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## Expanding energy generation capacity in SADC

# Challenges and Opportunities for Power Sector Infrastructure Development

### 1.0 Introduction

The Southern African region has been experiencing power shortages going back four years due to a combination of factors that have contributed to a diminishing generation surplus capacity against increasing growth in demand. This situation has prompted some Member States to resort to various coping mechanisms that include load shedding as well as other demand-side management measures while longer term solutions are being sought to remedy the situation through improved supply.

Electric power is one of many sources of energy in SADC, along with fossil fuels and biofuels including biomass. Electricity in SADC comes from both renewable energy sources (hydroelectric, solar and wind power) and non-renewable sources (coal, diesel, natural gas and uranium).

The power sector is generally understood to mean electricity. Grid electricity is often the most affordable electric power yet it is accessible to only about 30 percent of the SADC population (ranging from 7 percent in the Democratic Republic of Congo to 70 percent in South Africa and Mauritius) against a world average of 75 percent. However, while electricity's social value in SADC may be low compared to biomass such as woodfuel used by the majority of SADC citizens mostly in rural and peri-urban areas, its economic value is by far the most important as it drives economic activity in all major commercial and industrial centres across the region. Yet the SADC region has run out of surplus power generation capacity, a situation that became more evident in 2006/7, as accurately predicted by the Southern African Power Pool (SAPP) over a decade ago.

This policy paper briefly explores some of the major policy challenges and opportunities facing SADC as the region takes steps to extricate itself from what has become one of the biggest obstacles to regional development and integration.

### 2.0 Regional strategic objective and policy response

The SADC Directorate for Infrastructure and Services contends that in line with the guiding vision of the SADC Treaty, the principles of the SADC Protocol on Energy and the Regional Indicative Strategic Development Plan (RISDP, signed in 2003), SADC Member States are committed to developing and using energy to support economic growth and development, alleviation of poverty and improvement of the standard and quality of life throughout the region. The directorate further states that the overall objective of the Energy Sector is to ensure the availability of sufficient, least-cost energy services that will assist in the attainment of economic efficiency and the eradication of poverty, while ensuring that use of energy resources is environmentally sustainable.

The SADC Energy Activity Plan (approved in 2000) indicates the policies and strategies to be pursued and translated into activities and is guided by the sector governing instruments including the SADC Protocol on Energy (1996), the SADC Energy Cooperation Policy and Strategy (1996), and the SADC Energy Action Plan (1997). However, all these governing instruments have become outdated as they were adopted more than 10 years ago yet the sector has seen profound reforms over the years while recent developments such as the climate change agenda has become more relevant than before. Thus it has become necessary to review all these documents so that they can be more responsive to current realities. It therefore came as no surprise when the Energy Ministers at their meeting in Angola in April 2010 agreed to undertake a comprehensive review and rationalization of the entire energy sector governing instruments and also adopted a new SADC Regional Energy Access Strategy and Plan of Action.

### 2.1 Institutional framework

In terms of institutional arrangements, the Committee of SADC Ministers of Energy is the apex policy body in the overall energy sector. It meets annually, reporting to Council which in turn reports to Summit. Below it is the SADC Energy Ministers Taskforce with ministers from Angola, Namibia, South Africa and Zimbabwe which was constituted in 2004 in response to the then impending power shortages and was therefore given

the immediate mandate to develop a roadmap to address the looming shortages in consultation with all Member States. An Intergovernmental Memorandum of Understanding signed by Member States in 1995 gave effect to the Southern Africa Power Pool (SAPP) which now is a 12-member regional body that coordinates the planning, generation, transmission and marketing of electricity on behalf of Member State utilities in SADC.

The power utilities in mainland SADC Member States, with the exception of Angola, Malawi and the United Republic of Tanzania, are interconnected through SAPP, allowing them to sell electricity to one another through a competitive market. In 2002, the Ministers of Energy further agreed to form the Regional Electricity Regulators Association of Southern Africa (RERA) to harmonise the regulatory framework as well as provide a conducive environment for investment in the region's power sector. The April meeting in Angola also made another key decision as it approved RERA's Guidelines for Regulating Cross-Border Power Trading in Southern Africa.

### 3.0 Major challenges and opportunities

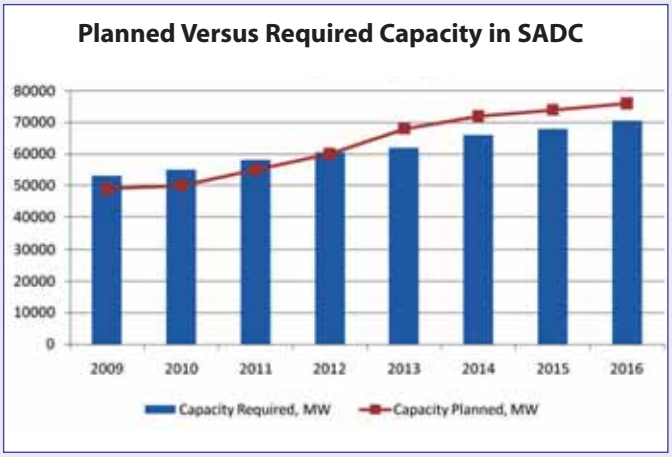
Most of the SADC Member States are still suffering crippling energy shortages and the region is only expected to fully recover from the current widespread energy vulnerability in 2013 when power utilities can once more enjoy the desired collective cushion of 10 percent surplus power generation capacity, according to SAPP. The reserve margin is necessary to guarantee system reliability and allow for unexpected surges in demand. But the target recovery year would only be met if all short term generation projects are implemented by Member States as per agreed plans. However, the SADC Energy Ministers meeting in April worrisomely revealed that SADC could in fact continue to experience serious shortages beyond 2013 as most projects being undertaken are actually slower than expected.

Many factors have been attributed to the current power shortages obtaining in the region as well as the slow pace of recovery from the situation. Some of the reasons officially cited as having historically contributed to where the region presently finds itself in include:

- Economic growth of more than five percent constantly achieved in most SADC Member States leading to unprecedented growth in electricity consumption and demand;
- Increase in demand for base metals resulting in high metal prices on the world market with new mining companies being established in the SADC region in the last few decades;
- Inadequate investments in generation and transmission infrastructure over the last 20 years;
- Electrification expansion programmes such as rural electrification have partly contributed to increased consumption and demand.

However, while the above are mostly unavoidable consequences of an expanding regional economy and one that is constantly striving to widen access (with perhaps the exception of the point about lack of investment in new power infrastructure), going forward there are even more complex challenges of a technical and political nature which may continue to hamper speedier and full recovery. These include:

- Cross-border power trading;
- Tariff viability;
- The quest for self-sufficiency;
- Investor sentiment; and
- Capacity issues.




**STATUS OF THE SAPP SUPPLY & DEMAND**

| No. | Country | Utility | Installed Capacity [MW] As at 2009 | Available Capacity [MW] As at 2009 | Installed minus Available [MW] | 2009 Actual Peak Demand [MW] | Capacity Required [MW] 10.2% Reserve | Surplus ( MW) |
|---|---|---|---|---|---|---|---|---|
| 1 | Angola | ENE | 1,187 | 930 | 257 | 724 | | |
| 2 | Botswana | BPC | 132 | 120 | 12 | 553 | | |
| 3 | DRC | SNEL | 2,442 | 1,170 | 1,272 | 1,028 | | |
| 4 | Lesotho | LEC | 72 | 70 | 2 | 116 | | |
| 5 | Malawi | ESCOM | 287 | 267 | 20 | 260 | | |
| 6 | Mozambique | EDM | 233 | 174 | 59 | 435 | | |
| | | HCB | 2,075 | 2,075 | - | | | |
| 7 | Namibia | NamPower | 393 | 360 | 33 | 451 | | |
| 8 | South Africa | Eskom | 44,170 | 40,483 | 3,687 | 35,850 | | |
| 9 | Swaziland | SEC | 70.6 | 70 | 1 | 204 | | |
| 10 | Tanzania | TANESCO | 1008 | 780 | 228 | 705 | | |
| 11 | Zambia | ZESCO | 1,812 | 1,200 | 612 | 1,604 | | |
| 12 | Zimbabwe | ZESA | 2,045 | 1,080 | 965 | 1,714 | | |
| TOTAL SAPP | | | 55,927 | 48,779 | 7,148 | 43,644 | 48,096 | 683 |
| Total Interconnected SAPP | | | 53,445 | 46,802 | 6,643 | 41,955 | 46,235 | 567 |

Note: Largest single unit in SAPP is 920 MW

SOUTHERN AFRICAN POWER POOL

### 3.1 Power Trading

In SADC, cross-border power trading is facilitated by SAPP and the trading allows countries to buy and sell surplus electricity through an existing network of transmission lines and relay substations, thus enabling the exchange of power from those countries that are energy resource-rich to those that suffer energy vulnerability.

Cross-border power trading can be done through a number of ways and using various models. The bulk of the power trade in southern Africa is through long-term bilateral arrangements. However, about five percent of power trade is in the recently introduced short term competitive market where members are presently using the Day-Ahead-Market (DAM) model through a system coordinated by SAPP. Under DAM, prices are set based on demand and supply between the utilities in the countries where the power pool operates. The new system presents an opportunity to attract more players, including Independent Power Producers (IPPs). In contrast, the price is usually fixed under the long term bilateral arrangements.

One of the major challenges in SADC's cross-border trading is that the power sector is not yet deregulated. Utilities in the region are "single buyers" in their respective countries, without open grid to, for instance, IPPs. According to a recent SAPP-commissioned study report, the present single-buyer model is aggravated by the fact that most power utilities do not have a balance sheet that can support new large power projects nor attract partners, and most existing regional projects were premised on Eskom, South Africa's power utility, signing a Power Purchase Agreement (PPA) as South Africa consumes most of the power in the region. This was the case with Cahora Bassa Hydropower plant which even to this day sells most of its 2,075 MW capacity to Eskom. However, in recent years, Eskom's balance sheet has also experienced severe pressure from its own expansion programme.

The South African minister of energy is reported to have recently stripped Eskom of the responsibility of signing PPAs and was as of 2009 in the process of setting up a separate buying office within the Department of Energy. Furthermore, negotiating PPAs can be a complex process that is often drawn-out, taking too long to conclude and many utilities do not always have the financial or human resource capacity to undertake such an onerous task. As the largest consumer, South Africa remains the pull factor for any new major investments into the power sector including those from IPPs who may be seeking cross-border PPAs based on assured viability.

### 3.2 Tariff viability

Recent studies commissioned by SAPP and RERA have concurred that power tariffs throughout the region are below the combined real cost of generation, transmission and distribution and therefore cannot sustain the power supply industry, provide the right signals for investment and encourage efficiency. The RERA study therefore recommended that there is an urgent need to develop strategies to move towards cost reflective levels to make the energy supply industry viable and encourage investment.

The SAPP study further observed that while moving towards cost reflective tariffs would go a long way towards improving viability, it may take a while before tariffs rise to the desired levels given the legacy of very low tariffs in the region. Quite evidently, the process of adjusting tariffs to make them cost reflective has become a very sensitive issue and has often met with stiff political resistance as it can be a potential election minefield. But perhaps quite significant is the fact that most governments and utilities in the region have recognized the need to move towards cost reflective tariffs, albeit moving at a gradual pace. However, the slow pace means that most utilities in SADC would for a long time continue to have unhealthy balance sheets that make them less attractive to the much needed private investment.

### 3.3 Energy security and the quest for self-sufficiency

Regional power projects have often lacked the much-needed political champions as Member States worry about security of supply. Some Member States have raised genuine concerns in terms of both physical security of transmission infrastructure as well as contract security particularly in the absence of a regional regulatory framework. Under such circumstances, Member States have tended to take the sovereign route of attempting to self-provide, rather than depending on supply from another country.

A case in point is the Westcor Power Project which had been initiated by five Member States to draw power from the DRC to Angola, Botswana, Namibia and South Africa but the initiative is now moribund due to a number of factors including concerns over security of supply. In a proposed Pool Plan based on different scenarios and with a planning horizon stretching to 2020, SAPP has underscored the benefits arising from pursuing projects collectively as a region rather than as individual Member States. Going this route would not only result in better coordination and optimization but total cost savings of US$48 billion over the planning horizon.

### 3.4 Investor sentiment

Southern Africa must work collectively towards creating a conducive environment that would make the region an attractive investment destination for energy projects. This appeal reverberated at recent investor conferences including the Power Sector Investors Roundtable in Livingstone, Zambia, in July 2009, and the SADC Energy Infrastructure Development Conference in Frankfurt, Germany, in March 2010. One interesting observation that was made at these two conferences is the paradox of the region having abundant primary energy resources yet most Member States continue to experience serious power shortages, itself an opportunity for new investment.

Power projects, moreso those with a regional dimension, have a long lead time, making it imperative for Member States to accelerate implementation and the need to secure PPAs upfront. And the magnitude of the financial outlay required for power projects means most governments in SADC cannot single-handedly raise the necessary investment finance without the help of international financiers and perhaps even more sustainable, working with the private sector through IPPs and Public Private Partnerships (PPPs).

Low electricity tariffs, political instability and long tendering procedures in some SADC Member States have been identified as some of the major stumbling blocks by investors.

Equally important is the political will to move on agreed projects. Thus the current situation where projects spent several decades in the offing is not attainable as far as private investors are concerned, a point that has also been repeatedly raised by International Cooperating Partners (ICPs).

### 3.5 Capacity issues

The lack of technical capacity at a regional level is a matter that has been acknowledged by Energy Ministers at most recent meetings and ICPs have come forward in some instances to provide support to fill some of the gaps. The capacity deficit is manifest at different institutional levels ranging from the SADC Secretariat and the subsidiary organizations such as SAPP and RERA, to the utilities and line ministries. Notable competences lacking are in general planning, engineering, project packaging and financing, and project management while technologies that are lagging behind are those in electric energy and power systems, and energy in general.

SADC could do well to seize the opportunity of resources availed by ICPs to address these shortcomings but current recruitment procedures at SADC for example have proved cumbersome leading to a slow pace in addressing the problem.

## 4.0 Conclusions and Recommendations

### 4.1 Conclusions

As long as the economic growth momentum is maintained in SADC, Member States will continue to consume more electricity than they produce unless identified generation projects are implemented on time. For this to happen, a collective approach is required where Member States put regional interests ahead of narrow national interests. A major challenge for SADC is to prioritise regional power projects and jointly raise investment into the sector.

The expansion of regional power generation capacity faces a host of challenges that require a coordinated regional approach underpinned by regional consensus and should guarantee security of supply to all participating countries. Building confidence in this approach would more likely dissuade Member States to take a nationalistic approach as they seek self-sufficiency, which may in effect be a more expensive route to security of supply.

The present power shortages in the region are as much a challenge as an opportunity to attract private investment through IPPs and PPPs. However, the investment environment needs to be more attractive through policies that justify private capital such as cost reflective tariffs and more flexible power purchase arrangements.

### 4.2 Policy Recommendations

- Member States need to speed up power sector reforms including adopting a friendlier regulatory environment as well as descent tariffs that can attract private capital. The current slow pace towards cost reflective tariffs may require Member States to adopt stop gap measures such as a regionally administered revolving risk capital bridging facility to underwrite the gap between current and projected cost-reflective tariffs.
- The current single buyer model needs review with a view to removing the burden of underwriting power projects from utilities to other players such as large and intensive users of power who may in fact have the financial muscle that some utilities in SADC currently do not have.
- Given the complex nature of PPAs and the dominant role of South Africa, SAPP is well placed to coordinate any regional approach that is based on security of supply to all participating Member State utilities while maintaining a regional identity that is necessary to give a semblance of impartiality.
- Current self-sufficiency policies of some Member State Utilities should be reviewed to encourage regional development and integration. r

*– By Munetsi Madakufamba, August 2010*

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