

SOUTHERN AFRICA TRADE HUB



Technical Report:

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

SATH

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BACKGROUND ON 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 12 July 2002 and the Association was officially launched in Windhoek, Namibia on 26 September 2002. The Association was established in terms of the SADC Protocol on Energy (1996), the SADC Energy Co-operation Policy and Strategy (1996), the SADC Energy Sector Action Plan (1997), the SADC Energy Activity Plan (2000) and in pursuit of the broader initiative of the New Partnership for Africa's Development (NEPAD) and the African Energy Commission (AFREC).

RERA 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 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 organization 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 the vision and its commitment are captured in the following *Mission Statement*:

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

Membership to RERA is open to the electricity regulatory bodies in each country within the SADC region. As at 31 December 2009, eleven (11) out of fifteen (15) countries in the SADC region had established regulatory authorities and the following nine (9) 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 Authority (LEA)
- National Electricity Advisory Council (CNELEC) of Mozambique
- Malawi Energy Regulatory Authority (MERA)
- National Energy Regulator of South Africa (NERSA)
- Zimbabwe Electricity Regulatory Commission (ZERC)

CHAPTER 1: INTRODUCTION

In the Southern African Development Community Region (SADC), the availability of timely and reliable energy data in general and electricity tariffs data in particular remains a big challenge. As tasked by the SADC Ministers responsible for energy to bridge the information gap on electricity tariffs and selected performance indicators, a survey was carried out via a questionnaire distributed to all the fifteen (15) SADC countries. The following limitations were encountered and must be taken into account when reading this publication:

- Namibia and South Africa have partially unbundled industries with many distributors. The data returned for these two countries is a mix of data from the national power utility and other sources and is not entirely consistent with the other countries' data when it comes to customer and employee numbers which are not necessarily national totals.
- There were challenges with economic data on Zimbabwe and it had to be omitted on many of the country charts displaying economic and/or financial data in this report to avoid inadvertent distortions to the analysis. Although Zimbabwe provided information on most of the questions, the economic challenges that the country faced over the past few years would have made comparisons with other countries in the region difficult.
- The inflation, foreign exchange rate and GDP numbers provided by the survey respondents did not in all cases correspond to official national figures obtained from national statistics websites. The discrepancies have not been corrected in all cases and may lead to some inaccuracies. However, everything possible has been done to use the correct data. In most cases the data were obtained from the "African Statistical Yearbook 2010". Due to lack of real GDP data some of the economic analysis had to be omitted from this publication. The data for South Africa and Namibia were obtained from the official Reserve Bank of South Africa and Bank of Namibia websites.
- The following countries did not submit any data: Angola, Botswana, and the DRC. For this reason these countries are omitted from many charts (where general population and economic data was sourced separately they have been included). In addition some respondents did not provide data for 2010. For this reason a number of charts include only data up to 2009, specifically those charts displaying summed or averaged data for the whole region where the missing data would cause distortions.
- When information was omitted by respondents these countries were left out in that specific analysis for ease of reading and reference.
- Monetary amounts are expressed in USD (United States Dollars) unless stated otherwise.

The data obtained from responses to the RERA questionnaire (a summary of which is appended at the end of this publication) was augmented using the following key sources:

- Monitoring Performance of Electric Utilities - Indicators and Benchmarking in Sub-Saharan Africa, The World Bank 2009
- African Statistical Yearbook 2011, African Development Bank
- Southern African Power Pool (SAPP) Executive Committee Report to the Ministers Responsible for Energy in the SADC Region, Gaborone, Botswana, 26 May 2011

The main part of the Publication is organized in three sections. Chapter 2 deals with the demographic information of the RERA member countries followed by some economic indicators for the different countries. Chapter 3 deals with the technical information and indicators for the relevant countries and Chapter 4 provides an overview of the tariffs for the different countries.

CHAPTER 2: DEMOGRAPHIC AND ECONOMIC INDICATORS

The SADC region had a population estimated at 242 million in 2004. In 2010 the population in the region increased to an estimated 276 million. This constitutes an average population growth rate over the time period 2004 to 2010 in the region of 2% per annum.

The largest population is found in the DRC followed by South Africa, Tanzania and Mozambique. The countries with the smallest populations are Seychelles, Swaziland and Mauritius.

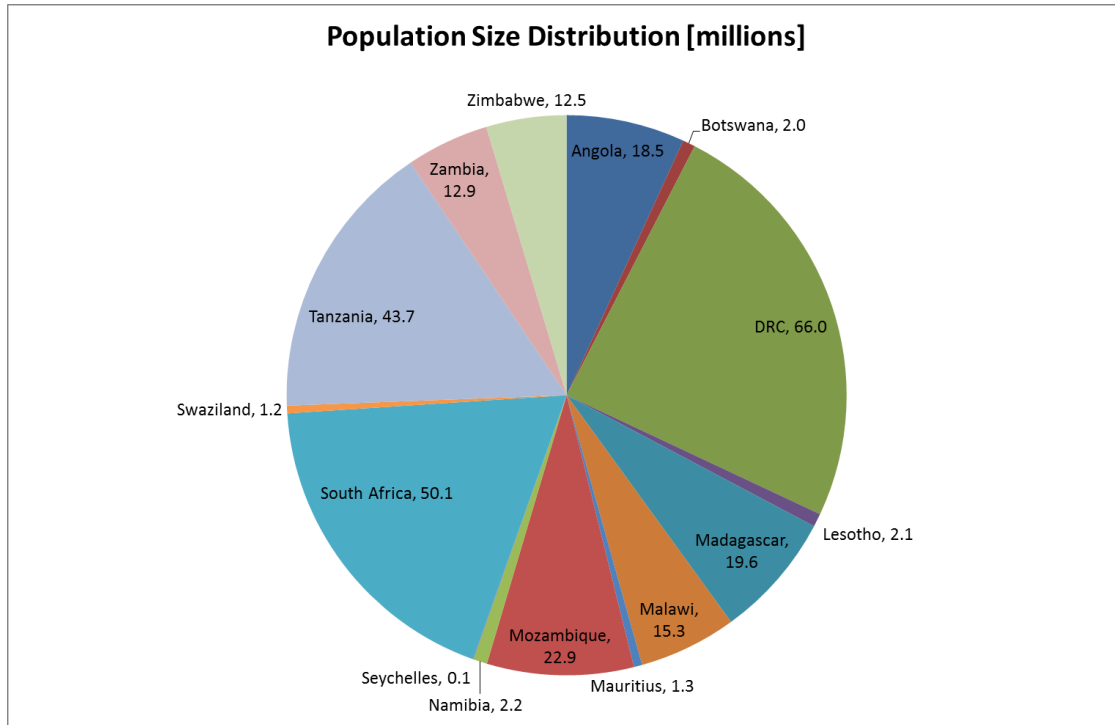


Figure 2-1: Population Size Distribution

In 2010 economic growth on average remained below the earlier trends in Southern Africa. This region had been most affected by the global recession and had experienced on average slightly negative growth in 2009. The South African economy recovered in 2010 with growth of 2.8%, after a negative growth of 1.7% in 2009 caused by the repercussions of the global recession. South Africa's recovery contributed to the rebound of the Southern Africa region, which grew by 3.3% in 2010 after having contracted by 0.5% in 2009. (Source: African Statistical Yearbook, 2011, African Development Bank)

The global recession temporarily stalled economic growth in Angola. Lower prices for oil and diamonds during the global recession led to a contraction in GDP in 2009.

The real GDP has shown a decline over the past four years in Botswana. The Botswana economy's dependency on diamonds makes it vulnerable to depressed commodity prices. Botswana's heavy reliance on this single luxury export was a critical factor in the sharp economic contraction of 2009 and 2010.

In the Democratic Republic of Congo (DRC) much economic activity still occurs in the informal sector that is not reflected in the GDP data. Renewed activity in the mining sector, the source of most export income, boosted the country's fiscal position and GDP growth from 2006-2008. The government's review of mining contracts that began in 2006, combined with a fall in world market prices for the DRC's key mineral exports weakened output in 2010.

Economic growth dropped in 2010 in Lesotho, due mainly to the effects of the global economic crisis as demand for the country's exports declined and Southern African Customs Union (SACU) revenue fell when South Africa - the primary contributor to the SACU revenue pool - went into recession in 2009.

Agriculture, including fishing and forestry, is the mainstay of Madagascar's economy, accounting for more than one-fourth of GDP and employing 80% of the population. Exports of apparel have boomed in recent years primarily due to duty-free access to the US. However, Madagascar's failure to comply with the requirements of the African Growth and Opportunity Act (AGOA) led to the termination of the country's duty-free access in January 2010. The current political crisis which began in early 2009 has dealt additional blows to the economy. Tourism dropped more than 50% in 2009, compared with the previous year, and investors seem wary of entering the uncertain investment environment.

Landlocked Malawi ranks among Southern Africa's most densely populated and least developed countries. The economy is predominately agricultural with about 80% of the population living in rural areas. Agriculture, which has benefited from fertilizer subsidies since 2006, accounts for more than one-third of GDP and 90% of export revenues. The performance of the tobacco sector is key to short-term growth as tobacco accounts for more than half of exports. With donor and economic assistance from the IMF and World Bank the Malawi economy has shown substantial growth GDP growth in 2009. However, the government will have to address barriers to investment such as unreliable power, water shortages, poor telecommunications infrastructure, and the high costs of services.

The economy of Mauritius rests on sugar, tourism, textiles and apparel, and financial services, and is expanding into fish processing, information and communications technology, and hospitality and property development. Sugarcane is grown on about 90% of the cultivated land area and accounts for 15% of export earnings. Mauritius' sound economic policies and prudent banking practices helped to mitigate negative effects from the global financial crisis in 2008-2009.

The real GDP growth declined since 2006 in Mozambique from 8.7% in 2006 to 6.3% in 2009. However, the economy is showing positive signs of recovery after years of civil war. In spite of economic recovery, Mozambique remains dependent upon foreign assistance for more than half of its annual budget, and the majority of the population remains below the poverty line.

The Namibian economy is heavily dependent on the extraction and processing of minerals for export. Mining accounted for 6% of GDP in 2010, but provides more than 50% of foreign exchange earnings. Namibia is the world's fourth-largest producer of uranium. The Namibian economy is closely linked to South Africa with the Namibian dollar pegged one-to-one to the South African rand. Until 2010, Namibia drew 40% of its budget revenues from the Southern African Customs Union (SACU). Increased fish production and mining of zinc, copper, and uranium spurred growth in 2006-2008, but growth in recent years was undercut by poor fish catches, a dramatic decline in demand for diamonds, higher costs of producing metals, and the global recession.

Growth was robust from 2004 to 2007 as South Africa reaped the benefits of macroeconomic stability and a global commodities boom, but began to slow in the second half of 2007 due to the electricity crisis and the subsequent global financial crisis' impact on commodity prices and demand. At the end of 2007, South Africa began to experience an electricity crisis. State power supplier Eskom encountered problems with aged plants, necessitating "load-shedding" to residents and businesses in major cities. GDP fell to negative 1.7% in 2009.

Surrounded by South Africa, except for a short border with Mozambique, Swaziland is heavily dependent on South Africa from which it receives more than nine-tenths of its imports and to which it sends 60% of its exports. Swaziland's currency is pegged to the South African rand, subsuming Swaziland's monetary policy to South Africa. The government is heavily dependent on customs duties from the Southern African Customs Union (SACU), and worker remittances from South Africa substantially supplement domestically earned income. Just like for other countries in the region who are members of SACU, customs revenues fell due to the global economic crisis and a drop in South African imports leading to a contraction of the real GDP over the past number of years.

Continued donor assistance and solid macroeconomic policies supported a positive growth rate in Tanzania despite the world recession. In 2008, Tanzania received the world's largest Millennium Challenge Compact grant, worth \$698 million. The government used fiscal stimulus and loosened monetary policy to ease the impact of the global recession. Real GDP growth in 2009 was a respectable 6% per year due to high gold prices and increased production.

Zambia's economy has experienced strong growth in recent years, with real GDP growth in 2006-2009 about 6% per year. Zambia's dependency on copper makes it vulnerable to depressed commodity prices, but record high copper prices and helped Zambia rebound quickly from the world economic slowdown that began in 2008.

Zimbabwe's economy is showing signs of recovery though the country is still facing a number of economic challenges, including a large external debt burden and insufficient formal employment. The power-sharing government formed in February 2009 has led to some economic improvements, including the cessation of hyperinflation by eliminating the use of the Zimbabwe dollar and removing price controls.

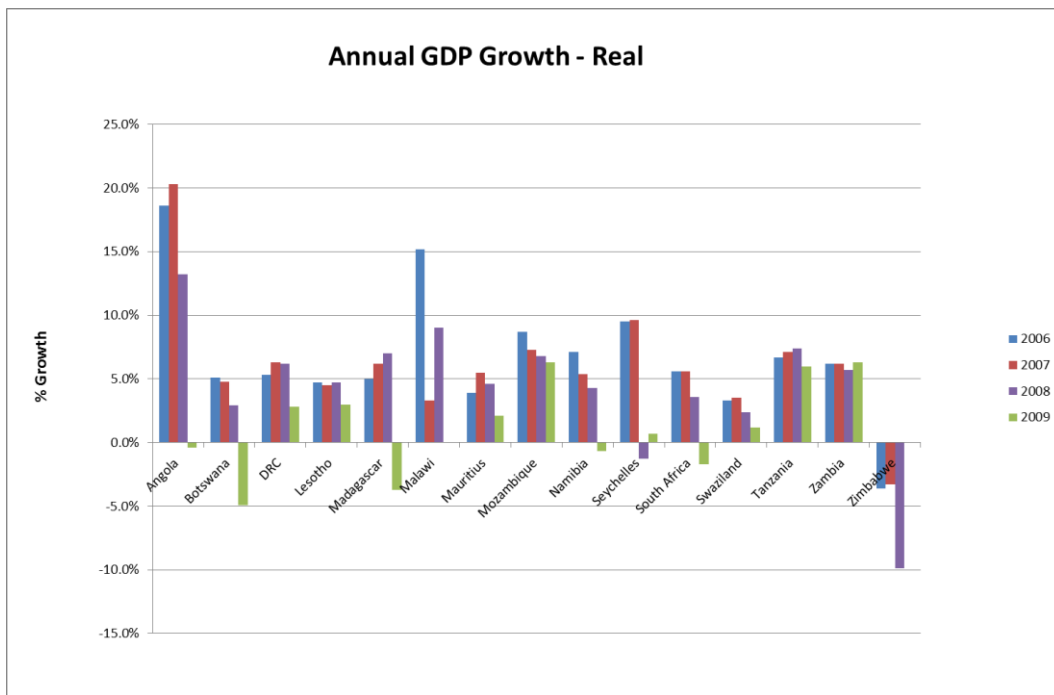


Figure 2-2: Annual Real GDP Growth per Country

The Gross Domestic Product for the SADC countries also mirrored the economic crisis of the world with a decline over the past two years due to heavy dependence on mining or the South African Customs Union (SACU). More diversified efforts are needed to ensure continued growth in all the SADC countries.

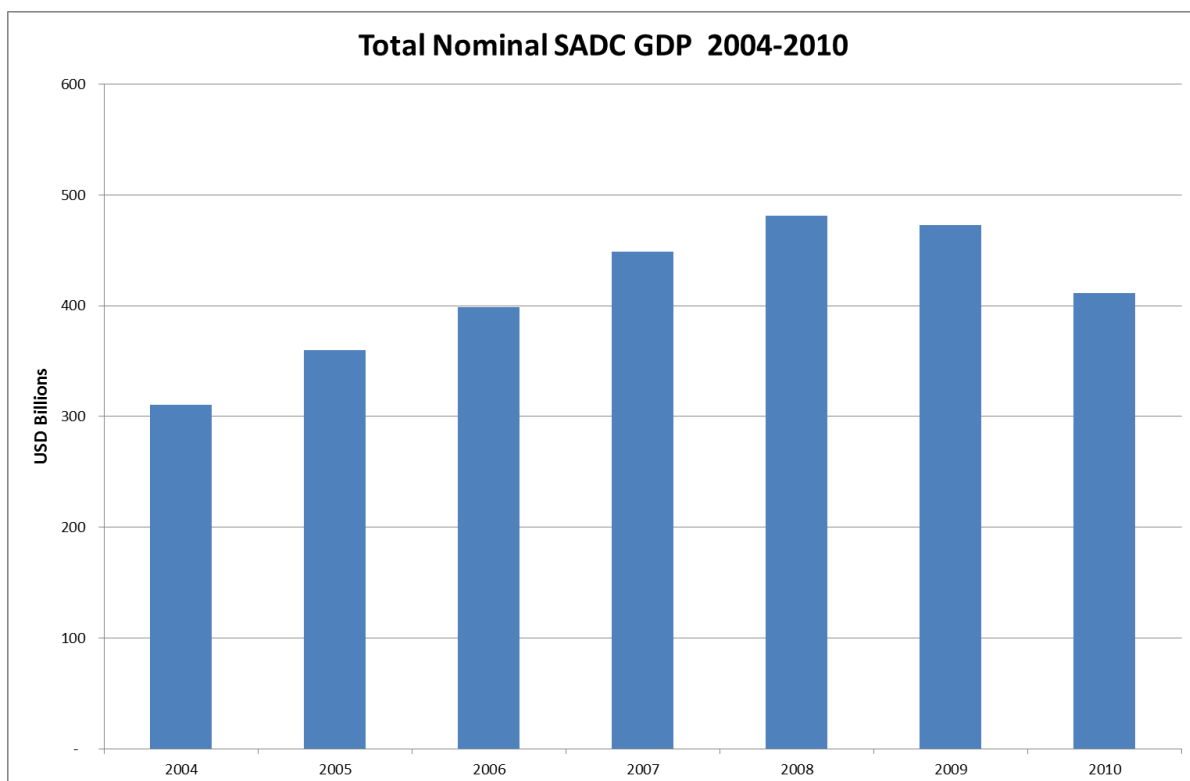


Figure 2-3: Nominal SADC GDP Trend

The South African economy continues to dominate the region followed by Angola and then Tanzania. The rest of the countries' economies are more or less equal in size.

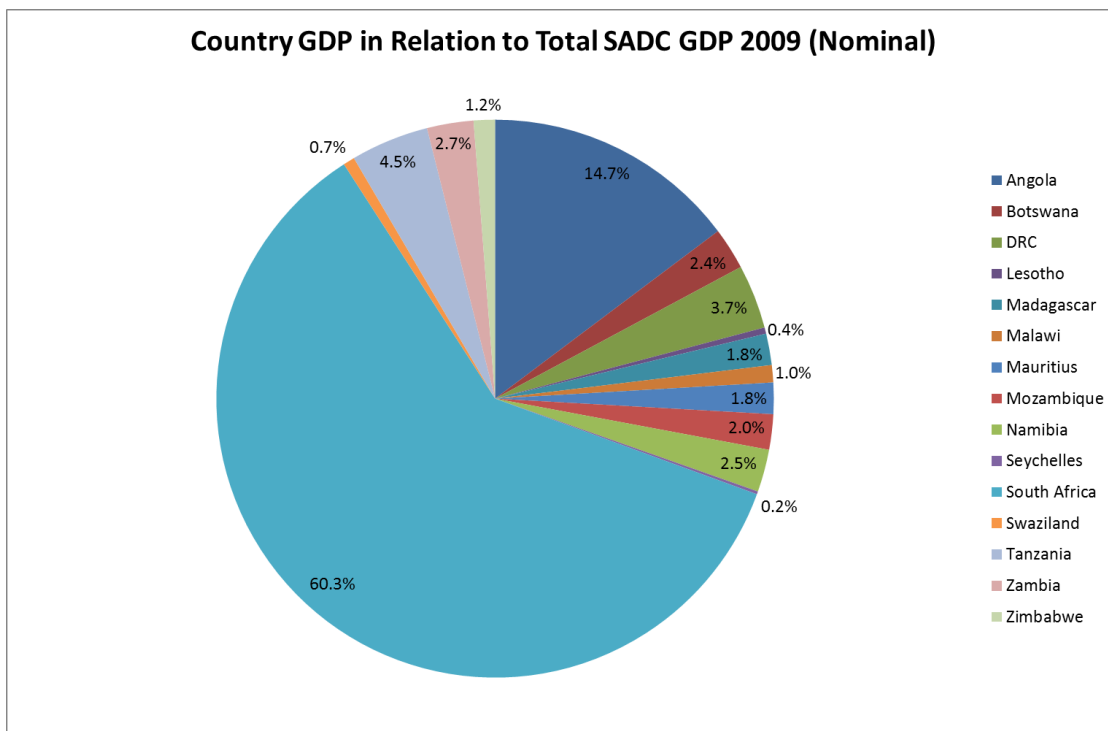


Figure 2-4: Country GDP in Relation to Total SADC GDP - 2009

The moderation of inflation allowed the monetary policy to remain on the whole accommodating, as in South Africa where authorities lowered its policy interest rate to further support economic activity. Most countries followed a monetary policy of low interest rates to stimulate economic growth. Most countries inflation rates declined from the 2008 levels except in Angola and Mozambique.

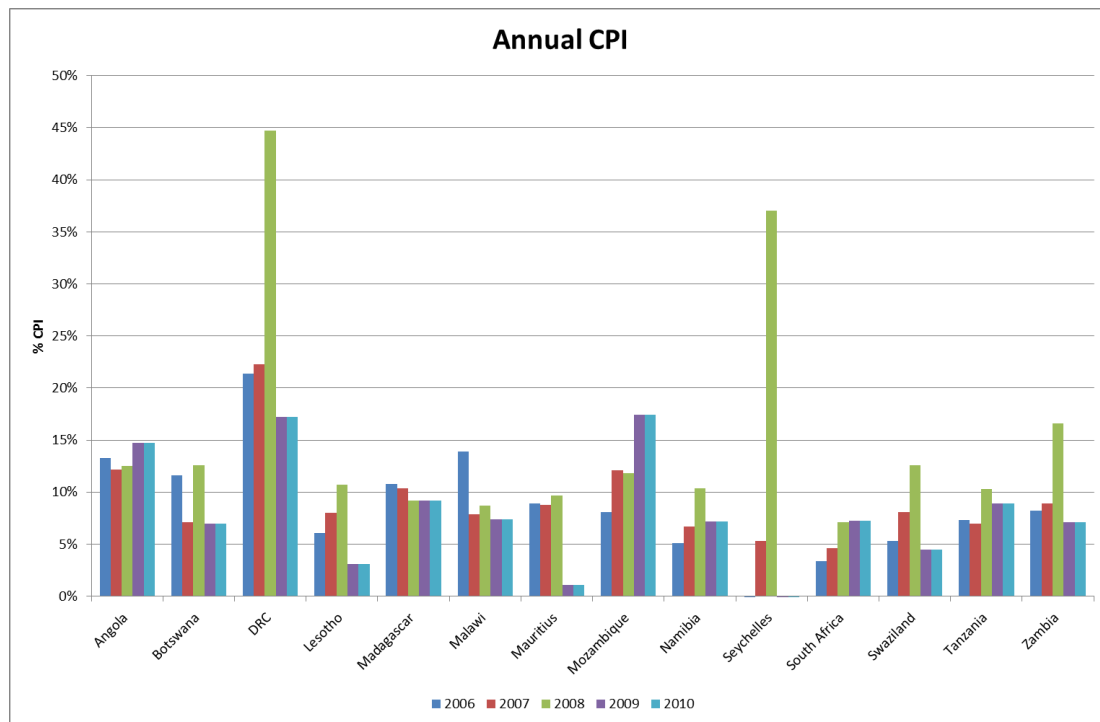


Figure 2-5: Annual CPI per Country

GDP growth and electricity system growth are normally very closely correlated. This is due to the fact that the economy and electricity are interdependent. Electricity is needed for economic growth and without economic growth the demand for electricity does not usually grow. From the figure this correlation is very clear but in many countries the demand for electricity was increasing at a faster rate in 2009 than economic growth. This can be seen in all countries except Namibia, Swaziland and Zambia.

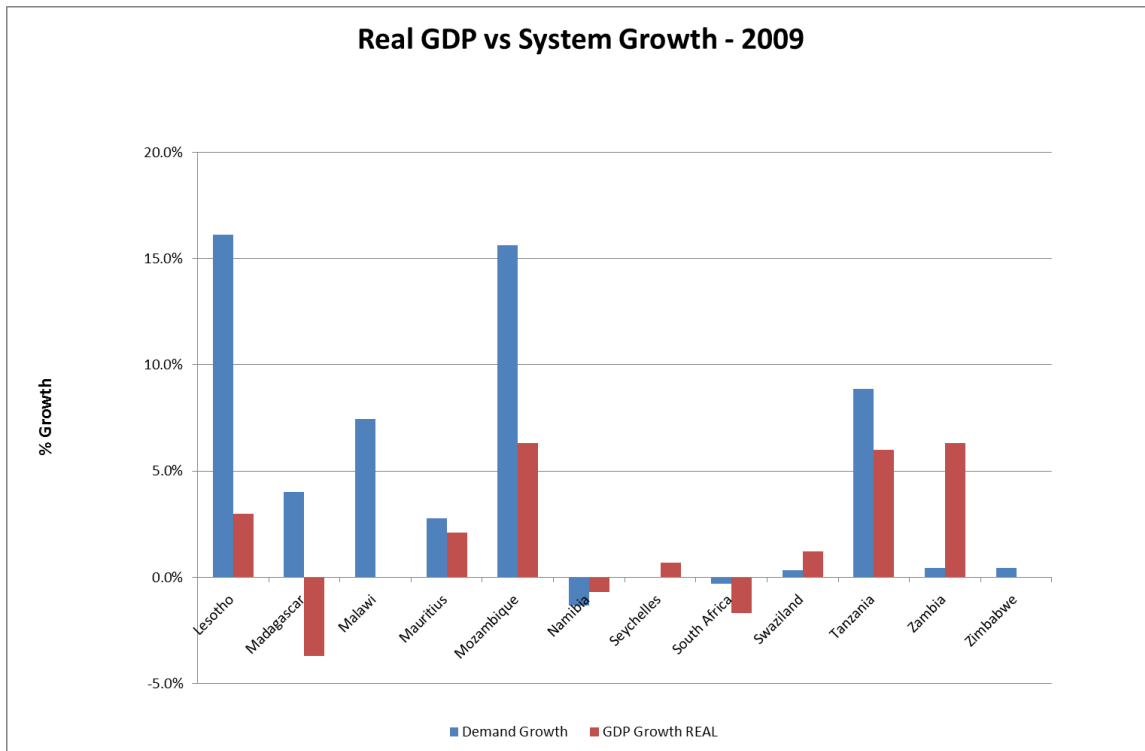


Figure 2-6: Real GDP vs. System Growth in 2009

The indicator of annual per capita consumption of electricity reflects the level and potential of the country's economic development. It is also indicative of the power sector's ability to benefit from economies of scale in the sector. According to the World Bank (2009) the kWh/capita indicators for low income countries is 309 kWh/person and for lower middle income countries 1,269 kWh/person. This is the group under which most of the SADC countries who responded and provided data to calculate this indicator, are classified. South Africa falls outside these brackets into the upper middle income countries where the benchmark is 3,242 kWh/person.

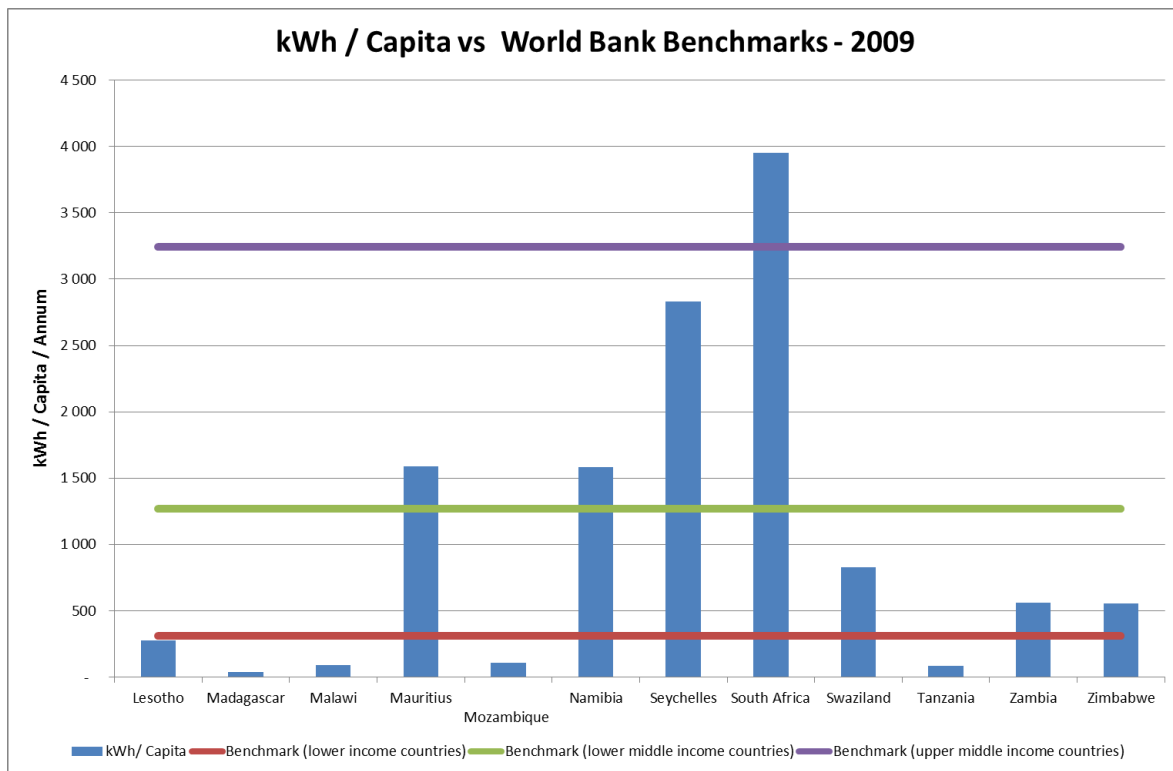


Figure 2-7: Electrical Energy per Capita vs. Benchmarks

In summary, the economies in the region continued to vary in size and composition. South Africa dominates the region as the largest economy whereas the DRC has the largest population. Due to the impact that the financial crisis had on the economy of South Africa, many of the countries belonging to SACU recorded a decline in revenue due to reduced SACU income. Electricity plays an increasingly important role in contributing to economic growth in the region and at the same time economic growth contributes to the increase in demand for electricity. This places additional pressure on utilities and governments to utilize scarce resources in the most efficient ways.

CHAPTER 3: TECHNICAL AND SYSTEM INDICATORS

The technical and system considerations in much of the SADC region have been dominated by the generation shortage in recent years. Electricity production costs have risen sharply and the generation capacity crisis is by no means over. It is expected that supply will have difficulty meeting increasing demand as utilities and countries struggle to build new generation capacity at a rate that would create a larger margin between supply and demand. When the region will eventually emerge from the tight supply situation will depend on how much of the expected demand growth will become reality, and to what extent generation build programs are completed in time. SAPP's 2011 projections indicate that the present crisis is likely to continue until at least 2014 in terms of generation capacity and 2016 in terms of availability of adequate amounts of energy.

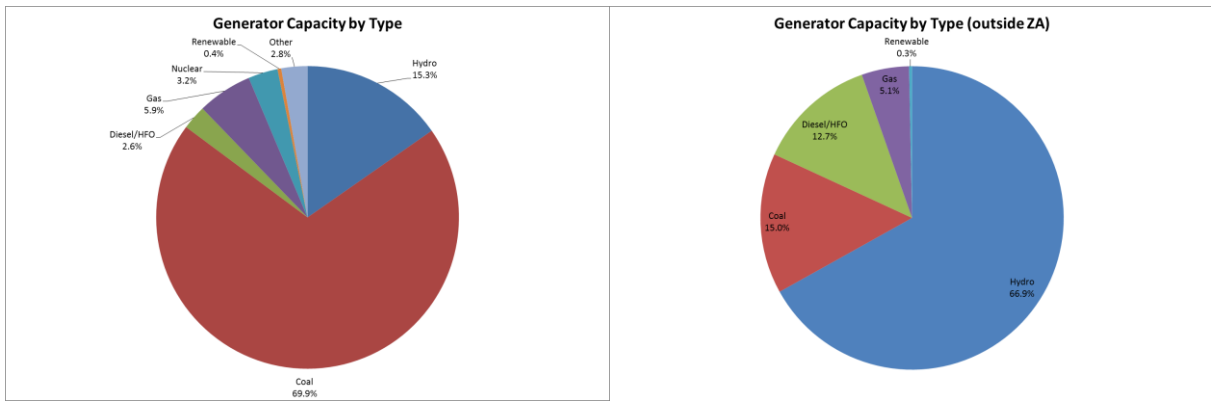


Figure 3-1: Generation by Type

The current generation mix in the region is dominated by coal (almost 70%). Outside South Africa the generation mix is dominated by hydro (67%), followed by coal (15%).

Renewable generation (other than hydro) is still in its infancy, contributing only marginally (0.4%) to the regional generation mix. Few countries outside South Africa and Tanzania have concrete schemes promoting renewable energy sources, and even in South Africa the REFIT (Renewable Energy Feed in Tariff) scheme has produced few if any actual projects so far. However South Africa has in 2011 announced an NIRP (National Integrated Resource Plan) that promises significant investment in a portfolio of renewable generation options, prominently featuring large scale wind and solar generation.

Hydro generation does account for about two thirds of installed capacity outside South Africa. This gives that part of the region an impressive renewable energy status. According to SAPP the new generation mix planned for 2011-2016 comprises 27.8% hydro, 0.6% solar and 1.3% wind.

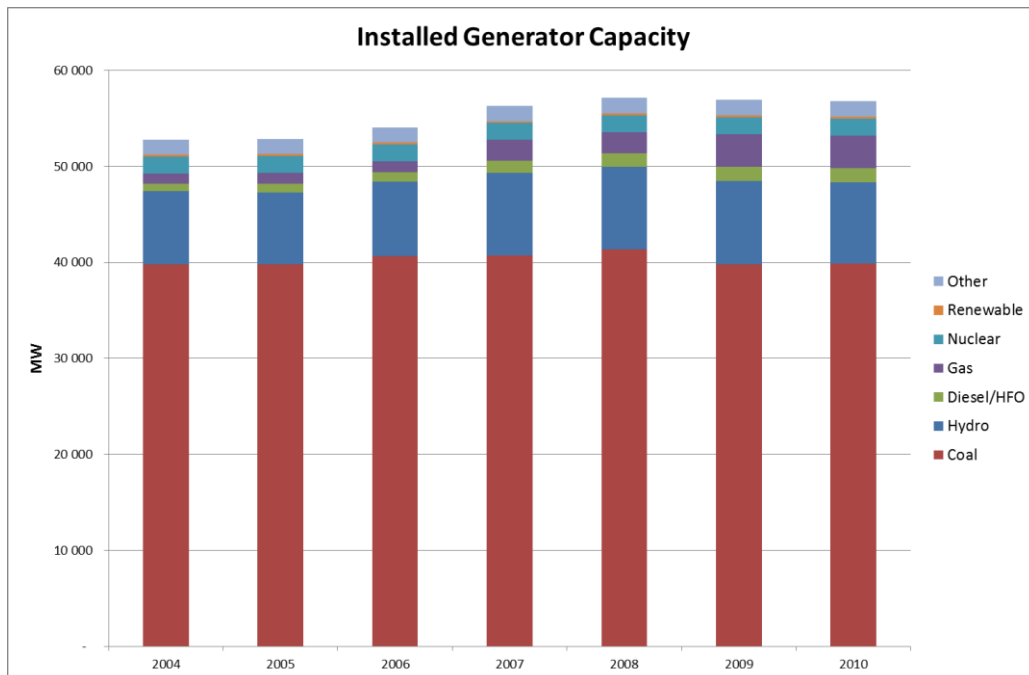


Figure 3-2: Installed Generator Capacity Trend

Installed generation capacity has not increased much since 2004 according to the data submitted. The growth recorded was mostly in gas and diesel/HFO (Heavy Fuel Oil) generation plants. This supports the notion that the generation crisis hit the region without adequate preparation since most new generation is of types that can be deployed quickly, even though they are some of the most expensive generation types available. Even though most utilities did foresee the looming crisis it appears that investment decisions to avert it could not be made in time.

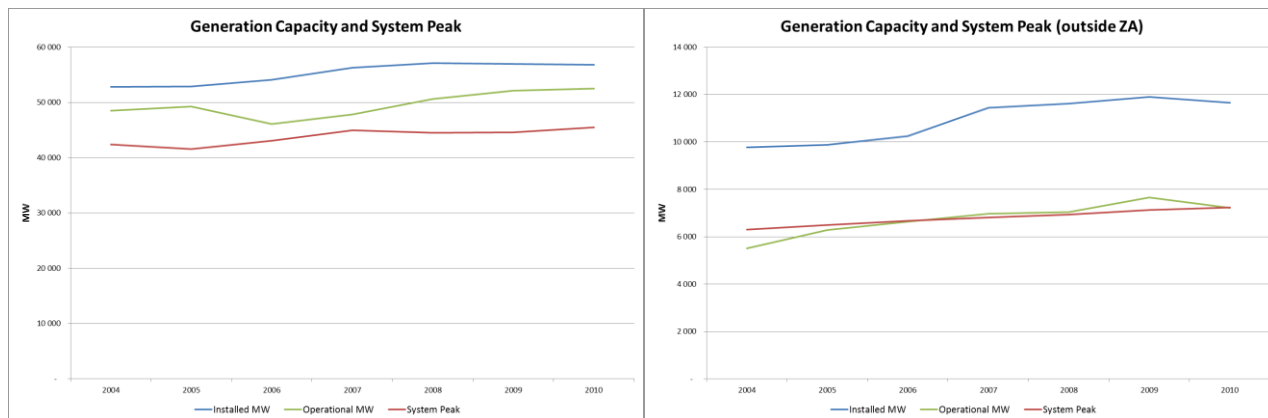


Figure 3-3: Generation Capacity and System Peak Trend

Comparing installed generation capacity to the summated peak demand (simple summation not taking into account diversity) indicates a healthy reserve margin; however the operational capacity leaves much less margin. According to the data submitted the actual margin was at a minimum in 2006 and 2007, improving thereafter (although SAPP forecasts indicate a narrowing of the margin in the next years). Omitting South Africa from the analysis yields a different picture: Operational capacity barely covers system peak demand, even though installed capacity would provide a comfortable margin if more were operational. This appears to indicate that returning non-operational plant to service could solve some of the capacity problems outside South Africa.

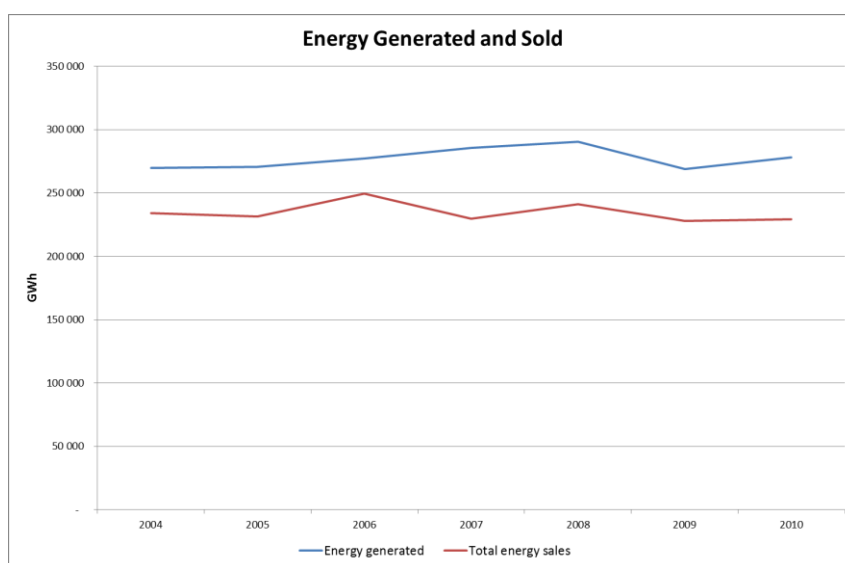


Figure 3-4: Energy Generated and Sold Trend

The data on energy generated and sold indicates moderate growth before the global financial crisis, with limited recovery so far after the crisis (even though many of the economies have shown recovery). This will in part be due to DSM (Demand Side Management) measures which were widely implemented. According to SAPP a saving of 750MW had been realized by 2010 through compact fluorescent lighting programs, and a total of over 4000MW in savings are planned by 2012.

The margin between sales and production can in part be attributed to system losses, the remainder being attributed to data inconsistencies with probably some element of electricity theft also showing. The difference between energy generated and sold calculated from the data varies between 10% and 20% over the years under review.

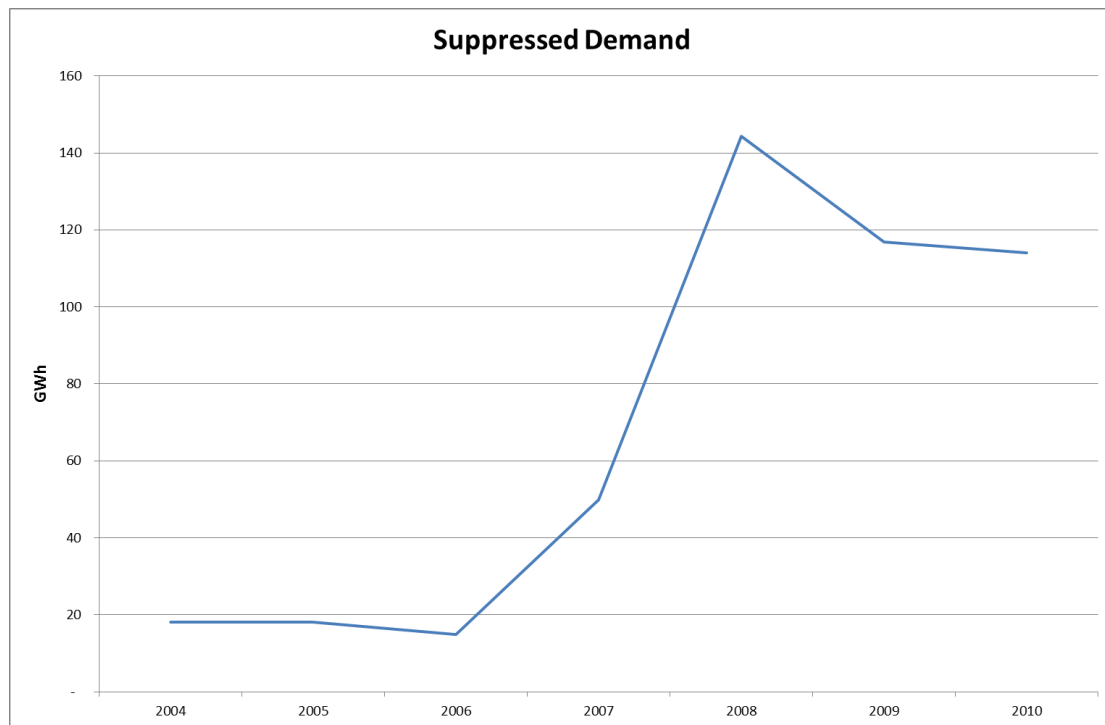


Figure 3-5: Suppressed Demand Trend

The reported amount of suppressed demand for electricity correlates with the peak of the energy crisis in 2008 when unplanned and planned plant outages came together to result in the most prominent power cuts in South Africa and those countries that rely heavily on supply from South Africa. The situation has since stabilized, however suppressed demand remains in place due to continuing supply constraints. Few countries reported on suppressed demand, and it is likely that the true suppressed demand in the region is far beyond that reported here.

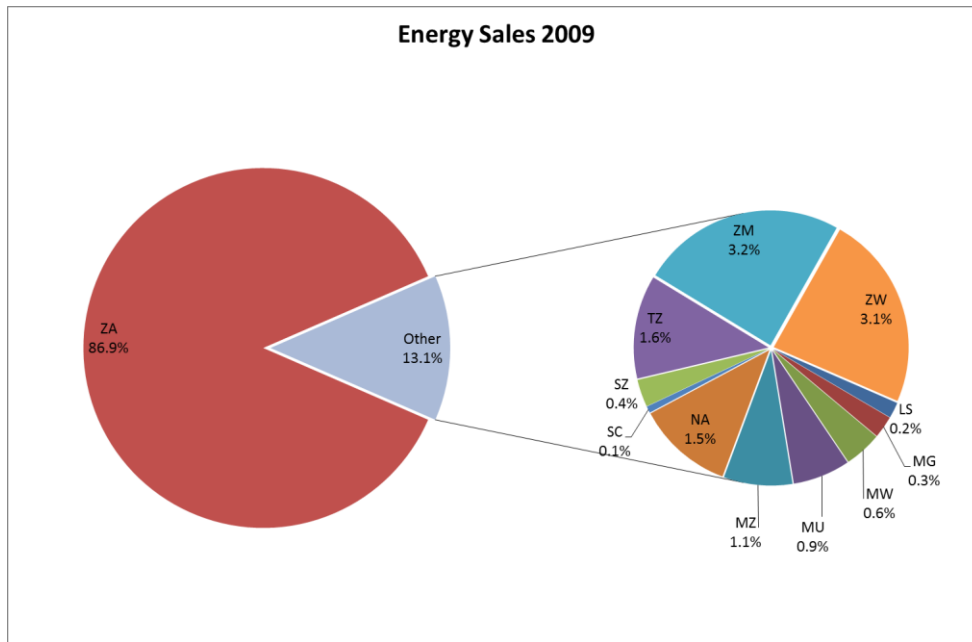


Figure 3-6: Energy Sales by Country

The regional electricity market is also dominated by South Africa which accounts for more than 85% of electricity consumption, followed by Zimbabwe and Zambia who together account for almost half of the remaining sales of electricity. Unfortunately the consistency of reported data does not allow conclusions to be made on the trend over time of South Africa's proportion of energy consumption.

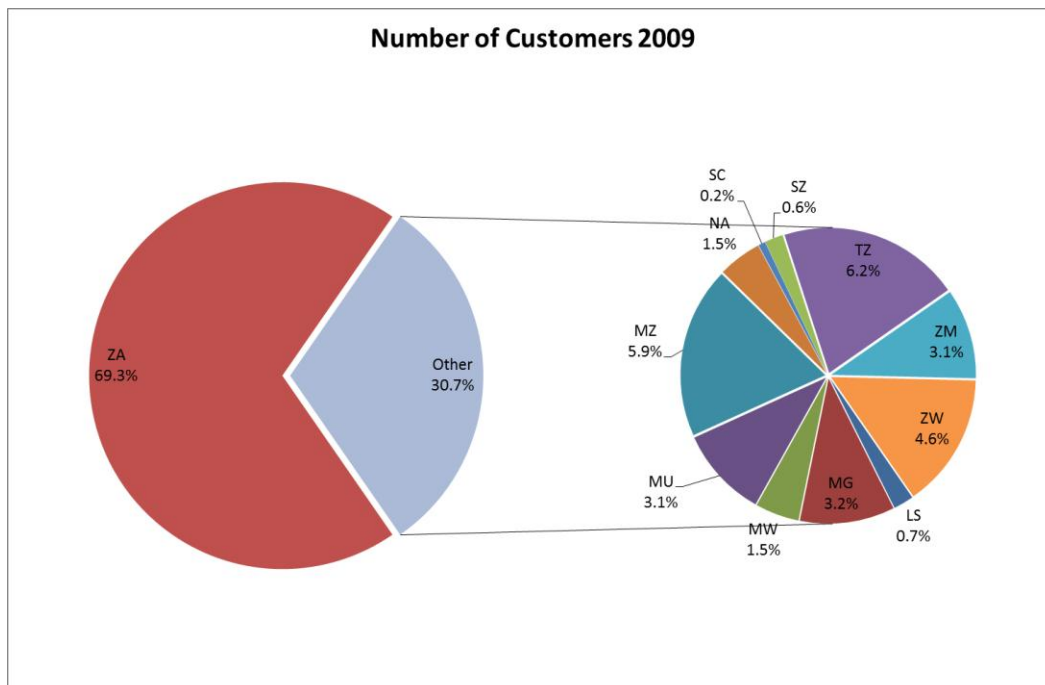


Figure 3-7: Customer Numbers by Country

South Africa also dominates in terms of customer numbers, however not as much as for energy sales. South Africa accounts for almost 70% of customers, followed by Tanzania,

Mozambique and Zimbabwe who together account for about half the remainder. It is noteworthy that Mozambique has a much higher proportion of customers than of energy. Overall the lesser dominance of South Africa on customers compared to energy indicates a more energy intensive economy (and industry) than the average in the region. This finding is even more significant when put in the context of South Africa's relatively high household electrification rate.

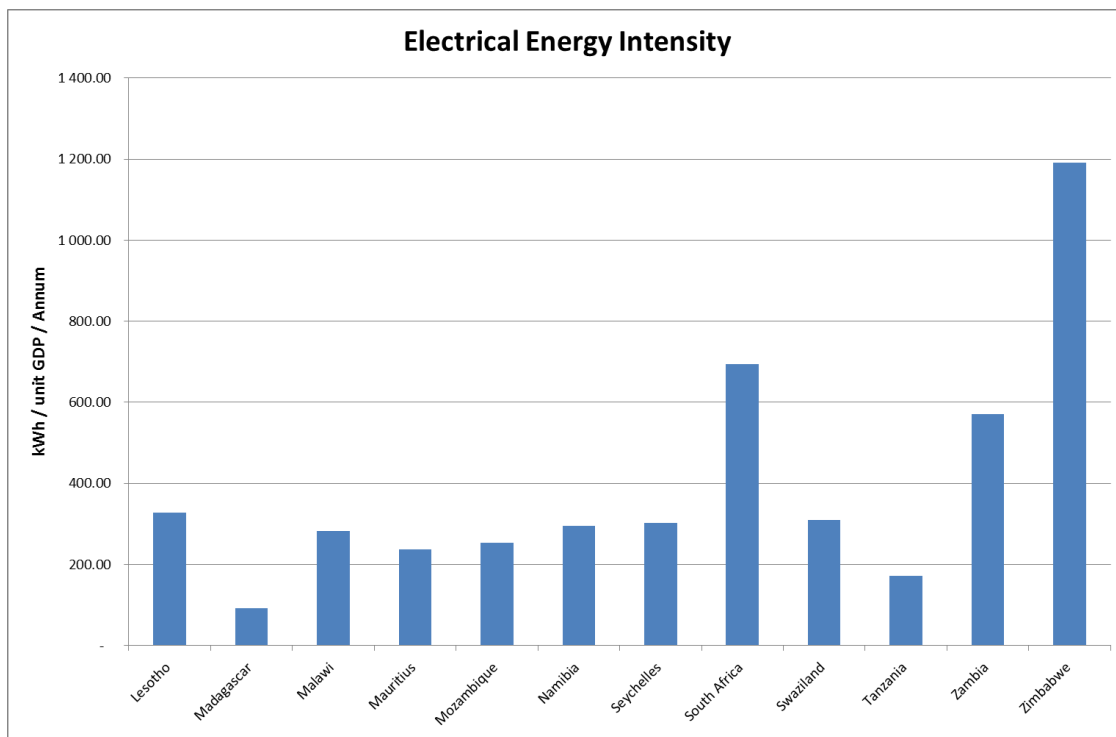


Figure 3-8: Electrical Energy Intensity by Country

Considering electrical energy intensity (per unit GDP in 2009 nominal terms converted to USD) gives another measure of industrialization without distorting the measure with population numbers. This puts Zimbabwe, South Africa and Zambia on top with most of the other countries roughly on the same level. The notable exceptions at the low end are Madagascar and Tanzania whose data seem to indicate economies with lower reliance on electricity.

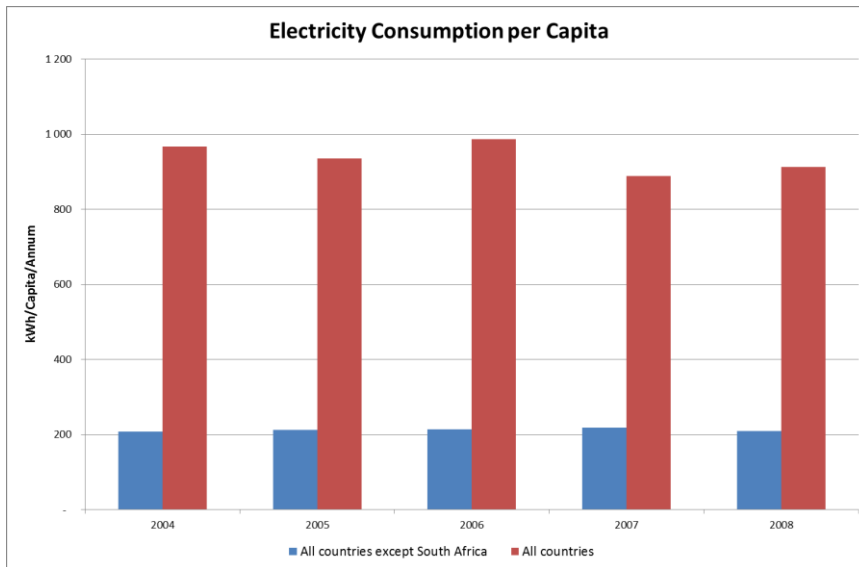


Figure 3-9: Electricity Consumption per Capita

The trend of electricity consumption per capita shows a roughly even trend, the data does however include some unexplained fluctuations. Once again South Africa's economic dominance in the region is shown when the country is excluded from the regional data, which brings down the average consumption by up to 80%.

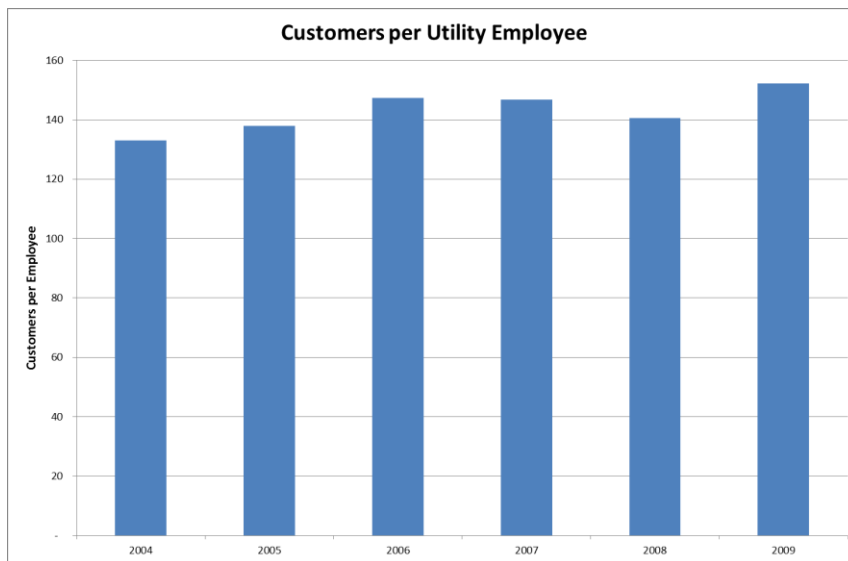


Figure 3-10: Customers per Employee Trend

The trend for customers per utility employee is a key utility efficiency indicator. This shows a moderately improving trend over time for the region as a whole, which is encouraging. The data collected lumps all utility employees together irrespective of which sector of the electricity value chain they are employed in, and this introduces some distortion. It is however assumed that most employees are engaged in the distribution and retail sectors, which is where this measure gives the most direct indication.

Compared to international benchmarks (which indicate a range of 200 to 400 customers per employee) the figures shown are low. In the Southern African region the customer

profile is different from most developed countries (where the benchmark figures originate) in that rural customers are far more dominant here. Rural customers and networks bring with them a much higher overhead in terms of personnel requirements due to the low geographic customer density compared to developed (and highly urbanized) countries. This impacts the level of customers per employee that can realistically be achieved.

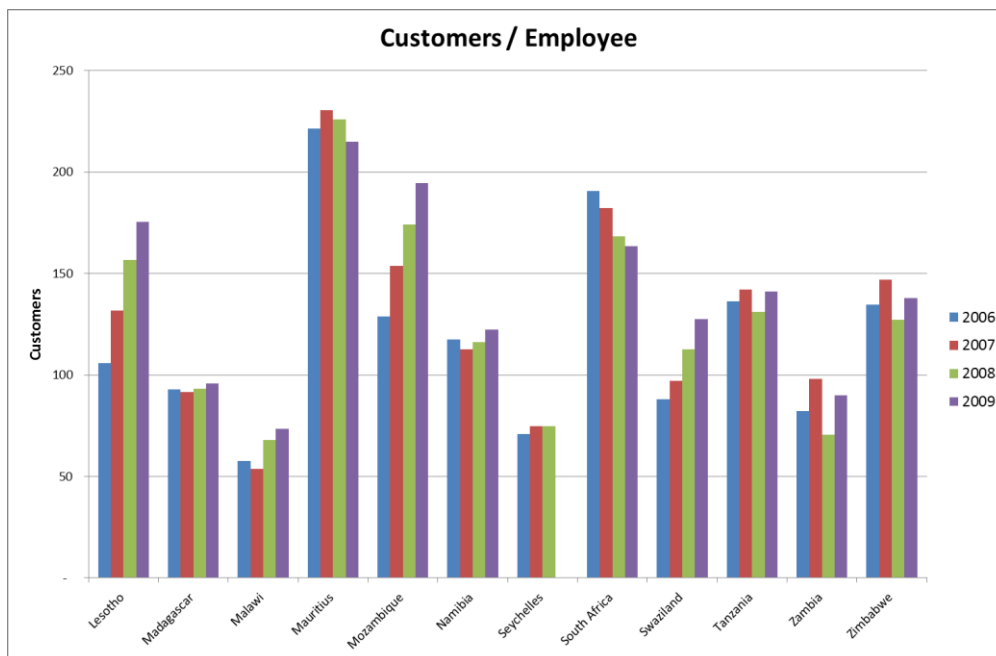


Figure 3-11: Customers per Employee by Country

The same efficiency indicator on a per country basis shows differing trends, with South Africa declining while Lesotho, Swaziland and Mozambique showing remarkable improvements. It is not clear whether these trends are a true reflection of reality or whether they are due to data inconsistencies. One would normally expect only moderate changes in this indicator over such a short period of time.

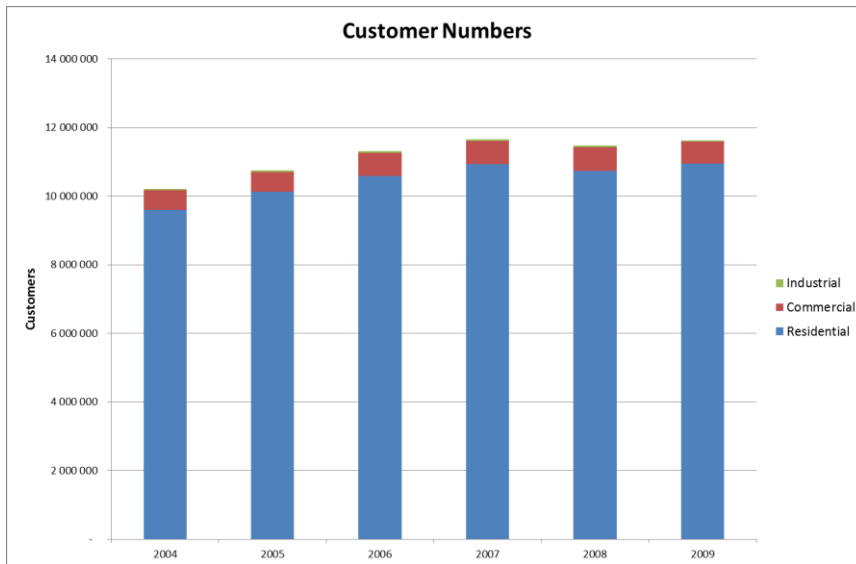


Figure 3-12: Customer Numbers Trend

The regional growth trend for customer numbers shows a moderate increase over time but with some stagnation showing in 2008 and 2009. Growth in customer numbers is provided mainly by residential customers who account for more than 90% of all customers, and one would not really expect the growth trend to decline due to the economic crisis unless electrification spending by Governments had been seriously affected. One may therefore assume that much of the stagnation shown is due to data inconsistencies more than real stagnation. It must be noted that high quality data on end consumer numbers is difficult to compile, especially in the case of South Africa and Namibia where distribution is done by many utility entities.

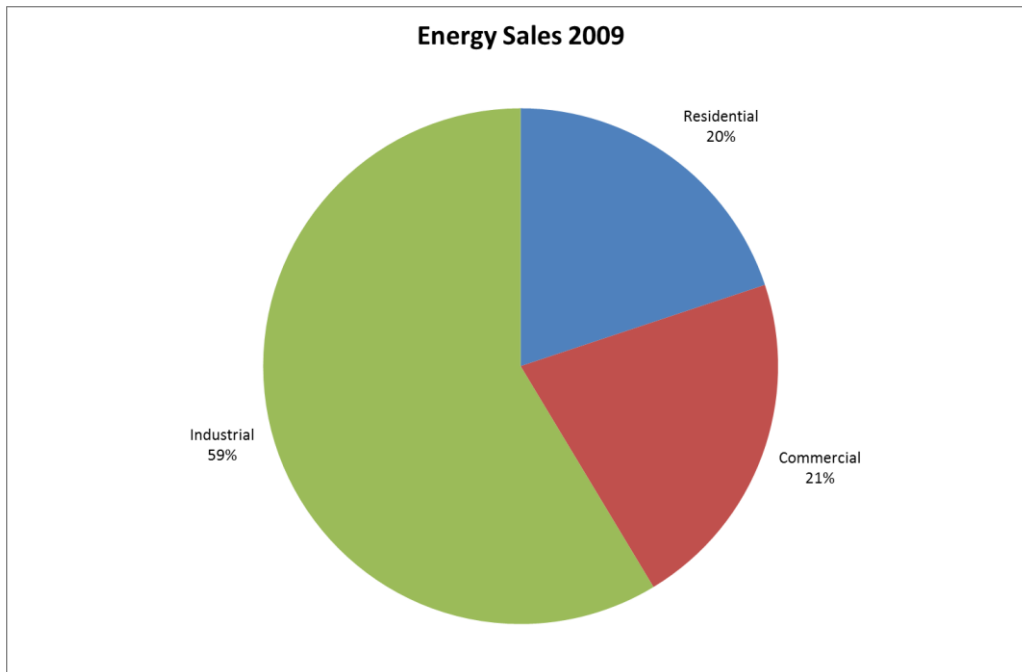


Figure 3-13: Energy Sales by Category

In stark contrast to the split in customer numbers (which is dominated by residential) the energy sales is dominated by industrial and commercial customers. This is as expected, and is supported by the chart below showing the same data per country which also indicates that in all countries (except Madagascar, which is taken as a data error) commercial and industrial consumption accounts for more than half of the total consumption.

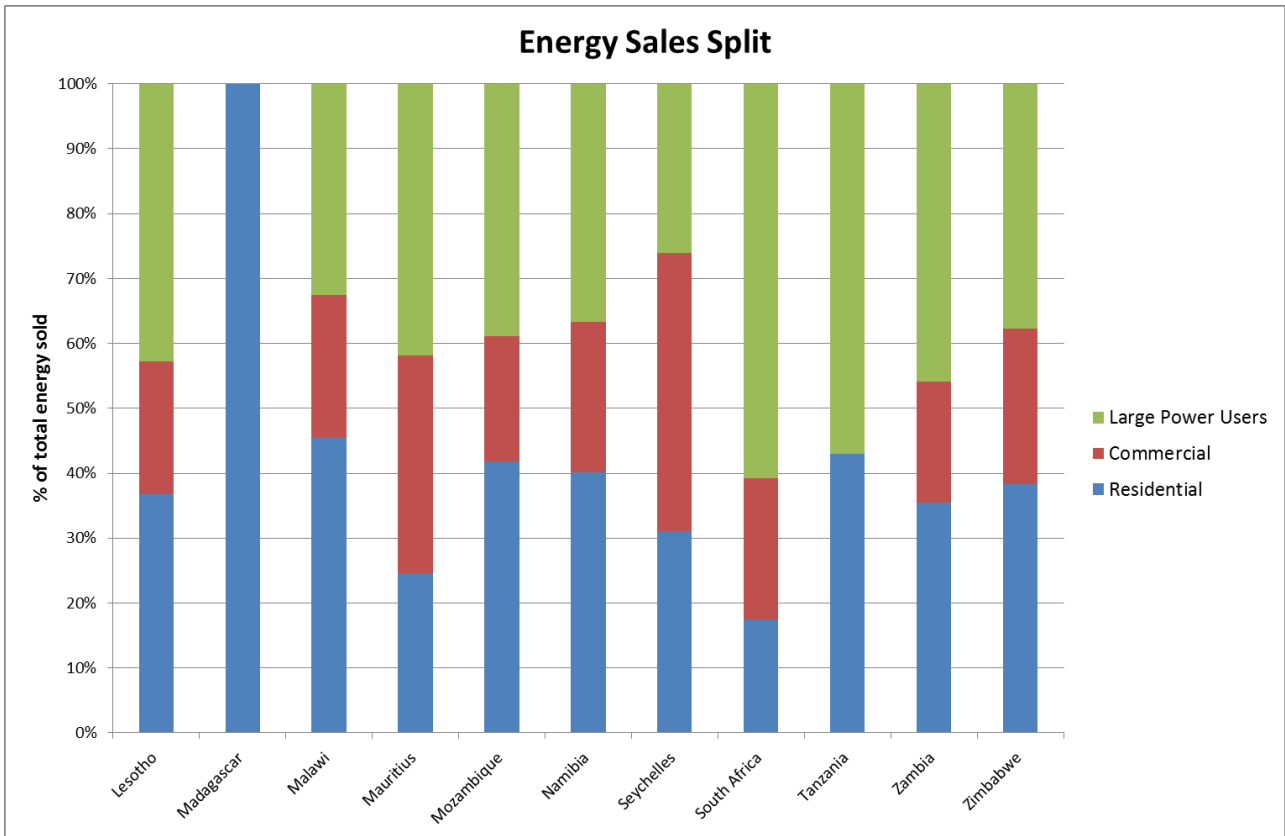


Figure 3-14: Energy Sales by Category by Country

The split in energy sales between the countries differs significantly, with South Africa having the smallest proportion residential sales at less than 20% while most other countries sell around 40% of their energy to residential customers. The distinction between large power users and commercial consumers may also differ between countries.

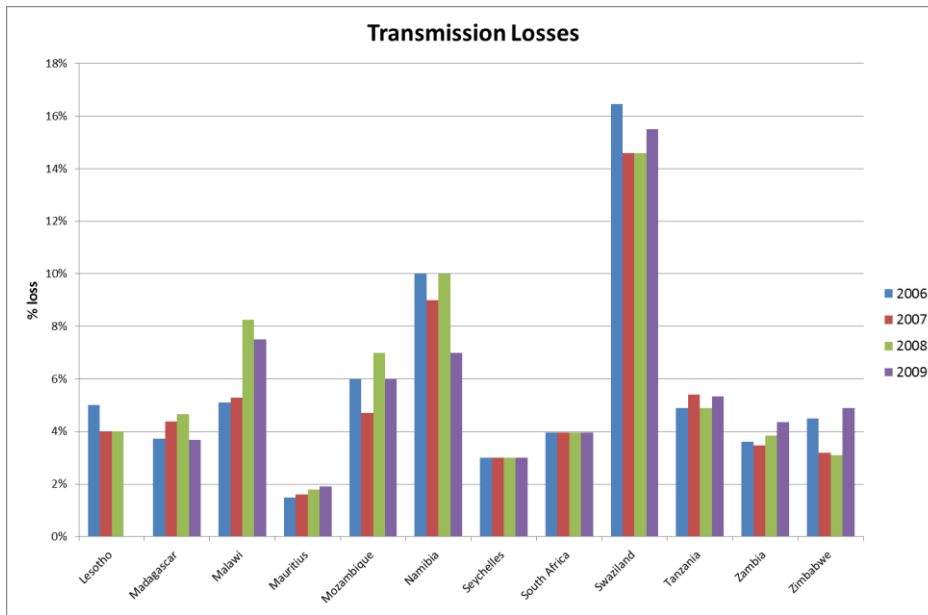


Figure 3-15: Transmission Losses by Country

Transmission losses show few major variations for most countries. The level of these losses is influenced by various factors such as network length, energy intensity, loading of the network and also the definition of the voltage level splitting transmission and distribution which may differ between countries. This may explain why Swaziland has such high stated losses.

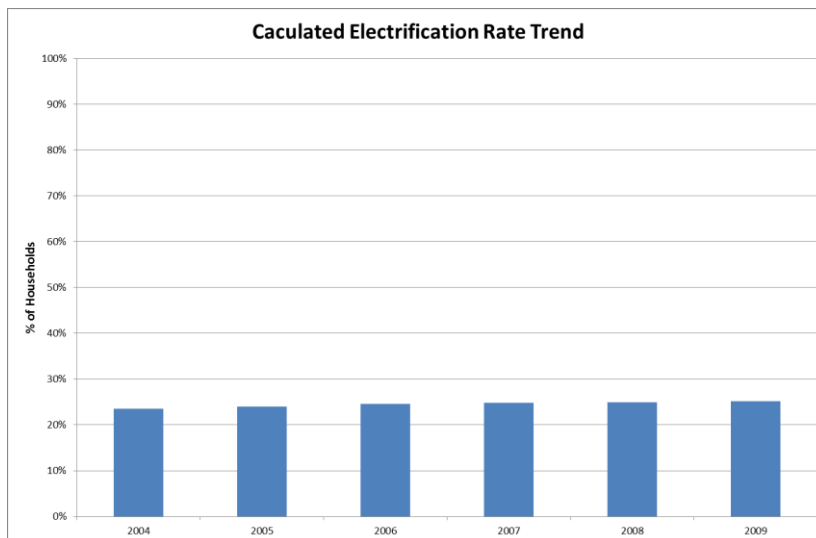


Figure 3-16: Calculated Electrification Rate Trend

The calculated electrification rate (number of domestic consumers / number of households) for the entire region shows a flat trend. This indicates that electrification drives have difficulty keeping up with population growth. The household electrification rate is difficult to determine accurately because it relies on accurate customer numbers and number of households (which relies on census data and assumptions about average household size). Reliable data on household size and/or number of households per country is difficult to find, making this indicator less reliable.

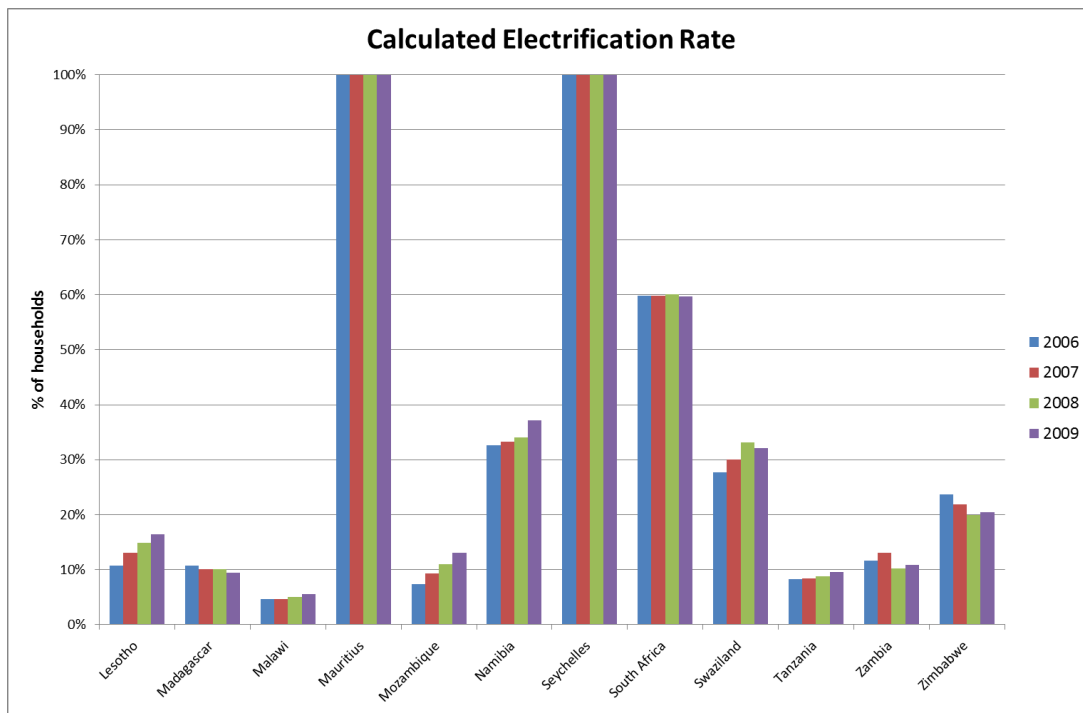


Figure 3-17: Calculated Electrification Rate by Country

Calculated electrification rates differ significantly between countries in the region. Mauritius and the Seychelles are fully (or nearly fully) electrified, while many other countries have electrification rates of 20% or less. South Africa (60%), Botswana (40%-50%), Namibia (33%) and Swaziland (33%) seem to fare better than most (Note however that this calculation relies on average household size data which has been collated from various sources). Electrification, especially of rural areas, remains a major social and financial challenge for most countries in the region.

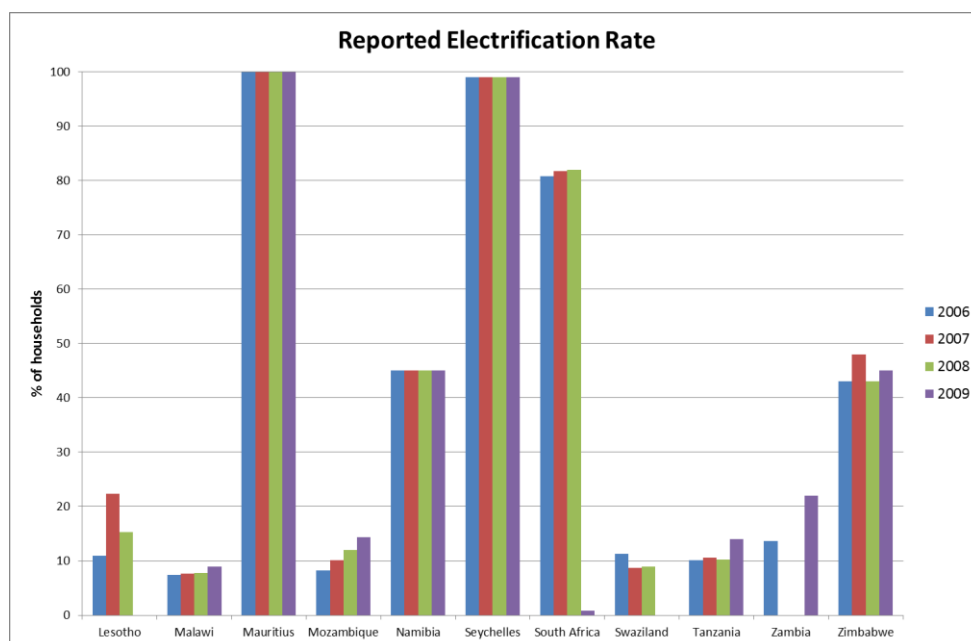


Figure 3-18: Reported Electrification Rate by Country

Comparing the reported (“official”) electrification rates to the calculated ones shows some significant differences. In some cases the claimed rates are higher than those computed (notably South Africa, Namibia and Zimbabwe). In the case of Swaziland the claimed rate is much lower. It is assumed that the differences are mainly due to differing assumptions on population and household size.

The question of grid versus off-grid electrification must also be raised. In most places electrification is measured in terms of grid connections (as is the case here, with customers probably being reported as on-grid customers). Off-grid electrification is often regarded as a temporary solution by consumers, and often seen in the same light by electrification agencies and policy makers. This is the case despite off-grid electrification efforts using renewable energy sources being quite common (for example South Africa, Namibia and Botswana have official off-grid renewable energy based electrification efforts).

In summary, South Africa continues to dominate the Southern African electricity market with most of the generation capacity, customers and energy sales. The international financial crisis has made itself felt, as has the generation shortage which became fully apparent in 2007 – 2008 and as a result of which demand has not shown the growth experienced before the crises. Generation is dominated by coal (70%), followed by Hydro (15%). Growth in generation capacity has been mostly in HFO, Diesel and gas turbines, alluding to emergency solutions rather than long term planning. Generation reserve margins remain tight, especially outside South Africa where there is hardly any reserve margin at all. Electrification remains a major challenge in most countries, while the total customer/employee ratio has shown a slight improvement. The following years will reveal how new generation will be able to meet rising demand as the first few generation projects are expected to come into production, and that should make for interesting statistics to track in coming years. It will also be interesting to see how the use of renewable energy sources unfolds as these are increasingly incorporated in mainstream generation planning, and how DSM will contribute to reducing peak load.

CHAPTER 4: TARIFFS

In many SADC countries today electricity tariffs are not cost reflective although many governments in the region have taken the decision that this should be an important goal. The SADC Council of Ministers took a decision in 2008 that electricity tariffs in the region should reach cost reflectivity by the year 2013.

South Africa used to have excess supply and was a net exporter to many of the SADC countries. The electricity supply industry in the SADC Region is facing an enormous challenge due to many reasons including (i) a lack of effective advance planning (and/or lack of investment decisions on the basis of such planning), (ii) an impressive growth in energy demand in many of the countries in the region, (iii) generally low tariff levels due to Eskom’s past surplus capacity, and (iv) a sizable drop in Eskom’s generation surplus over the last few years. These factors have put pressure on governments and regulators alike to increase electricity tariffs because there is a need for investment in electricity infrastructure but at the same time there is also a need for private sector participation in the electricity industry in the region. Without cost reflective electricity prices both these objectives will be hard to achieve. Regulators will in future face the challenge of keeping electricity tariffs affordable for the customers but at the same time reach tariff levels that promote investment in new generation and transmission capacity in the region.

Of the fifteen (15) countries in the SADC region twelve (12) responded to the questionnaire. Out of the twelve countries nine countries (75%) have done cost of supply studies to determine what the cost reflective tariffs levels should be. This is three countries more than the previous questionnaire. Six (6) countries indicated that a target date has been set to reach cost reflective levels and five (5) have indicated that there was an indicated plan on how these levels should be reached. These countries are Malawi, Namibia, Swaziland, Tanzania and Zambia.

Only 4 of the countries indicated that the current tariffs were sustainable and would promote investment in the electricity industries. These countries were Madagascar, South Africa, Swaziland and Zambia. It is not clear whether the survey responses are a true reflection of reality in at least three of the countries or due to mistaken responses. Reality on the ground is that these countries have not yet fully implemented their plans to reach cost reflective tariffs and they are still experiencing some challenges to finance their new build programs. Madagascar has recently approved a tariff reduction of 10%. Six (6) countries have calculated cost reflective tariffs for generation, transmission and distribution separately. They are Malawi, Mauritius, Namibia, Seychelles, South Africa and Zambia.

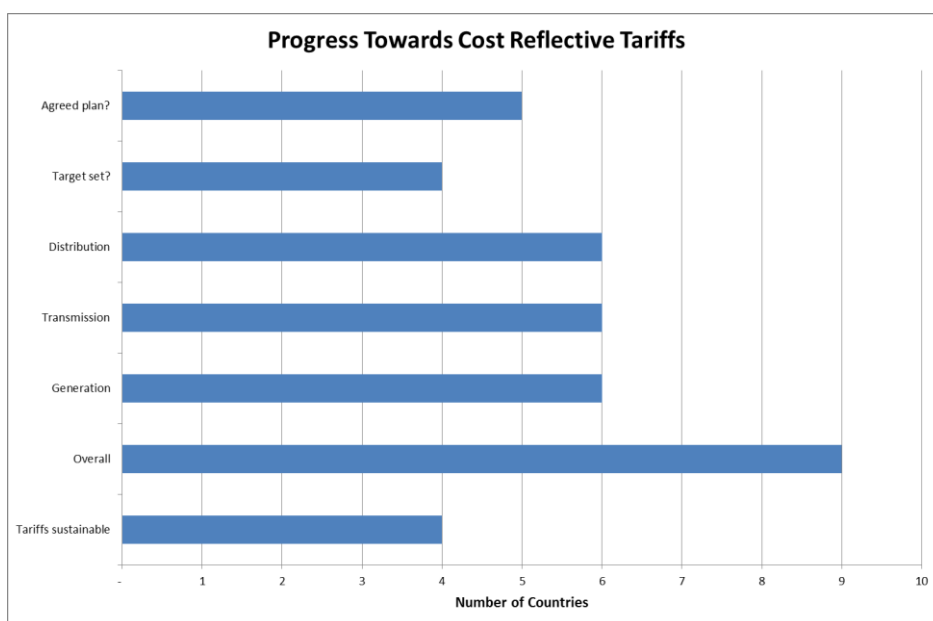


Figure 4-1: Progress Towards Cost Reflective Tariffs

Most countries have retail tariffs due to the fact that the utility is responsible for the whole value chain from generation to distribution and retail. Only three countries have separate tariffs for generation namely Madagascar, Namibia and South Africa. Three (3) countries have separate tariffs for transmission namely DRC, Namibia and South Africa. Four countries have separate tariffs for distribution namely DRC, Namibia, Seychelles and South Africa. Five countries have separate retail tariffs namely Madagascar, Malawi, Seychelles, South Africa and Tanzania. This data is questionable since distribution and retail is embedded and it is more likely that the two tariffs are combined. Separate retail operation is a phenomenon that is mostly found in developed countries where there is competition at retail level. Eight of the twelve countries that responded have implemented Time-of-Use (TOU) tariffs. They are as follows: DRC, Madagascar, Malawi, Mauritius, Namibia, South Africa, Swaziland and Zambia. None of the countries that responded

currently have a separate tariff for renewable energy and the conclusion can be drawn that the renewable energy tariff forms part of the weighted average generation tariff.

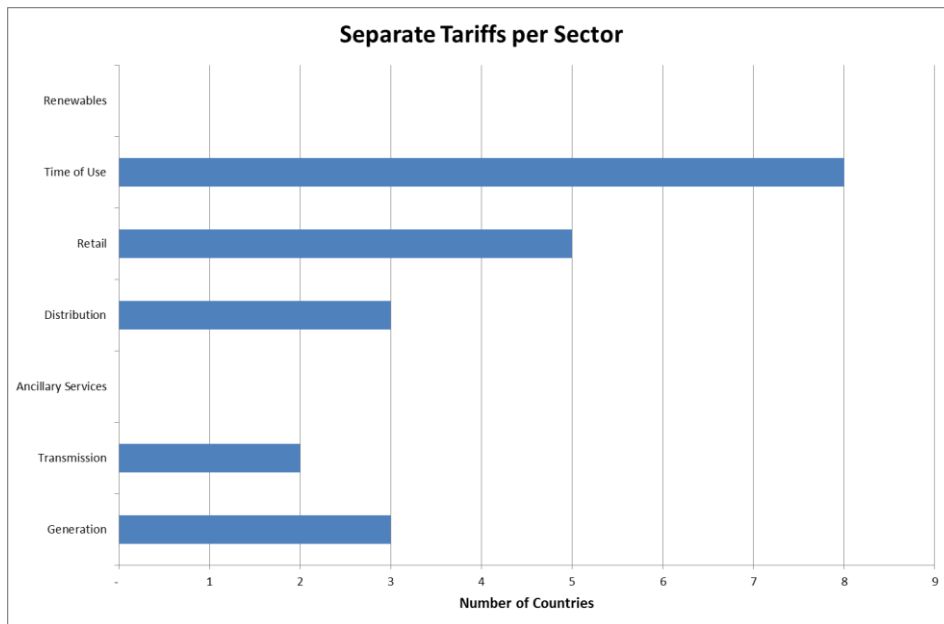


Figure 4-2: Separate Tariffs per Sector

Four of the countries namely Mauritius, Seychelles, Swaziland and Zimbabwe that responded to the questionnaire indicated that levies, surcharges and subsidies are not allowed in electricity tariffs. It is, however, very difficult to exclude subsidies from tariffs because there is always some level of cross subsidization between customer categories. Seven countries indicated that they allow cross subsidies between customer categories. Countries where cross subsidies do not exist are Lesotho, Madagascar, Swaziland, Zambia and Zimbabwe. As mentioned earlier there will always be some level of cross-subsidization between customer categories although countries might have a policy to minimize such cross-subsidization. One utility has to pay subsidies namely Mauritius and four utilities receive subsidies namely Lesotho, Malawi, South Africa and Tanzania.

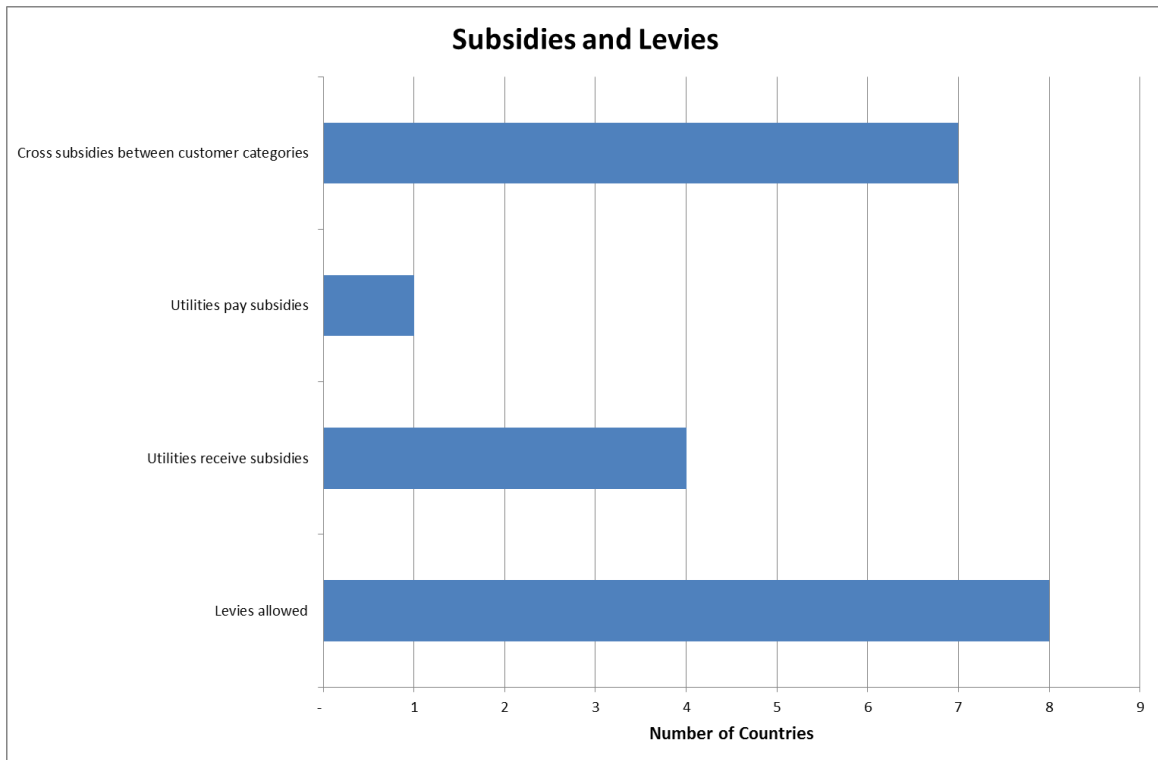


Figure 4-3: Subsidies and Levies

Eight of the twelve countries responded that there is no tariff for renewable energy. Two countries have a REFIT tariff namely South Africa and Tanzania. One country calculates the tariff per energy source namely Mauritius and one country uses a levelized cost approach for Independent Power producers (IPPs) namely Namibia. No country has as yet implemented net metering.

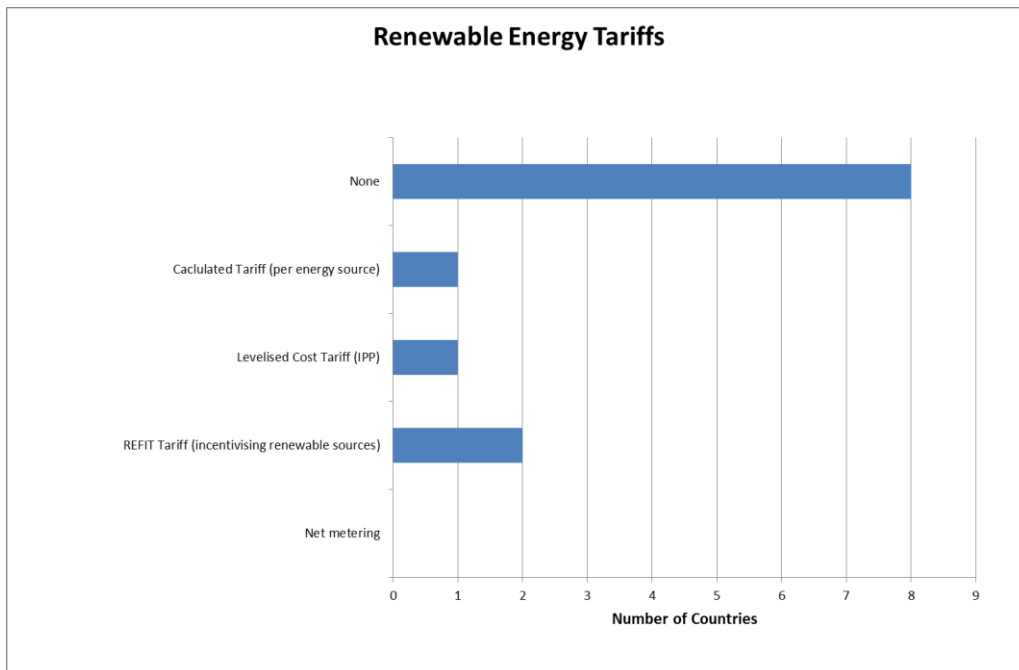


Figure 4-4: Renewable Energy Tariffs

The graph depicts those countries that granted tariff adjustments in 2010 and the different percentages granted for bulk and for end users. Zambia granted the highest increase in the region with 26% followed by South Africa with 25%. MERA granted a 20% increase to ESKOM in Malawi whereas the ECB granted an 18% increase to NamPower and 20% maximum to the end consumer. Tanzania increased tariffs by 19% and Mauritius by 10%. In Madagascar tariffs were decreased on average by 10% from the previous very high levels. This is mainly due to the decrease in oil prices since all the electricity on the island is diesel generated.

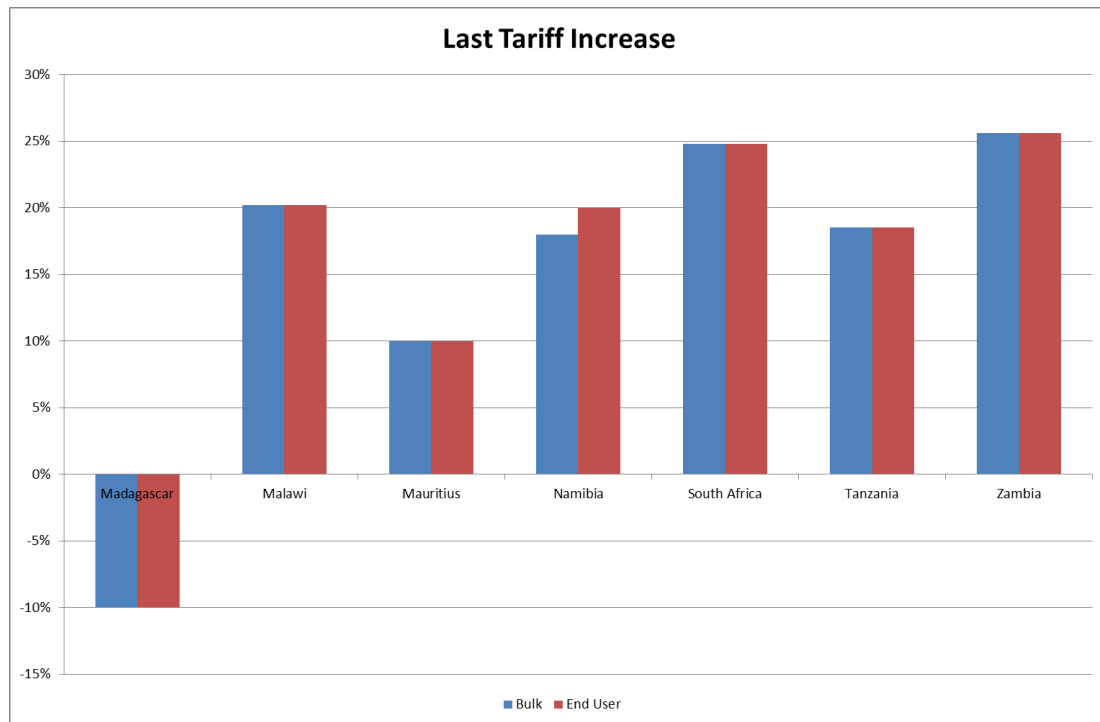


Figure 4-5: Last Tariff Increase

The graph depicts the average electricity price in US dollar over the past four years. Countries provided the information in local currency and for comparison the tariffs were converted to US\$. The method used to calculate the average tariff was to divide total utility revenue into total units sold to consumers. One should take into consideration the impact of the exchange rate on the tariff data. However, generally electricity tariffs are increasing in the region. It was, therefore, decided to also include a graph with the electricity prices in local currency to provide a more realistic view of price increases over the past number of years in the region.

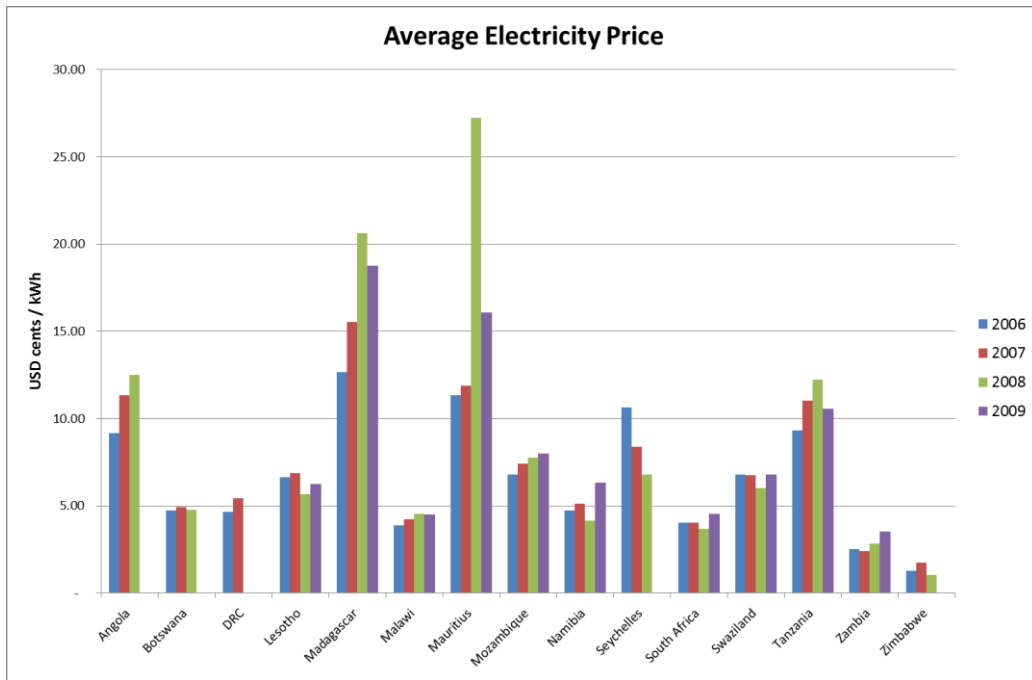


Figure 4-6: Calculated Average Electricity Price (USD)

The graph depicts the average tariff in local currency indexed against the average tariff of 2006. This analysis was done to show the trend of rising tariffs in the region amongst the different countries. The highest increase can be seen in Zambia over time.

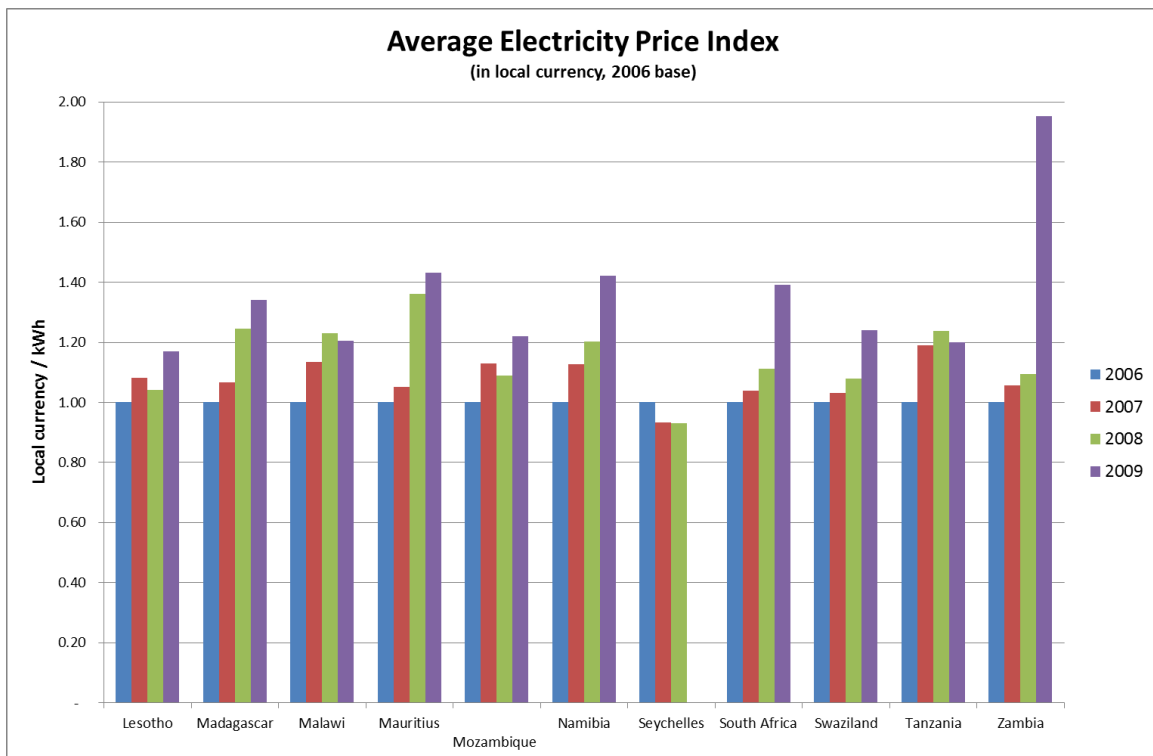


Figure 4-7: Calculated Average Electricity Price Index (Local Currency)

South Africa and Namibia are the only two countries in the region that have reported on separate tariffs for industrial, business and domestic customers. The domestic customers in South Africa pay on average 6.8USc/kWh against the 3.51USc/kWh that the industrial customer pays. In Namibia the prices that the different customer categories pay are closer with the average domestic tariff at 12.34USc/kWh and the average industrial tariff at 11.71USc/kWh. The average domestic tariff in Madagascar in 2009 was 19.12USc/kWh and the Lesotho it was 7.94USc/kWh.

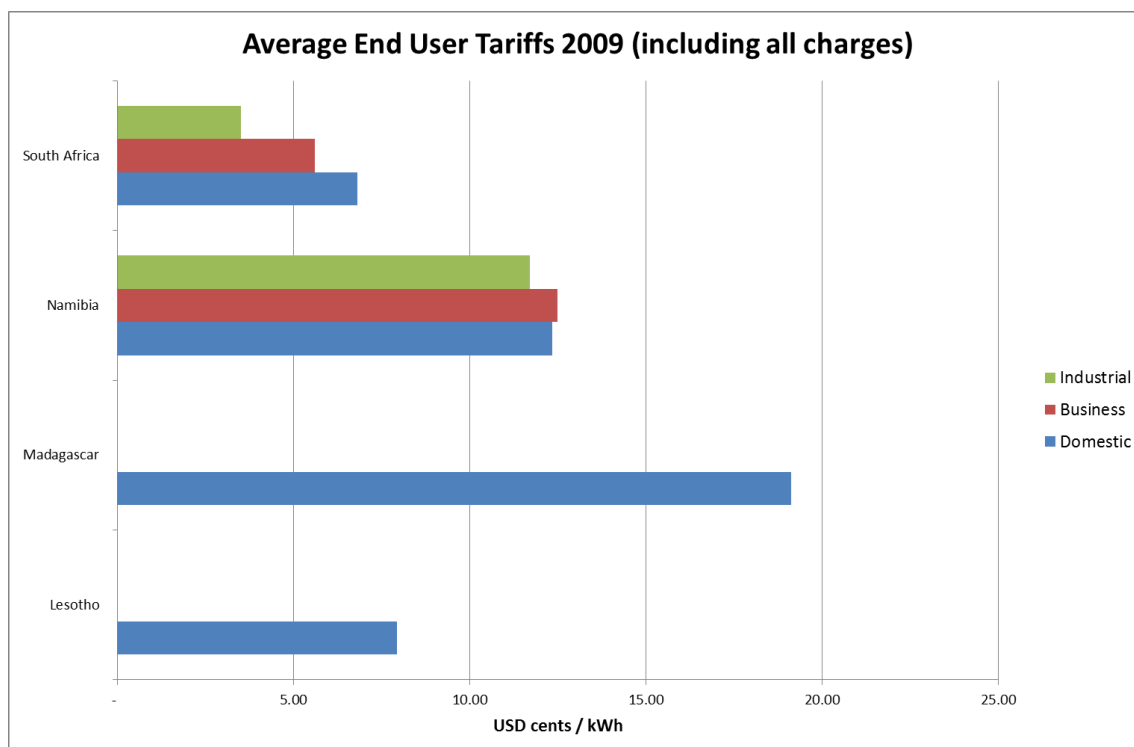


Figure 4-8: Reported Average End User Tariffs

The graph depicts the average sectoral tariffs for 2009 for a number of countries. One would make the assumption that the generation and transmission tariffs feed into or contribute to the distribution and retail tariff and that this tariff was not separated out. Seychelles has the highest generation tariff at 13.23USc/kWh followed by Namibia at 7.83 USc/kWh and South Africa at 2.50 USc/kWh. Seychelles also has the highest end-user tariff of all the countries that provided information on this section namely, 15.43USc/kWh followed by Namibia at 13.83USc/kWh. Malawi and South Africa have more or less the same end-user tariff at 4.47 USc/kWh and 4.21USc/kWh respectively. South Africa has the lowest transmission tariff at 0.14 USc/kWh followed by Zambia at 0.38 USc/kWh. The transmission tariff for Malawi is 1.42 USc/kWh and for Namibia 1.88USc/kWh. Zimbabwe does not have a separate transmission tariff.

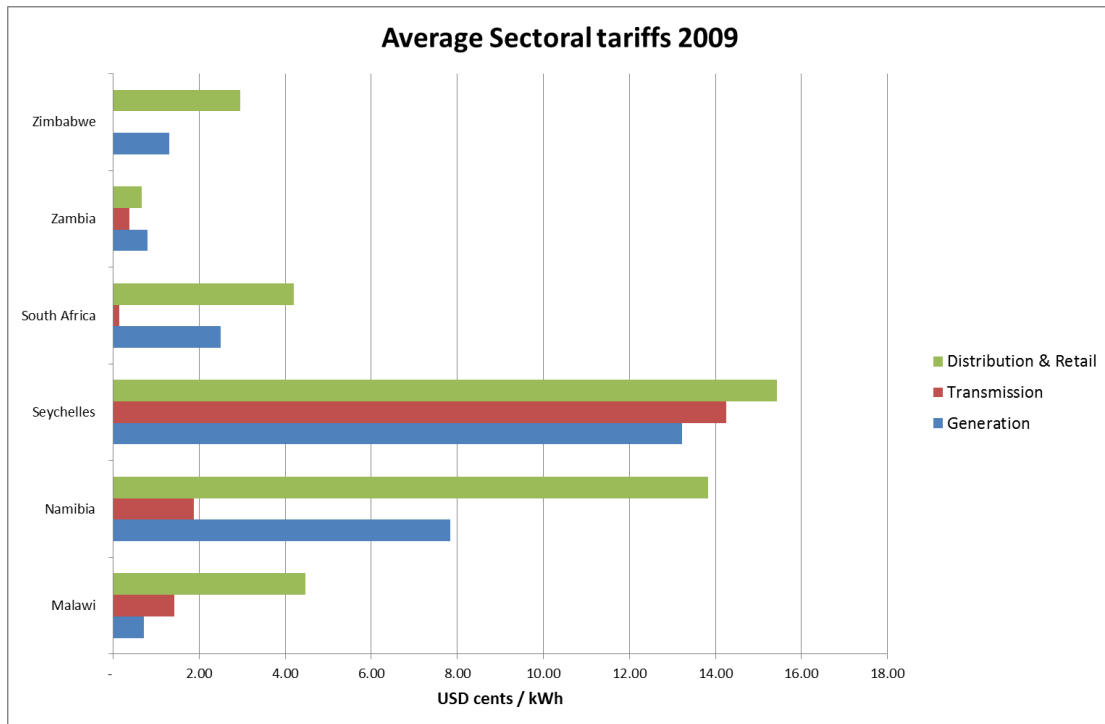


Figure 4-9: Average Sectoral Tariffs

Very few countries were in a position to provide the information on end-user energy rates by customer category. Mauritius has the highest energy rates for all customer categories but the business category pays by far the highest energy rates at 21.59USc/kWh. In both Malawi and Zimbabwe the business customers also pay the highest energy rates at 5.71USc/kWh and 3.47USc/kWh respectively. In Zambia the domestic customers pay the highest energy rate at 5.74 USc/kWh which is still much lower than the 16.04 USc/kWh that the average domestic customer in Mauritius has to pay for energy.

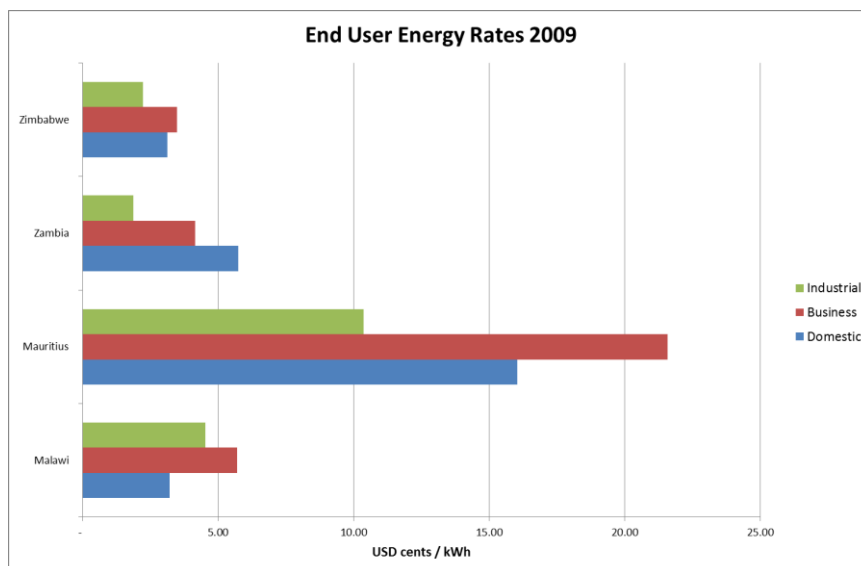


Figure 4-10: End User Energy Rates

Most countries in the region use a rate of return tariff methodology to determine the electricity tariffs although there are some differentiations in the way it is applied especially among those countries where there is not yet a regulator. Twelve out of the 15 SADC countries have Electricity/Energy Regulators.



Figure 4-11: Countries with Regulator

Some countries in the region continue to show a negative nominal return on assets such as Malawi. The situation in Mauritius improved in 2009. Both Lesotho and Namibia are showing declines in 2009 in their return on assets. This is an indication of the financial stability of the utility and should be a warning to regulators and governments if there is no improvement over time. Since most of the electricity tariffs in the region are not yet cost reflective one would expect that the return on assets data would reflect that the utilities are still earning negative or very low returns on their assets.

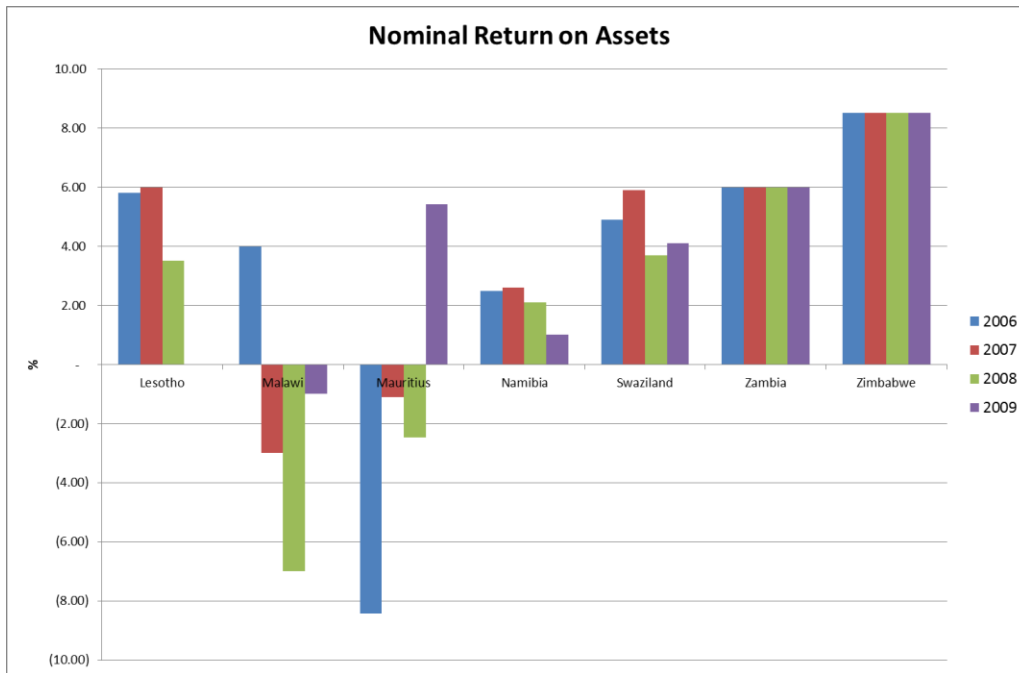


Figure 4-12: Nominal Return on Assets

South Africa (ESKOM) had the highest utility revenue in 2009 which is expected since it is the largest utility on the African continent. This is followed by TANESCO in Tanzania and the Central Electricity Board (CEB) in Mauritius and ZESCO in Zambia. Almost all the utilities in the SADC region are responsible for the whole value chain from generation to transmission to distribution and retail.

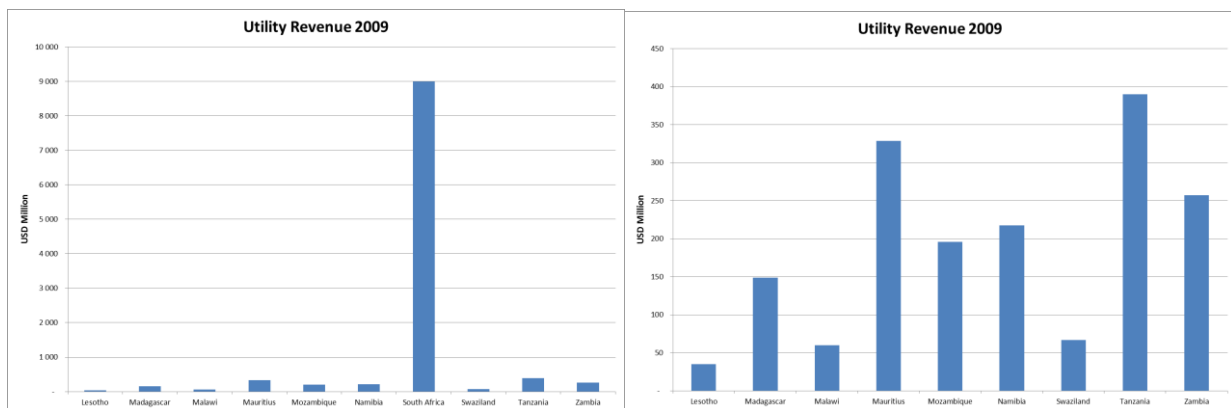


Figure 4-13: Utility Revenue

No country in the region has separate retail companies. This is a market structure used in countries such as Norway where there is competition at retail level. Two countries in the region have separate distribution companies namely Namibia and South Africa. Two countries have independent transmission companies namely Mozambique and Zambia. Several countries have IPPs and only four indicated that there are no IPPs in the electricity industry namely Malawi, Seychelles, Swaziland and Zimbabwe. Most countries have a fully integrated market system.

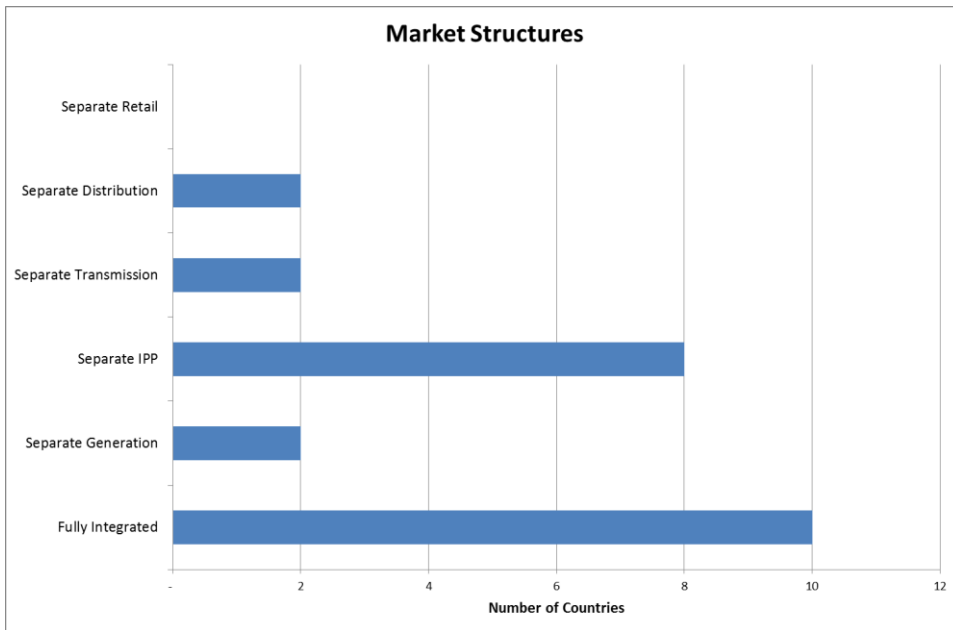


Figure 4-14: Market Structures

In most countries in the region electrification is funded outside the utility and is typically a responsibility of government.

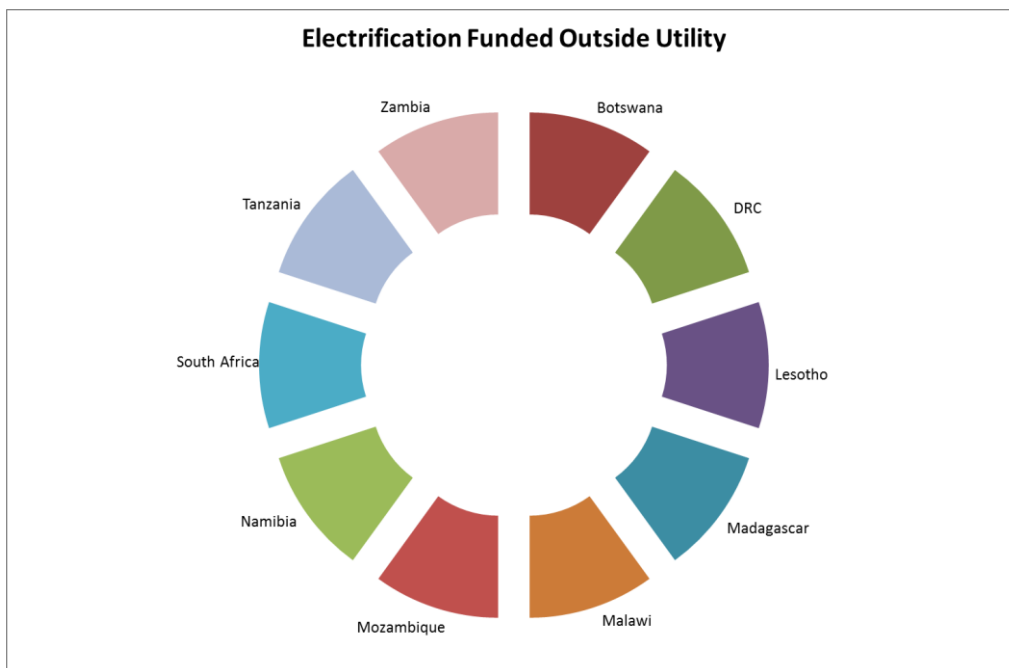


Figure 4-15: Electrification Funding

Tariffs in the region continue to be below cost reflective levels although the data show some improvement over the past two years. Electricity tariffs are slowly starting to increase in most countries showing the realization from governments that the current low tariffs will not lead to enough investment in the electricity industry to ensure enough supply for the growing demand.