RERA Publication on Electricity Tariffs & Selected Performance Indicators for the SADC Region

2012 and 2013

Regional Electricity Regulators Association of Southern Africa

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Foreword

The Southern African Development Community (SADC) region continues to experience severe electricity capacity constraints that may adversely affect the region's long-term development prospects. It has long been recognized by SADC Member States, regulators, utilities and developers that the current electricity supply crisis is in part driven by inadequate past investments in electricity infrastructure – especially in the generation and transmission sectors – largely as a result of very low or low electricity tariffs that did not provide adequate incentives to promote new investments. To this end, the SADC Ministers responsible for energy decided, in July 2004 in Namibia, to adopt the principles of cost reflective tariffs in the SADC region. This decision was reaffirmed at another meeting of the Ministers of energy held in Zimbabwe in April 2007. At its meeting in Zambia in February 2008, the SADC Council of Ministers resolved that Member States should endeavor to reach cost reflective tariffs within a period of 5 years, i.e. by 2013.

To implement the resolutions by the SADC Ministers of energy, the Southern African Power Pool (SAPP) with the support of the Development Bank of Southern Africa (DBSA) reviewed and documented the electricity tariffs setting principles, approaches and pricing applied in the SADC region. The recommendations resulting from the study were presented and approved at the meeting of the SADC Ministers responsible for energy in Mozambique in April 2009. At that meeting, the Ministers directed the Regional Electricity Regulators Association of Southern Africa (RERA) to start producing, on an annual basis, a publication on the annual developments in electricity tariffs and their cost reflectivity in Member States, and to provide a comparative analysis of such tariffs for the SADC region.

This fourth publication of the Regional Electricity Regulators Association of Southern Africa (RERA) on "Electricity Tariffs and Selected Performance Indicators in the Southern African Development Community Region" builds on the previous three publications on the topic in responding to the task given to the Association by the SADC Ministers responsible for energy. This publication provides an opportunity for national electricity utilities, energy/electricity regulators and their respective governments to address some of the challenges regarding the availability of timely, reliable and comprehensive information from within the electricity supply industry (ESI). With more SADC countries creating energy/electricity regulators that continue to increase RERA membership, the deepening comparative analysis of the tariffs and other ESI performance indicators at the regional level provides a platform for informing cross-border electricity infrastructure investment and trading decisions, and paves the way for benchmarking, monitoring and evaluation.

The present publication provides information of interest to governments, ESI practitioners, regulators, utilities, non-governmental organizations, academia, investors and others interested in regional trends on electricity tariffs and performance. With the continued support from its main stakeholders, RERA aims to enhance the scope, depth of analysis and timeliness of future publications.

RERA would like to thank SADC Member States, the SADC Secretariat and the SAPP for their good cooperation in providing the information used in the publication. RERA is also grateful to the U.S. Department of State's Bureau of Energy and Resources for supporting the development of this publication. Special thanks go to the Energy Regulation Board of Zambia, the RERA Economic Regulation

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Ms. Phindile Baleni (née Nzimande)
RERA Chairperson & National Energy Regulator of South Africa (NERSA) Chief Executive Officer (CEO)

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1.	Pinehas Mutota	ECB (Chairperson)
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For further information or for provision of feedback, please contact the RERA Secretariat via email: secretariat@rerasadc.com

This publication is also available to download for free from the RERA website: www.rerasadc.com

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Glossary

In compiling a technical document such as the *RERA Publication on Electricity Tariffs and Other Performance Indicators for the SADC Region (Tariff Report)*, it is important to strive for a common interpretation of terms, definitions and usage to give readers a shared understanding of the issues under discussion. While the Glossary & Abbreviations below were developed to support the 2012/2013 Tariff Report, it is, however, important to point out that a term's inclusion in the list does not necessarily infer full agreement on its definition amongst all Member States at the time that respondents provided data. As such, there may be inconsistencies in the way countries have used certain terms, possibly impacting comparability between some metrics. Also, some of the terms listed may not necessarily feature in this Tariff Report, however, they were deemed to be additive to the context and understanding of the subject matter as a whole.

The following descriptions are based on definitions used by the U.S. Energy Information Administration (EIA), the U.S. Federal Energy Regulatory Commission (FERC), the North American Electric Reliability Council (NERC), and within EU Directives and the ENTSO-E Statistical Glossary.

Term	Description
Allowable costs	Total costs approved by the regulatory authority to be included in the calculation of tariff rates.
Ancillary services	Services that ensure reliability and support the transmission of electricity from generation sites to customer loads. Such services may include load regulation, spinning reserve, non-spinning reserve, replacement reserve, and voltage support.
Available generator capacity	Net capacity of the generator available for selling through the network. It differs from the installed generator capacity (nameplate generator capacity) and is expressed in megawatts (MW).
Capacity charge	An element in a two-part pricing method used in capacity transactions (energy charge is the other element). The capacity charge, sometimes called Demand Charge, is assessed on the amount of capacity being purchased rather than the amount of energy used.
Capital costs	Costs for the acquisition of a utility plant.
Commercial sector	An energy-consuming sector that consists of service-providing facilities and businesses and includes institutional living quarters and sewage treatment facilities. Common uses of energy associated with this sector include space heating, water heating, air conditioning, refrigeration, cooking, and running a wide variety of other equipment. Note: This sector includes generators that produce electricity and/or useful thermal output primarily to support the activities of the above-mentioned commercial establishments.
Cost-reflective tariffs (electric)	A tariff setting concept used for the design and development of tariff schedules to ensure that the filed tariff schedules recover only the cost of providing the service.
Cost of service regulation	A traditional electric utility regulation under which a utility is allowed to set rates based on the cost of providing service to customers and the right to earn a limited profit.
Cross-subsidy	The allocating of revenue requirement among classes of customers so that one class pays less than its cost of service and other classes make up the revenue shortage.
Demand (electric)	The rate at which electric energy is delivered at an instant or averaged over a certain period. Usually expressed in kW or kVA.
Demand metered	Customer billing based on measured usage levels in kWh over a specified period of time.
Deregulation	The elimination of some or all regulations from a previously regulated industry or sector of an industry. Often more aptly referred to as restructuring or unbundling, deregulation frequently refers to the process of transitioning from one industry structure to another, and revising the regulatory scheme accordingly.
Diesel/Heavy Fuel Oil (HFO)	A fuel composed of distillates obtained in petroleum refining operation or blends of such distillates with residual oil used in motor vehicles. The boiling point and specific gravity are higher for diesel fuels than for gasoline.

Term	Description
Differential pricing	Classifying customers into groups and charging different prices to each group. The opposite of uniform pricing.
Distribution	Refers to the process of transporting energy from transmission systems to end-use customers. In some contexts, distribution is considered to be any transmission of energy on lines carrying less than 110,000 volts.
Electrical system energy loss	The amount of energy lost during generation, transmission, and distribution of electricity, including plant and unaccounted for use.
Electrification rate	The rate defining the percentage of electrification of the country. Electrification rate is the number of electrified households divided by the total number of households.
Energy intensity	A ratio of energy consumption to another metric, typically national gross domestic product in the case of a country's energy intensity. Sector-specific intensities may refer to energy consumption per household, per unit of commercial floor space, per dollar value industrial shipment, or another metric indicative of a sector.
Fixed cost (expense)	An expenditure or expense that does not vary with volume level of activity.
Fixed operating costs	Costs other than those associated with capital investments that do not vary with the operation, such as maintenance and payroll.
Gas turbine	A gas turbine consists typically of an axial-flow air compressor and one or more combustion chambers where liquid or gaseous fuel is burned and the hot gases are passed to the turbine and where the hot gases expand and drive the generator and are then used to run the compressor.
Generation	The process of producing electric energy by transforming other forms of energy; also, the amount of electric energy produced, expressed in kilowatt hours.
Household	A family, an individual, or a group of persons occupying the same housing unit, the housing unit is the person's usual or permanent place of residence.
Hydroelectric power	The use of flowing water to produce electrical energy.
Independent Power Producer (IPP)	A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility.
Installed generator capacity	The maximum rated output of a generator, prime mover, or other electric power production equipment under specific conditions designated by the manufacturer. Installed generator capacity is commonly expressed in megawatts (MW) and is usually indicated on a nameplate physically attached to the generator.
Load factor	The ratio of the average load to peak load during a specified time interval.
Losses (average)	The total difference in energy input and output or power input and output (due to losses) averaged over a time interval and expressed either in physical quantities or as a percentage of total input.
Maintenance costs	That portion of operating costs consisting of labor, materials, and other direct and indirect costs incurred for preserving the operating efficiency and/or physical condition of utility plants used for power production, transmission, and distribution of energy.
Non demand metered	Customer billing based on an assumed usage level over a specified period of time. Usually applies to customers with lower consumption and at secondary voltages.
Non-technical losses	Non-technical losses comprise electricity that is delivered mostly for consumption but which is not paid for. This is mainly caused by the illegal abstraction of electricity (energy theft), non-metered supplies, as well as errors in metering, billing and data processing.
Operating costs	Charges incurred in the normal course of business to generate, sell and distribute energy and services to customers. Such costs are normally for goods and services consumed in less than one year.
Operational generation capacity	The average amount of generation capacity in functional condition, available for production. Operating generation capacity includes capacity under planned maintenance. The International Energy Agency defines operating capacity as "the sum of all individual plants' maximum capacities available during a period of at least 15 hours per day."
Peak demand	The maximum load during a specified period of time.
Power pool	An association of two or more interconnected electric systems having an agreement to coordinate operations and planning for improved reliability and efficiencies.

Term	Description
Rate base	The value of property upon which a utility is permitted to earn a specified rate of return as established by a regulatory authority. The rate base generally represents the value of property used by the utility in providing a service and may be calculated by any one or a combination of the following accounting methods: fair value, prudent investment, reproduction cost, or original cost. Depending on which method is used, the rate base includes cash, working capital, materials and supplies, deductions for accumulated provisions for depreciation, contributions in aid of construction, customer advances for construction, accumulated deferred income taxes, and accumulated deferred investment tax credits.
Rate of return	The ratio of net operating income earned by a utility, calculated as a percentage of its rate base.
Rate of return on rate base	The ratio of net operating income earned by a utility, calculated as a percentage of its rate base.
Regulation	The governmental function of controlling or directing economic entities through the process of rulemaking and adjudication.
Reliability	The degree of performance of the elements of the electricity system that results in electricity being delivered to customers within accepted standards and in the amount desired.
Reserve margin	A measure of available capacity over and above the capacity needed to meet normal peak demand levels.
Retail sales (electric)	Sales made directly to the customer that consumes the energy product.
Revenue - (electricity)	The total amount of money received by an entity from sales of its products and/or services; gains from the sales or exchanges of assets, interest, and dividends earned on investments; and other increases in the owner's equity, except those arising from capital adjustments.
Revenue requirement	The total revenue that the utility is authorized to recover, which includes fuel, operating expenses and a reasonable return on the rate base.
Supply	The sale, including resale, of electricity to customers.
System maximum demand	Peak demand, often expressed monthly or annually, and calculated in MVA or MW.
Technical losses	The energy lost due to the inherent resistance of electrical conductors. The resistance causes electrical energy to be transformed to heat and noise whenever current flows through the conductors.
Time-of-use rate	The rate charged by an electric utility for service to various classes of customers. The rate reflects the different costs of providing the service at different times.
Transmission	The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer.
Transmission system	An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems.
Unbundling	Separating vertically integrated monopoly functions into their component parts for the purpose of separate service offerings.
Variable costs	Costs, such as fuel costs, that vary with the amount of electric energy generated.

Abbreviations

Abbreviation	Expansion
AFREC	African Energy Commission
BPC	Botswana Power Corporation
CEC	Copperbelt Energy Corporation
CNELEC	National Electricity Advisory Council of Mozambique
DBSA	Development Bank of Southern Africa
DRC	Democratic Republic of the Congo
ECB	Electricity Control Board of Namibia
EDM/HCB	Electricidade de Mozambique / Hidroeléctrica de Cahora Bassa
EIA	Energy Information Administration
ENE	Empresa Nacional de Electricidade de Angola
ENTSO-E	European Network of Transmission System Operators for Electricity
ERB	Energy Regulation Board of Zambia
ESCOM	Electricity Supply Corporation of Malawi
ESI	Electricity Supply Industry
EU	European Union
EWURA	Energy & Water Utilities Regulatory Authority of Tanzania
FERC	Federal Energy Regulatory Commission
GDP	Gross Domestic Product
HFO	Heavy Fuel Oil
IEA	International Energy Agency
IPP	Independent Power Producer
IRSE	Institute for Electricity Regulation of Angola
kVA	Kilovolt-amp
kW	Kilowatt
kWh	Kilowatt hour
LEC	Lesotho Electricity Company
LEWA	Lesotho Electricity and Water Authority
LHPC	Lusemfwa Hydro Power Company
MERA	Malawi Energy Regulatory Authority
MVA	Megavolt -amp
MW	Megawatt
NEPAD	New Partnership for Africa's Development
NERSA	National Energy Regulator of South Africa
ORE	The Office of the Electricity Regulator of Madagascar
RERA	Regional Electricity Regulators Association of Southern Africa
RSA	Republic of South Africa
SADC	Southern African Development Community
SEC	Swaziland Electricity Company
SERA	Swaziland Energy Regulatory Authority
TANESCO	Tanzania Electricity Supply Company Limited
U.S.	United States
ZERA	Zimbabwe Energy Regulatory Authority
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	Zambia Electricity Supply Corporation

1.0. Background

1.1. About RERA

The Southern African Development Community (SADC) Ministers responsible for energy established the Regional Electricity Regulators Association of Southern Africa (RERA) as a formal association of electricity regulators at a meeting in Maseru, Lesotho, on July 12, 2002. However, RERA was officially launched in Windhoek, Namibia on September 26, 2002. The Association was established pursuant to 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 has the following three (3) strategic objectives:

i. *Capacity Building & Information Sharing*: Facilitate electricity regulatory capacity building among members at both a national and regional level through information sharing and skills training.
ii. *Facilitation of Electricity Supply Industry (ESI) Policy, Legislation and Regulations*: Facilitate harmonized ESI policy, legislation and regulations for cross-border trading, focusing on terms and conditions for access to transmission capacity and cross- border tariffs.
iii. *Regional Regulatory Cooperation*: Deliberate and make recommendations on issues that affect the economic efficiency of electricity interconnections and electricity trade among members that fall outside national jurisdiction, and to exercise such powers as may be conferred on RERA through the SADC Energy Protocol.

The Association strives to be a credible regulatory association with the following Vision Statement:

"To be a world class association that ensures a consistent and harmonized regulatory framework in the energy sector within the SADC region."

RERA endeavors to champion the cause of electricity regulators in realizing this vision; its commitment to this is captured in the following Mission Statement:

"To facilitate harmonization of regulatory policies, legislation, standards and practices and to be a platform for effective cooperation among energy regulators within the SADC region."

Membership

Membership to RERA is open to the electricity regulatory bodies in each country within the SADC region. As of November 30, 2013, twelve (12) out of the fifteen (15) countries in the SADC region had established regulatory authorities. However, only the following ten (10) regulatory authorities were members of the association:

- Electricity Control Board (ECB) of Namibia;
- Energy Regulation Board (ERB) of Zambia;
- Energy & Water Utilities Regulatory Authority (EWURA) of Tanzania;
- Institute for Electricity Sector Regulation (IRSE) of Angola;
- Lesotho Electricity and Water Authority (LEWA);
- Malawi Energy Regulatory Authority (MERA);
- National Electricity Advisory Council (CNELEC) of Mozambique;
- National Energy Regulator of South Africa (NERSA);
- Swaziland Energy Regulatory Authority (SERA); and
- Zimbabwe Electricity Regulatory Authority (ZERA).

The non-Member States (Botswana, Democratic Republic of the Congo, Mauritius, Madagascar and Seychelles) were expected to join the association as soon as operational regulatory agencies were established, or when their country circumstances allowed them to join.

1.2. Objectives of the RERA Publication

This RERA publication on Electricity Tariffs & Selected Performance Indicators for the SADC Region 2012 and 2013 serves to support RERA's three strategic objectives set out above. More specifically, the objective of the Tariff Report is to provide a consolidated snapshot of the electricity markets within the SADC region, focusing on:

- The power sector policy environment, regulatory approaches and trends in power market development, sector restructuring and industry reforms;
- Key technical indicators that characterize the ESI; and
- Comparative electricity tariffs within Member States and the trend towards cost-reflectivity.

In order to provide context for the tariff comparison, the Tariff Report also provides a basic overview of the key demographic and economic indicators within each of the countries included. The target audience for the Tariff Report includes governments and policy makers, regulators, utilities, investors, ESI practitioners, academia, non-governmental organizations and any other parties taking an interest in regional trends on power market development and in electricity tariffs.

1.3. Data Collection and Analysis Process

The RERA survey questionnaire on which this Tariff Report is based was distributed by RERA to all Member States in January 2014. The Tariff Report was prepared in 2014 by the Economic Regulation Directorate of the Energy Regulation Board of Zambia on behalf of the RERA Secretariat. The data used and the analysis thereof is based on the submissions made by Member States. The data generally covers the 10 year period from 2004 to 2013; however, some analyses are limited to a shorter timespan due to unavailability of data. It is anticipated that going forward, as more data is collected and archived, a consistent timespan will be utilized in the analysis to facilitate comparability. The following countries (Table 1-1) submitted data to RERA as of the publication date and only data submitted prior to November 28th, 2014 was included in the analyses.

Table 1-1: Data Submission Status of SADC Member States

Country	2012	2013
Angola	✓	✓
Botswana	×	✓
Democratic Republic of Congo (DRC)	×	×
Lesotho	✓	✓
Madagascar	×	✓
Malawi	✓	✓
Mauritius	×	✓
Mozambique	×	✓
Namibia	✓	✓
South Africa (RSA)	✓	✓
Swaziland	✓	✓
Seychelles	×	×
Tanzania	✓	✓
Zambia	✓	✓
Zimbabwe	✓	✓
Submission Status		
Submitted	✓	
Not Submitted	×	

Source: RERA Database

Data Challenges

One of the major challenges faced during data collection was the lack of submission of questionnaires by Member State respondents. The submission deadline was consequently extended from the original deadline of August 31st, 2014 to November 28th, 2014 to enable the team to collect more data. While all Member States subsequently submitted their questionnaires by the November 28th deadline, four of the Member States submitted incomplete questionnaires. The impact of these incomplete questionnaires is wide ranging, but the most consequential effect is that the comparative analysis was limited to those countries that submitted complete data sets. It is also noted that the significant data gaps resulting from incomplete data submissions for 2012 skewed some of the indicators and comparisons presented. However, the 2013 information is largely complete; with 13 out of 15 countries submitting full questionnaires. Readers of the Tariff Report should bear this in mind when drawing conclusions from the data presented herein.

1.4. Arrangement of the Tariff Report

The Tariff Report is arranged as follows:

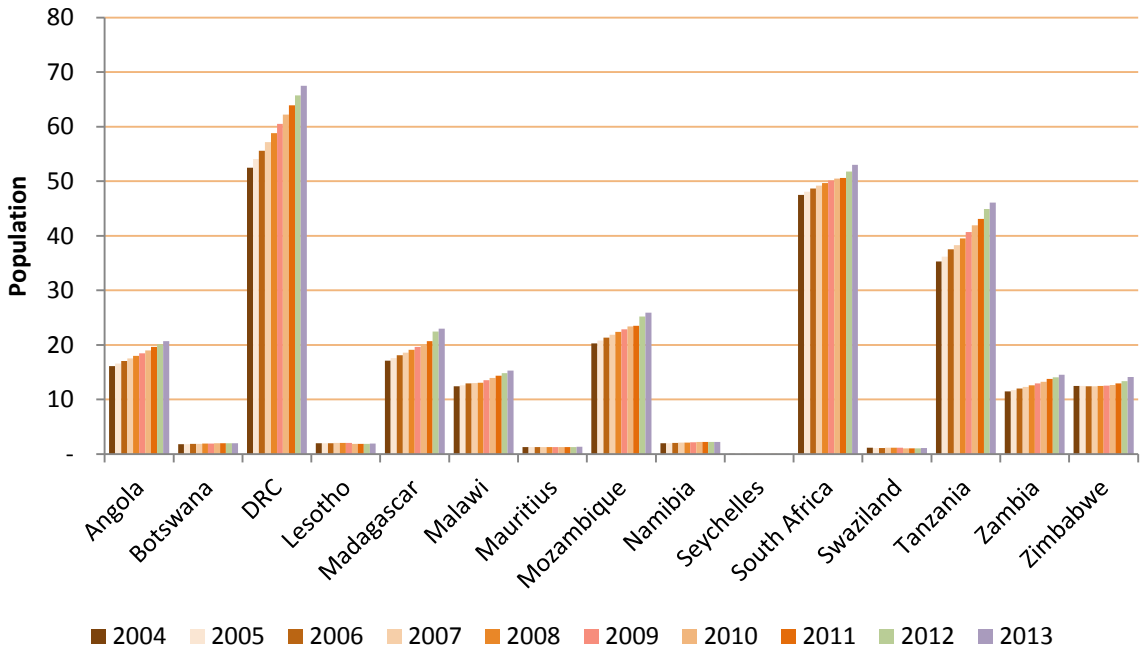
- Chapter 1 provides background information about RERA;
- Chapter 2 provides the macro context for the Tariff Report by discussing key demographic and economic indicators;
- Chapter 3 discusses technical and system indicators;
- Chapter 4 provides technical perspective on cost of service tariffs and discusses overall trends and comparative tariffs in the region for 2012 and 2013; and
- Chapter 5 concludes the Tariff Report.

2.0. Demographic & Economic Indicators

2.1. SADC Population

The SADC region had an estimated population of 234 million in 2004. The regional population grew by an average of 2.4% per annum from 2004 to 2013 and by 2013, the population had grown to 289 million. Over this period, the fastest growth was experienced between 2011 and 2012 when the population grew by 3.6% from 271 million to 281 million. Madagascar and Mozambique recorded the highest population growth in percentage terms between 2011 and 2012 at 8.5% and 7.2%, respectively. Similarly Zimbabwe and Seychelles recorded the highest population growth in percentage terms between 2012 and 2013 at 5.9% and 5.3% respectively. Figure 2-1 below shows the population of SADC countries from 2004 to 2013.

Figure 2-1: Population of SADC Countries (in millions) 2004 - 2013

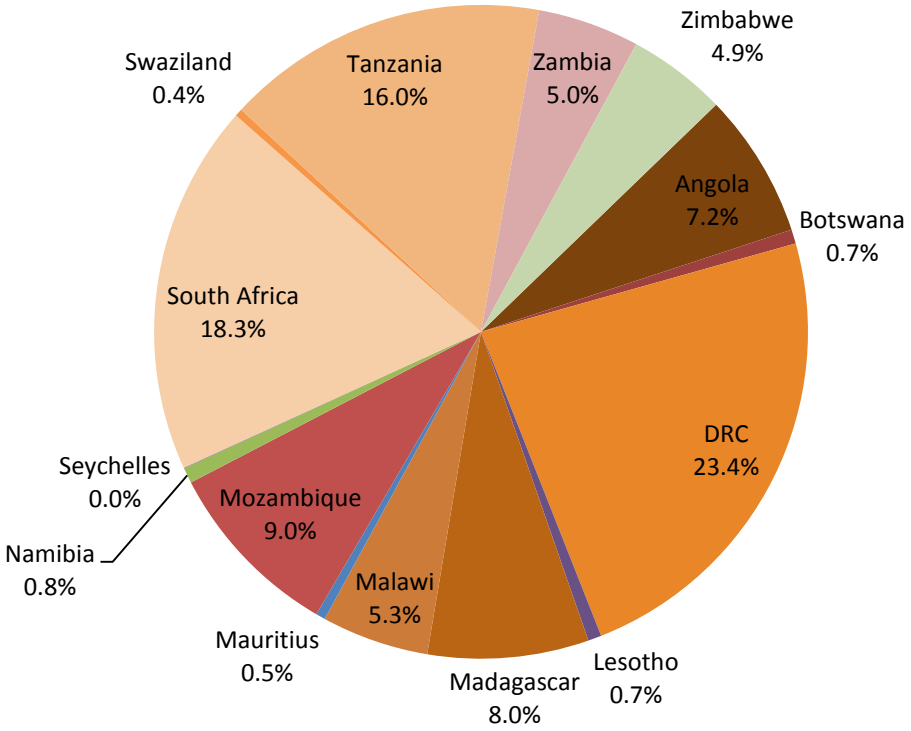


Source: International Monetary Fund, World Economic Outlook Database, October 2014

The region's most populous nation is the DRC with a population estimated at 68 million in 2013. After DRC, South Africa, Tanzania, Mozambique and Madagascar were the next most populous countries in descending order.

The countries with the smallest populations were Seychelles, Swaziland, Mauritius, Lesotho, Botswana and Namibia. Figure 2-2 below shows the proportion of the regional population of SADC countries in 2013.

Figure 2-2: Proportion of the SADC Countries' Population to the Regional Population (2013)



Source: International Monetary Fund, World Economic Outlook Database, October 2014

2.2. Economic Growth

Data derived from the International Monetary Fund, World Economic Outlook Database, October 2014, indicated that economic conditions in sub-Saharan Africa remained generally robust against the backdrop of a sluggish global economy. Most low-income countries continued to grow soundly in 2012 and 2013, while middle-income countries, particularly South Africa, slowed further, reflecting closer links to European markets. Inflation fell as pressures on food and fuel prices eased following a surge during 2011. Strong domestic demand, including demand from domestic investment, is expected to support growth in many low-income countries, while a weak external environment, particularly in Europe, will continue to be a drag on middle-income countries' growth.

In 2012, Zimbabwe grew the fastest with a growth rate of 10.6% followed by Mozambique, DRC and Tanzania with growth rates of 7.2%, 7.2% and 6.9%, respectively. In 2013, DRC recorded the highest (regional) real GDP growth rate of 8.5%, followed by Mozambique, Tanzania and Angola, which recorded growth rates of 7.1%, 7.0% and 6.8%, respectively. Table 2-1 below shows the trends in GDP for the whole SADC region from 2004 to 2013.

Table 2-1: Percentage Changes in GDP, Constant Prices (2004 – 2013)

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Angola	10.9%	18.3%	20.7%	22.6%	13.8%	2.4%	3.4%	3.9%	5.2%	6.8%
Botswana	2.7%	4.6%	8.0%	8.7%	3.9%	-7.8%	8.6%	6.2%	4.3%	5.9%
DRC	6.7%	6.1%	5.3%	6.3%	6.2%	2.9%	7.1%	6.9%	7.2%	8.5%
Lesotho	2.8%	2.9%	4.1%	4.9%	5.1%	4.5%	5.6%	4.3%	6.0%	5.7%
Madagascar	5.3%	4.8%	5.4%	6.5%	7.2%	-3.5%	0.1%	1.5%	2.5%	2.4%
Malawi	5.5%	2.6%	2.1%	9.5%	8.3%	9.0%	6.5%	4.3%	1.9%	5.2%
Mauritius	4.3%	1.5%	4.5%	5.9%	5.5%	3.0%	4.1%	3.9%	3.2%	3.2%
Mozambique	7.9%	8.4%	8.7%	7.3%	6.8%	6.3%	7.1%	7.3%	7.2%	7.1%
Namibia	12.3%	2.5%	7.1%	5.4%	3.4%	-1.1%	6.3%	5.7%	5.0%	4.3%
RSA	4.6%	5.3%	5.6%	5.5%	3.6%	-1.5%	3.1%	3.6%	2.5%	1.9%
Seychelles	-2.9%	9.0%	9.4%	10.4%	-2.1%	-1.1%	5.9%	7.9%	2.8%	3.5%
Swaziland	2.9%	2.5%	3.3%	3.5%	2.4%	1.3%	1.9%	-0.6%	1.9%	2.8%
Tanzania	7.8%	7.4%	6.7%	7.1%	7.4%	6.0%	7.0%	6.4%	6.9%	7.0%
Zambia	7.0%	7.2%	7.9%	8.4%	7.8%	9.2%	10.3%	6.4%	6.8%	6.7%
Zimbabwe	-6.5%	-7.7%	-3.6%	-3.3%	-16.4%	8.2%	11.4%	11.9%	10.6%	3.3%

Source: International Monetary Fund, World Economic Outlook Database, October 2014

The positive growth in the DRC and Mozambique was mainly attributed to activities in the mining sector, with Mozambique continuing to enjoy overseas coal exports which started in 2011. Growth in the DRC was also enhanced by improvements in the business environment, the reconstruction of infrastructure and by strong domestic demand.

Growth in Zambia was driven by robust activities in the mining, agriculture, manufacturing, construction, and transport and communications sectors. In Tanzania, growth was driven largely by communications, transport, financial intermediation, and construction. Additionally, continued investments in the recently discovered natural gas reserves in Tanzania and the expansion of public investments (including the ongoing construction of a USD 1.2 billion gas pipeline from Mtwara to Dar es Salaam), as well as related investments aimed at stabilizing power generation in the country, contributed to growth.

Swaziland's growth has lagged behind that of its neighbors; real GDP growth has averaged 2.2% since 2004, nearly 2.0% lower than the average regional growth rate, although registering a slight uptick in 2013. In Malawi, growth also recovered in 2013, after slowing in 2011 and 2012, when weak tobacco earnings resulting from lower than expected prices and poor quality crop, a lower-than-expected mining contribution, problems in the private sector caused by foreign exchange difficulties, and higher fuel prices suppressed economic expansion.

In 2013, Angola's real GDP growth continued the positive trend registered since 2009, when growth was severely constrained by the meltdown in the global economy. In 2011, Angola's real GDP grew by 3.9% followed by 5.2% in 2012, driven by rising oil prices, and robust non-oil sector growth of 7.7%, which helped offset the effects of production constraints in the hydrocarbon sector.

Lesotho's economy has partly recovered from the impact of the global economic crisis despite the detrimental effects of floods in the early part of 2011. The economy recorded a growth rate of 6.0% in 2012 and a slightly more modest 5.7% in 2013. Over the medium-term, economic growth is expected to remain moderate, underpinned by good performance in the mining sector, reconstruction activities to repair the damage done by the floods, and investment in Phase II of the Lesotho Highlands project.

Madagascar's economy accelerated in 2012, growing by 2.5% compared to 1.5% in 2011. In 2013, the economy expanded by 2.4%, mainly driven by mining, transport (helped by a revival of tourism) and exports from customs-free zones.

Mauritius continued to register relatively stable economic growth over the 2012 and 2013 period, albeit slightly less robust, at 3.2% in both years, compared to 3.9% in 2011. The slight slowdown can be attributed to weak sugar and textile exports and a decline in construction activity.

Namibia seems to have recovered from the effects of the global economic crisis, recording growth of 6.3% and 5.7% in 2010 and 2011, respectively, after contracting by 1.1% in 2009. In 2012, GDP growth fell off a little, at 5.0%, dropping slightly again in 2013, to a still robust 4.3%, as drought conditions in that year and weak global demand for mineral exports had an impact.

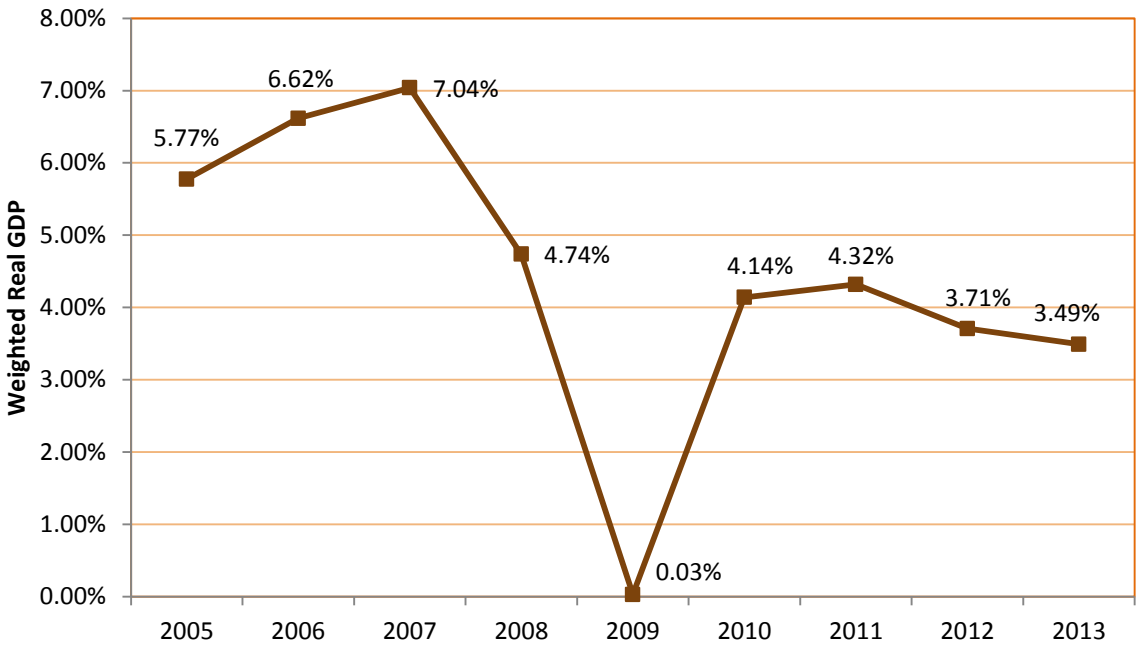
The island of Seychelles recorded real GDP growth of 2.8% in 2012, a marked deceleration from the 7.9% posted in 2011. The International Monetary Fund noted that Seychelles' slow growth was a result of a slowdown in European tourism, Seychelles' primary market, resulting from the Eurozone debt crisis. However, GDP growth was higher in 2013 at 3.5%, largely due to a rebound in the tourism sector, evidenced by a 10% rise in tourist arrivals.

The South African economy posted real GDP growth of 2.5% in 2012, lower than the 3.6% growth experienced in 2011. The decline in growth was mainly due to a slump in mining production as strikes persisted during the final quarter of 2012. Expansion slowed again in 2013, registering a growth rate slightly less than 2%.

Finally, the Zimbabwean economy extended the recovery that started in 2009, with real GDP expanding by double digits in 2010, 2011, and 2012, albeit from a small base. The GDP growth decelerated in 2013, registering a moderate 3.3% largely as a result of lack of sustained economic activity, lack of access to external credit lines, and high financing and energy costs.

Overall, real GDP growth across the SADC region remained relatively robust over the 2012 to 2013 period, albeit showing some moderation from 4.3% in 2011 to 3.7% in 2012, with a further slowdown to 3.5% in 2013. This slight cooling off can be attributed to international developments such as the continued effects of the global financial downturn, particularly the prolonged Eurozone crisis, as well as volatility in the global commodity markets. Figure 2-3 below shows the weighted regional real GDP growth from 2005 to 2013.

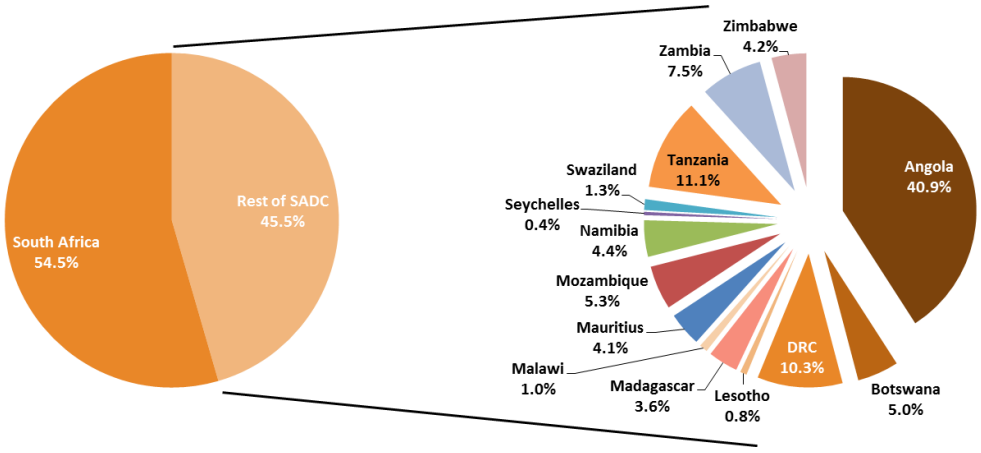
Figure 2-3: SADC Region Weighted Real GDP Growth (2005 – 2013)



Source: International Monetary Fund, World Economic Outlook Database, October 2014

In 2013, South Africa's regional share of GDP was 54.5% whilst the contributions to GDP from Angola, DR Congo, and Tanzania increased by 2%, 1% and 1% respectively. The rest of the SADC countries' contribution to regional GDP remained constant. Figure 2-4 shows each country's share of GDP relative to the region's total GDP in 2013.

Figure 2-4: Country GDP in Relation to South Africa (2013)



Source: International Monetary Fund, World Economic Outlook Database, October 2014

2.3. Inflation in SADC Countries

SADC countries have identified high inflation as an economic challenge that greatly affects the region. Inflationary pressures are mainly due to higher food and energy prices, wage increases, fiscal reforms and local currency depreciation. Inflation increases the cost base of power utilities and typically also decreases consumers' purchasing power. SADC governments, cognizant of the potential political cost price hikes can have, can be reluctant to fully pass on such increases to consumers by increasing electricity tariffs. However, the data provided by Member States for this report indicates that power price hikes towards cost reflectivity are being implemented. For example, in South Africa, which has the most energy intensive economy of all 15 Member States, higher electricity prices is one of the key drivers of inflation.

Most countries recorded inflation rates above the set regional target of 5.0% in both 2012 and 2013. In 2012, Malawi and Tanzania had the highest inflation rates of 21.3% and 16.0%, respectively. In contrast, DRC, Mozambique, and Lesotho had the lowest inflation rates of 2.1%, 2.1% and 3.6%, respectively. The average inflation rate for the region was 7.4% in 2012 and 6.7% in 2013. Table 2-2 below shows the inflation trends in the SADC region from 2004 to 2013.

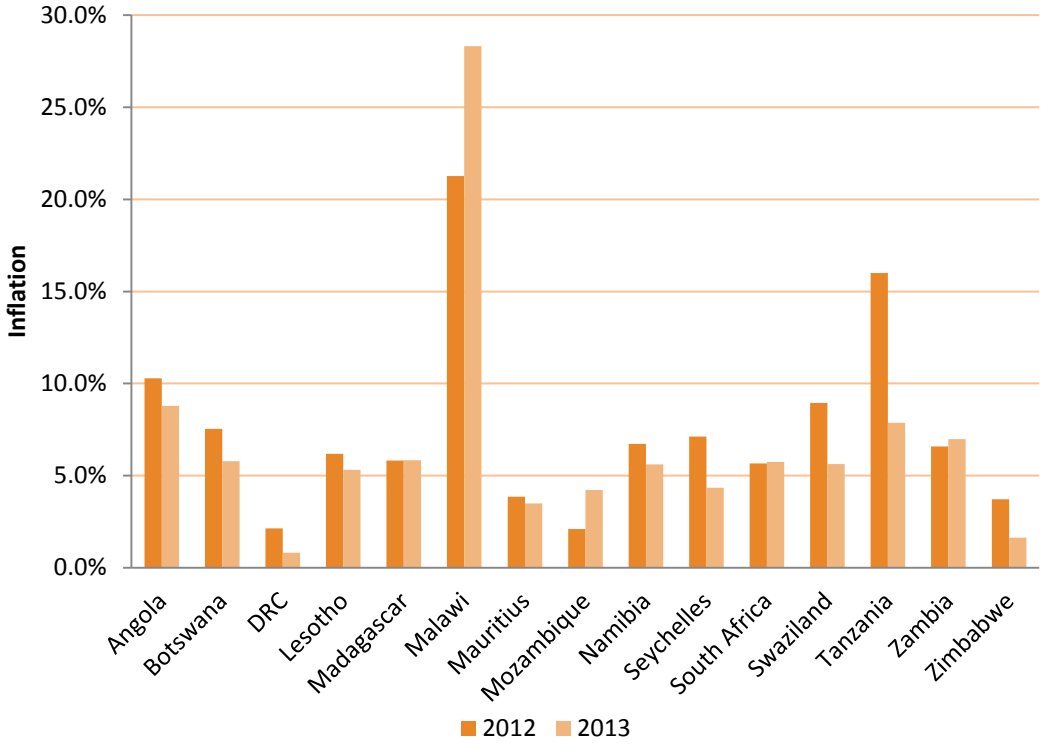
Table 2-2: Inflation, Percentage Change in Average Consumer Prices (2004 – 2013)

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Angola	43.6%	23.0%	13.3%	12.2%	12.5%	13.7%	14.5%	13.5%	10.3%	8.8%
Botswana	7.0%	8.6%	11.6%	7.1%	12.6%	8.1%	7.0%	8.5%	7.5%	5.8%
DRC	4.0%	21.4%	13.2%	16.7%	18.0%	46.2%	23.5%	15.5%	2.1%	0.8%
Lesotho	5.0%	3.5%	5.0%	3.4%	6.1%	8.0%	10.7%	7.4%	3.6%	5.0%
Madagascar	14.0%	18.4%	10.8%	10.4%	9.2%	9.0%	9.3%	10.0%	5.8%	5.8%
Malawi	11.5%	15.4%	13.9%	8.0%	8.7%	8.4%	7.4%	7.6%	21.3%	28.3%
Mauritius	4.7%	4.9%	8.9%	8.8%	9.7%	2.5%	2.9%	6.5%	3.9%	3.5%
Mozambique	12.6%	6.4%	13.2%	8.2%	10.3%	3.3%	12.7%	10.4%	2.1%	4.2%
Namibia	4.1%	2.3%	5.0%	6.5%	9.1%	9.5%	4.9%	5.0%	6.7%	5.6%
RSA	1.4%	3.4%	4.7%	7.1%	11.5%	7.1%	4.3%	5.0%	5.7%	5.8%
Seychelles	3.9%	0.6%	-1.9%	-8.6%	37.0%	31.7%	-2.4%	2.6%	7.1%	4.3%
Swaziland	3.4%	1.8%	5.2%	8.1%	12.7%	7.4%	4.5%	6.1%	8.9%	5.6%
Tanzania	4.1%	4.4%	7.3%	7.0%	10.3%	12.1%	7.2%	12.7%	16.0%	7.9%
Zambia	18.0%	18.3%	9.0%	10.7%	12.4%	13.4%	8.5%	8.7%	6.6%	7.0%
Zimbabwe	113.6%	-31.5%	33.0%	-72.7%	157.0%	6.2%	3.0%	3.5%	3.7%	1.6%

Source: International Monetary Fund, World Economic Outlook Database, October 2014

As depicted in Figure 2-5, in 2013, Malawi' s inflation rate was once again the highest in the region at 28.3% while Tanzania managed to reduce its inflation rate from 16.0% in 2012 to 7.9% in 2013. Only five countries out of 15 attained the regional target of 5.0% in 2013, namely; DRC (0.8%), Zimbabwe (1.6%), Mauritius (3.5%), Mozambique (4.2%) and Seychelles (4.3%).

Figure 2-5: Annual Inflation Rates for SADC Countries in 2012 and 2013



Source: International Monetary Fund, World Economic Outlook Database, October 2014

To summarize this section on economic activity in the region, it is clear that member state economies continued to vary in size and composition over the period under review. South Africa continued to dominate the SADC region by a considerable margin, and therefore had the most impact on overall economic trends and indicators. Although, the regional economy appears to have largely recovered from the 2007 – 2009 global recession, the protracted Eurozone crisis continued to constrain regional growth. The increased availability of electricity continued to play an important role in supporting development, however, many countries remained short on power, restraining economic activity and suppressing growth.

3.0. Technical and System Indicators

3.1. Technical Base – Supply and Demand Summary

Supply Demand Balance – SAPP Outlook to 2016

The SADC region as a whole continues to suffer from a shortfall in supply, as is widely understood. The exact extent of the shortfall is hard to gauge, given the difficulty in estimating suppressed demand and the impact of self-generation. In its 2013 Annual Report, SAPP estimated there to be a capacity shortfall of 7,709 MW within the twelve countries that make up the mainland SADC region.

Table 3-1 below presents installed and available capacity (taking into account planned and unplanned outages) for SAPP member utilities, as of January 2013. This data excludes Madagascar (500 MW installed), Mauritius (900 MW installed) and Seychelles (90 MW) since they are not currently connected to mainland Southern Africa and are not SAPP members.

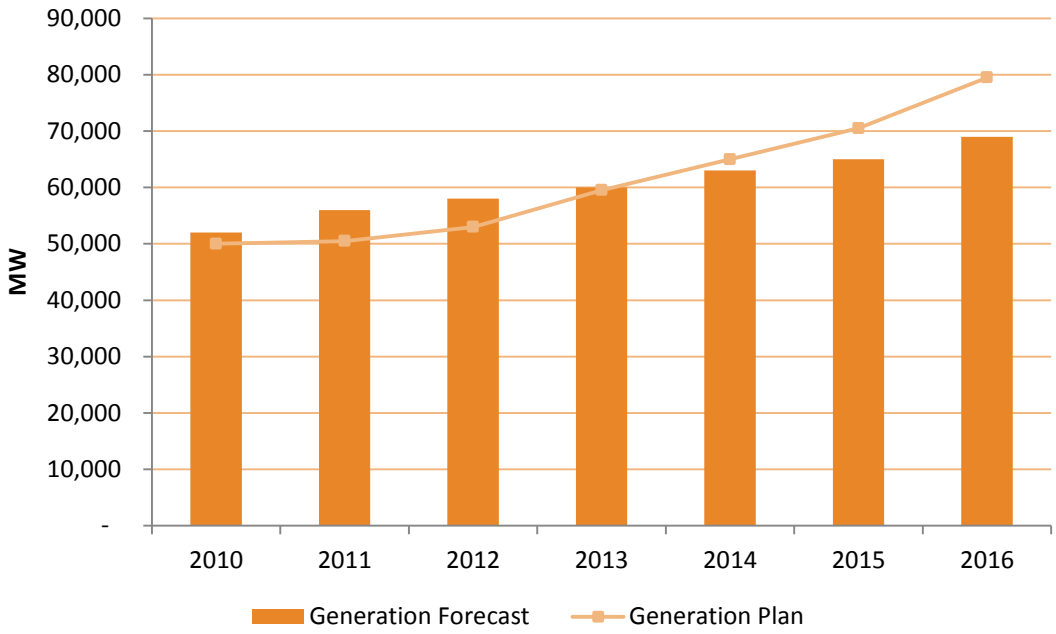
Table 3-1: SAPP Supply Situation as of January 2013

Country	Utility	Installed Capacity as of January 2013 (MW)	Available Capacity as of January 2013 (MW)
Angola	ENE	1,793	1,480
Botswana	BPC	352	322
DRC	SNEL	2,442	1,170
Lesotho	LEC	72	72
Malawi	ESCOM	287	287
Mozambique	EM/HCB	2,308	2,279
Namibia	NamPower	393	360
RSA	Eskom	44,170	41,074
Swaziland	SEC	70	70
Tanzania	TANESCO	1,380	1,143
Zambia	ZECO/CEC/LHPC	1,870	1,845
Zimbabwe	ZESA	2,045	1,600
Total SAPP		**58,182**	**51,702**
Total Interconnected SAPP		**53,722**	**48,792**

Source: SAPP 2013

SAPP's member utilities provide long term plans and shorter term forecasts to the SAPP Coordination Center on a regular basis. Forecasts submitted by the 12 countries in 2012 and 2013 indicate that they anticipate new additions over 2014, 2015 and 2016 to come online at a slower rate than their longer term plans had previously envisaged, as captured in Figure 3-1. Challenges in adding new capacity are well known, and range from ongoing projects being behind schedule to difficulties securing financing for plants still at the feasibility stage. However, additional capacity is being commissioned – equivalent to over 1,000 MW in 2012, for example, with higher figures forecast for 2013, 2014 and 2015, driven particularly by activity in Angola, Botswana, South Africa, Zambia and Tanzania.

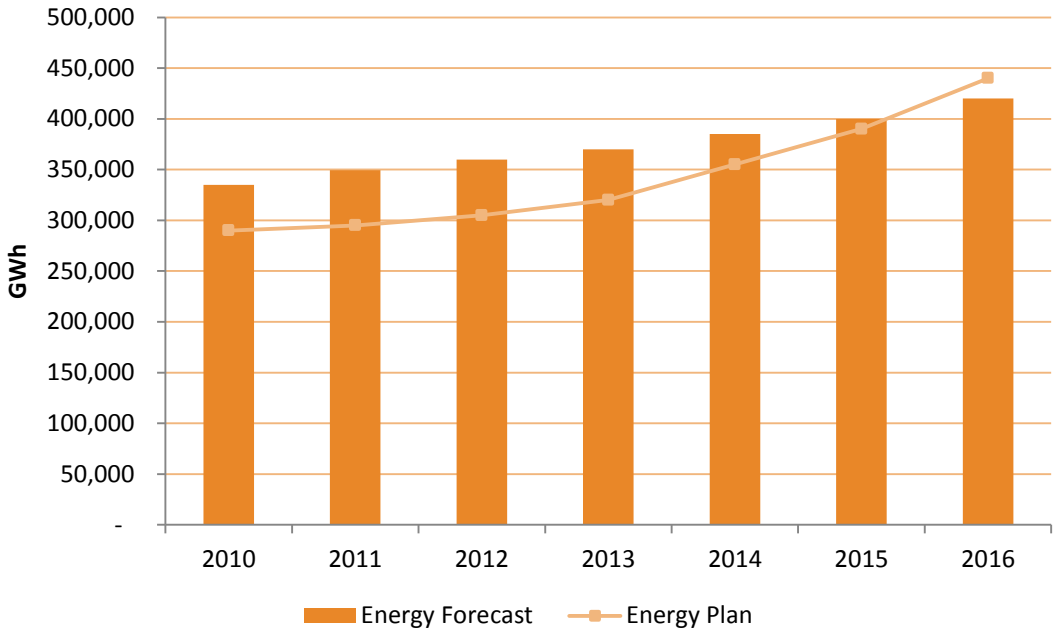
Figure 3-1: Planned Total Generation Forecast against Plan for all SAPP Members (2012)



Source: RERA Database 2012/2013

While capacity additions appear to be slipping slightly below plan, energy generated is ahead of plan, as depicted in Figure 3-2. This is attributed to the nature of the capacity additions in the region. In both 2012 and 2013, the majority of new generation projects were fossil fuels powered plants, which tend to have higher load factors.

Figure 3-2: Energy Planned against Forecast for all SAPP Members (2011)

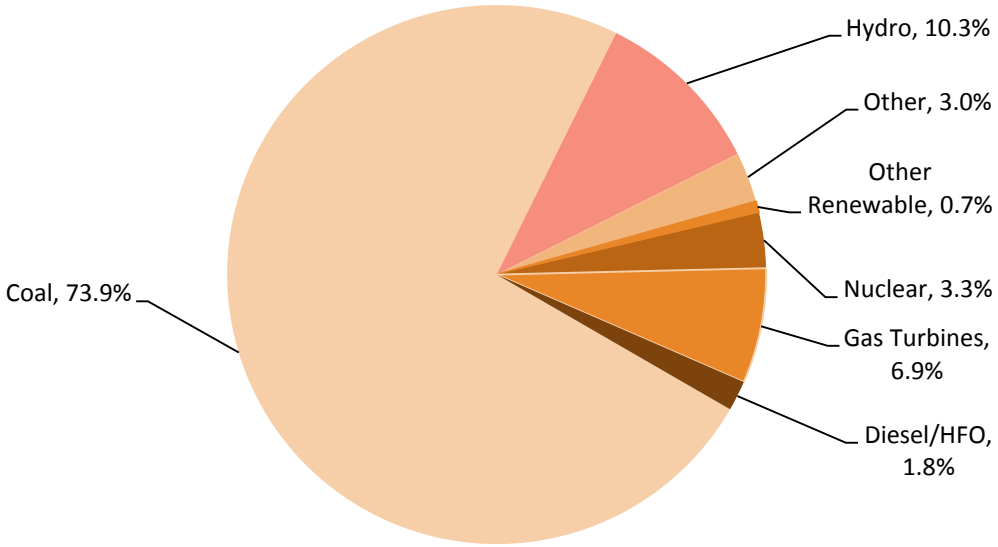


Source: RERA Database 2012/2013

Generation Mix

As shown in Figure 3-3 below, in 2013, coal fired power plants accounted for approximately 74% of the total installed generation capacity in the SADC region. This is largely attributable to South Africa's continued, extensive reliance on coal fired power plants. Other installed generation capacity in the region included hydro, which accounted for approximately 10%, gas turbines contributed around 7%, nuclear just over 3% (South Africa), diesel/HFO around 2%, other renewables at 1% and other generation technologies at 3%.

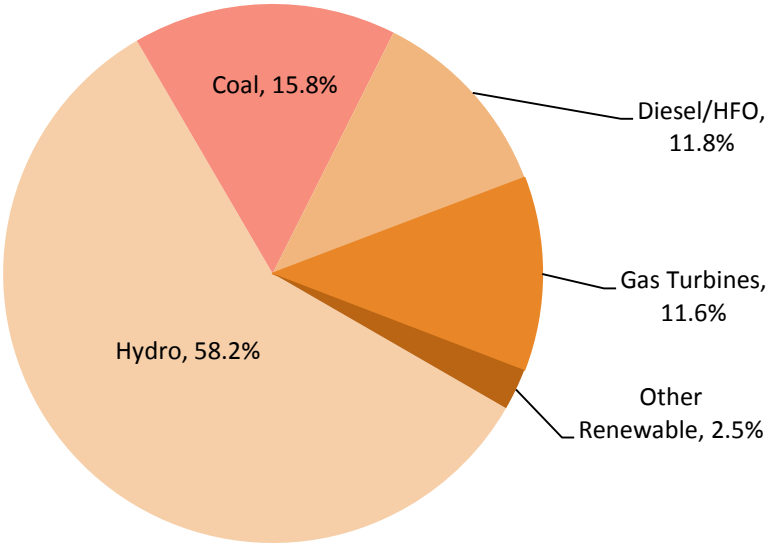
Figure 3-3: Proportion of Installed Generation by Fuel Type (2013)



Source: RERA Database 2012/2013

If we exclude South Africa, the proportions of the region's installed generation capacity by technology type differ markedly. For example, in 2013 the region's installed capacity excluding South Africa was dominated by hydro, which accounted for approximately 58% of the total. This was followed by coal at around 16%, diesel/HFO at 12%, gas turbines at around 12% and other renewables at approximately 3% (as shown in Figure 3-4 below).

Figure 3-4: Proportion of Installed Generation by Fuel Type, Excluding South Africa (2013)

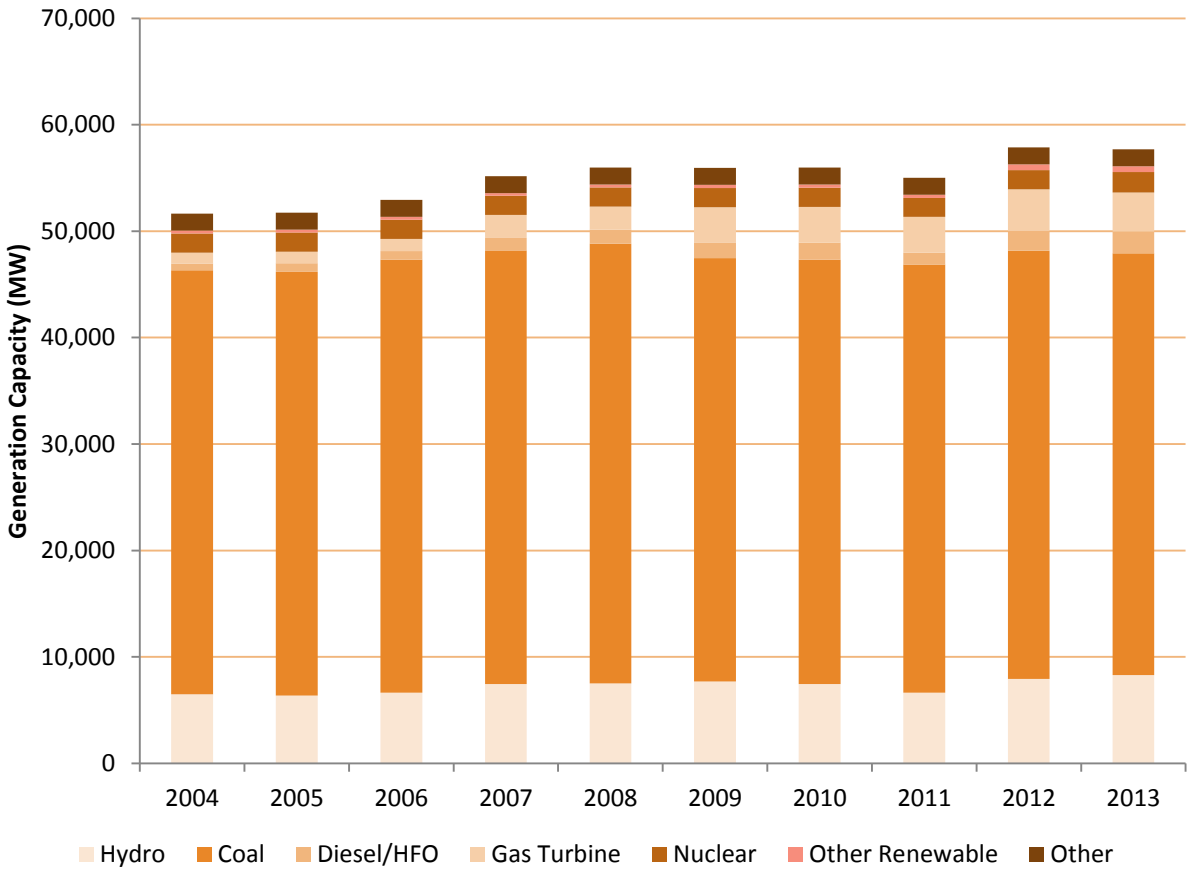


Source: RERA Database 2012/2013

Generation Mix – Long Term Historic Trends

The trends in the overall generation mix for the SADC region are shown in Figure 3-5 below. As discussed above, coal has always accounted for the lion's share of installed capacity, followed by hydro. While total installed capacity increased from about 52,000 MW to about 58,000 MW during the 2004 to 2013 period, coal's contribution has remained somewhat constant at around 40,000 MW.

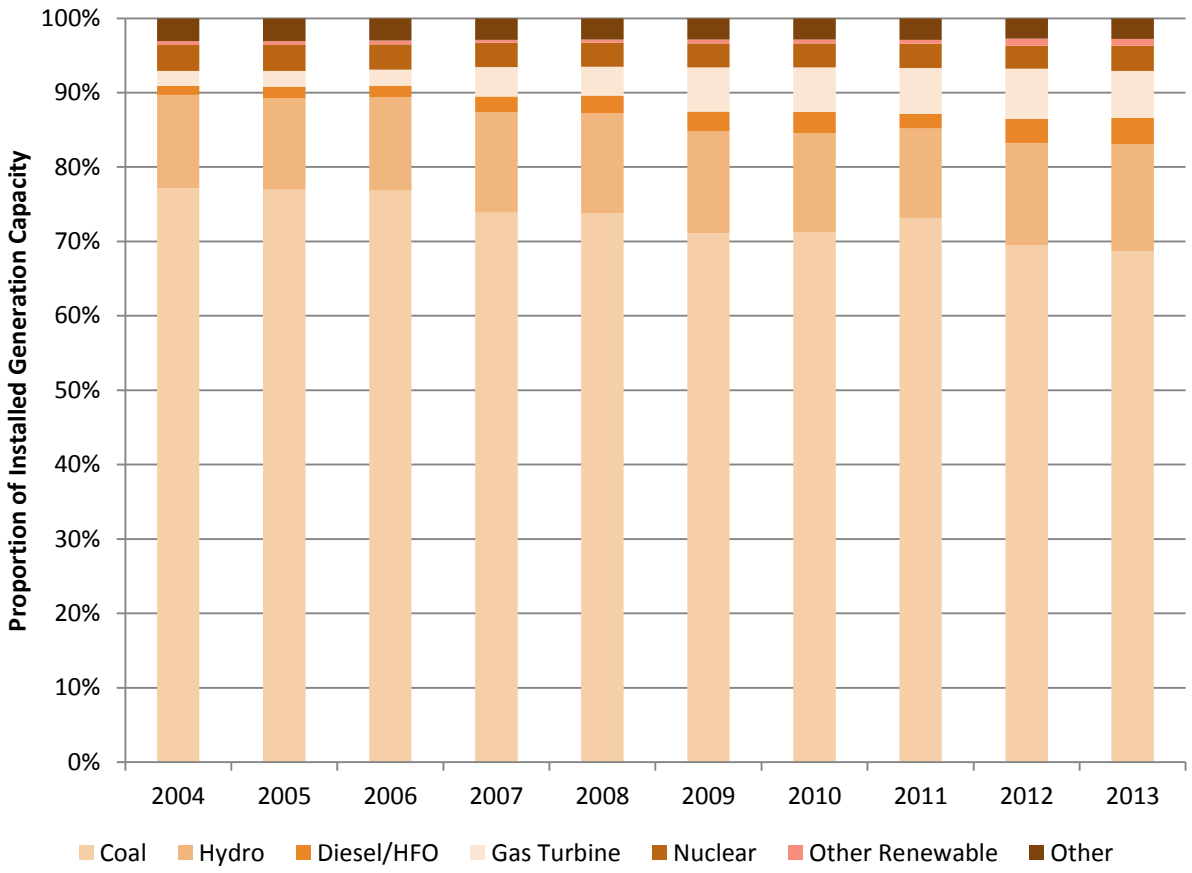
Figure 3-5: Installed Generation Capacity Breakdown by Type



Source: RERA Database 2012/2013

Figure 3-6 below shows the variations in each of the technology's contribution to total installed capacity in the region.

Figure 3-6: Installed Generation Capacity by Type (%)



Source: RERA Database 2012/2013

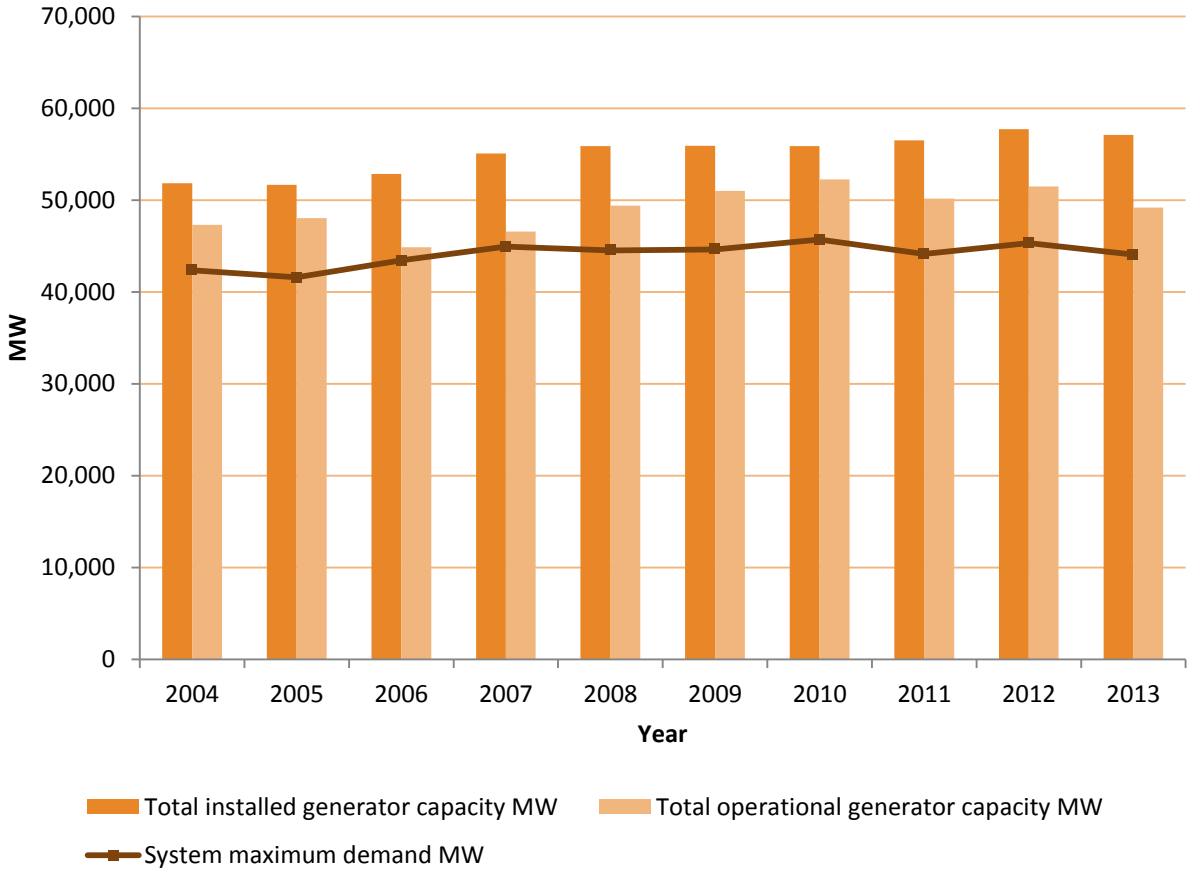
The data shows a material reduction in the relative contribution of coal-fired generation over the 10 year period shown, from around 77% in 2004 to 69% in 2013. However, the commissioning of Kusile and Medupi in South Africa would change this picture drastically, given that Eskom reported the design capacity for these two complexes to be 8,000 MW. The completion of Morupule B in Botswana, at 600 MW, would also have an important impact. Hydropower has gained little prominence in the region, but the fastest growth rates are observed in diesel/HFO fired generation and gas turbines, which combined contributed 10% to regional capacity in 2013, compared to 3% in 2004. Given the premium cost of generation associated with using such hydrocarbon based power plants, we postulate that the increased contribution of hydrocarbon based plants may be linked to the relatively short lead times associated with bringing them online to relieve power shortages. This may indicate that, in many cases, the region is struggling to develop and implement long term, least cost expansion plans.

Also worthy to note, while hydropower is an important part of the energy mix, other renewable sources still represent a very small proportion of overall capacity, at 1% in 2013, and are installed predominantly in South Africa, Namibia and Tanzania. However, SAPP member utilities have stated their intent to increase the contribution renewable energy makes, and initiatives like South Africa's ongoing Renewable Energy IPP Procurement Program (REIPPPP) will have an impact, as will the more recent promotion of the use of renewable energy sources in other countries in the region.

Generation Available to Meet Demand

Figure 3-7 below shows the difference between nameplate capacity, operational capacity, and system maximum peak demand for the mainland SADC region.

Figure 3-7: Installed Capacity, Operational Capacity and System Peak Demand, SAPP Countries



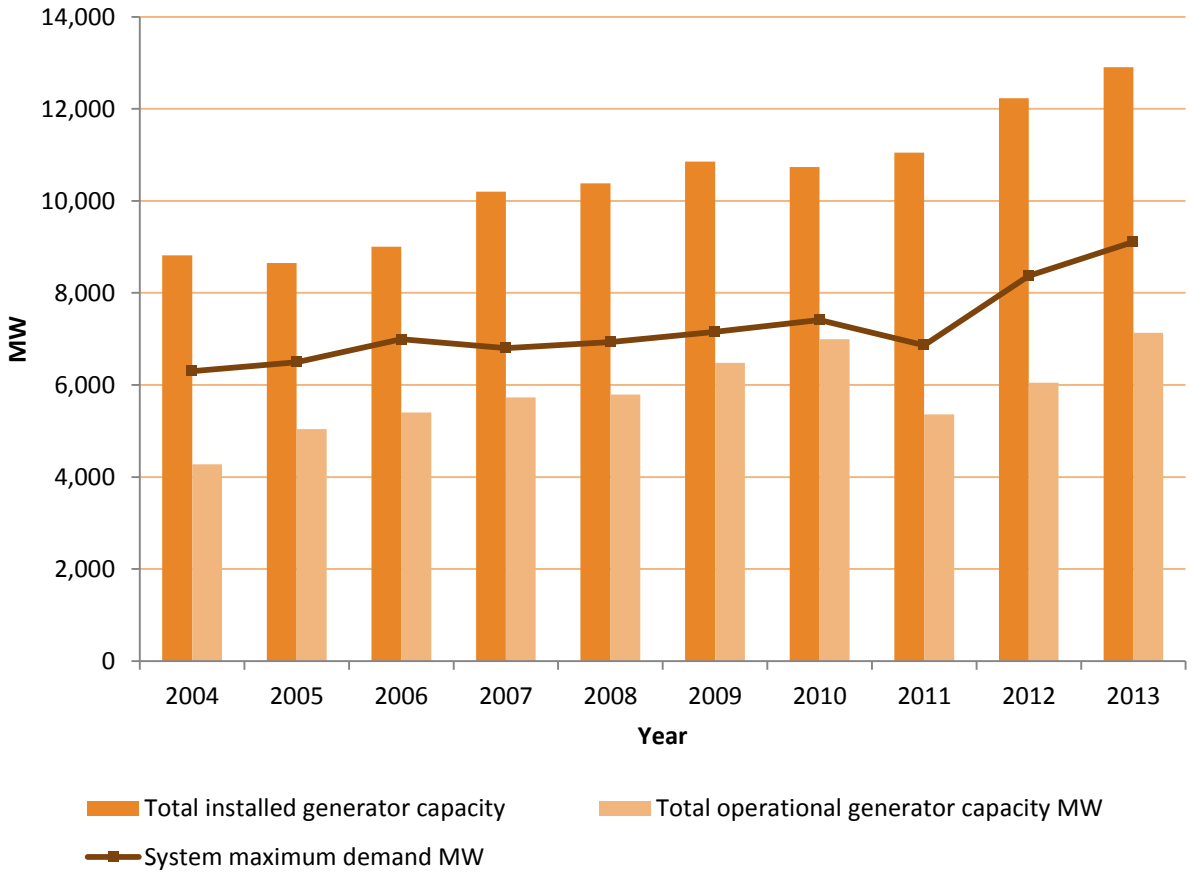
Source: RERA Database 2012/2013

This analysis might indicate the presence of adequate, albeit often precarious (reserve margin appears to have been particularly tight in 2006 and 2007, when compared to the NERC reference benchmark figure of 15%) operational capacity across the entire period from 2004 to 2013. In spite of this, we emphasize that it is difficult to accurately gauge the true need for power in the region when latent and suppressed demand[1] is so common a characteristic of the industry. South Africa's power system, for example, is increasingly constrained, and has suffered power blackouts and load shedding during peak demand times over the period under review, partially a consequence of an aging, overly stressed system suffering breakdowns. Eskom continues to work hard to arrest this trend.

[1] According to the World Bank, suppressed demand occurs in a situation where energy services provided are insufficient – due to poverty or lack of access to modern energy infrastructure.

It should also be noted that when South Africa is excluded, it appears that total available generator capacity fell short of reported system maximum demand over the entire 10 year period, as shown in Figure 3-8 below. This underscores why SADC utilities have made it imperative that they secure investment capital for new generation capacity across the region.

Figure 3-8: Installed Capacity, Operational Capacity and System Peak Demand, SAPP Countries Excluding South Africa

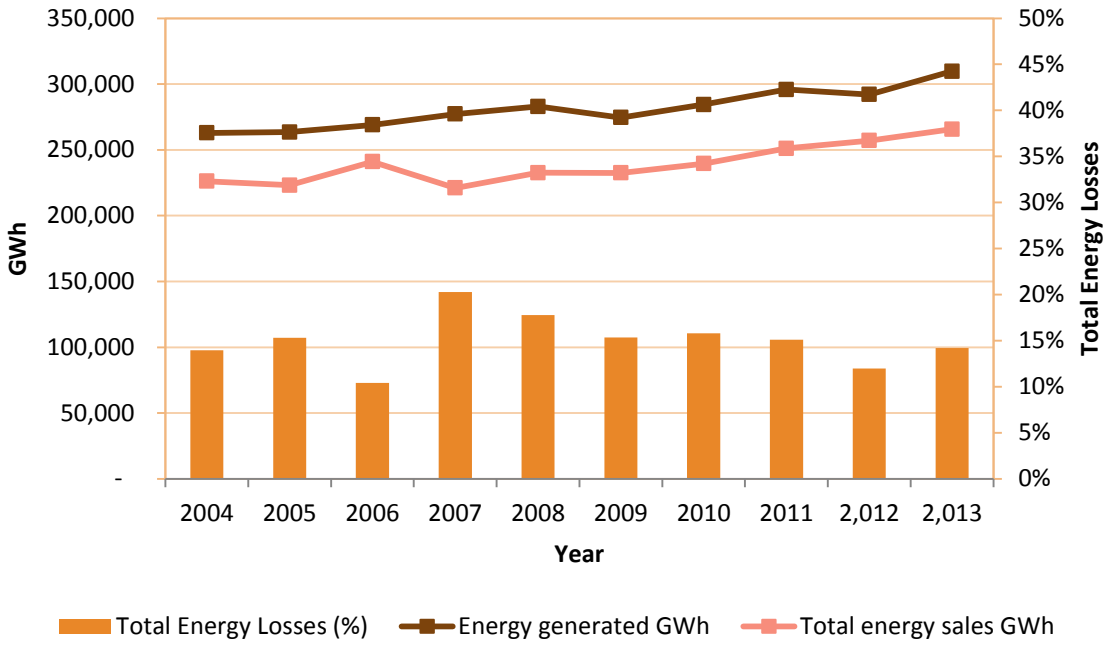


Source: RERA Database 2012/2013

Energy Generated and Energy Sold – Total SADC Region

Data submitted on power generated and sold indicates a low compound annual growth rate of around 1.8% for the 10 year period from 2004 to 2013 (as depicted in Figure 3-9 below). The difference between electricity generated and electricity sold is attributed to energy losses. These losses varied between 10% and 20% across the period, settling at 14% for 2013. Losses at this level, and some SADC utilities are performing better than others, are not unheard of within power markets in transition. However, they do serve to underscore the need to quickly increase collections and better manage technical and non-technical losses, as well as introduce cost reflectivity. For this reason, SAPP and its member utilities have made distribution loss reduction a high priority area.

Figure 3-9: Energy Generated and Energy Sold in the SADC Region

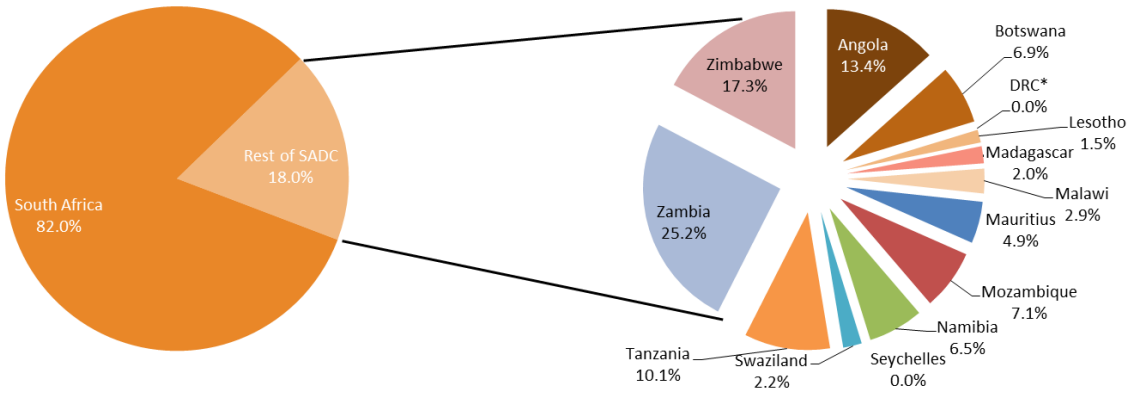


Source: RERA Database 2012/2013

Energy Sales – Country Breakdown

The SADC electricity market continued to be dominated by South Africa, which accounted for 82% of total electricity sales in 2013. The remaining 18% was shared among the other countries of the region as depicted in Figure 3-10 below.

Figure 3-10: Shares of Energy Sales in the SADC Region (2013)[2]



Source: RERA Database 2012/2013

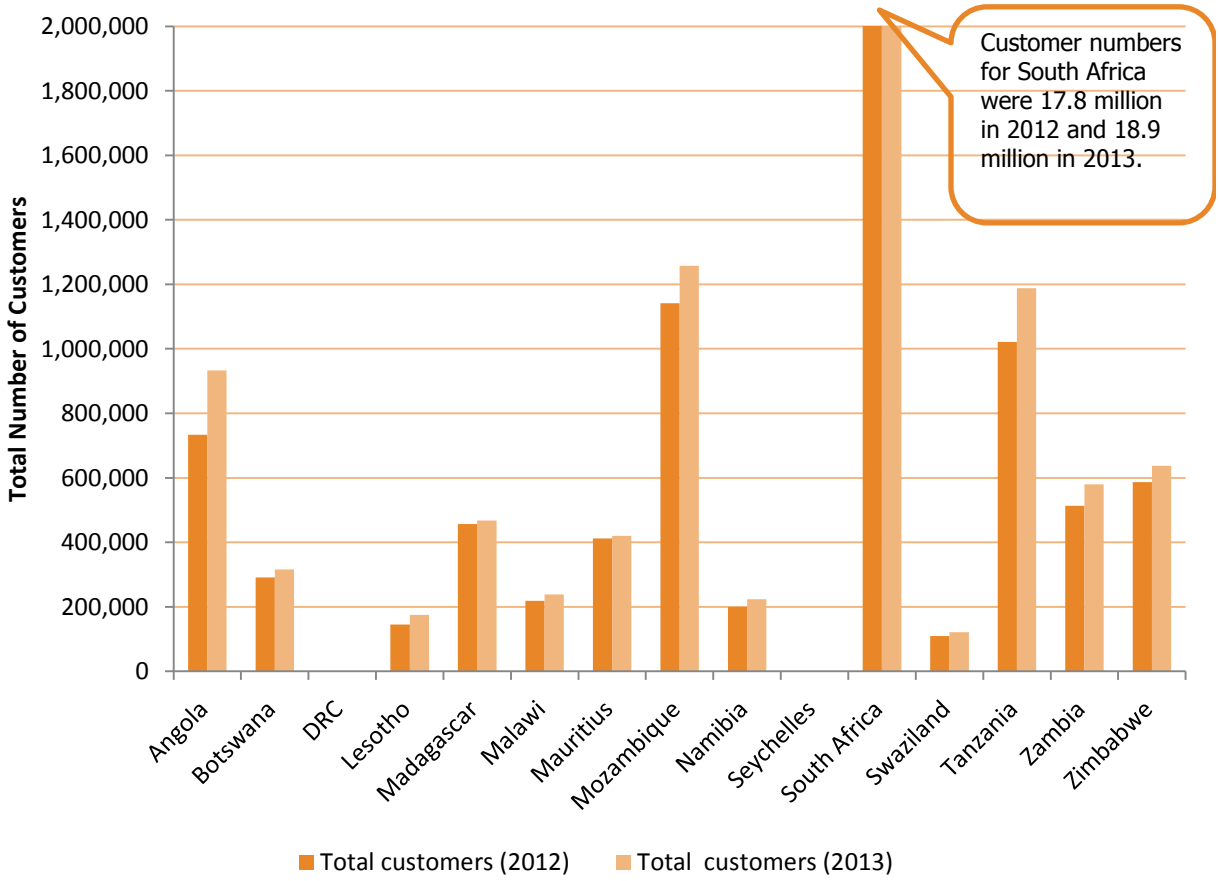
[2] The DRC did not provide data on energy sales

3.2. Customer Overview

Customer Numbers by Country

In 2013, South Africa had the largest number of customers within the region with over 18 million accounts served, representing almost 74% of the current SADC customer base. This was followed by Mozambique at 5%, Tanzania at 5% and Angola at 4%[3]. The remaining countries make up the balance of 12% (see Figure 3-11). This again underscores South Africa's economic dominance compared to the rest of the region.

Figure 3-11: Customer Numbers, SADC Region (2012 & 2013)



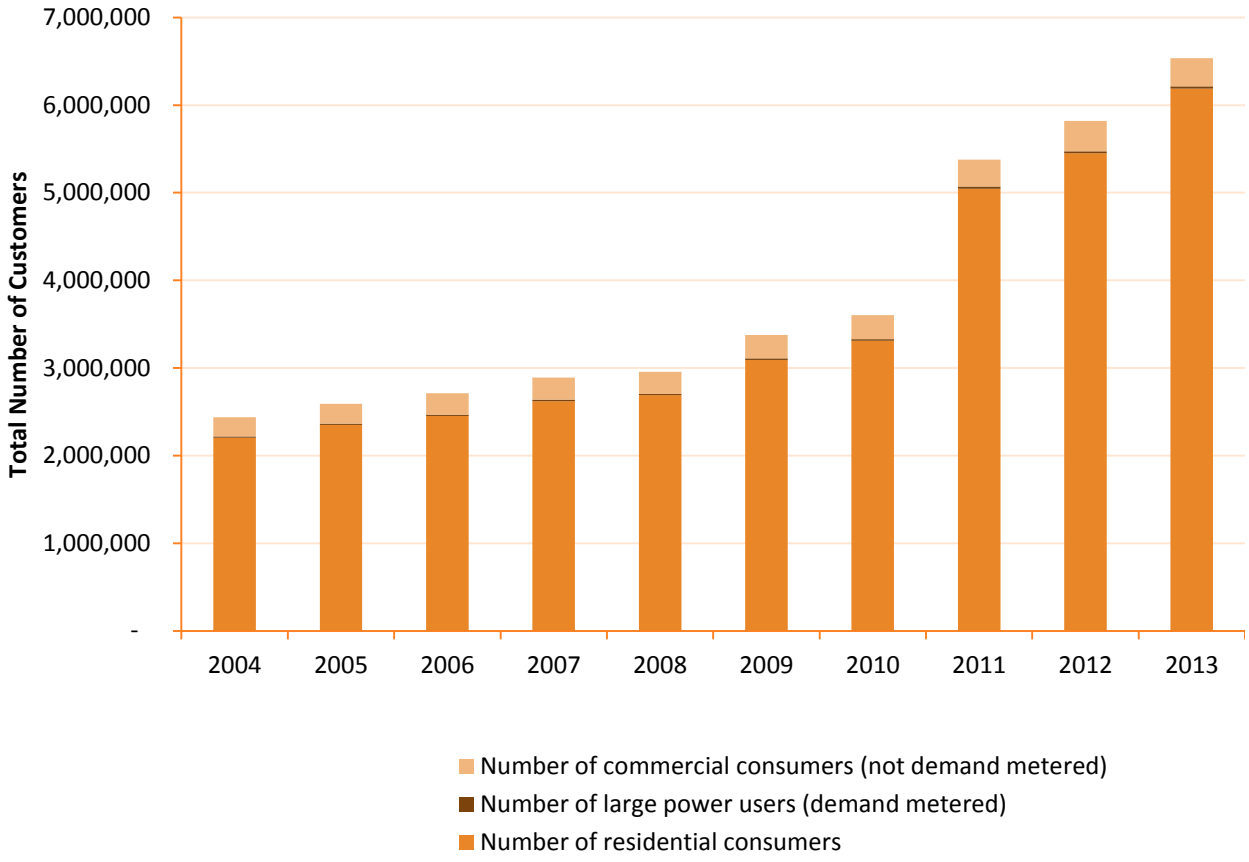
Source: RERA Database 2012/2013

Customer Numbers by Category (SADC)

The total number of electricity customers in the SADC region increased sharply between 2004 and 2013, with residential connections almost tripling over the period, as indicated in Figure 3-12 below.

[3] This analysis excludes number of customers in DRC and Seychelles as data was not available.

Figure 3-12: Number of Electricity Customers by Category, Excluding South Africa[4] (2004 – 2013)



Source: RERA Database 2012/2013

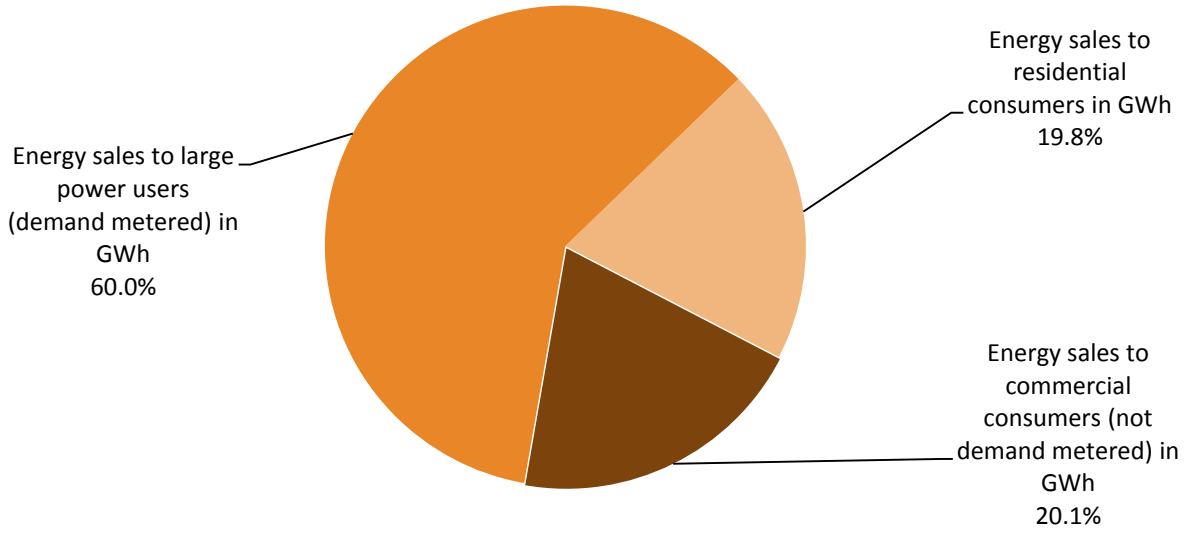
Outside of South Africa, data submitted shows a particularly sharp gain in customer numbers in 2011, with residential consumers rising from 3.3 million in 2010 to 5.0 million in 2011. This is partly attributable to SADC Member States' implementation of their national plans to increase energy access levels – Angola and Lesotho both added significant new customers in 2011. However, a lot of the 50% single year increase is accounted for by Tanzania's exclusion from the data prior to 2011.

Customer Energy Sales by Category

The breakdown of energy sales by customer category for 2013 is shown in Figure 3-13.

[4] Note that the above chart excludes South Africa data because of the large numeric difference between South Africa data and that of the rest of the region.

Figure 3-13: Energy Sales to Customer Categories in SADC Region, Excluding South Africa[5] (2013)



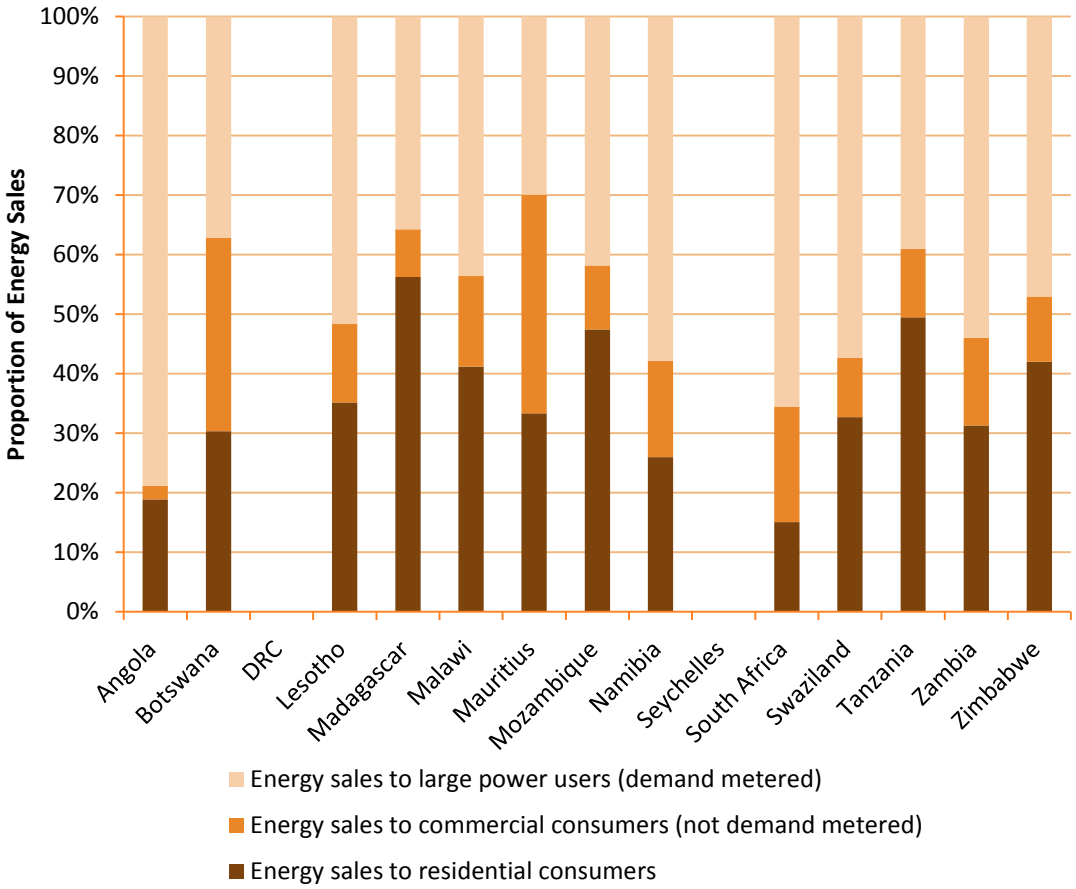
Source: RERA Database 2012/2013

Although large power users (i.e. demand metered industrial and commercial customers) constituted by far the smallest proportion of the total number of customers (only 1% of the total customer numbers), they accounted for 63% of total power sales in the region in 2013 (up from 60% in 2012). Similarly, non demand metered commercial consumers made up a relatively small proportion (5%) of total customer numbers, and accounted for 19% of total electricity sales, in 2013 (down from 20% in 2012). Finally, residential consumers contributed by far the largest proportion (94%) of total customer numbers and accounted for only 18% of total power sales in 2013 (down from 20% in 2012).

Carrying out a similar comparison to that above, per country, highlights that electricity sales to different end-user categories differ significantly between the various SADC countries. This is illustrated for 2013 in Figure 3-14 below.

[5] Note that the above chart excludes South Africa data because of the large numeric difference between South Africa data and that of the rest of the region.

Figure 3-14: Energy Sales Breakdown per Main Customer Category (2013)



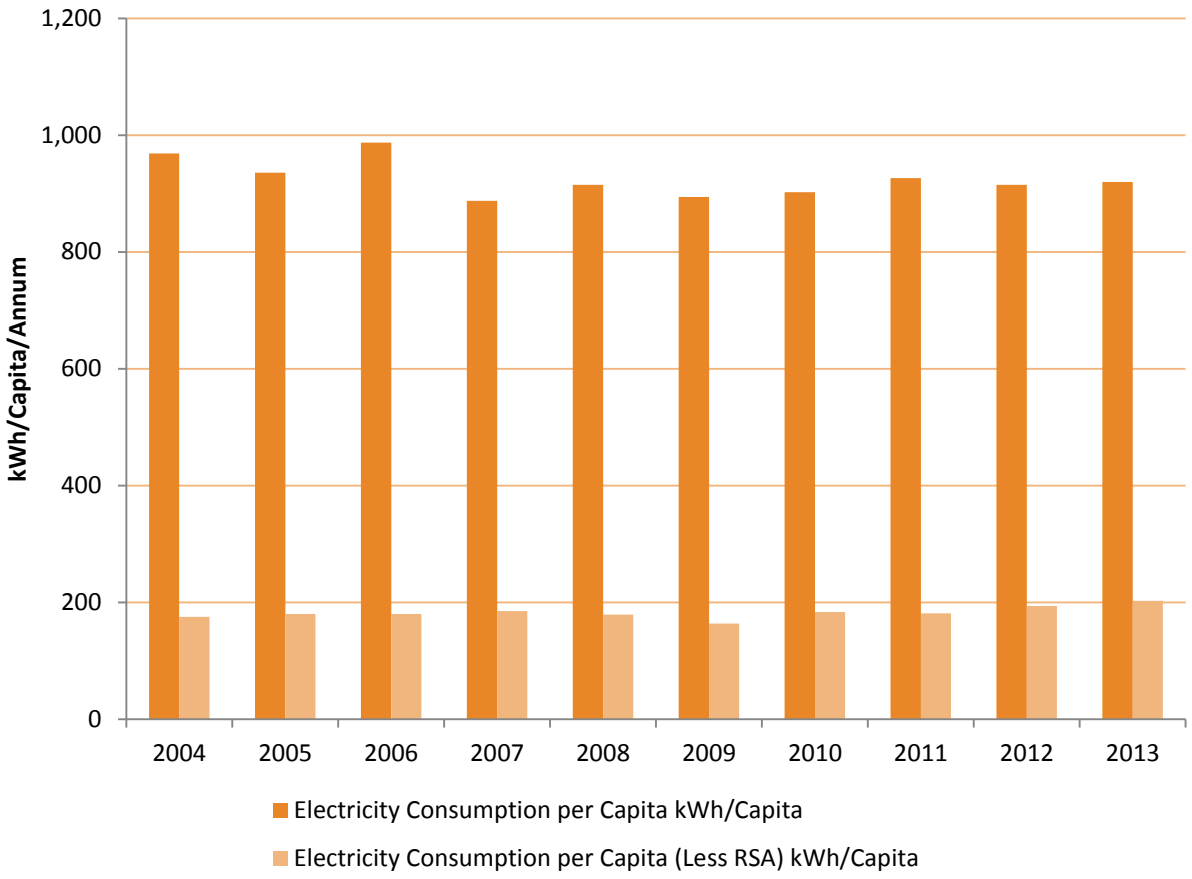
Source: RERA Database 2012/2013

Large users dominate power sales volumes, making up more than 50% of the total in Angola, South Africa, Swaziland, Namibia, Zambia and Lesotho, signaling the predominance of large scale industrial economic activity in these countries. By comparison, sales in Madagascar, Tanzania, Mozambique, Zimbabwe and Malawi are driven strongly by residential consumers, indicating a relatively lower level of commercial and industrial activity. Mauritius and Botswana show a relatively balanced mix between large power, commercial and residential power sales.

3.3. Electricity Consumption Per Capita

In terms of electrical energy consumption per capita, the economic dominance of South Africa within SADC is again evident, as depicted in Figure 3-15 below.

Figure 3-15: SADC Region Electricity Consumption per Capita per Annum



Source: RERA Database 2012/2013

For the entire region, the average consumption per capita has been relatively stable for the past 3 years. If South Africa is excluded, electrical energy consumption per capita for the remaining countries increased by 7.0% and 5.0% in 2012 and 2013 respectively.

According to the World Bank, the world average per capita energy consumption in 2011 was 3,471 kWh. The average annual per capita energy consumption ranged from as high as 16,473 kWh in Canada to as low as 149 kWh in Nigeria[6]. In 2011, the SADC region's average annual per capita consumption was 181 kWh (excluding South Africa) which was about 20 times below the world average. This confirms the need for further and substantial power sector and economic development in the region.

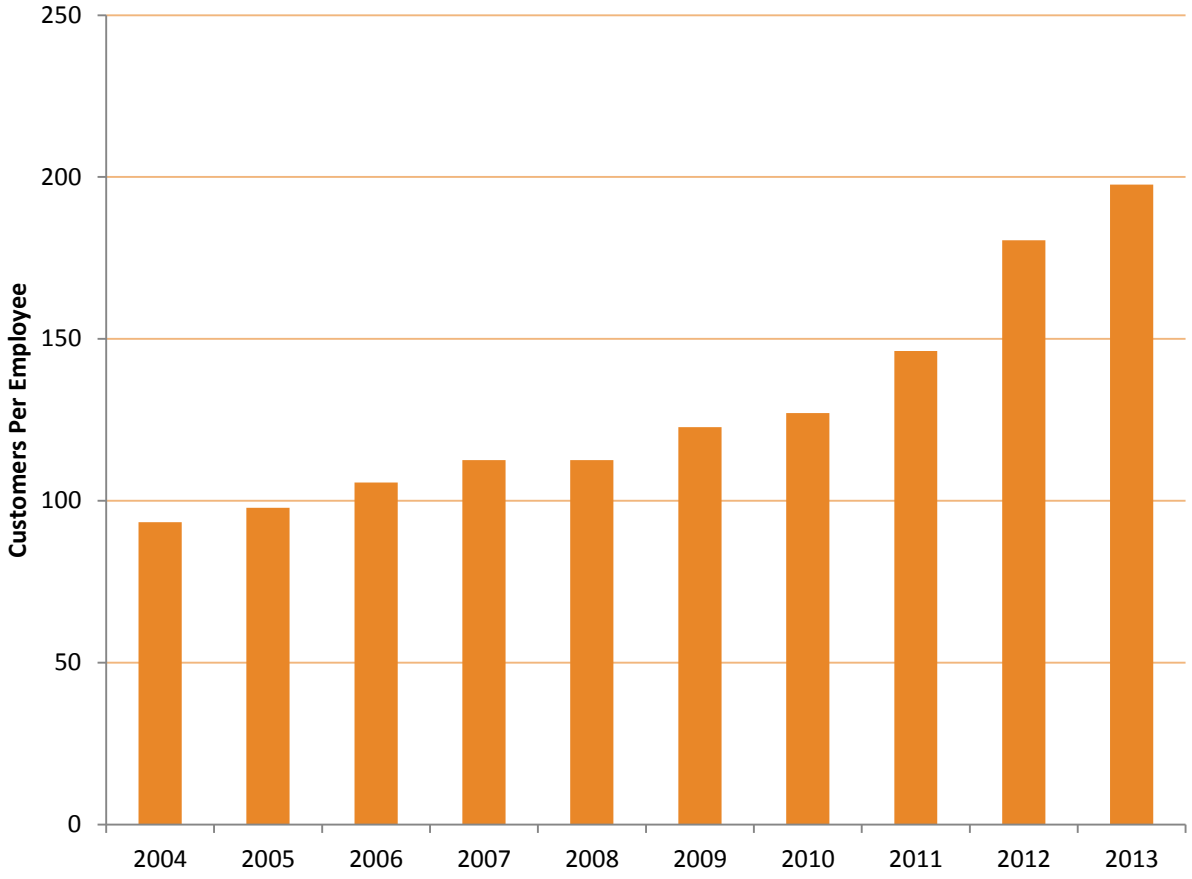
3.4. Customers per Employee

The number of customers per utility employee is a key efficiency and productivity indicator used in power utility performance management worldwide. While too high a metric might indicate that the utility is not servicing its customers adequately, too low a metric might indicate there are inefficiencies in utility

[6] This exclude self-generation

management. The international benchmark ranges from 200 – 400 customers per utility employee. In the SADC region, the number of customers per utility employee has shown a steady increase from around 130 to 180 over the four year period from 2010 to 2013 (as depicted in Figure 3-16 below). However, it should be noted that the data used provides only the total number of utility employees irrespective of the sub-sector and the electricity value chain element in which these employees were employed, which may introduce distortions. It is, nonetheless, assumed that most employees were engaged in the electricity distribution and retail sectors, which is where this measure has the most relevance. As such, this represents a considerable improvement and a positive trend for the region.

Figure 3-16: Average Customers per Employee in the SADC Region, Excluding RSA[7] (2004 – 2013)



Source: RERA Database 2012/2013

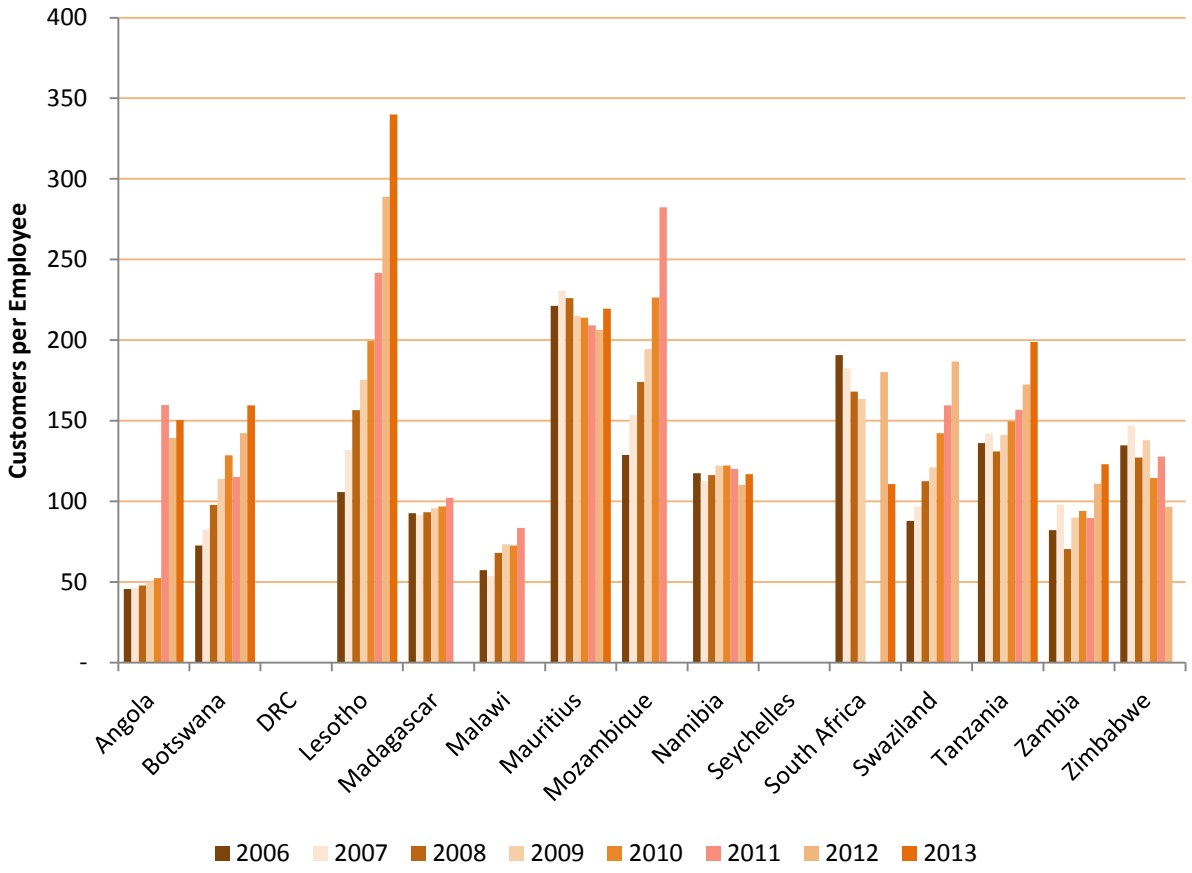
While the average customers per employee metric has shown a consistent upward trend and reaches the bottom end of the benchmark range by 2013, it is important to note that the SADC region serves a substantial number of rural customers who are distributed across considerable geographic areas. Rural customers and the networks serving them generally have higher personnel overhead requirements than

[7] Please note that the above chart excludes South Africa data because of the large numeric difference between South Africa data and that of the rest of the region.

their urban counterparts, which has an impact on the number of customers that can be realistically served per utility employee.

Looking more closely at this indicator by country, the number of customers per employee is still below international standards for the vast majority of countries. Additionally, there is considerable variation between countries, as shown in Figure 3-17 below.

Figure 3-17: Number of Customers per Employee per SADC Country (2006 – 2013)



Source: RERA Database 2012/2013

Most SADC countries have shown considerable improvement in the number of customers per employee, with the most recent figures for Lesotho, Mauritius and Mozambique falling within the international benchmark range noted above.

The number of customers per employee shows a sustained decline in Zimbabwe, highlighting the economic and other challenges faced in the country.

3.5. Transmission Losses

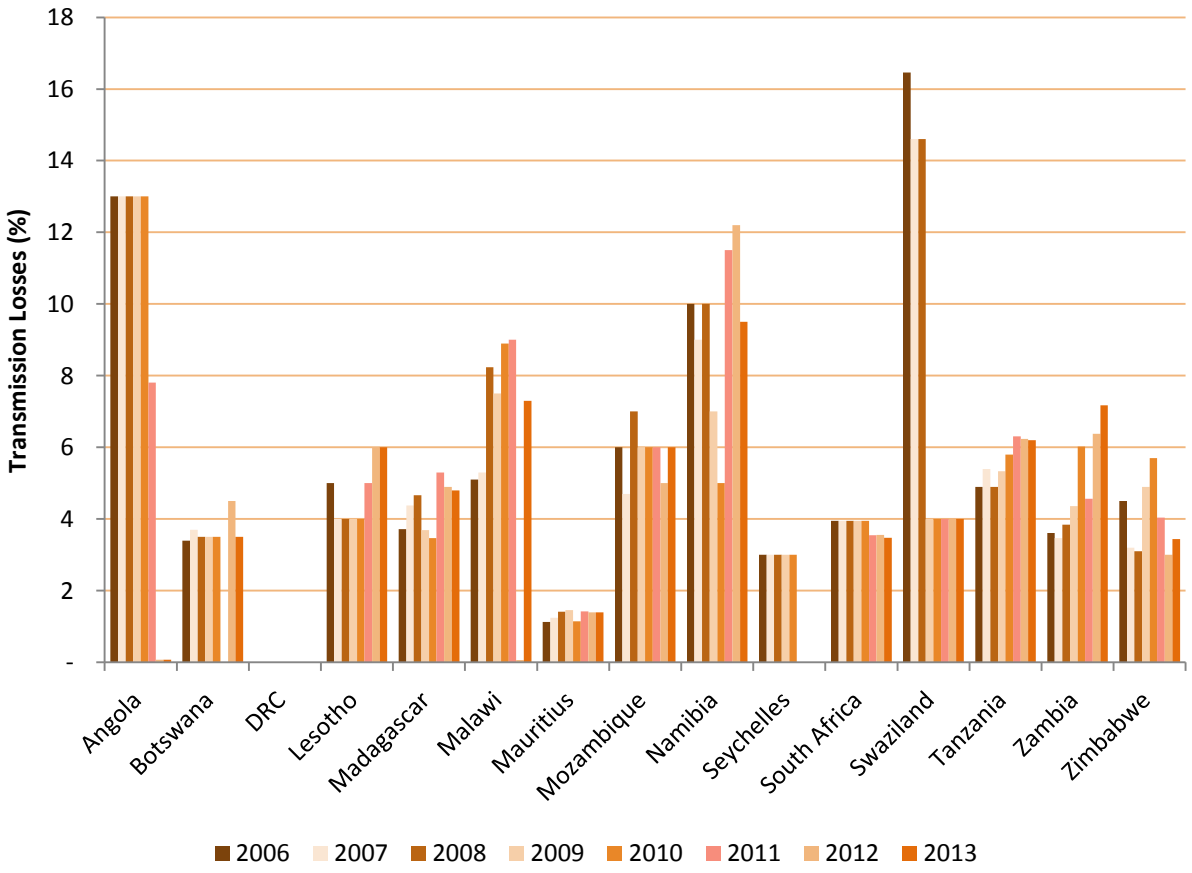
The transmission of electricity from generation points to load centers over long distances creates power losses. A major part of the energy losses comes from the joule effect in transformers and power lines and manifests as heat lost in the conductors. Transmission losses typically range from 4% to 8%, however,

they can be higher due to a multitude of reasons, such as poor management, inadequate investment in transmission, and poorly planned or haphazard growth of transmission subsystems and other power delivery infrastructure.

In the SADC region, transmission losses are strongly influenced by network length from generation points, energy intensity, loading of the network, as well as the age and condition of the power delivery system. According to data submitted, as shown in Figure 3-18 below, the highest transmission losses in 2012 were reported by Namibia, at around 12%, followed by Malawi and Zambia at around 7%. At the low end, Mauritius, South Africa and Zimbabwe reported transmission losses of between 1.5% and 3.5%.

For 2013, the highest transmission losses were reported in Angola at 13% and Namibia (improved) at 9.5%, followed by Malawi and Zambia at around 7%, and Mozambique, Tanzania and Lesotho at around 6%.

Figure 3-18: Transmission Losses in the SADC Region (2006 - 2013)



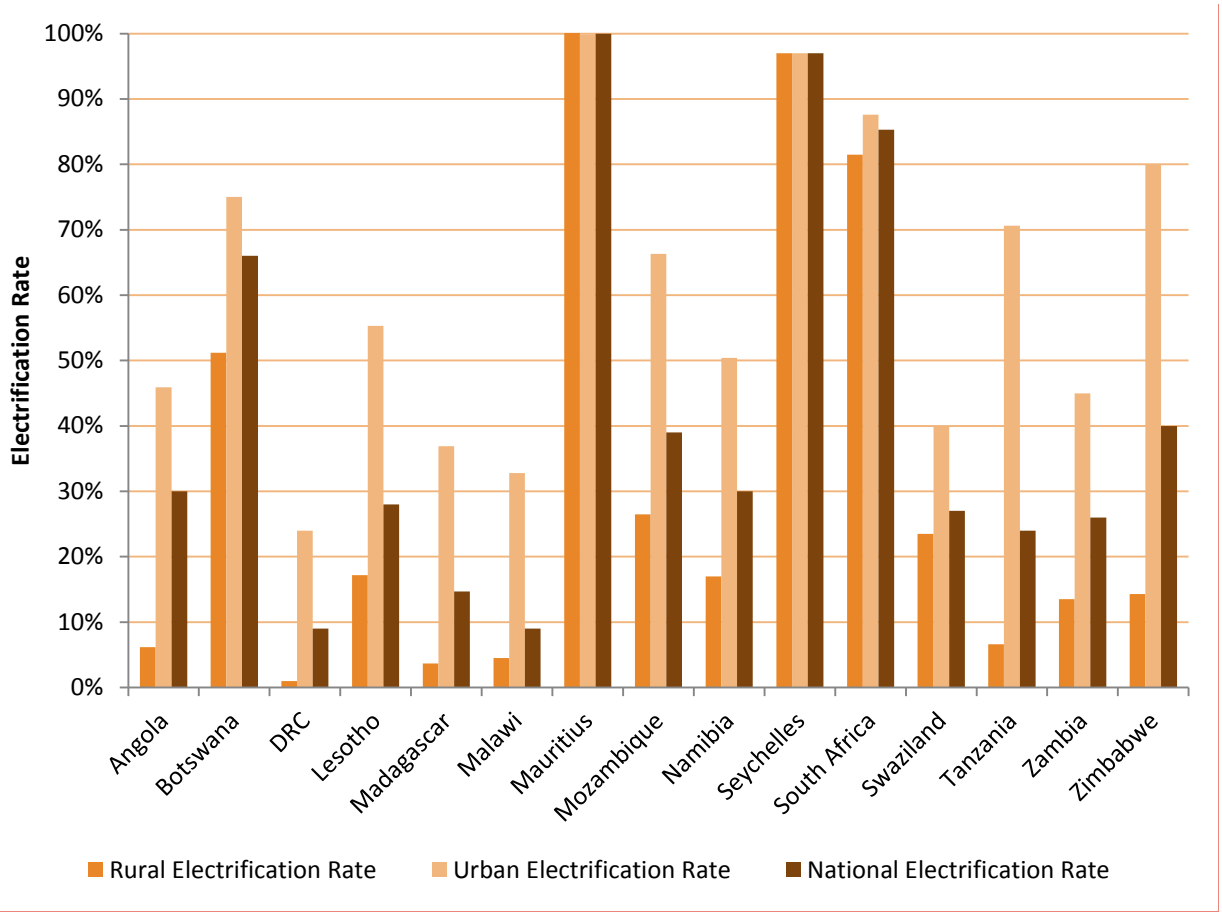
Source: RERA Database 2012/2013

It is noted that many countries have provided exact figures that do not vary from year to year. This may indicate that these are either regulated targets or set figures as opposed to values measured annually.

3.6. Electrification Rate

Figure 3-19 below shows the proportion of the population with access to electricity (electrification rates) in each of the SADC countries in 2012. Evidently, the national electrification rates vary significantly among countries in the region, with Mauritius being fully electrified and the Seychelles being very close to fully electrified. In contrast, Malawi has the lowest national electrification rate at around 9%. Other countries with low levels of national electrification include the DRC and Madagascar, both with electrification rates below 20%.

Figure 3-19: Electricity Access in Southern Africa (2012)



Source: International Energy Agency (IEA), World Energy Outlook 2014

4.0. Tariffs

4.1. Cost of Service – A Primer

For the majority of the electricity industry's existence, power utilities globally have adopted similar approaches to industry structure and tariff setting. As singular entities responsible for generation, transmission and distribution services, utilities have traditionally charged customers a sole tariff that is intended to account for all of these activities as a bundled whole. Unfortunately, many countries, for a multitude of reasons, allowed electricity prices to gradually drift below the cost of providing power. As a consequence, unable to generate from their own operations the capital needed to invest in system upkeep and expansion, the power industry in a number of countries has suffered from deterioration in the quality of service, blackouts, voltage spikes, and power failures. Under such conditions, customers have been even less likely to pay their bills which exacerbated the financial and operational problems of the utilities. These paired issues have led to a feedback loop in which deteriorations in service quality and payment collection exacerbate one another and threaten the viability of the entire utility system.

Aware of the imperative for change, and wishing to relieve the strain subsidized power sectors put on national budgets, governments began to rethink how they structured and charged for service within their power systems. This led to the creation of new market structures that unbundled core activities such as generation, transmission and distribution into separate services, and opened some core services to limited competition. Such unbundled market models have resulted in a lower cost of supply (particularly in generation), they have attracted significant amounts of private capital, they have maximized public revenues from the sale of government owned assets, and they have created a more environmentally and financially sustainable and efficient electricity sector.

The migration from a state owned, vertically integrated power sector to an unbundled sector with private sector participation, coupled with the maintenance of cost based, or cost of service, tariffs has been central to the success of this transition to a better performing power sector.

Generally speaking, by transferring the cost of supplying the service from the producer to the consumer, cost of service tariffs serve two primary roles in the electricity industry:

- *They send signals to consumers on the value of the provided service to encourage efficient usage*
- *They allow asset owners and investors to recover the (allowable) costs incurred in providing the service (which includes a rate of return).*

On the corollary, the lack of cost of service tariffs will impede private sector investment as investors will have doubts about being able to recover their investment and secure a reasonable return.

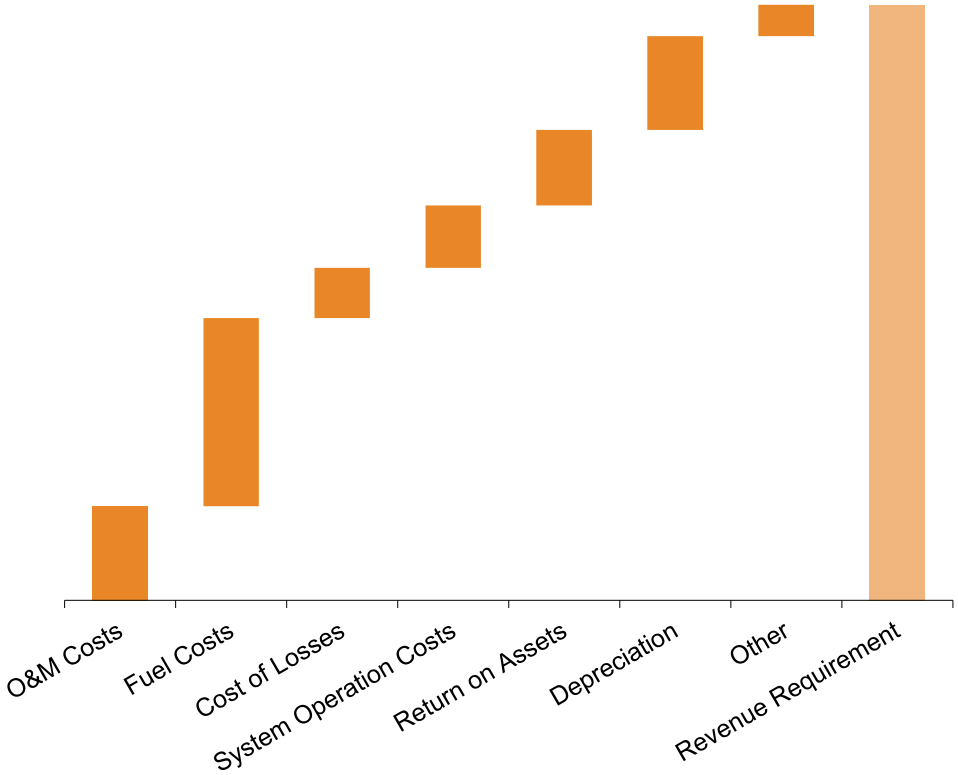
According to the U.S. Energy Information Administration (EIA), the cost of service is a ratemaking concept used for the design and development of rate schedules to ensure that filed rate schedules recover only the cost of providing the electricity service at issue. This concept attempts to correlate the utility's costs and revenues with the service provided to each of the various customer classes. In principle, the revenues collected (with provisions for losses) must cover the costs incurred. These typically include:

- Variable Costs:

    - Non-fuel operation and maintenance costs
    - Fuel costs
    - Losses (commercial and technical)
- Fixed Costs:
    - Depreciation
    - Return on assets
    - System operation costs

The sum of fixed and variable costs should equal the revenue requirement of the utility, as depicted in Figure 4-1 below. The revenue requirement is then divided among the expected sale units to determine the tariff.

Figure 4-1: Exampled of Revenue Requirement Components

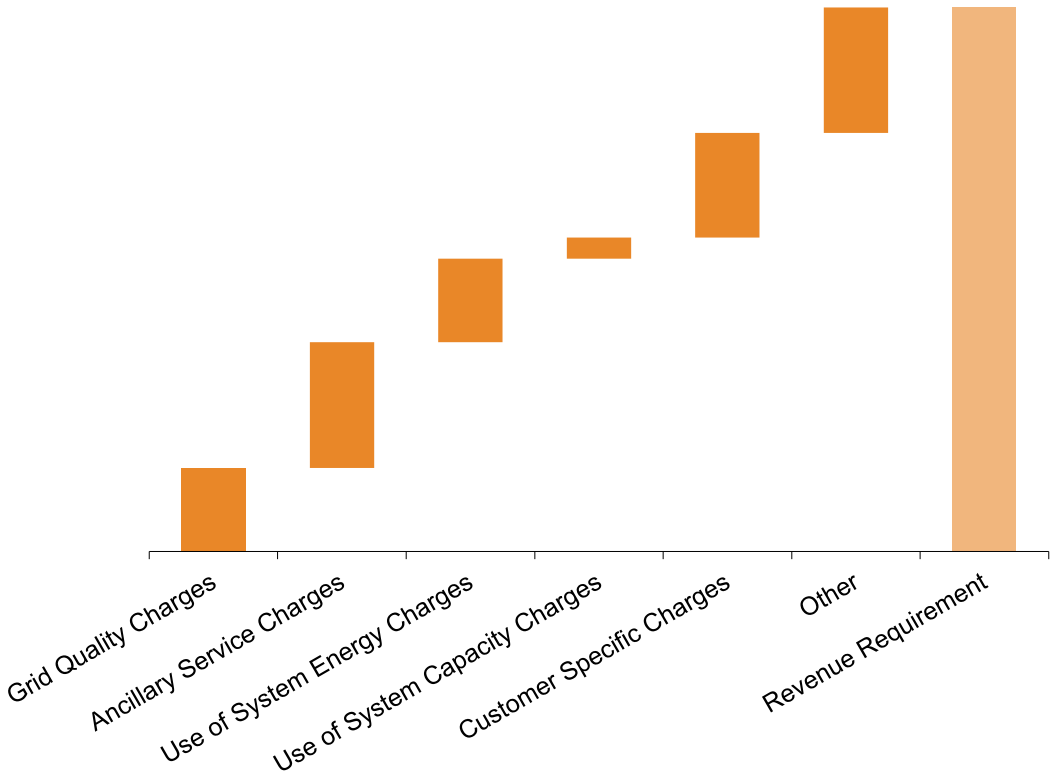


In seeking to achieve cost reflectivity in charges levied, a number of network cost components can be included in the tariff. Some of the more common cost components include:

- Energy charges
- Individual customer charges
- Charges for use of system capacity
- Use of system energy charges
- Ancillary service charges
- Grid quality charges.

In a well-designed pricing system, these various charges will add up to the total revenue required. This approach is depicted in Figure 4-2 below:

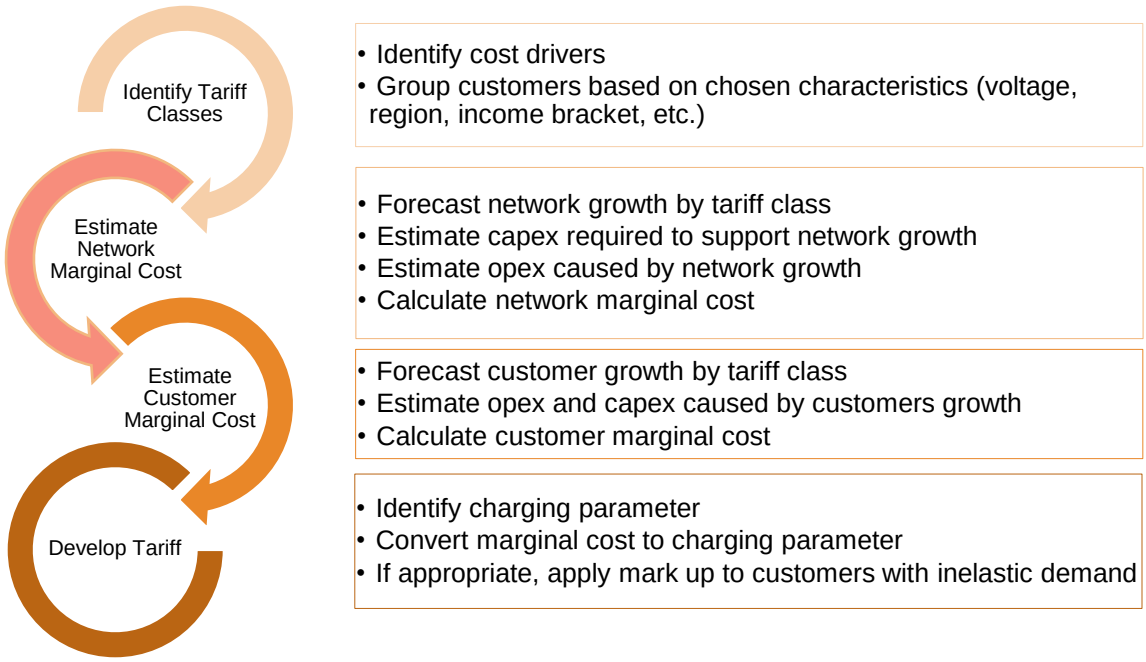
Figure 4-2: Example of Revenue Requirement to Cover Charges



If a utility has say, two classes of customers (for example, residential and commercial), the regulator will only approve rates that are sufficient to cover the costs incurred in providing the service to each of the two classes. If a regulator strictly adheres to the cost of service concept, then there should not be any cross-subsidization between the classes. However, there is almost always some level of cross-subsidization and, in some cases, it is an explicit policy objective of the authorities. In some countries, for example, cross-subsidization enables lifeline tariffs for the poor. If tariffs are truly cost-reflective, a distributor will be indifferent to any changes in the use of the network as cost changes will be exactly offset by matching revenue changes.

Below, as indicated in Figure 4-3 are some of the general steps often undertaken in determining and understanding the costs incurred in providing a service to a group of customers.

Figure 4-3: Understanding Costs Imposed by Customers



While we indicate that the adoption of cost of service tariff methodologies, such as the ones shown above, have been central to the success of the transition from a failing to a sustainable electricity industry, it is also worthy to note that well designed, well managed lifeline tariff programs that allow for the provision of electricity below cost to the poorest customers can also be integrated into a successful market structure.

Finally, while cost-reflective tariffs are important, a utility's ability to collect payment for the electricity it delivers is also a vital component of a healthy power system. If a utility has cost-reflective tariffs in place, but is unable to collect the revenues that it is owed by its customers, the sustainability of the industry is again threatened. However, global experiences in developing countries indicate that customers are generally willing to pay for the full cost of power, provided they receive an improvement in reliability and service delivery. For this reason, many electricity market reform programs combine implementation of a full cost recovery program with a utility performance improvement initiative that focuses both on reducing losses and increasing billings and collections.

4.2. Migration towards Cost of Service Tariffs

The migration to cost reflective tariffs can be accomplished in different ways. However, most migrations will involve the following three principal steps as they collectively determine the price path that will be followed in achieving cost reflective tariffs.

- *Determination of Required Revenues:* By and large, any migration to cost reflective tariffs will involve a thorough analysis of the costs incurred in providing the electricity service to all customers. This analysis forms the basis of the required revenues determination. A comprehensive revenue requirement determination will ensure that the utility will remain

financially sound and will be able to fully recover prudently incurred expenses, including a fair return on its necessary investments. The principles and components of required revenues have already been discussed in detail in Section 4.1 above.

- *Performance of a Cost of Service Study:* Making a full determination of revenue requirements often requires conducting a comprehensive Cost of Service Study (COSS). The purpose of a cost of service study is to compare the utility's revenues to revenue requirements by customer class. The process of determining the cost of service – and therefore establishing a cost reflective tariff – for each customer category will at the least require disaggregating the utility's costs into functions (generation, transmission, and distribution), and services rendered by the utility. The functionalized costs of providing service are first classified by cost components and then allocated to each class of service based on the specific service characteristics of that particular customer group (such as power delivery infrastructure used, voltage levels, etc.).
- *Design New Tariff Rates:* The final component in the migration to cost reflective tariffs is the design of new electric rates. The results of the COSS will indicate the degree to which existing rates recover revenues from each customer classification on a cost of service basis, and can be utilized by the regulator to design new rates that will fully cover the required revenues and sustain the utility, and the sector, going forward.

The need to understand, design and negotiate with utilities complicated cost reflective rate structures often means that regulatory agencies need to go through capacity building programs to ensure that they possess the skills necessary to efficiently oversee and support the transition to cost reflective tariffs.

Concurrent with the above mentioned steps, countries wishing to migrate to cost reflective tariffs often also seek to socialize the concept of cost of service tariffs to their customers. This can be done with the assistance of a public relations campaign that explains why cost reflectivity is needed, and how the removal of subsidies can benefit most customers. For example, energy subsidies often mostly advantage upper-income groups, and they divert public resources away from spending that is more pro-poor, and economic growth-enhancing.

The pacing of reforms is just as important as the reforms themselves, and as such, the regulator and utility may need to gradually lift prices to remove subsidies, while also striving to improve the quality of supply and quality of service. Hastily or overly aggressively hiking prices, or trying to rapidly implement a cost recovery program, may be politically and practically impossible, resulting in backlash from customers, and possibly the withdrawal of political support to the process. What is required is the adoption of a clearly articulated, well-structured plan that can be implemented over a reasonable time frame, but that is adhered to. The incorporation of publically announced automatic pricing mechanisms, for fuel feedstock for example, that respond to clearly defined input costs can also be useful, and help to depoliticize the tariff adjustment process.

4.3. Cost Reflectivity

As noted above, the drive towards cost-reflective tariffs remains a priority for the ESI in the SADC region. Reasons cited for this prioritization include:

- Ensuring the long term viability of the sector;
- Attracting private sector investment (e.g., IPPs);
- Increasing regional cross-border electricity trade;
- Encouraging the appropriate and efficient use of scarce resources;

- Facilitating investment, operational, and energy efficiency; and
- Facilitating a self-funding power sector that allows governments to fund other services/areas (e.g., education, healthcare).

In this Tariff Report, the definition of a cost-reflective tariff is the tariff level that can recover all the allowable costs of each regulated and licensed activity within the generation, transmission, distribution and supply value chain. 'Allowable Costs' in this case are all operating costs reasonably incurred, a fair rate of return on utility assets plus any other unique cost components allowed to be included in the calculation of the tariff level. In attempting to pass on the cost of service from the service provider to the consumer, cost reflective tariff structures usually include two basic categories, an energy charge(s) for the power used, and a delivery charge(s) to cover the cost of transporting the power to the user. Delivery charges can incorporate any element that has received regulatory approval, with examples being customer charge, meter ownership, service and data reading, as well as the more intuitive transmission charge. In some countries, a charge to enable the transition to a more efficient power market can also be levied.

It is important to understand that the concept of cost-reflective tariffs may be applied to different extents and at different scales in the ESI, ranging from an overall macro level down to individual customer tariff levels.

In the first instance, at the highest level, cost-reflective tariffs broadly refer to the overall average level of electricity tariffs across all customer groupings. This implies that the electricity sector as a whole is self-funding and is therefore economically viable and sustainable without the requirement for additional financial subsidization from other sources (e.g., the national budget). In other words, revenues from electricity sales cover the full cost of supply. This is typically the first priority in pursuing cost-reflectivity.

In the second instance, cost-reflective tariffs may refer to the level of tariffs associated with each aspect of the electricity supply value chain (e.g., generation/wholesale energy supply, transmission and/or distribution networks, and retail supply). While some countries have made progress in unbundling their tariffs to these value chain components, and are pursuing cost-reflective levels for each of these components (or competition, where tariffs are set by market forces), the vast majority of the countries in SADC have not yet done so.

Thirdly, it is possible to apply the notion of cost-reflective tariffs to individual customer categories or groupings (e.g., industrial, commercial and residential customers). However, it is understood that socio-economic policies (e.g., electrification and affordability, agricultural development, etc.) may mean that in most countries in the region, the pursuit of cost-reflectivity – while it remains a goal for the ESI as a whole - does not extend to tariff levels across all individual customer categories, with the most economically vulnerable receiving power at below cost.

There is a debate around how best to pay for the difference between revenue collected and the cost of service for such groups, with some advising cross-subsidization (e.g., rural electrification levies added to industrial consumers bills to fund rural electrification initiatives) and others believing the shortfall should be funded by sources outside of the industry, such as the national budget. Whichever approach is taken, and a combination of the two may be most effective, it is important that the subsidization program and the possible inclusion of levies or surcharges be evaluated, weighing the benefits against any associated negative impacts, and that the program is well planned and the costs, and implications for the broader ESI, clearly understood.

Within the SADC region, the current aspiration for most countries is to pursue cost-reflectivity at the overall average level of tariffs as the first step. This will be followed by cost reflectivity by customer class at more granular level leading to a reduction in cross-subsidization.

In order to meet cost-reflective criteria, tariffs must fulfil the following requirements:

- Distinct recovery and reflection of all the various costs incurred in the generation and supply of power i.e., fixed vs. variable costs;
- The utility must earn a reasonable return;
- Recovery of all prudent business operating and maintenance costs; and
- Positive and sustainable cash-flows.

While the above criteria are generally taken to define tariffs that are cost-reflective, individual regulators may have other jurisdiction-specific criteria, and/or may not include all of the above.

In determining progress towards cost-reflective tariffs across the SADC region, a questionnaire was sent to each of the national regulators, or responsible parties where no regulator yet exists (such as Botswana), with the following questions:

- Is there an approved/agreed plan to achieving cost-reflective tariff targets?
- Has a target date been set for achieving cost-reflective tariff levels?
- Have cost-reflective levels of tariffs been calculated for distribution?
- Have cost-reflective levels of tariffs been calculated for transmission?
- Have cost-reflective levels of tariffs been calculated for generation?
- Have overall cost-reflective tariffs been calculated?

The responses to the questionnaire are displayed in Table 4-1 below. A check mark indicates a response in the affirmative, an "x" indicates a response in the negative and a dash indicates no response was given.

Table 4-1: Progress towards Cost-reflective Tariffs

Country	Distribution		Transmission		Generation		Overall		Agreed Plan		Target Set	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Angola	×	×	×	×	×	×	×	×	✓	×	✓	×
Botswana	-	×	-	×	-	×	-	✓	-	-	-	✓
DRC	-	-	-	-	-	-	-	-	-	-	-	-
Lesotho	✓	✓	✓	✓	✓	✓	✓	✓	×	×	×	×
Madagascar	-	×	-	×	-	×	-	✓	-	×	-	×
Malawi	×	×	×	×	×	×	×	×	-	-	×	×
Mauritius	-	✓	-	✓	-	✓	-	✓	-	×	-	×
Mozambique	-	-	-	-	-	-	-	-	-	-	-	-
Namibia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RSA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Seychelles	-	-	-	-	-	-	-	-	-	-	-	-
Swaziland	×	×	×	×	×	×	✓	×	✓	-	×	×
Tanzania	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓
Zambia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zimbabwe	×	×	×	×	×	×	×	×	×	×	×	×
Total	**4**	**6**	**4**	**6**	**4**	**6**	**5**	**8**	**5**	**4**	**4**	**5**

Source: RERA Database 2012/2013

Although all SADC Member States formally announced a policy to adopt cost reflective tariffs by 2013 in 2008, as depicted in Table 4-1 above, only five countries (Botswana, Namibia, South Africa, Tanzania, and Zambia) out of fifteen reported in their survey response that a target date for achieving cost reflectivity had indeed been set. The target dates for those that did report positively ranged from 2012 to 2014. Angola, which reported in 2012 that a target date had been set for 2016, provided a negative response for 2013, which represents a misinterpretation of the question, rather than a change in policy. Overall, while there has been progress, it is apparent that the original 2013 date adopted across the region has not been achieved by any Member State.

4.4. Tariff Structure

In determining the tariff structure in each of the countries, regulators/responsible parties responded to a questionnaire that included the following questions:

- Do you have a separate tariff for generation?
- Do you have a separate tariff for transmission?
- Do you have a separate tariff for distribution?
- Do you have a separate tariff for retail?
- Do you have time of use (TOU) tariffs?
- Do you have a separate tariff for ancillary services?
- Do you have a separate tariff for renewable energy?

The responses to the questionnaire are displayed in Table 4-2 below. As in Table 4-1 above, a check mark indicates a response in the affirmative, an "x" indicates a response in the negative and a dash indicates no response was given.

Table 4-2: Summary of Tariff Structure (2013)

Country	Generation		Transmission		Distribution		Retail		Time of Use		Ancillary Services		Renewable	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Angola	×	×	×	×	×	×	✓	✓	×	×	×	×	×	×
Botswana	-	×	-	×	-	×	✓	✓	-	×	-	×	-	×
DRC	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-
Lesotho	✓	✓	×	×	×	×	✓	✓	×	×	×	×	×	×
Madagascar	-	✓	-	×	-	×	✓	✓	-	✓	-	×	-	-
Malawi	×	×	-	×	✓	✓	✓	✓	✓	✓	×	×	✓	✓
Mauritius	-	×	-	✓	-	×	✓	✓	-	✓	-	✓	-	×
Mozambique	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-
Namibia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	×	×	×
RSA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	×
Seychelles	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-
Swaziland	×	×	×	×	×	✓	✓	✓	✓	✓	×	×	×	×
Tanzania	×	×	×	×	×	×	✓	✓	×	×	×	×	✓	✓
Zambia	×	×	×	×	×	×	✓	✓	✓	✓	×	×	×	×
Zimbabwe	×	✓	×	×	✓	✓	✓	✓	✓	✓	×	×	-	✓
Total	**3**	**5**	**2**	**3**	**4**	**5**	**15**	**15**	**6**	**8**	**1**	**2**	**2**	**3**

Source: RERA Database 2012/2013

When rates for each of the distinct services (generation, transmission and distribution) are unbundled, it becomes easier to identify where inefficiencies lie within the ESI value chain. As depicted in Table 4-2, five members indicated that they had separate generation tariffs, five countries indicated they had separate distribution tariffs, and three countries indicated they had separate tariffs for transmission in 2013.

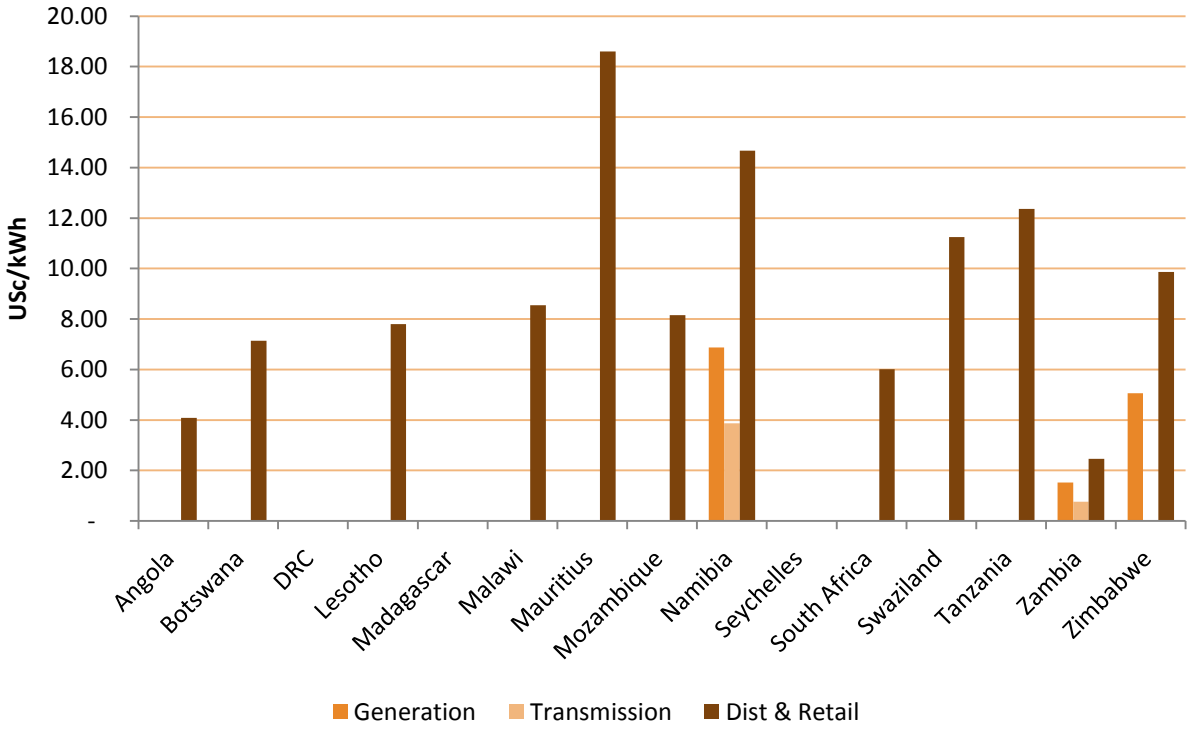
Among the countries that responded, only South Africa and Namibia had a complete set of tariffs for generation, transmission and distribution. It is noted that, in countries where the utilities were vertically integrated, generation, transmission, and distribution tariffs may be separately computed although they are not charged separately.

For 2013, Mauritius and South Africa acknowledged having a separate tariff for ancillary services while the rest of the countries did not. Additionally, three countries; Malawi, Tanzania and Zimbabwe indicated that they had separate tariffs for renewable energy technologies while the rest had none.

4.5. Tariff Levels

The average tariff levels for 2012 indicate that the distribution and retail sector had the highest tariff level in all the countries that submitted data except in Zambia, where the generation tariff was the highest.

Figure 4-4: Average Sectorial Tariffs (2013)



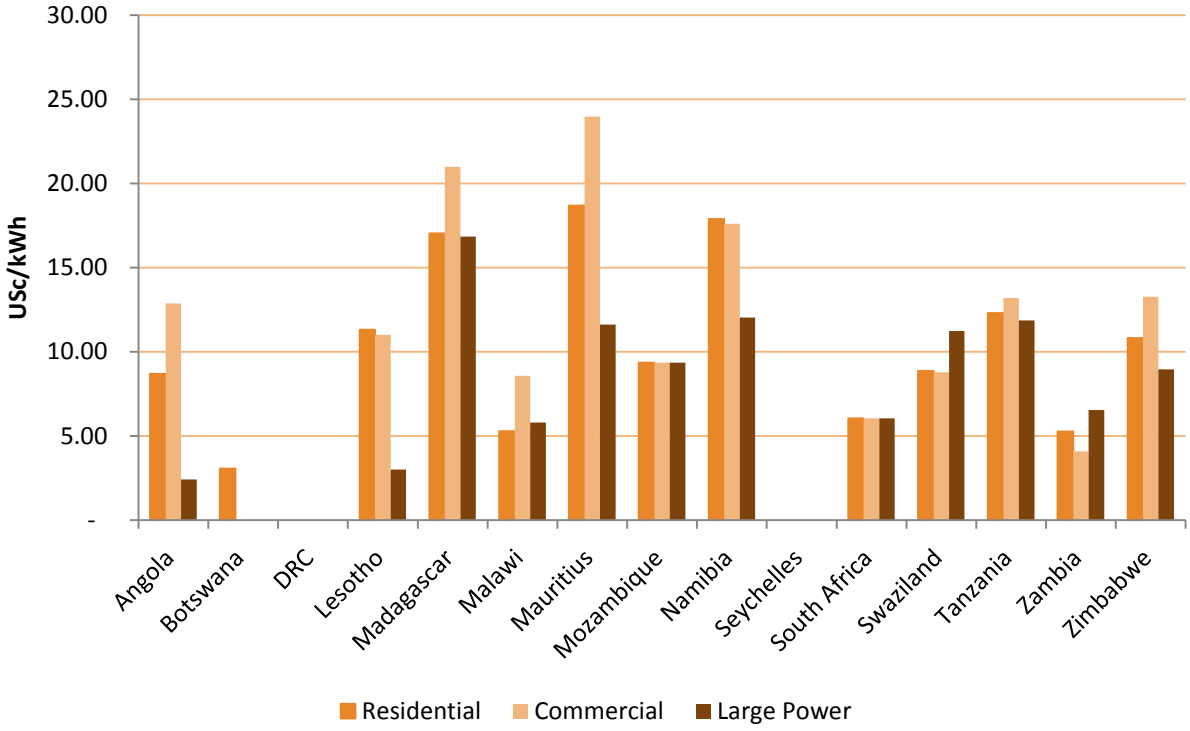
Source: RERA Database 2012/2013

Drawing meaningful conclusions from Figure 4-4 above is hampered by the lack of data. As can be seen in the graph above, most of the countries did not provide any information on unbundled tariffs. The most probable reason for this could be that a single bundled tariff is used in each of these countries. Table 4-2 above indicates that only South Africa and Namibia have sectorial tariffs, which stands in contrast to the results displayed in Figure 4-4 above.

There are a number of factors that explain why Zambia had the lowest average sectorial tariffs. Zambia's electricity generation is predominantly hydro powered, which is the cheapest mode of power production. On the other hand, of the seven countries that responded in 2013, only Zambia indicated responses for the three tariff categories. Tanzania had the highest distribution and retail average sectorial tariffs followed by Malawi and Angola while Zambia had the lowest, as depicted Figure 4-4.

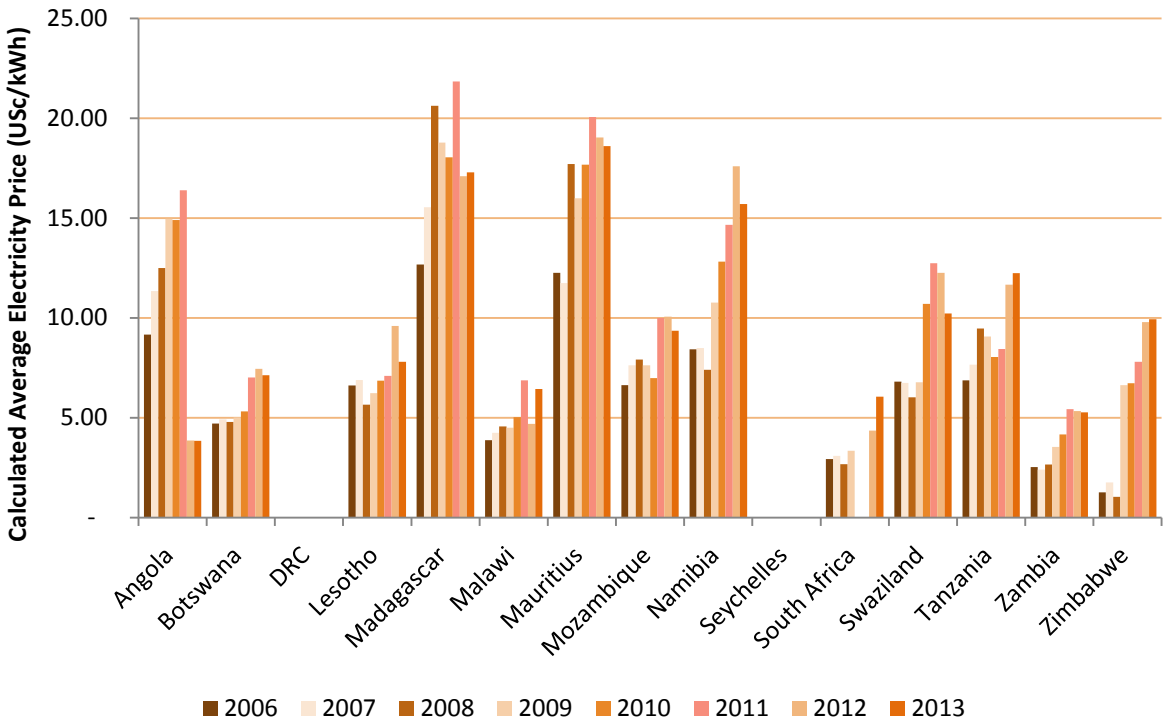
Figure 4-5 below shows the average end user tariffs for each of the customer categories in each of the Member States in the region. Two countries (DRC and Seychelles) did not provide tariff information for the customer categories, with one country (Botswana) providing tariff information on only the residential category.

Figure 4-5: Average End User Tariffs (2013)



Source: RERA Database 2012/2013

Figure 4-6: Calculated Average Electricity Price (2006 – 2013)



Source: RERA Database 2012/2013

The average calculated price of electricity depicted in Figure 4-6 above is inconsistent with expectations based on the situation on the ground. Reported data from SAPP indicates that in general tariffs are lower than is depicted in the graph above. However, the general direction of the inconsistencies is difficult to ascertain as there are several confounding factors. It is possible that perceived inconsistencies might result if some of the data provided does not include retail prices charged to the end users by Regional Electricity Distributors (REDs) and municipalities, as the case may be. Additionally, since this metric is calculated as revenues divided by power sold, it fails to account for other factors such as commercial and technical losses, which remain considerable.

4.6. Tariff Review

In 2012, all the regulators reported that tariff reviews were allowed in their respective countries. Further, all the regulators indicated that tariff reviews were allowed at least every 12 months except in Tanzania, where tariff reviews are allowed after 36 months. However, Zambia and Swaziland reported that utilities were at liberty to make tariff review applications as and when their cost structure changes to accommodate these cost changes. Shorter review periods might be beneficial in that they allow utilities to more quickly adjust the tariff and recoup unanticipated changes in their cost bases. In some cases, longer periods might be more beneficial as there are costs associated with performing tariff reviews.

For 2013, 11 of the 15 countries indicated that annual tariff reviews are allowed, while one (Angola) indicated that tariff reviews were not allowed. Extraordinary tariff adjustments to reflect significant changes in costs were allowed in six countries and not permitted in four.

In 2012, the latest tariff increases were as follows:

- Lesotho: 0% for bulk customers and 17% for end use customers;
- Namibia: 18% for bulk customers and 20% for end use customers;
- South Africa: 25% for bulk customers and 25% for end use customers;
- Swaziland: 0% for bulk customers and 8% for end use customers;
- Tanzania: 40.29% for end use customers;
- Zambia: 30% for bulk customers and 26% for end use customers; and
- Zimbabwe: 0% for bulk customers and 31% for end use customers respectively

4.7. Subsidies, Surcharges and Levies

In 2012, eight of the countries reported that levies, taxes and surcharges were allowed on tariffs as depicted in Table 4-3 below.

Table 4-3: Summary of Subsidies, Surcharges and Levies

Country	Cross-subsidies Between Customer Categories		Utilities Pay Subsidies		Utilities Receive Subsidies		Levies Allowed	
	2012	2013	2012	2013	2012	2013	2012	2013
Angola	-	-	×	×	✓	✓	✓	✓
Botswana	-	-	-	×	-	✓	-	✓
DRC	-	-	-	-	-	-	-	-
Lesotho	-	-	×	×	×	×	✓	✓
Madagascar	-	-	-	×	-	✓	✓	✓
Malawi	✓	✓	✓	✓	-	-	×	✓
Mauritius	-	-	-	✓	-	×	-	✓
Mozambique	-	-	-	-	-	-	-	-
Namibia	✓	✓	×	✓	×	×	✓	✓
RSA	✓	✓	✓	✓	✓	-	✓	✓
Seychelles	-	-	-	-	-	-	-	-
Swaziland	✓	✓	×	✓	×	-	✓	✓
Tanzania	×	×	×	×	✓	✓	✓	✓
Zambia	-	-	×	×	✓	✓	✓	✓
Zimbabwe	-	×	×	×	✓	-	✓	✓
Total	**4**	**4**	**2**	**5**	**5**	**5**	**9**	**12**

Source: RERA Database 2012/2013

Surcharges and levies normally consist of value-added taxes (VAT) and levies. In 2013, five countries indicated that their utilities received subsidies. In reality, all utilities in the region received subsidies from their governments especially in the wake of capital expenditure projects being undertaken to increase generation capacity. As an example, ZESCO in Zambia benefitted from the government's Eurobond funds to accelerate its generation expansion projects. Subsidies were a Zambian government policy aimed at supporting utilities as most tariffs were not cost-reflective. This is confirmed in Table 4-3 above; with Zambia indicating they received subsidies from the government.

In both 2012 and 2013, four of the countries, Malawi, Namibia, South Africa and Swaziland indicated that there were cross-subsidies between customer categories in their electricity tariff structures. In reality, cross-subsidies were inherent in most tariff structures especially in countries where tariffs were uniform throughout the country.

Five countries indicated that the utilities paid subsidies to other economic sectors of government (Malawi, Mauritius, Namibia, South Africa, and Swaziland) in 2013 compared to two in 2012. Five countries indicated that the utilities received subsidies from their respective governments (Angola, Botswana, Madagascar, Tanzania and Zambia) in 2013. Finally, twelve countries reported that taxes, levies and/or surcharges were allowed on electricity tariffs in 2013.

4.8. Rural Electrification Assets

The majority of rural inhabitants in the SADC region have no access to modern energy services, as shown in Figure 3-19. The vast majority of countries have rural electrification rates less than 20%. According to the World Bank, most rural communities cannot be transformed into modern economies without improved access to modern energy services. To that end, most countries in the region have programs and initiatives aimed at supplying rural communities with electricity. For example, the Tanzanian government set up (in 2007) an autonomous institution under the Ministry of Energy and Minerals known as the Rural Electrification Authority (REA) to spearhead the rural electrification program. In Zimbabwe, the Rural Electrification Fund Act (2002) established the Rural Electrification Fund which operates under the auspices of the Ministry of Energy and Power Development.

Funding for rural electrification programs vary from country to country. In Tanzania, funding for the REA is through the utility and other cooperating partners. Funding for the Rural Electrification Fund in Zimbabwe comes from a variety of sources including a 6% levy on all utility sales, and donations and grants from governments, organizations, and individuals. As shown in Table 4-4 below, rural electrification assets were funded from outside the utility in seven of the eight countries that responded to the questionnaire. Rural electrification operational deficits were funded from outside the utilities in six out of the 12 countries that submitted data.

Table 4-4: Summary of Rural Electrification Assets and Deficits Funding

Country	Rural Electrification Assets Funded from Outside the Utility?	Rural Electrification Operational Deficits Funded from Outside the Utility?
Angola	✓	✓
Botswana	✓	×
DRC	-	-
Lesotho	✓	✓
Madagascar	✓	×
Malawi	-	×
Mauritius	×	×
Mozambique	-	-
Namibia	✓	×
RSA	-	✓
Seychelles	-	-
Swaziland	-	✓
Tanzania	✓	✓
Zambia	✓	✓
Zimbabwe	-	×
Total	**7**	**6**

Source: RERA Database 2012/2013

Increasing energy access levels outside of urban areas remains a high priority policy initiative for all SADC Member States. Succeeding here, while also continuing to move towards cost reflectivity, requires a clearly thought through approach, as we have explained above in Section 4.3.

5.0. Conclusion

At its meeting in Zambia in February 2008, the SADC Council of Ministers resolved that Member States should endeavor to reach cost reflective tariffs by 2013, the second of the two years this Tariff Report reviews. While this Tariff Report and the factors summarized below indicate progress is being made, none of the reporting countries had achieved full cost reflectivity within the targeted time frame.

- Five countries reported a target date had been set for achieving full cost reflectivity in 2013, compared to four in 2012;
- Six countries reported they had calculated separate, unbundled costs for generation, transmission and distribution services in 2013, compared to four in 2012; and
- Eight countries reported they had calculated cost-reflective tariffs for electricity service in 2013, compared to five in 2012.

While there is a lot of work to be done to create a sustainable power sector across SADC that is able to attract private investment in the volumes needed, many Member States deserve recognition for making the politically difficult decision to implement the price hikes that their utilities require in order to move closer to being able to fully recover their own costs. In spite of this, five utilities reported that they had received subsidies from the government to cover costs, the same number as in 2012. As well as the need for cost reflective tariffs, the sector's continued reliance on subsidies underscores why SADC utilities have identified loss reduction as vital to enhancing their health. The importance of success here is reflected in the scale of losses reported by respondents to this Tariff Report, which, using a US$ 10 cent per kWh sale price, equates to the equivalent of close to US$5 billion in revenues in 2013 alone. A 33% reduction in losses would provide additional available capacity equal to at least 1,000 MW of new capacity at US$1.5 million per MW installed.

In continued support of the energy policy stated by southern African governments, the SADC utilities, RERA and its member regulators, have all committed to maintaining their efforts to continue implementing the transition to cost recovery going forward. Important initiatives in this context include RERA's decision to develop an online portal to act as a central repository for ESI data to increase the level of visibility into the sector's development, and also the design and implementation if an IPP Framework to promote increased private sector participation.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