Electricity Exports and Imports in SADC:

Potential Roles for National Electricity Regulators

Inception Report to the Regional Electricity Regulators' Association (RERA) and the World Bank

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Abbreviations and Defined Terms

AFTEG	World Bank Africa Energy Group
AGC	Automatic Generation Control
APL	Adaptable Program Lending
ASA	Ancillary Services Administrator
BPC	Botswana Power Commission
CEC	Copperbelt Electricity Corporation
CIC	CIC Energy Corporation
DAM	Day Ahead Market
DBSA	Development Bank of Southern Africa
DME	Department of Minerals and Energy, South Africa
DRC	Democratic Republic of Congo
ECB	Electricity Control Board, Namibia
EdM	Electricidade de Mocambique
EMTF	SADC Energy Ministerial Task Force
ENE	Empresa Nacional de Electricidade, Angola
ERB	Energy Regulatory Board, Zambia
ESCOM	Electricity Supply Corporation of Malawi
EWURA	Energy and Water Utilities Regulatory Authority of Tanzania
FERC	United States Federal Energy Regulatory Commission
GMS	Greater Mekong Subregion
HCB	Hidroelectrica de Cahora Bassa
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IGMOU	Inter-Governmental Memorandum of Understanding
IPP	Independent Power Producer
IRSE	Institute for Electricity Sector Regulation of Angola
ITC	Independent Transmission Company
LEA	Lesotho Electricity Authority
MCU	Mmamabula Coordinating Unit

MERA	Malawi Energy Regulatory Authority
MOE	Ministry of Energy
MOTRACO	Mozambique Transmission Company
MOU	Memorandum of Understanding
NERSA	National Energy Regulator of South Africa
OPPPI	Office for Promoting Private Power Investment, Zambia
PJM	Pennsylvania-Jersey-Maryland
PPA	Power Purchase Agreement
RERA	Regional Electricity Regulators Association
RTO	Regional Transmission Organization
SADC	Southern African Development Community
SAPP	Southern Africa Power Pool
SATA	Southern Africa Telecommunications Association
SEC	Swaziland Electricity Company
SIEPAC	Central American Electrical Interconnection System
SNEL	Société National d'Eléctrcité, DRC
SPV	Special Purpose Vehicle
STEM	Short Term Energy Market
TANESCO	Tanzania Electric Supply Company
THN	Transit Horizontal Network
TK	Transit Key
TOR	Terms of Reference
TSO	Transmission System Operator
USAID	United States Agency for International Development
WAPP	West Africa Power Pool
WATRA	West African Telecommunications Regulatory Association
WESTCOR	Western Power Corridor
ZERC	Zimbabwe Electricity Regulatory Commission
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	Zambia Electricity Supply Corporation

Executive Summary

There are a large number of planned but undeveloped generation and transmission projects in Southern Africa that would rely on cross-border power sales. Unfortunately, projects that have been identified as technically and economically feasible are being held up by political, institutional and financing constraints. The Regional Electricity Regulators Association of Southern Africa (RERA) and the World Bank are interested in understanding the requirements for an enabling environment for regional power trading, and have asked Castalia to complete a study on regulatory and pooling arrangements for cross-border power trading in the Southern African Development Community (SADC).

The main outputs from our work will be a set of guidelines for national regulatory entities in SADC aimed at promoting efficient, large-scale power transactions, and a checklist for the Southern Africa Power Pool (SAPP) that clarifies the power pool's responsibilities for progressing regional power projects. This Inception Report describes our initial thinking on the guidelines and checklist, and highlights the major issues that should be addressed through these initiatives.

There appear to be significant benefits to enabling cross-border power trading in Southern Africa. An increased level of power imports and exports in the region will allow countries to achieve a desired level of security of supply at a lower overall cost. Numerous recent studies show that regional trading and cooperation within SADC will substantially reduce investment and operating costs for new generation and transmission facilities. Greater trading should also be able to achieve security of supply in meeting steadily increasing levels of demand over the near, medium and longer term.

A clear regulatory environment can significantly improve the prospects for regional power developments by providing the revenue certainty required to finance large capital investments. Given the current market in Southern Africa for selling the output from power projects, a long-term PPA complemented by appropriate regulation is the only arrangement that will provide sufficient revenue certainty to lenders.

An initial assessment of potential regional power projects illustrates that a number of viable projects exist that could provide the capacity necessary to generate and transport required power; and that those projects are not currently being developed to the extent expected. There are numerous barriers to developing these projects, and this Report focuses on two areas that create barriers to investment. The first is the lack of clarity and certainty in the national regulation of cross-border trading. The second is the technical and institutional support that should be provided to cross-border projects by SAPP.

Dealing first with regulatory issues, national regulatory entities in SADC countries have been generally been empowered to deal with the following core regulatory functions:

- Licensing generators, transmission providers and importers/exporters (issues of market entry)
- Reviewing the terms of PPAs for pass-through into retail tariffs and determining whether purchasing costs should be allowed to be passed through into retail tariffs (pricing and pass-through issues)
- Reviewing minimum technical standards for interconnection and requirements for the quality and reliability of supply (access rules and quality standards).

We have found that the substance of how regulators and Government Ministries discharge these responsibilities, and the processes in place for undertaking these regulatory responsibilities, are not clear to investors and power utilities. This lack of clarity is adding to investment uncertainty and delaying viable cross-border projects. Specific provisions in the regulatory guidelines will need to clarify how regulatory entities will deal with market entry, pricing issues, and access rules and quality standards for cross-border projects.

Before regulatory entities can effectively adopt and implement regulatory guidelines, the policy and institutional framework for cross-border power trading needs to be determined. Governments in the region must be comfortable that regional power deals can meet domestic security of supply requirements. Given recent experience with supply shortages in the region, the issue of security of supply poses a significant challenge to expanding cross-border trading. The ways in which the issue of security of supply is addressed in SADC countries will directly impact the appetite for regional power projects and regulators' effectiveness in facilitating good cross-border power transactions.

In addition, the market structure in each country needs to be clarified so that the sector operates efficiently. Once a market structure has been decided upon, regulatory entities can implement regulation that is consistent with the chosen market arrangements. Most countries in SADC have passed electricity and regulatory laws to enable private sector participation in the power sector, and that trading functions need to be licensed. However, it is unclear whether all power purchases in each country need to go through the national utility, or whether independent power producers and large customers can trade directly, including across borders.

Turning to pooling arrangements, the main responsibilities of SAPP for cross-border power trading are to:

- Evaluate the technical impacts of specific cross-border power deals
- Establish technical and economic rules needed for an efficient and reliable trading platform
- Monitor the performance of member utilities.

Each of these responsibilities will be developed as part of the checklist for the power pool developed in this assignment. We note that SAPP currently has difficulty adequately performing these tasks. This may be due to a lack of resources, capacity issues, restrictive governance arrangements, or a combination of these constraints.

In addition to investment barriers created by regulatory and pooling arrangements, there are a number of other possible barriers to expanding cross-border power trading in SADC that will not be addressed in this assignment. These other issues include the fact that some countries in the region have particularly high levels of political or country risk that deter foreign investment, and that retail tariffs do not recover all costs in every country. Some of these other barriers to progressing new cross-border trades are being studied in a separate consultancy led by Utho Capital of South Africa. Utho Capital's work focuses on financing issues for cross-border power developments, and complements our study in helping to clarify the environment for investments in cross-border power projects in SADC.

To move forward with preparing the regulatory guidelines and SAPP checklist, our team will immediately begin working on the four case studies discussed in the Terms of Reference.

The cases will review the specific experience with cross-border trading in North America, Central America, the Greater Mekong Subregion and Western Africa. The case studies will focus on the areas highlighted in this Inception Report where regulatory and pooling arrangements in Southern Africa could improve the prospects for cross-border power trading.

We propose to present the main findings from the case studies at an Investor Roundtable conference to be held in Zambia from 15-17 July 2009. Finally, we aim to present proposed regulatory guidelines during the RERA annual meeting scheduled for September 2009. SAPP has also scheduled a series of meetings for September 2009, which could be used to present the draft regulatory guidelines and SAPP checklist to a broader group of stakeholders.

1 Introduction and Purpose of this Study

The Regional Electricity Regulators Association of Southern Africa (RERA) and the World Bank have asked Castalia to complete a study of the role of national regulators in cross-border power trading in the Southern African Development Community (SADC).[1] The Terms of Reference for this assignment are attached as Appendix A. The main outputs of this assignment will be:

- A set of guidelines for national regulators in SADC aimed at promoting efficient, large scale power transactions that lower supply costs and enhance the security and reliability of electricity supply within Southern Africa
- A checklist for the Southern Africa Power Pool (SAPP) that clarifies the power pool's responsibilities for progressing regional power projects.

This work has been commissioned at a time of significant change in the power sector in Southern Africa. Existing generation capacity is now fully utilised within South Africa, the largest power producer and consumer in the region, and large new projects located in other countries are seen as a potentially viable way to meet future power demand. Other countries in the region could also benefit from increased electricity trade by diversifying supply sources and developing economic opportunities for power production. Furthermore, as a result of power shortages experienced in Southern Africa at the start of 2008, SADC Energy Ministers have issued a directive to RERA and SAPP to facilitate and promote new regional power projects. This is also consistent with the views expressed at the highest political levels of the Southern Africa Development Community.[2]

While these developments create a demand for new large power projects in Southern Africa, a transparent, stable and effective regulatory framework is important for providing private investors with the certainty needed to make the large investments being considered. Regulatory certainty is especially necessary in the SADC region, where private investment in the power sector is relatively uncommon and investors perceive a higher level of political/country risk than in most other regions of the world.

This Inception Report summarises our initial assessment of the major issues that could be addressed through a set of regulatory guidelines proposed by RERA and a checklist of activities for SAPP. The issues addressed in this Inception Report have been identified through discussions with stakeholders in Southern Africa during April 2009 (see Appendix B), and through a review of previous studies and existing laws and regulations (see Appendix C and Appendix D).

We will discuss the issues identified in this Inception Report with stakeholders in July 2009, together with the findings of targeted case studies of cross-border power trading in other regions. Based on these discussions we will generate a set of practical guidelines that national regulators will be able to implement when carrying out their responsibilities for cross-border power trading.

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[1] The countries in SADC include South Africa, Namibia, Botswana, Zimbabwe, Zambia, Mozambique, Lesotho, Swaziland, Tanzania, Angola, Malawi, and the Democratic Republic of Congo. References in this report to Southern Africa refer to these countries. Other SADC members include Madagascar and Mauritius.

[2] See press release from SADC meeting on 21 February 2009.

The remaining sections of this Inception Report are as follows:

- Section 2 provides context for our work by examining the potential benefits of regional power trading in the SADC region. We also introduce the value of having a clear set of regulatory guidelines
- Section 3 provides background on the regional power trading environment within SADC by considering current electricity system supply and demand, and presenting information on some regional power projects currently being investigated. This section also provides an overview of the roles of different regional and national bodies within the SADC electricity industry
- Section 4 provides details of the regulatory issues in cross-border power trading we have identified as being particularly relevant. The regulatory guidelines we will prepare as part of this assignment will directly address these issues
- Section 5 provides details of the responsibilities that may be adopted by the power pool that appear to not be performed by SAPP. The checklist for SAPP that we will prepared as part of assignment project will include these responsibilities
- Section 6 provides a brief summary of other issues that are holding-back regional power trading within SADC that will not be explicitly addressed through this project. These issues will be considered when formulating recommendations for national regulators and SAPP, but will not be directly addressed through the regulatory guidelines or SAPP checklist
- Section 7 provides an updated view on the regulatory guidelines and SAPP checklist, along with a proposed work plan and series of next steps for this project
- Appendix contains the Terms of Reference for this assignment
- Appendix B provides a summary of the stakeholder meetings held in April 2009
- Appendix C reviews previous studies commissioned by SAPP on financing cross-border power trading, developing a regional power pool, establishing transmission pricing and ancillary services proposals, developing market rules and tariffs in the SADC region
- Appendix D reviews national legislation in five SADC countries.

2 Potential Benefits of Cross-border Power Trading in SADC

A number of proposed generation projects in Southern Africa that rely on cross-border power trading have excellent potential. Although these regional projects appear to be technically and economically feasible, many projects are not moving forward. Within this assignment we are focusing on trading from large, cross-border generation and transmission projects and the agreements required to develop these projects. These developments can be contrasted with the short-term energy trading that takes place within SAPP that is not contingent on raising finance. Accordingly, where this report refers to "regional power projects", we refer to generation and transmission investments that require cross-border agreements.

This section provides an overview of the reasons that Governments, regulators and development agencies should be concerned with the absence of cross-border projects in SADC reaching financial close in recent years. This section also introduces the benefits of clear regulatory arrangements for cross-border power projects.

2.1 Recapping the Main Benefits of Cross-border Power Trading

Increased cooperation and cross-border trade in the SAPP region will allow countries to achieve a desired level of security of supply at a lower cost. Numerous studies have shown that regional trading and cooperation within SADC will substantially reduce the investment and operating costs associated with new generation and transmission facilities. Greater trading should also be able to achieve security of supply in meeting steadily increasing levels of demand over the near, medium and longer term.

Cross-border power trading would lead to:

- Significant cost reductions that could be achieved by developing least cost resources first
- Improving security and reliability of supply through diversification of sources of generation
- Increasing access to finance for projects developed by smaller countries.

We have reviewed a number of different studies that have developed models to analyse the costs of expanding the power sector in the SAPP region over near, medium and long terms under a variety of different assumptions. The consensus is that significant reductions in investment and operational costs can be achieved over different timeframes by coordinating and optimising generation and transmission developments in the region. These studies derive their conclusions by comparing scenarios reflecting current planning and constraints—specifically economic and political constraints—with an idealised free trade scenario in which all economic and political constraints to optimised cross-border trade have been lifted.

Three recent reports have estimated the benefits of regional power integration in SADC—the SAPP Pool Plan (reviewed in Appendix C), the Africa Infrastructure Country Diagnostic (AICD) recently undertaken by the World Bank, and an article in the *Energy Policy* journal entitled "Optimizing trans-national power generation and transmission investments: a Southern African example". The main findings for these studies are as follows:

- **SAPP Pool Plan**—More power trading will reduce total investment and operational costs by approximately 10 percent over the period of 2006-2025 saving a total of more than US$5 billion. Greater regional integration will also reduce the future costs of unserved energy by more than US$300 million
- **World Bank AIDC**—Expanding power trading in SADC will reduce total estimated investment and operating costs by US$1.1 billion over ten years. The AIDC model suggests that trade would allow a reduction of annualised power system costs of 5-6 percent across the SAPP region in aggregate. The investment costs to enable trading would be recouped in less than a year, and the investments would yield a return of 167 percent.
- ***Energy Policy* article by Graeber and others, 2005** ("Optimizing trans-national power generation and transmission investments: a Southern African example")—Cost savings from greater system integration would total between US$2-4 billion over 20 years, or 5 percent of total system development costs (in 1999 USD). Approximately 40 percent of these savings are associated with lower investment costs, while the remainder can be attributed to lower operational costs.

The interest in regional trading and cooperation on power development within SADC did not grow purely from analysis of potential cost savings. Rather, the region's decision makers have recognised the vulnerability of individual countries if policies of self-sufficiency are pursued. Utilities and national governments recognised that security and reliability of supply can be improved by taking advantage of:

- Different resources in different parts of the region
- Different peak demand times in different parts of the region
- Sharing generation reserve margins among several utilities or countries.[3]

However, we note that from the perspective of national governments and the utilities in each country, this discussion of security and reliability of supply is highly dependent on the willingness of those entities to rely on significant imports. Recent experiences of power outages in South Africa have impacted negatively on the perceptions of neighbouring countries on the reliability of imports. This issue will have to be addressed if there is to be greater political support for regional power trade.

A further benefit of regional trade is to increase access to finance for projects being developed by smaller, less-creditworthy countries. Most countries in the SADC region fall into this category. The fragmented bilateral structure of cross-border power trade in the region means that many utilities or countries operating on a single-buyer model are simply too small or lack the financial resources to engage in a PPA that would make commercial finance viable.

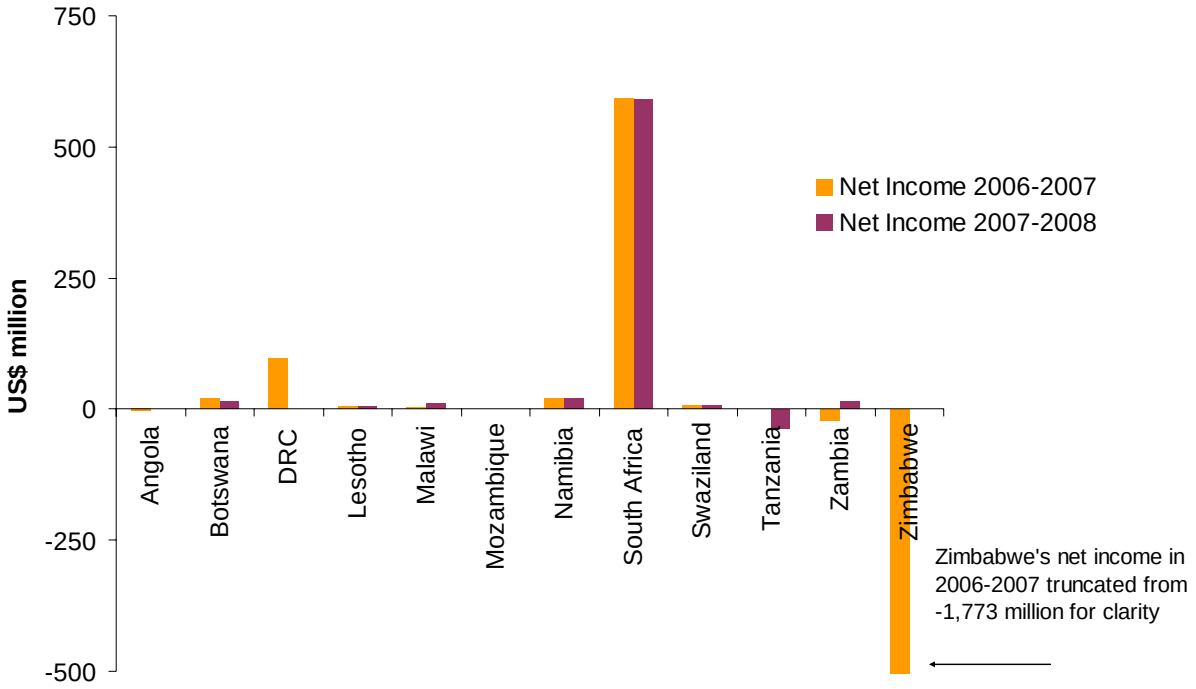
To illustrate this point, Figure 2.1 presents data on the net income earned by each of the national utilities within the SADC region.[4] This information is indicative of the relative

[3] Graeber et al, 2004.

[4] The electricity utilities in SADC are ENE in Angola, BPC in Botswana, SNEL in DRC, LEC in Lesotho, ESCOM in Malawi, EdM in Mozambique, NamPower in Namibia, Eskom in South Africa, SEC in Swaziland, Tanesco in Tanzania, ZESA in Zimbabwe, and ZESCO in Zambia.

capacity of the national utilities to fund future expansion projects (although a number of factors other than net income will influence a utility's capacity to raise finance for new projects).

Figure 2.1: Net Income of Member Utilities in SADC Region



Source: SAPP

Regional cross-border power trading would help to mitigate this challenge by developing a broader market for power projects and allowing larger, most cost-effective projects to be developed. Greater regional cooperation will also help smaller players in the SADC region progress projects without the participation of Eskom, as shown by the progress of projects such as the ZIZABONA transmission line (discussed in Section 3.1 below).

2.2 The Need for Regulatory Certainty

This assignment focuses on ensuring that clarity and consistency exists regarding the role of national regulators in reviewing, approving and monitoring cross-border power trades. As discussed above, a transparent, stable and effective regulatory framework is particularly important to give investors certainty when making large investments.

A clear and transparent regulatory environment can improve the prospects for regional projects during the development stage by:

- Providing certainty to potential investors in new generation that equity provided to develop new projects will not be wasted as a result of regulatory intervention to prevent a cross-border trade from taking place
- Assuring utilities that the reasonable costs of purchasing power under cross-border trades will be allowed to be passed-through into retail tariffs

- Reassuring Government officials about the viability of buying power from generating plants located in other countries.

Much of the regulation of the price and conditions of a cross-border power transaction will be contained in the power purchase agreement negotiated by the parties to the deal ("regulation by contract"). However, national regulation may still play a role once a power purchase agreement has been concluded by:

- Ensuring that the outcomes resulting from cross-border power trades are consistent with contractual agreements
- Monitoring the performance of the power pool to ensure that the pool is providing a valuable service in enabling regional power trading
- Reviewing the positive or negative impacts of cross-border trading on service standards and quality.

In essence, investors and lenders will be unwilling to provide equity and debt to any project that does not have a secure, long term revenue stream. Given the current market in Southern Africa for selling the output from power projects, a long-term PPA complemented by appropriate regulation is the only type of arrangement that provides such a revenue stream.

3 Overview of the Power Trading Market in SADC

There are a large number of planned but undeveloped generation and transmission projects in Southern Africa. Unfortunately, projects that have been identified as technically and economically feasible are being held up by political, institutional and financing constraints. According to the draft SAPP Pool Plan, the region may be losing up to 4 percent of GDP annually as a result of unmet power demand reducing economic investment, productivity and employment.

The disparities in energy resources and demand at the country and regional level, combined with differences between regulatory and institutional frameworks among SADC countries contribute to the problem. Different countries are at various stages of reform; most national utilities are vertically integrated power suppliers. As a consequence, demand in the region is dominated by a single, large buyer (Eskom) and several smaller markets. In the smaller markets, some national utilities are too small or do not have sufficient financial capacity to be credible buyers. The majority of supply being developed in the region that has financing is located in South Africa and is being developed by Eskom, while large projects in other countries are struggling to reach financial close. There are also large uncertainties in the political priorities and regulatory environment in SADC countries, which create complexity in the financing structure for new power projects.

This section provides a description of how the cross-border power projects that are frequently discussed in Southern Africa would fit within the regional electricity sector. Section 3.1 presents background information on the supply and demand situation in Southern Africa, and provides details of a set of illustrative regional power projects. Section 3.2 then outlines the roles played by regional and national entities within the SADC region in relation to cross-border trading.

3.1 Background on the Electricity Sector in Southern Africa

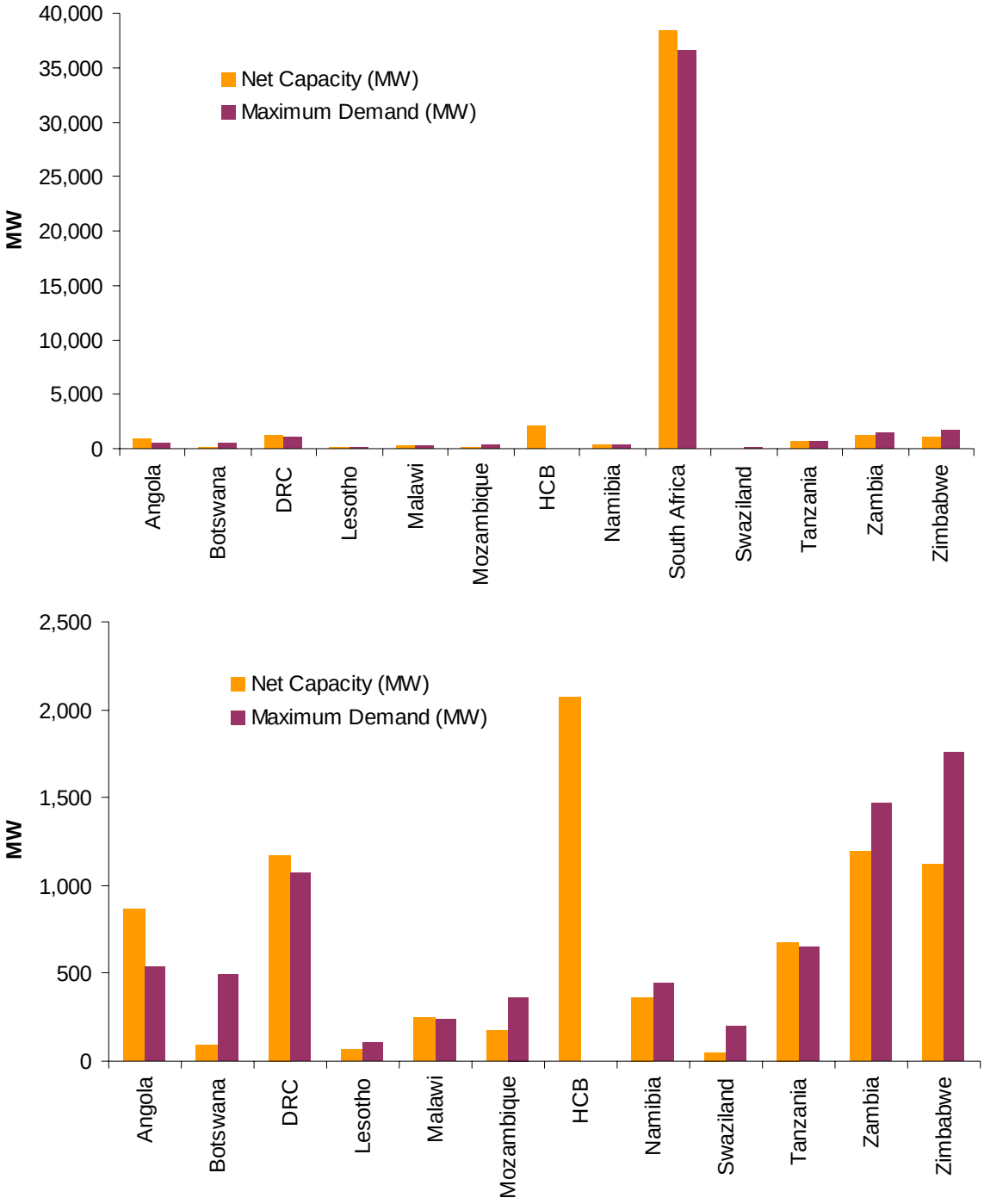
To consider how regulatory arrangements might help develop viable regional power projects it is first important to understand the context in which cross-border power trading happens in Southern Africa. This section first considers demand for power within the region, and then provides important details on some of the regional power projects that are frequently discussed in the SADC region.

Demand side view

South Africa occupies a dominant position within the electricity sector in Southern Africa, accounting for over 80 percent of overall power demand in the region. This means that Eskom will likely play a major role (including as off-taker) in the development of many new projects.

Figure 3.1 provides an overview of existing net capacity and maximum demand for each country within SAPP (with and without South Africa). The top graph (with South Africa) illustrates that the power system in South Africa is much larger than all other power systems in the region. Net generating capacity in South Africa is slightly higher than maximum demand, although the level of surplus generating capacity in South Africa has fallen in recent years.

Figure 3.1: Overview of Electricity Demand in SADC (with and without South Africa)



Note: Most of the output from HCB is sold to South Africa, with 300–400 MW sold to EdM (via South Africa) and a smaller amount sold to Zimbabwe.

Source: Southern Africa Power Pool

The bottom graph in Figure 3.1 indicates that Botswana, Lesotho, Namibia and Swaziland are currently net importers of electricity within SAPP. All four countries have traditionally

purchased a significant proportion of their energy from South Africa. Other countries, such as the DRC, Zambia and Mozambique are net exporters to the SAPP system.

Regional demand for electricity had been growing quite rapidly until the financial crisis, driven largely by industrial demand from extractive industries. Despite the recent regional and global crises, regional demand is ultimately expected to recover, particularly if international commodity prices rebound. The recent power crisis in South Africa underscores this demand growth.

In 2007–2008 South Africa experienced a number of power cuts that affected industrial and residential customers alike. From November 1, 2007 to January 31, 2008 there was an estimated shortage of 67 GWh of energy, therefore leading to load shedding. The power crisis was precipitated by years of better than expected economic growth rates in South Africa. Poor planning, and contradictory policy decisions, left the country's existing power infrastructure unable to cope with this substantial increase in demand. Additionally, it should be noted that countries throughout the region are planning large increases in residential electrification. This suggests that in addition to expected overall demand increases in the coming years, countries will need to prepare for substantial increases in peak demand to match the increase in residential electrification.

Potential regional power projects

As discussed in Section 2.2, regional power projects will rely on clear regulatory frameworks to facilitate financing for investment. Within the broad category of regional power projects, it is useful to further distinguish between three types of projects:

- "**Large multi-party projects**" with multiple owners and off-takers (e.g. WESTCOR)
- **Mid-sized multi-party projects**, potentially using Special Purpose Vehicles (SPVs) to coordinate equity and off-take arrangements (e.g. ZIZABONA)
- Less-complicated **bilaterally negotiated projects** with only one or two anchor off-takers and owners (e.g. Mmamabula, Mpanda Nkuwa, Moatize)

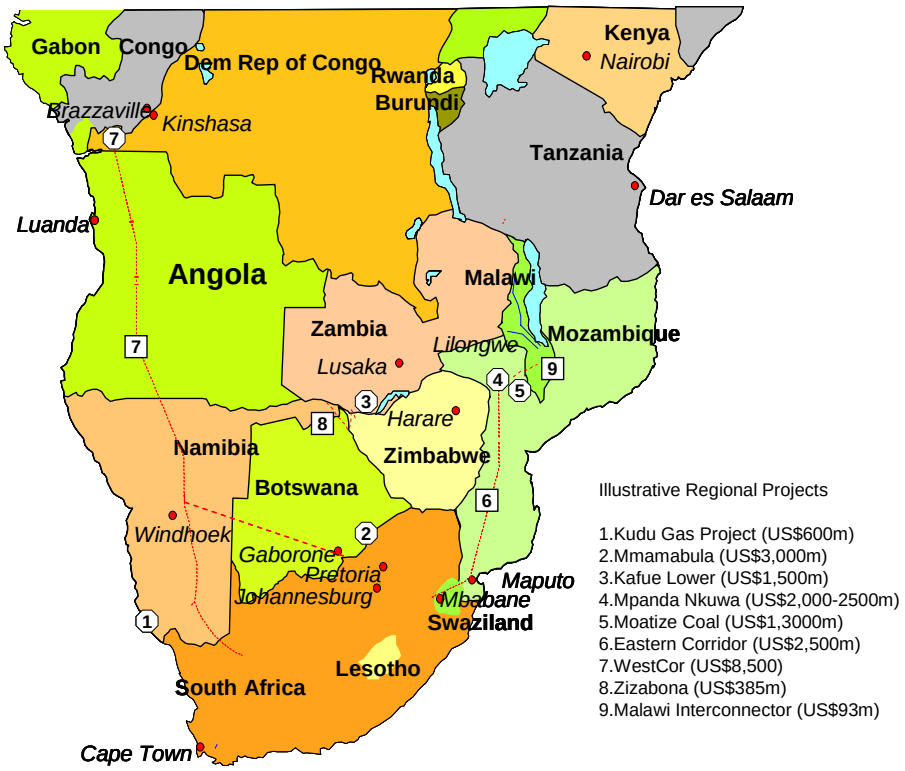
The distinction between these types of regional power projects will be relevant because regulatory requirements will be quite different types of project. Marginal regulatory improvements might help to get the bilateral deals done, while the large multi-party projects will probably require additional Governments involvement. The category of mid-sized projects involving multiple parties is not common for projects being developed in the SADC region, which may be due to the need for greater regulatory certainty and financial resources.

Figure 3.2 shows the location of nine regional power projects in the SADC region that are currently being considered for investment. This list of projects is not exhaustive, and other projects could well be developed ahead of those shown in Figure 3.2. Additional regional power projects are discussed in our review of the SAPP Pool Plan in Appendix C. The Kudu, Mpanda Nkuwa, and Kafue Lower generation projects are included in the SAPP Pool Plan scheduling of new generation projects, while Mmamabula and Moatize are not.[5] The projects shown in Figure 3.2 are also unlikely to overlap completely with the shortlist of

[5] The Mmamabula project was included in an earlier draft of the Pool Plan but was removed by Eskom. The Moatize project was proposed by EdM for an earliest commissioning date of 2015, but appears to have been excluded using the methodology applied for prioritizing projects.

bankable projects identified for the Investor Roundtable conference in July 2009. One potential project that could reach financial close before the projects shown in Figure 3.2 is the gas-fired power station proposed at Moamba, Mozambique (60 kilometres north-west of Maputo) that would be partially funded by petrochemical company, Sasol.

Figure 3.2: Location of Illustrative List of Regional Power Projects



Source: Modified from Utho Capital Presentation, April 2009

Table 3.1 provides some further details on the illustrative new generation and transmission projects shown in Figure 3.2. The table lists the main project features, rationale for the project and the major issues that have been encountered in developing the projects to date. With the exception of the ZIZABONA project, we understand that none of these potential projects has reached full financial close.

Table 3.1: Summary of Illustrative List of Regional Power Projects

Project name (location)	Project type	Main project features	Project rationale	Major issues
Kudu Gas (Namibia)	▪ Bilaterally negotiated	▪ Initial 800 MW CCGT using natural gas from the Kudu field 170 km off Namibia's southwest coast ▪ Could support an additional 800 MW CCGT ▪ Cost of initial 800 MW plant US$600 million ▪ NamPower is the lead developer	▪ Use natural gas resource for power generation ▪ Provide power to NamPower and Eskom	▪ Project delayed due to lack of PPA with Eskom ▪ Treatment of foreign exchange and commodity price changes in PPA
Mmamabula (Botswana)	▪ Bilaterally negotiated	▪ 1,200 MW coal-fired power station, integrated with coal mine ▪ Mmamabula-Medupi transmission consists of two 400 kV HVAC lines ▪ The cost of entire project (including mine, power station and transmission) is approximately US$3 billion ▪ CIC Energy and International Power are the main developers	▪ Considered to be the second largest untapped coal resource in SADC ▪ Near South Africa border	▪ Project delayed and downsized due to three-fold cost increase ▪ Difficulties in finalization of EPC (now resolved) ▪ Allocation and mitigation of foreign exchange risks ▪ Local environmental concerns ▪ Concerns from Eskom as potential buyer about emissions profile of purchases
Kafue Lower (Zambia)	▪ Bilaterally negotiated	▪ 600–750MW hydro power station ▪ Located downstream from existing 900MW Kafue Gorge Upper Hydro Dam ▪ US$1.5 billion (largest privately-financed hydro project in Africa) ▪ Bidding process for private developer run by IFC	▪ Project designed largely for use by mining operators in Zambia's copper belt driven by the surging price of copper ▪ Could provide power to South Africa	▪ Environmental concerns ▪ Demand risks given falling copper mine prices and output

Project name (location)	Project type	Main project features	Project rationale	Major issues
Mpanda Nkuwa (Mozambique)	▪ Bilaterally negotiated	▪ 1,500 MW hydro project with transmission link of over 1,000 km to Maputo ▪ Approximate cost of US$2-2.5 billion for generation and transmission ▪ Camargo Corrêa is the lead developer	▪ Develop hydro potential in Mozambique ▪ Lower emissions profile of electricity sales in South Africa	▪ Regional transmission links ▪ Environmental concerns (less impact than Cahora Bassa); seismic activity
Moatize Coal (Mozambique)	▪ Bilaterally negotiated	▪ Up to 2,000 MW coal-fired power station, developed in stages and integrated with coal mine ▪ Project equity provided by strong international energy company (Vale) ▪ Proposed single PPA with EdM, which would trade power to a third party ▪ Total cost of power project US$1.3 billion ▪ Vale is lead developer for the first phase of the power development	▪ Use thermal coal produced as a by-product of coking coal mine ▪ Economic benefits provided in the Tete region of Mozambique ▪ Investments contribute to electrification of northern Mozambique	▪ EdM payment risks (mitigated through the use of escrow accounts) ▪ EdM performance risks, specifically to negotiate back-to-back PPAs ▪ Local environmental concerns ▪ Concerns from Eskom as potential buyer about emissions profile of purchases ▪ Lack of clarity on transmission
Eastern corridor (Mozambique)	▪ Medium sized multi-party or mega-project	▪ First phase: Mozambique North-South line from Tete to Maputo ▪ 1 x 400kV HVAC plus 1 x 800kV HVDC ▪ Cost of North-South line is US$1.7 billion ▪ Future project phase could connect to East African power pool (Tanzania, Kenya, Uganda, Rwanda and Burundi)	▪ Connect Maputo with the Tete region to reduce dependence on existing transmission ▪ Provides transmission for multiple projects in Tete region	▪ Access to finance ▪ Cost sharing between multiple generation projects in Tete region ▪ Decision on lead developer

Project name (location)	Project type	Main project features	Project rationale	Major issues
Zizabona (Zimbabwe, Zambia, Botswana, Namibia)	▪ Medium sized multi-party	▪ Phase 1: A 120 km line from Hwange in Zimbabwe to Livingstone in southern Zambia, followed by the construction of substation at Livingstone and a switching station at Victoria Falls ▪ Phase 2: A 300 km line from Victoria Falls to Katima Mulilo in Namibia, via Pandamatenga in Botswana ▪ Estimated cost of US$385 million	▪ Provide an alternative transmission route to Namibia to help relieve congestion on existing transmission lines	▪ SAPP attempting a project promotion and coordination role ▪ Project initially conceived as an SPV. Now separate investments by utilities
Malawi interconnector (Malawi and Mozambique)	▪ Bilaterally negotiated	▪ 210-220 km transmission line from existing substation in Tete to new substation site in Malawi ▪ Initially operated at 220kV, but constructed and insulated for future operation at 330kV ▪ ESCOM (Malawi) proposed PPA with Hidroelectrica Cahora Bassa for 50MW ▪ Additional investment beyond interconnection and technical assistance proposed under World Bank IDA loan	▪ Improve Malawi's security of supply ▪ Interconnect Malawi to SAPP grid ▪ Export power from Tete region in Mozambique ▪ Facilitating Malawi's economic development	▪ Take-or-pay agreement requires that the line be operational by December 2009, or ESCOM will be liable for liquidated damages ▪ ESCOM performance risks
WESTCOR (DRC, Angola, Namibia, Botswana and South Africa)	▪ Mega-project	▪ Initial capacity of plant of 5,000MW (24 x 220MW) ▪ Two 400kV HVAC lines from Inga III to Capanda Power Station (Angola) ▪ Further 400kV HVAC line will connect Inga III with Kinshasa, DRC ▪ Two multi-terminal HVDC systems from Angola to Namibia, Botswana and South Africa. Length of HVDC line is approximately 3,000 km ▪ Cost of project is approximately US$8.5 billion ▪ Westcor SPV is the lead developer	▪ Linking major power source in DRC to demand in South Africa ▪ Tap into estimated total generation capacity of the Grand Inga development of over 40,000 MW ▪ Develop project based on postage-stamp price of US5c/kWh for all off-takers	▪ Technical challenges associated with transmission distances and location ▪ Country risks associated with DRC ▪ Need for off-take commitment from South Africa (Eskom)

Given the benefits of cross-border power trading it is of concern that the potential for enhancing power trading in SADC is unfulfilled. The assessment of potential regional power projects shows that a number of viable projects exist that could provide the capacity necessary to generate and transport required power; and that those projects are not currently being developed to the extent expected.

There are numerous barriers to developing these projects which are described below. As required by this assignment's Terms of Reference, we focus on two areas that create barriers to investment. The first is the lack of clarity and certainty in the national regulatory frameworks that deal with cross-border trading. These regulatory issues are discussed in Section 4. The second is the technical and institutional support that should be provided to proposed cross-border projects by the Southern Africa Power Pool (SAPP). Areas of institutional support that SAPP should provide for cross-border transactions are discussed in Section 5.

Some of the other barriers to progressing new cross-border trades are being studied in a separate consultancy led by Utho Capital of South Africa. Utho Capital's work focuses on financing issues for cross-border power developments, and is reviewed in more detail in Appendix C, Section C.1. The near-term aim of Utho Capital's work is to stimulate investor and political interest in a subset of generation and transmission projects that are likely to be bankable in the near-term, and which can enhance SADC security of supply in the medium term. Utho Capital's assignment complements our study, in helping to clarify the environment for investments in cross-border power projects in SADC.

3.2 Role of Regional and National Authorities

This section reviews the roles played by regional organisations (RERA, SAPP and the SADC Energy Secretariat), national Government entities (regulators and Ministries), and other sector players in regional power trading.

Regional Electricity Regulators Association of Southern Africa

The Regional Electricity Regulators Association of Southern Africa (RERA) is a formal association of independent electricity regulators, approved by the Southern African Development Community (SADC) Ministers responsible for Energy in Maseru, Lesotho on 12 July 2002. The establishment of regional regulatory associations is also endorsed by clause 110 of the NEPAD Programme of Action of the African Union. RERA was officially launched in Windhoek, Namibia on 26 September 2002, and the RERA Secretariat (based in Windhoek) became functional in 2005.

Membership in RERA is open to the electricity regulators of the SADC countries. Of the 15 SADC countries, 9 have regulators that have joined RERA. The members of RERA are:

- The Electricity Control Board of Namibia (ECB)
- The National Energy Regulator of South Africa (NERSA)
- The Lesotho Electricity Authority (LEA)
- The Zimbabwe Electricity Regulatory Commission (ZERC)
- The Energy Regulation Board of Zambia (ERB)
- The Malawi Energy Regulatory Authority (MERA)

- The Energy and Water Utilities Regulatory Authority of Tanzania (EWURA)
- The Institute for Electricity Sector Regulation of Angola (IRSE), and
- The National Electricity Advisory Council of Mozambique (Conselho Nacional de Electricidade, CNELEC).

Swaziland is contemplating setting up a regulator and may soon join.

RERA is not a regional electricity regulatory body because it has not been granted any formal regulatory responsibilities by SADC governments. Instead, it is a voluntary association of national electricity regulatory entities. To date, RERA's principal activities have been to share information, build up the capacity of its members and to try to harmonise regulatory practices among its members.

RERA is governed by decisions made by plenary meetings of all members. An Executive Committee meets regularly and comprises the Chairperson of RERA, three Portfolio Committees Chairpersons and one other elected Member.

Following the SADC Energy Ministerial Task Force (EMTF) meeting in Gaborone, Botswana in February 2008, the RERA Secretariat has been working on recommendations for creating an enabling environment for investment. In addition to the present assignment, RERA is undertaking the following initiatives with the USAID Trade Hub to improve the enabling environment:

- A comprehensive survey on issues such as policy, legal, institutional and regulatory frameworks
- An annual survey of SADC electricity tariffs (briefly reviewed in Appendix C, Section C.5)
- A review of the licensing arrangements for special purpose vehicles created for regional power and transmission investments, such as WESTCOR.

Southern Africa Power Pool

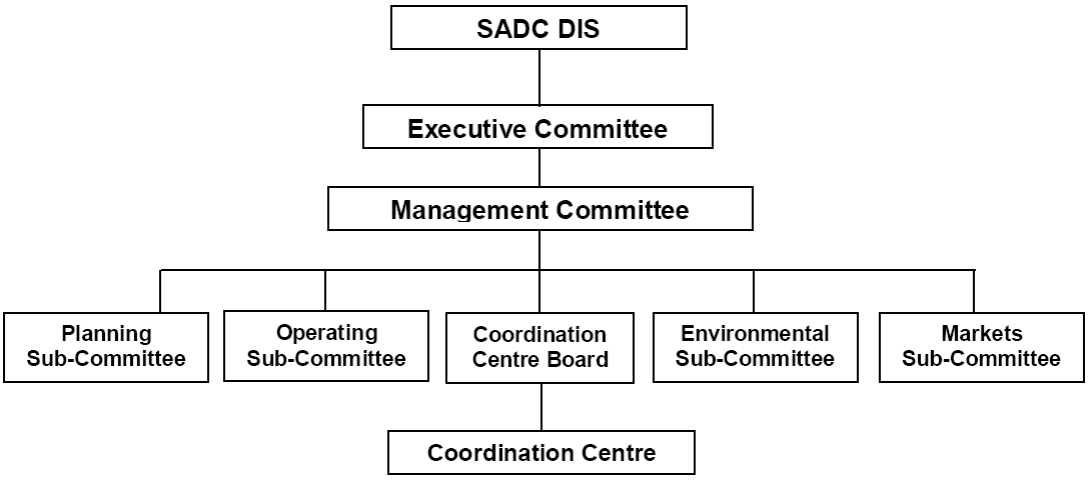
SAPP was formed in 1995 by the national utilities in the southern African region to facilitate the provision of reliable and economical electricity supply. SAPP's four governing documents are an inter-Government MOU (amended 2006), an inter-utility MOU (amended 2007), an agreement between operating members (amended 2008) and a set of operating guidelines (1996).

The present members of SAPP are the electricity utilities in Angola (ENE), Botswana (BPC), DRC (SNEL), Lesotho (LEC), Malawi (ESCOM), Mozambique (EdM), Namibia (NamPower), South Africa (Eskom), Swaziland (SEC), Tanzania (Tanesco), Zimbabwe (ZESA), and Zambia (ZESCO). Three members of SAPP are not operating members of SAPP because their systems are not interconnected: ESCOM of Malawi, ENE of Angola and Tanesco of Tanzania.

Although SAPP's inter-Governmental MOU was revised in 2006 to allow for non-utility operating members, only national electricity utilities have SAPP membership. Hidroelectrica de Cahora Bassa (HCB), MOTRACO and Copperbelt Electricity Corporation (CEC) have observer status within SAPP. We understand that MOTRACO and CEC have applied for full member status, although a final decision on these applications has not been announced by SAPP's Executive Committee.

An overview of the organisation structure of SAPP is shown in Figure 3.3. The SAPP Coordination Centre reports to the SAPP Coordination Centre Board. The SAPP Coordination Centre Board has two representatives from each national utility, one being a substantive member and the other an alternate. Each member has one vote and decisions are made by consensus or, failing this, by a two-thirds majority of the Members present at the meeting. In case of a tie during voting, the matter is referred to the Management Committee.

Figure 3.3: Organisational Structure of SAPP



The functions and duties of the Coordination Centre are contained in the Agreement Between Operating Members (May 2008) (the "ABOM") and these include the following which are pertinent to this work:

- Monitor transactions between Operating Members and between Members and non-Members (ABOM, clause 7.4.)
- Monitor the inadvertent power flows and the return in kind between the Members (ABOM, clause 7.4.4)
- Monitor and advise on the use of the SAPP Guidelines and rules as applicable, such as operating guidelines, market rules and environmental guidelines (ABOM, clause 7.4.6)
- Provide information and give technical support to Members of the SAPP in matters pertaining to parallel operation (ABOM, clause 7.4.9)
- Evaluate the impact of future projects on the operation of the Pool and advise the Management Committee (ABOM, clause 7.4.10)
- Perform various operational planning studies to highlight possible operating problems (ABOM, clause 7.4.11)
- Give advice on short-term and long-term operating problems (ABOM, clause 7.4.12)

- Perform studies to determine transfer limits on the lines and inform Operating Members accordingly. Monitor adherence of Operating Members to these limits (ABOM, clause 7.4.13)
- Establish and update a data base containing historical and other data to be used in Planning and System Operation studies (ABOM, clause 7.4.14)
- Advise on the feasibility of wheeling transactions (ABOM, clause 7.4.16)
- Gather and act as the official custodian of data pertaining to transactions between Operating Members and between Operating Members and non- Members (ABOM, clause 7.4.17)
- Carry out projects and assignments as directed by the Management and Executive Committee (ABOM, clause 7.4.19)
- Disseminate the generation and transmission maintenance schedules received from the Operating Members and advise on the adjustments that are required to maintain at all times the contractual Pool reserves and the agreed upon services (ABOM, clause 7.4.23)
- Management of the trading platform and trading functions (ABOM, clause 7.4.30)
- Checks and enforces compliance to Market rules, SAPP rules and guidelines (ABOM, clause 7.4.31).

The vast majority of energy traded in SAPP is under long-term bilateral contracts. Parties entering bilateral contracts in SAPP are expected to have negotiated access rights to the required interconnector capacity, and as a result most of the existing transmission capacity is taken up by the utilities that own the cross-border transmission lines.

In addition, SAPP has established a Short Term Energy Market (STEM) for bilateral trading of energy on a daily basis, and is currently testing a Day Ahead Market (DAM) based on a competitive wholesale market model. STEM is a market for firm energy contracted on a daily basis between participants that are part of a SAPP control area and have met necessary requirements for trading.[6] There is also a provision in STEM for weekly and monthly contracts but these types of trades have not been used. The energy traded from April to July 2007 was 68 GWh at an average cost of US 1.02 cents per kWh. The amount of energy traded is low due to power shortages and transmission constraints. STEM trading last happened in July 2007; STEM is presently inactive. Further information on the DAM is provided in the review of the SAPP market rules contained in Appendix C, Section C.3.

The SAPP Coordination Centre is funded through membership fees. SAPP has less than 10 employees and has an annual budget of US$745,000. This is considerably less than other power pools in Africa. SAPP will also receive revenue as the market operator for the DAM, which will be based on transaction volumes. This revenue stream is highly uncertain and will not materialise in the event that the DAM is not fully implemented or used by members.

[6] There are three SAPP host control areas: Southern controlled by Eskom, Central controlled by ZESA and Northern controlled by ZESCO.

SADC Energy Secretariat

The activities of the SADC Energy Secretariat are also relevant to cross-border trading. The SADC Energy Secretariat coordinates regional interactions in the energy sector, and organises the regular meetings of SADC Energy Ministers. The guiding principles and objectives of regional coordination are expressed in the SADC Energy Protocol, including the agreement in Article 4 to "cooperate in the development of energy and energy pooling to ensure security and reliability of energy supply and the minimisation of costs".[7]

The SADC Energy Secretariat is currently focusing on overcoming the diminished power surplus capacity in SADC, through implementation of the SADC Energy Ministers Roadmap and by coordinating the activities of the Energy Ministers Task Force. The SADC Energy Secretariat also plays a role in power system planning through the Regional Energy Planning Network and by publishing the SADC Energy Statistical Year Book. The SADC Energy Secretariats provides policy guidance to SAPP and RERA, and monitors progress on regional power projects.

National regulators

The duties and powers of the national regulator differ across the SADC region. In some countries, regulators have powers to make decisions on cross-border trades, while in other countries functions that would typically be regulatory responsibilities are undertaken by national Ministries. In South Africa and Zambia, regulators play an important role in cross-border trading. In contrast, the regulatory agency established in Mozambique (CNELEC) currently has no decision making powers and therefore does not play an important role in power trading. The responsibilities allocated to regulators and national Ministries are discussed in our review of national legislation in Appendix D.

The regulatory guidelines will focus on the responsibilities of national regulatory entities, and not on whether these responsibilities will be carried out by a national regulator or Government Ministry. The role of national regulatory entities in cross-border power trading is discussed in detail in Section 4 of this Inception Report. The main functions of national regulatory entities (vis a vis cross-border projects) are:

- Licensing generators, transmission providers and importers/exporters (issues of **market entry**)
- Reviewing the terms of PPAs and allowing pass-through of purchasing costs into retail tariffs (**pricing and pass-through issues**)
- Reviewing minimum technical standards for interconnection and requirements for the quality and reliability of supply (**access rules and quality standards**).

While technical standards are currently developed by SAPP, national regulators also guide decisions on technical standards. Regulators have grid codes which include planning, maintenance and system operations standards, and also determine the appropriate level of reliability across the SAPP system. National regulators also issue separate standards dealing with quality of supply.

[7] The SADC Protocol on Energy is available at http://www.sadc.int/index/browse/page/147#article3

National governments

National governments make policies for the energy sector. The governments' policies may be specified in documents like a policy "White Paper", an Integrated Resource Plan, a National Energy Plan or Ministerial regulations issued in terms of the Electricity Act or Electricity Regulation Act. The national regulator—or a national government agency with regulatory responsibility—is then required to implement the government's energy policy when making particular regulatory decisions.

The government's energy sector policies may include directions on the following issues relevant to regional power projects:

- Which entities will be allowed to import and/or export electricity. That is, whether the incumbent government-owned utility has an exclusive single-buyer status or whether other producers and consumers import or export directly
- Third party access to transmission facilities
- Which technologies can be used to generate electricity, and a desired mix of fuels or supply sources (potentially including a maximum amount of electricity to be imported and/or exported)
- Targeted levels of reserve capacity or energy, including a ceiling on imports
- The extent of access to foreign exchange
- Processes for procuring new sources of supply to ensure competition
- Pricing policies, including principles of cost recovery and pass through of cross-border power purchases
- Whether any of the benefits from a cross-border transaction (either in terms of energy or revenues) should be transferred to domestic customers
- Appropriate subsidies for one or more classes of consumers.

In addition, because all of the national electricity utilities in Southern Africa are state-owned, national Governments may impose other requirements to protect their ownership interests, including:

- The currency and other risks that the utility will be allowed to bear
- Whether the utility will be the buyer and/or provide equity to a particular project, and the size of its purchasing or ownership interest

Other relevant players

The other important players in making regional power trading happen are the power utilities and private sector investors. The utilities in Southern Africa are all vertically integrated entities, owning generation assets, transmission and distribution lines, and providing end-users with electricity. As mentioned above, all of the electricity utilities in Southern Africa are fully state-owned.

One private utility, Copperbelt Energy Corporation, is mainly a transmission company and operates in Zambia to provide electricity to large mining customers in the Copperbelt region. This company serves up to 50 percent of Zambia's current national demand for electricity.

Most Southern African countries currently have no IPPs. The only IPPs are Songas and IPTL in Tanzania and a few small IPPs in Zambia. The City of Johannesburg sold the Kelvin plant located just outside the city, and there are some very small hydro and wind IPPs in South Africa. Other plants that are not independently owned, such as HCB, are operated on a commercial basis.

Various other initiatives are being explored to increase private investment in the power sector, particularly in new generation. The Mmamabula, Lower Kafue, Moamba, Mpanda Nkuwa and Moatize developments all envisage private sector project promotion and eventual equity participation. Other existing and proposed projects are structured as joint ventures between government-owned national utilities (namely, MOTRACO and WESTCOR).

4 Regulatory Issues in Cross-border Power Trading

This section provides details of the regulatory issues in cross-border power trading we have identified. Within Sections 4.1 to 4.4 each issue is first described, and examples from the Southern Africa region are provided on the ways that each issue impacts cross-border power developments. Finally, each sub-section provides our initial thoughts on how the issue might be addressed through improvements in the regulatory environment. These possible solutions will ultimately form part of the regulatory guidelines, after we have consulted with national regulators and other sector stakeholders.

The possible solutions identified in this Inception Report are divided into immediate actions and longer-term responses. Immediate actions could be taken within the current mandate of national regulators and RERA, and therefore do not rely on changes to national legislation or the adoption of an inter-country agreement. Longer-term responses would require modifications to existing national laws or regional agreements, such as SAPP's founding documents. Changing national legislation can be a time consuming process, and altering regional agreements would require consideration by SADC Energy Ministers.

The regulatory issues and possible solutions discussed in this Section are summarised in Table 4.1. The first two of these issues, security of supply and market structure, are not typically considered to be "core" regulatory functions. We have identified these issues as relevant to our work because they will have a significant bearing on the actions that regulators can take to facilitate regional power projects. We address these issues first because they establish the framework in which substantive regulatory decisions on market entry, pricing and access take place.

Table 4.1: Regulatory Issues in Cross-border Power Trading and Possible Solutions

Issue	Description	Possible immediate solutions	Possible longer-term solutions
Ensuring security of supply in cross-border power trading	Authorities responsible for ensuring security of supply need to be assured that regional power deals can meet domestic security of supply requirements	▪ Security of supply (adequacy and reliability) standards needs to be established (including permissible import levels) and responsibilities allocated for ensuring security of supply at the national level ▪ As regional entities, RERA & SAPP need to continue to persuade SADC Energy Ministers of the security and cost benefits of regional power trade	▪ As regional entities, RERA & SAPP need to continue to persuade SADC Energy Ministers of the security and cost benefits of regional power trade ▪ As regional entities, SAPP or RERA could provide some regional planning and monitoring functions
Clarifying sector structure and functions to regulate effectively	Market structure in each country needs to be clarified so that the sector operates efficiently. Once a market structure has been decided upon regulators can implement a regulatory framework that is consistent with the chosen market arrangements	▪ RERA members in each country could clarify existing market structures under current policies, laws and regulations in each SAPP country ▪ RERA as an association could then highlight any areas of current market structure that are unclear or confusing or which inhibit cross-border trades	▪ RERA as an association could share information and provide analysis on the impact of market structure on cross-border trading ▪ Guidelines could be expanded as other sector structures emerge
Regulating market entry, pricing, and access for cross-border power projects	The lack of clarity around substantive regulatory tasks—such as licensing cross-border facilities, approving prices and terms and providing third-party access to transmission—creates regulatory risk that can block projects or significantly increase their costs to consumers	▪ Drafting regulatory guidelines for review of imports and exports that will create common-ground on market entry, pricing and access	▪ National regulators clarify licensing and technical requirements, cost pass-through, issues of transmission pricing ▪ RERA as an association could establish an independent advisory panel on cross-border regulation
Establishing clear regulatory processes	The processes that regulators will follow are not made transparent to investors or utilities. There needs to be greater clarity as to "who does what and when" in each of the member countries	▪ Regulatory guidelines could clarify the roles of regulators and others in the process of developing regional power projects ▪ Regulatory guidelines could establish standard entry points for the involvement of national regulator ▪ Regulatory guidelines could identify an appropriate level of regulatory transparency	▪ An independent advisory panel within RERA could assist regulators in liaising with project developers and off-takers on relevant regulatory requirements for their commercial negotiations

4.1 Ensuring Security of Supply in Cross-border Power Trading

Security of supply is a paramount concern in any electricity system. The asymmetric costs of not having sufficient power supplies make it imperative to ensure adequate and reliable supplies, even if this results in higher system capital costs. The ways in which the issue of security of supply is addressed in SADC countries will directly impact the appetite for regional power projects and regulators' effectiveness in facilitating good cross-border power transactions.

Overview of the need to ensure security of supply

There is a new scepticism in Southern Africa regarding the ability of regional power trading to provide reliable and secure electricity supply. Given the paramount importance of security of supply in an electricity system, these reservations will need to be addressed through credible commitments to secure supply under cross-border deals. Put simply, all of the discussion on the benefits of cross-border trading will have limited appeal to politicians in SADC countries unless decision-makers can be persuaded that imported power will be supplied as specified in agreements for importing power and that agreements are well prepared and understood.

The requirement of security of supply can be divided into three concepts:[8]

- **Supply adequacy**—the ability of the system to supply the total system peak capacity and energy requirements for a defined period of time
- **Supply reliability**—the ability of the system to withstand sudden disturbances, such as electric short circuits or unanticipated loss of system facilities. Supply reliability can be further broken down into requirements relating to the design of new facilities to be connected to the system, and the operation of existing facilities
- **Commercial security**—cross-border trading must be underpinned by well-drafted agreements that are honoured by parties to the trading.

In this Inception Report we refer to the adequacy of supply and the reliability of the system. The scepticism about ensuring both adequacy and reliability arises because the conditions for achieving domestic security of supply through cross-border trading are not guaranteed in all SADC countries. These conditions include the ability to:

- Ensure that contractual obligations to supply power across borders are well-prepared and understood, particularly in relation to emergency situations
- Ensure that contracts for cross-border supply are honoured, even in severe emergency situations
- Ensure that the transmission system in each country is maintained properly to allow power to flow according to contractual agreements
- Ensure that interconnected utilities do not take power they are not entitled to, thereby frustrating agreements on cross-border supplies

[8] The first two components of this definition are based on the North American Electric Reliability Council definition of "reliability". See www.nerc.com and IDEI (2006). We have added the third element, which because commercial security is relevant for cross-border power trading.

- Ensure that power transmitted according to cross-border agreements is restricted only on *bona fide* technical grounds, and not for other commercial reasons.

Evidence that security of supply is an issue for cross-border power trading

During our visit to Southern Africa we encountered major concerns about security of supply at the political level, particularly in the likely future importing countries of South Africa, Namibia and Botswana. In the wake of the power shortages across the region in early 2008, SADC countries are increasingly determined to boost investments in domestic power projects to ensure supply security.

A number of countries that previously depended on imports of surplus power from South Africa experienced load-shedding during early 2008. Power purchases from South Africa that were believed by importing countries to be "firm" were in fact limited to help to resolve the supply shortage. Although we have not reviewed supply contracts between South Africa, Namibia and Botswana, we understand that the actions taken by Eskom were in accordance with contractual agreements. This suggests that the problem was not in enforcing contractual rights to "firm" power supply, but rather the problem was in not drafting contracts for firm supply or understanding potential restrictions on non-firm supply.

For different reasons, power flows over the central corridor through Zimbabwe have all but ceased. Zambia has separated its grid from Zimbabwe on several instances over the past year to contain network stability issues in Zimbabwe.

As a result of these undesirable supply conditions, some countries now explicitly seek to limit imports and are generally more reluctant to enter into cross-border trades even where they would lower supply costs. In South Africa, Eskom has an implicit cap on imports equal to its reserve margin. The Government of Namibia has issued a White Paper requiring that 75 percent of domestic energy demand and 100 percent of domestic peak capacity is able to be met from domestic sources.

Balancing these concerns, there is some evidence to suggest that electricity sector players within SADC are willing to expand opportunities for cross-border trading. There is a long history of power trading within the region, and existing large power supply contracts continue to be honoured. Utilities in the region have also recently pledged to support South Africa to maintain security of supply during the 2010 World Cup, suggesting that a level of goodwill exists between regional players.

In addition, some of the projects being discussed in Southern Africa are specifically designed to increase domestic security of supply. For example, the interconnection between Mozambique and Malawi would provide direct benefits for security of supply in Malawi during drought periods. Even without a firm supply agreement, there may be sufficient reasons to pursue this interconnection on the basis of avoiding the high costs of establishing emergency diesel plants in Malawi.

Possible solutions for ensuring security of supply in regional power projects

A genuine question exists concerning the entities that have responsibility for ensuring security of supply. National regulators, governments and the utilities all have a role to play, and at the regional level RERA as an association and SAPP could help to understand and address legitimate concerns about potential impacts of cross-border trades, both positive and negative.

- *Possible immediate solutions:* National security of supply standards need to be established and responsibilities allocated for ensuring security of supply at the national level.
  - Responsibility needs to be clearly allocated for generation expansion planning and procurement and contracting of new power – and regulators need to monitor progress in meeting expected demand
  - To ensure supply adequacy, regulators in countries outside SAPP are often responsible for checking that utilities have covered expected demand from their own generation, plus domestic and imported firm power purchases. This plays an important part in clarifying the impact of regional deals on supply security
  - Other power pools throughout the world typically play an important role in resolving issues of supply reliability by providing effective dispute resolution processes for parties to PPAs to enforce their rights. Article 20 of SAPP's Inter-Utility Memorandum of Understanding, and Clause 12 of the Agreement Between Operating Members provide procedures for resolving disputes. However, we understand that these procedures have not yet been tested
  - Develop better capacity for drafting PPAs and better understanding the implications of contractual provisions, particularly relating to emergency situations. PPAs should create economic incentives for sellers and buyers to comply with security of supply provisions. We understand that the agreements for the Mmamabula development contain detailed and explicit provisions on how to deal with emergencies and defaults, including providing rights to the off-taker to step in to operate the plant in the event of material breach on the part of the IPP. We also understand that the agreements to supply the Mozal smelter in Mozambique adequately addresses security of supply issues. Such arrangements have been agreed to (at least in principle) through an intense process of commercial negotiation, and are therefore likely to represent a workable solution for developing future regional power projects
  - Contractual provisions can be enhanced by performance guarantees supported by outside parties. For example, the World Bank has specifically guaranteed the compliance with regulatory contracts in at least three countries (Uganda, Romania and Albania). Similar guarantees could potentially be developed to ensure compliance with provisions in PPAs that are designed to enhance security of supply.
- *Possible longer-term responses*: In the future, SAPP or RERA could provide some planning and monitoring functions at the regional level. SAPP is currently mandated to "perform various operational planning studies", and this mandate could be extended to a longer-term, regular pool planning exercise. Power pools in other jurisdictions commonly under take this responsibility.

4.2 Structural Uncertainties in the Power Sector Need to be Resolved

Regulators conduct their activities within the sector structure chosen by the Government. Power sectors that have a single, vertically-integrated power utility will require effective regulation of prices to recover the costs incurred throughout the supply chain—generation,

transmission, distribution and power sales. In contrast, where competition is allowed into sector activities such as generation, regulation will focus on how to maximise competitive forces to ensure fair and reasonable prices for consumers. The important task for Government Ministries and national regulators in SADC is to ensure that the chosen sector structure is explicit, well-understood by market participants, and that effective regulatory methods are used within the chosen sector structure.

Apart from traditional market structure decisions, such as the degree of vertical and horizontal integration in the sector, the Government also needs to whom can buy from whom, and which entities are responsible for sector planning.

Overview of the need to resolve uncertainties in sector structure

Most countries in SADC have passed electricity and regulatory laws indicating that private sector participation is possible in the power sector and that trading functions need to be licensed (see Appendix D for further details of national legislation). However, it is unclear whether all power purchases in each country need to go through the government-owned utility, or whether private producers and large customers can trade independently, including across borders.

The traditional electricity industry model, comprising of a vertically-integrated, government-owned monopoly, has been abandoned in many countries around the world. Many government-owned utilities have performed poorly and have not had the resources to invest in new capacity. A number of countries have therefore considered adopting power sector reforms that unbundle activities within the power supply chain, introduce competition in generation, and privatise power sector assets.

South Africa previously considered introducing a competitive power market modelled on overseas markets like Nordpool or the Pennsylvania-Jersey-Maryland (PJM) market in the United States. Zambia was also considering sector unbundling and privatisation. However, those plans have been abandoned in the face of political opposition, pending power shortages and the need to add new capacity quickly (Gatwick and Eberhard, 2009). Nowhere in the region, and nowhere across the African continent, has the full set of power sector reforms been fully implemented: competitive power markets are absent (except for very small trades in SAPP's short term energy market - STEM).

Instead, hybrid power markets have emerged where government-owned utilities have maintained a dominant market position, with IPPs introduced on the margin. These hybrid power markets present a new set of challenges, which unless explicitly addressed could prejudice new investments relying on cross-border power trading. In particular, it is not clear how opportunities to develop new generation assets are allocated between government-owned utilities and private investors, or who is responsible for procuring, contracting and dispatching private power and on what terms.

Increasingly governments are declaring that they are adopting a single-buyer model whereby the incumbent state-owned utility is responsible for these functions. However, it is not usually clear whether the government an exclusive single-buyer function, or whether the national utility is merely required to act as an aggregator of captive demand and be a non-exclusive central purchaser, potentially allowing private producers and users to contract and trade power, including across borders. For example, in South Africa Eskom is required to provide open and non-discriminatory access to the grid under the terms of its transmission license. This implies that major users are able enter into cross-border power trades with

generators located in another country, provided that Eskom is fairly compensated for the use of its assets. However, we understand that in practice Eskom has adopted a ceiling on the amount of power that can be directly supplied to major users of 300MW.

While most cross-border trades in SAPP are bilateral contracts between national utilities, SAPP is now planning to institute a day-ahead-market which could potentially have private participants. Lack of clarity regarding the existing and future structures of national power markets may potentially inhibit trades in this day-ahead-market.

Lack of policy certainty around power market structures creates a number of difficulties for regulators in facilitating cross-border power trades. Relevant questions that need to be answered include:[9]

- Who should be responsible for generation expansion planning and security of supply?
- How are new build opportunities allocated between the incumbent SOE and IPPs?
- Should an office to conduct the single-buyer activities of the national utility be licensed, and under what terms?
- Should such an office be given exclusivity in imports or exports?
- Who should be responsible for contract negotiations with IPPs?
- Should IPPs be given export trading licenses?
- Should large customers be given import licenses if they so desire?
- Who should approve long term PPAs and on what basis should export or import contracts and PPAs be assessed?
- Is economic or competitive procurement a requirement or should unsolicited bids be accepted? Should this only apply to purchases which are passed through to captive customers?

Greater clarity and harmonisation of power market structures in SADC/SAPP will facilitate trade. The absence of certainty, and different market regimes, will inhibit power trade.

Evidence of structural uncertainties affecting cross-border trading

During our meetings with stakeholders in Southern Africa, we were told of several examples where private investors in new generation were unsure if they could sell directly to large users, either within the national borders or to users located in another country. This could clearly be an issue for the Kudu power plant, which will be larger than the total Namibian market. Will this plant have to trade exclusively with NamPower, or could the Kudu developer sign PPAs directly with Eskom or other off-takers in the region?

The sector legislation that we reviewed in both Namibia and South Africa embodies principles of open access to transmission facilities, but how this access will be provided in practice is unclear. Large users are impacted as they do not know if they are restricted to

[9] Many of these questions come from Eberhard, A and Kapika, J (2008).

buying their power from the national utility or can purchase power from IPPs located in other countries.

Utilities have been operating under a "gentlemens' agreement" to allow certain cross-border trades to large users after the approval of the national utility or Government Ministry. For example, sales to the Scorpion mine in Namibia directly from Eskom received approval from Namibia, and Mozambique approved Eskom supply to the Mozal aluminium smelter near Maputo.

Regulators have a different view about this issue than utilities. In South Africa, NERSA considers that there is no legal reason that foreign IPPs and large customers in South Africa cannot trading across South Africa's borders. However, as mentioned above, Eskom intends to limit direct supplies and there are different views within Eskom on its exclusivity with regard to cross-border trades. Furthermore, the Government of South Africa has declared that Eskom is the single-buyer, but different stakeholders have conflicting opinions on whether this means an exclusive single-buyer, or merely a centralised purchasing function to meet aggregated demand of captive customers.

In Namibia, the government has declared that NamPower is the single-buyer, but the regulator believes the Namibia Electricity Act requires it to promote competition, and is actively exploring the option of a modified single-buyer which would enable IPPs to export directly across borders without going via NamPower. The regulator is concerned about reciprocity. If it allows this, will Eskom and NERSA allow these independent imports, and would they also allow IPPs to export into Namibia? Similarly, in Zambia, the regulator has a mandate to promote competition. It can license utilities and IPPs to import, but exports require Ministerial approval. BPC believes it is the single-buyer in Botswana, but the proposed Mmamabula IPP has received permission to sell directly to Eskom.

Possible solutions to resolve structural uncertainties

Definition of market structures is a policy matter that is best resolved by governments. Regulators should then operate within defined policy. However, the present confusion impacts so directly on the core functions of regulators that it is desirable for regulators to begin advocating for greater clarity and harmonisation in sector structure.

The human capacity to develop workable proposals on sector structure is also relevant. In Southern Africa, many Ministry staff moved across to newly-established independent regulatory agencies, and the latter now often have more capacity than the relevant government Ministries. Regulators commonly have more industry expertise than government officials, and can therefore make an important contribution to policy development—even though ultimate responsibility for finalising policy will remain with the government Ministry.

- *Possible immediate solutions:* RERA members should play a role in clarifying the market structure that exists under current laws and regulations. Regulators should then highlight to their national government areas of the market structure or legal framework that are unclear or confusing. The RERA Secretariat could then be responsible for developing ways to address any inconsistencies between countries that impact in negative ways on the regulation of cross-border power trading. For the purposes of the regulatory guidelines, we propose to assume a set market structure: one where IPPs are underpinned by long-term, firm supply contracts either to national utilities or large customers. This is not a recommendation on a preferred market structure, but rather an explicit assumption to allow an

appropriate focus for the regulatory guidelines based on possible developments in market structure in the near to medium term.

- *Possible longer-term solutions:* The RERA Secretariat should begin to advocate to SADC Energy Ministers that a certain common power market structure at the national level be agreed and adopted over time. As other sector structures emerge, the regulatory guidelines issued by RERA as an association would need to be expanded to work within these other sector structures.

4.3 Regulating Market Entry, Pricing, and Access for Cross-border Power Projects

The issue of how national regulatory entities will carry-out their substantive responsibilities in relation to regional power projects is the major focus of this assignment. In reviewing cross-border power deals, national regulators are most concerned with:

- Whether the costs and risks of a power purchase and associated transmission charges should be passed through into retail tariffs (for importing countries)
- Whether the costs and risks of selling to a buyer in another country are fully recovered in the price of a power sale (for exporting countries)
- Whether the sale is consistent with any security of supply targets or technical standards, such as a grid code or supply quality threshold (for both importing and exporting countries).

How national regulators address these concerns matters for the development of regional power projects. A lack of clarity on the ability to pass-through power purchase costs will create unwillingness on the part of utilities to enter into the PPAs required to finance new projects. Ambiguity on the transmission prices that apply to a particular deal will alter the commercial business case for an investment, again delaying the ability for the project to reach financial close.

Regulatory responsibilities for licensing and approving cross-border power trading

Regulators in the SADC countries have three primary responsibilities with respect to cross-border power trades:

- Licensing generators, transmission providers and importers/exporters (issues of **market entry**).
- Reviewing the terms of PPAs for pass-through into retail tariffs and determining whether purchasing costs should be allowed to be passed through into retail tariffs (**pricing and pass-through issues**).
- Reviewing minimum technical standards for interconnection and requirements for the quality and reliability of supply (**access rules and quality standards**).

With respect to obtaining a licence, investors should be able to easily discover the criteria for obtaining licenses and the *bona fide* reasons for not being granted a license or for having a license revoked. Investors will also want to know if the issuance of a license is separate from approval of a particular power transaction proposed by a licensee.

The conditions for cost pass-through within the SADC region are also not explicit. In particular, it is unclear how different prices and risk allocations in PPAs are evaluated by

regulators.[10] Similarly, regulatory review of transmission prices within SAPP is unclear, particularly when SAPP transmission pricing diverges from rules established at the national level. SADC Energy Ministers have specifically raised an interest in this issue.[11]

In relation to technical standards, it will be difficult for national regulators to take any action to try to resolve technical issues in the power system of another country. For example, in Section 4.1 we mentioned technical issues related to the central corridor through Zimbabwe, which have led to Zambia separating its grid from Zimbabwe in recent months. The national regulator in Zambia would have little ability to remedy this technical problem, apart from referring the matter to SAPP.

As discussed above, the lack of clarity on how national regulators within SADC will exercise these substantive regulatory powers creates uncertainties for off-takers and investors. Furthermore, if the regulator's approach to a particular issue is not known then off-takers will be able to use the threat of regulation as a negotiation tool to try to improve the terms and conditions of the PPA.

Evidence of lack of clarity in undertaking core regulatory functions

Different electricity laws within SADC contain varying level of information on the conditions for obtaining a licence. For example, the criteria for obtaining a concession are relatively explicit in Mozambique, whereas the conditions for licences to be granted or subsequently cancelled are less clear in Botswana and Zambia (see Appendix D). The lack of clarity around licensing is also demonstrated by a request received by RERA from WESTCOR to clarify the requirements for obtaining required licences in the five countries involved in that development.

The need for greater clarity around the pass-through of power purchase costs into retail tariffs has also been identified by the regulator in South Africa, which has recently published a consultation paper with draft "Regulatory Rules for Power Purchase Cost Recovery". While the initiative should be commended, some stakeholders have criticised the criteria for assessing the extent to which pass-through should be allowed as being vague, providing little certainty and granting the regulator too much discretion. Further details of NERSA's Guidelines are provided in Box 4.1.

Box 4.1: NERSA Guidelines on Cost-Pass Through for PPAs

When utilities enter into power purchase agreements (PPAs) with Independent Power Producers (IPPs) or other utilities, including cross-border trades, a key regulatory issue is the extent to which those power purchase costs can be recovered by the utility by passing the costs through into regulated retail tariffs to customers.

The National Energy Regulator of South Africa (NERSA) has recently published a consultation paper with draft "Regulatory Rules for Power Purchase Cost Recovery" for domestic or cross-border PPAs longer than three years.

The paper proposes a cost-recovery benchmark which will set the hurdle for recovery of

[10] A useful summary on regulatory approaches to cost pass-through of PPAs is provided in Arizu, B, Maurer, L, and Tenenbaum, B "Pass-through of Power Purchase Costs: Regulatory Challenges and International Perspectives", Energy and Mining Sector Board Discussion Paper No 10, February 2004.

[11] SADC Energy Ministers, minutes of April 2009 meeting, page 26.

power purchase costs by Eskom as part of its regulated revenue allowance. In assessing the cost-effectiveness of power purchases, NERSA will consider the following criteria:

- The cost of alternative supply options
- The direct costs of power purchases, including fuel
- Time of use differentials
- Network benefits and costs
- Security of supply
- Firmness of supply
- Environmental considerations
- Fuel diversification
- Quantifiable risks.

Some stakeholders have criticised the above criteria, saying they are far too vague, provide little certainty and grant the regulator too much discretion. However, the draft rules also state that projects finalised through a competitive tender process would be assumed to be cost effective.

Recoverable costs include payments for fixed capacity, variable energy, black start and ancillary services, hedging costs, administration of PPAs, market integration and restructuring costs, termination costs, stranded contracts and "any other costs as determined by the Regulator as appropriate."

If not included in the national integrated resource plan, Eskom, as the Single-Buyer, would need to demonstrate that the quantum of power purchases is needed at the time of entering into each PPA.

The consultation paper proposes that Eskom and the IPPs engage with NERSA at an early stage of project development to check that the design of the PPAs achieves "efficient risk transfer" whereby the party best able to manage specific risks is allocated those risks.

Source: http://www.nersa.org.za/ConsultationPapers.aspx

Possible solutions to clarify regulatory decision-making

The following options for providing greater clarity on the substance on regulatory decisions on cross-border power trading should be explored.

- *Possible immediate solutions:* Regulatory guidelines for the review of imports and exports will help to create common-ground on regulatory reviews for market entry, pricing and access. The focus of substantive regulatory reviews in generally consistent across the region, which provides the potential for immediate improvements in the enabling environment for investments without the need for legislative changes. The guidelines will also be consistent with the approach applied for PPAs with domestic IPPs
- *Possible longer-term solutions:* National regulators could work towards harmonising licensing and technical requirements (for example through a common grid code), and ways of dealing with cost pass-through and transmission pricing. RERA as an association could establish an independent advisory panel on cross-border regulation with initial functions that might include:
  - Providing technical assistance to RERA members in implementing the guidelines

– Conducting public consultations on SAPP proposals on matters such as transmission pricing, ancillary services and inadvertent energy flows.

4.4 Establishing Clear Regulatory Roles and Processes

In addition to the substantive matters addressed by national regulatory entities, the processes followed by national regulators for regulatory cross-border power trading need to be understood and made more transparent.

The need to establish clear regulatory roles and processes

There appears to be uncertainty in three areas of regulatory process:

- **Regulators' involvement in negotiation of cross-border trades**. The nature of the regulators' engagement in the process of negotiating power trades is unclear and regulators have different responsibilities in the negotiating process in each country. The process followed by regulators to engage with potential investors and utilities on cross-border power deals is not transparent
- **Timing of regulatory interactions and decisions**. When and how the regulator will give guidance or provide decisions on the acceptability of the proposed terms of a particular cross-border transaction is not understood. The seller, buyer and financiers for the transaction would prefer decisions and commitments from the regulator as soon as possible. In contrast, regulators are typically reluctant to bind themselves to any early commitments. Instead, regulators prefer to delay their formal decisions until they can see the "the whole package."
- **Public availability of commercial information**. Uncertainty exists on how much information should be publicly released about the terms and conditions of a cross-border transaction. Typically, most parties to a transaction will want to minimise the amount of information about the transaction that is made publicly available. It is often argued that terms and conditions are commercially sensitive. However, the credibility of regulators, and in some cases the empowering legislation, requires that explanations are given for a particular decision. This requires revealing some level of information about the transaction that has been approved or rejected. Transparency about cross-border deals would also help potential investors understand the terms of deals that are currently being negotiated, to assess whether their project would be viable on those terms.

Evidence of uncertainty in current regulatory roles and processes

In countries where an independent regulator has not yet been established, the relevant government Ministry will be responsible for all commercial and regulatory interactions with cross-border project. For example, in Botswana the Ministry of Minerals, Energy and Water Affairs has been responsible for all the Government activities in negotiating the Mmamabula power development (through the Mmamabula Coordinating Unit). The Ministry will later be asked to review the terms of deal from a regulatory perspective to protect consumers. In most situations, the interests of the Ministry to pursue the development of national resources for power generation will align with the Ministry's responsibilities to keep electricity prices fair and reasonable. However, where these interests conflict it could make it difficult to adopt and implement common guidelines.

In other countries where a regulator has been established, its role in the process of power purchase negotiations is not always clear. For example, in Namibia the Minister is responsible for all final decisions for approving licences and making rules. The regulator only has the power to make recommendations, which presumably extends to recommending rules for imports and exports. This has led to an interpretation of the regulator's role as being one of coordination, including the coordination of government activities for new power developments such as the Kudu gas project. Again, potential conflicts of interest may arise if the regulator is both the promoter and regulator of a project.

Box 4.2 provides an example of where apparently different regulatory responsibilities for a cross-border power trade resulted in some confusion and frustration.

Box 4.2: Different Regulatory Responsibilities in Recent ZESCO-NamPower Trade

NamPower has been interested in diversifying the sources of supply to reduce its reliance on Eskom. One deal that was negotiated to achieve this objective was a 200 MW supply from ZESCO via the Caprivi link. The approximate location of the line being built to strengthen transmission from Zambia to Namibia is shown on the map (right).

A price for the power to be supplied by ZESCO was agreed through commercial negotiations between NamPower and ZESCO. However, when the regulator in Zambia came to approve the deal it found that the sale price to NamPower was lower than ZESCO's cost of supplying customers in Zambia (taken from a recent cost of service study). This meant that the regulator was unwilling to approve the sale at the commercially negotiated price, due to the potential for domestic customers to be subsidising sales in Namibia.

The result of the regulators rejection was that the price for the cross-border power transaction was increased, and the volume that NamPower was prepared to purchase at the higher price declined. The deal is now only for 50 MW.

The powers exercised by the regulator in Zambia are appropriate, and the concerns are valid. However, there was little understanding in Namibia of the regulator's role in reviewing the transaction. The Namibian regulator was not able to be involved in resolving the issues, since its role is simply to review the transaction for the purposes of allowing NamPower to pass the costs through into retail tariffs.

The stage that national regulators should become involved in potential cross-border developments is also an issue. For example, the Mmamabula project developers only began to seriously engage with NERSA very recently, and developers for other projects such as Mpanda Nkuwa are unsure of the process for engaging with NERSA. In fact, under section 8 of the Electricity Regulation Act 2006, potential licence applicants are free to discuss the contemplated operation of generation, transmission and distribution facilities, imports/exports, or trading with the regulator prior to filing a licence application. This is important because the Act envisages a constructive role for the national regulator in

engaging with potential investors, prior to having finally negotiated the terms of an investment. We would propose to reflect this approach in the regulatory guidelines.

Possible solutions to clarify regulatory roles and processes

The following options for providing clear processes for making regulatory decisions on cross-border power trading should be considered in our work.

- *Possible immediate solutions:* Regulatory guidelines can help to clarify the regulator's role in PPA process, which is distinct from Government policy roles and utility commercial negotiation roles. Guidelines could also establish standard entry points where national regulators will be involved. This should provide for some *ex ante* guidance or approval in principle to off-takers that particular negotiated deals fall within the regulators' tolerance limits for price and risk allocation. Guidelines could also identify an appropriate level of regulatory transparency, which will lie somewhere between releasing the full terms of PPAs and the current practice in many countries of simply general releasing media statements (i.e. "tariffs are increasing because the utility's power purchasing costs have increased").
- *Possible longer-term solutions:* An independent advisory panel to the RERA association could assist national regulators in liaising with project developers and off-takers on relevant regulatory requirements for their commercial negotiations.

5 Issues for the Southern Africa Power Pool

To effectively promote good regional power projects, regulatory requirements should be complemented by the activities of the power pool. There are several areas where SAPP is best placed to effectively address cross-border trading issues, and the power pool should be empowered and properly resourced to undertake these functions.

This section presents the issues identified in our work to date that relate to the activities of SAPP for regional power projects. The solutions developed in our work to respond to these issues will form part of the checklist for SAPP required in the Terms of Reference for this assignment.

We consider that SAPP can help to promote cross-border trading in three principal ways:

- **Evaluating the technical impacts of specific cross-border power deals**. The technical impacts of regional power projects need to be understood through load flow studies and dynamic impact analysis. These studies are part of SAPP's existing mandate, although the studies are not currently being done to the mutual satisfaction of all parties. These studies should be included in the SAPP Checklist to ensure that all regional power projects are suitably assessed from the perspective of their impact across the interconnected network. To be useful, the studies also need to satisfy agreed minimum technical engineering requirements
- **Establishing technical and economic rules needed for an efficient and reliable trading platform**. SAPP needs to specify general rules dealing with trading platform issues such as transmission pricing, ancillary services and system balancing. SAPP clearly understands the need for resolution on these issues, and has made progress in formulating proposals on transmission pricing and ancillary services (reviewed in Appendix C. However, SAPP has been unable to implement proposals on these platform issues. SAPP has also been unable to enforce discipline on system balancing, which has lead to uncompensated inadvertent energy flows. These issues are not only relevant to future trading proposals, such as the Day Ahead Market. It will be difficult to plan for any major cross-border transactions without first knowing how transmission and ancillary services will be structured and priced
- **Monitoring the performance of member utilities**. Monitoring performance is the first step to improving performance. SAPP has an important role to play in monitoring utility compliance with grid codes and resolving disputes arising from undesirable trading situations and technical concerns. We understand that although SAPP's governing documents provide for procedures resolve disputes, these measures have never been tested. To effective resolve disputes SAPP also needs enforcement mechanisms to penalise undesirable behaviour.

5.1 Technical Impacts of Specific Regional Projects are Not Studied

The first area where the power pool is best-suited to developing regional proposals is to understand the technical impacts of integrating projects to the interconnected grid. This role needs to be carried out whether the project developer is a national utility or an independent party.

The responsibility of SAPP for studying the impact of regional power projects

Many of the core functions of SAPP set out in the Constitution of the Co-ordination Centre relate to undertaking technical studies. These functions include requirements to:

- Evaluate the impact of future projects on the operation of the Pool and advise the Management Committee (ABOM, clause 7.4.10)
- Perform various operational planning studies to highlight possible operating problems (ABOM, clause 7.4.11)
- Give advice on short-term and long-term operating problems (ABOM, clause 7.4.12)
- Perform studies to determine transfer limits on the lines and inform Operating Members accordingly. Monitor adherence of Operating Members to these limits (ABOM, clause 7.4.13)
- Establish and update a data base containing historical and other data to be used in Planning and System Operation studies (ABOM, clause 7.4.14)
- Advise on the feasibility of wheeling transactions (ABOM, clause 7.4.16).

SAPP does not have clear procedures for completing the technical studies required to integrate new generation and transmission projects into interconnected SAPP grid. SAPP also lacks staff with sufficient skills and experience, or the financial resources to hire external consultants, to complete the required studies. The utilities that are directly involved in a cross-border development typically study the impacts of the project on their own systems only. This means that the regional impacts of significant projects are not fully understood, exacerbating the risks of technical complications.

The lack of understanding on regional impacts also means that the full benefits of certain investments are not well known, and that the costs of certain investments cannot be attributed to beneficiaries. For example, a new transmission line may have benefits in reducing losses across the interconnected grid. Without system-wide studies these benefits would be ignored in evaluating the merits of the investment.

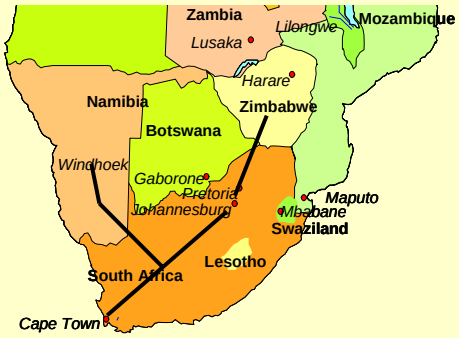
Evidence on lack of technical studies

The issue of SAPP's capability to complete required technical studies was highlighted several times during our meetings with stakeholders. SAPP's dynamic studies of the impact of the Mmamabula project were described as "not useful". In addition, SAPP will only perform studies for "members", who pay for the studies through membership fees. This makes it difficult for IPPs to access cross-border trading possibilities without involving national utilities. The SAPP network model is not made available to non-utilities.

A recent example of the technical impacts of a cross-border power transaction is provided in Box 5.1. It is unclear whether any SAPP studies considered the issue that has now arisen in delivering contracted power from Zimbabwe to Namibia. However, clearly more thorough agreed planning would have helped to clarify the ability of the interconnected grid to deliver the power under different contingencies.

Box 5.1: Technical Impacts of Trading between NamPower and ZESA

As an initiative to diversify supply and purchase additional power, NamPower agreed with the Zimbabwe power utility (ZESA) to rehabilitate the Hwange Power station in Zimbabwe and purchase a proportion of the output. As shown in the map (right), this deal initially requires wheeling through South Africa over transmission assets owned by Eskom.



After the agreement between NamPower and ZESA had been implemented, there was a period when the wheeling path was not available as anticipated. Eskom is required to ensure security of supply in the Cape region, and when units at the Koeberg power station in the Cape region are out of service it has to transfer more power down the main north-south transmission network. At times of transmission congestion, Eskom claims it has been unable to meet fully Namibia's needs. While Eskom is entitled to restrict power supply to Namibia for legitimate technical reasons, no clarity exists on whether the technical reasons provided by Eskom are valid. There have been complaints from Namibia that even now Eskom has not justified its position on limiting transfers through their network.

SAPP was not requested to check available transmission capacity for the Namibian purchases from Hwange. In essence, power from Hwange was replacing purchases from Eskom, so NamPower had an incentive not to involve Eskom in the negotiations until the deal was signed. Furthermore, NamPower has not used the dispute resolution processes within SAPP to assist in confirming Eskom's network limitations.

Possible solutions

The technical studies needed for regional power projects could be delivered using the following approaches.

- *Immediate:* SAPP already has a mandate to complete technical studies and resolve disputes on technical issues in interconnected region. However, these procedures are not being used effectively. The SAPP Checklist should contain a list of studies (with sufficient detail) to meet the expectations of all parties. The SAPP network model could also be provided on an open basis (subject to any issues of commercial sensitivity). The studies will also require additional resources, which SAPP should be able to recover from project sponsors. Funding from development agencies could also be used to bolster SAPP's resources for necessary studies, if the benefits of providing the support were clear
- *Longer-term responses:* As SAPP builds capacity in completing or managing required technical studies, SAPP could perform this service for non-members on a fee for service basis.

5.2 Trading Platform Issues

SAPP needs to specify the general rules that will apply to various trading between members (long-term bilateral trading, short-term transactions and Day Ahead Market (DAM) trading).

These "platform" issues include dealing with transmission pricing, ancillary services and balancing.

SAPP's responsibilities for establishing a credible trading environment

As with technical studies, platform trading issues are within SAPP current mandate. SAPP's Constitution requires it to:

- Monitor and advise on the use of the SAPP Guidelines and rules as applicable, such as operating guidelines, market rules and environmental guidelines (ABOM, clause 7.4.6)
- Provide information and give technical support to Members of the SAPP in matters pertaining to parallel operation (ABOM, clause 7.4.9).

Core power trading issues and problems such as transmission pricing, ancillary services, balancing markets, and inadvertent energy flows, remain unresolved by SAPP. It will be difficult to plan for major cross-border transactions without knowing how these required services will be structured and priced.

The lack of transmission from viable generation sources is a particularly acute issue in Southern Africa. All parties agree that unlocking this generation will require bold decisions on new transmission investments (building the highways). Raising the capital to fund these transmission projects will not be possible without a methodology that provides a reasonable return on investment. Without an agreed pricing methodology that recovers investment costs, regional transmission projects will need to develop bespoke pricing arrangements. For example, The Eastern Corridor in Mozambique is being proposed using a cost-recovery wheeling price that is independent of the SAPP methodology.

Evidence

SAPP's current methodology for transmission pricing does not allow for the full recovery of transmission asset values because the current methodology uses depreciated asset costs charged under a MW-km approach. SAPP's arrangements for pricing ancillary services are *ad hoc* and require formalisation. SAPP has commissioned work to address the issues of transmission pricing and ancillary services, and these studies are reviewed and evaluated for this project in Appendix C. However, these proposals have not made much progress since they were presented in 2007, due to the time required to get all SAPP members to agree on the proposal. A similar lack of progress has been made on resolving inadvertent energy flows and implementing sustainable balancing arrangements.

New proposals within SAPP that would encourage cross-border trading are delayed by the need to achieve consensus on the issues involved. In the spirit of decision making in SADC, SAPP decisions are expected to be made by consensus. This means that the countries involved will try to negotiate unanimous acceptance, but if this is not possible then a measure can proceed with two-thirds acceptance. Only countries that vote in favour of the measure are required to implement the agreement. This ensures that no country in the region is required to implement any measure they have not agreed to. Delays will be incurred as utilities refer decisions to regulators and governments for their views. The ability to enforce decisions made within SAPP on utilities that do not agree to the proposal is also unclear.

Possible Solutions

The platform issues needed for regional power projects could be resolved by applying a range of possible solutions.

- *Immediate*: SAPP needs more resources to keep proposals on schedule and drive them to a satisfactory conclusion. SAPP has applied for funding for a capacity building exercise to address the need for capacity building of regulators, governments and key stakeholders on what is happening in SAPP. The capacity building could also highlight the improved security of supply a day ahead trading platform can offer utilities with limited generation. Of course, capacity building will be of little value unless it leads to specific actions on the platform issues that need to be resolved
- *Longer-term responses:* A party independent of SAPP could be given responsibility for ensuring that trading platform issues are adequately addressed within reasonable timeframes. The independent Advisory Panel within RERA suggested in Section 4 could play a role in monitoring progress on important issues, assisting national regulators with implementation of the regulatory guidelines and running public consultations on SAPP proposals, if necessary. Such a role for RERA would be similar to FERC's responsibilities in the United States to seek a resolution on matters that cannot be resolved independently within power pools.

5.3 Monitoring the Performance of Member Utilities

SAPP and member utilities have noted a level of ill-discipline in compliance with the SAPP rules, especially in the areas of inadvertent energy flows, reserve levels, security of supply and equipment maintenance. There currently seems to be no way for SAPP to improve operating discipline or effectively apply its dispute resolution procedures to enforce operating guidelines.

Need to monitor utility performance and enforce operational discipline

The performance of member utilities needs to be monitored by SAPP. SAPP's current Constitution explicitly provides that SAPP will:

- Monitor transactions between Operating Members and between Members and non-Members (ABOM, clause 7.4.)
- Monitor the inadvertent power flows and the return in kind between the Members (ABOM, clause 7.4.4).

SAPP should play a role in resolving disputes relating to regional power trading. The SAPP Co-ordination Centre is responsible for administering dispute resolution procedures in SAPP, including the selection of a mediation and/or arbitration panel, if required. The panel selected by SAPP Co-ordination does not need to be from member utilities, providing a potential source of independence in the activities of SAPP.

Evidence of operational ill-discipline and need for effective resolution of disputes

Operating ill-discipline within SAPP was mentioned by several utilities during stakeholder meetings. The technical impacts of the deal between NamPower and ZESA for the output from the refurbished Hwange power station (described in Box 5.1) also point to the need for effective dispute resolution procedures.

Possible solutions

To effectively monitor the ongoing performance of member utilities, SAPP could apply the following approaches.

- *Immediate*: SAPP is in the process of procuring an EMS system in order to start monitoring member's conformance to agreements and operating guidelines. The checklist for SAPP developed in this project could also clarify the steps that SAPP will follow in the event that an unremedied operational breach or dispute arises between SAPP members
- *Medium term* Development of improved performance monitoring of control areas and members to ensure compliance to reliability targets. This would include Ancillary Services, imbalances and inadvertent energy flows, technical constraints and market monitoring.

5.4 Other Possible Responsibilities for the Southern Africa Power Pool

Some stakeholders have suggested that SAPP could play a larger role in developing cross-border power projects in Southern Africa. After carefully considering the benefits of expanding SAPP's mandate, we have concluded that SAPP should first be properly resourced to undertake the responsibilities described in Sections 5.1 to 5.3. Enabling SAPP to properly discharge these responsibilities will require additional resources.

Several stakeholders consider that the reason that regional power projects have stalled in the SADC region is that there is no project champion to resolve issues in a timely and effective manner. When SAPP was formed the SADC region had a surplus of capacity. For this reason, SAPP's focus has been on power trading. While SAPP has produced a pool plan and periodically released a list of priority projects, the region has moved into a shortage situation and no regional power projects have reached full financial close. This lack of progress has led to suggestions that there may be a role a party to promote regional projects and play some of the roles typically undertaken by a project sponsor.

A possible role for SAPP in the promotion of regional projects was proposed during our meetings in Southern Africa, and considered in the preparation of this report. We concluded that it would be difficult to see SAPP playing a productive role in structuring projects—for example, by finding equity participants and identifying potential off-takers—and in fact any role played by SAPP may be counterproductive at this stage in duplicating the efforts of project sponsors.

Investors and financiers will be attracted to projects that are technically and economically viable, and that can secure reliable contracts with off-takers generating the required revenue stream to repay loans and provide an attractive risk-adjusted return on their investment. At least in relation to generation projects, there seems to be sufficient interest from developers to put equity into good generation projects with a certain market.

We understand that the West African Power Pool (WAPP) is currently playing a project promotion role for a subset of cross-border projects deemed to be "priority projects" by West Africa's political authorities. The case study of WAPP will consider this role of promoting projects, but unless clear positive results are identified from the WAPP case study, we propose not to further investigate a role for SAPP in structuring projects.

6 Other Issues for Cross-border Trading in SADC

In addition to the issues discussed in Sections 4 and 5 of this report, there are a number of other possible barriers to expanding cross-border power trading in SADC. Because the focus of our work is on regulatory and pooling arrangements, we will not address these other issues. However, it is important to identify these issues and consider ways that regulatory actions might have benefits that spill-over into helping solve other problems.

This section presents the other issues that seem to be holding back regional power trading, but that fall outside the scope of our Terms of Reference. The ways in which our work may help to resolve these issues are also discussed.

The following issues are deemed to fall outside our Terms of Reference:

- **Not all SADC countries have attractive investment climates**—Investors and lenders are hesitant to provide equity and debt for power projects based in SADC countries without significant Government support and guarantees. This is true for most countries in the SADC region, and is particularly acute for a few particularly risky investment countries such as Zimbabwe and the DRC. This issue will not be resolved quickly, and therefore significant Government involvement in regional power projects is expected to be the norm for some time. We note that some countries have set up effective "one-stop shops" that promote and facilitate private investment in power projects (e.g. Mmamabula Coordinating Unit in Botswana). This appears to be an effective way to smooth the way for new projects and to deal with outstanding policy, legislative and regulatory barriers. SADC/SAPP may wish to assess the lessons from the Mmamabula Coordinating Unit and to disseminate these more widely.
- **SAPP governance structure**—The governance arrangements in SAPP are described in Section 3.2 of this Inception Report. There are clear limitations in the fact that SAPP is controlled by national utilities, and therefore has no independence to pursue initiatives that may be beneficial to the region but are not in the interests of all utilities. The decision-making processes in SAPP may also be sub-optimal in requiring the agreement of all utilities or a super-majority to an initiative. This may directly impact on initiatives discussed in this Inception Report, such as transmission pricing.
- **Retail tariffs are not cost-reflective in all SADC countries**—Retail tariffs in most countries within SADC are not cost reflective, despite assurances over many years from Governments and regulators of desires to move towards full cost recovery. Clearly, tariffs that recover full costs are the most desirable and secure source of revenue for off-takers to pay the costs of purchasing power from regional power project. However, the important point for the regulatory guidelines is that regulators commit to approving PPAs that represent the lowest-cost next source of supply, and that investors and lenders are satisfied on the payment risks associated with a particular project. If retail prices are below utility costs, lenders and developers are likely to require Government guarantees. How the costs are actually funded within the country paying for the source of power (i.e. by consumers or taxpayers) is beyond our scope of work. Recent studies examining tariffs in Southern Africa are reviewed in Appendix C.

- **Inability to Reach Agreement on a Least Cost Expansion Plan**. An issue that has arisen in SADC and SAPP over the past few years is the inability of member states to agree on a least-cost regional power development plan. The assignment of Utho Capital to identify a shortlist of bankable projects seems to be premised on the conclusion that reaching such an agreement is no longer a good use of time and resources. In a sense, Utho Capital have created a "bypass" of the least cost expansion plan by focusing on a subset of projects that have the greatest potential for reaching financial close and providing medium term security benefits for the region.
- **Eskom Dominates the Regional Trading Environment**—As described in Section 3, Eskom's buying power is a major feature of the trading environment within the region. Eskom's ability to use its buying power should always be considered when putting together a cross-border transaction. This characteristic makes the investment environment more challenging is some respects, but these features cannot effectively be addressed through regulatory guidelines or pooling arrangements.

7 Preparing the Regulatory Guidelines and SAPP Checklist

This section provides an updated view on our plans to produce the main outputs in this assignment—the regulatory guidelines and SAPP checklist.

Structure of the regulatory guidelines and SAPP checklist

The Terms of Reference refer to two-levels in the guidelines. A set of high-level political principles that can be agreed to at an inter-Governmental level, and a more detailed set of guidelines for national regulators fleshing out the details of recommended regulatory reviews and processes for cross-border trades. Our initial work on this assignment confirms the value of presenting the guidelines in this way.

- **High-level political principles**. These principles are important to give the guidelines a level of political commitment that cannot be achieved by focusing only on national regulators. The political principles will also help to clarify the framework for regulation in areas where national regulators would not otherwise be empowered to make effective decisions. The best approach for the high-level political principles will be to address the principles to SADC Energy Ministers, and for RERA Secretariat to present the principles at one of the regular meetings of SADC Energy Ministers or the SADC Energy Ministerial Task Force.

  Gaining political commitment to good regulation of cross-border power trading will require thought on how to implement the high-level regulatory guidelines. We understand that RERA is able to recommend initiatives to the SADC Energy Ministers, which would appear to be appropriate. Thought will also need to be given to the form of the high-level guidelines, whether they should be contained in an inter-Governmental MOU or a stronger instrument under international law such as a protocol or Treaty.

- **More detailed regulatory guidelines**. The regulatory guidelines will be more detailed and prescriptive than general principles, but will need to retain sufficient flexibility so that regulators can apply them in each jurisdiction. The issue of how to pitch the guidelines at the right level will be discussed closely with national regulators as we pursue our work

- **SAPP checklist**. The SAPP checklist needs to complement the regulatory guidelines by covering the areas that are most effectively addressed by the power pool, rather than national regulators. We will continue to work with the SAPP Coordination Centre to understand what responsibilities SAPP can realistically adopt, what additional resources would be required to effectively respond to matters included in the checklist, and where additional funding might come from.

We propose to produce two versions of the regulatory guidelines—one with commentary explaining the purpose and intent of the guidelines, and a clean version. The annotated version will help to educate national regulators as to why a particular rule or regulation is proposed, and how it should be implemented. The commentary will constitute something like a users guide for the regulatory guidelines.

Proposed work plan

Before our team begins drafting the regulatory guidelines and SAPP checklist, we will complete a series of case studies focused on particular issues in regulating regional power trading identified in the SADC region. Consistent with our original proposal, we propose to complete four case studies—US-Canada power trading (focusing on trading between New England purchasing utilities and Canadian hydro power producers), West African Power Pool, Central American (SIEPAC) and the Greater Mekong Subregion.

The case studies for this project will focus on the areas identified in this Inception Report where the regulatory and pooling arrangements for cross-border trading need to improve. This approach can be distinguished from more general case studies, which would provide broad, wide-ranging descriptions of different regions that trade power. For this project, we will aim to hone in on approaches used overseas that address the specific regulatory barriers to cross-border trading that are experienced in SADC

The particular issues or lessons learned in each case study will be identified in conjunction with RERA and the World Bank team. Early discussions with the World Bank suggest that the US–Canada case study will be most valuable in exploring approaches to recovering the cost of transmission lines that will be used by multiple generators and buyers. This is interesting in relation to SAPP, where the price for recovering new transmission investment from regional trading have not been finalised. An interesting issue for the WAPP case study is likely to be the role of the power pool in promoting an agreed subset of priority projects. By talking to individuals involved in the projects, our team will make an assessment of how useful this function is in practice and whether the pool is the appropriate party to promote projects with regional benefits.

We also see value in undertaking two tasks that would be additional to the work required in the Terms of Reference. These tasks would require additional resources, which would be discussed with RERA and the World Bank.

- Reviewing non-SAPP related literature on the regulation of cross-border power trading and pooling arrangements. We are aware of several comprehensive studies that have been completed on issues that will be central to the regulatory guidelines, such as the pass-through of power purchase costs and the sharing of capital costs for new transmission projects. Presenting formal reviews of international studies could help stakeholders in the region better understand the reasoning for particular guidelines, and the consequences of adopting different regulatory approaches
- Completing more in-depth case studies of actual projects being developed in the region and the actual policy and regulatory barriers encountered in those projects. Possible candidates for these studies would be Mmamabula, WESTCOR, Kafue Lower, and Mpanda Nkuwa.

Our proposed work plan for completing the remaining work in Phase One of this assignment (Tasks 1–5 in the Terms of Reference) centres on achieving the following three milestones:

- **End-June 2009: Deliver draft case studies**—This will allow sufficient time to distil the main findings of each case study for the presentation to stakeholders proposed for mid-July.

- **Mid-July 2009: Present at Investor Roundtable conference**—Our team will return to Southern Africa to present the main findings of our initial visit and case study reviews. We propose to time this trip to coincide with the Investor Roundtable conference organised by Utho Capital for July 15-17 in Livingstone, Zambia. This conference will provide an ideal opportunity to share our initial findings from the case studies as most of the players in the region will be present. An opportunity for our team to present at the conference has been requested. During this visit we will fulfil the requirement of Task 3 in the Terms of Reference to meet with RERA members to discuss regulatory approaches. This will enable our team to try to develop a consensus on most viable solutions for the regulatory guidelines and SAPP checklist from the case studies we have considered. We would propose that Fiona Woolf, Anton Eberhard, Graeme Chown and Ben Gerritsen are present on this trip.
- **Mid-September 2009: Present proposed regulatory guidelines and SAPP checklist**. The timing of our presentation of the proposed regulatory guidelines will coincide with the RERA annual meeting to be held in mid-September. SAPP has also scheduled a series of meetings for the following week, which we could use to present the regulatory guidelines and SAPP checklist to a broader group of stakeholders. This trip will satisfy the requirements of Task 5 in the Terms of Reference to meet with RERA members to present voluntary guidelines.

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Appendix A Terms of Reference

Electricity Exports and Imports In SADC: Potential Roles For National Electricity Regulators

A. Objective

To prepare a report for the Regional Electricity Regulatory Association (RERA) of Southern Africa and World Bank that: 1) documents how national regulators or ministries in other developed and developing countries have dealt with the regulatory issues that arise from new generation projects that create large, cross country imports and exports; 2) examines experiences in other regions of the world including the actual or proposed division of responsibility between national entities (e.g. national regulators, line ministries, etc.), between national and regional regulators (in regions such as Central America and West Africa) and between national and regional regulators and power pools or regional transmission organisations (RTOs); 3) documents how the above issues are currently being dealt with in the SADC countries where major new import / export projects are already well-advanced; and 4) based on all of the above, proposes voluntary regulatory guidelines for national regulating entities, aimed at promoting efficient, large scale, regional bulk power transactions to enhance the security and reliability of electricity within the SAPP region, for consideration by RERA members and their governments. It is **not** the purpose of these guidelines to propose a restructuring of the power sectors in the various SADC countries. Therefore, in developing the guidelines, the Consultant should take each of the current sector structures in the SADC countries as a "given."

B. Project Background

Several Southern African countries are in various stages of developing large, export-based generation projects (see Box 1 for key characteristics of such projects). Many of the countries planning new IPP generation capacity have electricity regulatory agencies – some newly established and others that have been operational for years – whose primary responsibility is to regulate the supply of electricity for the benefit of domestic consumers (i.e., residential, commercial and industrial), a task which includes ensuring an adequate return for investors that operate efficiently. It is common for these regulatory agencies to have an explicit legal obligation to review the terms and conditions of power purchases that will be used to supply captive domestic customers of the state-owned utility. In general, these statutory obligations were intended to apply to purchases from domestic supply sources though the statutes normally do not distinguish between domestic and non-domestic supplies.

SADC countries and their electric utilities have engaged in electricity trading based on bilateral import / export contracts for over two decades and more recently several Southern African Power Pool (SAPP) members have become active traders on the SAPP Short Term

Energy Market.[12] However, the move toward developing large, export-based power plants is a relatively new phenomenon. This new initiative raises new questions about how the interests of domestic consumers in both importing and exporting countries will be factored into the development of large export-based generation projects, the role of national regulators in balancing the interests of domestic consumers and domestic and international investors, and the most efficient division of responsibilities between national electricity regulators, national ministries of energy, national utilities and SAPP.

Key organizations in SADC

SAPP. The Southern African Power Pool was created in August 1995 when member governments of SADC (excluding Mauritius) signed an Inter-Government Memorandum of Understanding for the creation of a regional electricity power pool. One of SAPP's principal goals is to "facilitate the development of a competitive electricity market in the SADC region." Until 2007, membership in SAPP was limited to the traditional, vertically integrated power enterprises in each of the 12 member countries. In 2007, the Inter-Government Memorandum was revised to allow for full membership by independent power producers (IPPs) and independent transmission companies (ITCs). At present, SAPP has an installed capacity of about 55,000 MW, of which about 47.000 MW was available as of April 2008. SAPP has operated a Short Term Energy Market since 2005. It is anticipated that this market will be replaced in the near future by a "Day-ahead Market Trading Platform." In SADC, such types of trading have been described as "opportunity trading" or "trading around the edges" because no generating plant is built solely to serve this limited cross-border trade and the trading revenues are very small.

RERA. The Regional Electricity Regulators Association of Southern Africa (RERA) was established in 2002 as a result of a decision of the SADC Energy Ministers. RERA's secretariat became fully operational in 2005. At present, 10 of the SADC countries have regulatory entities with responsibility for the national electricity sectors. Of the 10 regulatory entities, 9 are members of RERA. In a Vision Statement adopted by its members, RERA states its goal is to "ensure a consistent and *harmonized regulatory framework* in the energy sector within the SADC region." (Emphasis added.) RERA's 2008-2010 Strategic Plan identifies improvements in "the regional investment climate in the power sector" as one of its priority focus areas. *RERA is* ***not*** *a regional electricity regulatory body because it has not been granted any formal regulatory responsibilities by SADC governments.* Instead, it is a voluntary association of national electricity regulatory entities. To date, RERA's principal activities have been to share information , build up the capacity of its members and to try to harmonize regulatory practices among its members.

April 2007 Memorandum of Understanding between SAPP and RERA. In April 2007, SAPP and RERA signed an MOU that was designed to increase cooperation between the two organizations through attendance as observers at each others meetings and through the explicit sharing of information. This project has been designed to further the goals of that MOU by providing for SAPP to receive the work products produced by the consultant under this consultancy. In addition, SAPP will be asked to designate a representative who

[12] Information on the Southern African Power Pool can be found at http://www.sapp.co.zw

will be invited to participate as an observer at meetings of the project Steering Committee (see Section H).

The purpose of this project. The Regional Electricity Regulators Association of Southern Africa (RERA) and the World Bank are interested in exploring the implications of the emerging electricity trading arrangements for large, export oriented projects for the regulation of domestic sales of electricity by electricity regulators in the region. Through the stronger integration of SAPP, the members of RERA are facing a changing environment. The proposed study will look at how other regions in the world have dealt with similar situations and will put forward voluntary regulatory guidelines for consideration by RERA members and their respective governments. A transparent, fair, stable and effective regulatory framework is important, especially in a region such as SADC that is currently facing significant generation capacity constraints.[13]

Supra-national regulatory authorities. Within Africa, a related effort is being undertaken in the West Africa Power Pool (WAPP). The governments of the 14 WAPP member countries recently approved taking steps to create a regional electricity regulatory authority.[14] It is possible that such a supra-national regulatory body could also be created in the future in Southern Africa. But since this is not likely to happen in the near or mid-term, RERA believes that a good, initial strategy is to focus on promoting regulatory approaches and actions at the national level in importing and exporting countries that will support the new large regional generation projects in the absence of a regional regulatory authority. If there is success in this first step, the political authorities of the SADC region might, at some point in the future, consider the establishment of a regional regulatory body with explicit authority to review the technical and operating proposals of SAPP with respect to grid code, the price and non-price terms of transmission service, compensation mechanisms for inadvertent flows and the pricing and provision of ancillary services. Also, by that time, the SADC region will have the advantage of being able to evaluate the real world experience of the WAPP regional regulatory board and the operation of the regional electricity regulatory entity (CRIE) that already exists in Central America.

C. Analytical Issues

Cross-border electricity trade without a regional regulatory entity. It may be useful to think of the development of a regulatory system that promotes large regional power projects, and the associated power sales and purchases as having two possible phases. In Phase I, there is no regional regulatory body. In Phase II, there is a regional regulatory body. *The focus of this proposed consultancy will be on a Phase I regulatory system.*

The project's principal output will be a set of voluntary regulatory guidelines addressing issues such as those listed in Appendix A that will need to be considered by national

[13] It is also consistent with the views expressed at the highest political levels of the Southern Africa Development Community. See (press release for the February 21st SADC meeting).

[14] See "Supplementary Act A/SA.2/1/08 Establishing the ECOWAS Regional Electricity Regulatory Authority, Thirty-third Ordinary Session of the Authority of Heads of State and Government, Ouagadougou, January 18, 2008.

electricity regulatory bodies, national energy ministries or SAPP relative to large, cross-border power transactions when there is no regional regulatory body. The guidelines should also present recommendations for deciding how these issues should be addressed or at least the criteria that should be used in making decisions on these issues, and the division of responsibility among the relevant parties (national regulators, line ministries, SAPP). There is no presumption that RERA or its nine individual members in importing or exporting countries will necessarily adopt the guidelines. Instead, the purpose of the guidelines is to focus discussion within the region and in individual countries on issues that need to be addressed and possible approaches for dealing with these issues. The voluntary guidelines will be based on an assessment of experience from other regions and the current situation in SADC.

In addition, the study will also develop background information on how regional electricity regulatory bodies have functioned or are proposed to function in other regions of the world so that the political authorities in the SADC region will have timely and relevant information if they wish to consider the creation of a regional regulatory body sometime in the future. However, there is no presumption that SADC will create a regional regulator in the near future.

A Working Definition of Regulation. The consultant will need a definition of regulation in order to complete the tasks of the project. One possible working definition is: government imposed controls on particular aspects of business activity.[15] These "government imposed controls" could be imposed by national regulating entities or some regional governmental or political body. (The consultant is free to propose an alternate definition, to be agreed in consultation with RERA and World Bank.) When a government regulates an infrastructure sector, it imposes direct or indirect controls on the decisions or actions of enterprises within that sector.[16] The focus of this consultancy will be on economic regulation as opposed to health, safety and environmental regulation. Within economic regulation, the two traditional core regulatory tasks are the setting, monitoring and enforcing of maximum or minimum tariff levels and of minimum service standards. These two core regulatory tasks may be performed for retail service and other types of electricity service (e.g., transmission service).

Regulation and Cross-border Electricity Trading. The range of possible regulatory tasks usually expands and becomes more complicated when a country or a region such as SADC decides that it wishes to promote competition and trade in the national or regional electricity sector. It may be useful to think of the possible additional regulatory tasks triggered by cross-border trade as falling into one of two categories:

- **Category One—Retail Service Issues.** In this first category are issues such as:
    - the reasonableness of the price ultimately paid by retail customers for power from a particular generation project,

[15] See Brown, Stern and Tenenbaum, *Handbook For Evaluating Infrastructure Regulatory Systems,* World Bank, 2006, p. 16.

[16] Regulation is only one form of government control. Governments can also control enterprises through ownership and fiscal incentives

- the quantity of power from the project that is allocated to retail consumers,
- whether the price of the power is cost effective when compared to other alternatives,
- whether profits earned from a project should be shared with retail customers and
- how power should be allocated if there is shortage of power from a particular project.

Any of the decisions made on these issues will have a direct and immediate impact on the price and supply of electricity for retail consumers in both the exporting and importing countries. There seems to be general consensus that these retail service issues are best decided at the national level, whether by the national electricity regulator, the ministry of energy or some other national entity.

- **Category Two—Cross-border Trading Platform Issues.** In the second category are issues that relate to creating an effective "cross-border trading platform," These include:
  - the price and non-price terms of transmission service, cost sharing agreements for new transmission investments,
  - methods for dealing with inadvertent power flows over an interconnected grid, the provision of ancillary services,
  - the pricing of emergency energy, coordination of planned maintenance schedules,
  - the terms of grid codes that affect daily operations and the nature of the generation and transmission planning process.

Decisions on these issues directly affect the operational viability and cost of any cross-border transaction, whether the transaction is long-term or short-term, large or small. Hence, decisions on these issues will affect every electricity consumer or producer in the SADC region who is connected to the grid. Some have argued that these decisions must be made at a regional level because their impact is region-wide. It has also been argued that if decisions on these issues were made by national regulators, there would be a high risk that the decisions would create a patchwork of conflicting and inconsistent standards that would hurt expansion of regional trade.

Large Cross-Border Electricity Transactions: Competing Views About The Role of National Electricity Regulators. Preliminary discussions with SADC stakeholders suggests that there are divergent views on the role of national regulators with respect to both the retail service issues (Category One) and cross-border trading platform issues (Category Two). Our understanding of these disagreements is summarized below.

Category One—Retail Service Issues:

- **View 1—"Let the Ministries Do It."** Large regional export projects are critical for ensuring reliable and economic supplies for host countries and for SADC. These projects will require lengthy and delicate negotiations on political and

economic issues between governments and national utilities of the countries that will be involved. Since it is likely that each country's energy ministry will be taking the lead in these negotiations, it is best to let the same energy ministry also be responsible for protecting the interests of its country's domestic electricity consumers as one more element in the final agreement. Little will be gained, and a lot could be lost, if a country's electricity regulator conducts a separate review and then mandates changes that may upset a carefully balanced set of agreements which reflects the economic and political needs of several countries. A national electricity regulator has neither the legal mandate nor the responsibility to balance these sometimes competing interests. Therefore, responsibility for these "regulatory" issues should be assigned to the energy ministry (or any other government ministry that took the lead in the negotiations, with little if any direct role for the national regulator).

- **View 2—"The Regulator Is Needed to Protect The Interests of Domestic Consumers."** National regulators are specifically charged with protecting the interests of domestic consumers. In an exporting country, the energy ministry may be more focused on maximizing sales and revenues for the project rather than ensuring that domestic consumers get their fair share of the benefits of the project. In an importing country, the energy ministry may not have adequate information or incentive to give full consideration to other less costly sources of supply. Therefore, there is genuine benefit in having an independent entity review the terms and conditions of the transaction from the perspective of current and future domestic customers. This could be done early in the process so as to not cause any delays. If the national regulator is not allowed to make such a review, then its mandate to protect the interest of domestic retail customers will be more "fiction" than "reality."

Category Two—Cross Border Trading Platform Issues

- **View 1—"SAPP Should Do It."** Many of the issues affecting cross-border trade are technical and operational. SAPP has made considerable progress in developing workable protocols. It would be best to leave these issues to SAPP rather than now re-defining them as "regulatory" and having each of these matters reviewed and possibly modified in different ways by the national regulators in each of the SADC countries. At best, such reviews would slow things down and at worst, may reverse the considerable progress that has been achieved to date. Therefore, SADC political authorities and national regulatory entities should defer to SAPP technical and operational judgments. If it is decided that there is a need for some review of SAPP agreements, then it should be done by a regional group such as the SADC Energy Ministers rather than in separate and time consuming proceedings by each of the national energy or electricity regulators. If national regulatory entities get involved, there is a high risk that they would reverse the considerable progress that SAPP has made to date.
- **View 2—"Some Government Entity Must Be Able to Review SAPP"** It is naïve to believe that these are purely technical and operational issues. Any decision on these issues could have dramatically different cost implications

for different SADC members. Individual countries have a right to protect their national economic interests. Therefore, there must be some review of SAPP's technical and operational determinations by national entities. The national electricity regulators are best equipped to perform these reviews.

The positions summarized above represent the end points on the spectrum of possible approaches. It is likely that there are hybrid arrangements that would allow for both ministries and regulators to handle various aspects of the domestic retail service issues. Similarly, there are probably hybrid institutional approaches for resolving the cross-border trading platform issues. The consultant will be expected to consider these intermediate options in developing the proposed voluntary guidelines.

General guidance for developing voluntary regulatory guidelines. The consultant should use his or her best professional judgment in developing the proposed guidelines. However, in developing these guidelines, there are at least six considerations that should be taken into account:

- **First, in deciding which functions are best performed in Phase I by the national regulator, the guidelines must necessarily address which other functions are best performed by three other entities: SAPP, a country's Ministry of Energy and Power and the SADC Energy Ministers.** This does not imply that regulatory functions will be performed in the same way or by the same entity in both Phases I and II. For example, certain Phase I functions (e.g., transmission pricing and compensation mechanisms for inadvertent flows) that are currently performed by SAPP could conceivably be transferred to or reviewed by a regional regulatory body in Phase II. A threshold question is: should all the functions currently performed by SAPP continue to be performed by SAPP in the absence of a regional regulatory body within SADC? To minimize any conflict or inconsistency between the voluntary regulatory guidelines and SAPP actions, the Consultant will prepare a "checklist" of actions that could be taken by SAPP to integrate new large generation and transmission projects in to the SADC system.

- **Second, there is no presumption that national regulatory functions must at all times be performed by the national regulatory authority.** For example, the consultant may propose that under certain conditions, it may be more efficient for some regulatory functions (i.e, particularly the Category One Retail Service Issues listed above) to be handled by the Ministries of Energy or Power that negotiates the transaction, perhaps taking account of guidelines developed or supported by the national regulator. In other words, regulation of large, cross-border electricity transactions need not always be performed by the national electricity regulator. The "regulating entity" could be one or more ministries that actually negotiates the import or export transaction. The voluntary guidelines should cover the full scope of important regulatory issues and should also include recommendations on which entity is best placed to cover which functions.

- **Third, the goal of a "harmonized regulatory framework" must be defined more precisely if it is to going to be operationalized.** Many documents from the SADC region emphasize the need to create a harmonized regional regulatory framework. However, it is not obvious that all national regulatory decisions need to be harmonized. For example, government authorities in two exporting countries may reach very different decisions on how much of the power from two different export projects should be reserved for domestic retail customers. One country may reserve 10% of a plant's output for domestic retail customers while another country may opt for 35%. There is no obvious harm to cross-border trade caused by different regulatory decisions relating to the effect of large export projects on domestic retail service (i.e., Category One issues). However, this not true for decisions involving cross-border trading platform issues. For example, allowing national regulators to use different methods for pricing transmission or wheeling services could cause major damage to cross-border trading. Therefore, it would seem that decisions on cross-border trading platform issues (the Category II issues) do need to be harmonized. If this is true, then the next question is how best to achieve this outcome. To date, the reality is that SAPP has made many of the decisions on operational and technical issues that affect cross-border trade. Clearly, the utility members of SAPP have more "hands on" experience than most of the new regulators. But there still remains the question of whether some SAPP decisions should be subject to some further regional or national regulatory review in the absence of a regional regulator. And, if so, what entity should perform that function?
- **Fourth, electricity regulatory statutes are not the same in all SADC countries.** Some statutes may specify what the regulator can and cannot do with respect to power imports and exports while other statutes are silent on these issues. Since the consultancy would become overly complex to create different guidelines tailored for the different regulatory statutes in each SADC country, the consultant should develop recommended guidelines on the assumption that a country's existing regulatory law will not be a constraint in adopting the proposed guidelines. However, if current laws do not allow for the adoption of proposed guidelines in one or more countries, the consultant should also indicate possible changes in the existing statutes to accommodate the guidelines.
- **Fifth, it should be recognized that national regulators often have a variety of regulatory tools available for reviewing power purchases and sales.** For example, a regulator in an importing country could directly or indirectly affect proposed power purchases through at least five regulatory actions: a) when it issues an import license; b) reviews a proposed PPA because it has jurisdiction over the buyer/offtaker; c). develops a model PPA; d) establishes competitive procurement guidelines for power purchases by buyers that are under its regulatory jurisdiction; d) develops or accepts an integrated resource plan, c) benchmarks the price and risk elements of proposed purchases against other alternatives; and e) decides on the timing and extent of pass through of power purchase costs that will be allowed in retail tariffs. Ideally, the regulator should choose a mix of regulatory actions and reviews that provides as much certainty as possible for those involved in the transactions (sellers, buyers and financiers) as

soon as possible while still protecting the interests of domestic electricity customers.

- **Sixth, the voluntary guidelines should not be formulated just at the level of general principles.** Guidelines can be formulated at different levels of specificity ranging from the very general to the very specific. An example of a very general guideline for regulators in buying countries would be: "The regulator should give as much certainty as possible as soon as possible as to the risks and costs of a power purchase that buying entity will be allowed to pass through to its retail customers." While this may be adequate as a first principle (and one which might suitable for adoption by SADC political authorities), it provides little useful guidance for regulators who might be interested in operationalizing the principle. Both the political and regulatory audiences are important if the guidelines are to produce any useful outcomes. Therefore, the Consultant will be required to produce a "hierarchy of guidelines": the first level for SADC political authorities and the second level for SADC national regulators.

Related activities and other donor-assisted programs.

Five existing or soon to be completed documents appear to be particularly relevant for this project. They are: 1) the SAPP Pool Plan study (Nexant); 2) a study on SAPP's market rules (Nord Pool Consultants); 3) a study on current cost of service and tariff setting methodologies for end use or retail customers in 5 SADC countries (CORE Consultants); 4) a study on ancillary services and the pricing of wheeling services (Power Planning Associates), and 5) the TOR for DBSA initiated study on the financing of cross-border trade. Provision will be made for the consultant to review these documents at the beginning of the consultancy.

The proposed project complements World Bank-assisted programs designed to support the advancement of the regional electricity trade in the Southern African Power Pool (SAPP). These programs include an on-going Southern African Power Market Adaptable Program Lending (APL) series, on-going technical assistance for the development of Southern African Power Pool Indicative Generation and Transmission Expansion Study, and the proposed new regional APL series aimed at leveraging private sector financing, beginning with the Mozambique Regional Transmission Development Project.

Box 1

Key Features of Proposed Large, Export Based Generation Projects in Southern Africa

- an Independent Power Producer (IPP) model
- limited recourse financing with significant borrowing from commercial banks
- a private sponsor/strategic partner bringing financial resources and technical expertise to the deal
- state equity participation in the IPP [for example, an ownership interest in the IPP by the state-owned utility or an ownership interest in the fuel (resource) supply]
- a commercially-based off-take agreement / power purchase agreement for the majority of the electricity generated with the state owned entity in the importing country or an entity other than the state-owned utility, e.g. export to another country or sales to a large industrial electricity consumer; these large, multi-year "anchor" sales constitute the financial basis for limited recourse financing
- a minority off-take for the state-owned utility in the exporting country to meet growth in domestic demand
- a minority ownership interest for the importing country and/or a BOT/BOOT type of arrangement that transfers ownership of the project to the state-owned utility in the exporting country the future
- a concession or similar agreement between the developer and the government of the exporting country
- a significant investment in transmission and / or significant additional load on existing transmission facilities to link the new generation to the major off-taker at a suitable level of reliability
- the overall transaction is likely to be the outcome of lengthy, multi-party negotiations rather than a competitive procurement though the construction and operation of different components of the projects may be awarded through a competitive process
- greater likelihood of "loop flows" and transmission grid instabilities caused by long distances between the source of generation and the load centers that will be supplied.

C. Scope of Work, Outputs and Estimated Resource Requirements

a. ***Task 1--Meet with key electricity sector stakeholders in SADC, review relevant reports, national electricity and regulatory statutes and prepare an inception report***

i. Scope

1. **Meetings with electricity stakeholders in SADC.** The consultant will travel to the SADC region to meet with key stakeholders who may be involved in negotiating the terms and conditions of imports and exports of power from large generation projects. During a trip of about three weeks, it is anticipated that the consultant will interview officials at ministries of energy in five SADC countries, likely major buyers and sellers, national electricity regulatory bodies, the SADC energy secretariat and SAPP. The consultant will also meet with World Bank staff members who are involved in energy projects in this region. The purpose of the trip is to learn about the large generation and transmission projects that are being developed or discussed within the region and the perspectives and concerns of different stakeholders. The consultant will summarize the views relevant for this assignment of the different stakeholders in the inception report (see below).

2. **Review of studies undertaken for SAPP.** It is important that the consultant be familiar with other studies have been recently completed or are being prepared for SAPP, the Development Bank of Southern Africa (DBSA) and the SADC Energy Ministers. At this time, five existing or soon to be completed documents appear to be particularly relevant. They are: 1) the SAPP Pool Plan study (Nexant); 2) a study on SAPP's market rules (Nord Pool Consultants); 3) a study on current cost of service and tariff setting methodologies for end use or retail customers in 5 SADC countries (CORE Consultants); 4) a study on ancillary services and the pricing of wheeling services (Power Planning Associates), and 5) the TOR for DBSA initiated study on the financing of cross-border trade. With the permission of SAPP, DBSA and possibly other organizations, the consultant will be provided with copies of these five documents and up to two other documents that may have relevance for the consultant's work. The consultant will review the documents and provide a written report of no more than 20 pages that discusses the possible implications of these documents for the voluntary regulatory guidelines that will be prepared for this project. This short report will be included as an appendix to the inception report.

3. **Review and summary of existing national laws and regional agreements.** It is also important that the consultant understand the legal responsibilities vis-à-vis electricity imports and exports that have been

assigned to the national electricity regulators and national ministries (or other national entities) within SAPP. The consultant will be provided with copies of the relevant national statutes. The consultant will summarize the legal responsibilities relative to electricity imports and exports of each of the national regulators, the national ministries and SAPP and evaluate the flexibility provided by the statutory language in a short paper of no more than 15 pages that will be attached to the inception report as an appendix. Particular attention should be paid to possible overlap or lack of clear demarcation in functions and responsibilities between the national electricity regulators in SADC, the national energy line ministries and SAPP.

ii. Outputs and Schedule

1. Prepare the inception report with the following attached appendices.
    1) Summarize the views and concerns of key electricity sector stakeholders expressed during the meetings. (Appendix)
    2) Summarize related reports and analyze their implications for the proposed guidelines. (Appendix)
    3) Summarize and analyze the implications of national energy statutes and multi-country agreements for the review of imports and exports by national energy regulators. (Appendix)

2. The inception report and the accompanying appendices should be completed 12 weeks after the signing of the contract.

b. ***Task 2-Document Experiences of Four Other Regions (North America, Central America, the Greater Mekong Sub region, and the West Africa Power Pool) In A Written Report (Task 2 can be carried out simultaneously with Task 1)***

i. Scope

1. The consultant will review the function of regulators, ministries and national utilities in cross border electricity trading in four other regions of the world. This is not simply a desk study. It is expected that it will include interviews with individuals knowledgeable about the power sector in the concerned regions. Particular emphasis should be placed on large bilateral transactions. In each region, the consultant should describe the formal regulatory requirements as well as how the formal regulatory requirements have actually been implemented. In all regions, the focus of the consultant's analysis should be on the actions and decisions of national regulators and energy ministries with respect to large cross-country power imports and exports.
2. To facilitate comparisons of the regulatory approaches used in the four regions, the consultant should describe how the regulators and ministries in each region have dealt (or propose to deal) with the issues listed in Appendix A and any other issues that the consultant believes are

important. Where a regional regulatory body exists or has been proposed, the consultant should, to the extent possible, describe the existing or planned division of responsibilities between the regional regulatory body, national electricity regulatory bodies and regional power pools or transmission system operators. If the consultant believes that the experience of some other region may be more useful to RERA in producing the voluntary guidelines, then the consultant should propose that region as a substitute for one of the four regions listed above.

3. For North America, the consultant should examine major bilateral power transactions involving power enterprises in Canada, the United States and Mexico. Particular attention should be paid the functions performed by the national regulators versus the energy ministries or departments. For example, what are the criteria used by the Canadian National Energy Board and the US Department of Energy in approving major exports? In addition to these ministerial actions, what other functions that affect imports and exports (e.g., prudence reviews of purchases) are performed by national or provincial and state regulators in these two countries? The North American case seems to represent a case in which both ministries and regulators have specific functions with respect to exports and the construction of cross-border transmission lines.
4. The Greater Mekong Subregion (GMS) is composed of Cambodia, Laos, Myanmar, Thailand, Viet Nam, and Yunnan Province in China). GMS should be of particular interest to SADC because a significant number of export oriented IPPs are being developed in the region. In many cases, the IPPs are located in less developed power systems but which are rich in resources. The planned IPPs would sell to more developed and higher demand countries. In GMS, national electricity regulators did not exist until recently. Consequently, most of agreements were negotiated and approved by the national utilities and various ministries (e.g., energy and foreign affairs) in each of the countries. The national regulators have been marginal or non-existent in this process. The consultant should pay particular attention to the reviews undertaken for the Nam Theum II hydroelectric project. Since the World Bank has had heavy involvement in this project, the consultant should interview members of the World Bank team that has been involved in this project.
5. For Central America, the consultant should pay special attention to the actual or proposed division of responsibility between CRIE (the regional regulatory entity) and the six national electricity regulators. The consultant should also compare the characteristics of CRIE with the characteristics of the recently approved regional regulatory body for the West Africa Power Pool (WAPP). It appears that CRIE's decision making body is comprised of officially designated representatives from each of the six national electricity bodies in Central America.
6. In the case of WAPP, it is recognized that the regional regulatory body will probably not be functional at the time the research for this project is being conducted. Therefore, the write-up should focus on what has been proposed, the reasons for choosing the selected regulatory design and a list of key design issues that SADC political authorities would need to

consider if they decide to create a regional regulatory body in the future. At this time, it appears that the WAPP regional regulator will be comprised of three individuals from the WAPP region. Each of these three individuals will be explicitly charged with representing broader regional interests rather than the interests of the country for which he or she is a citizen. In other words, they are expected to serve as independent regional regulators.

ii. Outputs and Schedule

1. Report on the experiences in North America, Greater Mekong Sub region, Central America, and WAPP.
2. A draft report should be completed 15 weeks after the date on which the contract is signed.

c. ***Task 3-Meet with RERA members (individually and as a group) to discuss the regulatory approaches for large, cross border trade used in other regions (General Meeting #1)***

i. Scope

1. The first meeting with RERA members will have two purposes: first, to present the results of the consultant's research on the regulatory approaches used in four other regions and, second, to have initial discussions with RERA members on possible voluntary guidelines for RERA members.
2. It is anticipated that this discussion will take place at a regularly scheduled meeting of the RERA members.
3. A draft of the consultant's reports (Task 1 and 2) will be made available to RERA members prior to the meeting.

ii. Schedule

1. The date of the meeting will be scheduled by RERA. It is anticipated that it will take place within 4 to 6 weeks after the completion of the Task 1 and 2 report.

d. ***Task 4-Prepare Initial Voluntary Guidelines for Consideration by RERA Members and a Checklist of Possible SAPP Actions***

i. Scope

1. The voluntary guidelines should provide recommendations on the delineation of responsibilities of the national regulator vis-à-vis the national line ministry and vis-à-vis SAPP. The guidelines should also provide recommendations on the regulatory approaches and decision making criteria that that can be used by the regulating entity(ies) of an exporting country and importing country. A preliminary list of issues that the consultant should consider addressing is given in Appendix A. The consultant is free to add other issues that he or she believes must be considered in developing guidelines.

2. The Consultant will be expected to produce a hierarchy of guidelines containing at least two levels of guidelines. The first level will specify guidelines that could be issued jointly by SADC political authorities (i.e,, at the presidential or ministerial level). These first level guidelines are likely to be at fairly high level of generality. The second level will be guidelines for the national regulators. The second level will contain a higher level of specificity to promote operationalization of the first level guidelines. It is recognized that different regulatory approaches may be equally successful in achieving similar outcomes. Therefore, the second level guidelines (i.e., the guideline for regulators) may find it useful to present two or more alternative regulatory approaches for consideration by SADC national regulators.
3. It is especially important that the voluntary guidelines for national regulators be coordinated in both substance and timing with any actions that SAPP will take to integrate new large generation projects and associated transmission investments into the SADC regional system. To increase the likelihood that the voluntary regulatory guidelines will not conflict with SAPP actions or procedures, the Consultant should prepare a proposed "checklist" of actions and procedures that he or she recommends be taken by SAPP to integrate new large generation and transmission projects into the SADC grid. It is anticipated that this "checklist" will cover some or all of the following: long-term pricing of transmission services, the provision of ancillary services, loop flow and stability determinations and associated compensation mechanisms and allocation of transmission rights on new or existing transmission lines. The checklist will describe the actions that should be undertaken by SAPP as well as the timing and procedures for undertaking these actions. Since this proposed checklist will be of direct immediate interest to SAPP and SAPP has the principal expertise in these areas, the Consultant will provide the checklist directly to the SAPP Executive Director for review by a designated SAPP committee. A copy will also be provided to RERA. The Consultant should take account of any comments received from SAPP and RERA in preparing the final version of the voluntary guidelines.
4. The consultant should prepare the written guidelines with a background explanation of the rationale for different components of the guideline.

ii. Schedule

1. The draft of the voluntary guidelines should be completed within three weeks after the meeting with RERA members (Task 3).

e. ***Task 5-Meet with RERA Members To Present the Voluntary Guidelines (Meeting #2)***

i. Scope

1. Preparation and delivery of a PowerPoint presentation on the proposed guidelines and then meeting with RERA members as a group and individually to discuss the guidelines.

2. The comments of three outside reviewers (recruited by and paid for by the WB under separate contracts) and the consultant's responses to these comments may be included as a separate appendix to the final report (see Task 7 below).

ii. Schedule

1. The meeting will be scheduled by RERA. It is anticipated that it would take place within four weeks after the submission of the voluntary guidelines (Task 4).

f. ***Task 6-Prepare Draft Final Report And Meet with RERA, SAPP and SADC Energy Secretariat officials To Discuss The Draft Final Version of the Proposed Guidelines (Meeting #3)***

i. Scope

1. The consultant would revise the guidelines based on the discussions held with RERA members and others.
2. The draft final report should include both the four case studies (North America, Central America, Continental Europe and WAPP) with a new section evaluating the relevance of the experiences of these other regions to SADC as well as the draft final version of the voluntary guidelines and a summary of concerns raised about the voluntary guidelines and exceptions and adjustments that may be required for individual SADC countries (see #4 below).
3. RERA recognizes that it is important that the consultant's analysis and recommended voluntary guidelines be understood and discussed beyond the membership of RERA. Hence, RERA will arrange for a presentation by the consultant to other key stakeholders in the SADC electricity sectors. It is anticipated that this presentation would occur at a meeting attended by members of RERA, utility members of SAPP, the SAPP, line Ministries, and the Energy Secretariat of SADC. Representatives of line ministries would also be invited.
4. At the conclusion of this meeting attended by a broader cross-section of SADC electricity sector stakeholders, the consultant would produce a summary of the concerns raised by various stakeholders, possible modifications to the guidelines if the consultant believes that such modifications are needed. The document summarizing stakeholder concerns and the consultant's response to these concerns should be included as an appendices to the final report (see Task 7 below).

ii. Outputs and Schedule

1. Revised guidelines and add a new section of the report that evaluates the relevance of the experiences of the four other regions to SADC (Task 2).
2. Summarize concerns raised by other stakeholders and possible responses to these concerns.
3. The draft final report with the Task 6 appendices should be completed within three weeks after the Task 5 meeting with RERA. The final meeting with the larger stakeholder group will be scheduled by RERA. It

is anticipated that this meeting will take place within four to six weeks after the submission of the draft final report.

g. ***Task 7-Prepare a final report that incorporates any revisions that the consultant deems necessary in response to comments received from SADC stakeholders and the comments of the three independent outside reviewers***

   i. Scope
      1. In the final report, the consultant will make any changes in the voluntary guidelines and the final report that are triggered by the comments of the broader SADC stakeholder group and the three independent outside reviewers of the draft final report.
   ii. Outputs and schedule
      1. The final report should be completed no later than three weeks after the reception of comments from the three outside reviewers.

Future work in this area could be considered as an extension of this assignment if it relates to the role of national regulators and the design of a regional electricity regulatory body for SADC. The World Bank, in consultation with RERA, reserves the right to change tasks of this consulting assignment as long as the modified tasks are related to the general topic of regulation of major imports and exports of power in SADC and the modifications do not lead to a need for additional consulting resources (or agreement is reached between the consultant and RERA and the World Bank on the provision of additional resources).

D. Consultant Qualifications and Experience

The consultant is expected to be a firm. The team leader should have at least 15 years of directly relevant experience in two or more of the areas listed below with at least five years in a leadership position. Any areas not covered by the team leader can be covered by other team members. At least one team member should have relevant experience in the following areas.

1. Experience in representing private and public entities operating as sponsors or off-takers in long-term bilateral power transactions that were consummated through power purchase agreements (PPAs). If the transactions were cross-border transaction, this would be preferable.

2. Experience in working with electricity regulators and political authorities in one or more countries on retail tariff setting issues that arise from power sales and purchases for regulated power enterprises that are buying or selling power.

3. Experience in working on regional electricity regulatory issues resulting from proposed or actual short-term or long-term power transactions in regions outside of the SADC region.

4. Direct working experience with SAPP or another power pool or system operator on technical and economic issues that accompany long-term cross-border power

transactions. These issues might include long-term pricing of transmission services, the provision of ancillary services, loop flow determinations and compensation mechanisms and allocation of transmission rights on new or existing transmission lines. Direct experience with SAPP on one or more of these issues is preferable.

5. Direct experience in negotiating or facilitating multi-country political and regulatory agreements to facilitate large electricity or in other infrastructure transactions. If the agreements involved cross-border electricity transactions, this would be preferable.

E. Estimated Timetable

February - March 2009	Begin Task 1 Hold up to 8 pre-interview video/audio conferences Begin review of previous relevant studies
April 2009	Travel to SADC region. Begin Task 2 case studies.
May 2009	Submission of the Inception Report (including annexes) by mid-May. **Completion of Task 1.**
June 2009	Submitting case studies by mid-June. **Completion of Task 2.**
July 2009	Meet with RERA members to discuss the reports of task 1 and task 2 **(Task 3)** by end of July or early August..
August 2009	Begin work on initial draft of voluntary guidelines (start of Task 4).
September 2009	Finalize initial voluntary guidelines. Send to RERA members by early September. **Completion of Task 4**
October 2009	Meeting with RERA members to present the initial voluntary guidelines by early October. **Completion of Task 5** Review voluntary guidelines based on comments from RERA members. Submission of the draft final report by late October
November 2009	Meeting to discuss the draft final report with larger SADC stakeholder group by the end of November or early December (**Task 6)**
December 2009	Final Report by the end of December. **Completion of Task 7**

F. Improvement of Terms of Reference

The consultant may offer suggestions and improvements in the Terms of Reference, which he/she considers would result in a better product for RERA. Such proposals, if accepted, will form part of the Terms of Reference of the assignment.

G. Conflict of Interest

The consultant shall adhere to the World Bank's conflict of interest rules.

H. Contracting and Administration

The Contracting Authority is the World Bank. The contract will be administered by the Bank's Africa Energy Group (AFTEG) as a form of Economic and Sector Work (ESW). The substantive decisions with respect to comments on the consultant's report and recommended guidelines will be made jointly by RERA and the World Bank. The consultant shall produce voluntary guidelines that RERA can recommend for adaptation by its members. The consultant will report to the World Bank. The coordination of the contact within SADC will be handled by RERA. To ensure that the work products meet the needs of RERA, a Steering Committee will be created consisting of 3 RERA members and one World Bank representative. To ensure that RERA has the benefit of different perspectives on the consultant's analysis and recommendations, the Steering Committee will routinely make drafts and final versions of the consultant's work products available to the SAPP Control Center, the Energy Secretariat of SADC and individual national energy ministries. The World Bank will assume the responsibility of distributing the consultant's work products to interested members of the donor community and financing communities.

All contract outputs and deliverables shall be submitted in English. All task deliverables and reports shall be submitted in four hard copies and on 2 CDs (one for RERA and one for the World Bank).

Office-related costs which may include office rental, communications (fax, telecommunications, mail, courier etc.), and secretarial/interpreting services are considered to be included within the fee rates of the Experts. No costs of this nature may be charged in addition.

I. Deliverables

1. Inception report including annexes (Task 1)
    a. Review of studies undertaken for SAPP and other SADC organizations
    b. Review and summary of existing national laws and regional agreements
    c. Summary of views expressed at meetings with various SADC stakeholders
2. Report on the actual or proposed regulatory systems for dealing with cross-border transactions in four other regions outside of SADC (Task 2).
3. Meet with RERA members (individually and as a group) to discuss the Task 2 report and elements of possible voluntary guidelines (Task 3)
4. Prepare initial voluntary guidelines dealing with regulation of cross-border trade for consideration by RERA members (Task 4)
5. Meet with RERA members to present initial voluntary guidelines (Task 5)
6. Prepare a draft final report containing the revised voluntary guidelines and the report on the experiences of other regions and meetings with various SADC stakeholders to discuss this draft final report (Task 6)

7. Prepare a final report that reflects any revisions that the consultant deems necessary in response to comments received from SADC stakeholders and the comments of three independent outside reviewers (Task 7)

J. Schedule of Payments

a. 10 percent on signing of the contract

b. 30 percent upon completion of the inception report and the report documenting the experiences of four other regions (Deliverable 1&2)

c. 30 percent upon submission of the voluntary guidelines (Deliverable 4)

d. 30 percent upon completion of the full final report including the summary of issues and concerns raised at the stakeholders meeting (Deliverable 7).

Appendix A

A Preliminary List of Regulatory, Policy and Operational Issues Affecting Regional Electricity Trade in SADC

Issues For Electricity Exporting Countries

- **Sharing of profits and losses.** If the state-owned utility is an equity member of an IPP consortium: (i) is there a potential conflict of interest in terms of maximizing returns on investment and supplying least-cost electricity to domestic consumers? (ii) who decides what the exporting utility will do with the profits or losses produced by export sales? (iii) should any sharing of any profits or losses depend on whether and to what extent domestic customers have financed the export sale through revenues generated from their domestic tariffs? (iv) how can it be determined whether domestic customers helped to finance a plant that exports? (v) if domestic customers are insulated from the business outcomes of export projects, what specific methods are available to ensure "ring fencing" of profits and losses?

- **Allocating energy to domestic consumers.** Should the regulator have the authority to mandate that the domestic market will get a specified amount of the electricity produced by the export project at a specified tariff? Or in the alternative, should this decision be left to the Ministry of Energy or other government body that may have negotiated the terms of the sale on behalf of the exporting country? Should there be a presumption that domestic consumers are always "entitled" to some share of the output of the export project?

- **Public vs non-public information.** Should the regulator or minister require that the terms and conditions of the export sales be made public? If such a requirement is imposed, will this hurt the ability of the country to make the sale relative to other countries? If such information is not made available prior to the completion of the sale, should it be made available sometime after the sale is consummated?

- **Regulation for out-of-country buyers.** Should the volumes and tariffs of cross-border sales to out-of-country buyers be regulated by the national regulator of the exporting country? Or it should it be assumed that out of country buyers can protect their own interests and that the national regulatory entity's responsibilities in the exporting country will be limited to protecting the interests of national domestic customers? If so, which government entity should perform these regulatory functions in the exporting country: a ministry or the regulator?

- **Energy or capacity shortfalls.** In a shortfall situation, should the regulator or minister ensure that there are contract provisions that ensure that domestic and export customers be treated equally with respect to curtailing power? Should

shortfall situations be differentiated between (i) short term or emergency shortages, (ii) seasonal shortages (e.g., in hydro generation systems experiencing a drought or low rainfall), or (iii) long term shortages due to insufficient investment in the export country?

- **Assessment of reliability impacts.** Who should make the assessment of the impact that the exported electricity will have on the national and regional transmission system operation and reliability?

Issues For Electricity Importing Countries

- **Review of purchases.** If the national utility has purchased power from another country's export project or receives it because it has a partial ownership interest in a plant located in another country, what should be the nature of the review or approval (if any) by the importing utility's national regulator? Should the nature of the regulatory review be the same for all power purchases regardless of where the generating plant is located? If the national regulator in an importing country approves of a purchase, should this imply that there will bee automatic pass through of the costs of the purchase over the life of the PPA?

- **Timing and need for regulatory reviews.** If there is a regulatory review of imported power, when should it take place? If the regulator reviews the specific terms and conditions of proposed PPAs, should there be a mechanism that allows the regulator to give early binding or non-binding feedback to sponsors/sellers, off-takers/buyers and financing entities as to the prices and risk allocations that will be acceptable to the regulator? Or, in the alternative, if the import has been explicitly agreed to by the government of the importing country, should the national regulator be required to accept that decision and not conduct any further review?

- **Limits on maximum permissible imports** Should there be any limits on the maximum permissible import volumes? Is this a policy or regulatory determination for the buying country?

- **Reliability and security of supply.** Should the national regulator, the energy ministry or some other entity assess the impact of reliance on imports on the reliability and security of supply? Should the review of the transaction by SAPP be limited to the effect of the transaction on the operational reliability of the SADC regional grid? What supply safeguards exist in the SAPP agreements?

- **Public availability of information on the transaction**. Should it be mandatory that the price and non-price terms and conditions of the import be made public? If so, when should the information be made public? If so, should the regulator try to benchmark the price and non-price terms and conditions against alternative supplies (as recently proposed by the Nigerian electricity regulator for power purchases from facilities above 100MW)?

- **Prior assurances of full cost recovery.** Should the regulator provide assurances that the importing utility will be assured of full cost recovery of the imported power for the full duration of the agreement (i.e., domestic tariff cost pass through provisions? If so, how?

Issues For Cross-border Trading In General

- **Cross-border trading platform issues.** Which of the following issues must be resolved for the success of large export projects:
    - Price and non-price terms of transmission service including the right to receive wheeling services from parties other than the exporting and importing country. (i.e., mandatory access to transmission facilities owned by third parties)?
    - Compensation methods for inadvertent power flows
    - Compensation methods for loop flow
    - Obligation to provide ancillary services
    - Regional performance and security standards
    - Operating reserve requirements
    - Pricing of ancillary services
    - Pricing of emergency service
    - Coordination of planned maintenance services
    - Grid codes (e.g., control area operations, telecommunications protocols, etc.)
    - Least cost planning for generation and transmission projects
    - Daily, weekly and monthly operational optimization
    - Rights and privileges of IPPs and ITCs to SAPP membership

  Which of these issues are under current study by SAPP? Are there other issues related to grid development and operation that need to be resolved?

- **Harmonization.** Should there be regional rules on some or all of these cross-border trading platform issues? Or alternatively, should they be addressed on a project-by-project basis rather than on a generic basic? If they are addressed on a generic basis, is there a way to create generic regional rules in the absence of a regional electricity regulator?

- **Operational management and discipline.** Who should manage the operational impact of the transaction (e.g., daily and weekly operations, transmission congestion, reliability constraints that may limit imports and exports) ?What is the best way for ensuring operational discipline (application and enforcement of SAPP rules) amongst SAPP members? Should the national electricity regulators have any role in ensuring compliance with SAPP rules?

- **Network security.** Who should review the impact of a particular proposed transaction on regional network security? If it is left to SAPP, should there be any procedure for reviews or appeals of SAPP's decision?

- **Role of RERA relative to the national electricity regulators.** Should RERA be granted formal legal authority over the actions or decisions of national electricity regulators? If RERA is given some authority, should it be limited to all regulatory decisions of national regulators or just decisions relating to cross-border trading issues?
- **Role of RERA relative to SAPP.** Of the set of all possible cross-border transactions, which ones require formal approval or review by SAPP? What should be included in SAPP's review of major cross-border transactions? Should RERA be given any formal review authority over the decisions of SAPP? If so, should it be over all SAPP decisions or just certain decisions?

Appendix B Summary of Stakeholder Meetings

In this Appendix, we summarize the views and concerns that electricity sector stakeholders expressed during our meetings in April 2009. Stakeholders interviewed include utilities, private sector investors, national regulators, government officials and other interested parties. The comments in this summary have not been attributed to any party to maintain confidentiality.

In Sections B.1 to B.5, we discuss five issues that arose consistently in the meetings:

- Security of supply
- Market structure
- Regulatory powers and the role of national regulators
- The role of regional regulatory associations
- The role of the power pool.

B.1 Security of Supply

The utilities, investors, regulators, and government agencies that we interviewed considered security of supply to be one of the major hurdles to increasing power trading within SADC. Recent challenges in managing existing regional power trades have raised anxiety around security of supply, particularly as a result of load-shedding for countries supplied by South Africa in early 2008, and severe reliability issues associated with major transmission lines passing through Zimbabwe. These concerns have made governments and utilities wary about increasing their reliance on imported power.

The following bullet points provide selected examples of security of supply concerns highlighted during stakeholder meetings:

- Representatives of a government agency and a national utility argued that security of supply concerns are a major reason for the lack of agreement on an effective pool development plan. They provided the example of Botswana, which aims to phase out imports by 2012, partly due to its experience of load-shedding from Eskom in 2008. Acknowledging that such concerns are not exclusive to Botswana, they said that South Africa's Eskom required extensive assurance to allay its concerns about security of supply during negotiations on the Mmamabula project. For example, the agreement on termination events gives Eskom the right to take over the project in certain circumstances (subject to lenders being repaid), such as a material failure to perform by the IPP
- A project developer said that the transmission path for any sale from the Lower Kafue in Zambia to Eskom would be through Zimbabwe. This poses major risks, and it is unclear how this risk would be allocated and managed. A representative of a government agency noted that Zambia recently had problems with Zimbabwe that resulted in temporarily opening the interconnection with Zimbabwe. Despite these problems, governments frequently acknowledged that security of supply and reliability is enhanced through integration. One official acknowledged the high cost of developing 100MW of emergency power supply (around 20c/kWh) relative to opportunities in the region to procure power

- In several meetings, interviewees discussed an unwritten policy in South Africa that total imports will not exceed Eskom's projected reserve margin. This is expected to be in the range of 15-19 percent of Eskom's total peak demand, which is expected to grow over time. Other assurances on power reliability are provided under South Africa's Grid Code and through Government-to-Government agreements on protocols during emergency events.
- We were told that Namibia aims to achieve security of supply through new domestic generation sources. In a 1998 energy White Paper the Government set a target that 75 percent of energy requirements and 100 percent of capacity requirements should be met from domestic power generation sources. NamPower is planning to achieve this target by 2012. In addition, the Ministry of Energy and Mines in Namibia has received a directive from the President to improve security of supply and to promote new generation in Namibia.

B.2 Market Structure

Interviews with market participants uncovered a considerable amount of uncertainty on what the current market structure in each country allowed in terms of IPPs selling directly to major users, particularly major users located in another country. Many stakeholders were aware that a "single buyer" model had been adopted, but were unaware of whether this means all power sold within the country needed to come from the national utility, or whether any exclusive arrangements only relate to truly captive residential and smaller power users.

Whichever market structure is adopted, stakeholders agreed that the opportunities to trade power within the market should be made clear.

- We were told that the market structure needs to be fit for purpose. There is a growing realisation that the market models used in developed regions are not going to work in Africa any time soon. Accordingly, any recommendations around market structure need to be tested against the environment in SADC.

The government agencies and utilities we interviewed generally believed that the single-buyer model is appropriate for the level of development in SADC, although different reasons were given for favouring the single-buyer model:

- The OPPPI is currently preparing a memo to the Ministry of Energy (MOE) in Zambia highlighting the benefits of an exclusive single-buyer model. This opinion is based on the limited capability for IPPs to compete with the utility to sell electricity.
- A representative of a major utility said that it needed to be the single buyer to ensure sufficient revenues for its electrification programme and other sector expansion investments.
- In Namibia, the current government position is that the utility is the (exclusive) single-buyer of electricity. The Electricity Control Board (ECB) has proposed a modified single-buyer model where large users are free to purchase directly from IPPs, and the utility is currently seeking advice from an independent expert on the proposal.

- In South Africa, Eskom is prepared to allow large industrial customers to supply themselves with electricity, including from a generating asset located in another country. However, we were told that the company has a policy to restrict such independent supply to total of 300MW. When Eskom provides power to major users located in other countries (for example to the Scorpion mine in Namibia), the blessing of the national utility in the other country is first sought. Eskom would expect reciprocal treatment for any foreign utility or generator proposing to supply a customer located in South Africa..
- The Botswana national utility is currently understood to be an exclusive single-buyer. A representative of the utility said that Botswana's Government is currently considering whether to open up the market to allow major buyers to be supplied directly by IPPs. Botswana would want likely want reciprocity from neighbours in opening their markets as well.

The sector regulators that we interviewed generally questioned whether an exclusive single-buyer arrangement had been agreed, and in many cases considered that cross-border power to non-utility third parties was possible under the principle of open access to transmission enshrined in national legislation:

- The ECB in Namibia has granted an exclusive import license,[17] and a non-exclusive export license, to NamPower. IPPs can sell directly across the border if they are able to generate in excess of Namibia's domestic power supply needs. There is also a "public interest" exception in the legislation for the ECB to override licence conditions, although the ECB is not clear how this should be interpreted.
- In South Africa, NERSA understands that Eskom is required to provide open and non-discriminatory access to the grid (in terms of its transmission license), and the regulator does not see why major users cannot enter into cross-border power trades with generators located in another country provided that Eskom is fairly compensated for the use of its assets. NERSA does not believe that the utility currently has any exclusivity and the single-buyer model allows for bilateral arrangements between independent parties
- In Zambia the regulator understands that IPPs are entitled to sell directly to large consumers, but that ZESCO has the right of first refusal to the power. It is unclear how this works in practice.

B.3 Regulatory Powers and the Role of National Regulators

PPA approval process

The process for receiving regulatory approval of PPAs varies widely across the SADC region. This appears to create particular regulatory risks for new cross-border power projects:

- Regulatory rules for approving PPAs seem to differ substantially across the SADC region. For example, in Zambia, regulators review each PPA and are able to order changes to the terms even after a commercial agreement had been reached. In

[17] The one exception to NamPower's exclusive import licence is the supply to the Scorpion Mine from Eskom South Africa

contrast, in some other SADC countries the regulator does not review each PPA, but instead inserts guidance and terms in to the utility's export and import licenses. If these conditions are not met then regulator could refuse to pass through the costs into the tariff. We intend to obtain copies of licences (if possible) to evaluate what guidance or conditions can be inserted by national regulators

- There is also uncertainty about the regulatory approval procedures within SADC countries. A private project developer said that Eskom has an import license from NERSA, but needs approval for any new import deals. This could presumably be done through an amendment to the existing licence, either by listing the import deal as an approved transaction or inserting an additional schedule in the licence with the terms of the import deal. In South Africa, NERSA will also have to approve cost-pass through of the purchase costs from Eskom to consumers in South Africa These approvals are conditions precedent in the PPAs, meaning that regulatory risks at the initial review stage lie with the project developer.
- The substantive terms of PPAs need to be approved by national regulators. The level of detail that regulators will provide for in this review is unclear. A representative of one national regulator said that it proposes to undertake a thorough review of the terms and conditions of different cross-border power trades to ensure the reasonableness of their terms, such as the rates of return provided to the project developer and the cost of allocating specific risks.

Regulators and government officials in several countries suggested that it would be useful to develop examples of standard PPAs for use by regulators and utilities. They argued that these PPAs would be would be helpful in making the PPA approval process more coordinated and transparent. One interviewee noted that the idea of developing example PPAs was been floated at a recent Indaba (meeting) on the financial crisis.

National regulators and IPP developers agreed that increased transparency would help to improve the regulatory effectiveness in reviewing cross-border PPAs:

- A representative of a national regulator commented that increased regulatory transparency will make it easier to benchmark costs according to different studies
- An IPP developer said that in order to properly assess the price of a PPA, regulators need to have accurate information on the cost of new energy sources available to the utility—either through the utility new build programme or from IPPs. He commented that it is not clear that regulators in the region currently have this information available
- However, not all interviewees thought that significantly more regulatory transparency is possible. For example, we understand that it is unlikely that Government of Botswana will publicly release the terms of the Mmamabula PPA if this deal is finally agreed. Typically in Botswana, the terms of power purchases are referred to in tariff decisions. For example, if the tariff needs to increase because power purchase costs have risen, the reasons for the tariff increase will be publicly stated in those general terms. The commercial sensitivity of the issues and the tendency for parties to focus on individual terms, rather than the totality of the agreement, militate against a full release of PPAs.

National regulators and IPP developers said that their mutual exchange of information with one another during the project development can help control regulatory risks:

- NERSA is prepared to meet with project developers and Eskom prior to PPAs being submitted for approval. This helps the parties to the PPA understand what is likely to be acceptable to NERSA, and is consistent with good regulatory practices internationally (for example, FERC "pre filing conferences" in the United States)
- A private developer said that it is currently engaging with NERSA and DME to ensure that the developer's interests are looked after throughout the regulatory approvals process. While this developer said that the regulatory risks associated with the project are significant, the company saw these risks as manageable due to long-standing Government support for the project and draft regulatory guidelines for cost pass-through recently issued by NERSA.

Variance in transmission pricing limits power trading

Utilities, regulators, and private developers all commented that the variation between national transmission pricing methodologies and SAPP transmission pricing is a major impediment to power trading:

- A private IPP developer said that transmission pricing is one of the most significant impediments to regional power trading. This developer gave the example of a potential deal to wheel power through Zambia for sale to another country. To recover the costs of such a deal, the developer considered that the current domestic transmission pricing methodology in Zambia (where revenues are split 90 percent to ZESCO, 10 percent to the other transmission owner, CEC) would need to be reviewed
- A representative of a national utility noted that the postage stamp transmission pricing in the country in which he is based differs markedly from proposed SAPP wheeling price. This creates uncertainty as to whether SAPP pricing will apply or domestic transmission price for a particular transaction
- A representative of a national regulator said that traditional wheeling charges in SAPP have been too low. Wheeling charges in SAPP have been based on depreciated asset prices, which do not provide sufficient incentives for new transmission investment. However, other stakeholders (particularly SAPP members) expressed concern that the proposed transmission pricing methodology for SAPP does not ensure that higher transmission revenues for wheeling will be used to enhance regional trading (and for example, could be used to subsidise national customers)
- Another regulator said that there is lack of clarity in his organisation on pass-through of costs of new transmission. However, this comment is not consistent with recent academic regulatory review, which concluded that the regulator has a clear cost-of-service methodology for generation, transmission and distribution, with a clear asset valuation methodology and ROR equal to WACC.

Additional regulatory coordination problems

- A national regulator said that procedures for creating new regulatory guidelines were not adequately coordinated between the regulator and other government agencies. For example, in South Africa the regulator has been empowered to draft rules dealing with how to process unsolicited bids, while the guidelines recently released by the Department of Minerals and Energy appear to require competitive bidding processes
- National regulators generally noted that lack of harmonisation on the role of regulators as a factor that can inhibit power trading. The example was given of the recent deal between NamPower and ZESCO for supply to NamPower via the Caprivi link, where the Zambian regulator (ERB) decided that the tariff to supply NamPower was too low, requiring the parties to renegotiate the deal. The quantity to be supplied was subsequently reduced from 200MW to 50MW.

Lack of clarify on regulatory framework and the role of regulators

There is widespread agreement among utilities, private developers, and national regulators that there is a lack of clarity on regulatory frameworks and the role of regulators in power trading.

- A representative of a national utility said that a clear and supportive regulatory environment is critical to getting regional projects done. This framework should enable investors to know what is required to get a deal done, particularly in terms of the allocation of risks such as foreign exchange
- A private developer noted that differences in the legal and regulatory frameworks for IPPs impedes the development of cross-boarder power projects. He gave the example of draft regulations governing the procurement of IPPs recently published by the Department of Minerals and Energy (DME). Apparently these rules do not explicitly encompass cross-border PPAs, but could have significant effects on the way that regional power projects are developed. There is uncertainty on whether the regulations will be finally issued
- A different private developer noted that there is very little clarity in the regulatory framework for regional power sales. This regulatory risk has limited the ability of project developers to access finance. In response, this developer has adopted a model with initially higher equity contributions, with the expectation of refinancing in five years time as the regulatory and credit situation improves
- A representative of a national regulator commented that there is a general failure in SADC to understand regulators roles. Regulators have a mandate, but uncertainty exists on how this mandate is distinct from the responsibilities of relevant government ministries. This results in a failure to understand the importance of independence in regulatory decisions

A private developer said that regulators should not be involved in commercial negotiations. This developer considered that regulators' roles should be confined to:

- Clarifying technical issues (substations, voltage etc)
- Establishing rules that protect consumers and the national utility

- Providing clarity on other investment issues, such as import/export taxes

In contrast, governments should be focusing on removing stumbling blocks and investment barriers

Lack of regulatory skills and high turnover at regulators

The USAID Trade Hub recently completed a survey of the institutional capacity at each of the electricity regulators in SADC. This study found that most regulators were relatively inexperienced and that most regulators have high staff turnover. The study also showed that there are problems with regulatory independence.

B.4 The role of regional regulatory associations

There seems to be some disagreement in the region about the role of RERA as an association and the degree to which its recommendations should be taken into account by national regulators.

Some think that as a regional entity RERA should have a larger role in SADC energy regulation

Stakeholders understand that RERA is a voluntary association and no ability to impose its recommendations on national regulators. One regulator considered this to be no problem for bilateral deals, but could raise difficulties for regional projects, such as ZIZABONA and WESTCOR. The representative said that it would it would be good for RERA as an association to play a greater role in these projects. As a regional entity RERA could also help to clarify and monitor open access to the transmission network and possibly take on the role of the running market surveillance committee for DAM as an independent body.

A representative of a national utility said because RERA as an association has no enforcement powers it is not necessarily adding value for regional power trading.

There are concerns that a larger role for RERA would decrease national regulatory independence

National regulators are concerned that a more prominent role for the association of RERA might mean reduced regulatory independence and autonomy at the national level:

- A representative of a national regulator said that RERA as an association should recognise that different member regulators have different enabling statutes and mandates. RERA guidelines should therefore be pitched at a level of being "general principles", so that regulators can agree to the principles and apply them accordingly to country-specific requirements
- Another national regulator said that there are discussions about an Inter-governmental MOU for RERA. This regulator said that RERA probably could not make specific recommendations to Energy Ministers on things like market structure, but could present the advantages and disadvantages of different options, and the value of harmonisation.

Interviewees suggested roles for RERA that don't limit national regulatory independence

Interviewees suggested a number of roles that RERA as an association could play without limiting national regulatory independence:

- In our meeting with RERA, potential future roles for the organisation were discussed. RERA is prepared to consider any institutional changes that enhance its capacity to fulfil its mandate, such as a regulatory panel. A regulatory panel could have independent members. Its function would be to help implement non-binding regulatory guidelines, and provide advice on cross-border proposals (such as transmission pricing)
- A representative of another regional regulatory association (AFUR) said that as a voluntary regional association, RERA might issue voluntary regulatory initiatives. He suggested that these might include high-level governance documents and working level guidelines. Possible models for regional regulatory arrangements mentioned were WATRA (West African Telecommunications Regulatory Association), CRASA (Communications Regulators' Association of Southern Africa) and SATA (Southern Africa Telecommunications Association) (an industry body)
- A representative of the SADC Secretariat said that regional power projects involve numerous steps, and a checklist of the requirements to implement regional power projects would be valuable. For example, he noted that, when Botswana undertook the project to bring power from Zambia through Zimbabwe some time ago, there were many issues that needed to be resolved (including rights for air space above the Zambezi river and import conditions for materials). These issues will also relate to proposed power developments today, such as WESTCOR, which will need to deal with resource rights, servitudes, and operating procedures.

B.5 The role of the power pool

The appropriate role for the power pool was also a focus for the stakeholder meetings. There is a common view among stakeholders that SAPP's role is currently limited by the nature of its membership and decision-making being confined to national utilities. This may change as non-utility members are granted full membership status. This governance issues seem to limit SAPP's role to that of a coordination body focusing on technical issues, rather than evolving into a more effective entity making regional power trades happen.

SAPP could play a larger role

There is a commonly-held view in SADC that the SAPP Coordination Centre needs more independence and funding if it is to effectively undertake a mandate of promoting and facilitating regional power projects:

- In 2008 Energy Ministers asked SAPP to help create an enabling environment for regional power investment by developing demand-side management for short term improvements and ensuring that long-term developments proceed
- Because the governance of SAPP is controlled by utilities, SAPP needs a measure of independence if it is to implement projects that are outside the utilities (or may even disadvantage the interests of utility members)
- In more than one meeting the development of the West African Power Pool (WAPP) was discussed. One stakeholder commented that although WAPP appears to have more responsibilities for implementing regional projects, it has a

staff of 30 and a budget in 2008 of US$5.4 million. In contrast, SAPP has a staff of less than 10 and an annual budget of US$745,000.

Facilitation of regional power projects

There was a wide variation in views about the role that SAPP should have in facilitating regional power projects. A number of interviewees were optimistic about SAPP's ability to effectively facilitate regional power projects:

- Utho Capital sees an enlarged role for SAPP that includes updating project feasibility studies, providing initial project structuring, and providing access to standardised PPAs to help mobilise risk capital for regional power projects. This is consistent with the findings of the consultants study reviewed in this Inception Report
- A representative of a national utility said that SAPP should have some role in reviewing the regional impacts of large power developments (load flows, dynamic studies, etc), because utilities are focused solely on assets in their own systems. The utility has asked SAPP to do this on one project, but it has not yet been done
- A number of different interviewees noted that there have already been some successes in SAPP's facilitation of regional power projects. These have included the WESTCOR project, which was initiated through discussions at SAPP meetings, and the ZIZABONA project.

However, other interviewees mentioned reasons that SAPP is not well-placed to facilitate regional power projects. These include the following statements:

- SAPP reports to utility CEOs, likely impeding its ability to pick projects that would provide a net benefit to the region, but might harm the interests of certain utilities
- The intention of the SAPP Pool Plan was to develop a least-cost investment plan for the region. However, a lack of agreement on the plan has meant that SAPP's project list has become a set of national projects, which do not represent a least-cost way of meeting regional power requirements
- SADC utilities are driven by their own commercial interests and therefore cannot develop a realistic least-cost plan for sector development. Accordingly, SAPP as it currently stands is not the right forum for developing a regional plan. Only Governments and regulators can develop national supply/demand plans, which could be aggregated by RERA members into a regional plan
- The WAPP Secretariat has been given a mandate directly from ECOWAS to focus on getting regional power developments built. SAPP has no such mandate
- In the past SAPP has prepared "regional plans" than are little more than shopping lists of projects. For example, the project list presented in 2005 at an investor conference failed to stimulate investment for this reason
- There is a need to address governance structures of both SAPP and RERA as current governance arrangements in SAPP and RERA severely restrict capability of the organisations to play a more constructive role in promoting regional power trading

- SAPP should only become involved in new interconnections and transmission investments once utilities have agreed on technical solutions. SAPP should then help to raise funding for the required studies to develop the investment
- Politics has disrupted the engagement of SAPP in creating a pool plan because government Ministers want to see the projects in their country being developed. The timeframes for the projects in regional priority lists have not been realistic. Utho Capital has also noted the difficulty in getting realistic costs for proposed new projects, which makes prioritisation difficult
- SAPP has focused too much in recent years on trading arrangements and has not played a role facilitating the planning of new generation and transmission facilities
- In the spirit of decision making in SADC, SAPP decisions are expected to be made by consensus. This means that the group of countries will try hard to negotiate unanimous acceptance, but if this is not possible then a measure can proceed with two-thirds acceptance, with only accepting countries implementing the agreement. This means that no country in the region is required to implement any measure they have not agreed to.

One stakeholder said that his organisation views SAPP as a forum for national utilities to exchange information on system performance, and to enable smaller utilities to understand how Eskom operates its system. This view appears to limit SAPP's current role compared to the functions generally undertaken by effective power pools.

Facilitating ongoing regional power trading

Some interviewees see a role for SAPP in facilitating day-to-day power trading arrangements:

- Representatives of utilities and private developers noted that SADC energy flows need to be assigned, billed and payments received. A representative of a utility said that another role for SAPP is to reconcile the effect of inadvertent power flows in a timely manner. Regional utilities and SAPP appear to have lost discipline in this area, and imbalances commonly go uncompensated for extended periods (previously settled on a monthly basis). This will not be acceptable once IPPs are trading in the region, as inadvertent power flows will need to be settled on commercial terms. The DAM will also face challenges in accounting for differences between contracted versus actual flows, and which parties are responsible for imbalances (generators or load)
- A representative of a donor agency that we met with said that the core responsibilities of SAPP should be to coordinate interconnections and manage trading arrangements. SAPP has an especially important role in communicating information on transmission interconnections. There has been a tendency to burden SAPP with additional non-core roles (such as energy efficiency), which should be resisted
- A representative of a national utility said that SAPP has a role in providing information on regional power trading through load flow and dynamic stability studies.

Technical issues and dispute resolution

Some interviewees noted that there are technical barriers to the development of cross-border power projects. Technical issues could potentially be resolved through the use of SAPP's dispute resolution procedures, which have not been tested to date:

- Private developers and national utilities noted recent technical issues in SAPP where the power pool should play an active role. For example, the opening of the interconnection between Zambia and Zimbabwe due to instabilities in Zimbabwe's network (resulting from Hwange outage, SVC outage and lack of servitude clearance). These issues should be monitored and resolved by SAPP. Grid codes exist, but are too restrictive because they are based on first world power systems. The view was expressed that Southern Africa needs a realistic, practical grid code that can be enforced
- A representative of a national utility noted that the SAPP operating members' agreement contains a dispute resolution procedure. This procedure has never been used because members have bilaterally negotiated resolutions to any disputes. The current dispute around the failure of Eskom to deliver 150MW of power from Hwange, Zimbabwe to Namibia due to "technical reasons", may indicate the need for independent monitoring/dispute resolution mechanisms.

One private developer said that transmission is a major issue impeding progress on its current project. He said that the developer is supportive of initiatives to reinforce transmission, but noted that technical issues relating to these investments will still need to be addressed, such as the allocation of losses and how power will be dispatched.

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Appendix C Review of Previous SAPP Studies

C.1 Financing Cross-border Power Developments (Utho Capital)

In an effort to address the power crisis that the region is facing, the SADC Council of Energy Ministers tasked SAPP with commissioning a study on cross-border financing models for regional power projects. The purpose of the study is to review conditions in the region and develop a mechanism to access the pubic funding that is available and attract commercial investment in large-scale, bankable regional power projects. A consortium led by Utho Capital was contracted to complete the study.

Under the sub-headings below we review the relevant background to the study, the problem as defined in the preliminary report, the updated recommendations of the consultants, and the implications for our assignment. As noted in Section 3 of this Inception Report, the work undertaken by Utho Capital has similar objectives to our work to try to resolve the barriers facing cross-border power projects. This similarity in focus is not surprising because both studies respond to the directive given to SAPP and RERA by the SADC Energy Ministers following the energy shortages in the region in early 2008.

In summary, the recommendations made by Utho Capital in the revised report (summary and presentation provided to Castalia in April 2009) are generally consistent with the initial findings of our team presented in this Inception Report. Although it is beyond the scope of our work, Utho Capital's recommendations on reforming the governance arrangements in SAPP would help to enable the power pool to more effectively carry out its functions. The Utho Capital work provides only very general recommendations on regulatory issues, although the principles of cost-reflective tariffs, clear provisions for passing-through power purchases into retail tariffs, and open access to transmission are consistent with our preliminary views on the substance of the regulatory guidelines.

Background

The lack of progress on new power projects relying on cross-border trading motivates the need to consider a regional model to encourage investment in least-cost power projects, and to take advantage of the efficiency provided by a strong regional power pool. The Utho Capital work highlights that the SADC region currently lacks the institutional capacity and the regulatory and financing arrangements to accomplish this.

In particular, the report concludes that:

- The SADC Secretariat lacks capacity to coordinate infrastructure projects. The power project steering committee and power project teams were created to help bring projects to completion. Unfortunately, these bodies lack sufficient capacity or mandate to assist in coordinating and championing regional projects to completion
- SAPP has the technical capacity to serve as a project coordinator and champion, but it currently lacks necessary operational mandate. SAPP was designed to be a trading platform rather than an institution that ensures regional investment and power security. In its current form, SAPP is dominated by utilities and lacks the independence necessary to fulfil a financing mandate.

The March 2009 presentation given by Utho Capital on their work compares the governance structures of the West African Power Pool (WAPP) to SAPP. A major difference identified by the consultants is that in WAPP "the reporting structure is clear with utilities reporting to WAPP who is ultimately responsible for project execution". In contrast, the SAPP Coordination Centre "is not empowered to Act independently of the utilities as its reporting structures are via the utilities".

Problem definition in Utho Capital report

The Utho Capital report identifies the following primary problems in the current financing arrangements:

- **An over-dependence on PPAs and Eskom as the major regional player**. The poor creditworthiness of small power utilities is preventing the mobilisation of funding and driving a dependence on Eskom as the major regional buyer. The currently fragmented bilateral structure of cross-border power trade means that many utilities or countries operating on a single-buyer model are simply too small or lack the strength of balance sheet to engage in a PPA that would make commercial finance viable. As a result, lenders almost exclusively look to Eskom as the only large, credit-worthy off-taker
- **Poor project preparation capabilities.** The report finds that there is a lack of understanding of the commitment necessary to prepare the feasibility and structure of a project before it is presented to potential financiers. This problem is largely a result of weak project sponsors at all levels, which leads to uncoordinated planning and execution of new projects
- **Lack of political will and effective project champions**. The dominant political paradigm is that countries should be self-sufficient before developing power for export. As a result, the economic rationale behind a strong regional power pool is ignored and cross-border projects do not receive the necessary political endorsement at the national level. There is currently no project champion with the appropriate resources and mandate necessary to bring a project to completion. Additionally, the current bilateral structure accents the challenges arising from complex agreements between countries with different political dynamics and competing demands.

The report also identifies the following additional and related, but less emphasised problems:

- **High country and political risk**. Local risk is priced into a project by financiers and makes many projects economically unfeasible
- **Legal and institutional frameworks**. The region lacks a harmonised structure, which prevents coordination and limits the ability to attract project funding based on predictable, coherent institutional arrangements
- **Weak utility balance sheets**. The financial strength of many utilities prevents them from borrowing on their own credit. Often governments are wary of guarantees or government guarantees are not large enough to unlock funding
- **National interests**. Many countries prioritise local energy security and view the region only as a potential export market and, as a result, do not pursue the benefits of a strong regional power pool

- **No cost reflectivity of tariffs**. Countries are moving at different paces toward marginal rates, which affect the ability to secure financing.

It is interesting to contrast the problem definition in this Inception Report to the problems identified by Utho Capital. Although our assignment focuses on regulatory arrangements, rather than financing constraints, our team has diagnoses many of the same underlying investment constraints. In particular, the desire for self-sufficiency and protecting the national interest seems to be limiting the potential for developing even the best generation sites for regional trading.

Recommendations made by Utho Capital

The main recommendation made by Utho Capital is to empower SAPP with the capacity and resources to ensure that regional power projects reach financial close.

The preliminary Utho Capital report sought to develop a mechanism to isolate sovereign risk, so that financing flows to viable projects and not to individual countries (each with particular political dynamics and unique regulatory and legal frameworks). Although the consultants appear to have reconsidered this proposal in their latest presentation, the main features of this proposal are as follows:

- Under the new financing model an empowered SAPP would act as a single buyer and enter into PPAs with project developers
- As the primary power off-taker in the region, SAPP would then sell power to member countries at wholesale cost
- SAPP member countries will take an equity share in regional projects as part of an open call for investors. The allocation of power will then be proportional to equity.

The main stated benefit of this proposal is that by absorbing and spreading the risks associated with individual countries, SAPP will be a more credible buyer. The increased credibility will help attract project developers and commercial finance to the region. The model will also motivate member countries to complete projects and to act as reliable consumers because they have a direct financial stake in the project's results.

We do not know why the consultants are no longer actively pursuing the concept of SAPP as a regional single buyer. However, we consider that the challenges in implementing the suggested model would be immense and SAPP would first need to prove that it has the capacity and resources to undertake the difficult commercial negotiations involved. The more limited recommendation in the report to redefine SAPP's mandate and empower it to prepare and champion projects to completion appears to be a sensible first-step in testing SAPP's capacity to understand project dynamics and progress good regional projects.

In relation to regulatory issues, Utho Capital provides only general recommendations. For example, the latest Summary of Recommendations from Utho Capital suggests ensuring that "an appropriate regulatory framework to address the issues of cross-border trade, cost pass-throughs in PPAs and security of supply for a country that's importing its power from a plant located in another country". As expected, these regulatory issues have been discussed in this Inception Report in detail due to the focus of our work on the role of national regulators.

Implications for our work

The recommendations made by Utho Capital in the revised report are generally consistent with the initial findings of our work. However, we would add the following conditions to expanding the mandate of SAPP:

- SAPP must first be able to adequately fulfil its current mandate, and be assured that the additional resources available will be sufficient to properly undertake SAPP's expanded role
- SAPP's governance arrangements should be reviewed to ensure SAPP is able to make good decisions on the regional power projects to promote
- There is significant uncertainty as to what would be involved in a project promotion role for SAPP. It is also not clear that such a role would provide significant benefits, and may in fact cause unnecessary duplication or confusion.

Although the Utho Capital work provides only very general recommendations on regulatory issues, an expanded mandate for SAPP would likely benefit from some greater regional regulatory guidance or oversight. This function could be provided by the independent RERA Advisory Panel mentioned in this Inception Report. At a regional level, the RERA Advisory Panel would advise on the regulatory issues highlighted as barriers to financing new cross-border projects in the Utho Capital report. These are the principles of cost-reflective tariffs, clear provisions for passing-through power purchases into retail tariffs, and open access to transmission.

C.2 Pool Plan (Nexant) and Priority Projects Lists (SAPP and Utho Capital)

During the last several years there has been interest within SAPP to prepare an integrated regional plan for new generation and transmission developments in Southern Africa. This has been motivated by shortages and concerns over security of supply, and the desire to the reduce cost of developing new sources of supply. This interest has resulted in various lists of priority projects being prepared and an initiative to develop an agreed pool plan for SAPP.

This review focuses on the SAPP Priority Projects List prepared in 2005, the Nexant SAPP Regional Generation and Transmission Expansion Plan Study ("Pool Plan" or "Nexant Pool Plan") and the current work being completed by Utho Capital to prepare a shortlist of bankable regional power projects.

SAPP Priority Projects List

In 2001, the SAPP Planning Sub-committee engaged external consultants to develop an integrated generation and transmission expansion plan for SAPP that would highlight the benefits that could be derived for each member from coordinating individual system expansion plans. However, the assumptions used in this exercise were heavily criticised, and the plan developed was not well-received. To move the process forward, in 2005 SAPP elected to prepare a list of priority projects for the region.

In 2005 the demand for power in Southern Africa was increasing at a rate of 3 percent per year, resulting in a rapidly diminishing level of surplus generation capacity. Recognising that investments in both generation and transmission infrastructure were required to serve increasing demand, SADC Energy Ministers asked SAPP to prepare a priority list of power projects in the region.

To do this, SAPP asked utilities to provide information on the power projects located in their territory. SAPP then evaluated each project based on criteria for selecting and prioritising regional projects. The 2005 priority projects list prepared by SAPP included seven criteria:

- Project size (MW)
- Levelised production cost (US$/MWh)
- Level of transmission integration required
- Regional economic impact
- Percentage of off-take committed at the time of the review
- Expected regional contribution as a percentage of project capacity (including import replacement)
- Number of participating countries.

Each of these criteria received a weighting in order to prioritise the projects. Levelised production costs were given a weighting of 25 percent, while regional considerations (economic impact, regional contribution, number of participating countries) were given a combined weighting of 35 percent.

This SAPP priority projects determined applying these criteria were divided into three categories:

- Rehabilitation and associated transmission projects
- Short-term generation projects
- Transmission projects aimed at interconnecting non-operating members.

The Priority List identified 12 rehabilitation and associated transmission projects (primarily hydro projects), with a total capacity of 1,048 MW and an estimated total cost of US$523 million. All of these projects were expected to be commissioned by 2010. Nine transmission projects were identified to support these rehabilitation projects at an estimated total cost of US$706 million. These transmission projects were intended to reduce congestion and evacuate power to the load centers.

The priority projects list identified a further 12 new short-term generation projects. These included two gas-fired plants, two coal-fired plants, and eight hydro plants with an expected capacity of 4,217 MW and an estimated project cost of US$3,830 million. The criteria for selecting these projects also required that the projects:

- Were expected to be commissioned by 2010
- Had completed feasibility studies
- Had approved environmental impact assessments.

The study identified three planned transmission projects aimed at interconnecting non-operating members at a total cost of approximately US$3,915 million. These projects identified were the:

- Malawi-Mozambique interconnector
- Zambia-Tanzania-Kenya interconnector
- WESTCOR project.

The SAPP list of priority projects represented the first step in a larger process of identifying the most appropriate regional projects for investor financing. However, the approach taken by SAPP did not represent an optimised plan for the development of a regional power pool.

SAPP Pool Plan

In 2006, SAPP and the World Bank asked Nexant to prepare an update of the 2001 pool plan. The main objective of the SAPP Pool Plan study is to develop an integrated generation and transmission expansion plan for the SAPP, and highlight the benefits that can be derived for the members from a coordination of their individual expansion plans. In order to illustrate the benefits of this coordination, the updated Pool Plan presents two scenarios for comparison.

- A **Base Case** incorporating the existing generation and transmission plans of each of the 12 interconnected SAPP utilities. The Base Case takes the existing national development plans as given, and therefore is biased towards the development of domestic supplies. The Base Case does not rely heavily on increased trade between countries, which reflects current economic and political realities and constraints on expanding power trading. The Base Case can be thought of as a plan to meet future demand under a scenario where no progress is made on the financial and regulatory issues facing cross-border power trading.

- An **Alternative Case** that optimises generation and transmission capacity additions assuming free trade, no economic or financial constraints on the expansion of the interconnecting lines and removal of the constraints within the utilities' internal networks. The Alternative Case illustrates the benefits to SAPP members of complete cooperation by comparing outcomes to the Base Case. The Alternative Case has fewer investment constraints that the Base Case, so one would expect it to be significantly lower in cost than the Base Case, and certainly no higher.

Given the assumptions made in the Alternative Case, it may not actually be a realistic plan. It is difficult to conceive that all the investment constraints facing cross-border developments will be lifted during the timeframe proposed for new projects, or that all projects will be developed according to the proposed plan.

Nexant delivered the updated Pool Plan in draft form in November 2007 to present power system plans and benefits derived from each scenario. Following the submission of the draft Pool Plan, Eskom revised its load forecast upward. The revised peak load value in 2025 is about 22,000 MW—or 41 percent—higher than the forecast used for the draft. Eskom's revised generation expansion plan includes two large new coal-fired plants, 19,000MW of new nuclear plants, and many other significant changes. Eskom's forecast and plans are critical to the Pool Plan as it provides more than 80 percent of SAPP's demand and generating capacity. To appropriately reflect these changes, Nexant developed an updated Base Case and an updated Alternative Case, which have been reviewed for this summary.

Input Data

The original SAPP Pool Plan in 2001 was undermined by several flawed assumptions and incomplete data. In any integrated plan, the inclusion of specific individual projects can affect the perception of the plan as a whole. If certain project data is not realistic, readers may be inclined to dismiss the entirety of the plan as based on incomplete or false data. This remains an issue for the Pool Plan prepared by Nexant because many of the projects included in the plan lack a recent feasibility study.

Some inconsistencies and outdated or optimistic assumptions in previous pool plans have been addressed in the Nexant Pool Plan:

- Using common values for the $/KW capital cost or greenfield and brownfield large conventional coal plants
- Delaying the earliest possible operating dates of some projects
- Updating Eskom's load forecast and the capacity and operating dates of committed units
- Analysing scenarios with sensitivities on forced outage rates, the capital cost of nuclear plants, and whether the plants are treated as committed.

Nevertheless, uncertainties and possible inconsistencies remain. Nexant concluded that several key parameters may need to be reviewed, including:

- Capital cost of each project
- Energy generation from hydro plants, average and dry year
- Availability and costs for field-specific gas and coal fuels

- Forced outage rates for all units.

Comparison of Base Case and Alternative Case

The Base Case adds 63,269 MW with emphasis on conventional coal, nuclear and hydro. The Alternative Case maintains the emphasis on nuclear plants, significantly reduces the emphasis on conventional coal, and increases emphasis on hydro and peaking units. The Alternative Case adds 4,760 MW less than the Base Case because it eliminates excess capacity above SAPP's reserve requirements.

Table C.1 lists the plants that are included in both the Base Case and Alternative Case. In the early years of the plan projects are nearly all committed and under way, with few differences between the two cases. The major differences between the scenarios appear towards the end of period considered, particularly in the commissioning dates of new projects and the rated capacity of new developments.

Table C.1: Capacity Additions Included in Base and Alternative Cases

			Capacity Added (MW)		Commissioning Year	
Project Name	**Utility**	**Hydro or Thermal**	**Base Case**	**Alternative Case**	**Base Case**	**Alternative Case**
Zongo-Refurbishment	SNEL	Hydro	75	75	2006-2011	2006-2011
Cape OCGT Phase I	Eskom	Thermal	720	720	2006	2006
Camden De-mothball	Eskom	Thermal	1,140	1,140	2006-2008	2006-2008
Tedzani Refurbishment	ESCOM	Hydro	40	40	2007-2008	2007-2008
Arnot Upgrade I	Eskom	Thermal	100	100	2007	2007
Cape OCGT Phase I	Eskom	Thermal	480	480	2007	2007
Arnot Upgrade II	Eskom	Thermal	200	200	2007-2011	2007-2011
Greetvlei De-mothball	Eskom	Thermal	1,128	1,128	2007-2009	2007-2009
Maguga	SEB	Hydro	20	20	2007	2007
Existing GT Rehabilitation	ENE	Thermal	125	125	2007-2013	2007-2013
TG-12.5	ENE	Thermal	38	38	2007-2008	2007-2008
ENE Diesels	ENE	Thermal	7	7	2007-2008	2007-2008
Benguela	ENE	Thermal	83	83	2008	2008
Capanda II	ENE	Hydro	260	260	2008	2008
Koni Refurbishment	SNEL	Hydro	42	42	2008	2008
Mwadingusha Refurbishment	SNEL	Hydro	36	36	2008-2010	2008-2010
Sanga (near Zongo) Refurbishment	SNEL	Hydro	8	8	2008-2011	2008-2011
Mavuzi and Chicamba Refurbishment	EdM	Hydro	35	35	2008-2009	2008-2009
Cape OCGT Phase II	Eskom	Thermal	1,200	1,200	2008	2008
Komati De-mothball	Eskom	Thermal	909	909	2008-2011	2008-2011
Ubungo	TANESCO	Thermal	100	100	2008	2008
Tegeta - Wartsila	TANESCO	Thermal	45	45	2008	2008

			Capacity Added (MW)		Commissioning Year	
Project Name	**Utility**	**Hydro or Thermal**	**Base Case**	**Alternative Case**	**Base Case**	**Alternative Case**
Kariba North Refurbishment	ZESCO	Hydro	210	210	2008-2009	2008-2009
Hwange Refurbishment	ZESA	Thermal	480	480	2008-2009	2008-2009
TG-20	ENE	T	20	20	2008	2008
Nseke Refurbishment	SNEL	Hydro	62	62	2009	2009
Nzilo Refurbishment	SNEL	Hydro	27	27	2009	2009
Kinyeredzi	TANESCO	Thermal	200	200	2009	2010
Kafue Gorge Upper Refurbishment	ZESCO	Hydro	150	150	2009	2009
TG-40	ENE	Thermal	80	80	2009-2010	2009-2010
TG-60	ENE	Thermal	60	60	2009	2009
Gove Refurbishment	ENE	Hydro	60	60	2010	2010
Inga 2 Refurbishment	SNEL	Hydro	640	640	2010-2014	2012
Kaphichira II	ESCOM	Hydro	64	64	2010	2010
DME OCGT	Eskom	Thermal	1,050	1,050	2010	2010
Kiwira	TANESCO	Thermal	200	50	2010	2010
Morupule B	BPC	Thermal	1,200	300	2012-2015	2012-2015
Inga 1 Refurbishment	SNEL	Hydro	120	120	2012-2013	2012-2013
Medupi Coal MW	Eskom	Thermal	4,230	4,230	2012-2015	2012-2015
Braamhoek Pumped Storage	Eskom	Hydro	1,332	1,332	2012-2013	2012-2013
Kariba North Extension	ZESCO	Hydro	360	360	2012	2012
Cambambe II	ENE	Hydro	260	260	2013	2013
Bravo Coal	Eskom	Thermal	4,800	4,800	2013-2016	2013-2016
Itezhi-Tezhi	ZESCO	Hydro	120	120	2013	2013
Kariba South Extension	ZESA	Hydro	300	300	2014	2014
Songwe	ESCOM	Hydro	340	340	2014-2016	2024
Kudu	NamPower	Thermal	774	774	2015	2024
Steelpoort Pumped Storage	Eskom	Hydro	1,484	1,484	2015-2016	2015-2016
Generic Pumped Storage	Eskom	Hydro	2,968	2,968	2016-2024	2016-2024
Generic Nuclear	Eskom		18,702	18,702	2017-2025	2017-2025
Kafue Gorge Lower	ZESCO	Hydro	750	750	2017	2017-2022
Batoka Gorge	ZESA/ZESCO	Hydro	1,600	1,600	2017	2023-2024
ENE Gas Turbine Plants	ENE	Thermal	300	400	2017-2025	2010-2025
Busanga	SNEL	Hydro	240	240	2019-2022	2025
Mphanda Nkuwa	EdM	Hydro	1,300	1,300	2020	2024
Zongo 2	SNEL	Hydro	120	120	2021	2022
Hendrina Retirement	Eskom	Thermal	-1,895	-1,895	2022	2022
Arnot Retirement	Eskom	Thermal	-2,280	-2,280	2024	2024

All screening analysis used in the study supports the selection of the projects included in the Alternative Case generation expansion plan except 18,702 MW of new nuclear plant.[18] The commitment to these projects in South Africa is driven by the South African Government and Eskom's desire to address climate change, so these projects are considered to be politically and not economically driven. The Pool Plan states that the nuclear units increase costs and reduce flexibility for the SAPP system to accept other resources.

Table C.2 highlights the advantages of the Alternative Case when compared with the Base Case for the SAPP community on the whole.

Table C.2: Advantages of the Updated Alternative Base Case

General Advantages	Financial Advantages
Reduces capacity deficits before 2015	Discounted costs are US$5.2 billion less than the Base Case
Lowers capacity surpluses after 2015	85 percent of the savings come from optimised, lower capital expenditure
Adds a more economically justifiable set of resources to the system	The cost advantages of the Alternative Case are robust because they apply if higher forced outage rates occur or if the nuclear plants are not considered committed
Expands transmission interconnections	72 percent of the discounted cost savings of the Alternative Case could be obtained simply by eliminating the excess capacity in the Base Case.
Maintains adequate reliability	The impact of higher forced outage rates is more than US$8.5 billion for the Base Case and more than US$9 billion for the Alternative Case
Uses approximately the same amount of fuel	Even with higher forced outage rated there is little energy not served when reserve margins in either case meet SAPP requirements
Produces approximately the same amount of emissions	
Results in more than twice the amount of imports and exports of energy throughout the region	

The Alternative Case is better balanced with respect to the overall supply position over time. Early year deficits are less than in the Base Case, and later year surpluses are largely eliminated. An additional benefit of the Alternative Case not mentioned by the Pool Plan Study is that it increases the prospects for lower-cost financing from development agencies for regional projects.

[18] One of the defining features of both cases is that they treat nearly 19,000 MW of new nuclear capacity (in Eskom and other countries) planned to come on line from 2017-3035 The study evaluated scenarios that relaxed this assumption partially (6,000 MW of Grand Inga replacing about 6,000 MW of nuclear) and entirely (no nuclear) and in both scenarios demonstrated dramatically reduced total costs.

Simply eliminating surplus capacity from the Base Case was shown to achieve more than 70 percent of the net savings of the Alternative Case.

The paper goes on to analyse the differences between the scenarios and discuss the results that suggest clear benefits to SAPP from system-wide planning. The source of most of the benefits is identified as:

- Replacing higher cost units with lower cost units
- Eliminating surplus capacity
- Interconnecting ESCOM (Malawi), TANESCO (Tanzania), and ENE (Angola).

Other real benefits include increased protection against inaccuracies in planning assumptions such as forced outage rates, load forecast, and hydro generation.

Perceived disadvantages to greater regional integration could include less self-sufficiency on the part of some utilities, and more reliance on large generation and transmission projects far from load, such as at the Inga site in the DRC.

Transmission Expansion Plan

The Base Case shows a limited number of new transmission interconnections—with an undiscounted cost of US$0.6 billion. The large capacity surpluses from 2015-2025 leave most utilities self-sufficient and limit the need for transactions. Transmission interconnections bring two more SAPP members—Malawi and Tanzania—into the integrated system and slightly improve the transfer capacity of the existing system.

The Alternative Case includes far more interconnection facilities than the Base Case—with an undiscounted cost of US$3.8 billion. The purpose of the additional interconnections is to move power from Inga to Luanda and from Inga to South Africa

The Alternative Case has substantially fewer interconnections than the previous pool plan, because Eskom would be more self-sufficient through new nuclear facilities. This would reduce Eskom's needs for imports and SAPP requirements to transmit power to South Africa.

Utho Capital Shortlist of Bankable Projects

There is general agreement among stakeholders in Southern Africa that finalising the Pool Plan has been particularly challenging. The lack of agreement on the plan has meant that other methods are being explored to move ahead on a subset of projects that would help to ensure medium term security of supply. One initiative is being completed by Utho Capital.

Utho Capital have organised an Investors Roundtable Conference in Livingstone for July 2009 that will be hosted jointly by SADC and SAPP. At this conference ten priority projects will be presented to financiers, who will be asked to provide financial support. The ten projects are being selected based on four criteria:

- **Time to financial close**—this must be possible within a two-year period
- **Least-cost**—based on recent feasibility studies
- **Regional impact**—this means that the project must rely on cross-border trading
- **Environmental impact**—must be understood and managed.

At the date of writing this Inception Report, the ten projects selected using these criteria are not known. We expect several of the projects discussed in Section 3.1 of this Inception Report will be included.

Conclusions

The Pool Plan study suggests that increased integration offers significant benefits to the SAPP community as a whole, and highlights some of the benefits to Eskom in particular.

Nexant identified several key issues that must be addressed before achieving the benefits of the Alternative Case that are not addressed in detail:

- The willingness of utilities to rely on thousands of MW and hundreds of thousands of GWh of imports, some coming from as far as DRC, to meet load plus reserve requirements
- The ability of less creditworthy utilities to finance billions of dollars in generation and transmission capital investments
- Uncertainty in the cost and performance estimates that are the foundation for the calculation of benefits
- The need for transmission system analysis beyond the load flow studies completed by Nexant in order to confirm the Alternative Case transmission interconnection expansion plan.

The study makes three specific recommendations regarding generation additions:

- The most pressing need in SAPP is to reduce or eliminate the forecast shortages before 2014. The most cost effective projects should continue to be pursued or accelerated where possible. These include rehabilitations, de-mothballing, and extensions of existing plants
- Existing feasibility studies should be brought on to a common basis to allow for more reliable comparison of projects, older feasibility studies should be updated, and new studies should be conducted where one does not exist
- The issue of South Africa's committed nuclear plants should be studied in more detail.

Implications for our work

The comparison of the Base Case and the Alternative Case suggests that trading provides substantial benefits, namely that it:

- Reduces total costs by around 10 percent (US$5.2 billion)
- Reduces the future costs of unserved energy by more than US$300 million.

The Alternative Case would also increases the prospects for raising finance for projects in some of the less-developed countries in SADC by providing access to development lending, and potentially involving parties other than financially weak national utilities.

Of note is that in the Alternative Case, all countries are net exporters of power at some point during the timeframe of the plan. This suggests that the expansion of regional trading would still lead to the development of new generation projects that are spread across the region.

C.3 SAPP Market Rules (Nord Pool Consultants)

In March 2006, Nord Pool Consultants was contracted by SAPP to deliver a day-ahead market (DAM) system to manage auctioning of electricity contracts. The market solution provided is based on the systems used in the Nordic market, and German and French power exchanges. The market design is a day-ahead spot market with market splitting to resolve transmission congestion. Nord Pool partnered with Enerweb, a subsidiary company of the South African national utility (Eskom), to provide local support and web client applications.

The SAPP implementation of the DAM would be the first outside Europe and the world's largest in geographic terms (extending over 9.3 million square kilometres).

As a result of the Nord Pool work, SAPP has a trading platform which will allow members to trade day-ahead with each other. The platform will allow members to trade energy for each hour of the next day to potentially offset their own expensive generation, sell surplus generation or make up generation shortfalls. In order to put in an offer to purchase in SAPP DAM a Member has to have sufficient collateral to cover for the DAM purchases. This is to guarantee payments to the seller/s of energy. DAM is currently under going market trials and is expected to go live in the next few months.

This review looks at the principles and settlement mechanism used in the DAM, and considers the implications of this market for our work on the regulation of cross-border power trading in SADC. The information on market principles and congestion management is sourced from the DAM Users Guide, while the main reference for information on the DAM settlements and balancing arrangements is the Draft Balancing Mechanism working paper of December 2006.

Day-ahead market pricing and principles

DAM is a non-mandatory auction-trading model, and is the counterparty in all DAM market trading. DAM is also used as a tool for managing grid congestion. All participants trade on equal terms, provided that they have a physical grid point of delivery or consumption. DAM participants are SAPP members.

The auction-trading model means gathering all bids at the same time and determining a balance price that is valid for all trades, as opposed to other markets that have continuous trading. Prices are determined for all 24 hours for delivery the next day. Participants submit bids that are known only by the Power Exchange (SAPP) and the submitting party. Initially only one bid per DAM area is allowed, but this could be extended by agreement of market participants.

Bilateral contracts have higher priority than DAM trading. Schedules for bilateral contracts need to be entered by the Power Exchange or participants. DAM automatically calculates the bilateral contract schedules per hour and transmission capacity available to DAM trading.

Transmission capacities are entered into a grid model that captures available transmission capacity between DAM areas. These transmission capacities are decided by the border countries and submitted to the SAPP. Transmission capacities can be separately entered for both flow directions, and the capacity in each direction can be different. For each hour, a system price and an area price is calculated. The system price is the price calculated assuming no transmission congestion. If the contractual flow of power exceeds the transmission capacity available for DAM contracts, grid congestion occurs and separate prices are calculated in each area.

The separation points between DAM areas normally reflect potential bottlenecks within a control area and borders between control areas. For example, South Africa has been split into two DAM areas due to the high potential for transmission constraints between the main area of generation in the centre of the country and the Cape area and Namibia. Zimbabwe will also be modelled as two DAM areas.

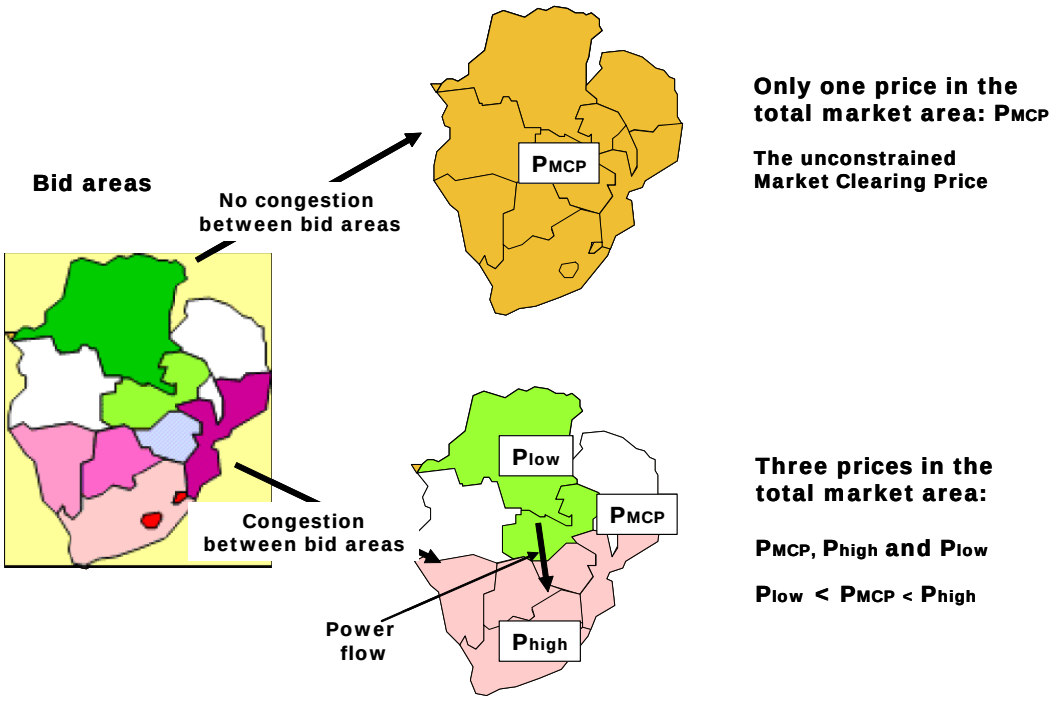
Congestion management

Congestion management is the corner-stone of the DAM price calculation algorithm. Grid bottlenecks are relieved by comparison of the calculated contractual flow with the transmission capacity available for spot trading, and if the flow exceeds the capacity, the prices are adjusted on both sides of the bottleneck so that the flow equals the capacity. If the flow does not exceed the capacity between any DAM areas, a common price is established for the whole system.

The contractual flow between two interconnected areas is the difference between purchases and sales in each area. Accordingly, the flow of power depends on the price level. If the power flow exceeds the capacity at the common price for the whole market, the market is split in a surplus area and a deficit area. The price is reduced in the surplus area (sales > purchases) and increased in the deficit area (purchases > sales). This will reduce sales and increase purchases in the surplus area. In the same way, it will reduce purchases and increase sales in the deficit area reducing the needed flow.

Figure C.1 illustrates an example of the SAPP DAM areas with and without price splitting due to transmission congestion.

Figure C.1: SAPP DAM example with and without congestion



Source: Adapted from Cigre training tutorial on Nordic /European/SAPP markets, Nord Pool Consulting AS, August 2005.

SAPP DAM Governance and Market Monitoring

The SAPP Coordination Centre would be the market operator and run the Power Exchange. DAM governance is currently managed by the SAPP markets sub-committee, and an oversight committee is planned, but not yet established.

The SAPP markets sub-committee[19] has a maximum of two representatives per Member and reports to the Management Committee. The chairperson is elected annually on a rotation basis and has to be one of Operating Members of the National Power Utilities from the SADC Member States. The Chairperson may stand for a maximum of 2 years. Decisions will be made by consensus or, failing this, by a two-thirds majority of the Members present at the meeting, subject however to voting ratios as defined for the Executive Committee. Tie decisions are referred to Management Committee for a final decision.

The functions of the SAPP markets sub-committee are at least:-

- The continued development of an appropriate electricity market for the SADC Region
- The design and recommendation of a suitable market structure for SAPP
- Determine criteria to authorise Members to trade

[19] Inter-Utility Memorandum of Understanding, dated on 8 December 1995, revised 27 April 2007.

- Responsibility to admit and authorise Members to trade, risk management, research and benchmarking.

A SAPP DAM oversight committee is in the process of being developed which is envisioned will monitor market participants and look into issues such as market power and abuse. The structure and proposed make up of the oversight committee is not known at this stage.

SAPP DAM settlements and balancing arrangements

SAPP DAM settlements are done according to day-ahead contractual positions, and are not based on actual power flows. Transmission wheeling charges and losses are also settled as part of DAM settlements.

Imbalances occur when real time power flows are not equal to contracted levels. These imbalances may result from over- or under-generation, or over- or under-consumption.

The existing system within SAPP for dealing with imbalances is an "in-kind" arrangement. Under the arrangement the differences between scheduled energy and actual energy exchanged (referred to as inadvertent energy) is returned during a time period when the additional power provided has approximately the same value as when the power was taken. This approach is inadequate for a modern and efficient power system, and in most other parts of the world imbalances are settled in cash. SAPP has therefore decided to initiate a project to introduce a financial balancing mechanism.

The balancing mechanism project will address the following main areas:

- A detailed identification of issues related to imbalances not covered in the ongoing projects addressing the development of the DAM and transmission pricing/ancillary services market design,
- A proposal for an interim Balancing Mechanism,
- A clarification of additional requirements for a more long term competitive market solution for balancing services,
- A high level description of such a final solution for a competitive balancing market, and
- A schedule for the introduction of different levels of balancing mechanism.

This work is currently ongoing.

Implications for our work

The following implications arise from the process of creating the DAM market rules for the purposes of our work.

- It is good that a well-designed market has been created in Southern Africa for trading power
- Market design unlocks possibilities for members to optimise their day-ahead position. This could be attractive to investors who cannot get full off take through bilateral contracts.
- IPP's and large consumer's membership of SAPP could be restricted by the individual regulators and hence restrict them from trading in DAM. This comes back to the whole issue of SAPP governance and focus.

- However, DAM cannot develop until countries have surplus power to trade. I.e. the power projects that are being seriously considered are not projecting any financial benefit from trading in DAM
- There is a potential for projects to access revenues from DAM but it will take a while for the market to evolve for these revenues to be used to raise finance
- Membership in SAPP and DAM for IPP's is unclear, restrictive and private investors will not be happy with the fact that chairman has to be a utility member and utilities have the majority vote. This could be an inhibiting factor for any investor looking for potential off take from DAM participation.
- There is a proposed oversight committee to "regulate" DAM trading. However the independence and structure of these has not yet been published. How utilities are allowed to trade in DAM is unclear. Will Regulators give an acceptable range for offers and bids, and allowable volumes to be traded on DAM. Are the utilities allowed to make a profit (loss) from DAM trades? Will utilities ask regulators to allow a pass-through to reduce risk to themselves against DAM price volatility.

C.4 Transmission Pricing and Ancillary Services (Power Planning Associates)

The original methodology for transmission pricing in SAPP was a "postage-stamp" charge based on the number of countries involved in "wheeling" power. Under this methodology "wheeling" was defined as power transferred through one or more countries which were not the final point of consumption of the power. The tariff was simply calculated as 7.5 percent of the value of the energy transferred and based on the bilateral price for the energy.

In 1999 a recoverable "rent" on the assets actually used for wheeling was implemented in SAPP, using a MW-km model. Under this approach each transaction is explicitly analysed, and the rent payable is based on historical asset values. This methodology requires that the counterparty is known for each trade.

With the future implementation of the Day-Ahead Market, counterparties to trades will not be explicitly known and hence a change in methodology was required to break bilateral contract dependence. SAPP also required transmission prices to provide an appropriate rate of return on transmission assets, and not the discounted rate provided by the existing methodology. Power Planning Associates were engaged by SAPP to develop a new transmission pricing methodology for the region.

Transmission pricing principles and methodology

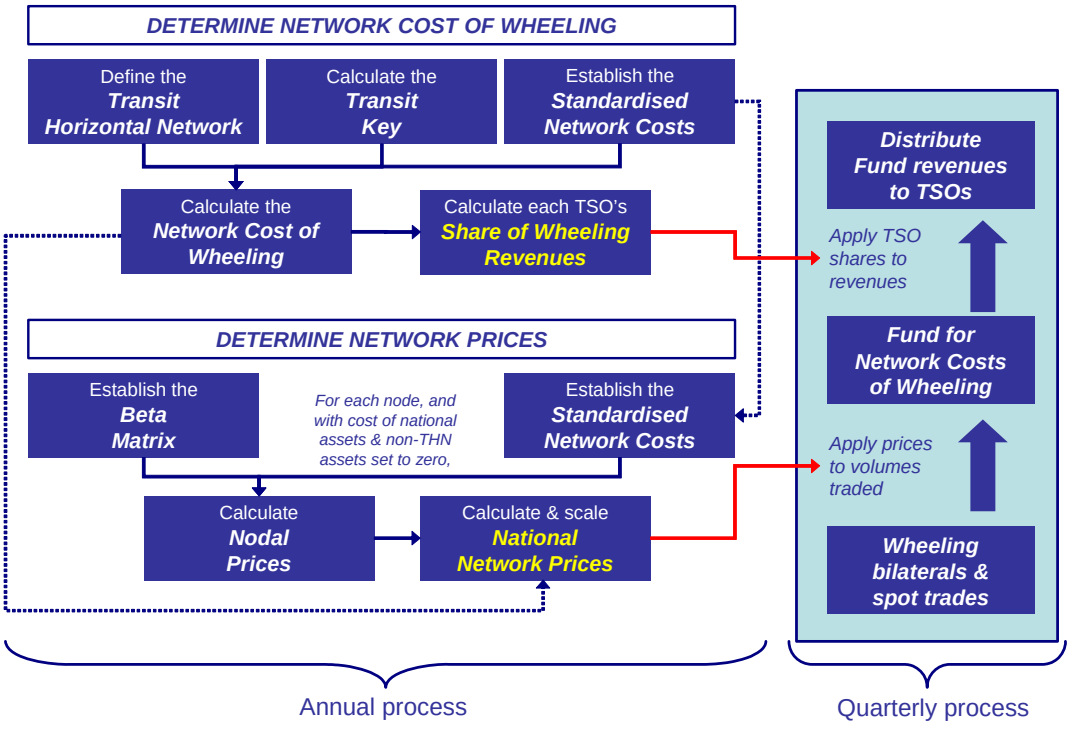
The methodology for transmission pricing in SAPP has the objective of recovering a defined level of revenue for transmission system operators (TSOs) that reflects the proportional use of their assets for wheeling power. This methodology is used in Europe, and is commonly known as the "transit-key" approach. The revenue needs to be recovered from exporters and importers in an equitable way, based on locational pricing signals. This is similar to the zonal methodology (built up from nodal analysis) used in England and Wales, where the zones align with energy market definitions. In the case of SAPP, the zones would be demarcated by country boundaries. This enables charges to be applied independently of identified trading counterparties by having defined "entry" and "exit" prices between zones.

There are two parts to the recommended transmission pricing methodology:

- Determination of the network costs of wheeling and revenue shares per TSO; and
- Determination of network wheeling prices to participants.

Details of the steps involved in the determination of the network costs of wheeling and network wheeling prices are illustrated in Figure C.2.

Figure C.2: Overview of Network Pricing Methodology



In order to determine the network costs of wheeling and revenue shares per TSO, the following steps are undertaken:

- A Transit Horizontal Network (THN) is defined, representing the transmission assets that could potentially be used for wheeling
- The THN is costed for each TSO based on a standard costing methodology incorporating both asset-related and operating costs
- A Transit Key (TK) is defined for each TSO as the ratio of energy that is wheeled to the total energy transported on the network
- The TSO's network cost of wheeling is then calculated as the product of the TK and the cost of the THN for each TSO
- Each TSO's share of revenue received from network charges is then determined as the ratio of that TSO's network cost of wheeling to the total network cost of wheeling (across all TSOs).

In order to determine the network prices to participants, the following steps are undertaken:

- The Nodal Power Transfer Distribution Factor Matrix (Beta-matrix) is formed. This matrix represents the incremental MW flow in each element of the network resulting from incremental injection or extraction at each node. The matrix is formed relative to a reference node that is assumed to absorb or supply increments of demand and generation respectively. Note that the reference node

is selected so that revenues from loads approximate to revenues from generators, i.e. reflecting the electrical "centre of gravity" of the network.

- Each network element is costed using standard costing factors (as per the costing of the THN described above) to provide a vector of unit network costs ($/MW per year).
- For each generator node, the relevant column of the Beta-matrix is multiplied (sum-product) by the vector of network costs and the relevant Transit Key, where the costs of both (a) network elements inside that node's host country and (b) network elements outside the THN, are set to zero. This provides a set of nodal prices relative to the reference node price of zero.
- In each country, a single nodal price for all generators, and a single nodal price for all loads, is determined based on the arithmetic average of all nodal prices in the country.
- The resulting nodal prices ($/MW per year) are converted to energy prices ($/MWh) at an assumed load factor of 100%. The energy prices are then adjusted with an additive component so that the revenue received from network charges (based on the preceding year's wheeling volumes) is equal to the total network cost of wheeling (across all TSOs). The reference node is selected so that approximately 50 per cent of revenue will be received from generators and 50 per cent from loads.

Transmission pricing implementation issues

Two issues have been raised on how the transmission pricing methodology recommended by PPA would be implemented:

- How will the costs of subjecting existing bilateral arrangements to the new pricing methodology be covered?
- Does the transmission pricing methodology provide the correct investment signals to finance merchant transmission investments?

To resolve the first issue, SAPP operating members could enter into hedging arrangements to minimise financial risks.

To address the second issue, the consultants were first asked to adjust the rate of return on transmission assets in the pricing model to ensure that returns are consistent with existing industry benchmarks for merchant transmission investors. However, the recommended methodology will still view an independent transmission line as a wheeling asset in its entirety. This means that regardless of the flow on an independent line, the transmission prices calculated for wheeling over this asset will provide a full recovery of costs (i.e. the Transit Key for the line will be 1). Although the principle behind this calculation is correct, SAPP members are rightly concerned about creating incentives to over-design wheeling assets or locate wheeling assets in the wrong location on the network. Several proposals to overcome this issue have been recommended for SAPP members to consider when evaluating the wheeling revenue for independent transmission assets.

We understand that it remains likely that at least one member utility will not support the transmission pricing proposal developed by Power Planning Associates. If the proposal is rejected then SAPP will have to develop a new methodology for transmission pricing. The

current methodology cannot be applied within the SAPP DAM, and when the DAM goes live all TSOs will require an assurance of fair compensation for the use of their assets.

Review of ancillary services arrangements

Members in SAPP are currently required to maintain minimum requirements for operating reserves, reactive power and black-start capabilities. These requirements are contained in the SAPP Operating Guidelines. In some instances, control areas within SAPP maintain these services on behalf of control areas, and charge for doing this as an ancillary service. Other control areas have been providing these ancillary services for free. For example, Eskom South Africa provides operating reserves for all of the utilities within its control area (which includes Namibia and Botswana).

The main purpose of Power Planning Associates' work on ancillary services was to define a proposed set of ancillary services, and then develop a cost methodology, trading arrangements, settlement procedures and performance monitoring for the defined ancillary services. This work essentially formalised the *ad hoc* arrangements already taking place between operating members.

Proposed ancillary services definitions for SAPP

The five proposed tradable ancillary services for SAPP were defined as follows:

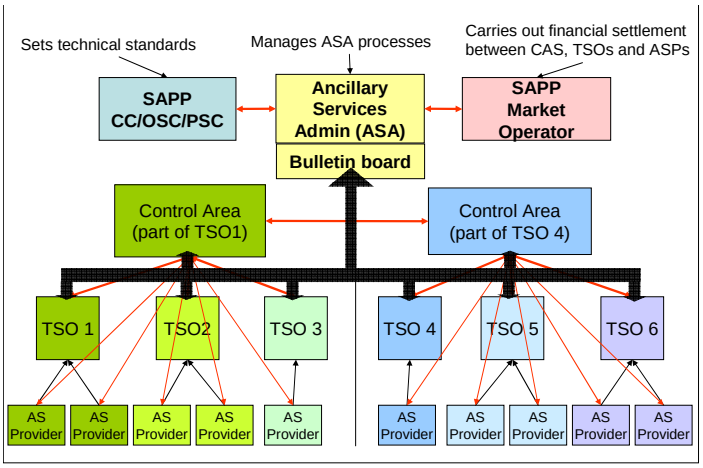
- **Instantaneous reserve** is defined as generation capacity or demand-side managed load that is available to respond fully within 10 seconds in the event of a sudden deviation in frequency outside the allowed limits. This response must be able to be sustained for at least 10 minutes
- **Regulation reserve** is defined as the provision of generation and load response capability, including capacity, energy and manoeuvrability that respond to automatic control signals issued by the system operator. This includes generation that is under Automatic Generation Control (AGC) and can respond within 10 seconds and be fully active within 10 minutes of activation. This response must be able to be sustained for at least one hour. This reserve is used for second-by-second balancing of supply and demand. The reserve is also used to restore instantaneous reserve within 10 minutes of the disturbance
- **Ten-minute reserve** is defined as generating capacity (synchronised or not) or any demand-side managed load that can respond within 10 minutes when called upon, and is available for at least 2 hours
- **Reactive power supply and voltage control** from generators or specialised transmission devices is defined as a service required to maintain transmission voltages in a utility within acceptable limits through production or absorption of reactive power
- **Black start** is defined as the provision of generating capacity that, following a total system collapse (blackout), is able to start without an outside electrical supply and energise a defined portion of the transmission system. This means that the unit can act as a start-up supply for other capacity to be synchronised as part of a process of re-energising the system.

Proposed Trading Arrangements

Most of the benefit in terms of liquidity and tradability in providing ancillary services would be derived from enabling the services to be optimised across the whole SAPP area based on a centralised procurement process. This is the ultimate goal for trading ancillary services in SAPP. However, a second-best solution can be realised through generation and IPPs competing to supply services within their control area. Under this approach, each TSO establishes the optimum local operating arrangements using internal sources of ancillary services and any standing contracted services, and examines opportunities to reduce costs through bilateral contracts.

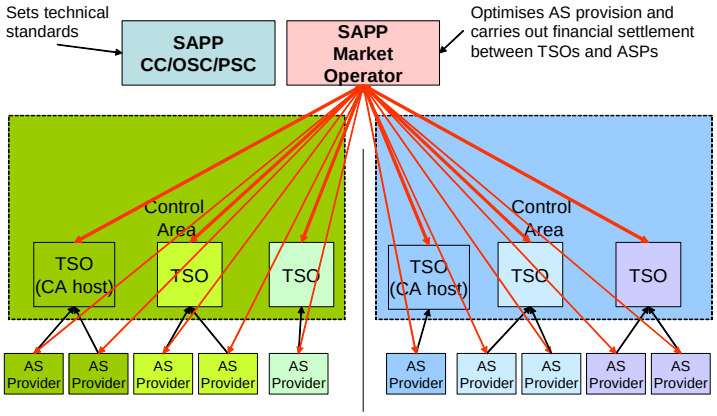
PPA has proposed an intermediate set of trading arrangements to allow trading under an agreed methodology for charging and remunerating for ancillary services within specific market zones, without any central procurement of ancillary services. An additional mechanism has also been suggested to support identifying bilateral trades between TSOs and control areas through a bulletin board administered by the Ancillary Services Administrator (ASA). This arrangement is shown schematically in Figure C.3.

Figure C.3: Intermediate Trading Arrangements for Ancillary Services



The final goal for trading ancillary services under a centralised procurement process is shown in Figure C.3. The migration to central procurement could take place for individual services in turn, with operating reserves an obvious candidate for early centralised procurement.

Figure C.4: Centralised Procurement of Ancillary Services



SAPP has decided to wait for the DAM to start and balancing arrangements to be completed before any more focus is placed on ancillary services. This is the consistent with the order of establishing markets in other areas of the world due to the less-significant financial impacts associated with ancillary services compared to energy trading.

Implications for our work

The following implications for our work arise from the proposals on transmission pricing and ancillary services.

- Currently there is a disparity between national and SAPP transmission charges, such that transmission providers generally have an incentive to charge domestic transmission rates (at least this is what we were told by CEC in Zambia)
- Important to provide appropriate incentives for new transmission investment
- How can SAPP ensure that sensible proposals (like DAM, transmission pricing and ancillary services) are not hijacked in the future? Is there a role for the RERA independent Advisory Panel to move SAPP proposals forward even if the SAPP exec committee can't agree? Independent entities will not rely on current SAPP structures for long term investments due to the power utilities have to make changes. They would much rather prefer long term contracts with the individual utilities they are dealing with.

C.5 Tariff Studies for SAPP Region (CORE Consultants, RERA, Sadelec)

This section reviews studies that have been completed on the processes for setting tariffs and resulting tariff levels in SAPP member countries. Three studies have been reviewed:

- The 2008 RERA "Publication on Electricity Tariffs and Selected Performance Indicators for the SADC Region" prepared by Mrs. Helene Vosloo, Manager – Economic Regulation at the Electricity Control (ECB) of Namibia and Chairperson of the RERA Economic Regulation Subcommittee and EMCON Namibia
- The 2008 SAPP "Study on Tariff Setting Principles and Issues Surrounding tariffs and Electricity Pricing in Southern Africa" produced by CORE International
- "Electricity Prices in Southern and East Africa April 2006 (including selected Performance Indicators)" produced by SAD-ELEC.

The 2008 studies provided the data for this review, while the 2006 Sadelec study was used for historical context to the 2008 RERA study.

How are tariffs set in the SADC region?

The 2008 CORE International study provides the most recent review of tariff setting practices in five SAPP member countries. The study looks at tariff types, distribution, and other fees and subsidies included in the tariff in Lesotho, Mozambique, South Africa, Zambia, and Zimbabwe. Table C.3 provides an overview of the findings of the study.

Table C.3: Tariff Types and Structure in the Five Study Countries

Country	Tariff Type	Distribution Tariff	Other Fees and Subsidies
Lesotho	Revenue requirement	Unified tariff structure with distinct charges for customer categories	Company tax, VAT
Mozambique	Cost plus rate of return	Unified tariff structure with distinct charges for customer categories	VAT
South Africa	Cost plus rate of return plus revenue cap "clawback", multi-year	Price cap for distinct distribution components	Losses, Ancillary
Zambia	Revenue requirement	Unified tariff structure with distinct charges for customer categories	Fees for public broadcasting and rural electrification; VAT, excise and corporate taxes
Zimbabwe	Cost plus rate of return with annual review and intra-annual adjustments	Unified tariff structure with distinct charges for customer categories	Levies for rural electrification and capital development, large users pay VAT

Source: CORE Consultants

The CORE study concludes that:

- The most widely used form of tariff setting in the study countries is to use cost plus rate of return. This method is often supplemented with cost or revenue caps
- Four of the study countries feature unitary tariffs for all customer categories. South Africa is the exception to this with a price cap for distinct distribution components. Three of four countries with unitary tariffs are planning to introduce unbundled tariffs into major business segments within the next two years. Actual unbundling of the systems is expected to follow tariff unbundling, though a timetable has not yet been set
- The cost control methods in use—specifically the cost cap, revenue cap, and price cap—are generally better suited to a relatively static electricity system
- Demand growth and the needs for investment are pushing some of the countries in the study towards a "de facto marginal cost tariff approach." This may be appropriate in countries such as South Africa, Zambia and Mozambique that might otherwise experience significant step increases in tariffs as planned investments come online. The use of marginal cost tariffs has led to tension between some utilities employing them and national regulators that seek to limit utilities' windfall revenues.
- Accounting systems differ significantly in the five countries reviewed. This is likely to complicate any near-terms attempts to harmonise tariffs in the region.

What are the tariffs levels that have been set?

The 2008 RERA "Publication on Electricity Tariffs and Selected Performance Indicators for the SADC Region" includes a comparative analysis of actual tariff levels across the SADC region. The study found that only three of the 14 SADC member countries indicated that their current tariff levels are sustainable. Only eight countries have done cost of supply studies to determine what a cost reflective tariff level should be, and in only three countries has a price path towards cost reflective tariffs been approved. This suggests that while countries have begun to recognise the need for cost reflective tariffs, no effort has been made to reach these cost recovery levels.

Most SADC countries have only determined tariff levels for retail electricity supply. Five countries in the region have separate generation tariffs. Only three countries have separate retail tariffs. The study expressed concern that few of the countries have determined tariff levels for the value chain from generation to retail, and that this raises questions of the accuracy of the countries' cost of supply studies.

In 2007, the most recent year the study reviewed data for, Madagascar had the highest retail tariffs in the region at nearly UC 16 cents per KWh owing to the fact that most of the country's electricity is generated from diesel generators. Mauritius, Tanzania and Angola are the next highest, with tariffs between US 10.5 cents and US 13 cents. Malawi and Botswana had the lowest retail tariffs in the region at US 3.5 cents and US 4.5 cents respectively. Other member countries' rates fell between US 8 cents and US 5 cents per KWh. South Africa's

rates were actually the lowest in the review, but Eskom's bulk supply tariffs were used and were not suitable for comparison with other countries' retail tariffs.

What are the impacts of tariffs on national utilities?

There is limited information in these tariff studies on the overall financial performance of the utilities in the tariff studies reviewed. Only three countries in the SADC region have determined a price path towards cost recovery tariffs. Without further detail on the actual pricing plan, and more detailed financial data from each utility, it is difficult to determine just how far current tariffs are below full cost recovery levels. The studies also question the accuracy of data on the cost of supply.

Full cost recovery throughout the SADC region would also be affected by regional inflation rates that are higher generally than in the rest of the world. The rate of regional inflation increased from 6.5 percent in 2006 to 7.8 percent in 2007. To accommodate this many countries allowed their utilities to increase tariffs in 2007, but few of these increases were sufficient to counteract the high rates of inflation. In countries such as South Africa, Swaziland, Malawi, Mauritius and Botswana the impact of real revenue growth was negative, suggesting that the tariff increases would note have been adequate to lead to cost recovery in the short term.

We understand that regulators in South Africa and Zambia are currently completing tariff reviews. The outcome of these reviews will be considered in our work.

Appendix D Review of National Legislation

In proposing regulatory guidelines for cross-border power trading in the SADC region, it is important to understand the legal powers, duties and responsibilities of national regulators, government Ministries and other entities responsible for electricity imports and exports. This review of relevant national electricity sector statutes in five SADC countries provides an initial assessment of how the legal framework for sector regulation impacts on the regulatory guidelines. This review also evaluates the flexibility provided in the statutory language, and highlights differences between the laws in each country.

This review focuses quite narrowly on the issues in national legislation and the legal framework relating to cross-border power trading. In particular, this review concentrates on three important issues in our work:

- How does national legislation impact on the ability to develop the new generation and transmission facilities required for future electricity imports and exports?
- How are national regulators empowered to make decisions that are consistent with expanding regional power trading?
- Would national regulators be able to implement regulatory guidelines on power imports and exports?

In addition to reviewing the national legislation, we have asked for access to the relevant licences issued to current market participants. This is particularly useful for transmission licences, which will contain important details on how principles of open access and non-discrimination are applied in practice.

D.1 Summary of Main Findings

Our review of national legislation finds that the need to obtain licences to carry out all the various activities in the electricity is clearly prescribed. Each of the five countries in Southern Africa considered in the review has a licensing regime. Four of them explicitly envisage licences for the import and export of electricity. The advantage of this is that the licence conditions can be tailored to the regulatory needs in relation to each buyer and seller, and each network owner, operator and user. The disadvantage is that there may be existing licences that have conditions that may not be consistent with regional power trade that would need to be changed. This calls into question the mechanism for changing licences which is a sensitive issue with licensees, for obvious reasons.

In countries where a national regulator has been established (South Africa, Zambia and Namibia), the regulator has an ability to adopt and implement guidelines on imports and exports. However, where no regulator exists (Botswana and Mozambique) it is less clear how the guidelines could be adopted, implemented or ultimately enforced.

The respective duties and powers of national regulators and government Ministries under the laws differ across the countries reviewed. In South Africa and Zambia the regulator has more independent decision-making abilities, whereas in Namibia the legislation preserves Ministerial approval for most regulatory actions.

Table D.1 summarises whether the legislation in each country addresses the main requirements for effective cross-border regulation and the implementation of regulatory guidelines. A tick represents a positive indication in the law that the requirement is met. An empty cell indicates that the requirement is not explicit in the law, although it may be achieved under licence conditions or through the practices adopted in each country.

Table D.1: Summary of Review of National Electricity and Regulatory Laws

	Main requirements	Botswana	Mozambique	Namibia	South Africa	Zambia
1.	No restrictions on imports/exports	√	√	√	√	
2.	Regulator or Minister empowered to regulate in a manner that facilities imports/exports	√ (by implication)	√	√	√	
3.	Regulator or Ministerial duties are consistent with regional power trade		√			
4.	Regulators able to adopt and implement common guidelines			√ (Ministerial approval required)	√	√
5.	Status and enforceability of guidelines would be clear			√	√	√
6.	Regulator/Minister empowered to impose appropriate licence conditions	√	√	√	√	√
7.	Licence conditions can be changed to accommodate new guidelines			√ (non-price terms)		
8.	Mechanism to enforce licences and regulatory rules is in place	√		√	√	√

	Main requirements	Botswana	Mozambique	Namibia	South Africa	Zambia
9.	Third party access to networks is in place	√ (subject to licence provisions)	√ (limited to existing technical capacity)	√ (limited to existing technical capacity)	√	√ (provisions for "common carriage")
10.	Prices and terms of service for connection, use of system and wheeling are regulated	√	√	√	√	√
11.	Regulator/Minister can obtain the necessary information					
12.	No obvious provisions that may deter investment (e.g. loose provisions allowing for revocation or suspension of licences or changes in permitted tariffs)	√ (Revocation/ suspension can be appealed)	√	√		
13.	Clarity as to the licensing principles and procedures		√		√	
14.	Tariffs for imports/exports cannot be changed by regulator			√		

D.2 National Legislation Must be Enabling

We would not expect legislation to contain a great deal of detail on issues of regional power trading. It is appropriate for the detail to be contained in the licences and, if appropriate, in generic regulatory rules. Instead, we would expect the legislation to provide the framework to enable good power projects (including cross-border power trading) to be developed.

The legal framework for regulating cross-border power trading will be effective if it:

- Allows for, envisages or does not restrict imports and exports
- Establishes and empowers a regulatory agency to regulate in a manner that will facilitate or will not restrict imports and exports
- Imposes duties and powers on the regulator that are consistent with regional power trade and that do not deter investment (whilst at the same time protecting consumers)
- Would enable the regulator to adopt and implement a common set of guidelines on regional power trade (and to communicate how guidelines will be adopted and implemented)
- Does not make the status of the guidelines and their enforceability unclear, and provide a mechanism for enforcement
- Enables the regulator to impose appropriate licence conditions in the licences of all participants such as buyers, sellers and network owners and operators in order to facilitate regional power trade (and to delete or avoid any conditions that are inconsistent)
- Provides mechanisms for licence conditions to be changed (even if the mechanism appears in a licence or regulatory rule) so that the guidelines can be implemented and not be defeated by the terms of a licence
- Provides a mechanism for the enforcement of licences and generic regulatory rules and procedures
- Empowers the regulator to make any necessary or appropriate generic regulatory rules (or the government to do so in secondary legislation if that is what the primary legislation or the constitution requires) for the implementation of the guidelines
- Allows for third party access (connection, use of system and wheeling) in relation to interconnections, transmission and distribution lines and networks and the regulation of prices and terms of service (often this is done through appropriate licence conditions)
- Enables the regulator to obtain and disseminate the necessary information.

The power sectors in Southern Africa are based on licensing regimes. It is therefore important to understand what a licence is in a regulatory context, and how a licence contrasts with a concession, as both of them contain regulatory requirements.

A licence is nothing more than a blank sheet of paper on which the detailed rules of the regulatory regime can be written, in simple and understandable language that is tailored to

the particular regulatory requirements for each industry participant. The advantage of putting regulatory provisions in a licence is that it avoids entrenching detailed regulatory rules in primary and secondary legislation, which can be very difficult to change. Licensing also avoids the need to attempt to write generic rules on a "one-size-fits-all" basis, which is difficult in countries where there are very few participants in the same category.

The legislation will typically say nothing more than it is an offence to carry out a certain activity (generation, transmission, distribution, export, import) without a licence. It will then empower the regulator (or the Minister of Energy) to issue the required licences and attach any appropriate conditions to the licence. The conditions contained in transmission and distribution licences can be quite extensive, going beyond prices and quality of service into planning and working of the market and the system. This reflects the natural monopoly characteristics of these functions. In contrast, generation licences tend to be more straightforward.

There can be wide discretion in the design and application of conditions of licences, subject to some over-arching general duties and protections against abuse of power. In some countries, not all activities in the electricity industry require a licence because there is little to regulate. For example, generation licences often have little more in them than an obligation to comply with the Grid Code (and market rules, if any), to provide information and to pay a fee to the regulator. If there is a power purchase agreement in place with a single buyer, the agreement may be self-regulating. The licence may or may not be time limited.

Most countries in Southern Africa require "licences", while others (such as Mozambique) refer to "concessions". The concept of regulation by licence comes from the English common law system. The concept of a concession comes from the French system of administrative law. A concession may have similar regulatory requirements as those contained in a licence relating to prices and quality of service. Typically, the concession will also grant the right to take possession of relevant assets (that are usually vested in the state) and to exploit the assets for the period of the concession. Alternatively, the concession may act like a permit to undertake the activity or carry on the business for the concession period. It will also regulate how investment is to be made and remunerated.

D.3 Review of National Laws in Selected SADC Countries

To evaluate the legislation in Southern Africa for the purposes of our work, we have selected the five countries that our team visited in April 2009 for this assignment. This enables us to apply some important context of how the laws are being applied in each sector. The countries also represent a mix of electricity importers and exporters, which is useful in understanding the different issues of importance within the region as a whole.

We have reviewed the following national statutes:

- Botswana Electricity Supply Amendment Act, 2007
- Mozambique Electricity Law 1997
- Namibia Electricity Act, 2007
- South Africa Electricity Regulation Act, 2006
- Zambia Electricity Act 1995 and Energy Regulation Act 1995.

In this section we provide excerpts from the primary legislation in each country surveyed that are most relevant to our work on regulation of cross-border power trading. These excerpts are then briefly analysed against the benchmark of an enabling legal framework discussed in Section D.2 above.

Botswana

The following provisions of the Botswana Electricity Supply Amendment Act, 2007 are particularly relevant for our review.

- The stated purpose of law is to authorise the creation and licensing of IPPs
- Licences are required for generation, supply, transmission, distribution, export and import above 25kW capacity (section 3)
- The Minister shall issue a licence that may contain terms on applicable tariffs, compliance with technical standards and any other matters. The requirements for obtaining a licence are not explicit (section 5)
- Licence can be suspended for non-compliance with licence terms, contravention of the Act, "as may be necessary in the public interest" (section 8). Assets then transferred to Ministerial nominee, with compensation according to public works legislation (section 10)
- Appeals to High Court are available on decisions of the Minister not to renew, transfer or modify a licence, or to suspend or cancel a licence (section 11)
- Access to transmission and use of transmission owned an operated by BPC on terms and conditions set out in licence (section 9).

Botswana currently has no regulator in place, with the Ministry of Minerals, Energy and Water Affairs responsible for all Government activities in the electricity sector. This creates a potential conflict between the Ministry's role in negotiating new power developments (such as through the Mmamabula Coordinating Unit), and later reviewing the terms of deal from a regulatory perspective to protect consumers. In most situations, the interests of the Ministry to pursue the development of national resources for power generation will align with the Ministry's responsibilities to keep electricity prices fair and reasonable. However, where these interests conflict it could make it difficult to adopt and implement common guidelines.

The Act also confers wide Ministerial powers to cancel licences "as may be necessary in the public interest". In some countries, this provision would cause serious concern that the investments made by private investors would be vulnerable to expropriation. However, in Botswana the provision appears to cause less concern, as evidenced by the willingness of private investors to contribute risk capital of US$50 million to the Mmamabula project.

Also of note in the wording of the legislation is that access to transmission is not guaranteed as open and non-discriminatory, but the terms of access are stipulated in BPC's transmission licence. We have not seen BPC's licence, although we expect it to contain principles of open access and non-discrimination.

Mozambique

We understand that the Mozambique Electricity Law 1997 is currently under review as part of the Energy Reform and Access Programme. This review may address many of the issues described in this review.

The following provisions of the Mozambique Electricity Law 1997 are particularly relevant in our review.

- Law applies to all supply of electricity, including imports and exports (article 1)
- Independent regulatory entity (CNELEC) established, responsible for resolving disputes on market entry, supply, pricing, access (article 7)
- Role of CNELEC to "pronounce on policies… express opinions, pronounce on and propose regulations… express opinion on proposals concerning new projects… develop proposals on [electrification]…" (article 8)
- Concessions required for generation, transmission, distribution and marketing, including import and export (article 9). The requirements for obtaining concessions include:
  - Benefits exceed costs (including economic, social and environmental)
  - Any costs to third parties and the environment are compensated
  - Applicable tariffs are fair and reasonable
  - Supply takes place within framework of existing grid (the meaning of this requirement is unclear)
  - Term must be specified (i.e. not a concession in perpetuity)
  - Other factors must have been taken into account, including the balance between supply and demand, development of future demand, availability of alternative supply, coverage of demand and cost-effectiveness of energy efficiency
  - Concessionaire has proven qualifications and technical and financial capabilities
- Private investment in transmission is permitted (article 14)
- Power transmission operator may not deny the use of electric facilities by other concession operators or consumers for the purpose of transmitting power, provided that sufficient technical capacity is available (article 20)
- Access to be provided without discrimination and under conditions comparable in terms of price and quality to those of the power transmission service provided by the concessionaire (article 20)
- Transmission tariff to be cost based and subject to review by the "competent authority" (article 20)
- Concessions can be cancelled for serious non-compliance with agreement or law
- Council of Ministers responsible for regulating the implementation of the provisions established by the law (article 42)
- Mozambique will continue to take part in international organisations and events in the electricity sector and contribute to investments at a regional level with a view to the energy capabilities of the country.

A limitation of the existing legal framework in Mozambique is that the regulator entity (CNELEC) has not yet been given the power and duties usually expected of a regulator. CNELEC currently only has a duty to pronounce and express opinions. The actual substantive regulation appears to be left to the Council of Ministers, according to article 42. We understand that this arrangement reflected a desire to build capacity and experience within CNELEC to undertake regulatory responsibilities, and that the current review of the Law will provide substantive regulatory functions to CNELEC.

It is interesting to note that the conditions for obtaining a concession are relatively explicit. This is likely to be because the legal tradition of concessions in the French administrative system conferred more property rights than a licence (as discussed above). The conditions nevertheless provide a greater level of transparency and certainty for investors because the broad conditions for obtaining a concession are known. The criteria in article 9 of the Law seem reasonable—to ensure that project benefits exceed costs, that fair and reasonable tariffs are implemented and that technical competence is assured. These conditions may provide a good reference point for the regulatory guidelines for cross-border trading.

We also note the high-level commitment contained in the Law to continue to participate in international electricity sector organisations, which would include SAPP. The pledge in the Law to contribute to investments at a regional level is constructive, and is consistent with the large potential for energy exports from Mozambique.

Namibia

The following provisions of the Namibia Electricity Act, 2007 are particularly relevant in our review.

- Electricity Control Board (ECB) established to exercise control over electricity supply and consumption, ensure efficiency and competition and to promote private sector investment (section 3(1))
- ECB may make rules and codes (safety and grid codes) dealing with the establishment, operation and administration of electricity markets that once approved by the Minister can be Gazetted as regulations (section 3(4))
- ECB may issue guidelines to enhance the understanding of rules or codes (section 3(5))
- Minister issues with licences on recommendation of ECB (section 3(2))
- Separate licences are required for generation (over 500kW), trading, transmission, supply, distribution, import and export (section 17(1))
- Licences must specify the activity, area for the licence, conditions and tariffs (if applicable) (section 17(8))
- Minister, on recommendation of Board, can change non-price terms of a licence after a cost-benefit analysis of the change and after hearing the representations of the licensee (section 24(3))
- Generally tariffs charged by licensee will be according to licence terms, but can be reviewed on application by the licensee (section 27). This does not apply to imports and exports unless in the public interest (section 27(4))

- Transmission and distribution licensees must provide access to all existing and potential users of the transmission and distribution networks, provided sufficient technical capacity exists (section 30(1))
- ECB entitled to set standards on quality of supply after consultation with the Minister (section 44(1)).

The Minister responsible for energy is given the power to finally approve licences and rules. The regulator makes recommendations on licences and can make rules approved by the Minister, which presumably extends to rule-making for imports and exports. The legal framework clearly confers less final decision-making powers to the regulator than in other jurisdictions. However, the regulator should still be able to adopt and implement regulatory guidelines for cross-border trading, providing that the Minister agrees with the value of the guidelines.

The Act contains a requirement to provide access to all existing and potential users of the transmission and distribution networks. However, from our discussions with industry participants the exact legal requirements for supply are not clear. We understand that the government has declared that NamPower is the single-buyer, but the regulator believes the Act requires it to promote competition and is actively exploring the option of a modified single-buyer whereby IPPs could export directly across borders without going via NamPower. This reflects some confusion on the role of the national utility under the Act, which could impact on cross-border trading.

South Africa

The following provisions of the South Africa Electricity Regulation Act, 2006 are particularly relevant in our review.

- Regulator must consider applications and may issue licences for operation of generation, transmission and distribution facilities, import and export of electricity and trading (sections 4 and 8)
- Regulator must regulate prices and tariffs (section 4)
- The Regulator shall issue rules designed to implement the national government's electricity policy framework, the integrated resource plan and the Act (section 4)
- Licence applicants are free to discuss the contemplated operation of generation, transmission and distribution facilities, imports/exports, trading with the regulator prior to filing a licence application. The regulator must furnish required information to the applicant (section 8(3))
- Possibility to move from licence regime to registration regime (section 9)
- Licence applications must include:
  - A description of the applicant including related parties involved in electricity sector
  - Required documentary evidence
  - Description of the proposed facility
  - General description of the customers served and tariff principles applied

- Evidence of compliance with any integrated resource plan applicable, and reasons for any deviation from the plan (section 11)

- Separate licences are required for (a) operation of generation, transmission and distribution facilities, (b) the import and export of electricity, (c) trading (section 14)
- Licence conditions imposed by regulator may include tariffs and tariff setting principles, performance targets and quality standards, exclusive rights (section 15)
- Tariffs are determined by regulator. Tariff principles:
  - Must enable an efficient licensee to recover full costs, including a return on margin
  - Provide incentives for continued efficiency improvements
  - Provide information to end users on costs imposed on licensee
  - Avoid undue discrimination (but some cross-subsidies are allowed (section 16)
- Licensee may not discriminate between customers or classes of customers regarding access, tariffs, prices and conditions of service, except for objectively justifiable differences approved by the regulator (section 22(2)
- Transmission and distribution licensees must, to the extent provided in the licence, provide non-discriminatory access to the transmission and distribution power systems to third parties. The licence must stipulate the conditions on which access will be allowed or refused, and the strengthening or upgrading of the power system that would be required to accommodate access and how the costs would be recovered from users (section 22(3))
- Minister may, in consultation with the regulator, determine new generation capacity required, determine type of supply required, require competitive tendering for new electricity supply and provide for private sector participation (section 46(1))
- The Minister has such powers necessary to issue guarantees, indemnities or securities that bind the State to future financial commitments necessary or expedient to develop, construct, commission or effectively operate generation (section 46(2))
- Regulator may make guidelines after consultation with licensees and other stakeholders (section 47).

The South African legislation contains strong empowering provisions for the regulator. The South African regulator is explicitly able to adopt and implement guidelines. The licence information requirements and tariff principles are clearly specified and the requirement for open access to transmission and distribution is clear (subject to any contrary statements in the licence).

The Act also contains an explicit provision for the regulator to be involved in process of developing new facilitates. Under section 8, licence applicants are free to discuss the contemplated operation of generation, transmission and distribution facilities, imports/exports, trading with the regulator prior to filing a licence application. This is

important because the Act envisages a constructive role for the national regulator in engaging with potential investors, prior to having finally negotiated the terms of their investments. We would propose to reflect this principle in the regulatory guidelines.

The Minister of Minerals and Energy has a key role in planning to determine the type of supply required, require competitive tendering for new electricity supply and provide for private sector participation. We understand that the Department of Minerals and Energy has recently released draft guidelines on rules for competitive procurement of new power supplies. The Minister also has the powers necessary to issue guarantees, indemnities or securities that bind the State to progress new power sector developments. However, the implementation of these powers would depend on current Government policies and practices. For example, in the past the Government has not guaranteed the financial obligations of Eskom.

Zambia

The following provisions of the Zambia Electricity Act 1995, Energy Regulation Act 1995 and the 2003 Amendment to the Energy Regulation Act are particularly relevant in our review.

- Minister may declare any transmission line to be a "common carrier" (section 4(2), Electricity Act). The 2003 Amendment revises the definition of "common carrier" to include an electricity transmission or distribution line declared as a "common carrier" under the Electricity Act (section 2(a), Energy Regulation Amendment Act)
- Charges for supply are determined in accordance with licences (section 7, Electricity Act). The national regulator has the responsibility of licensing all undertakings (section 6, Energy Regulation Amendment Act)
- ERB responsible for granting licences to undertakings taking into account:
  - the extent to which the public interest will be served
  - the merits of any objection (section 11, Energy Regulation Act)
- The powers of the Minister to penalise licensees are limited by the Energy Regulation Amendment Act, although the Minister retains the power to approve import licenses (section 11(a(ii)), Energy Regulation Amendment Act).
- Regulations may be issued by the Minister for security of supply, standards, and other matters (section 30, Electricity Act)
- Regulator (ERB) responsible for monitoring efficiency and performance, dealing with complaints, making rules and orders for effective regulation (section 6(1), Energy Regulation Act)
- The Energy Regulation Amendment Act expands the role of the regulator to develop and implement rules to promote competition in the energy sector (section 5(f(ii)), Energy Regulation Amendment Act).

The regulatory regime for electricity in Zambia is the oldest sector-specific regime for electricity in Southern Africa. Perhaps because the legislation was drafted in 1995, the provisions are not always clear and contain terms that differ from other statutes in the

region. For example, the Energy Act refers to a Ministerial power to declare "common carriage" on a transmission facility. It is not clear whether this designation confers rights of open access on third parties wishing to access that transmission facility.

The regulators powers under the Energy Regulation Act are quite broad, including an ability to make rules for effective regulation for the sector. This would include adopting and implementing regulatory guidelines. The criteria for obtaining licences are also relatively broad, simply weighing the public interest against the merits of any objections.

D.4 Issues to be Addressed in Regulatory Guidelines

From this review of legal frameworks in SADC countries we have prepared an initial list of the issues that the regulatory guidelines will need to focus on. This list is similar in many respects to the Appendix to the Terms of Reference that highlights a set of issues for the regulatory guidelines:

- **Restricting entry for generators**—What powers and duties exist for issuing permits and licenses for new generators?
- **Restricting entry for transmission providers**—What powers and duties exist for issuing permits and licenses for new transmission?
- **Regulating access to transmission**—What powers and duties exist for ensuring that potential generation and load has access to transmission facilities?
- **Regulating PPA prices and terms**—What review powers do national regulators have? Are these power ex-post or ex-ante? Is the regulatory review the same for all power purchases regardless of where the generating plant is located? Do limits exist on the maximum permissible import volumes?
- **Principles for cost pass-through—**How will decisions be made on the pass-through of power purchase costs into retail electricity tariffs?
- **Regulating transmission prices**—What powers and duties do regulators have in relation to transmission pricing for cross-border power deals?
- **Restricting who can buy power**—Are large users allow to buy power from IPPs located outside the country? What does "single buyer" mean in practice? What prudential requirements are necessary for buyers?
- **Ensuring national benefits from resource use**—Are there any requirements to sell a certain proportion of supply within the country where the plant is located?
- **Ensuring security of supply**—Who is responsible for power reliability in each country/service area? Who assesses the impact that power trades will have on national and regional transmission system operation and power reliability? What supply safeguards exist in the SAPP agreements?
- **Rationing power in emergencies**—What happens in supply shortfalls? Are domestic and export customers treated equally with respect to curtailing power?
- **Ongoing system operations**—How is the system currently operated with respect to dispatch, load shedding, balancing, ancillary services? How are disputes currently resolved?

- **Access to information that regulators need—**How do regulators access information from sector participants to effectively undertake their powers and duties?
- **Regulating access to information**—Should the terms and conditions of cross-border PPAs or other trades be made public by the regulator?
- **Obligations to expand capacity**—Is there an obligation to expand capacity in countries (such as Mozambique and Namibia) where transmission access is limited to existing transmission capacity?
- **Development and oversight of technical and operating rules**—How are grid codes and market rules developed?
- **Congestion management—**How are decisions made on the management of transmission congestion and constraints?

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