

SAPP Membership and Operations

SAPP Coordination Centre



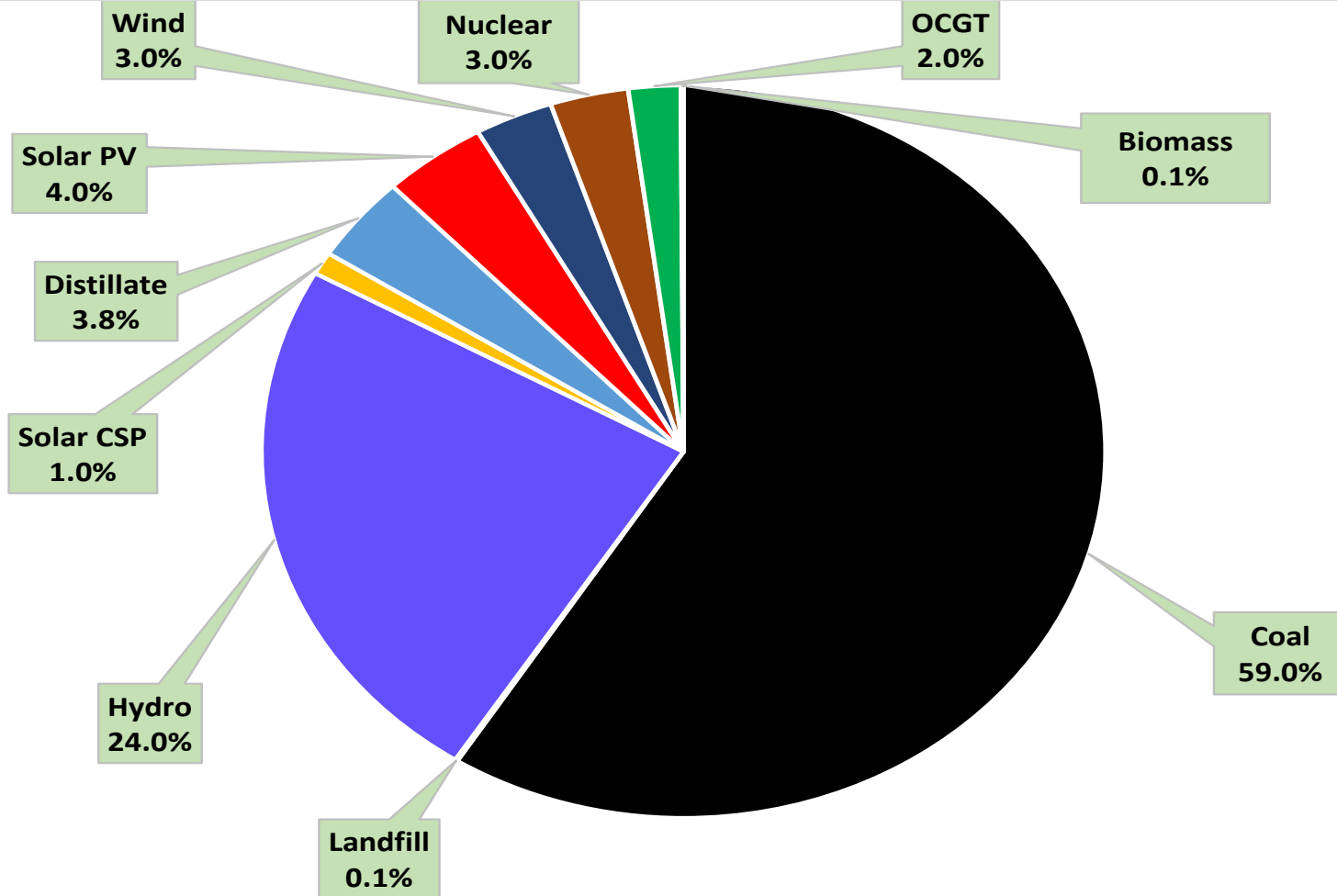
28 August 2023

SAPP Objectives

- Provide a forum for the development of a world class, robust, safe, efficient, reliable and stable interconnected electrical system in the southern African region.
- Coordinate and enforce common regional standards of quality of supply, measurement and monitoring of systems performance.
- Harmonise relationships between member utilities.
- Facilitate the development of regional expertise through training programmes and research.
- Increase power accessibility in rural communities.
- Implement strategies in support of sustainable development priorities.



Generation Mix in SAPP - 2022



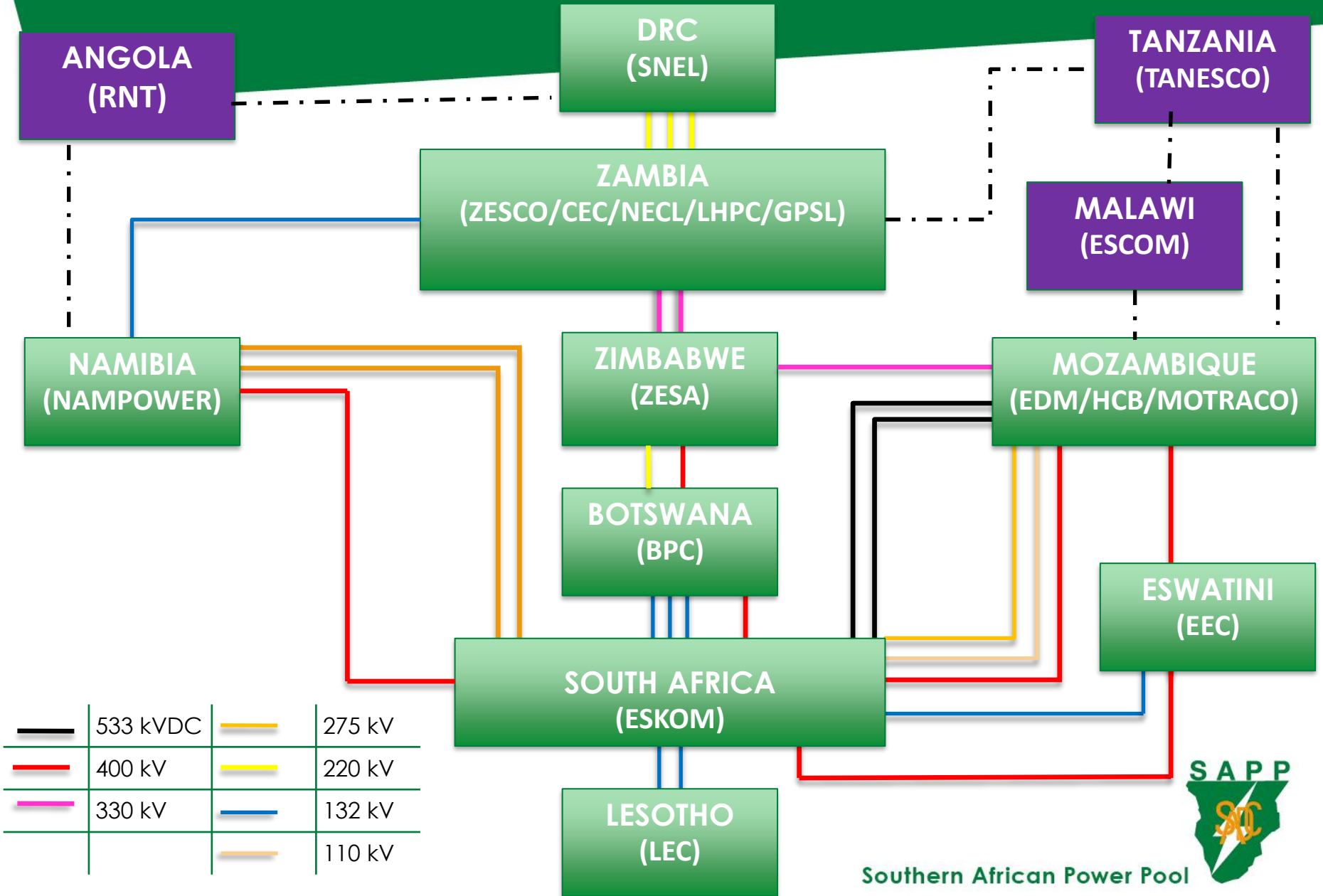
■ Coal ■ Landfill ■ Hydro ■ Solar CSP ■ Distillate ■ Solar PV ■ Wind ■ Nuclear ■ OCGT ■ Biomass

SAPP Demand and Supply Situation - 2023

Country	Utility	Installed capacity (MW)	Operating Capacity (MW)	Current Peak Demand (MW)	Peak Demand Plus Reserves, (MW)	Capacity Excess/S hortfall (MW)
Angola	RNT	6,020	4,947	2,303	2,803	2,144
Botswana	BPC	892	630	634	701	-71
DRC	SNEL	2,819	2,096	4,213	4,522	-2,426
Eswatini	SEC	71	65	226	259	-194
Lesotho	LEC	74	70	198	213	-143
Malawi	ESCOM	506	330	351	380	-50
Mozambique	EDM/HCB/ MOTRACO	2,796	2,642	1,948	2,240	402
Namibia	NamPower	624	370	695	765	-395
South Africa	Eskom	60,326	28,372	33,854	37,443	-9,071
Tanzania	TANESCO	1,822	1,741	1,402	1,612	129
Zambia	ZESCO/CE C/ LHPC/NEC L/IPP	3,493	2,650	2,406	2,589	61
Zimbabwe	ZESA	2,771	1,952	1,922	2,118	-166
TOTAL (All)		82,214	45,865	50,152	55,644	-9,779
TOTAL (Operating Members)		73,866	38,847	46,096	50,849	-12,002

Regional power deficit situation is huge

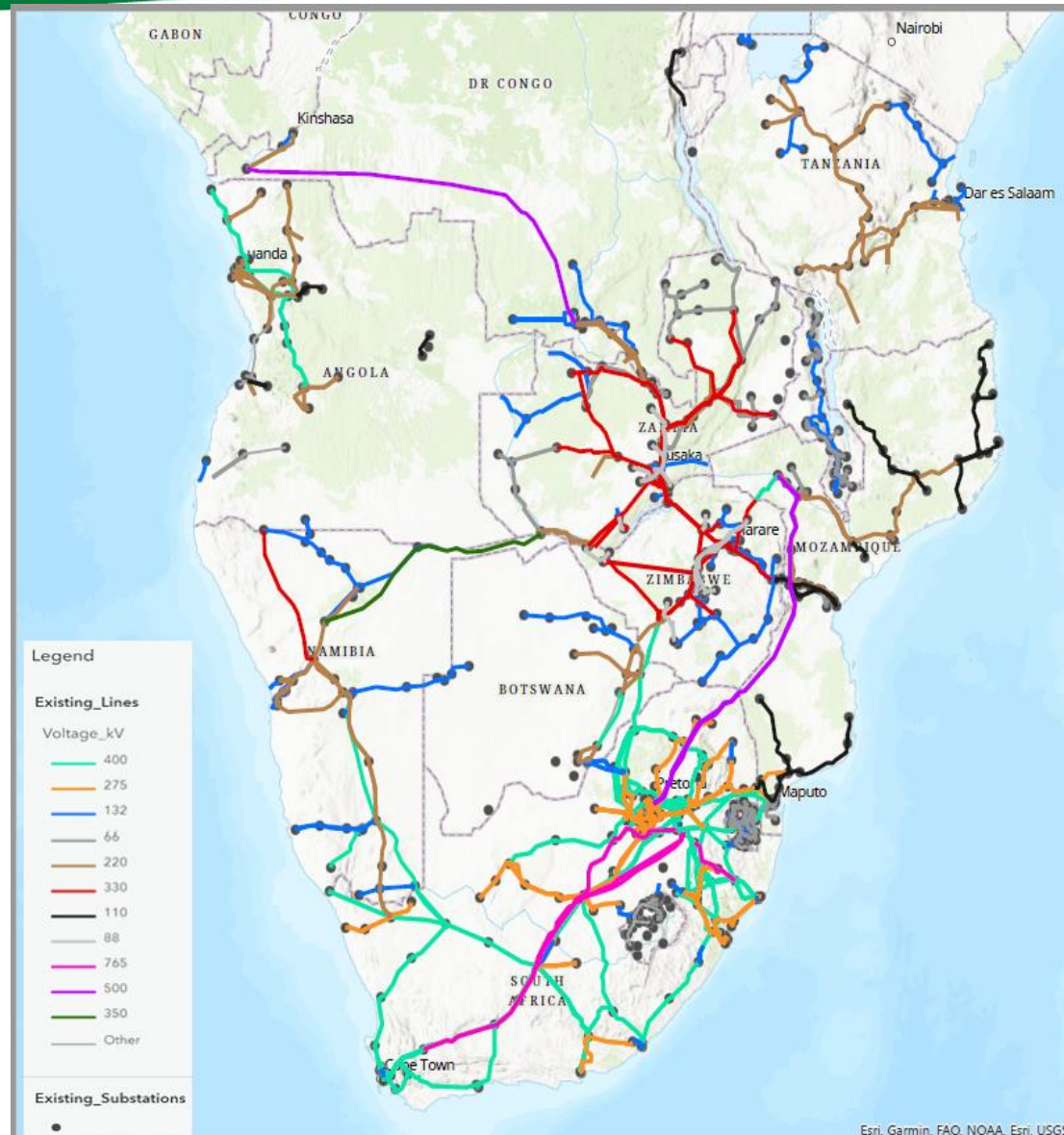
The SAPP Interconnected Grid



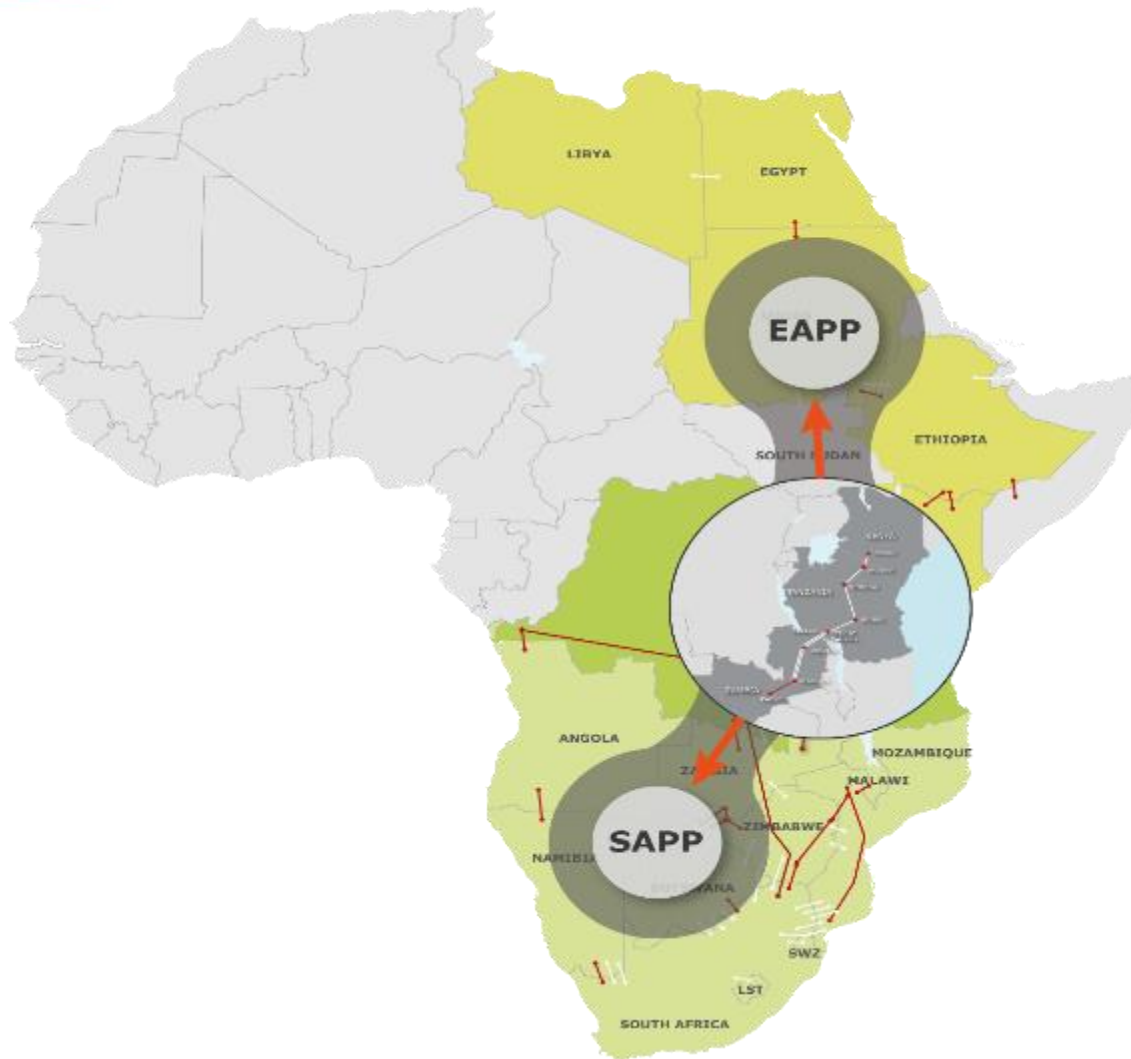
SAPP Regional Transmission Projects

Categories of Transmission requirements are:

- Category 1: Projects to Interconnect Non – Operating Members (Angola, Malawi, Tanzania)
- Category 2: Projects to Relieve transmission Congestion (both interconnectors and domestic transmission networks)
- Category 3: Transmission Projects to move Power from new generating stations to load centres – Pool Plan



Regional Transmission Integration



SAPP Membership....

Selected Definitions

- 1. Independent Power Producer:** means the operator of a privately-owned generating facility that is connected to the SAPP grid;
- 2. Service Provider:** means an entity authorised by means of legislation or other consent to provide electricity market related services within the jurisdiction of its incorporation or establishment.

SAPP Membership Categories

SAPP has the following Membership Categories:

- 1. National Power Utility**
- 2. Operating Member**
- 3. Market Participant**
- 4. Conditional Market Participant**

National Power Utility means...

A Member that:

- a) Operates the national control centre or national grid in its country; and,
- b) Carries out transmission system and/or market operations functions; and,
- c) Is a Member State owned entity or is designated as such by a SADC Member State,

Operating Member means...

A Member which:

- a) Operates a permanent generation facility of total capacity of at least 300 MW physically connected to the SAPP Grid at a voltage level of at least 110 kV; and/or,
- b) Operates a transmission system of 110 kV and above which is physically connected to the SAPP Grid at a voltage level of at least 110 kV; and,
- c) Has capability to provide ancillary services.

Market Participant Means...

A Member which:

- a) Operates or contracts generation capacity or a load of at least 5 MW that is physically connected to the SAPP Grid; and**
- b) Complies with respective national legislation on cross-border trading; and,**
- c) Power is not be tied to a single buyer contract; or, where such contract exists, must have counter party consent to trade the contracted power on the market; and,**
- d) Possess capability of balancing agreed schedules or must have a contract for balancing agreed schedules with a SAPP operating member.**

SAPP Market Participant Requirements

- 1) **Licence or letter of support from regulator to carry out cross border trading**
- 2) **Letter of support from local National Power Utility to confirming the provision of connection, metering and balancing services**

Conditional Membership (Market Participant)

“**Conditional Membership for Market Participants**” is meant for power developers who intend to construct power plants for trading on the SAPP markets to be able to provide comfort to their funders before the plants are constructed.

Conditional Membership shall be granted to an applicant meeting the following conditions:

- (i) Where applicable, be licensed and or supported by a competent body/authority(ies) within their jurisdiction to engage in cross border electricity trade.

- (i) The Conditional Membership for Market Participants will be for a period of five (5) years, following which the entity must meet the requirements for Membership as contemplated in Article 5 of the IUMOU. The Conditional Membership is subject to renewal.

- (i) Payment of the prescribed application fees shall apply. No Conditional Membership participation fees are to be applied.

Membership Eligibility

- 1. Any Electricity Supply Enterprise situated in a SADC country and any non-SADC country is eligible to be considered for Membership for SAPP.**
- 2. The applicant shall indicate the class of membership applied for.**
- 3. Payment of Membership Processing Fee (USD 2,500)**

General Conditions of Admission

The Applicant must meet the following conditions:

- 1.** Where applicable, be licensed and or authorized by a competent body/authority(ies) within their jurisdiction to engage in cross-border electricity trade.

- 2.** Applicants from non-SADC member states, shall:
 - (i) Comply with the provisions of the Inter-Governmental MOU,
 - (ii) Require approval of the SADC, and
 - (iii) Meet any other conditions that may be stipulated in a separate written agreement.

General Conditions of Admission

Documentation to be submitted with Application

- 1.** Where applicable, certified copy of licence(s) or authorisation to engage in cross-border electricity trade issued by a regulator or competent authority /body.
- 2.** Maps showing current and planned interconnection to the SAPP Grid.
- 3.** For applicants from non-SADC member states, certified copy of signed accession with SADC treaty and proof that any specified terms and conditions have been met, and
- 4.** Any other details as may be specified by the SAPP.

Application Procedure Timelines (Calendar days) – Full Membership

No	Activity	Duration, Days	Cummulative Total, Days
1	Submit Completed SAPP Membership Application forms to SAPP		
2	SAPP acknowledges receipt of application	5	5
3	SAPP verification of completeness of Application	14	19
4	Payment of non-refundable Application Processing Fees	21	40
5	SAPP Management Committee Setup Membership Review Task Team	30	70
6	Membership Review Task Team sends notification of site inspection and budget for direct costs for Task Team to visit site	14	84
7	Applicant pays costs for site inspection	21	105
8	Physical Site Inspection by Review Task Team	21	126



Technical Site Visit Inspection Criteria

- 1. Design of Generation and Control Equipment**
- 2. Operation of Generation and Control Equipment**
- 3. Operating Procedures**
- 4. Energy Interchange**
- 5. Equipment Maintenance**
- 6. Telecommunication Facilities**
- 7. Control Organization**
- 8. Control Security**

Application Procedure Timelines (Calendar days)

After Site Visit

No	Activity	Duration, Days	Cummulative Total, Days
9	Review Task Team Report to SAPP Management Committee	7	133
10	Management Committee Recommendation to SAPP Executive Committee	30	163
11	SAPP Executive Committee Decision	60	223
12	Notification of Decision to Applicant	7	230



Application Procedure Timelines

230 Days



THE LOWER THE SCORE THE BETTER

- The first 2 Market Participants Applications took 3 and 5 months respectively
- SAPP will work towards processing the applications timely.

Market Participant Rights and Obligations

Rights

- a) to be represented in and vote at the SAPP Traders and Controllers Forum;
- b) to participate in the SAPP market.

Obligations

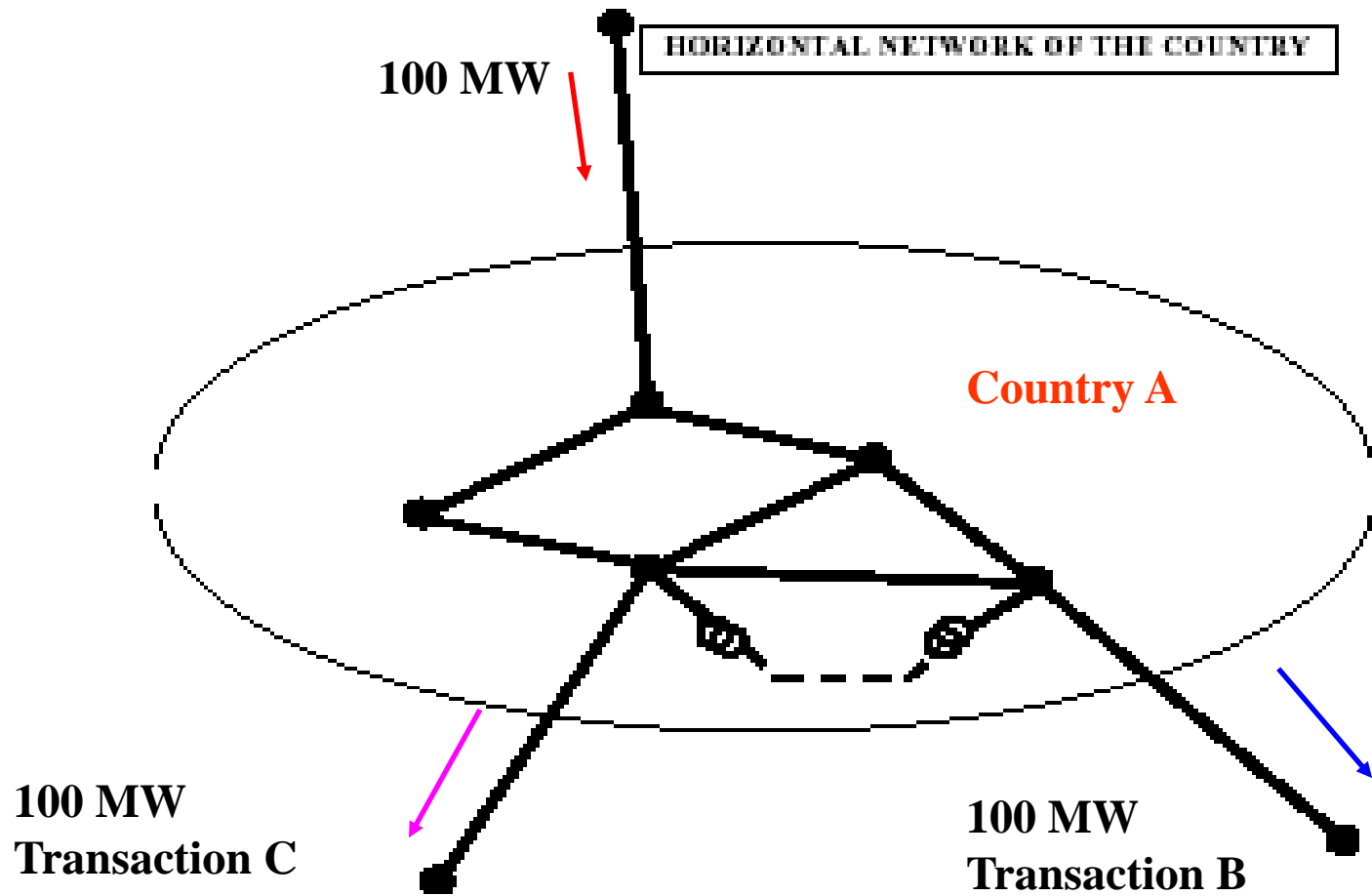
- a) to pay the prescribed fees on or before the due date;
- b) to defend and protect SAPP interests; and
- c) to comply with any other rules and regulations as may be prescribed or deemed necessary by the SAPP.

Annual fees current **USD 20,000** per annum for Market Participants

Wheeling in SAPP

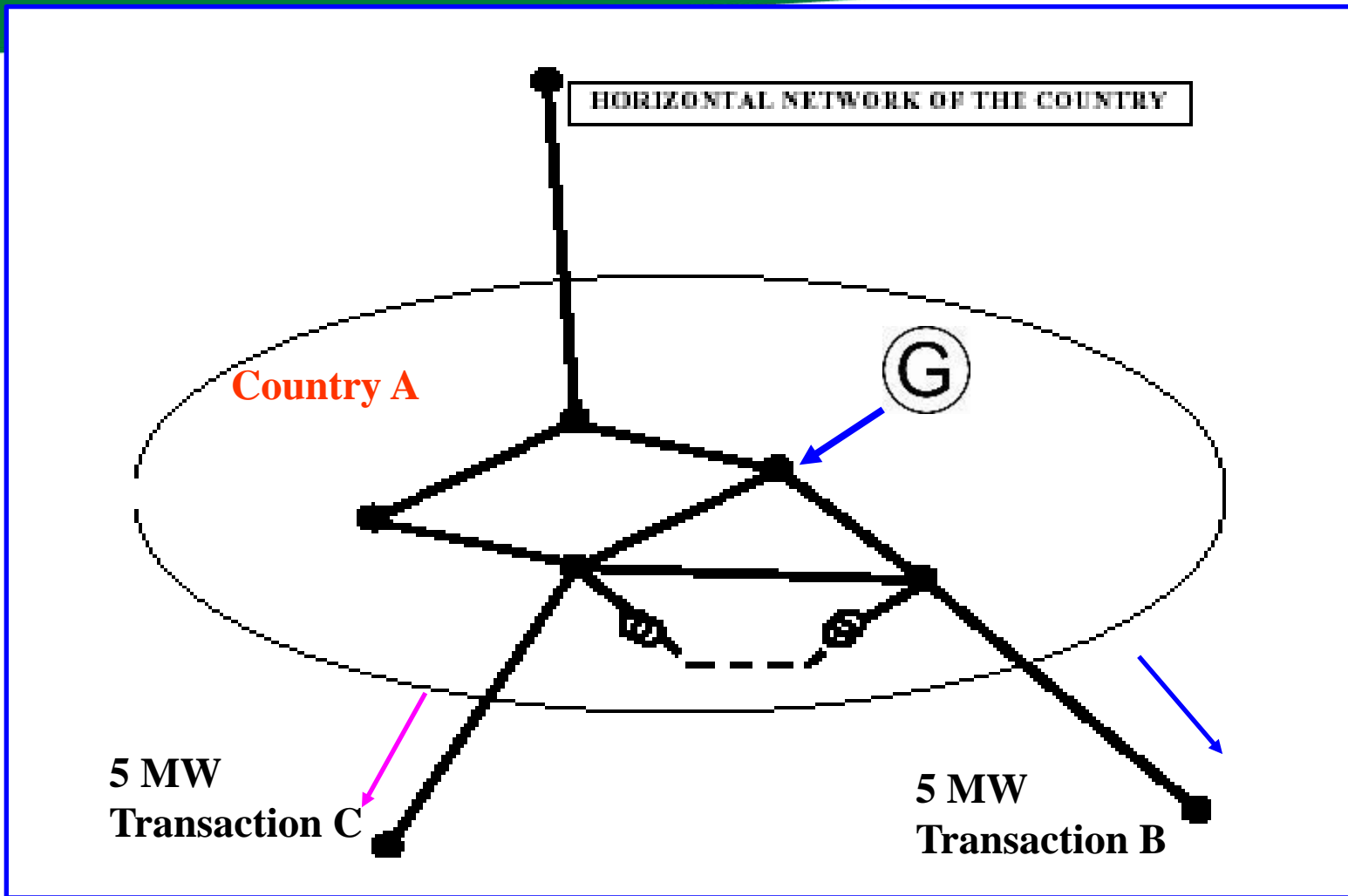
- ❑ Defined as transfer of power from country A to country B via country C.
- ❑ Wheeling path should be reserved in advance for Bilateral Trades.
- ❑ The buyer negotiates for a wheeling path for Bilateral trades
- ❑ In the DAM, the Available Transmission Capacity is calculated by the Market Operator

Wheeling in SAPP

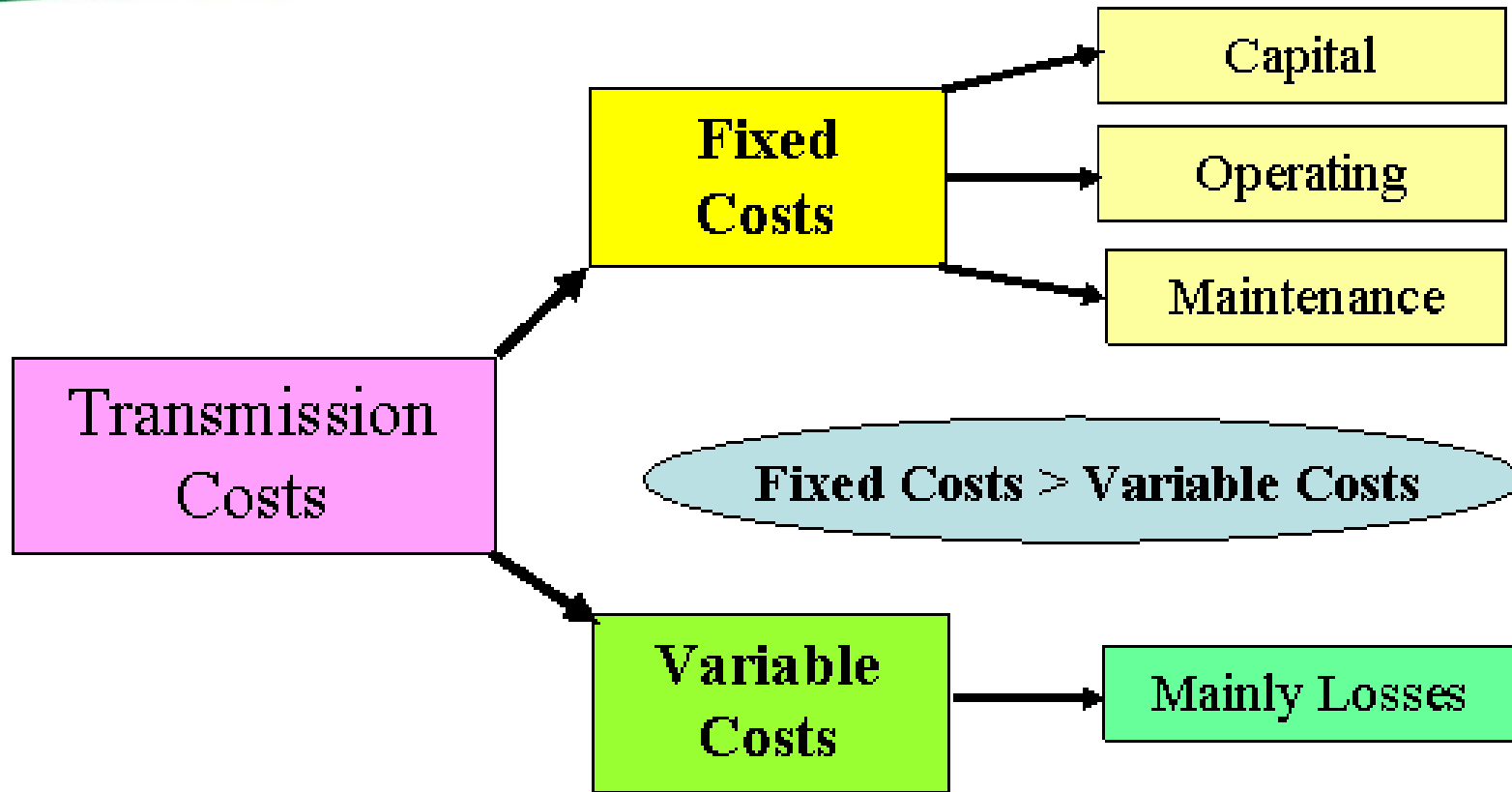


All Transmission equipment **used in wheeling** identified in **Country A**

Requirements for Connection to Transmission Grid



General Structure of Transmission Costs



Utilities have invested money and needs to be compensated adequately

Current Wheeling Principles

- SAPP CC is the **custodian** of the SAPP Wheeling Computer Model and for all updates.
- Charges are calculated for **specific transactions** based on load flow analysis
- Wheeling Charge in USc/kWh calculated based on **transaction/path** in each country.
- Total wheeling fee payable to **wheelers** based on the total wheeled energy (kWh).
- **Buyer** pays fully for wheeling for bilateral trades
- Buyers and Sellers in DAM pay **50% each** of the SAPP weighted average wheeling charge

Current Wheeling Charges Results

Transaction Seller to Buyer	WHEELERS , USc /kWh									Total USc /kWh
	BPC	ESKOM	EDM (S)	EDM (N)	EEC	ZESA	ZESCO	CEC	NAMPOWER	
SNEL - ZESCO								A		A
SNEL - ZESA							B	A		A+B
SNEL - BPC						C	B	A		A+B+C
SNEL - BPC via 400 and 220 kV						D	B	A		A+B+D

There are 130 different combinations of transactions

Charges range from 0.005 – 0.968 USc/kWh

Average Charge = 0.438 USc/kWh paid 50% each between buyer and seller in DAM

Requirements for Market Participants

1. There is a need for a transmission connection agreement with local power utility. Connection Agreement will specify the internal arrangements for wheeling, balancing and ancillary services.
2. All Market Participants should pay for the network use of system charges that apply internally within the country.
3. SAPP is not there to change current domestic national arrangements.

Motivation for Review of Wheeling Charges

- A desire for common charges for all users of the transmission systems
 - ✓ International wheeling charges and national charges should be non-discriminatory
- Charges need to be compatible with the DAM – a competitive short-term market in which counterparties are not known
 - ✓ Non transactional transmission entry and exit charges are required
 - ✓ The charges can be calculated in advance of the trades taking place
- A pricing method is required that is cost-reflective and based on efficient service provision, thereby promoting construction of new transmission infrastructure

Transmission Pricing Approach...

Under development

Calculate transmission network costs per TSO

Calculate nodal / TSO charges sufficient to recover total TSO costs

Consider external transmission system use

Apply to connected demand and generation

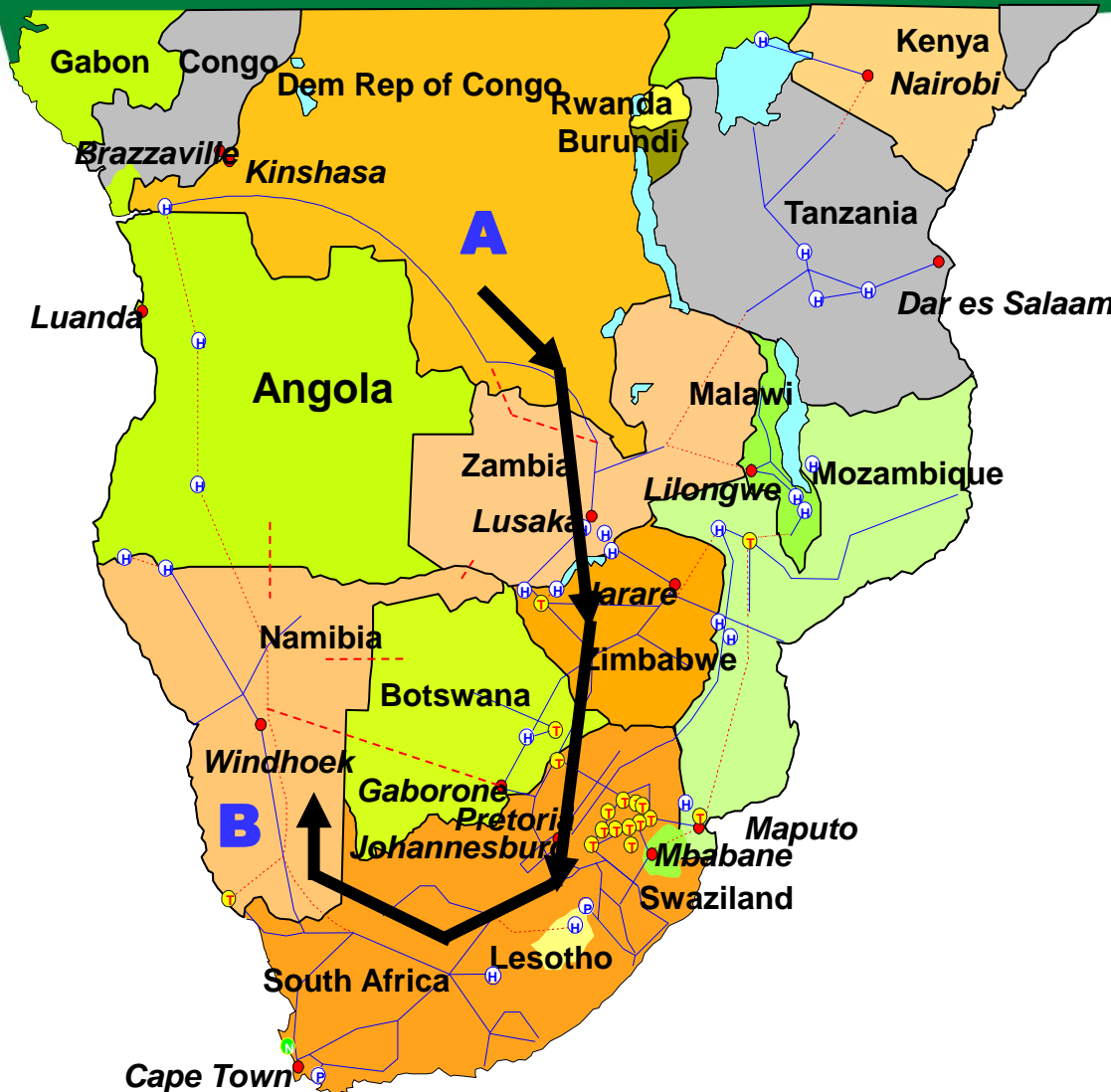
Charges Overview.....

Under development

- The proposed charges are “entry and exit” charges
- They will apply for power injection and withdrawal from the SAPP transmission networks
- They will be applied at a zonal level
- The new methodology has the option to consider:
 - ✓ Charges arising from flows on all the transmission assets in the SAPP networks, including those inside and outside the networks of the SAPP members undertaking particular trades; or
 - ✓ Charges that arise only from the flows on assets outside the trading parties’ own networks.

Transmission Losses..

Example for demonstration purposes only

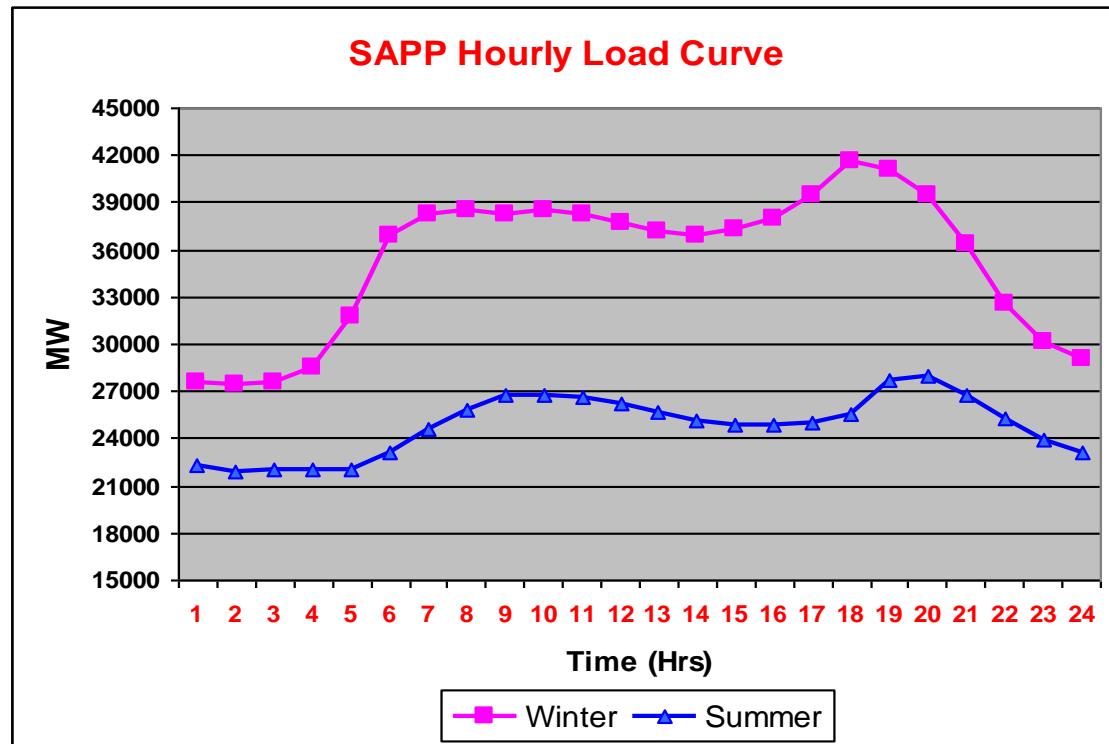


- ➔ The longest route in the SAPP is from the **DRC (A)** to **Namibia (B)**.
- ➔ Studies have shown that if **100MW** is dispatched from **A** to **B**, only about **86MW** would arrive at **B**.
- ➔ The **losses of up to 14 MW** are to be supplied by either the seller or the wheelers.
- ➔ If the seller supplies the losses, then over **114MW** is to be dispatched at **A** for a supply contract of **100MW** at **B**.



Transmission Losses

- i.** Load flow studies carried out to determine incremental losses.
- ii.** Losses determined for different time periods and seasons



Transmission Losses

- **Transmission losses calculated using load flow analysis**
- **Transmission loss factors determined for each transaction**
- **Losses compensated based on SAPP time of use and seasons ([winter](#), [summer](#))**
- **Losses paid using SAPP Average Market Clearing Prices for the previous year and by time of use**

Thank you!

