



OVERVIEW OF THE SOUTHERN AFRICAN POWER POOL

SADC-SAPP-RERA Investors
Roundtable

15-17 July 2009
Livingstone, ZAMBIA



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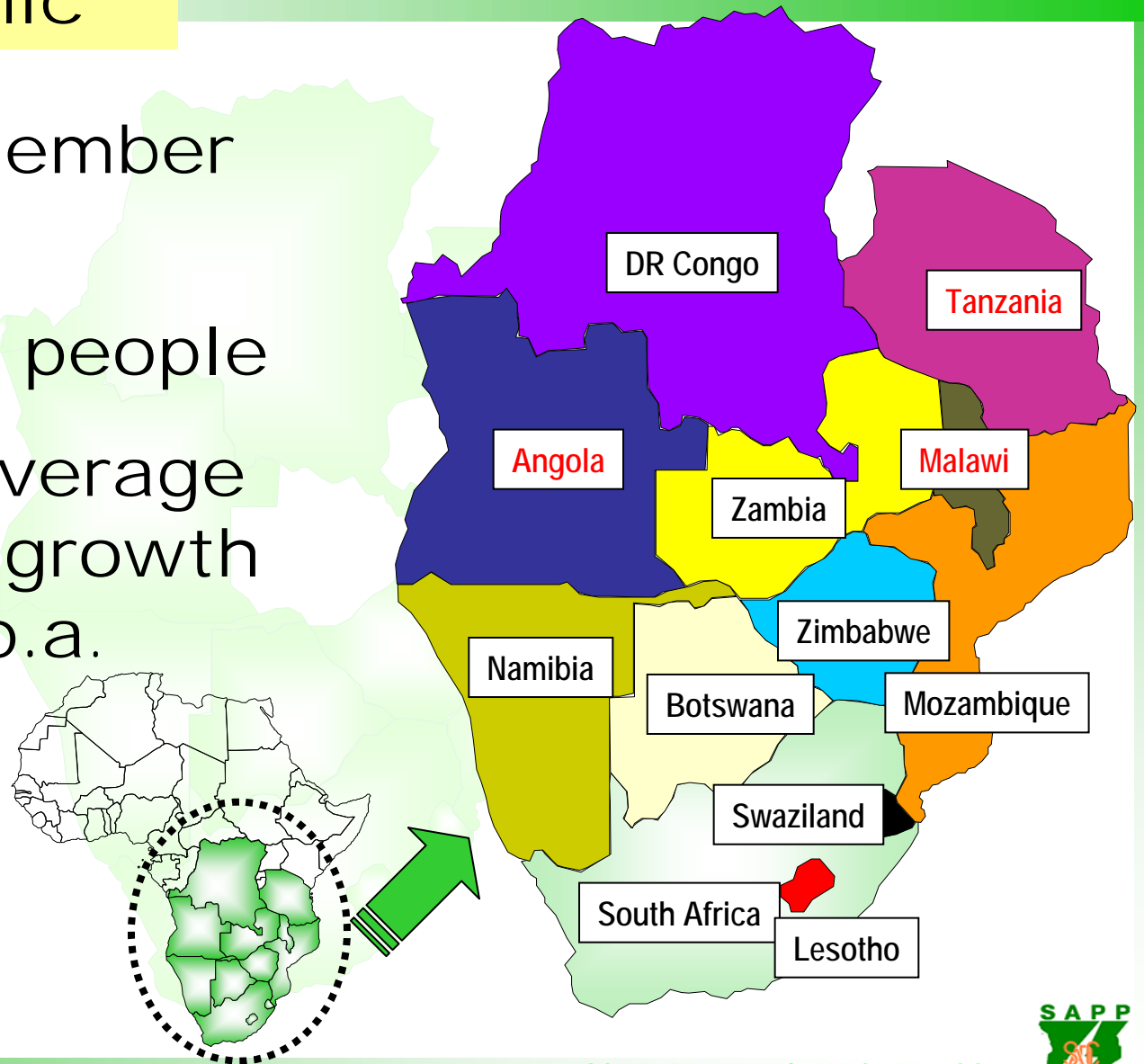
1. Introduction to the SAPP
2. Demand & Power Supply Situation
3. Future Requirements



1. INTRODUCTION TO THE SAPP

1.1 Geographic

- ❑ 12 SADC Member Countries
- ❑ 230 Million people
- ❑ Regional Average Electricity growth rate 4.6% p.a.



SOUTHERN AFRICAN POWER POOL

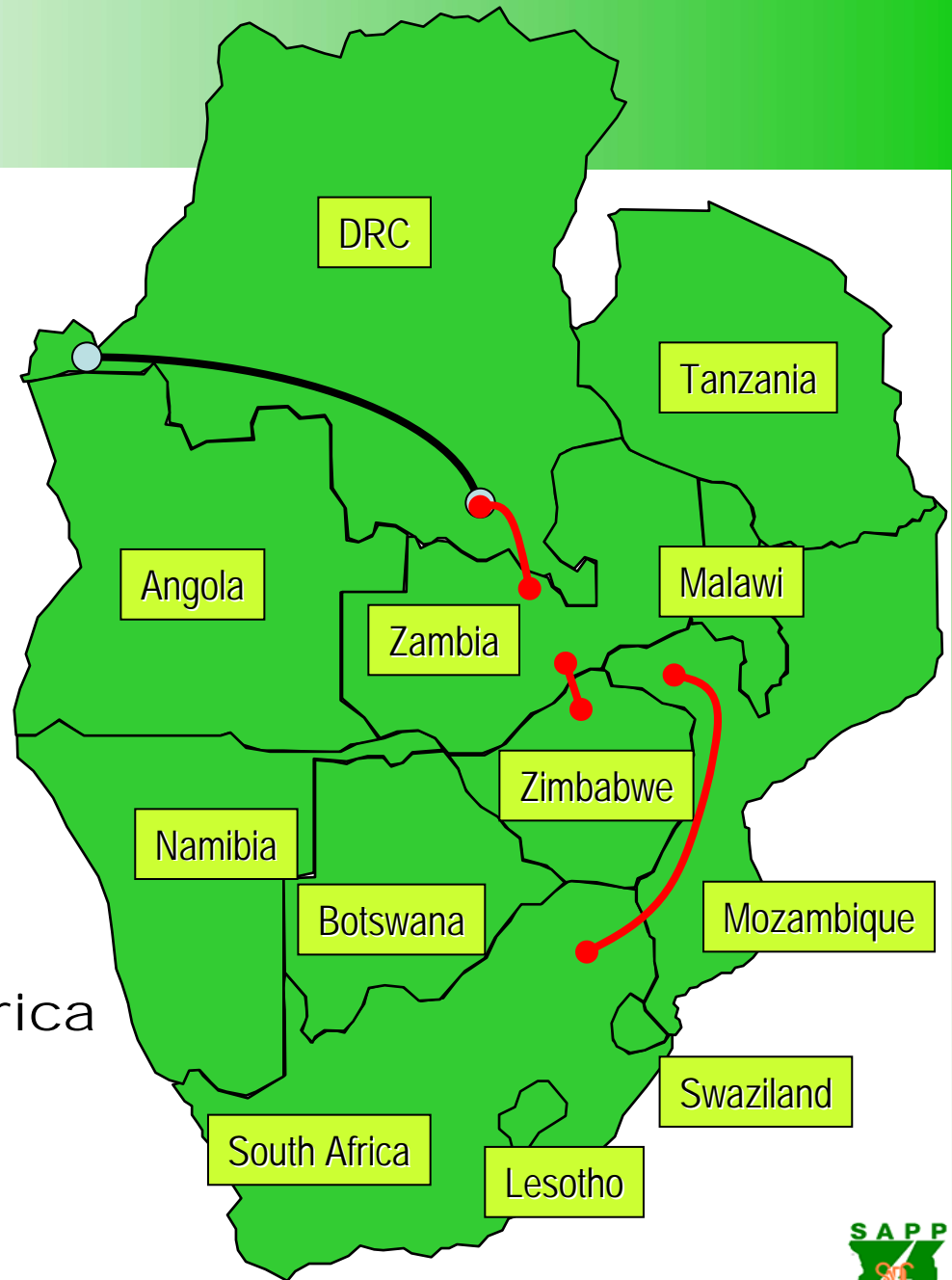


1.2 Historic

1950s: DRC-Zambia
500kV HVDC 1700km
1x220kV AC

1960s: Zambia – Zimbabwe
2x330kV AC

1975: Mozambique – South Africa
533kV HVDC – 1400km



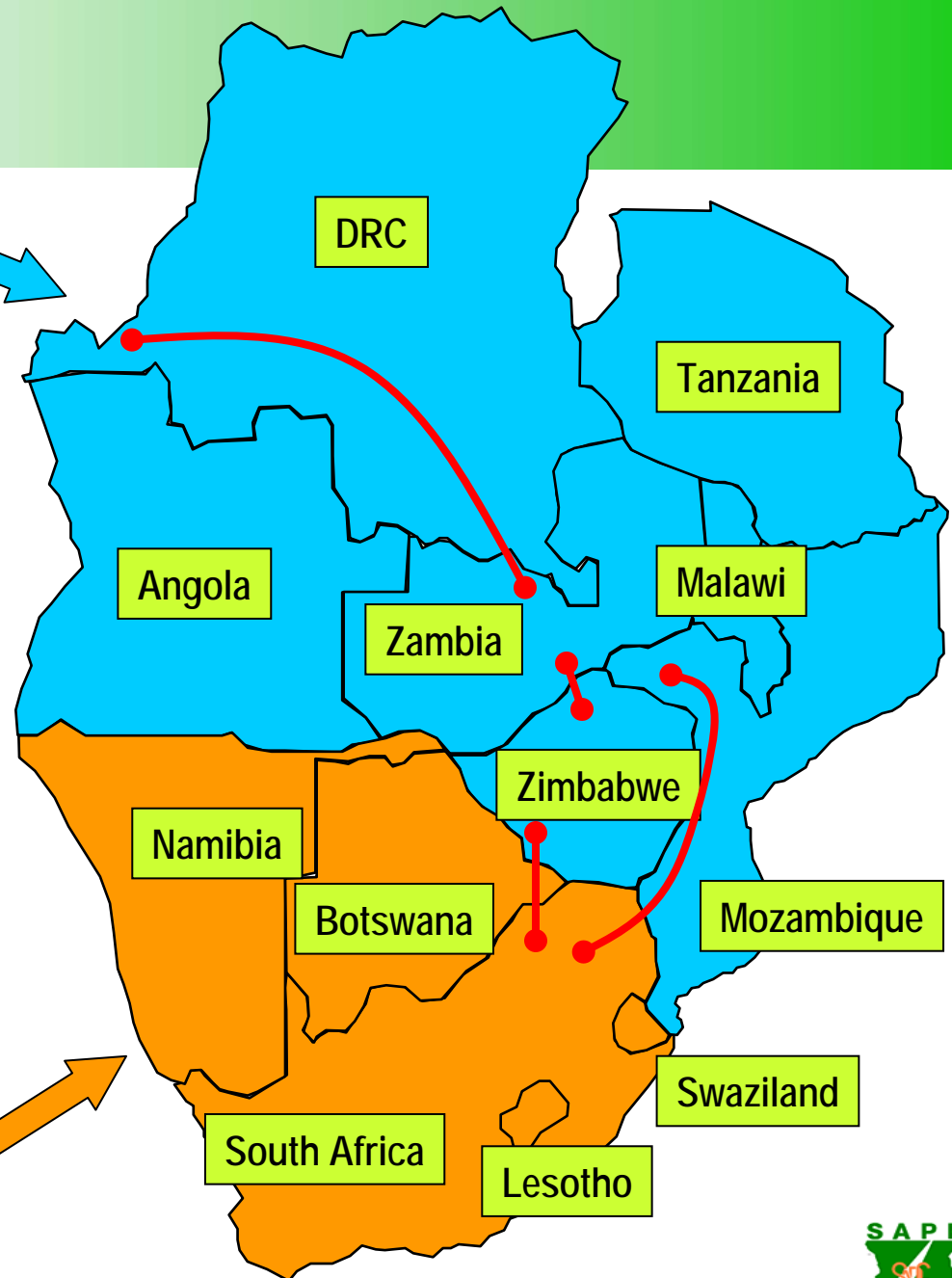
1.2 Historic

Hydro Northern Network

Two networks linked by weak lines at **220kV** & **132kV** via Botswana

In **1995** the **400kV** was constructed from Zimbabwe to South Africa via Botswana.

Thermal Southern Network



SOUTHERN AFRICAN POWER POOL



1.2 Historic

- The interconnection of the northern and southern networks created a platform for regional trade and cooperation.
- In 1995, the Ministers responsible for energy in the SADC signed Inter-Government MOU that lead to the creation of a power pool under the name, Southern African Power Pool (SAPP).

1.3 SAPP Vision

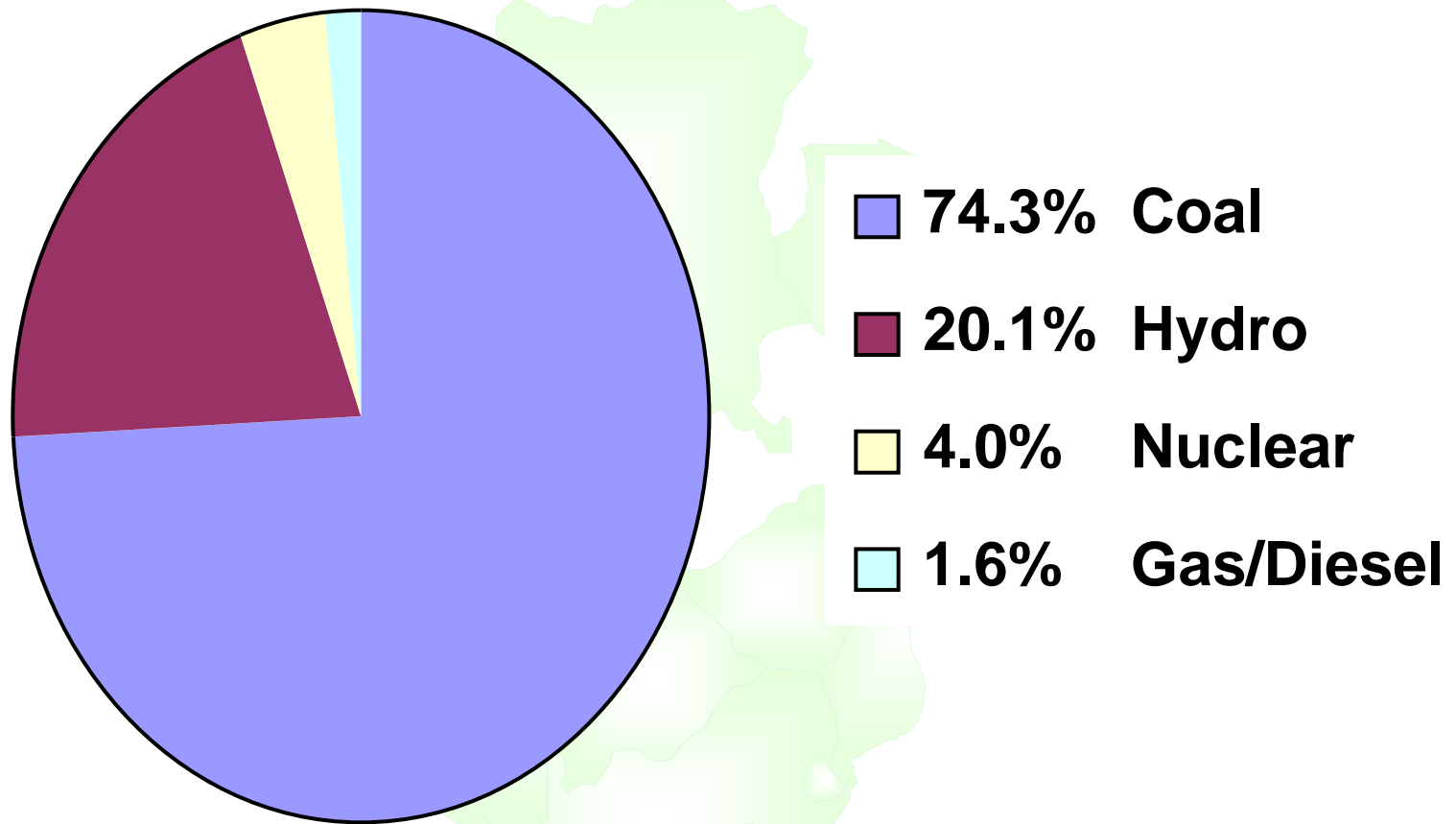
- Facilitate the development of a **competitive electricity market** in the Southern African region.
- Give the end user a **choice** of electricity supply.
- Ensure that the southern African region is the region of choice for **investment** by energy intensive users.
- Ensure sustainable energy developments through sound economic, environmental & social practices.

2. DEMAND AND POWER SUPPLY

2.1 Installed Capacity & Peak Demand

No.	Country	Utility	Installed Capacity [MW] As at June 2009	Available Capacity [MW] As at June 2009	Installed minus Available [MW]	2008 Peak Demand [MW]	Capacity Required [MW] 10.2% Reserve	Shortfall /Surplus (MW)
1	Angola	ENE	1,187	930	257	668		
2	Botswana	BPC	132	90	42	503		
3	DRC	SNEL	2,442	1,170	1,272	1,028		
4	Lesotho	LEC	72	70	2	108		
5	Malawi	ESCOM	287	267	20	260		
6	Mozambique	EDM	233	174	59	416		
		HCB	2,075	2,075	-			
7	Namibia	NamPower	393	360	33	430		
8	South Africa	Eskom	44,170	40,483	3,687	35,959		
9	Swaziland	SEC	70.6	70	1	200		
10	Tanzania	TANESCO	1008	680	328	694		
11	Zambia	ZESCO	1,812	1,200	612	1,604		
12	Zimbabwe	ZESA	2,045	1,080	965	1,714		
TOTAL SAPP			55,927	48,649	7,278	43,584	48,030	619
Interconnected SAPP			53,445	46,772	6,673	41,962	46,242	529

2.2 Generation Mix Year 2009

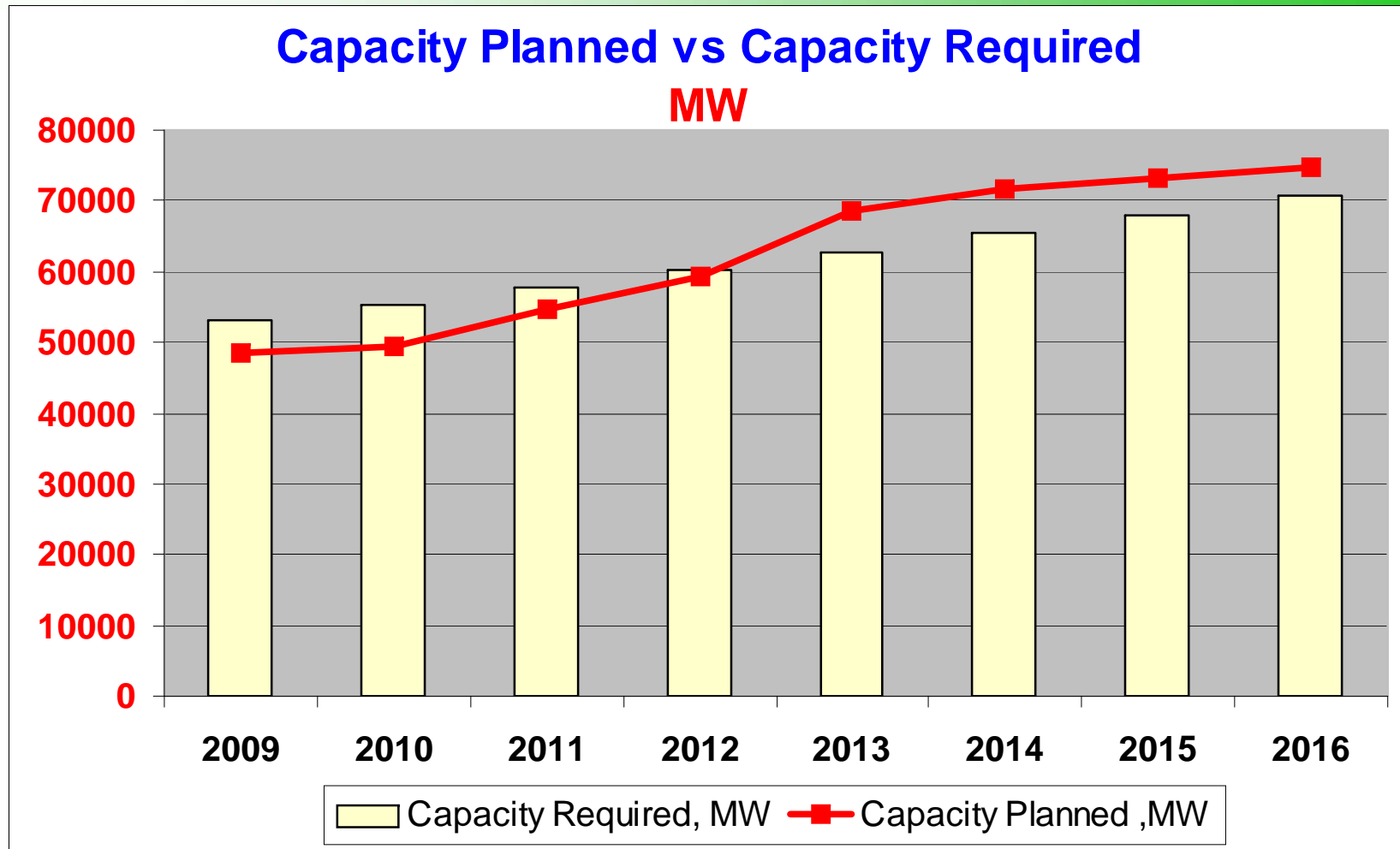


2.3 Demand Growth

No.	Country	Utility	2007 Peak Demand [MW]	2008 Peak Demand [MW]	Demand Growth [%]	Load Shed [MW]
1	Angola	ENE	476	668	40%	
2	Botswana	BPC	493	503	2%	0
3	DRC	SNEL	1,075	1,028	-4%	
4	Lesotho	LEC	109	108	-1%	18
5	Malawi	ESCOM	240	260	8%	
6	Mozambique	EDM	343	416	21%	
7	Namibia	NamPower	449	430	-4%	0
8	South Africa	Eskom	36,513	35,959	-2%	273
9	Swaziland	SEC	196	200	2%	0
10	Tanzania	TANESCO	635	694	9%	
11	Zambia	ZESCO	1,468	1,604	9%	150
12	Zimbabwe	ZESA	1,758	1,397	-21%	317
TOTAL SAPP			43,755	43,267	-1%	
Total Interconnected SAPP			42,404	41,645	-1%	

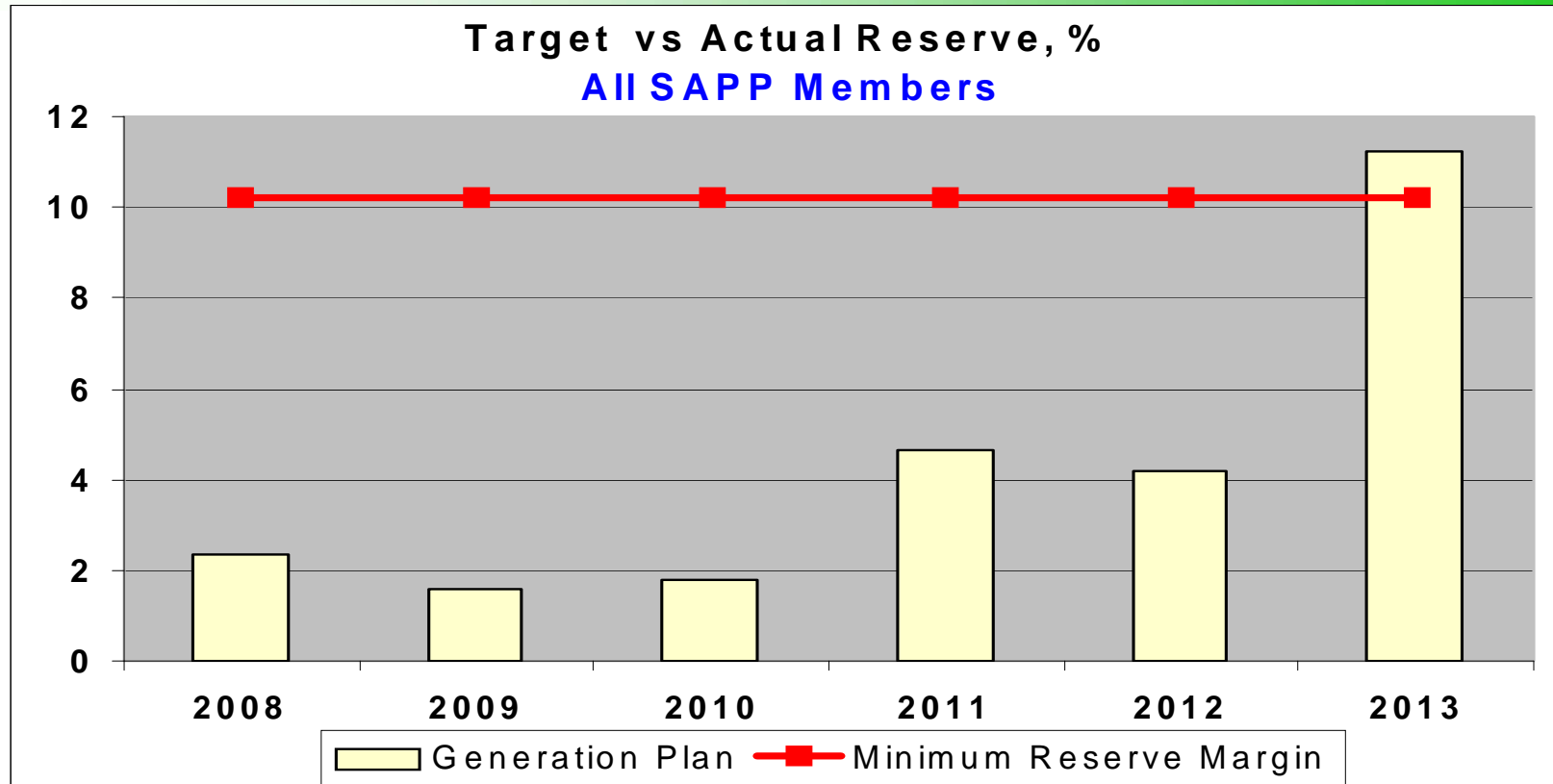
Note: ZESA had suppressed demand. If not suppressed, peak should have been **1,714MW**

2.4 Forecast Demand Vs Supply [2008 - 2015] All SAPP Members



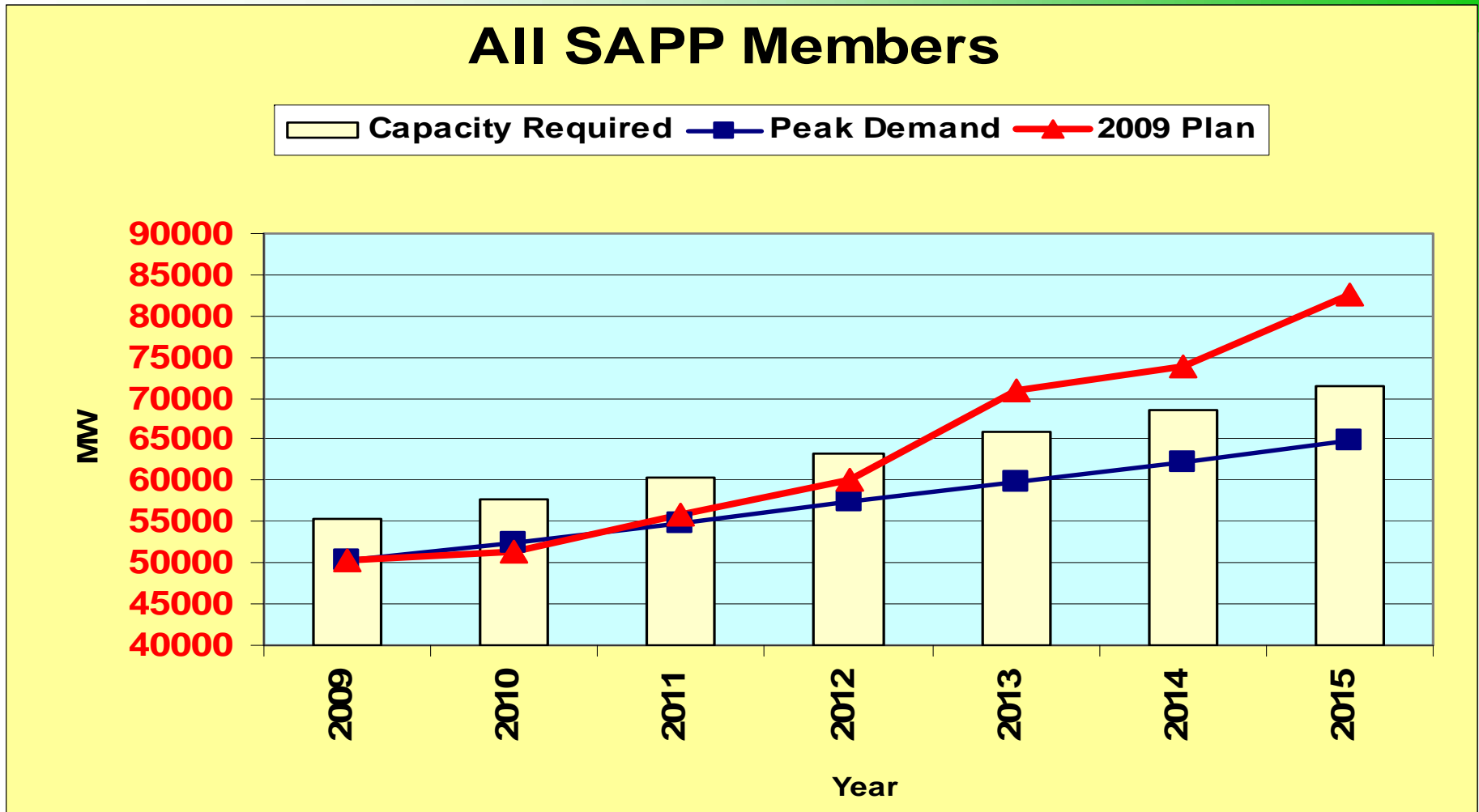
NO load management options implemented, there is a deficit in supply until 2013

2.5 Target Vs Actual Reserve Margin [2008 – 2013]



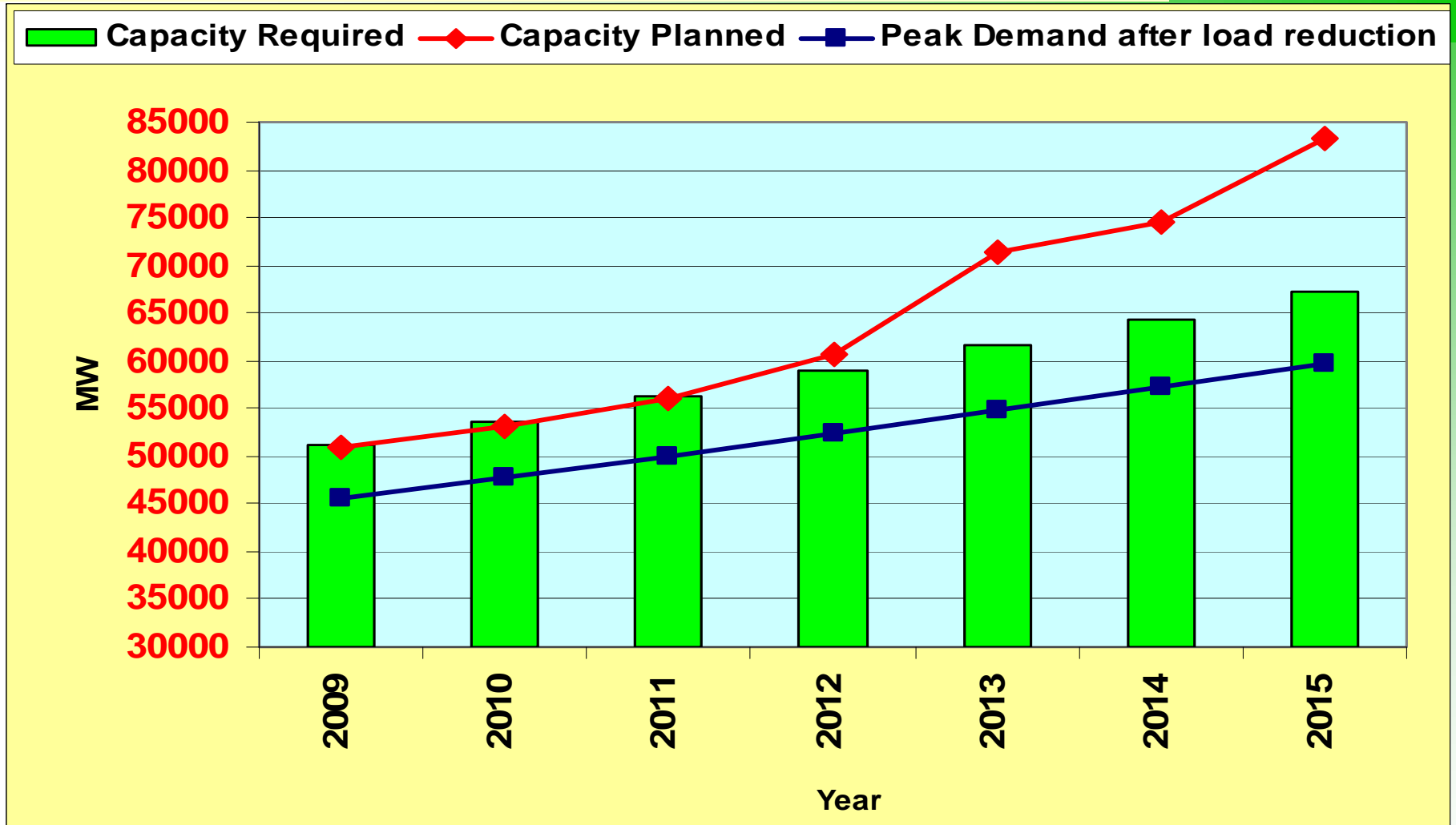
- ❑ Not enough reserves
- ❑ Adequate Generation Capacity by 2013
- ❑ Analysis excludes impact of load reduction

2.6 Impact of Load Management



No load management options implemented, there is a deficit in supply until 2013.

2.6 Impact of Load Management



Situation improves after **load management**.

2.7 COMMISSIONED PROJECTS

Commissioned Generation Projects - 2008

No	Utility	Country	Name	Type	Units	Capacity [MW]
1	Eskom	South Africa	Camden	Thermal	2	380
2	Eskom	South Africa	Grootvlei	Thermal	2	380
3	Eskom	South Africa	Komati Demoth	Thermal	2	202
4	ZESA	Zimbabwe	Hwange Rehab	Thermal	3	300
5	ZESCO	Zambia	Kafue gorge	Hydro	4	60
6	SEC	Swaziland	Maguga	Hydro	1	20
7	TANESCO	Tanzania	Ubungo	Gas	12	100
TOTAL						1,442

- ❑ In 2008, the SAPP commissioned 1,442 MW against a planned target of 2,014 MW
- ❑ 160 MW in the DRC and 100 MW in Zimbabwe were not commissioned as planned.

Projects Commissioned in 2009

No	Utility	Country	Name	Type	Units	Capacity [MW]
1	ENE	Angola	Lobito	Gas	1	83
2	Eskom	South Africa	OCGT	Gas	1	1050
3	Eskom	South Africa	Grootvlei	Thermal	1	565
4	Eskom	South Africa	Komati	Thermal	1	114
5	ZESA	Zimbabwe	Hwange Rehab	Thermal	1	100
					TOTAL	1912

Projects to be Commissioned in 2009

No	Utility	Country	Name	Type	Units	Capacity [MW]	Expected Date
1	SNEL	DRC	Inga 1 Rehab	Hydro	1	55	Sept 09
2	SNEL	DRC	Inga 2 Rehab	Hydro	1	160	Oct 09
3	TANESCO	Tanzania	Tegeta	Gas	3	45	Nov 09
4	ZESCO	Zambia	Kariba North	Hydro	1	15	Nov 09
					TOTAL	275	

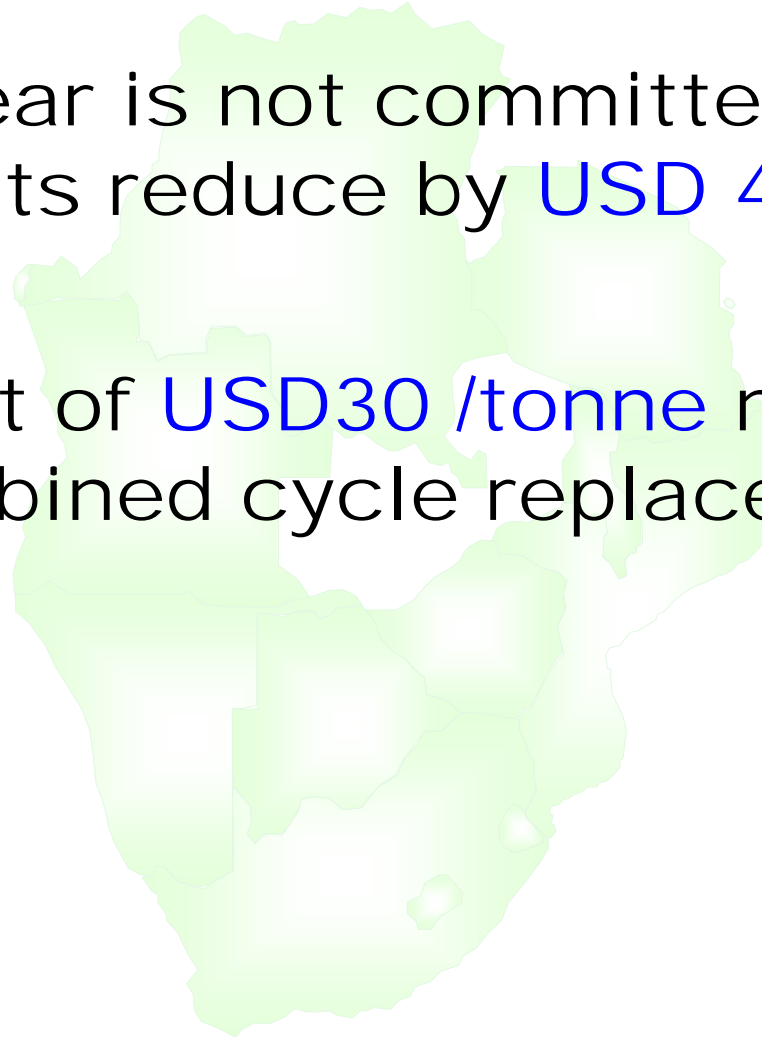
3. FUTURE REQUIREMENTS

3.1 POOL PLAN Results

- ❑ Capacity deficit from 2008 to 2013
- ❑ Base Case adds 4,870 MW more capacity and USD 8.7 billion more expensive (2009 to 2025)
- ❑ High cost coal displaced by low cost hydro
- ❑ Alternative case adds 8,400 MW less thermal and 5,600 MW more hydro than Base Case
- ❑ Total additional capacity of 57,000 MW at a cost of USD 83 billion

3.1 POOL PLAN Results

- ❑ When nuclear is not committed financial requirements reduce by **USD 48 billion**.
- ❑ At CO2 cost of **USD30 /tonne** nuclear, hydro, combined cycle replace coal units.



3.2 KEY POOL PLAN Recommendations

- ❑ Confirms significance of **coordinated** investments
- ❑ Interconnection of **Non-Operating Members** should be accelerated
- ❑ Reinforcement of **central transmission corridor** from DRC to South Africa via Zambia and Zimbabwe

3.3 GENERATION REQUIREMENTS - 1

- The SAPP PLAN shows that **56,686 MW** of new additional power generation capacity would be required by **2025** as follows:

Technology	Capacity [MW]	Percentage [%]
Coal	23,883	42%
Hydro	18,045	32%
Nuclear	-	0%
Gas	2,164	4%
Diesel	12,594	22%
TOTAL	56,686	100%

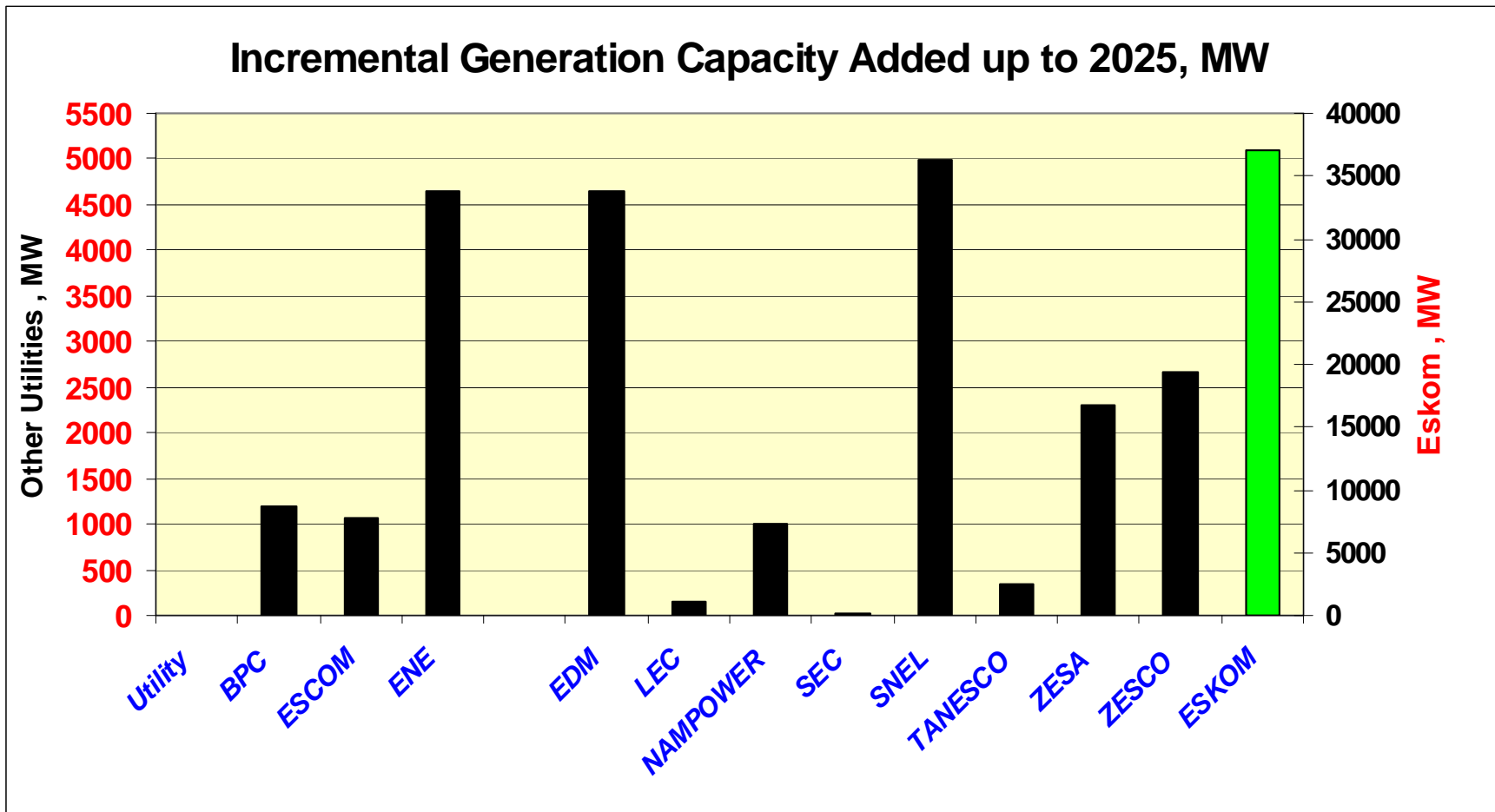
- The optimized plan includes no new nuclear.

3.3 GENERATION REQUIREMENTS -2

- In 2025, a total of 102,871 MW of generation would be required in the SAPP as follows:

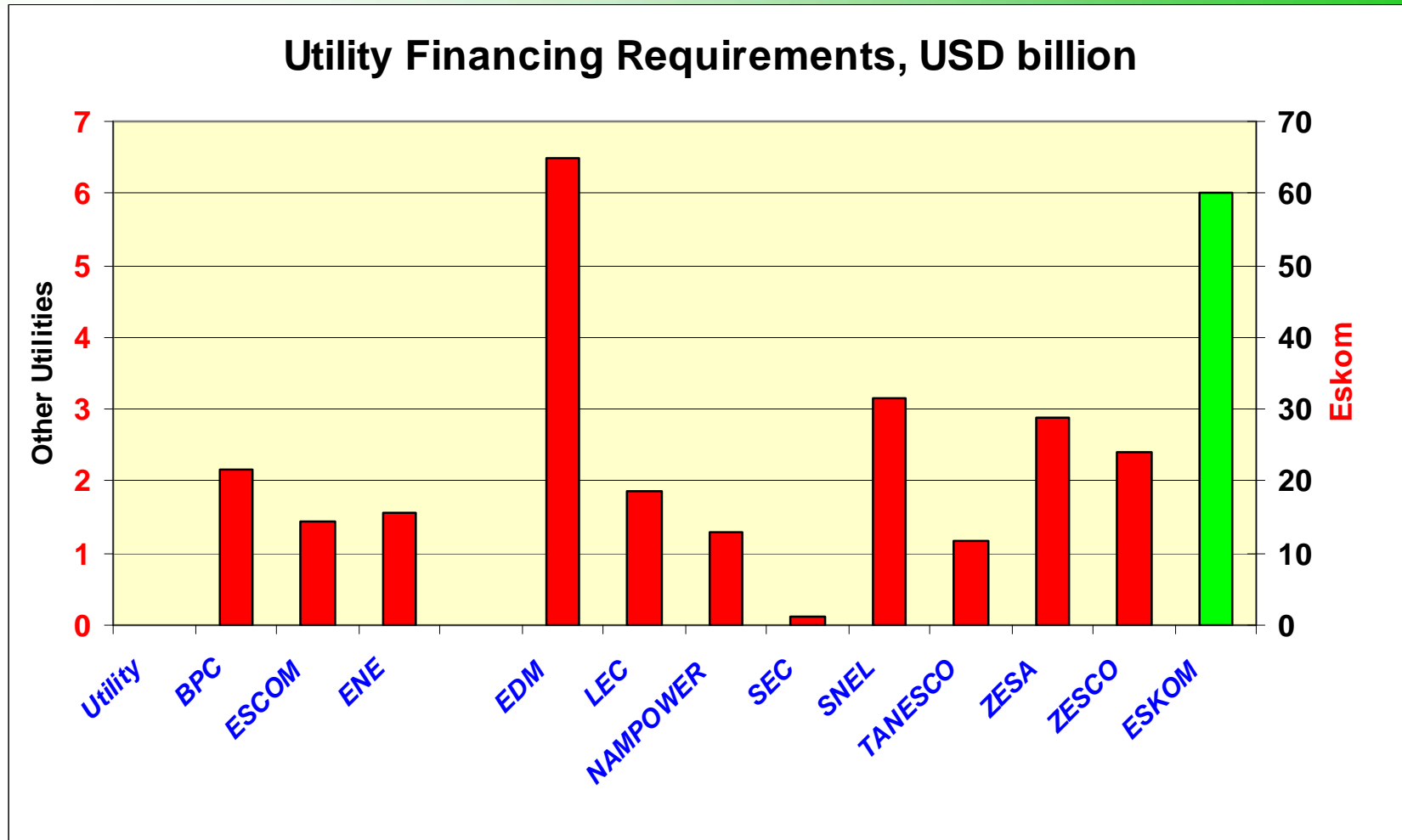
Technology	Capacity [MW]	Percentage [%]
Coal	57,415	56%
Hydro	27,016	26%
Nuclear	1,800	2%
Gas	2,732	3%
Diesel	13,908	14%
TOTAL	102,871	100%

NEW GENERATION CAPACITY ADDED - 2009 to 2025



A total of **57,000 MW** is added

FINANCING REQUIREMENTS 2009 to 2025



A total of **USD 83 billion** is needed

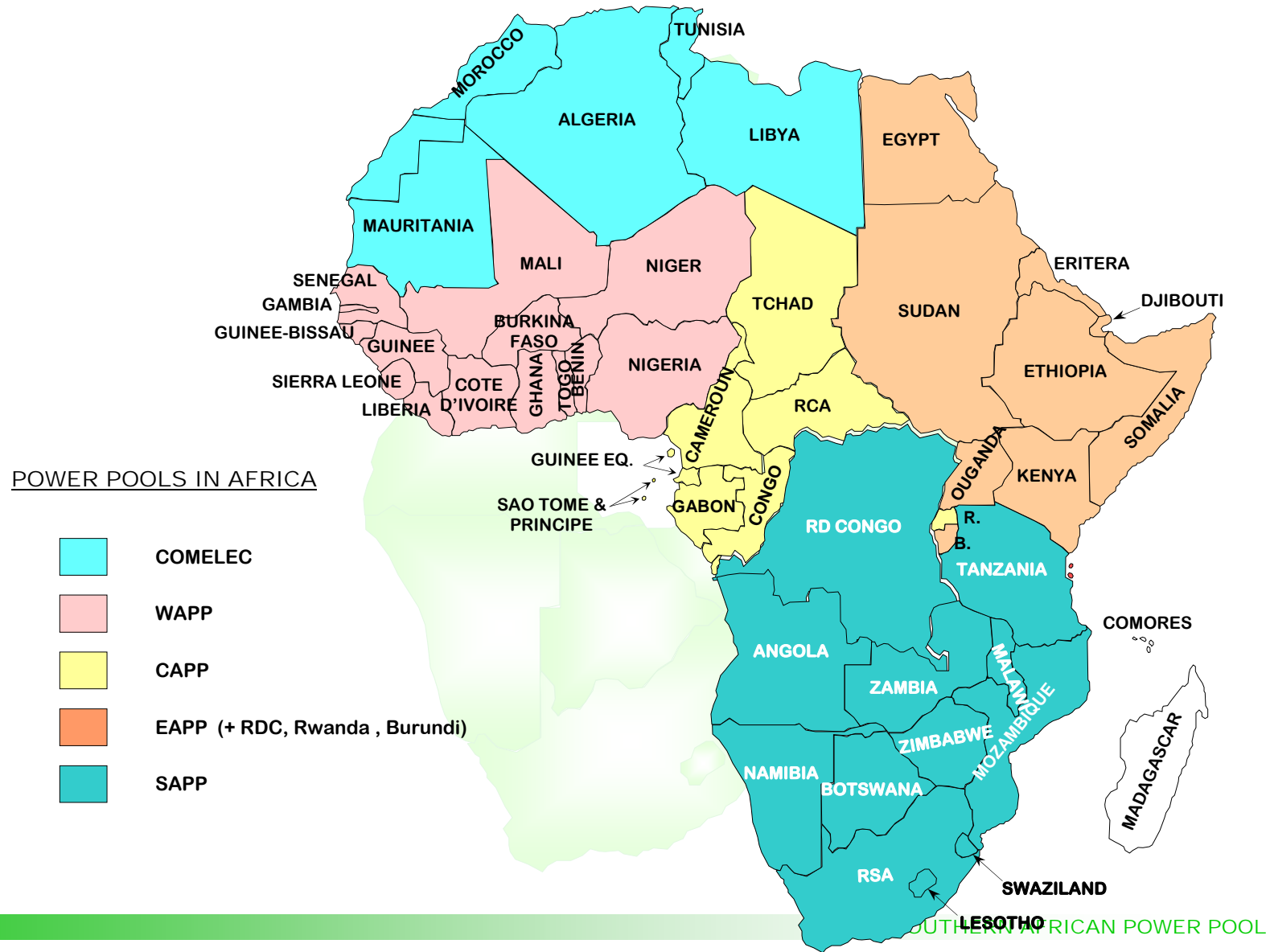
3.4 TRANSMISSION REQUIREMENTS

- ❑ In addressing forecast shortages as building new generation Interconnect:
 - ENE ([Angola](#))
 - ESCOM ([Malawi](#)) and
 - TANESCO ([Tanzania](#))

- ❑ Reinforce the central transmission corridor

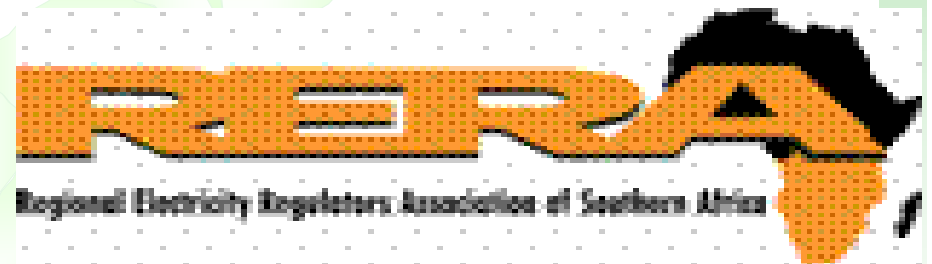


INTERCONNECTING POWER POOLS IN AFRICA





DETAILED FOLLOW UP WITH UTILITIES



Regional power
networking for
economic expansion



SAPP

S O U T H E R N A F R I C A N P O W E R P O O L