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# Building a Regional Electricity Market: SAPP Challenges

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Regional power trade has many potential benefits. Indeed, enlarging national electricity markets beyond borders could help to decrease variable supply and demand issues and stimulate capacity investment. In Southern Africa, the Southern African Power Pool (SAPP) is the 1995 regional association of the Southern African Development Community (SADC) member states' national utilities energy providers.<sup>1</sup>

Although limited during the initial 10 years of operation (1995–2005), regional power trade has increased over the last decade. Within the regional SADC framework, SAPP has made significant progress in furthering power

trade by developing a regional electricity market (REM).

Several actors are involved in implementing REM, including the Regional Electricity Regulator Association and, more recently, independent power producers

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1 A power pool balances electrical loads over a larger network (the electrical grid). It is a mechanism for an interchange of power between two or more utilities (electricity generator or provider). SAPP is based on regional co-operation in the electricity sector among member states' national utilities and takes place at policy, planning and operational levels; involving governments, power utilities and financial agencies.

(IPPs). A look at the IPP introduction at the regional and national levels reveals a general trend of privatisation and restructuring of state-owned power companies, also associated with the development of renewable energy sources (RES). However, SADC member states have different needs and expectations regarding the role of a REM and the IPPs. Dealing effectively with member states in terms of the diversity of their agendas and national utilities requires SADC to maintain a sharp focus on regional priorities.

Over the last 10 years the national actors – principally governments and utilities in the energy sector – and the SADC regional structures have contributed to the success of REM and to fostering competition in the regional and national energy sectors. Whether this last point will help with increasing energy access and broad regional development and integration is yet to be determined. Another important factor in the energy sector evolution is the recent introduction of RES in the SADC regional strategy and in several member states’ national policies and future energy mix.

The following analysis of the SAPP case intends to provide insight into the regional power-pool implementation by highlighting the difficulties encountered, the benefits so far, and the recent challenge posed by the IPP introduction at the regional level and in certain national markets. The case study suggests that there is a growing REM for energy exchange, which has been designated as a key priority in regional and national agendas, despite the lack of energy access and infrastructure building, which seem to have received only secondary recognition.

## ENERGY RESOURCES IN SOUTHERN AFRICA

The establishment of SADC in the 1992 Treaty quickly led to a focus on regional resources management. In 1995 SAPP gathered the member states’ national power utilities and, a year later, the SADC Protocol on Energy was signed by SADC member states. Power pools were formed and interconnections developed to cover network efficiency over increasingly long distances. All utilities participating in SAPP were given equal rights and obligations, and agreed to act in solidarity without taking advantage of one another. Since the 1990s SAPP has aimed to facilitate the development of a competitive

electricity market in the Southern African region and to act as ‘the right arm of the SADC Infrastructures and Services Division with regards to any energy-related project at the regional level’.<sup>2</sup> Management of the various energy resources in Southern Africa falls under the SADC Infrastructures Division, which in turn relies on SAPP to implement regional projects.

As stated by a representative from the New Partnership for Africa’s Development (NEPAD), ‘the SAPP is the most advanced power pool in Africa’.<sup>3</sup> By empowering SAPP, SADC has contributed to regional integration through the implementation of REM. This contribution questions the role played by member states, national utilities, private stakeholders and international investors in the regional energy sector. The SAPP role appears to extend far beyond regional supply of sufficient energy from the regional pool association of national utilities. According to the South African Department of Energy (DoE):<sup>4</sup>

The SAPP allows the free trading of electricity between Southern African Development Community (SADC) member countries, providing South Africa with access to the vast hydropower potential in the countries to the north, notably the significant potential in the Congo River (Inga Falls).

Southern Africa’s energy repartition is often presented splintered in a Thermal Southern Network, predominantly deriving power from coal and gas (Namibia, Botswana, South Africa, Lesotho, Swaziland); and a Hydro Northern Network from hydropower (the Democratic Republic of Congo, Angola, Zambia, Zimbabwe, Mozambique, Malawi, Tanzania). In 1995 the interconnection of these two networks through a stronger line of 400 kV created a platform for regional power trade and co-operation. SAPP aims to establish further interconnections between the Southern and Northern energy resources and grids, and to overcome

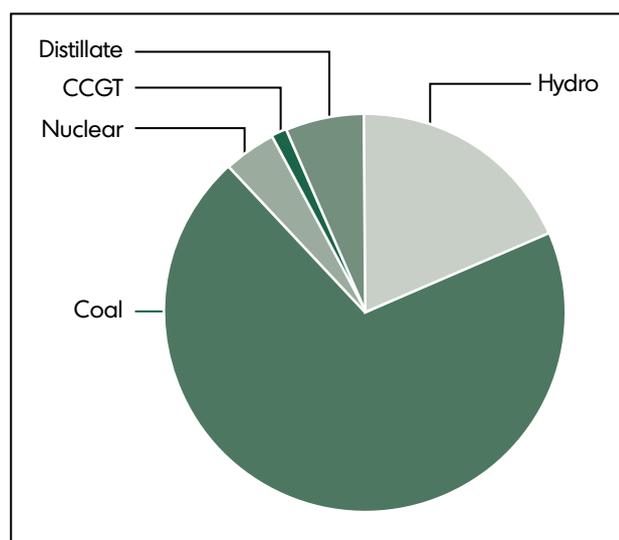
2 Personal interview, SAPP Environmental Officer, SAPP Coordination Centre, Harare, 2 May 2013.

3 Discussion with NEPAD Head Energy Division, Prof Elmissiry, US–Southern Africa Solar Workshop, Sandton, 21 May 2013.

4 South Africa, DoE, ‘Renewable energy’, [http://www.energy.gov.za/files/esources/renewables/r\\_hydro.html](http://www.energy.gov.za/files/esources/renewables/r_hydro.html).

any differences among member states, with the outcome of supporting one another during peak periods and emergencies. Overcoming such differences remains a key challenge faced by SAPP. Member states have vastly different political, economical, social and environmental situations, and varying needs and requirements in terms of energy production and consumption.

**Figure 1: The 2012 SAPP Installed Capacity (Generation) Mix**



Note: CCGT represents combined cycle gas turbine; Distillate represents fuel.

Source: SAPP, *SAPP 2012 Annual Report*. Harare, SAPP Coordination Center, 2012.

## REGIONAL ENERGY INSTITUTIONS AND POLICIES

SADC operates at a regional level through protocols that are signed and ratified by member states, and then enforced and implemented by SADC divisions. The SADC Energy Protocol, signed in 1996 and entered into force in 1998, intends to promote the development of national energy policies under a regional policy umbrella for the member states' common benefit, in providing a balanced and equitable development of energy resources throughout regional energy resources pooling.

The SADC Energy Protocol defines energy pooling as 'a co-operation among parties or entities in development, transmission, conveyance and storage of energy in order to obtain optimum reliability of service,

economy of operation, and equitable sharing of costs and benefits' (definitions) in order to 'ensure security and reliability of energy supply and the minimisation of costs' (objectives). It also refers to SAPP as an 'integrated power system'.<sup>5</sup>

Two memorandums of understanding (MoUs) have been signed by member states and their respective national power utilities: the Inter-Governmental MoU in 1994, which formerly established SAPP; and the following Inter-Utility MoU, which gathered all the national power utilities throughout SAPP and defined their management and operating interactions. Both MoUs were revised in 2006 and 2007. An agreement between the operating members was also signed to define the specific operating rules and pricing, and was revised in 2008. Operating guidelines have been devised, and market guidelines are in the process of being drawn up. The revisions of the MoUs allowed for the establishment of the SAPP Coordination Centre Board and the creation of the market subcommittee, alongside three existing subcommittees (environmental, planning and operating).

In 2001 SAPP established a short-term energy market; followed by a balancing market in 2002; and a competitive electricity market, known as a day-ahead market, in 2009. The shift from a co-operative pool to a competitive one has been operated by SAPP. Ancillary services are now used by utilities and grid operators to improve reliability and increase economic efficiency in regional energy markets by addressing short-term imbalances and dispatching resources. For example, in the case of a power plant or transmission line unexpectedly going out of service, SAPP is currently developing a demand response based approach, which also helps to integrate renewables generation capacity into the system. In 2010 a SADC Regional Energy Access Strategy and Action Plan was released, which provided a comparison between several case studies (including Tanzania, Namibia, South Africa) and focused on renewable energy initiatives in the region.<sup>6</sup>

From a regional perspective, all national energy policies in Southern Africa seem interconnected, although not to the extent expected. For example,

<sup>5</sup> SADC, *Protocol on Energy*. Gaborone: SADC, 1996.

<sup>6</sup> SADC, *Regional Energy Access Strategy and Action Plan*. Gaborone: SADC, 2010.

Botswana has only a draft of a future energy policy, with 15–25% dedicated to RES.<sup>7</sup> Public–private partnerships exist in the energy services (such as a delivery contract with *Electricité de France*) but are limited with the yet-to-be implemented Renewable Energy Feed-In Tariff (REFIT). REFIT is important for the establishment of a power purchase agreement between the IPPs and the national utility. Compared with Botswana, in South Africa the National Energy Regulator released a REFIT in 2009 and RES bids in 2011.

#### WHO WANTS TO BE ‘IN’ SAPP?

Although REM has been built and is currently overseen by SAPP, three member states have not yet been included in this market: Tanzania, Malawi and Angola. The Tanzania Electricity Supply Company, the Electricity Supply Corporation of Malawi and the *Empresa Nacional de Electricidade* in Angola are non-operating utilities in SAPP.

Despite its strong contribution to expanding electricity trade among its members, SAPP remains ‘powerless’ in the decisions of member states, and can only act as a counsellor in the development of the requirements to become part of REM.<sup>8</sup>

Increasing generation and transmission regional capacities are another important part of the SAPP mandate. In this prospect, SAPP seems to consider the IPPs as a source of increasing power production and transmission. One IPP and an independent transmission company (ITC), both from Zambia, have been formerly identified as operating partners in SAPP, respectively named the Copperbelt Energy Corporation and the Lunsemfwa Hydro Power Station. Two companies from Mozambique, also an IPP and an ITC, *Hidro Electrica de Cahora Bassa* and the Mozambique Transmission Company, have an observatory status within SAPP.

However, the member states are at different stages in the recognition and development of IPPs and ITCs through power purchase agreements. In South Africa,

the diversification of primary energy sources towards RES started in 2011 with a five-phase competitive bidding process launched by the DoE. Climate change is a cross-cutting challenge for South Africa and the Southern African region, both having hosted numerous international, regional and national summits and workshops related to climate change impacts and challenges. Although South Africa is entering the third window of its Renewable Energy and Independent Power Producer Procurement Programme (REIPPPP or REI4P) to increase the share of IPPs to 30% of its future energy production,<sup>9</sup> SAPP echoes the increased importance of the IPPs in its REM, but without taking further facilitating measures.

SADC is faced with diminishing surplus generation capacity, and energy security in the Southern African region is becoming vital. In 2007 SADC energy ministers acknowledged that the region will soon run out of surplus capacity if planned projects are not implemented and commissioned on schedule. SAPP acts as a driver of the REM and IPP introduction at the regional level. However, the SAPP mandate is limited, and it remains the association of national power utilities and an extension of the SADC Division of Infrastructures and Services. Member states thus have varying interactions with SAPP, depending on their interests and links with their national power utilities. At the national and local levels, SAPP has no mandate or power to sway member states. SAPP only presents criteria to the states and to the national providers or IPPs that wish to enter REM. In the RES sector, international firms and investors are complementing states’ initiatives, such as in South Africa, but their impacts seem limited at the regional level.

#### THE IPPS AND RENEWABLE ENERGY SOURCES: A BOTTOM-UP APPROACH TO BE CONSIDERED BY SAPP?

REM implementation and further development on a competitive basis requires member states, SAPP utilities and the IPPs to consider the regional imbalance

7 Discussion with BPC (Botswana Power Corporation) representatives, US–Southern Africa Solar Workshop, Sandton, 21 May 2013. The BPC is Botswana’s national power utility.

8 Personal interviews, SAPP representatives, SAPP Headquarters, Harare, 3 May 2013.

9 Since 2001 it has been decided that private-sector participation in power generation in South Africa should reach 30%, with Eskom, the state-owned company and national-utility electricity producer, keeping the remaining 70%.

**Table 1: South African REIPPPP intermediate results**

| RES technology                    | MW (Total) | REIPPPP Phase 1 2011–12  | REIPPPP Phase 2 2011–13 | REIPPPP Phase 3 (2013–14) |
|-----------------------------------|------------|--------------------------|-------------------------|---------------------------|
| <b>Onshore wind</b>               | 1 850.0    | 634                      | 563                     | (653)                     |
| <b>Solar</b>                      |            |                          |                         |                           |
| <b>Concentrated solar thermal</b> | 200.0      | 150                      | 50                      | (0)                       |
| <b>Solar photovoltaic</b>         | 1 450.0    | 632                      | 417                     | (401)                     |
| <b>Biomass</b>                    | 12.5       |                          |                         | (111)                     |
| <b>Biogas</b>                     | 12.5       |                          |                         |                           |
| <b>Landfill gas</b>               | 25.0       |                          |                         |                           |
| <b>Small hydro</b>                | 75.0       |                          | 14                      |                           |
| <b>Small projects</b>             | 100.0      |                          |                         |                           |
| <b>Total (MW)</b>                 | 3 725.0    | 1 416                    | 1 044                   | (1 265)                   |
| <b>Number of bidders selected</b> |            | 28<br>(53% success rate) | 19<br>(25%)             |                           |

Source: South Africa, DoE website press releases, [http://www.energy.gov.za/files/media/pr/2012/MediaStatement\\_IPP\\_W2\\_Announcement\\_21May2012.pdf](http://www.energy.gov.za/files/media/pr/2012/MediaStatement_IPP_W2_Announcement_21May2012.pdf), 21.05.2012 and [http://www.energy.gov.za/files/media/pr/2011/MediaStatement\\_IPP\\_07Dec2011.pdf](http://www.energy.gov.za/files/media/pr/2011/MediaStatement_IPP_07Dec2011.pdf), 07.12.2011.

mentioned among member states. These distortions can be observed at various stages, including between the national grids, between the energy access, and between the national policies. The South African introduction of the IPPs in the RES extension is currently on track, but has faced several challenges during its development. Some of them still need to be addressed, such as the connection of IPPs to the South African national grid backbone. The REM could perhaps benefit from the South African experience by establishing a similar preferred-bidders selection to increase the RES share in SAPP.

In South Africa, the recent empowerment of the IPPs stems from private-sector participation in the electricity industry, which was approved by the government in 2003 in a bid to facilitate future power-generation capacity. Indeed, the South African White Paper on Renewable Energy has set a rather ambitious target of generating 10 Gw of energy to be produced from RES by 2013, 21% of South Africa's future energy mix. The REIPPPP has thus been implemented to contribute towards the country's energy mix target of 3 725 MW in order to achieve sustainable development goals and to encourage the renewable industry in South Africa. The first and second bids have closed recently (9 May 2013 for the second bid signature of agreement between

preferred bidders and the DoE), and the last one should be concluded by 30 July 2014.<sup>10</sup>

In 2012 an additional 100 MW were added to the REIPPPP for extra small projects, but have yet to be allocated. The South African government is proud to highlight the further benefits of these preferred bidders in the two first windows in the South African renewable energy sector: job creation and the diminution of the renewable energy prices are the most important. Between the first and second bidding windows, wind energy prices have fallen by 22% and solar by 40%. Another interesting outcome concerns the lack of successful bidders for biomass and biogas sources. According to Eskom, the sale prices from these energy sources are still too high compared with the current energy market prices. Lastly, connection to the national grid backbones remains a challenge for South Africa; and stronger distribution and transmission planning need to be established between Eskom and the IPPs.

South Africa has regularly renewed its policies in several sectors and implemented new strategies, giving priority to its borders and markets. However, South Africa also holds a strong position on the international

10 South Africa, DoE, 'REIPPPP', <http://www.ipprenewables.co.za>.

energy scene and consequently represents a key actor at the regional level in the energy sector. Eskom, the national South African utility, is the regional leader, covering almost 80% of the total regional demand (producing and supplying).

## CONCLUSION

Since 1995 one of the SADC objectives has been to resolve differences between member states. However, these differences can still be identified in several areas of the regional energy sector. These include differences in the choice of sources (oil, gas, RES), within the organisation of the SADC member states' national energy market (distribution, consumption), and in terms of energy priorities forecast. Member states seek to intensify both their partnerships for supply and distribution in order to decrease their dependence. Thus both the South African energy market and REM seek to open energy markets inside and outside SADC.

Infrastructure building is central to the debate on future energy choices and the intertwined market.<sup>11</sup> Major projects (such as dam building) involve member states in the construction of interactions, with regards to the changes occurring in primary resources management (coal, uranium) and the production of energy (electricity) at local, national and international levels, partly due to the international debate on climate change.

Regional co-operation on resources is crucial. SADC targets resources management regional integration from water supply to energy production and distribution. SAPP operates at the regional level and has had a growing impact over the last decade, but is still facing what might be the biggest challenge encountered by a regional association, namely the political will to fulfil

commitments made. The IPP example highlights the necessity to simplify the procedures for enterprises to invest in the energy sector by providing attractive incentives and support at regional and national levels.

Last but not least, the financial dimension of energy infrastructure development plays a strong role. Low investments have been blamed for causing power failures and crises, slowing down gross domestic product growth in several countries. Nevertheless, investments are likely to improve, with the increasing presence of regional and international actors. These include the African Union Commission; NEPAD and the African Development Bank, through their Programme on Infrastructures Development in Africa; the BRICS (Brazil, Russia, India, China and South Africa), as financiers for public infrastructures; and the bilateral or multilateral co-operative agreements between states, such as the recent MoU signed between South Africa and the DRC in the energy sector.

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## ABOUT THE AUTHOR

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11 A remarkable number of interconnected projects are on the SADC agenda, such as the Inga Dams multiplication, or have already been commissioned, such as the ZIZABONA interconnector (Zimbabwe–Zambia–Botswana–Namibia).

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