modification of licenses. The LEA Act provides that no person may undertake a regulated activity without being in possession of a license issued by the LEA. The 'base criteria' for the granting of a license is that the LEA must be satisfied that the prospective licensee has an appropriate financial standing, technical and managerial competence. Licenses contain various conditions relating to electricity tariffs and prices, electrification commitments and quality of supply and service standards. Licenses may not be transferred without the approval of the LEA. Public participation processes are held on important issues such as tariff increases whilst regulatory decisions are publicly available. A standardized format to report operating commercial and financial data to the authority is used. Utilities have the right to appeal against regulatory decisions, and regulatory decisions are made known to the public via public processes.

3.5 Tariffs and pricing

Both residential and large customers' tariffs are regulated. A revenue cap is used for all tariffs except supply for which a price cap is used. Tariffs are not indexed. Periodic tariff reviews are allowed, at least once a year, whilst provision is made for exceptional circumstances. Normally, significant cost increases are allowed e.g. cost of fuel. While the LEA decision on tariffs is final, LEC can still appeal that decision in courts of Law if it feels unhappy about it.

At the last round, LEC requested a tariff increase of 35% but was only granted an increase of 8.7% - 12% depending on customer category.

3.6 Key regulations

Compulsory third party access to the transmission network is allowed but there is no independent system operator. There are defined targets or minimum quality of service standards for commercial performance as well as defined targets or minimum quality of service standards for technical performance. LEC can discontinue services to customers on certain defined conditions. The regulator is primarily responsible for protecting consumer rights whilst consumer groups also play a role. Whilst the law allows for private sector participation, no new players have come forward to date.

4. Rural Electrification

Lesotho has recently formed a dedicated rural electrification agency. LEC also has significant responsibilities in rural areas. Thus the key roles in rural electrification are played by the government with the agency, at central level, and the national power utility and the agency assuming responsibility for technical and operational issues.

5. Operating enterprises

5.1 Organization and autonomy

LEC is 100% owned by the central government. It has a Board of Directors comprised of seven Board members who are appointed by the shareholder from industry stakeholders and interest groups.

The Board is executive and is responsible for hiring of workers, laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects. It operates as any other private sector company in this regard, save that its revenue and expenditure is regulated by the LEA.

5.2 Monitoring and Performance

A Performance Contract exists between the national utility and the government. The contract is service-oriented with specific focus on technical and service standards. The Performance Contract is monitored on a monthly basis. The utility has appointed external auditors to audit its accounts. The audit of the accounts is made public, and the utility follows the International Financial Reporting Standards.

5.3 Finance and labor

The utility is required to earn a rate of return, but is not required to pay dividends. The utility is not exempt from any form of taxation and have access to credit at normal market rates. The utility is not remunerated for non-commercial activities by the state. However, the state has in some instances stood guarantee for its obligations.

In terms of liberty to lay-off workers when necessary, the utility has such liberty but it has to follow and provide due consideration to the pertinent regulations of the applicable labor legislation. With regard to the wages/salaries paid by the utility, they are somewhere in between public and private sector levels. The utility has not really contracted out activities to the private sector, except construction of infrastructure.

According to LEA, LEC is experiencing skills shortages that impact on the overall efficiency; especially on the leadership and technical side. The results are indecisiveness and inefficiency. Worryingly, no strategies are being implemented to address these shortcomings.

Performance Indicators⁶ Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	89.1	89.4	89.9	100.75	115.16
Energy generated	<i>GWh</i>					
Imports	<i>MW</i>	3.17	60.41	18.42		78.03
Total energy available	<i>GWh</i>	356.58	445.49	464.09	530	560
Suppressed demand	<i>MW</i>					
System load factor	%	45.68	56.86	58.91	60.05	55.51
Transmission losses	%			3.70	5.58	6.56
Distribution losses	%	11.81	22.50	10.70	10.67	9.3
Energy sales	<i>GWh</i>	314.46	345.23	414.40	473.46	507.71
Number of customers	<i>Number</i>	42192	43989	49184	54612	66838
Number of employees	<i>Number</i>	464	461	439	490	516
Customers/employee	<i>Ratio</i>	90.93	95.42	112.04	111.45	129.53
Sales/employee	<i>Ratio</i>	24462	255965	337747	391040	423203
Total revenue	<i>Local currency</i>	165.8	133	160	212	246.3

⁶ Data supplied by LEC

Indicators	Units	2003	2004	2005	2006	2007
Total operational costs	<i>Local currency</i>	133.5	89	101.0	101.8	112.2
Revenue per employee	<i>Ratio</i>	357328	288503 .25	364465	432653	477326
National electrification rate	%	9	11	11	12	13
Debtors days	<i>Number</i>	89.61	89.97	56.25	41.68	50.85
Rate of return on assets	%					

**Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT – MALAWI**

1. Introduction

Malawi is a landlocked agricultural country in central-east Africa bordering Zambia, Tanzania and Mozambique. Malawi has a population of about 12 million people and it is estimated that 85% live in rural areas and are small holder farmers.

The energy sector is controlled by the department of Energy in the ministry of Energy and Minerals. The state owned utility, the Electricity Supply Corporation of Malawi (ESCOM) is responsible for generation, transmission and distribution of grid electricity. The energy sector is regulated by the Malawi Energy Regulatory Authority (MERA), which was established in December 2007 which was preceding the National Electricity Council and Petroleum Control Commission.

Malawi has hydropower potential of over 900MW mainly on the Shire River and only a third is exploited (285MW) and the grid reaches only 7% of the population. The installed thermal generation capacity is only 51.3MW most of which is owned by private sector for own use. There is potential for more thermal power plants fuelled by coal or biomass to feed the national grid. The maximum demand is low at 244.5MW, given its population of twelve million. Malawi does not trade in electricity with its neighbours as it is not interconnected yet. Plans are underway to build transmission interconnectors to Zambia/Tanzania and Mozambique.

No oil and gas reserves have been found. Malawi's coal reserves are estimated at over a billion tonnes although only 22 million tonnes are proven and 55 000 tonnes are produced annually. Liquid fuels are mainly imported and blended with ethanol from sugar molasses which only contributes 3% to the total demand.

Good sunshine estimated at 5.8kWh/m²/day through out the year provides for photovoltaic and photo thermal applications. There are reasonable wind speeds for water pumping of between 2-7m/s. A number of rivers have potential for run of river mini hydro schemes. There are also a few sites with hot springs suitable for geo thermal power production.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

In Malawi the Energy policy was developed by an active process of public consultation which involved the following:

- Expert consultations through multi disciplinary task forces.
- Public consultation through stakeholder symposiums country wide.
- Peer/Principal Secretaries Review.
- Political/Cabinet approval.
- Publication in the Gazette.

The policy was adopted and published in 2003. The policy formulation is centralized and controlled through the Department of Energy Affairs which falls under the Ministry of Energy and Mines.

2.2 Key policy issues

The following are the key energy policy issues addressed in the Energy Policy in Malawi:

- Improvement Efficiency and Commercial Sustainability of Energy Supply.
- Improve the Security and Reliability of Energy Supply.
- Improve access to affordable Energy services.
- Stimulate Economic Development and Rural Transformation for Poverty Reduction.
- Improve Energy Sector Governance.

- Mitigate Environmental, Safety and Health Impact of Energy Production and Utilisation.

The issues of national self-sufficiency, regional complementarities in resources and cross border trade in energy (imports and exports) are covered in the policy. These include the following:

- Strengthening the Transmission and distribution systems through direct public investments.
- Reduce the dependency on hydropower generation on the Shire River and promote the exploitation of other energy sources.
- Ability of Malawi to take advantage of the emerging regional markets through imports and exports through interconnections.

The Malawi Energy Policy is fairly modern compared to other regional policies and also covers issues of:

- Independence of regulator(s).
- Commercial autonomy of utilities.
- Cost reflective prices and tariffs.
- Energy conservation and efficiency practices and financial and fiscal incentives.
- Climate change (including carbon trading).

2.3 Policy timing and implementation

Energy planning is the responsibility of the Ministry of Energy and Mines and the National Integrated resource plan is the responsibility of the Energy Sector wide regulator. The *obligation to supply* is mainly the responsibility of the national utility.

The Energy Policy, only adopted in 2003, has not been updated yet. The main constraints in implementing the policy include the following:

- Time lags between policy formulation and development of the enabling laws.
- The interconnection deal with Mozambique.
- Lack of funding and delays in concluding the interconnection deal.
- Emerging lessons from the experiences of other countries with similar policy direction.

The policy emphasizes on a private sector driven energy sector and the opening up of the energy production to private independent power producers.

Once policy environment and the enabling laws for private sector participation are all in place, may be what would then be of interest is to establish to what extent the vertically integrated national utility monopolies can act as a barrier to entry for prospective private investors. It is not known at the moment whether the existing market structure will attract or prevent the potential investors.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The power sector governance and management is the responsibility of the Ministry of Energy and Mines.

The Electricity Act of 1998 liberalised the electricity sector in Malawi to allow for the participation of private sector in the generation and supply of electricity. The same act also created the first independent power sector regulator and gave the national utility company the status of a limited Liability Company and recommending restructuring of the ESI.

In December, 2007, a new act, the Energy Regulation Act (2007) was gazetted and operationalized. This new Act superseded the Electricity Act of 1998 and provided for the creation of the MERA.

3.2 Sector organization

There are no legal restrictions on joint ownership of the various services and areas of activities. However, ESCOM is a vertically integrated utility with a monopoly on the generation, transmission and distribution in the country. Vertical integration exists between generation and transmission and transmission and distribution.

Thus the market model that best describes the structure of the sector is the vertically integrated monopoly. The national power utility is only responsible for the electricity supply and it is not involved in providing water and gas services.

As mentioned the law provides for the potential participation of new private IPPs.

3.3 Regulatory framework and processes

The regulatory framework provides for a strong an independent regulator overseeing virtually all aspects of the industry, such as the granting of licenses, approving tariffs, the establishment of technical and minimum service standards and monitoring and compliance regimes. The regulator has multi-sectoral jurisdiction which covers electricity and licensing of the petroleum sub sector. The institution is yet to start its full operations and recruit new staff. This presents challenges as there is need to rebuild capacity.

The National Electricity Council of Malawi (NECO) was created in 1998, and the new MERA was created in 2007/8. At the time of the survey, MERA was developing a budget which was to be funded by licensee's levies. The board members are appointed by the President and a Public Appoint Committee of Parliament interviews and vets the candidates. The members are appointed for a period of three years and can be reappointed. The circumstances and procedures for removing or replacing the commissioners are prescribed in the Energy Regulation Act. The decisions of the regulator are final but can be challenged in competent courts by any party not satisfied with the decision.

There is a standardized reporting format for licenses to report commercial and financial data to the authorities. The regulatory decisions are publicly available through the published reports and government gazette. The regulator has not held any public hearings on tariff applications.

3.4 Tariffs and pricing

All residential and large customers' tariffs are regulated. There is no defined capacity threshold (in MW) above which large customers tariffs are unregulated. The economic regulation methodology used for review of tariffs is the rate of return for generation, transmission and distribution. Periodic tariff reviews are allowed, at least once in 4 years. Extraordinary tariff adjustments are allowed for changes in exchange rate and inflation.

A cost of supply study was done in 2005 to determine cost reflective tariffs however these tariffs have not been approved yet and recommendations of the study are still to be adopted. There is a general belief that the current tariffs are not sustainable and not able to provide the right signals for new investments and efficient use of electricity. There is a target to achieve cost reflectivity by 2010. A plan to increase tariffs by 5% every year across the board for the next five years is currently being implemented. This is over and above the exchange rate and inflation related adjustment that will be applied as and when it is necessary and above the agreed threshold $\pm 5\%$.

3.5. Key regulations

Third Party Access to transmission and distribution networks is allowed by Law. However, there is no independent transmission system operator. The regulator or courts will intervene in access, connection and fees conflicts.

The power utility can discontinue its services in the following cases:

- I. non-payment of bills more than sixty (60) days in arrears, provided that the Service Provider delivers a Disconnection Notice to the Customer's address five (5) days before service is disconnected;
- II. unauthorised use or theft of electricity;
- III. refusal to grant access at reasonable times to equipment installed upon the premises of the customer for the purpose of inspection, meter reading or maintenance;
- IV. failure to reimburse the service provider for repairs to or replacement of the Service Provider's property used to supply service, when such repairs or replacements are necessitated by negligence on the part of the customer;
- V. misrepresentation of identity for the purpose of obtaining service; and
- VI. actions adversely affecting the safety of any customer or the integrity of the Service Provider's distribution system.

Customers disconnected are eligible for re-connection on payment of reconnection fees if disconnection was due to non payment of bills. There are no defined targets or minimum quality of service standards for commercial performance, however there are defined targets or minimum quality of service standards for technical performance. Malawi has defined penalties for non-compliance with quality standards.

3.6 Private Participation

The law in Malawi does allow for private sector participation however there no independent power producers in the local market yet.

4. Rural Electrification

4.1 Governance

The central government is overall responsible for rural electrification and there is a specialized Rural Electrification Agency. Both ESCOM and community based service providers have significant responsibilities in rural areas. Thus the key roles in rural electrification are played by the Government, at central level, and the Rural Electrification Agency. The government is responsible for organizing and providing the funding and regulation of rural electricity services whilst the utility provides the required technical and operational assistance for the rural electricity services.

There is a specialized fund covering rural electrification with money being sourced from the government, donors and sector levies. The annual budget was not provided however it was stated the rural projects are approved based on least cost and economic return.

4.2 Policy and Institutional set up

There is an official policy target for electrification, with a target of 10% of the total population serviced by 2010. Currently only 1% of the rural population is being served.

There are five isolated rural electricity systems and about five individual on-site power systems that exist in the country. The rural systems supplied by renewable energy sources are still small and the following capacities are installed at the moment:

	MW
a) Small-scale thermal systems	975kw
b) Small-scale hydro systems	4.7MW
c) Solar PV/home systems	63KW

There is a policy to provide incentives for the use of renewable energy, which was developed in 2003. The main incentive, provides for the duty free status on the importation of renewable energy equipment. The duty waiver has significantly reduced the landed cost of renewable energy equipment and helped increase access to renewable energy services. However, there is need to deal with the challenge of making sure that importers of renewable energy equipment pass on the benefit of the duty waiver to the targeted beneficiaries.

5. Operating enterprises

5.1 Organization and autonomy

ESCOM is 100% owned by the central government and the company was corporatized in 1998. It has a Board of Directors comprised of twelve members. The board members are selected from four central government representatives, four independent experts and the other representations come from the business sector, representatives of consumers, and church or local community leaders.

The Board is executive and through its management is responsible for hiring of workers, laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects. The utility under normal circumstances has the obligation to supply to every one who needs services except in situations such as unplanned interruptions of supply where the utility will have to give priority to essential services. The framework for the methodology for setting prices is defined by the regulator and the structure and levels are determined by the service provider but approved by the regulator. The government sets up the policy on the subsidy and passes it on to the service provider and its Board to implement.

5.2 Monitoring and Performance

The question on whether a performance contract exists between the national utility and the government was not answered nor the question on whether there are performance based incentive systems where the payments and promotion of managers are determined by their performance.

Performance is monitored on a quarterly and annual basis. Normal accounting principles are applied with and the utility is audited by external auditors appointed by the board.

5.3 Finance and labor

The national utility is not required to earn a rate of return or to pay dividends. This seems to contradict the adopted economic regulation methodology which is based on rate of return. The utility is exempt from any form of taxation and has access to credit at market rates.

ESCOM management has the liberty to lay-off workers when necessary subject to applicable labor law. The wages/salaries paid by the national utility, are somewhere in between public and private sector levels. The utility does not contract out activities to the private sector under service contracts. ESCOM does not have problems with skills shortages.

Performance Indicators

Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	209.46	226.84	234.36	239.57	244.71
Energy generated	<i>GWh</i>	1231	1358	1390	1453	1579
Imports	<i>MW</i>	n/a	n/a	n/a	n/a	n/a
Total energy available	<i>GWh</i>	1231	1358	1390	1453	1579
System load factor	%	65	65	65	65	65
Transmission and Distribution Losses	%	21	22	20	20	19.8
	%					
Energy sales	<i>GWh</i>	969	1056	1117	1166	1279
Number of customers	<i>Number</i>					
Number of employees	<i>Number</i>					
Customers/employee	<i>Ratio</i>					
Sales/employee	<i>Ratio</i>					
Total revenue	<i>Local MK</i>					
Total operational costs	<i>Local MK</i>					
Revenue per employee	<i>Ratio</i>					
National electrification rate	%					
Debtors days	<i>Number</i>					
Rate of return on assets	%	12	12	12	12	12

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI

COUNTRY REPORT- MADAGASCAR

1. Introduction

Madagascar has a population of over 17 million, a third of which are urbanized. It is the biggest island in the Indian Ocean off the coast of Africa.

The Ministry of Energy and Mines is responsible of the sector and the Directorate of Electricity and Renewable Energy oversees the electricity industry in the country. The national water and power utility, JIRAMA, is responsible for the electricity supply in the country serve for a few private suppliers.

The country has an installed capacity of about 311MW and over 35% is hydro and the rest is heavy fuel or diesel fired plants. The electrification rates in the country are still low at about 11%.

Madagascar has an estimated hydro power potential of over 7800MW with only 104Mw currently being exploited which is about 1.3%. There are a couple of power projects which are currently on going to augment the currently low available capacity and the heavy reliance on emergency diesel plants to reduce the frequent black outs and blown outs. The suppressed demand is estimated to be over 1000MW.

It was noted that there are some coal reserves in the south of Madagascar which might need to be explored more (approx 32 000 000 tonnes). Given the fact that Madagascar is a signatory to the Kyoto Protocol, coal can be exploited and its use can be linked to carbon sequestration programs to minimise its effect on the environment. Coal as a source of thermal energy is much cheaper than diesel or heavy fuel oil.

Geothermal potential can also be exploited in areas like Vaka. The use of solar water heaters and photovoltaic units should be exploited given that the solar potential is estimated at 2,000 kW/m². Wind speeds in the north are high between six and eight m/s and giving huge potential for wind turbines especially in Vohimena (>8m/s)

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

The central government is responsible for the formulation of the ESI Policy. The country does not have a separate ESI Policy. In 2006, the Malagasy Government launched Madagascar Action Plan (MAP) 2007 – 2012. This document shows the global policies for each economic sector in terms of commitments which are subdivided into challenges. The formulation process was done through stakeholder consultations. Over and above MAP, the Ministry of Energy and Mines prepared a strategic policy implementation document in December 2007 in which they described the detailed key energy sector strategies which will be implemented to meet the Millennium development goals and MAP objectives.

The energy sector's vision is covered in Commitment 2/challenge 4 of MAP which is defined as to *“Ensure accessible and adequate energy supply at affordable and competitive cost”*.

2.2 Key policy issues

The key objectives of the policy are to:

- Ensure adequate energy supply at affordable and competitive cost.
- Contribute to the growth of the country.
- Increase access to electricity.

- Reduce the financial burden of the electricity sector on public funds.
- Increase the use of renewable energy whilst reducing dependency on oil products.

The policy also specifically covers the following aspects:

- Independence of the regulator – through the creation of the Office of the Electricity Regulator (ORE).
- Cost reflective prices and tariffs – a policy was adopted to update the electricity tariffs based on the economical principle.
- The abolition of the national monopoly of the JIRAMA in terms of the production of electricity to allow for private sector participation through IPPs and also public private partnerships (PPPs).

2.3 Policy timing and implementation

The central government is responsible for energy planning and the development of the national integrated resource plan. The obligation to supply is the responsibility of the Power Utility (JIRAMA) in urban areas and that of the Rural Electrification Agencies in the rural area. The ORE is responsible for monitoring the implementation of the national electricity plan.

The planning horizon is defined in the short-medium term from 2007-2012 and in the long term from 2007-2032. The related Energy Policy has been updated three times in the past ten years i.e. in 2000, 2005 and in 2007.

Policy implementation has been estimated at about 60%. The main constraints in the implementation of policy are:

- Insufficient financial resources.
- Lack of capacity to implement power projects.
- Insufficient incentives to attract new investment and private sector participation.
- Lack of awareness of the national policy amongst key stakeholders (policy not communicated to the relevant investors and public).

It is important to note that the Energy Policy of Madagascar does facilitate private sector participation and PPPs. This was facilitated through the introduction of new Law 98-032 which liberalizes the electricity sector. This also included implementation of a system of incentives for investments in hydroelectricity and the creation of a regulator to ensure fair competition. The current policy does not cover issues of energy conservation, efficiency and climate change. These will be considered in the new energy policy which is yet to be developed.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The power sector governance and management is the responsibility of the Ministry of Energy and Mines.

The electricity sector has undergone reforms and the new sector legislation was passed in 1999 reforming the Malagasy Power Sector. The current legislation which rules power supply and distribution is law No. 98-032, published on 01/20/1999 (which is under revision). The same Law also provides for the establishment of the office of the ORE. The main aim of this Act is to liberalize the electricity sector and to permit private companies to

operate in it. According to this Act, potential investors must hold a license issued by the Ministry of Energy and Mines – on behalf of the Malagasy Government – before operating.

Three main kinds of licenses are available:

- i) the Authorization for Auto production (required for power plants > 1MW thermal and 500kW hydro);
- ii) the Authorization contract for power plants < 1MW hydro and 500kW thermal; and
- iii) the Concession contract for power plants > 1MW hydro and 500kW thermal.

For Authorization and Concession contracts, spontaneous applications are admitted for sites < 50MW. For sites which cross over this cap, a call for bids is launched by the Ministry.

It is prohibited to produce or to sell power without the agreement of Malagasy authorities. All companies which want to invest in the electricity sector must abide by the rules of the Malagasy commercial law and registered as Malagasy companies.

The duration of the license term depends on the type and the amount of the investments. The Law defines the tariffs determination methodology and regulation, and also the standards applicable to the power sector.

The Government through the national utility, JIRAMA is responsible for the transmission, distribution and supply of electricity. Electricity generation has been liberalized to include IPPs apart from the state-owned utility. The National Power Utility is a vertically integrated company responsible for generation, transmission and distribution of electricity supply. There are no legal restrictions in joint ownership of services such as generation and transmission and distribution except for generation and distribution.

Madagascar currently does not have a utility regulator in place. Although the Utility Regulatory Authority (URA) legislation was passed in 2004, this has not been proclaimed yet. The legislation is expected to be proclaimed before the end of 2008. The URA which will be created will have multi-sectoral jurisdiction.

3.2 Sector organization

The market model that best describes the structure of the sector is the single buyer. Vertical integration exists between generation and transmission, transmission and distribution and generation and distribution. Private ownership is mainly restricted to generation.

Vertical integration exists between generation and transmission, transmission and distribution and generation and distribution. Madagascar currently has 23 operators in generation (including JIRAMA, IPP and rural operators), one transmission and 23 distribution and supply operators. The power utility is also responsible for providing water services.

3.3 Regulatory framework and processes

Madagascar has an electricity regulatory body. The Ministry of Energy and Mines is responsible for granting of operational licenses and approving and monitoring investment plans. The government is also responsible for monitoring and enforcing compliance with regulation and arbitration of some disputes. The ORE is responsible for approving tariffs, monitoring investment plans, market oversight and rules, establishing technical and

minimum service levels, monitoring and enforcing compliance with regulations and arbitrating in a dispute. Appeals against regulatory decision are done through the Administration Courts. The National Power Utility (JIRAMA) assists in the establishment of technical and minimum standards.

The office of the regulator was established in 2005 though the enabling Act was approved 1999 and has jurisdiction over the electricity supply industry only. In 2008 the operational budget was equivalent to kMGA 1,654,500. The budget is derived from levies and license fees. The office of the Regulator is headed by an Executive Secretary who reports to the Board which is appointed by the line Minister. The term of office for the Board members is five years and these can be reappointed only once. The Minister has the authority to terminate the tenure of office for Board members. The decisions of the Board can be vetoed by the line Minister or the Administrative Courts.

The regulator has a standardized format for the ESI operators to report operating, commercial and financial data to the authorities. Not all regulatory decision are publicly available, however decision on tariffs are made available to the public. The regulator does not currently hold public hearings on proposed tariff increases.

3.4 Tariffs and pricing

Residential and Large Customers Tariffs are regulated. There is no defined capacity threshold in MW above which large customers tariffs are unregulated.

The tariff regulation methodology which is used for the determination and approval of tariffs at the supply end is the price cap. The tariff methodology used for price transfer between general, transmission and distribution is the economic cost.

The retail tariffs are indexed on an annual basis based on the variation of the following cost drivers:

- Price of oil
- Consumer Price Index
- Currency exchange rate

Currently tariffs are adjusted every six months and extraordinary tariff increases are allowed to cater for significant unplanned increases in the major cost drivers. Currently, the revenues collected by the Utilities are insufficient to cover operational costs. The currently tariffs are not sustainable and not able to provide the right signals for new investments and efficient use of electricity. There has not been any study to determine the level of cost reflective tariffs. The last cost reflective levels were determined in 1991. It is expected that the cost reflective tariffs will be achieved in 2009 and an approved plan to achieve this through regular tariff increases at least 15% every six months. The last tariff increase requested by the Utility was 50% and only 15% was approved by the regulator.

3.5 Key regulations

Third Party Access to transmission and distribution networks is allowed by Law. The Ministry and/or the office of the regulator ORE arbitrates. Transmission access is controlled by the state owned utility.

The power utilities can discontinue services in case of non-payments after a duration specified in the contract signed between the utility and the consumer. Customers disconnected are eligible for re-connection on payment of reconnection fees.

The regulator and consumer groups are responsible for the protection of the rights of consumers. There are defined targets and/or minimum quality of service standards for commercial performance as well as defined targets of minimum quality of service standards for technical performance. However, there are no well defined penalties for non-compliance with quality standards.

The Law allows entry by new private IPPs and PPPs have since entered the local market. The contract with the last IPP was awarded in 2006 and became operational in 2007. The current contract is still operational and has not been renegotiated. Apart from IPPs there are other private participants in the sector in the provision of distribution services. These contracts are awarded through concessions.

4. Rural Electrification

4.1 Governance

The central government is responsible for rural electrification and there is a specialized rural electrification agency. Even if there is a specialized rural electrification agency the major urban utilities still have significant responsibilities in rural areas. There are also community based electricity service providers.

All levels of government i.e. central, regional, local, Rural Electrification Agency, Power Utility and Community Service Providers are responsible for funding rural electrification projects. However, the Rural Electrification Agency is responsible for the provision of rural electricity services, technical assistance and regulation of rural electricity services. The major sources for funding are from Government, sector levies and donor agencies. The current annual budget is MGA 14.276.480.000.

The criteria used to prioritize rural electrification projects are:

- Least cost.
- Financial returns.
- Economic returns.
- Political (Balance of regional relations).

4.2 Policy and Institutional set up

There is an official policy target for rural electrification which is aimed at achieving 10% electrification rate by 2011. The 10% refers to rural population. As a policy there is no subsidy for water when forming part of rural electricity services.

The typical connection for a new residential customer if connected to an off-grid operator supplied by Hydroelectricity for less than 150 kW the cost is MGA 2.23 Million if supplied from a generator set less than 100 kW the cost is MGA 1.5 Million. If connected to the main grid operator the cost is MGA 1.5 Million. Currently, 53% of the existing rural electrification systems are in need of major rehabilitation and 148 isolated rural electricity systems exist in the country, 75% of which are owned by JIRAMA and the rest are private owned.

There are over 1000 individual own-site power systems in the country. About 1 650 000 people are served by the existing rural electricity systems. The table below shows the total installed capacity of isolated rural systems.

Type of Rural System	Installed Capacity (MW)
Small-scale thermal systems	17.4
Small-scale hydro systems	0.72
Solar PV/home systems	0.25
Other	-

There is a policy to provide incentives for the use of renewable energy which was formulated in 1999. In rural electrification, the principal incentive is the subsidy. The investment in rural electrification is subsidized up 70% and the tariffs are not regulated. The impact of incentives on the scale-up of renewable energy is insignificant. To date, the Rural Electrification Agency only subsidizes four projects in renewable energy (three in hydroelectricity and one in wind power). The incentive is not sufficient and the tax provisions (VAT and customs duty) are not specified.

5. Operating enterprises

5.1 Organization and autonomy

The JIRAMA is 100% owned by the central government, whilst the IPPs are private owned. JIRAMA is a public incorporated company incorporated in 1975.

The Board of Directors comprises eight members drawn from employees (two), Central Government Authorities (four) and two other members (experts). The Board is executive and has competence. Through its management, it is responsible for hiring of workers, setting wages/bonuses, how much to produce and who to sell to whilst approval of individual investment projects is done by management and the government.

5.2 Monitoring and Performance

There is no performance contract between the national utility and the government and there is no performance based incentive system to determine payments and promotion of managers. However, negotiations are in progress to introduce a performance based incentive system to be concluded before the end of 2008. Even though there are no penalties for poor performance, some managers have been dismissed in the past due to poor performance of the utility.

Performance is monitored quarterly using agreed performance indicators. The Utility has external auditors whose selection is approved by the Board. The JIRAMA produces an annual report which contains information on staff and managerial performance. The Utility does not follow the International Financial Reporting Standards. The results of the audit are however made public.

5.3 Finance and labor

The national utility does not earn a rate of return nor pay dividends. The utility is not exempt from any form of taxation and has access to credit below market interest rates which is guaranteed by the government. The enterprise is not compensated for non-commercial activities by the state.

The laying-off workers can only be done with the approval of government. The wages/salaries paid by the utility are somewhere in between public and private sector levels. The utility does not contract out some of the activities to the private sector under service contracts i.e. billing and collection and information technology services. The

National Utility is experiencing shortages of technical expertise including information technology.

Madagascar is in the process of developing strategies to attract and retain technical staff.

Performance Indicators (JIRAMA)

Key indicators for the last 5 years						
Indicators	Units	2003	2004	2005	2006	2007
System maximum demand						
.RI (Interconnected Network)	<i>MW</i>	196 131 67	204 136 68	211 140 72	212 142 71	224 153 71
.Others that RI						
Energy generated	<i>GWh</i>	898	983	988	1 004	1 052
Imports	<i>MW</i>					
Total energy available	<i>GWh</i>	898	983	988	1 004	1 052
System load factor		52,31	54,87	53,27	53,94	53,72
.RI (Interconnected Network)	<i>%</i>	55,26	58,55	58,72	58,29	57,74
.Others that RI		46,34	47,46	42,73	45,23	44,99
Transmission losses	<i>%</i>	3,34	3,70	3,57	3,72	4,33
Distribution losses	<i>%</i>	19,64	17,96	18,62	17,45	19,88
Energy sales	<i>GWh</i>	676	754	754	778	784
Number of customers	<i>Number</i>	364 483	391 793	401 900	403 777	394 396
Number of employees	<i>Number</i>	4 889	4 775	4 677	4 354	4312
Customers/employee	<i>Ratio</i>	74,55	82,05	85,93	92,74	91,46
Sales/employee	<i>Ratio (GWh)</i>	0,14	0,16	0,16	0,18	0,18
Total revenue	<i>Local currency (M Ar)</i>	96 498	107 139	131 587	213 538	231 601
Total operational costs	<i>Local currency (M Ar)</i>	92 475	128 333	163 740	223 281	199 958
Revenue per employee	<i>Ratio</i>	19,74	22,44	28,13	49,04	53,71
National electrification rate	<i>%</i>	10,6	11,1	11,0	10,8	10,2
Debtors days	<i>Number</i>	10	8	8	4	NA
Rate of return on assets	<i>%</i>	0,06	-11,88	-35,09	0	NA

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT- MAURITIUS

1. Introduction

Mauritius imports 90% of its energy needs. It doesn't have any oil, natural gas or coal reserves. In the 80's, more than 70% of the country's electricity requirements were met from oil. This made the country's electricity supply highly vulnerable in view of the volatility of the prices of all products. The electricity production is mainly supplied by the Central Electricity Board which is a parastatal body responsible for the production of 58% of the electricity requirements in the country. Forty-two percent of the requirements are met by the IPPs which are mainly private generators from the sugar industry. The electricity production of IPPs is bagasse and coal-based. The contribution to the total electricity production of renewable sources was about 22% in 2005, which is the highest within the SADC region.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

The central government is responsible for electricity supply industry policy formulation. Mauritius has an energy policy which was officially launched in April 2007. The current energy policy was reviewed after change in government policy in 2005 as a result of a paradigm shift on the world usage caused by climate change. The review process was developed through an active process of public consultations which culminated in the launch and publication of the policy in 2007.

The institutional framework for energy policy is headed by the Ministry of Public Utilities. Other stakeholders include the Ministry of Public Infrastructure, Ministry of Finance and Economic Development, Land Transport and Shipping, Ministry of Environment and National Development Unit, Ministry of Agro-Industry and Fisheries, Ministry of Industry, Small and Medium Enterprises, Commerce and Cooperatives, Meteorological Services, Central Electricity Board and the Mauritius Sugar Authority.

2.2 Key policy issues

The key energy policy issue addressed in the Energy Policy is capacity expansion plan for the period 2007 – 2013 with emphasis on enhanced use of renewable energy. Over and above that, Mauritius has also diversified its energy sources and is aiming to reduce the energy resource imports from 90% to 30% within the next 50 years by:

- Increasing access to affordable energy services.
- Improving energy governance – through the induction of the new Utility Regulatory Act (URA) which facilitates the setting up of an Energy Regulatory Board.
- Stimulating economic development.
- Managing energy-related environmental and health impacts.
- Increasing the contribution of renewable energy to more than 42%.

The policy also ensures viability of IPPs through sustainable pricing policy.

2.3 Policy timing and implementation

The *Energy Planning* and the introduction of a NIRP is the responsibility of the central government.

The obligation to supply electricity is mainly the responsibility of the National Power Utility which is the Central Electricity Board (CEB). Mauritius is fully electrified and any expansion of service is done by CEB. The planning horizon is well defined within the Energy Policy

which covers the period 2007 – 2023. The Energy Policy was reviewed and updated twice within the last 10 years in 2004 and 2007.

The Energy Policy was adopted in 2007 as one of the milestones to implement new policy. The other milestones are as follows:

- Proclamation of URA and Electricity Acts – end 2008.
- Passing of the Energy Efficiency Bill – mid 2008.
- Preparation of Detailed Energy Policy – end 2007.
- Renewable Energy Master plan – mid 2008.
- Use of biofuels for transportation in Mauritius – 2010 – 2015.

Although the above milestones have been achieved, the following constraints were identified as key in impeding timely implementation of the policy:

- Time consuming procedures/negotiation of PPPs.
- Change in policy orientation (with change of government).
- Financial sustainability.

It is important to note that the Energy Policy of Mauritius does facilitate the private sector participation and/or PPPs in the electricity supply industry which is evidenced by the fact that these contribute 48% of the electricity energy requirements in the country.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The power sector governance and management is the responsibility of the Ministry of Public Utilities.

The electricity sector reform process has been done in the country in which the power generation sector has been fully liberalized and there has been new legislation for the set-up of the URA. This was done through promulgation of the new sector legislation in 2004 and 2005.

The government through the national utility, CEB, is responsible for the transmission, distribution and supply of electricity. Electricity generation has been liberalized to include IPPs apart from the state-owned utility. The National Power Utility is a vertically integrated company. There are no legal restrictions in joint ownership of services such as generation and transmission and distribution or generation and distribution.

In line with the new procurement act effective as from January 2008, IPP project are now being implemented through competitive bidding.

Mauritius currently does not have a utility regulator in place. Although the URA legislation was passed in 2004, this has not been proclaimed yet. The legislation is expected to be proclaimed before the end of 2008. The Utility Regulatory Authority which will be created will have multi-sectoral jurisdiction.

3.2 Sector organization

The market model that best describes the structure of the sector is the vertically integrated monopoly. It is a vertically integrated monopoly with the State Utility being the single buyer. Private ownership is mainly restricted to generation.

Vertical integration exists between generation and transmission and transmission and distribution and generation and distribution. Mauritius currently has eleven operators in generation and only one transmission, distribution and supply company.

3.4 Regulatory framework and processes

Mauritius does not have an independent regulatory body. The Ministry of Public Utilities is responsible for granting of operational licenses (mainly generation), approving tariffs and approving and monitoring investment plans. The State Utility is mainly self-regulating, being responsible for the following:

- Market oversight and rules.
- Establishing technical and minimum service levels.
- Monitoring and enforcing compliance with regulation.
- Arbitrating in a dispute.

The Utility Regulatory Authority once appointed will take over the functions of the sector. It will be headed by a Board appointed by the President on advice of the Prime Minister. The Board's term of office will be limited to 3-5 years and the Board members can be at most reappointed only once. The President has the authority to veto the decision of the Commissioners.

The Act provides the right for the utilities to appeal against regulatory decisions through an Appeal Tribunal. The regulator will be expected to publicize regulatory decisions through public hearings, public reports and the internet.

3.5 Tariffs and pricing

Residential and Large Customers Tariffs are regulated. There is no defined capacity threshold in MW above which large customers tariffs are unregulated.

The type of regulation methodology will be decided by the Regulatory Authority once it is operational. The current tariff reviews are done regularly by the Ministry of Public Utilities. Although the revenue is sufficient to cover most of the operational costs, the current tariffs are not sustainable and not able to provide the right signals for new investments and efficient use of electricity. The cost reflective levels of tariffs have not been calculated for the various categories or classes of utility services hence there will be a need to carry a cost of service study. However, it is targeted that cost reflective tariffs be achieved by 2010.

The most recent tariff percentage increase which was requested by the electricity utility was 35% and the average percentage increase which was approved by the government was only 22%.

3.6 Key regulations

Third Party Access to transmission and distribution networks is allowed by Law.

The power utilities can discontinue their services in case of non-payments (60 days after non-settlement of bill). Customers disconnected are eligible for re-connection on payment of reconnection fees.

The regulator will be responsible together with consumer groups for the protection of the rights of consumers. Over and above that there is a Ministry responsible for consumer protection.

There are no defined targets or minimum quality of service standards for commercial performance but there are defined targets or minimum quality of service standards for technical performance. However, there are no well defined penalties for non-compliance with quality standards.

4. Rural Electrification

4.1 Governance

The central government is overall responsible for rural electrification and there is no specialized rural electrification agency.

The power utility is responsible for funding all electrification investments, rural electricity service provision and regulation of the rural electricity services. The rural electrification services was completed way back in 1980s (100%) and currently there is over 210 000 people served by the rural electricity systems. There is a policy which was introduced in 2007 which provides for the incentives for the use of renewable energy. Some of the incentives include tax incentives. The tax incentives have had limited impact on the scaling up of renewable energy hence other incentives are now being considered.

5. Operating enterprises

5.1 Organization and autonomy

The CEB is 100% owned by the central government, whilst the IPPs are private owned. The CEB is a statutory Board which was formed through an Act of Parliament. The Board of Directors comprise of 10 members chosen among candidates having experience in industrial, commercial, agricultural and member of the Engineering Association.

The Board is executive and has competence and through its management, it is responsible for hiring of workers, laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects.

5.2. Monitoring and Performance

There is no performance contract which exists between the national utility and the government. However, there is a performance based incentive system which was introduced in 2006, where payments and promotion of managers are determined by their performance. There are no penalties for non-performance.

Performance is monitored on an annual basis using key utility performance indicators. Normal accounting principles are applied and the company has external auditors with government also auditing the utility. The utility produces annual reports which are public and the first independent audit was carried out in 1964.

5.3 Finance and labor

The national utility does not earn a rate of return nor pay dividends. The utility is exempt from any form of taxation and has access to credit equal to market rate. In terms of liberty

to lay-off workers when necessary, the national utility has full control subject to applicable labor law.

With regard to the wages/salaries paid by the national utility, these are somewhere in between public and private sector levels.

The utility does not contract out activities to the private sector under service contracts. There is shortage of skills within treasury management and procurement specialist.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	*2005	2006	2007
System maximum demand	<i>MW</i>	324	332	353	367	367
Energy generated	<i>GWh</i>	1 840	1 922	2 017	2 091	2 198
Imports	<i>MW</i>	111	111	141	141	215
Total energy available	<i>GWh</i>	2 780	2 862	2 957	3 081	3 228
System load factor	%	64.8	63.2	65.2	65	68.3
Line losses	%					
Distribution losses	%	10.55	10.33	9.78	9.54	9.70
Energy sales	<i>GWh</i>	1 607	1 682	1 777	1 855	1 975
Number of customers	<i>Number</i>	338 600	357 500	368 300	376 600	385 321
Number of employees	<i>Number</i>	1 753	1 817	1 817	1 770	1 975
Customers/employee	<i>Ratio</i>	193:1	202:1	203:1	213:1	218:1
Sales/employee	<i>Ratio</i>	0.92	0.95	0.98	1.05	1.12
Total revenue Rs Million	<i>Local Currency</i>	5 197.2	5 588.5	6 038.9	7 039.8	7 816.9
Total operational costs	<i>Local currency</i>	3 725.3	4 301.5	5 739.2	6 828.84	7 293.5
Revenue per employee (MRs)	<i>Ratio</i>	2.965	3.166	3,324	3.977	4.424
National electrification rate	%	100	100	100	100	100
Debtors days	<i>Number</i>	61.7	65.8	67.3	65.9	67.2
Rate of return on assets	%	8.81	8.38	(2.9)	(8.73)	(1.56)

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT- MOZAMBIQUE

1. Introduction

Mozambique has a rich and diversified energy resource base capable of meeting both local demand and contributing to large scale energy exports, including hydro power, natural gas and coal. In the southern Africa region, Mozambique's hydroelectric potential is only surpassed by the potential of the Inga site in the Democratic Republic of Congo and the hydro potential in Angola.

About 4 TCF 113 billion cubic meters (BCM) of gas reserves are already proven, but interpretation of geochemical and seismic surveys indicate that the total gas reserves in southern Mozambique indicate a higher value. Exploration for oil is also ongoing.

Mozambique is relatively richly endowed with coal reserves, estimated at, at least 10 billion tones. The most important identified coal deposits are all located in the Tete Province, the largest being the Moatize deposit with an estimated reserve of 5.5 billion tones.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

Mozambique's electricity sector is governed by a number of laws and regulations of recent vintage. Legislation and policy govern a broad range of matters in the sector, and hence those classifiable as general, includes:

- Law number 21/97, of 01 October (the "Electricity Law");
- Resolution number 5/98, of 03 March (the "Energy Policy"); and
- Energy Sector Strategy (approved October 2000).

The policy formulation is centralized. As the defined formal ESI policy is relatively old (it is part of the "Energy Policy" approved by Resolution number 5/98, of 03 March 1998), the current Five Year Government Program stands out as a relevant policy document.

2.2 Key policy issues

The existing policy contains the following key aspects:

- Ensure the availability of electricity to meet current and future needs;
- Define that increase access is mainly through grid extension/expansion;
- Following the approval of the Electricity Act by the Parliament in 1997, the power sector was opened to private participation with no exception in terms of generation, transmission, distribution and commercialization activities. The formulation of the Energy Policy in 1998 was then focused among other aspects on the operationalization of the Law with regard to the promotion of the private participation in the sector. The policy promotes private sector participation in the power sector also by fiscal incentives and free trade zones. Large scale generations projects are essentially developed on IPP bases;
- Promote the development of renewable energy resources;
- Provides the need to balance export supplies with supplies to the domestic demand from new generation projects;
- No defined policy of self sufficiency; and
- Ensure commercial autonomy of the utilities and the application of cost reflective tariffs and pricing.

2.3 Policy timing and implementation

The *Energy Planning* and NIRP are the responsibility of the central government.

The *obligation to supply* is mainly the responsibility of local authorities and the national utility. With regard to the *rural electrification*, there is no established “rural electrification agency” as such. Thus rural electrification is mainly a responsibility of the government at various levels with its implementation being the responsibility of the power utility.

There is no clear definition in terms of policy horizon, but it can be interpreted as a long term horizon (15 – 25 years).

The Energy Policy adopted in 1998 has not been updated and the adopted national policies have not been fully followed and implemented. The main constraints in implementing the policy include the following:

- Weak institutional capacity, including the absence of a well established regulatory body.
- Limited human resources, infrastructure and financial resources.
- Outdated formulation of some aspects of the energy policy.
- No adequate harmonization between the legislation of the energy sector in general and the specific electricity legislation.
- Inadequate institutional sector coordination.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The power sector governance and management is the responsibility of the Ministry of Energy, created in 2005.

An electricity sector reform process was basically initiated in 1997 with the approval of a new Electricity Act aiming at attracting private sector participation in electricity generation and distribution. This Act also established an Advisory Board to the government on electricity related matters, but with limited regulatory functions. However, there is an ongoing process aiming at transforming this Advisory Board into an Independent Regulator.

As a result of this process there were some private concessions on isolated areas and the adoption of new tariff adjustment mechanisms. However, there was no vertical unbundling of the sector, with the national power utility keeping in essence the same responsibilities of generation, transmission and distribution levels since its establishment 30 years ago.

3.2 Sector organization

There are no legal restrictions on joint ownership of the various services and areas of activities as it is demonstrated by the vertical integrated national power utility, with responsibilities at level of generation, transmission and distribution.

Thus the market model that best describes the structure of the sector is the vertically integrated monopoly where vertical integration exists between the services of generation, transmission and distribution. However, there are two other major operators apart from the national utility being one in the generation and the other one in transmission with limited scope of activity. While the generation operator concentrates its activity mainly to export, the transmission operator has a dedicated role to supply an aluminum smelter.

The national power utility is only responsible for the electricity supply and it is not involved in providing water and gas services.

As mentioned the law provides for the participation of new private IPPs. The existing generation operator (apart from the national utility) can be characterized as an IPP, but it was established prior to Mozambique's independence. However, all new large generation developments are envisaged to be implemented as IPPs.

The Law also allows for private participation in other segments of the power sector. The first private distribution concession was awarded in 2004, but the government cancelled the contract in 2007 as the concessionaire did not honor the terms and condition of the concession contract.

3.3 Regulatory framework and processes

The regulatory framework is very weak as the regulator has not yet been established. Thus most of the regulations are specific, embodied in the respective concession contract. The existing regulatory framework does not require review or approval of power purchase and sales agreements and it also omits any requirement in terms of regulatory review or approval of imports and exports of electricity. However, the Electricity Act states that any company is allowed to export and import electricity provided that it has been registered and granted a license as a concessionaire.

The Ministry of Energy is the institution responsible for overseeing the power utilities in the following areas:

- Granting licenses.
- Approving tariffs.
- Approving and monitoring investment plans.
- Market oversight and rules.
- Establishing technical and minimum service levels.
- Monitoring and enforcing compliance with regulation.

The electricity Advisory Board (National Electricity Council) is responsible for arbitrating disputes. This Electricity Council was created in terms of the Electricity Act of 1997 mainly as an advisory board with very limited regulatory functions. Its performance has been poor hence the Cabinet recently decided to appoint a new Board as a way of creating a new working dimension.

As there is no established regulator, the regulatory reporting and monitoring mechanisms are not in place.

3.4 Tariffs and pricing

Residential and large customers' tariffs are regulated. There is no defined capacity threshold (in MW) above which large customers tariffs are unregulated. However, there are some cases but these are treated on a case by case basis.

Tariffs and pricing is an area subject to different interpretations and opinions depending on the entity responding to the questionnaire: The Government, Regulator or the Power utilities.

One example is the case of the type of regulation methodology used for each of the different segments of the ESI. In general, price cap applies to generation while the rate of return applies to the remaining segments.

Retail tariffs are indexed on annual basis mainly reflecting the currency depreciation, the inflation, fuel costs and costs of imported equipment and material. Periodic tariff reviews are allowed at least once a year.

Although there are different opinions on whether the revenue is sufficient to cover all the operational costs of the national power utility or not, it is understood that the revenue is sufficient for that purpose. Similarly, there are different opinions on whether the current tariffs are sustainable and able to provide the right signals for new investments and efficient use of electricity.

The tariffs tend, in general, to reflect the cost of supply for the various categories or classes of utility services.

3.5 Key regulations

The Third Party Access to transmission and distribution networks is allowed by Law. In the absence of a regulator the entities that intervene in access/interconnection terms/fees conflicts are the ministry and the power utility. There is no transmission access controlled by an ISO.

The power utilities can discontinue their services in case of non-payments (in general after 2 – 3 months of non payment). The utilities can also suspend the supply in cases of safety protection of the Grid, Tampering, etc.

In terms of protection of the rights of consumers, although the National Electricity Council has a role in this regard, in practice its influence had been limited. The Consumer Groups are relevant in this regard.

There are defined targets or minimum quality of service standards for commercial performance as well as defined targets or minimum quality of service standards for technical performance. However, there are no defined penalties for non-compliance with quality standards.

4. Rural Electrification

4.1 Governance

The central government is responsible for rural electrification and there is no specialized rural electrification agency established as such.

The major utilities have significant responsibilities in rural areas, in particular the national electricity utility, Electricidade de Mocambique (EDM). The involvement of the major utilities in the rural areas is complemented by community based electricity service providers, which have limited responsibilities in this context.

Thus the key roles in rural electrification are played by the government, at central level, and the national power utility, with the government organizing and providing the funding and regulation of rural electricity services and the utility providing the required technical and operational assistance for the rural electricity services.

There is a specialized fund also covering rural electrification with money being sourced by sector levies and donor funding. There is no defined budget being the criteria used to prioritize rural electrification projects based on economic return and population.

4.2 Policy and Institutional set up

There is an official policy target for electrification in general (although with significant impact in rural areas) with a target electrification rate of 20% in total to be achieved by 2020. Such policy also defines a rate of 12% to be achieved by 2012.

There is no typical connection charge for new rural residential customers defined. It is estimated a total of 60 isolated rural electricity systems. However, the information regarding percentage of existing rural electricity systems in need of major rehabilitation, number of individual systems and the total number of people served by existing rural electricity systems is very limited and not reliable.

There is no policy to provide incentives for the use of renewable energy.

5 Operating enterprises

5.1 Organization and autonomy

The National Electricity Utility is 100% owned by the central government. This Utility was transformed into a corporatized stated owned enterprise in 1995. It has a Board of Directors comprised of seven members. Six Board members are appointed by the central government and one by the employees.

The Board is executive and got competence and is responsible for hiring and laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects. In terms of setting prices and receipting of a public subsidy and its usage the central government has a decisive influence.

5.2 Monitoring and Performance

A performance contract exists between the national utility and the government, but there is neither performance based incentive systems, where the payments and promotion of managers are determined by their performance, nor penalties for poor performance of managers.

The performance contract is monitored on a quarterly basis and the utility has an independent external private auditor, appointed by the utility, to audit the accounts. The audit of the accounts is made public. However, the utility does not follow the International Financial Reporting Standards as yet.

5.3 Finance and labor

The utility is required to earn a rate of return but it is not required to pay dividends. The utility is not exempt from any form of taxation and have access to credit at market rate. Although it is defined that the utility should be remunerated for non-commercial activities by the state, there are cases of exception.

In terms of liberty to lay-off workers when necessary, the utility has such liberty but it has to follow and take due consideration to the pertinent regulations of the labor law. With regard to the wages/salaries paid by the utility, they are somewhere in between public and private sector levels.

The utility contracted out activities to the private sector under service contracts mainly in the commercial area (billing, collection and interruption of supply for unpaid consumption) and information technology services.

The utility is experiencing skills shortage, particularly in power market operation, tariff design for generation, transmission and distribution and long term planning. These skills impact on the utility's overall efficiency, use of advanced technologies and management tools for network operations and maintenance.

Strategies being implemented or contemplated to bridge the skills shortage include training programs with participation of most staff holding University degrees.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	1,107.1	1,115.8	1,134.6	1,170.1	1300
Energy generated	<i>GWh</i>	1,819.1	1,909.4	2,354.7	2,354.7	2,624
Imports	<i>MW</i>	10.6	14.0	19.2	26.9	16.6
Total energy available	<i>GWh</i>	1,829.7	1,923.4	2,373.9	2381.6	2,640.60
System load factor	%	0.68	0.71	0.73	0.76	NA
Transmission losses	%	9.7	5.7	6.3	6.5	7
Distribution losses	%	18.6	22.1	18.4	19.5	21
Energy sales	<i>GWh</i>	1,340.4	1,466	1,617.1	1,821.0	1,969
Number of customers	<i>Number</i>	245,859	284,562	338,951	415,667	510,854
Number of employees	<i>Number</i>	3,126	3,183	3,194	3,266	3,266
Customers/employee	<i>Ratio</i>	78.6	89.4	106.1	127.3	156.4
Sales/employee	<i>Ratio</i>	0.36	0.37	0.41	0.42	0.60
Total revenue	<i>Local currency</i>	1,848,025,381	2,246,267,725	3,074,893,736	2,620,132,875	3,316,759,072
Total operational costs	<i>1000xMTn</i>	1,780,535	2,380,562	2,632,160	2,709,837	NA
Revenue per employee	<i>Ratio</i>	591,179	705,708	962,709	802,245	1,015,542
National electrification rate	%	5.3	5.8	6.8	8.2	10
Debtors days	<i>Number</i>	NA	NA	NA	NA	NA
Rate of return on assets	%	NA	NA	NA	0.53	NA

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI

COUNTRY REPORT- NAMIBIA

1. Introduction

Namibia is endowed with abundant natural resources but it is susceptible to drought because of low rainfall and high evaporation rates. Mineral deposits are found throughout Namibia, but the largest concentrations are in the extreme south-west, the central Namibia and the north-eastern Otavi highlands. Minerals found are: diamonds, copper, uranium, gold, lead, tin, lithium cadmium, zinc, salt, cadmium, natural gas, suspected deposits of oil, natural gas, coal, and iron ore.

There are very limited internal annual renewable water resources with spectacular deserts, where some of the most unusual flora and fauna can be found, canyons and mountains, mark much of Namibia.

Presently Namibia imports most of its electricity from South Africa. As far as electricity generation options are concerned, there is a possibility of some hydro in the northernmost part of the country and also the possible use of offshore gas resources.

The country has an internal transmission system that is adequate to move power around the domestic market. Namibia is connected with all of its neighbors, with the most active interconnection being the 220 kV and 400 kV ties to the Eskom system. Namibia also exports on small to medium scale to Angola and Botswana. Additional transmission links with Zambia, now under construction, will enable power to move between the two countries more effectively according to pricing and other market conditions.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

In Namibia, the Government is responsible for formulating and adopting policy, with the incumbent state owned utility, NamPower, together with local authorities, responsible for policy implementation in accordance with the licensing framework established under the auspices of the independent regulator, the Electricity Control Board (ECB).

The key institutions in Namibia's power sector include the Ministry of Mines and Energy, NamPower, the national utility that recently listed on the stock exchange; and ECB, the national regulator.

ECB, the regulator is relatively new, and is in transition as the sector undergoes reforms. ECB is a member of the RERA and the African Forum for Utility Regulators (AFUR). NamPower is also a member of the SAPP and is engaged in power trading under SAPP.

2.2 Key policy issues

Namibia has a modern energy policy that also addresses ESI issues. A lot of focus is placed on restructuring of the electricity distribution sector with the formation of Regional Electricity Distributors REDs, as well as actively trying to encourage the establishment of IPPs.

Key focus areas are:

- Private sector investment.
- Economic merit power development.
- Renewable energy and energy efficiency

Issues of national self-sufficiency, regional complementarity in resources and cross border trade in energy are also covered in the policy.

2.3 Policy timing and implementation

Energy Planning is the responsibility of the central government in conjunction with the state-owned utility. The responsibility for *NIRP* is a shared responsibility between central government and the state-owned utility and regional governments are also involved. The *obligation to supply* is mainly the responsibility of the national utility, with the regulator playing an active role in terms of the Electricity Act in determining the extent of this obligation in the context of security of supply.

The main constraints experienced in implementing policy include the following:

- Weak leadership from government
- Co-operation issues between central, regional and local government
- Human resource constraints at all levels.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The Namibian ESI is regulated in terms of modern legislation that was passed in 2007. In terms of this legislation, a regulator is appointed, ECB that independently sets tariffs of licensees. The regulator is not independent regarding the issuing, transferring, renewing and amending of licenses, but recommends this to the Minister for approval. The ECB comprises five members appointed by the Minister of Mines and Energy on a four-year term.

The technical secretariat of the ECB, headed by the Chief Executive Officer, is responsible for the day-to-day management of the affairs of the ECB and the provision of technical advice to the Board on matters relating to the statutory functions of the ECB (licensing, tariffs, quality of supply, dispute resolution, industry restructuring, etc). The technical secretariat has a complement of 18 full time employees. Due to the specific nature of the institution as the electricity industry regulator, the bias of the staffing profile is towards engineers and other professionals. The senior management cadre comprises currently two general managers with one vacant position (Technical Services, Economic Regulation, and Finance and Administration).

The ECB's activities are funded by levies imposed on licensees. The Electricity Act requires that annual reports be submitted to Parliament by the Minister on the financial affairs of the Board. Key focus areas of the ECB centers around economic regulation of the ESI and the establishment of REDs.

3.2 Sector organization

NamPower acts as an integrated generation and transmission company with its entity NamPower Energy Trading acting as the electricity system's single buyer and only trader thus far. This entity also imports from and exports to neighboring countries (South Africa and Zambia). NamPower Generation's output is also purchased by this unit.

NamPower generation and transmission is integrated. NamPower Transmission then sells the power on to a small number of transmission/distribution (wholesale) customers. These are a mix of large users (mostly mines and water pumping schemes), the REDs, and an array of smaller consumers who, for legacy reasons, are connected directly to

transmission substations. There are also some cross border supplies where NamPower Transmission supplies power at the distribution or sub-transmission level to Angola, Botswana and South Africa.

3.3 Regulatory framework and processes

The ECB considers license applications and make recommendations to the Minister on the issuing thereof. Once the license is issued, the ECB is responsible for monitoring and enforcing the provisions thereof. Tariffs are approved by the ECB on application by a licensee to the ECB and not by the Minister. Quality standards have been published by the ECB and DSM measures developed, with various regulatory codes implemented.

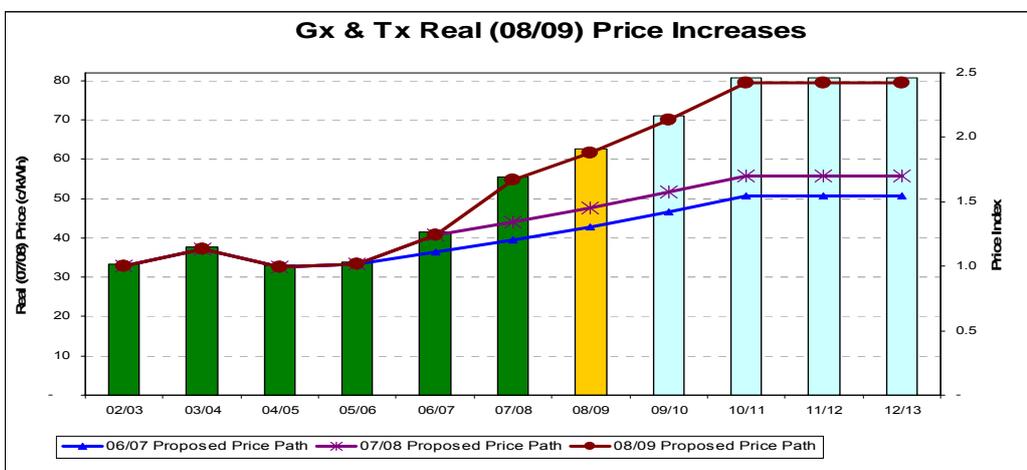
Use is made of a standardized format to report operating commercial and financial data to the ERB, whilst licensees have the right to appeal to the courts against regulatory decisions. Licences contain various conditions relating to electricity tariffs and prices, commitments and quality of supply and service standards. Licenses are issued by the Minister, but the ECB sets tariffs.

Public participation processes are held on important issues such as tariff increases whilst regulatory decisions are publicly available. A standardized format to report operating commercial and financial data to the authorities is used. Utilities have the right to appeal against regulatory decisions, and regulatory decisions are made know to the public via public processes.

3.4 Tariffs and pricing

Both residential and large customers' tariffs are regulated. A cost-plus methodology is used for all tariffs in which the revenue requirement is determined by the ECB. On generation, import parity is used given capping NamPower's costs at the Eskom export price.

Tariffs are indexed. Periodic tariff reviews are allowed at least once a year, whilst provision is made for exceptional circumstances. Normally, significant cost increases are allowed. Whilst revenues are currently cost-reflective, the ECB does not believe that tariffs are sustainable and able to provide the right signals for new investments and efficient use of electricity. The latest tariff increase was in the region of 40%. The following graph illustrates tariff level increases:



3.5 Key regulations

Compulsory third party access to the transmission network is allowed but there is no independent system operator.

There are defined targets or minimum quality of service standards for commercial performance as well as defined targets or minimum quality of service standards for technical performance.

REDs can discontinue services to customers on certain defined conditions. The regulator is primarily responsible for protecting consumer rights. Whilst the law allows for private sector participation, no significant new players have come forward to date in the generation sector.

However, on the distribution side some private service providers provide services to customers on a contract basis whilst REDs have been formed in various regions.

The key legislations are:

Electricity Act, 2007 (Electricity Act)	Establishes the ECB as the sector regulator, provides for licensing framework, approval of tariffs
Local Authorities Act, 1992 Regional Councils Act, 1992	Deal with local and regional council matters respectively, and give local and regional councils the right to supply electricity within their municipal boundaries. The sale and supply of electricity within the area of jurisdiction of a local authority is under the control of that authority. Barrier to RED formation.
Model Electricity Supply Regulations No. 71 of 1996	Issued by MRLGH for use by municipal councils
Administrative Regulations, 2000	Functioning of the Board of ECB, applications for licences, fees and appeals
Technical and Economic Regulations, 2004	Framework for technical and economic regulation
ECB Standards, 2004	National Quality of Supply and Service Standards.

4. Rural Electrification

The key roles in rural electrification is played by the government at central level, and the national power utility together with regional and local government assuming responsibility for technical and operational issues.

The national target for rural electrification is 25% by 2020. There are also active targets for renewable energy use with funds dedicated to encourage uptake.

5. Operating enterprises

5.1 Organization and autonomy

NamPower is a normal company subject to the provisions of the Namibian Companies Act. Directors are appointed by shareholders. The Board is executive and is responsible for hiring and laying-off workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects. In this regard, NamPower operates as any other private sector company.

5.2 Monitoring and Performance

Performance contracts exist between the company and its managers, with incentives and penalties. The utility has appointed external auditors to audit its accounts. The audited accounts are made public, and the utility follows the International Financial Reporting Standards.

5.3 Finance and Labor

The utility is required to earn a rate of return, and can declare and pay dividends. The utility is not exempt from any form of taxation and has access to credit at normal market rates.

The utility is not remunerated for non-commercial activities by the state. However, the state has in some instances stood guarantee for its obligations.

In terms of liberty to lay-off workers when necessary, the utility has such liberty but it has to follow and have due consideration to the pertinent regulations of the applicable labor legislation. The wages/salaries paid by the utility are in line with other private sector institutions.

The utility has not really contracted out activities to the private sector, except construction of infrastructure.

In line with the rest of the region, NamPower is experiencing skills shortages that impact on the overall efficiency; especially on the technical side. Bursaries are offered to try and address these shortcomings.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	371	461	491	490	539
Energy generated	<i>GWh</i>	1,421	1,379	1,660	1,606	1,576
Imports	<i>GWh</i>	1,045	1,566	1,706	1,948	2,045
Total energy available	<i>GWh</i>	2,466	2,945	3,363	3,554	3,621
Suppressed demand	<i>MW</i>	0	0	0	0	27
System load factor	%	76	73	78	83	77
Transmission losses	%	8.92	5.09	11.51	9.99	10
Distribution losses (REDS AVG)	%	23	20	17	16	18
Energy sales	<i>GWh</i>	2,246	2,795	2,976	3,199	3,259
Number of customers	<i>Number</i>	3,265	3,261	3,403	2,455	2,526
Number of employees	<i>Number</i>	818	839	891	960	843
Customers/employee	<i>Ratio</i>	4	4	4	3	3
Sales (units)/employee	<i>Ratio</i>	3	3	3	3	4
Total revenue (000)	<i>Local currency</i>	731,605	890,633	1,023,135	1,143,410	1,302,465
Total operational costs (000)	<i>Local currency</i>	492,035	681,288	824,482	820,989	943,824
Revenue per employee	<i>Ratio</i>	894	1,062	1,148	1,191	1,545
National electrification rate	%	42	49	56	64	74
Debtors days	<i>Number</i>	125	101	79	81	77
Rate of return on assets	%	4.8	1.4	1	1.8	1.6

**Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT- SOUTH AFRICA**

1. Introduction

South Africa has abundant coal reserves and other natural resources suitable for the generation of electricity. Eskom, South Africa's national utility, has available capacity of some 39 000 MW. It is the seventh largest utility in the world and overshadows all the other regional utilities. Most of its generation stations are coal fired, with one nuclear station and some hydro. It produces in excess of 95% of South Africa's electricity and almost half of all the electricity produced on the African continent.

For many years Eskom has had surplus capacity with the result that since the 1980's no significant new generation has been commissioned in South Africa. However, this is rapidly changing with South Africa running out of capacity and new generation capacity planned. This will in the short to medium term primarily be coal based with nuclear as a future option. In South Africa, government policy dictates that 30% of all new generation capacity must come from IPP's.

2. ESI Policy

2.1 Policy formulation and adoption

In South Africa, an Energy White Paper was developed by an active process of public consultation, beginning with the publication of the *Energy Policy Discussion Document* in August 1995. It described the energy sector and identified 111 major energy policy issues. Informally known as the 'Green Paper', it was released by the Minister of Mineral and Energy Affairs in August 1995 for analysis and comment. Formal and informal workshops were then held with interested parties. In August 1995, a team of expert 'issue rapporteurs' was appointed to draw up the first draft white paper. Their contributions were then edited for review by an editorial committee. The Draft White Paper was revised during 1997/98 in the Department and Cabinet approved its release in July 1998. This process was concluded in December 1998 when Cabinet approved the White Paper as the government policy on energy.

South Africa's electricity sector is governed by a number of laws and regulations of recent vintage, including the Constitution. These are set out in the following table:

Constitution of the Republic of South Africa Act No. of 1996	Supreme law. Gives municipalities rights to reticulate electricity in their municipal areas and oversee/regulate electricity service providers.
Electricity Regulation Act No. 4 of 2006 (Electricity Regulation Act)	Sets out regulatory and licensing framework for ESI in South Africa, and provides for specific powers for electricity licensees to conduct business. Amended 2006. Administered by NERSA.
Eskom Conversion Act, 2002	Changes Eskom (the state owned vertically integrated utility) into a company, grants powers to conduct business and establish subsidiaries.
Municipal Finance Management Act No. 56 of 2003	Sets out the municipal council financial framework, which impacts on issues such as tariff setting, cross-subsidies etc.
Municipal Systems Act No. 32 of 2000	Establishes the municipal council legislative framework. Municipal distributors operate under these Acts.
Electricity Regulations No. R506 of 1988	Technical supply standards.
NRS Standards	National standards relating to quality of supply, quality of service, minimum equipment standards, grid codes etc.
National Energy Regulator Act No. 40 of 2004	Replaces NER with NERSA, combines natural gas, petroleum pipelines and electricity in one regulator.

The policy formulation is centralized, with the National Government via its National Department of Minerals and Energy being accountable. However, it is also influenced by other Ministries/Departments, such as National Treasury and Public Entities.

2.2 Key policy issues

The key energy policy issues addressed in the Energy White Paper have the following policy objectives:

- Increasing access to affordable energy services
- Improving energy governance
- Stimulating economic development
- Securing supply through diversity
- Managing energy-related environmental and health impacts

2.3 Policy timing and implementation

The *Energy Planning* is the responsibility of the central government. The responsibility for *NIRP* is currently being debated, and depends on the final industry structure being implemented and the organization of Eskom, the national utility.

The *obligation to supply* is mainly the responsibility of local authorities and the national utility. However, there is a move towards six (6) REDs covering the whole of the country and it can be expected that these will eventually assume the responsibilities of distribution/reticulation and end consumer sales.

With regards to the *rural electrification*, there is no established “rural electrification agency” as such. Thus rural electrification policy is mainly a responsibility of the government at various levels with its implementation being mainly the responsibility of local authorities.

The Energy Policy adopted in 1998 has not been updated. The main constraints in implementing the policy include the following:

- Policies not perceived to be aligned with Constitution.
- Resistance to change, e.g. perception that EDI restructuring is not in the interest of Eskom, large electricity users or local government.
- Government capacity to implement policy changes.
- ESKOM is a vehicle for government delivering services to the people, and has political power and capacity to dictate the pace of change.
- Other priorities than the electricity industry.

However it is important to note that the Energy Act approved in 2008 highlights that “The Minister must develop and on an annual basis, review and publish the Integrated Energy Plan in the gazette”.

3 Regulatory and Institutional Framework

3.1 Governance and reform

The power sector governance and management is the responsibility of the Ministry of Minerals and Energy. An electricity sector reform process was basically initiated in 1995 with the establishment of a National Electricity Regulator (NER). This has in the meantime been transformed into the National Energy Regulator of South Africa (NERSA). At a national level, South Africa has also established an electrification fund and an energy efficiency agency.

The Energy Policy White Paper states that: *“Government realizes that competitive models and private sector participation hold the promise of benefits for electricity consumers and will therefore be closely following developments in countries implementing these new arrangements. Government will initiate a comprehensive study on future market structures for the South African electricity supply industry”*.

The intended market study was done, but its implementation delayed indefinitely. However, in the longer term IPP may be allowed in the South African electricity market. Both the Electricity Regulation Act and the Grid Code allow for third party access, but detail is lacking, e.g. development of transmission charges. On a small scale, IPPs do provide services to municipal distributors.

Fundamental market restructuring is likely to be delayed for a number of years while the distribution sector restructuring and the bulk of the electrification programme is undertaken. There has been no vertical unbundling of the sector, with the national power utility keeping in essence the some broad responsibilities.

3.2 Sector organization

There are no legal restrictions on joint ownership of the various services and areas of activities. However, Eskom is a vertically integrated utility with a monopoly on transmission activities and supplying the vast majority of generation in the country. As it also undertakes significant distribution activities, vertical integration exists between generation and transmission, transmission and distribution, and generation and distribution.

Thus the market model that best describes the structure of the sector is the vertically integrated monopoly. On the distribution side, mostly local authorities and Eskom provide services with a move towards integrating existing service providers into six regional REDs. The national power utility is only responsible for the electricity supply and it is not involved in providing water and gas services. As highlighted above, the law provides for the potential participation of new private IPPs. Government policy also dictates that 30% of all new generation in the country must be privately owned.

3.3 Regulatory framework and processes

The regulatory framework is strong as with an independent regulator overseeing virtually all aspects of the industry, such as the granting of licences, approving tariffs, the establishment of technical and minimum service standards and monitoring and compliance regimes. The regulator, NERSA has multi-sectoral jurisdiction and also covers natural gas and petroleum pipelines.

The NER, the NERSA's predecessor was created in 1995, and in its present form has an operating budget of some R110 million (hundred and ten million rand), 100% funded by industry levies. Its Board is appointed by the Minister of Minerals and Energy for periods of five years at a time for full time members and four years for part time members. Re-appointment is possible, and members can be replaced in exceptional circumstances, e.g. being of unsound mind.

NERSA has developed standardized reporting formats and utilities may appeal against regulatory decisions to court. Board deliberations are normally open to the public and written reasons for decisions recorded and provided on request.

3.4 Tariffs and pricing

Residential and Large Customers Tariffs are regulated. There is no defined capacity threshold (in MW) above which large customers tariffs are unregulated. Historically, Eskom entered into some bilateral agreements with large customers that were not regulated, but this is no longer the case.

Wholesale tariffs are determined based on Eskom revenue requirements, whilst retail tariffs are benchmarked against the Eskom tariffs. Periodic tariff reviews are allowed, at least once a year for retail tariffs and on a three year rolling basis for wholesale tariffs. Extraordinary tariff adjustments are allowed.

There are different opinions on whether the revenue is sufficient to cover all the operational costs of the national power utility or not, with NERSA maintaining it is and Eskom that it is not. Municipalities have not been canvassed on their views. Similarly, there are different opinions on whether the current tariffs are sustainable and able to provide the right signals for new investments and efficient use of electricity.

3.5 Key regulations

Third Party Access to transmission and distribution networks is allowed by Law. The newly approved Grid Code also provides for this. However, there is no independent transmission system operator and no transmission use of system charges have been determined by NERSA.

The power utilities can discontinue their services in case of non-payments (in general after a statutory notice period). Customers disconnected are eligible for re-connection on payment of reconnection fees.

There are defined targets or minimum quality of service standards for commercial performance as well as defined targets or minimum quality of service standards for technical performance. However, there are no well defined penalties for non-compliance with quality standards.

4 Rural Electrification

4.1 Governance

The central government is overall responsible for rural electrification and there is no specialized rural electrification agency established as such. Both Eskom and municipal service providers have significant responsibilities in rural areas. The involvement of the major utilities in the rural areas is not complemented by community based electricity service providers, which have very limited responsibilities in this context and are mostly renewable-energy based.

Thus the key roles in rural electrification are played by the government, at central level, and the national power utility, with the government organizing and providing the funding and regulation of rural electricity services and the utility providing the required technical and operational assistance for the rural electricity services.

There is a specialized fund also covering rural electrification with money being sourced from the fiscus. The annual budget is some R1 200 million (one thousand two hundred million rand) per annum, with projects based on least cost and population demand.

4.2 Policy and Institutional set up

There is an official policy target for electrification, with a target of 100% of the total population serviced by 2014. It is estimated that some 80% of the population (32 million people) is presently served.

Isolated electricity systems are not common with the grid being extended to the most remote areas. There is a renewable energy target, but implementation plans are not yet agreed. Some aspects being considered are:

- Feed in tariff – oblige distributors to purchase at regulated tariff per type of renewable energy resource;
- Renewable energy certificates – To allow generators to sell certificates and receive carbon credits;
- Net metering- Wider application than renewable energy

5 Operating enterprises

5.1 Organization and autonomy

Eskom is 100% owned by the central government, whilst municipal undertakings are 100% owned by their respective municipalities. Eskom is a limited liability share owned company. It has a Board of Directors comprised of fifteen members. Two board members are selected from management. The Board is executive and got competence and through its management is responsible for hiring of workers, laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects. In terms of setting prices the regulator has a decisive influence.

5.2 Monitoring and Performance

A performance contract exists between the national utility and the government and there is performance based incentive systems where the payments and promotion of managers are determined by their performance. Whilst there are no penalties on non-performance, non-performance earns lower or no bonuses.

Performance is monitored on a monthly, quarterly, semi-annually and annual basis. Normal accounting principles are applied with the present external auditors being Price Waterhouse Coopers and SizwelNtsaluba.

5.3 Finance and labor

The national utility is required to earn a rate of return and to pay dividends. The utility is not exempt from any form of taxation and have access to credit at below market rate. In terms of liberty to lay-off workers when necessary, the national utility has full control subject to applicable labor law. With regard to the wages/salaries paid by the national utility, they are somewhere in between public and private sector levels. The utility contracted out activities to the private sector under service contracts mainly in the information technology area.

There is world-wide (and in SA an increased) demand for technical skills, namely Engineers, Technicians, Technologists, Artisans, Operators and Project Management skills. Eskom is in an expansion phase building new plant and networks. Eskom's current attrition rate is 6.81% which is below that of industry (above 10%). Eskom recognizes that its demand for skills will, like any other big corporation, put pressure on the high demand for those skills already mentioned. Eskom has embarked on an aggressive local and

international recruitment drive offering attractive packages to source those skills in high demand. Without technical skills the sustainability of the organization is impaired. Whilst Eskom maintains that it has the skills to maintain plant and operations, it is expanding and growing and is challenged by an aging workforce. Strategies are being implemented to bridge the skills shortage.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	*2005	2006	2007
System maximum demand incl load reductions	<i>MW</i>	31 928		34 195	33 461	35 312
Energy generated	<i>GWh</i>	210 218	220 152	273 404	221 985	232 443
Imports	<i>GWh</i>	8 194	9 818	12 197	10 310	11 483
Total energy available	<i>GWh</i>	218 412	229 970	285 601	232 295	243 926
System load factor	<i>%</i>	76,8	77,4	78,0	79,8	82,7
Line losses	<i>%</i>	8.3	7.8	8.2	8.2	8.4
Energy sales	<i>GWh</i>	196 980		256 959	207 921	218 120
Number of customers	<i>Number Million</i>				3.759	3.963
Number of employees	<i>Number</i>	31 972		31 475	31 458	32 674
Customers/employee	<i>Ratio</i>					
Sales/employee	<i>Ratio</i>					
Total revenue	<i>Rm</i>	32 948		43 207	36 052	40 068
Total operational costs	<i>Local currency</i>					
Revenue per employee	<i>Ratio</i>					
National electrification rate	<i>%</i>					
Number of homes connected		175 396		222 314	135 903	152 125
Debtors days	<i>Number</i>					
Rate of return on assets	<i>%</i>	9,97		12,74	9,06	7,80

* For 15 months, change in Eskom's financial year.

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT- SWAZILAND

1. Introduction

Swaziland is a land locked country located in the eastern part of southern Africa and shares borders with South Africa to the north, south and west and Mozambique to the east. It has a population of about a million and about 30% is estimated to have access to modern energy forms.

Swaziland has abundant energy sources which include hydropower potential some of which is already tapped. Biomass is the most used in the form of wood from natural and commercial forests, hogged bark, bagasse, agricultural and animal waste by households, especially in rural areas. Solar and wind power have a viable potential. Anthracite coal is abundant and all is exported to mines and cement industries. Coal consumed in Swaziland is bituminous and is all imported from South Africa as most of the old equipment was designed to burn coal from South Africa.

The Ministry of Natural Resources and Energy is responsible for energy issues. The SEC is a state-owned electricity utility which has been recently corporatized. SEC is responsible for the generation, import, transmission and distribution of electricity in Swaziland. The sector is currently undergoing reforms which will result in the setting up of the Energy Regulatory Authority of Swaziland.

SEC has 70.1MW of installed hydro capacity whilst the maximum demand is about 200MW. Swaziland imports over 80% of its energy from South Africa and balance from EDM in Mozambique. This makes Swaziland heavily depended on South Africa, a challenge they share with Botswana and Namibia. They are prospects of developing a 1000MW thermal power plant using local coal which also targets the regional market.

2. ESI Policy

2.1 Policy formulation and adoption

The current policy was developed over a period of three years between 1999 and 2002 through an extensive stakeholder consultation process at levels and sectors throughout society. Based on these stakeholders' consultations and government's aspirations, a vision of the national energy policy was formed ensuring that the development goals of the country are met through the sustainable supply and use of energy for the benefit of all citizens of the Kingdom of Swaziland.

The institutional framework for energy policy is headed by the Ministry of Natural Resources and Energy. The energy policy was launched in 2003. The Energy Policy Review was carried out in 2008 culminating in the adoption of the 2008 Energy Policy Review which is supplied as a supplementary Annex to the 2003 policy.

2.2 Key policy issues

The key energy policy issues are summarized through the key objectives as outlined below:

- Ensuring access to energy for all.
- Enhancing employment creation.
- Ensuring security of energy supply.
- Stimulating economic growth and development.
- Ensuring environmental and health sustainability.

These five policy objectives are the foundation for the formulation of individual policy statements, in line with the National Development Strategy (NDS).

This policy covers issues of national self-sufficiency, regional complementarity in resources and cross border trade in energy (imported and exports). These issues are covered under the following:

- Generation of electricity.
- Strategic stocks.
- Creation of an enabling environment for IPPs.
- Development of energy efficiency programmes.

The policy specifically covers the followings:

- Independence of the regulator(s).
- Commercial autonomy of the utilities.
- Cost reflective prices and tariffs.
- Energy conservation and efficiency practices and financial and fiscal incentives.
- Climate change (including carbon trading).

2.3 Policy timing and implementation

The *Energy Planning* and the introduction of a NIRP is the responsibility of the central government. The obligation to supply electricity is mainly the responsibility of the Power Utility which is the SEC. Rural electrification is the responsibility of government and is implemented by the Power Utility.

The policy specifies the planning horizon with the short-term being up to five years and medium to long-term up to 10 years. The policy was received in 2008 and that is the first review after its adoption in 2003. The policy implementation is estimated at about 60% and the major constraints in the implementation of the policy being:

- Lack of capacity;
- Insufficient of budget allocation;
- Emergencies – political motivated moves and directives; and
- Unclear regulatory framework.

The policy allows for private sector participation and encourages IPPs.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The power sector governance and management is the responsibility of the Ministry of Natural Resources and Energy.

Swaziland like most of the SADC member states has implemented power sector reforms and the following new acts were promulgated in 2007:

- Energy Regulatory Act 2007.
- Swaziland Electricity Company Act 2007.
- Electricity Act, 2007.

The government through the national utility SEC is responsible for the generation, transmission, distribution and supply of electricity. There are a few other players who are allowed to generate electricity for their own consumption. The SEC is a vertically integrated company with full responsibility of generation, transmission, distribution and

supply. There are no legal restrictions in joint ownership of services such as generation and transmission and distribution or generation and distribution.

Swaziland currently does not have a utility regulator in place. It is currently in the process of implementing the roadmap for the operationalization of the Swaziland Energy Regulation Authority (SERA).

3.2 Sector organization

The market model that best describes the structure of the sector is the vertically integrated monopoly. It is a vertically integrated monopoly with the SEC being the single buyer. Private ownership is mainly restricted to generation for own consumption.

Vertical integration exists between generation and transmission and transmission and distribution and generation and distribution. Swaziland currently has six private operators in generation and the rest in transmission and supply.

3.3 Regulatory framework and processes

Swaziland does not have an independent regulatory body yet. The Ministry of Natural Resources and Energy is responsible for granting of operational licenses and approving tariffs and is responsible for arbitration in case of dispute. The Ministry of Natural Resources and Energy and the Public Enterprises Unit (PEU) are responsible for approval of tariffs above inflation in the country whilst State Utility is responsible for approval of tariffs below inflation. The Utility is self-regulating and is responsible for:

- Market oversight and rules.
- Establishing technical and minimum service levels.
- Monitoring and enforcing compliance with regulation.

Once the Regulatory Board is set up, it will oversee the functions of regulating the sector. The Board members are chosen by the line Minister. The vetoing of the decisions made by Commissioners is done by the Tribunal as set up by the Electricity Act.

The Act provides the right for the utilities to appeal against regulatory decisions through an Appeal Tribunal. The regulator will be expected to publicize regulatory decisions through public hearings, public reports and the internet.

3.4 Tariffs and pricing

Residential and large customers' tariffs are regulated. There is no defined capacity threshold in Megawatts (MW) above which large customers tariffs are unregulated.

The type of regulation methodology will be decided by the Regulatory Authority once it is operational. The revenue is sufficient to cover most of the operational costs. The cost reflective levels of tariffs have not been calculated for the various categories or classes of utility services hence there will be a need to carryout a cost of service study.

3.5 Key regulations

Third Party Access to transmission and distribution networks is allowed by Law. However, there is no independent transmission system operator. The power utilities can discontinue their services in case of non-payments (90 days after non-settlement of the bill). Customers disconnected are eligible for re-connection on payment of reconnection fees.

The regulator will be responsible together with PEU. There are no defined targets or minimum quality of service standards for commercial performance and defined targets or minimum quality of service standards for technical performance. There are no well defined penalties for non-compliance with quality standards.

4. Rural Electrification

4.1 Governance

The central government is overall responsible for rural electrification and there is no specialized rural electrification agency established as such.

The power utility is responsible for funding all electrification investments, rural electricity service provision and regulation of the rural electricity services. The key criteria used to prioritize rural electrification products is the least cost and population. There is an official policy target for rural electrification expected to be achieved in 2022. The goal for the Ministry is that access to electricity is made available to all the citizens by 2022 in line with the NDS.

5. Operating enterprises

5.1 Organization and autonomy

The SEC is 100% owned by the central government, whilst the co-generators are private owned. The SEC is a statutory company which was formed through an Act of Parliament, through the Swaziland Electricity Company Act 2007. The Board of Directors comprise of nine members including the Managing Directors. These are chosen from management, central government authorities and other private sector experts independent from government and management. The Board is appointed by the Minister of Natural Resources and Energy in consultation with Cabinet.

Management in consultation with the Board is responsible for hiring and laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects.

5.2 Monitoring and Performance

There is no performance contract which exists between the national utility and the government. However, there is a performance based incentive system which was introduced in 2007, where payments and promotion of managers are determined by their performance. There are no penalties for non-performance.

Performance is monitored quarterly by the PEU through submission of reports. Normal accounting principles are applied and the company has external auditors. The utility produces annual reports which are public.

5.3 Finance and labor

The national utility is required to earn a rate of return and to pay dividends. The utility is not exempt from any form of taxation and has access to credit equal to market rate. The state utility loans are guaranteed by government.

In terms of liberty to lay-off workers when necessary, the national utility has full control subject to applicable labor law. The utility wages/salaries are comparable to the private

sector and it does not contract out most of its activities to the private sector except line construction. It also does not experience any skills shortage.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	171.5	166	168.7	168.4	196.3
Energy generated	<i>GWh</i>	123	103.5	159.5	155.5	173.1
Imports	<i>MW</i>	868.2	916.5	842.5	864.5	932.6
Total energy available	<i>GWh</i>	991.2	1020.3	1002.0	1019.8	1105.7
System load factor	<i>%</i>					
Transmission losses	<i>%</i>					
System losses	<i>%</i>	16.1	16.4	14.2	16.1	14.6
Energy sales	<i>GWh</i>	831.6	852.8	859.6	855.8	943.5
Number of customers	<i>Number</i>	45348	48495	52742	58716	63798
Number of employees	<i>Number</i>		794	753	715	776
Customers/employee	<i>Ratio</i>					
Sales/employee	<i>Ratio</i>					
Total revenue((E'000)	<i>Local currency</i>		358048	384021	394206	447592
Total operational costs	<i>Local currency</i>		340535	339117	349241	386807
Revenue per employee	<i>Ratio</i>					
National electrification rate	<i>%</i>					
Debtors collection period days	<i>Number</i>		58	87	86	56
Rate of return on total assets	<i>%</i>		3.0	5.5	4.9	5.9

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT- TANZANIA

1. Introduction

Tanzania is located in eastern Africa and has borders with Kenya and Uganda in the north, Rwanda, Burundi and the DRC in the west, and Zambia, Malawi and Mozambique in the south. The east side of the country is a coast with the Indian Ocean stretching up north to Kenya. The island of Zanzibar is also part of Tanzania.

The population of Tanzania is currently over 40 million people and has an agro based economy. Petroleum, natural gas, hydropower and coal are the major sources of commercial energy in Tanzania. Biomass mainly comprising of fuel wood and charcoal from both natural forests and plantations accounts for 93% of the total domestic energy consumption.

Refined petroleum products are imported by private marketing companies. Natural gas reserves have been found and these were estimated at 44 billion m³ (proven reserves). Coal reserves are estimated at 1200 million tonnes of which 304 million were proven in 2005. The hydro electricity potential is estimated at 4.7GW of which only 12% is developed. Small scale hydropower, wind, solar and geothermal sources remain virtually untapped.

The electricity sub sector contributes less than 1% to the total energy needs of Tanzania. The interconnected grid has an installed capacity of 1006MW (2008) with a net capacity of approximately 800MW and peak demand 700MW. Over 66% is hydro, 33% is thermal whilst 1% is imported from Uganda. By 2005, only 10% of the population had access to electricity.

The electricity sub sector is administered through the Electricity Ordinance Cap. 131 of 1957 and is now regulated by the Energy and Water Utility Regulatory Authority (EWURA) which became operational in 2005. The new Electricity Act will accommodate changes to allow the private sector to play a greater role in providing modern energy services.

A new bill establishing the rural energy agency and fund was passed in 2005. The bill sets out the principles of rural energy development. The role of government will be to facilitate private sector and community based initiatives.

Government changed its energy policy of 1992, to allow for private participation in generation and by 2005, two IPPs had been licensed.

2. Electricity Supply Industry Policy

2.1 Policy formulation and adoption

In Tanzania, government is responsible for policy formulation and the Ministry of Energy and Minerals is responsible for the sector governance. The idea of a national Energy policy was first mooted in 1992. The policy was developed by an active process of public consultation which involved the following:

- Procurement of consultants- with financial support from the Sida.
- Production of inception report by the consultants.
- Meeting with stakeholders to discuss the inception report.
- Formation of Reference Groups to carry out sectoral reviews and situational analyses.
- Organisation of study tours to Uganda and South Africa to get a wider view of policy dimensions.
- Organising first and second national workshops on energy policy.

- Seminar involving members of parliament.
- Incorporation of inputs from all stakeholders to come up with draft policy document.
- Submission to the Cabinet for approval.
- Launching of the Policy- February 2003.

2.2 Key policy issues

The following are the key energy policy issues addressed in the National Energy Policy in Tanzania:

- I. Petroleum development.
- II. Power sector development.
- III. Renewable energies.
- IV. Private sector participation.
- V. Availability of rural energy services.
- VI. Energy trade and cooperation.
- VII. Environmental issues.

The issues of national self-sufficiency, regional complementarities in resources and cross border trade in energy (imports and exports) are covered in the policy. These include the following:

- Interconnection to the SAPP through Zambia.
- East African Community Power system Master Plan.
- Cross Border connections.

These are fully covered in the National Energy Policy Statements No. 22 and 51.

The Tanzania Energy Policy is fairly modern as compared to other regional policies and also covers issues of:

- Energy conservation and efficiency practices and financial and fiscal incentives.
- Climate change (including carbon trading).

It is important to note that the issues of independence of the regulator, commercial autonomy of the utilities and cost reflective tariffs became more topical after Tanzania launched the National Energy Policy.

2.3 Policy timing and implementation

Energy planning and NIRP is the responsibility of the Ministry of Energy and Minerals. The *obligation to supply* is mainly the responsibility of the national utility the Tanzania Electricity Supply Company Limited (TANESCO). Rural electrification is the responsibility of central government and the Rural Electrification Agency of Tanzania.

The Energy Policy went through a comprehensive review in 2003 and the main constraints in implementing the policy include the following:

- I. Lack of clear strategic plan.
- II. Lack of enforcement mechanism.
- III. Lack of sufficient funds.
- IV. Lack of adequate human capacity- experience and skills.
- V. Political interference.

There are aspects of the policy that facilitate private sector participation or private public partnerships.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The power sector in Tanzania has gone through significant reforms in the past decade. These reforms include the following:

- I. Commercialisation of operations of the national utility.
- II. Revision of the Electricity Act.
- III. Establishment of the Regulator.
- IV. Introduction of IPPs.
- V. Restructuring and unbundling of the utility.
- VI. Private Sector participation.

There is a New Electricity Act which was enacted in April 2008.

3.2 Sector organization

TANESCO is a vertically integrated state owned utility responsible for generation, transmission and distribution in the country and also a single buyer of energy and capacity from the IPPs. Vertical integration exists between generation and transmission, transmission and distribution and generation and distribution.

Thus the market model that best describes the structure of the sector is the single buyer model. There are currently more than seven operators at generation level and TANESCO retains the national monopoly in transmission and there is more than one distribution operator. The national power utility is only responsible for the electricity supply and it is not involved in the provision of water and gas services.

3.3 Regulatory framework and processes

The regulatory framework has provision for an autonomous regulatory authority, EWURA, overseeing virtually all aspects of the industry, such as the granting of licenses, approving tariffs, the establishment of technical and minimum service standards and monitoring compliance regimes. The regulator has multi-sectoral jurisdiction which covers electricity and water sub-sector. The law empowers the regulator to monitor the level of investment but is silent on approval. The required standards are established jointly by EWURA and the Bureau of Standards. Fair Competition Commission (FCC) has a role to play in market oversight and rules.

EWURA was operationalized in October 2005. Its budget was not indicated, but it is believed to be funded from sector levies and license fees. The board members are appointed by the Minister and the President appoints the Chairperson. The members are appointed for a period of 3-5 years and can be reappointed. The President or the Minister can dismiss the board members of EWURA. The decisions of the regulator are final but can be challenged through the Fair Competition Tribunal (FCT) by any party not satisfied with the decision.

There is no standardized reporting format for licenses to report commercial and financial data to the authorities, this is being developed. The regulatory decisions are publicly available through the published reports, internet, government gazette and media (radio and television). The regulator has held public hearings on a proposed tariff increase.

3.4 Tariffs and pricing

All residential and large customers' tariffs are regulated. There is no defined capacity threshold (in MW) above which large customers tariffs are unregulated.

The economic regulation methodology used for review of tariffs is the revenue requirement for end user tariffs. Tariffs are indexed on an annual basis and periodic tariff reviews are allowed, at least once a year. Extraordinary tariff adjustments are allowed for changes in exchange rate and inflation.

There is a general belief that the revenues collected by the utility are not sufficient to meet all the operation costs. This is due to the fact that current tariffs are not sustainable and able to provide the right signals for new investments and efficient use of electricity.

There is need to carry out a cost of supply study so as to determine the cost reflective tariffs. The recent EWURA order on tariff adjustment requires the Utility to undertake a cost of service study before the next tariff adjustment application.

3.5 Key regulations

Third Party Access to transmission and distribution networks is currently not allowed by Law. This is provided for under the new electricity law, of which the bill is currently being debated in the Parliament. There is no independent transmission system operator.

The power utility can discontinue its services in the following cases:

- I. Non-payment of bills.
- II. Unauthorised use or theft of electricity.
- III. Actions adversely affecting the safety of any customer or the integrity of the service provider's distribution system.

Customers disconnected are eligible for re-connection on payment of reconnection fees if disconnection was due to non payment of bills. The regulator is involved in the protection of customer rights. There are no defined targets or minimum quality of service standards or penalties for non-compliance with quality standards. These are currently being developed.

3.6 Private Participation

The law in Tanzania does allow entry by new private independent power producers. The first contract for an IPP was awarded in 2001 to Songas Limited. The Songo–Songo gas-to-electricity project was completed in 2004 and generates 182MW. The contract has not been renegotiated. This project also supplies gas to TANESCO's Ubungo Gas Turbine which generates 100MW. The other contract awarded to another IPP is the Independent Power Tanzania Limited (IPTL) which became operational in 2001. IPTL is involved in generation in the form of a management contract, which is currently operational.

4. Rural Electrification

4.1 Governance

The central government is overall responsible for rural electrification and there is a specialized rural electrification agency. The government is responsible for organizing and providing the funding, regulation of rural electricity services technical assistance for the rural electricity services. The rural electrification agency is responsible for providing the

rural electricity services. The national utility, TANESCO, also has significant responsibilities in implementation of rural electrification projects and providing technical support.

There is a specialized fund covering rural electrification with money being sourced from the government, donors and sector levies. The annual budget was not provided, however it was stated that prioritization of the rural projects is based on least cost.

4.2 Policy and Institutional set up

There is an official policy target for electrification, with a target of 25% of the total population serviced by 2015. Currently, only 2% of the rural population is presently served by the existing rural systems. The total installed capacity of isolated rural systems was given as follows:

	MW
d) Small-scale thermal systems	50
e) Small-scale hydro systems	20
f) Solar PV/home systems	2
g) Other	0.1

The wind power currently at 0.1MW is expected to grow to more than 200 MW in the next few years.

There is a policy to provide incentives for the use of renewable energy, which was developed in 2003. The main incentive provides for removal of VAT and duty on the importation of renewable energy gadgets especially solar photovoltaic systems and wind systems components. The duty waiver has significantly reduced the landed cost of renewable energy gadgets and helped increase access to renewable energy services. However, there is no direct benefit to the end user.

5 Operating enterprises

5.1 Organization and autonomy

TANESCO is 100% owned by the central government and the company is a corporatised state owned enterprise formed in 1964. The utility has a Board of Directors comprised of eight members, all selected by government.

The Board is executive and got competence and through its management, it is responsible for hiring and laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects. Under normal circumstances, the utility has the obligation to supply to every one who needs service, except in situations of unplanned interruptions of supply where the utility will have to give priority to essential services. The framework for the methodology for setting prices is defined by the regulator and the structure and levels are determined by the service provider but approved by the regulator.

5.2 Monitoring and Performance

The respondents did not complete this part of the questionnaire.

5.3 Finance and labor

The respondents did not complete this part of the questionnaire.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	506.25	508.65	552	603	653.32
Energy generated	<i>GWh</i>	3066.50	3264.81	3526.34	3462.83	4069.42
Imports	<i>MW</i>	479.34	1117.33	1738.92	2006.40	1555.48
Total energy available	<i>GWh</i>	3545.84	4382.14	5265.26	5469.23	5624.90
System load factor	%	69.00	73.00	72.94	65.52	71.10
Transmission losses	%	5.70	4.69	5.60	4.90	5.40
Distribution losses	%	25.00	25.00	24.00	24.00	23.00
Energy sales	<i>GWh</i>					
Number of customers	<i>Number</i>	513703	550863	585773	635310	667490
Number of employees	<i>Number</i>	4996	4857	4783	4640	4697
Customers/employee	<i>Ratio</i>	103	113	122	136	142
Sales/employee(GWh/no employees)	<i>Ratio</i>	0.47	0.51	0.55	0.59	0.68
Total revenue (million)	<i>Local currency</i>	202971	327033	300270	322321	444136
Total operational costs	<i>Local currency</i>	258236	312033	325284	486900	507407
Revenue per employee	<i>Ratio</i>	41	67	63	69	95
National electrification rate	%	8.40	8.95	9.45	10.17	10.61
Debtors days	<i>Number</i>					
Rate of return on assets	%					

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI
COUNTRY REPORT- ZAMBIA

1. Introduction

Zambia is blessed with abundant natural resources for the generation of electricity with the potential to generate from hydro-electric sources a large percentage of the power required by its neighbouring countries.

The electricity supply in Zambia started in 1906 when a small thermal station was built in Livingstone to serve a section of the town. In spite of the Victoria Falls potential, it was not until 1938 that hydro-electric power was first generated at a small station in the third gorge below the falls. The Victoria Falls power station was built in three phases. The first was done in 1938 while the second station was built underground giving an additional 60 MW in 1969. The third station was completed in 1972 providing an installed capacity of 108 MW.

In the early part of the last century, power development was mainly associated with the Copper mines and comprised largely thermal stations. The most significant development in the electricity supply situation took place between 1956 and 1962 when the Kariba dam and consequently the Kariba South Power Station were constructed. The next major step in making hydro-electric power potential abundant was taken with the construction of Kafue Gorge Power Station.

Zambia has an interconnected transmission system which serves the most developed areas in the country ranging from Mongu in the West to Livingstone in the south, and Lusaka and Copperbelt in the North. There are also isolated systems in terms of smaller hydro stations at Chishimba falls, Lusiwasi, Lunzua River and Musonda falls.

Two hydro stations were developed at Mulungushi and Lunsemfwa River to provide reliable power supply for Broken Hill (Kabwe) Copper Mines. Isolated diesel power stations also exist in various places. Zambia presently has over 1800MW of installed capacity.

The ESI is dominated by ZESCO Limited, a company under the Zambian Companies Act that is fully owned by the government. Government has managed to attract private investment into the ESI, such as the purchase by the Copperbelt Energy Corporation of the ZCCM Power Division. ZESCO estimates load growth at some 3 – 4% per annum, meaning that Zambia has effectively run out of capacity.

2. ESI Policy

2.1 Policy formulation and adoption

The energy policy formulation is centralized, with the National Government via its Ministry of Energy and Water being accountable for formulation and adoption.

2.2 Key policy issues

Zambia adopted a national energy policy in 1994. The national energy policy was launched as a government initiative as a guide on how the energy sector in Zambia was going to be managed, particularly in view of the liberalisation of the electricity and petroleum subsectors. It provided for the creation of a regulatory authority that would oversee and license the operations of industries in the energy sector. It also had provisions for the formation of a rural electrification authority.

The key policy issues addressed in the energy policy are the following:

- Role of Energy in National Development.
- Energy Resource Base and Use Patterns.
- Energy Policy Objective.
- New and Renewable Sources of Energy.
- Energy Conservation and Substitution.
- Energy Pricing.
- Role of Government.
- Legislative Reform.
- Resource Mobilisation and Donor Funding.

The policy has since been updated, now called National Energy Policy (NEP) 2008.

- To meet the long term energy needs of the country.
- To enable the energy sector to contribute to the country's economic growth.
- To increase the use of biomass in meeting transportation, engine and household needs.
- To promote sustainable forestry resource management.
- To achieve an equitable shareholding structure in the refinery.
- To establish petroleum strategic reserves and empower Zambians to take an active role in the petroleum subsector.
- To support and drive the commercialisation of ZESCO.
- To rationalise hydropower and transmission lines so as to maximise benefits from the sector through an open access regime, a framework for transmission pricing, a smart subsidy mechanism, a cost reflective tariff, enhanced autonomy of the regulator, provision of appropriate fiscal and other incentives, reviewing and enactment of relevant legislation, focussing electrification to income generating activities, etc.
- To promote private sector participation in the electricity subsector.
- To promote economic electricity tariffs.

2.3 Policy timing and implementation

Energy Planning is a shared responsibility between the central government, Local Authorities and the National Utility, ZESCO. In practice it seems as if ZESCO fulfills this function. Similarly, the responsibility for *NIRP* is also a shared responsibility between the above entities, with the rural electrification agency also involved.

The *obligation to supply* is mainly the responsibility of local authorities and the national utility. With regard to *rural electrification*, there is an established "Rural Electrification Authority" tasked with this process.

The Energy Policy of 1994 has been revised through an extensive consultative process that encompassed a wide cross-section of individuals and institutions in the country. The new policy (NEP 2008) sets out the government's intentions aimed at ensuring that the energy sector's potential to drive economic growth and reduce poverty is harnessed. The main constraints experienced in implementing policy include the following:

- **Financial constraints:** The scarcity of public funds and the competing need to invest in different sectors by Government has negatively impacted on the implementation of modern energy services development programs in Zambia.
- **Tariffs:** The electricity tariffs are not cost reflective.

- **Institutional arrangements:** An appropriate institutional structure specifically designed to effectively manage the implementation and mobilization of funds for power development has been lacking.
- **Lack of prioritization:** Energy was not one of the priority sectors in the country hence planning for future energy needs has been lacking.
- **High transaction costs:** There are inadequate mechanisms to meet the high costs involved from conceiving a project to the point of implementation.

3. Regulatory and Institutional Framework

3.1 Governance and reform

The Energy Regulation Act establishes the Energy Regulatory Board (ERB) as the regulator for the ESI. It is a multi-purpose regulator, with jurisdiction over electricity (including nuclear, solar and wind), petroleum and petroleum products, coal and its derivatives, firewood, charcoal and other wood derivatives, and uranium and other nuclear fuels. The ERB is an autonomous statutory body with perpetual succession.

3.2 Sector organization

ZESCO is a vertically integrated utility with a monopoly on transmission activities and, apart from the copper belt region, responsible for supplying the vast majority with electricity in the country.

Thus the market model that best describes the structure of the sector is the vertically integrated monopoly where vertical integration exists between the services of generation, transmission and distribution. However, an Office for Private Sector Participation in the ESI was created following the liberalization of the sector. There are already two private generators and one transmitter of electricity in the country as well as potential new projects that have been specifically earmarked for IPP's and PPP's.

The national power utility is only responsible for the electricity supply and it is not involved in providing water and gas services.

3.3 Regulatory framework and processes

The regulatory framework is strong with an active and independent regulator, ERB. Amendments to the Energy Regulation Act in 2003 introduced certain changes to the governance of the ERB. The ERB Board now consists of seven part-time members appointed by the Minister from among eminent persons who have adequate knowledge, experience and qualifications in engineering, finance, law, natural resources management, electricity industry, petroleum industry and administration. Both the Chairperson and Vice-Chairperson are appointed by Board members and not by the Minister as is the norm in the region. An Executive Director (who is not a member of the Board, but has the right to attend and speak at Board meetings) is responsible for the general administration of the ERB. The 2003 amendments also created the post of Board Secretary.

The ERB is funded by licence fees (it is allowed to charge and collect up to 0.8% of annual turnover) and some appropriations from Parliament, although allowance is made for receiving grants or donations from outside sources. The ERB is given the power to promote competition and accessibility in the ESI. The ERB is investigating the liberalization of the ESI as part of its mandate to advise government on electricity sector reforms.

The ERB has the following functions:

- Issue licenses for generation, transmission and distribution activities.
- Approve of tariffs.
- Monitor investments.
- Does market oversight.
- Monitor and enforce compliance with regulations.

The Zambia Competition Commission oversees competition whilst the courts play an active role in enforcement and arbitration of disputes.

Use is made of a standardized format to report operating commercial and financial data to the ERB, whilst authorities have the right to appeal to the Minister against regulatory decisions. Public participation processes are held on important issues such as tariff increases whilst regulatory decisions are publicly available.

3.4 Tariffs and pricing

Both residential and large customers' tariffs are regulated below 9MW. A rate of return methodology is used for all tariffs, including generation, transmission, distribution and supply. Retail tariffs are indexed on annual basis mainly reflecting the currency depreciation, the inflation, fuel costs and costs of imported equipment and material. Periodic tariff reviews are allowed at least once a year, whilst provision is made for exceptional circumstances.

ZESCO is of the opinion that tariffs are not sustainable with the ERB having an opposing opinion. The 2007 tariffs were approved by the ERB based on a comprehensive cost of service study carried out by a consultant engaged by the regulator. In effect, the 2007 tariff increase on average was 27%.

3.5 Key regulations

Compulsory third party access to the transmission network is allowed but there is no independent system operator. There are defined targets or minimum quality of service standards for commercial performance as well as defined targets or minimum quality of service standards for technical performance.

There is an agreement between the utility and the ERB with some agreed key performance indicators between them which are reviewed annually. Utilities can discontinue services to customers after thirty days from date that invoice is due. The regulator is primarily responsible for protecting consumer rights whilst consumer groups also play a role.

4. Rural Electrification

4.1 Governance

Zambia has a separate rural electrification agency established, but major utilities still have significant responsibilities in rural areas, in particular the national electricity utility, ZESCO.

Thus the key roles in rural electrification are played by the government, at central level, and the national power utility, with the government organizing and providing the funding

and regulation of rural electricity services and the rural electrification agency assuming responsibility for technical and operational issues with the assistance of the utilities.

There is a specialized fund for rural electrification with money being sourced by levies and donations. The 2006 budget for rural electrification was K11.6 billion whilst for 2007 it was K23 billion.

4.2 Policy and Institutional set up

There is an official policy target for electrification in general (although with significant impact in rural areas) with a target electrification rate of 51.6 % in total to be achieved by 2030. The typical connection charge for new rural residential customers are K4,700,000.00 for three phase and K2,700,000.00 for single phase.

It is estimated that over 90% of rural systems are in need of major rehabilitation. It is estimated that a total of seven isolated rural electricity systems exist, four mini-hydro systems and three solar photo voltaic systems. About 2% of the rural population presently has access to electricity.

Zambia has an official policy to encourage the use of renewable energy.

5. Operating enterprises

5.1 Organization and autonomy

The National Electricity Utility, ZESCO, is 100% owned by the central government. This Utility was transformed into a limited liability company. It has a Board of Directors comprised of nine members. Board members are appointed by industry stakeholders and interest groups.

The Board is executive and is responsible for hiring of workers, laying-off of workers, setting wages/bonuses, how much to produce, who to sell to and approval of individual investment projects. It operates as any other private sector company in this regard.

5.2 Monitoring and Performance

A performance contract exists between the national utility and the government with performance based incentive systems where the payments and promotion of managers are determined by their performance.

Performance is measured on turnover, growth, profitability and cash-flow criteria. The performance contract is monitored on a quarterly and annual basis and the utility has state appointed external auditors to audit its accounts. The audit of the accounts is made public, and the utility follows the International Financial Reporting Standards.

5.3 Finance and labor

The utility is required to earn a rate of return and is required to pay dividends. The utility is not exempt from any form of taxation and have access to credit at market rate. The utility is not remunerated for non-commercial activities by the state. However, the state has in some instances stood guarantee for its obligations.

In terms of liberty to lay-off workers when necessary, the utility has such liberty but it has to follow and provide due consideration to the pertinent regulations of the applicable labor legislation. With regard to the wages/salaries paid by the utility, they are somewhere in between public and private sector levels.

The utility has not really contracted out activities to the private sector. According to ZESCO, it is not really experiencing skills shortages that impacts on the overall efficiency; use of advanced technologies and management tools for network operations and maintenance. If this is indeed correct, it must be one of the few utilities in the region that does not face this dilemma.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>					1300
Energy generated	<i>GWh</i>	8,104	8,248	8,041	8,868	9,732
Imports	<i>MW</i>	310	300	4,893	5,691	101
Total energy available	<i>GWh</i>	8,085	8,233	8,030	8,767	9,572
System load factor	<i>%</i>	80	80	80	80	80
Transmission losses	<i>%</i>	3.6	3.1	2.9	3.61	3.47
Distribution losses	<i>%</i>	26	21	18.8	18.8	25.16
Energy sales	<i>GWh</i>	4,515	4,329	4,281	4,006	3,753
Number of customers	<i>Number</i>	277,724	303,995	310,122	349,543	355,507
Number of employees	<i>Number</i>	3,691	3,606	3,814	3,779	3,623
Customers/employee	<i>Ratio</i>	75	84	81	93	98
Sales/employee	<i>Ratio</i>	175	199	210	202	240
Total revenue	<i>Local currency ZMK 'm</i>	646,515	717,37	782,641	768,915	868,725
Total operational costs	<i>Local currency ZMK 'm</i>	526,320	597,293	623,828	702,687	770,923
Revenue per employee	<i>Ratio</i>	175	199	210	202	240
National electrification rate	<i>%</i>	3	3.2	4	6	4.9
Debtors days	<i>Number</i>	193	172	189	168	176
Rate of return on assets	<i>%</i>	30	34	28	26	28

Survey on Policy, Institutional and Regulatory Frameworks in the SADC ESI

COUNTRY REPORT- ZIMBABWE

1. Introduction

Zimbabwe is blessed with a variety of natural resources suitable for electricity generation. Electricity is presently generated from hydro sources, as well as coal. There is also ample opportunity for new generation opportunities, including non-traditional sources such as renewable energy, small hydro projects and coal bed methane.

However, the government of Zimbabwe faces a wide variety of difficult economic problems as it struggles with an unsustainable fiscal deficit and hyperinflation. This also has a negative impact on the whole of the electricity supply industry value chain, from the inability to generate and transmit power due to a lack of maintenance, spares and equipment to the inability of the utility to recover cost-reflective tariffs.

2. ESI

2.1 Policy formulation and adoption

The national government through the Minister of Energy and Power Development has executive responsibility for the ESI. ESI regulations are issued by the Minister. Zimbabwe has an independent electricity regulator, called Zimbabwe Electricity Regulatory Commission (ZERC).

2.2 Key policy issues

Zimbabwe has a modern energy policy that also addresses ESI issues. The starting point of the ESI Policy was the Energy Policy, which looked at strategies for meeting the demand for different forms of energy. In the case of electricity, the policy envisaged the unbundling of the integrated electricity utility, the Zimbabwe Electricity Supply Authority (ZESA). An Electricity White Paper was then developed in consultation with all stakeholders and using standing government procedures for policy formulation and implementation. The White Paper on Electricity resulted in an Electricity Bill, which was presented and debated in Parliament. The outcome of the process was the current Electricity Act (13:19) of 2002 and its related amendments.

A lot of focus is placed on restructuring of the electricity. Key focus areas are:

- Unbundling of the power sector.
- Private investments in electricity generation.
- Establishment of a regulator for ESI.

Issues such as self-sufficiency and cross border trade in energy are also covered in the policy, with minimum reserve levels and generation levels.

2.3 Policy timing and implementation

Energy Planning is the responsibility of the central government in conjunction with the state-owned utility companies. The responsibility for NIRP is a shared responsibility between central government and the state-owned utility. The *obligation to supply* is mainly the responsibility of the national utility, with the regulator playing an active role in terms of the Electricity Act.

The main constraints experienced in implementing policy include the following:

- Political will to implement policy
- Capacity weaknesses
- Lack of regulatory independence

- Overall economic environment and lack of investor confidence

It is not really policy that is problematic per se, but the will to implement the policy and other related issues such as:

- 'Economic nationalism' and the desire to control an industry perceived as central to a country's infrastructure.
- Subsidies or cross subsidies and sub-economic tariffs.
- Opposition or resistance from government owned utilities to change.
- Concerns of security of supply deemed strategic being entrusted to a foreign company.
- Lack of an appropriate legal and regulatory framework.
- Market models such as the single buyer are a barrier to IPPs, as some investors could be looking for an export market.
- Lack of clearly defined IPP Policy.
- Unattractive incentives compared to those offered by other countries in the region.
- Investment security and inappropriate shareholding structures for investments.
- Policy inconsistencies.
- Low credit rating on international financial markets.

These factors are compounded by the lack of a mechanism to promote the independence of the regulator. Other concerns are the lack of resources to the regulator to ensure good regulatory substance.

3. Regulatory and Institutional Framework

3.1 Governance and reform

Quite intense reform has taken place in Zimbabwe over the last couple of years. ZESA was unbundled into separate Generation (Zimbabwe Power Company – ZPC), Transmission (Zimbabwe Electricity Transmission Company – ZETCO and Distribution (Zimbabwe Electricity Distribution Company – ZEDC) companies under a single buyer model as well as two non core businesses in telecommunication – Powertel and support services (Transport, Training, Information Technology, Projects and Manufacturing) – ZESA Enterprises.

These former ZESA entities were put under a Holding Company – ZESA Holdings, whose core mandate is to hold shares of the entities on behalf of government. A dedicated company – the Rural Electrification Agency involved in rural electrification was established supported by a separate Rural Electrification Fund Act (13:20).

The above reforms allowed the participation of private investors, the ESI in the form of IPPs. In 2007, the Transmission company, ZETCO and the Distribution Company were merged to form ZETDC but still under ZESA Holdings. There are legal restrictions on cross-holdings of assets in generation and transmission and generation and distribution.

ZERC is responsible for regulating the ESI.

3.2 Sector organization

Zimbabwe is the only country in the region which has undergone vertical unbundling of its state owned utility. However, this has been somewhat tempered with by the 2007

amalgamation of the separate transmission and distribution companies. The market model can best be described as a single buyer model with IPP's possible at generation level.

Three IPPs are presently licensed, four generators operational and two under construction. The national utility, ZESA is main distribution company but several independent ones exist, especially in mining towns as well.

3.3 Regulatory framework and processes

The Electricity Act establishes the ZERC as the independent regulator. ZERC's role is to ensure that regulation of the ESI is fair and balanced for licensees, consumers, investors and other stakeholders. ZERC's funding is from licence fees as well as levies from electricity suppliers.

ZERC is a statutory creation with separate legal status. It has the following functions, to:

- Create and ensure competition;
- Ensure adequate supply of power; and
- Ensure fair and equitable tariff structures.

The Board of ZERC consists of between five and seven members, three of whom must be permanent, and one of whom is the Commissioner General. The Commissioners are appointed on a professional basis, with knowledge and experience in law, accounting, economics and engineering.

Complaints which cannot be resolved by licensed ZESA successor companies or other licensed suppliers are referred to ZERC for mediation or arbitration. This is one of the regulator's statutory functions. There is also Consumer Council of Zimbabwe which deals with all forms of customer complaints, including those on electricity.

ZERC considers and issues license applications. Once issued, the ZERC is responsible for monitoring and enforcing the provisions thereof. Tariffs are approved on application by a licensee to the ZERC but Ministerial approval is also obtained. Licenses contain various conditions relating to electricity tariffs and prices, commitments and quality of supply and service standards.

Public participation processes are held on important issues such as tariff increases whilst regulatory decisions are publicly available. A standardized format to report operating commercial and financial data to the authorities is used. Utilities have the right to appeal against regulatory decisions to the judiciary and regulatory decisions are made known to the public via public processes.

3.4 Tariffs and pricing

Both residential and large customers' tariffs are regulated. A rate of return methodology is used for all tariffs. Tariffs are indexed. The following indices have been identified as appropriate for inclusion in the adjustment formula - fuel cost (coal) index, inflation index - Consumer Price Index (CPI) and foreign exchange index.

Periodic tariff reviews are allowed at least once a year, whilst provision is made for exceptional circumstances. Normally, significant cost increases are allowed, such as:

- Fuel pricing.
- CPI.

- Foreign exchange rate changes.

Revenues are currently not cost-reflective and ZERC does not believe that tariffs are sustainable and able to provide the right signals for new investments and efficient use of electricity.

The latest tariff increase needed to meet revenue requirements is from Z\$5.2 Quadrillion to Z\$19.4 Quadrillion. The most recent average tariff increase was 1658% (One thousand six hundred and fifty eight per cent).

3.5 Key regulations

Compulsory third party access to the transmission network is allowed but there is no independent system operator. There are defined targets or minimum quality of service standards for commercial performance as well as defined targets or minimum quality of service standards for technical performance.

Licensees can discontinue services to customers on certain defined conditions. The regulator is primarily responsible for protecting consumer rights.

Whilst the law allows for private sector participation, no significant new players have come forward to date since 1997. However, on the distribution side some private service providers provide services to customers.

Key legislations are:

Electricity Act, 2002 (Chapter 13:19) (Electricity Act)	Establishes a new structure for the ZESA (namely: holding company, ZESA Holdings (Pvt.) Limited and three successor companies for generation, transmission and distribution. Also introduces a new regulator called ZERC Allows participation by IPPs in the generation business. Later amendment joined transmission and distribution companies
Rural Electrification Fund Act, 2002 (Chapter 13:20)	Planning and funding of rural electrification
Electricity Regulations	Technical supply regulations

4. Rural Electrification

The key role in rural electrification policy is played by the government at central level, but Zimbabwe has a dedicated rural electrification agency. The primary distribution company for urban and rural areas is also responsible for operating and maintaining the rural distribution system once the Rural Electrification Agency has put distribution infrastructure in place.

There is no national target for rural electrification. Over 19% of the population is served by rural systems.

5. Operating enterprises

5.1 Organization and autonomy

ZESA and its subsidiaries are 100% state owned. Its Board is appointed by government and has seven members, with one being from management hence it is a corporatized state owned entity. Its subsidiaries in turn are 100% owned by the holding company.

5.2 Monitoring and Performance

Performance contracts do not exist between the company and government. However, technical and financial performances of the utilities are monitored.

The ZESA Holdings has appointed external auditors to audit the accounts of its subsidiary companies and holding company. The audit of the accounts is made public, and the utility follows the International Financial Reporting Standards.

5.3 Finance and labor

ZESA Holdings is required to earn a rate of return, and can declare and pay dividends. The utility is not exempt from any form of taxation and has access to credit at normal market rates. The utility is not remunerated for non-commercial activities by the state. However, the state has in some instances guaranteed ZESA's obligations.

In terms of liberty to lay-off workers when necessary, the utility has such liberty but it has to follow and provide due consideration to the pertinent regulations of the applicable labor legislation. With regard to the wages/salaries paid by the utility, they are somewhere between public and private sector levels.

The utility has not really contracted out activities to the private sector, except construction of infrastructure.

In line with the rest of the region, ZESA is experiencing skills shortages that impacts on the overall efficiency; especially on the technical side. These shortages are described as very severe.

Performance Indicators
Key indicators for the last 5 years

Indicators	Units	2003	2004	2005	2006	2007
System maximum demand	<i>MW</i>	2007	2068	2066	1904	1758
Energy generated	<i>GWh</i>	8799	9718	9391	7778	7464
Imports	<i>MW</i>	3497	2537	3077	4246	2944
Total energy available	<i>GWh</i>	12296	12255	12468	12024	10408
System load factor	%	69.94	67.65	68.89	71.96	67.66
Transmission losses	%	4.3	3.6	4.0	4.5	3.6
Distribution losses	%	9.6	10.7	10.1	7.1	
Energy sales	<i>GWh</i>	10,368	10,117	10,408	10,293	10,039
Number of customers	<i>Number</i>	540,738	553,034	555,481	579,006	
Number of employees	<i>Number</i>	5883	5925	5928		

Indicators	Units	2003	2004	2005	2006	2007
Customers/employee	<i>Ratio</i>					
Sales/employee	<i>Ratio</i>					
Total revenue	<i>Local currency</i>	125,458.597	976,718.747	1,938,580.885	21,214.435	5,299,143.140
Total operational costs	<i>Local currency</i>					
Revenue per employee	<i>Ratio</i>					
National electrification rate	<i>%</i>					
Debtors days	<i>Number</i>					
Rate of return on assets	<i>%</i>					

Table 8 – Utility General Information April 2006 to March 2007

Country	Utility	Installed Capacity MW	Net Capacity MW	Maximum Demand MW	MD Growth %	Sales GWh	Sales Growth %	Number of Customers	Number of Employees	Generation Sent Out GWh	Net Imports GWh	Net Exports GWh	Transmission System losses %	Revenue US\$ Million	Debtor Days	Rate of Return %	Net Income USD Million
Angola	ENE	742	590	476	12.0	2,006	8.9	155,114	4,347	2,982	19.6	0	13	184.3	75	n/a	-3.11
Botswana	BPC	132	120	434	8.0	2626	8.7	151,800	2,091	977	2,050.40	0	10	111.4	35.5	-1	18.82
DRC	SNEL	2,442	1,170	1012	0.0	4,656	13	360,329	6,268	6,904	0	1,800.00	6.3	149	n/a	n/a	n/a
Lesotho	LEC	72	70	101	6.3	420	16	49,171	490	466	39	22	13	34.2	35	5	6.07
Malawi	ESCOM	305	253	251	3.8	970	4	135,000	2,400	1,177	0	0	19	5	110	1	2.218
Mozambique	EDM	233	137	320	12.3	1,380	5.6	417,675	3,215	222	1,870	174	7	126	65	4.2	1.8
Namibia	NamPower	393	390	490	-0.2	3,199	7.5	2,455	960	1,606	1,948.0	0	8	193	34	0.97	19
South Africa	ESKOM	42,011	36,398	34,807	4.0	208,316	0.2	3,758,931	29,697	221,985	8,643	5,515	8.2	5,926	22	8.4	592
Swaziland	SEB	51	52	188	1.1	855.8	-0.5	58,800	715	125.8	894	0	16	55.5	86	12.7	8
Tanzania	TANESCO	897	680	563	6.0	2,549	10.3	550,863	4857	3674	43	0	24	188	92	n/a	n/a
Zambia	ZESCO	1,632	1,630	1,393	4.7	8,116	-3.6	303,618	3,613	9,480	0	505	2.7	207	165	1	-23
Zimbabwe	ZESA	1,990	1,825	1,904	-7.8	10,293	-1.1	579,006	5,773	7,781	4,241	414.582	3.9	130	49	-48	-1773