ZESCO LIMITED

"The Power Situation in Zambia and the SADC Region"

A PRESENTATION TO THE SADC PARLIAMENTARY FORUM

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PRESENTATION LAYOUT

A. Overview of Zambian Power Sector
B. Outline of ZESCO Power System
C. The Power Supply Challenge
D. ZESCO System Status
E. Regional Strategies to Overcome the Deficit
F. Status of SAPP Electricity Supply
G. SAPP Tariff Study
H. Conclusion

A. OVERVIEW OF ZAMBIAN POWER SECTOR

I. MAJOR ECONOMIC ACTIVITIES

- Mining
- Agriculture
- Tourism
- Industry & Commerce
- Construction And Housing

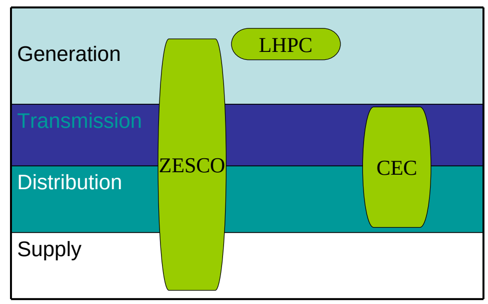
II. POWER SECTOR PLAYERS

ZESCO-PUBLIC UTILITY
- Public Utility
- Generation, Transmission, Distribution and Supply

COPPERBELT ENERGY CORPORATION
- Privately Owned
- Transmission & Distribution to Mines
- BSA with ZESCO to Purchase Power and Sell to Copperbelt Mines (Ex-ZCCM)
- 80MW Gas Turbines

LUNSEMFWA HYDRO POWER COMPANY
- Privately Owned
- Generation Capacity-37MW
- PSA with ZESCO for Sale of Bulk Power

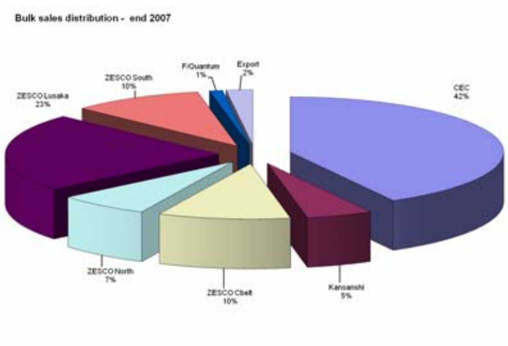
Role of the Players in the Zambian Electricity Supply Industry



B. OUTLINE OF ZESCO POWER SYSTEM

I. ZESCO FACT SHEET

- Vertically integrated utility
- Annual turnover - US$$200million
- Assets in excess of US$3.0billion
- Customer base: over 300,000
- Employees - 3,900
- Sales - 8,000GWh
- National maximum demand - 1,430MW
- Customer:employee ratio - 80
- Approx. 50% sales to CEC & other mining customers
- 5% exports to regional markets
- Access rates-22%



II. GENERATION ASSETS

- Kafue Gorge - 900MW
- Kariba North Bank - 600MW
- Victoria Falls - 108MW
- Small Hydros - 24MW

TOTAL INSTALLED CAPACITY (Before PRP) 1,640MW

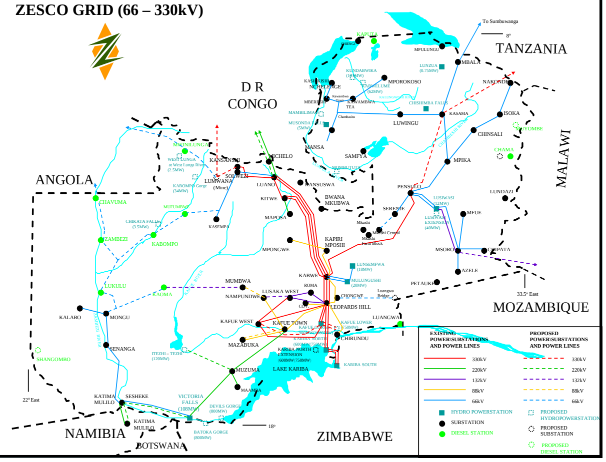
III. TRANSMISSION ASSETS

- 330KV - 2,008km
- 220KV - 548km
- 132KV - 85km
- 88KV - 704km
- 66KV - 3,014km
- High Voltage Substations - 27
- National Control Centre - 01
- Regional Control Centres - 03

IV. DISTRIBUTION ASSETS

- 66kV +3,000km
- 33kV & 11KV +6,500km
- MV lines +20,000km
- In excess of 5,000 substations
- 6 Diesel fired power stations 8MW

ZESCO GRID (66 – 330kV)



C. THE POWER SUPPLY CHALLENGE

- REGIONAL AND ZAMBIAN PERSPECTIVE

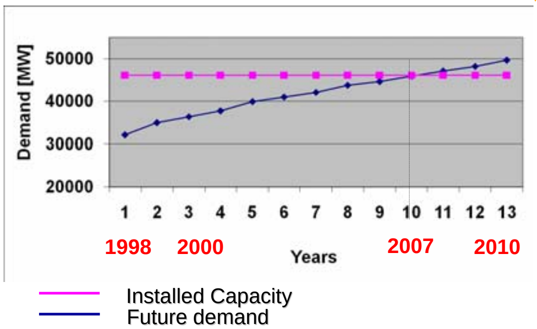
I. MAIN DRIVERS OF ELECTRICTY DEMAND AND THE DEFICIT

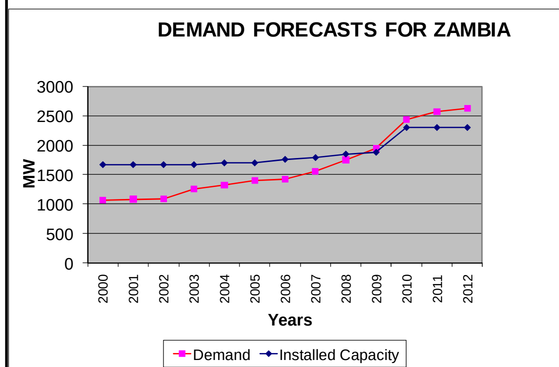
- Economic Growth of more than 5% in most of the SADC member countries
- Driven by increased demand for base metals resulting in high metals prices on world market
- New mining companies established and others expanded
- Growth in other sectors such as industry, commerce, agriculture, housing, etc
- Country electrification programmes – rural and urban
- Inadequate investment in generation and transmission infrastructure over the last 20 – 30 years

II. ENERGY DEMAND PROJECTIONS

- PREDICTIONS WERE THAT EXISTING CAPACITY TO BE EXHAUSTED AROUND 2007/08
- BOTH NATIONAL AND REGIONAL DEMAND TO SURPASS CURRENT CAPACITY
- NEED FOR NEW POWER PLANTS
- ELECTRICITY IS KEY TO NATIONAL ECONOMIC DEVELOPMENT

III. SAPP DEMAND PROJECTIONS 1998 TO 2010





THE CHALLENGE WAS IDENTIFIED AND COMMUNICATED BUT NOT ADEQUATELY ADDRESSED ACROSS SADC

IV. WHY WAS THE CHALLENGE NOT ADDRESSED?

❖ **CAPITAL INVESTMENT REQUIREMENTS**

- Power projects have long gestation periods
- Pre-feasibility & feasibility studies plus EIA
- Project packaging and mobilisation of finance
- Plus project implementation 5 – 7years
- Power sector investments require huge capital outlay
- Characterised by long payback periods
- But private sector requires short term returns
- Power projects compete for capital with more lucrative projects with short term returns

WHY WAS THE CHALLENGE NOT ADDRESSED? Cont'd

❖ **SUB-ECONOMIC TARIFFS**

- Tariffs in Zambia too low & not cost reflective
- Cannot meet typical investment requirements
- Legacy of socialist economy
- Topic flavoured by socio-political issues

❖ **SURPLUS CAPACITY**

- Zambia was an energy surplus nation
- Economy went through period of stagnation
- Did not anticipate high rate of economic recovery
- Despite projections and warnings the nation authorities did not see the looming deficit as urgent

WHY WAS THE CHALLENGE NOT ADDRESSED? Cont'd

❖ **STAKEHOLDERS AND LOBBY GROUPS**

- Sector opened to private investment through Electricity Act CAP 433 of 1995
- Govt. established OPPI in 1999
- Package of incentives for private sector investment in power projects put in place
- Future generation projects to be private sector driven
- Endless debates on privatisation and/or restructuring of ZESCO but no new Megawatts
- Private sector was seen as panacea for future energy requirements but none came to invest
- Generation projects taken away from ZESCO
- Excited with private sector: a case of all eggs in one basket

WHY WAS THE CHALLENGE NOT ADDRESSED? Cont'd

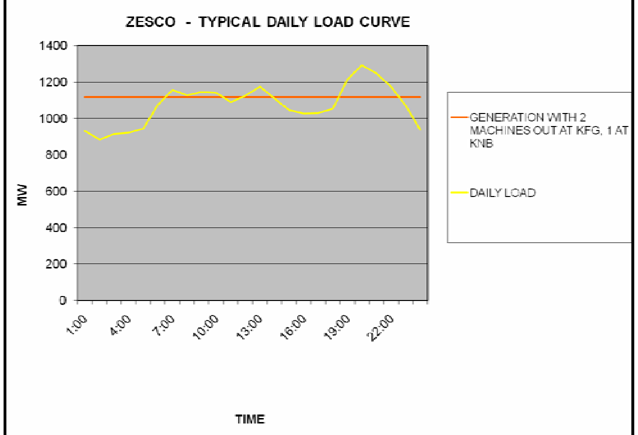
ZESCO'S RESPONSE

- ZESCO recognised that time was being lost in privatisation and other debates about the structure of the industry
- Not permitted to invest in new generation projects
- Saw that the nation would one day wake up to a power deficit
- Need for quick intervention at least to delay day of reckoning
- Took the option of changing scope of its Power Rehabilitation Project to include uprating
- Uprating of Kafue Gorge and Kariba North Bank to add 210MW of additional capacity at minimal cost

D. ZESCO SYSTEM STATUS

ZAMBIA: CURRENT DEFICIT

- PRP in progress at Kafue Gorge and Kariba North Bank power stations
- Therefore a total 450MW not available
- Available capacity 1,170MW
- Current national demand 1,450MW
- The deficit is a peak period phenomenon, sufficient capacity during off-peak periods
- Load management otherwise known as load shedding required in order to maintain balance of supply and demand during peak periods



E. REGIONAL STRATEGIES TO OVERCOME THE DEFICIT

1. SADC ENERGY MINISTERIAL TASK FORCE DIRECTIVES TO SAPP

At the Emergency Meeting of the SADC Energy Ministerial Task Force held in Botswana on 21 February 2008, the SAPP had presented the following short-term measures to overcome the supply deficit:

1.1 Demand Management based on others experiences:

- Power Conservation Programme (PCP)
- Demand Side Management (DSM)

1.2 Supply Side Measures:

- Maximize utilization of all installed supply option
- Short and Medium-term generation projects
- Creation of enabling environment for renewable energy
- Structures for least-cost project implementation

SADC ENERGY MINISTERIAL TASK FORCE DIRECTIVES TO SAPP

1.3 Provide Investment incentives to all Investors in the power sector, both local and foreign.
- ✓ Allow for VAT and Tax Exemptions for import of power equipment and machinery for a defined period.

1.4 Creation of an enabling environment for power sector investment:
- ✓ Legal framework
- ✓ Regulatory framework

1.5 Implement cost reflective and time of use tariffs in SADC

ENERGY MINISTERS TASK FORCE DIRECTIVES

- PCP Program: Development of a power conservation program (PCP) as a SADC programme.
- Energy Efficiency: Development of a SADC policy to ensure efficient use of available electrical energy.
- Standards: Develop a minimum energy efficiency standard for all new electrical connections.
- Phasing out Incandescent Lamps: Plan and propose the phasing out of incandescent light lamps in preference to compact florescent lamps (CFLs).
- Local Manufacturing: Assist in the development of local manufacturing capability to support DSM initiatives.
- Financial Incentives: Formulate the required financial incentives for DSM implementation.

OTHER DIRECTIVES [1]

- Project Tracking and Implementation
- Creation of Special Purpose Vehicle Companies
- Financial Model for Cross Border Projects
- Promotion of regional projects
- Information sharing on available funding
- Attach TIME FRAMES to all activities.

OTHER DIRECTIVES [2]

- Recapitalization of power utilities
- Promotion of renewable energy technologies
- Comprehensive skills audit/database and sharing of resources and skills
- Utilities to indicate financial requirements from governments on energy projects
- Restore interconnected SAPP grid within 60-days

2. PROGRESS ON SHORT-TERM MEASURES TO OVERCOME CURRENT SUPPLY DEFICIT

2.1. POWER CONSERVATION PROGRAM

- South Africa is currently developing the PCP and Eskom will communicate details to SAPP once concluded.
- The program has been formally split into three streams:
  - i. Rationing scheme
  - ii. Managing growth (new / increasing loads)
  - iii. Pricing (changes to tariff levels and structures to support energy efficiency)
- Target implementation date for PCP in South Africa: 1 July 2008.
- Other Members will adapt the initiative to suit their local situation.

2.2 ENERGY EFFICIENCY & STANDARDS

The efficient use of electrical energy could save the region a lot of wasted power. In order for this to be realised:

i. Tariff intervention & Time of Use Tariffs (TOU)
- Cost reflective tariffs should be implemented.
- TOU tariffs should also be implemented.

ii. Standards Development
- Standards on energy efficiency are being developed by bureau of standards in various member countries.
- SAPP members are encouraged to work closely with these assigned institutions.

ENERGY EFFICIENCY & STANDARDS

iii. Policy Intervention
- Policy on energy efficiency should be developed.
- SAPP to support RERA in the development process.

iv. Communication, Awareness and Education
- Communication on energy efficiency programs and technologies should be promoted.
- Customer awareness programme should be done and enhanced by all SAPP members.

2.3 PHASING OUT OF INCANDESCENT LAMPS

- SADC governments to develop policy on the phasing out of incandescent lamps and to provide tax incentives.
- Develop or adopt a common technical specification for CFLs:
  - ✓ The region should come to an agreement on policy development or adoption: July 2008
  - ✓ The replaced incandescent lamps should be crushed.
  - ✓ Campaign to encourage customers to be started: July 2008
  - ✓ LOCAL MANUFACTURING for CFLs to be exploited and Phillips who are in process of setting up a plant in Lesotho, should be contacted by SAPP: July 2008

2.4 FINANCIAL AND FISCAL INCENTIVES

- Implementation of DSM would come with cost to power utilities and to SADC region as a whole.
- Therefore, SADC governments could assist the SAPP by providing and putting in place the following:
  - i. Legislation and policies
  - ii. Rebates (subsidies, tax cuts, import tariff reduction or removal)
  - iii. Cost reflective and time of use tariffs where applicable,
  - iv. Government grants such as the creation of DSM fund to support DSM initiatives, and
  - v. Penalties for inefficiency use of energy by customers should be considered.

2.5 TECHNOLOGY INTERVENTION

i. Phasing out of Incandescent lamps

- ✓ SAPP utilities to sell CFLs at revenue collection points and then ensure that incandescent lamps are removed.
- ✓ The region must work towards a regional technical specification for purposes of mass procurement by the SAPP member states.
- ✓ Environmental impacts for disposals for CFLs should be highlighted and a disposal strategy be developed.
- ✓ Utilities should be encouraged to use CFLs in all new installations.

ii. Solar Water Heaters

- ✓ Solar water heaters should be encouraged and promoted in SADC member countries.

F. Status of SAPP Electricity Supply

Country	Utility	Installed Capacity [MW] *Apr-08*	Available Capacity [MW] *Dec-06*	Available Capacity [MW] *April 2008*	% Change	2007 Peak [MW]
Angola	ENE	1,128	683	943	38%	476
Botswana	BPC	132	120	90	-25%	496
DRC	SNEL	2,442	1,170	1,170	0%	1,075
Lesotho	LEC	72	70	70	0%	109
Malawi	ESCOM	302	241	246	2%	240
Mozambique	EDM	233	174	174	0%	365
	HCB	2,250	1,675	2,075	24%	
Namibia	NamPower	393	360	360	0%	449
South Africa	Eskom	43,061	36,208	38,764	7%	36,513
Swaziland	SEB	51	50	70	40%	196
Tanzania	TANESCO	1,186	680	780	15%	635
Zambia	ZESCO	1,737	1,095	1,200	10%	1,468
Zimbabwe	ZESA	2,045	1,085	1,125	4%	1,758
TOTAL SAPP		55,032	43,611	47,067	8%	43,780
l Interconnected SAPP		52,416	42,007	45,098	7%	42,429

1. Installed Capacity as at April 2008

- SAPP has an installed capacity of about 55,000MW
- Only about 47,000MW of capacity is available as at April 2008.
- Over 8,000MW of capacity is unavailable due to
  - Power rehabilitation projects & remedial maintenance:
    - ✓ Zambia (reduction of 450MW): Feb 2009
    - ✓ Zimbabwe (reduction of 400MW): Oct 2008
    - ✓ DRC (reduction of 344MW): Nov 2008
    - ✓ Botswana (30MW): June 2008
    - ✓ South Africa (2,000MW)
  - Power Station auxiliaries (MW generated minus MW sent out)
  - Fuel constraints (water hydrological, coal supply logistics, etc)
  - Ageing infrastructure

2. Commissioned Generation Projects 2007

No	Utility	Country	Type	Units	Capacity [MW]	Total Capacity [MW]	Commissioned Date
1	Eskom	South Africa	Thermal	2	190	380	1st Quarter of 2007
2	Eskom	South Africa	OCGT	7	148	1036	May-07
3	ENE	Angola	Hydro	1	130	130	Mar-07
4	ENE	Angola	Hydro	1	130	130	Jul-07
5	SEC	Swaziland	Hydro	1	20	20	Dec-07
				TOTAL		1696	

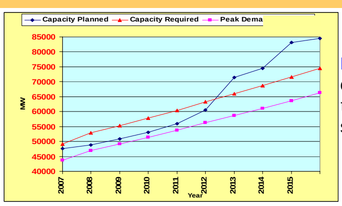
- A total of about 1,700MW was commissioned in 2007 against a target of 1,925MW.
- Angola not yet interconnected to SAPP

3. Projects to be Commissioned in 2008

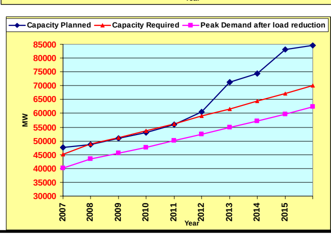
No	Utility	Country	Name	Type	Units	Capacity [MW]
1	Eskom	South Africa	Camden Demoth	Thermal	2	380
2	Eskom	South Africa	Grootvlei Demoth	Thermal	2	380
3	Eskom	South Africa	Komati Demoth	Thermal	2	202
4	SNEL	DRC	Inga 2	Hydro	1	160
5	ZESA	Zimbabwe	Hwange Rehab	Thermal	4	400
6	ZESCO	Zambia	Rehab	Hydro	4	60
7	ZESCO	Zambia	Rehab	Hydro	1	30
8	TANESCO	Tanzania	Ubungo	Gas	10	100
9	TANESCO	Tanzania	Tegeta	Gas	3	45
					TOTAL	1757

- In 2008, the SAPP is commissioning 1,757MW against a planned target of 2,014MW
- Tanzania is not yet interconnected to the SAPP grid

4. FORECAST DEMAND Vs SUPPLY [2008 – 2015] ALL SAPP MEMBERS



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



Situation improves and is better after load management.

5. SAPP MEMBER PROJECTS – FINANCING GAP

- Rehabilitation will add a total of 1,379MW at a cost of US$1 billion by 2008 - 2010.
  - ✓ Financing gap of US$101m for 170 MW identified.
- Short-term generation will add 5,961MW at a cost of US$3.9 billion by 2008 - 2010.
  - ✓ Financing gap of US$85m for 100 MW identified.
- Financing gap of US$ 13.5 billion for 8,800 MW between 2011 – 2013 identified.
- Long-term generation will add 44,000MW at a cost of US$41.5 billion by 2011 - 2025.

6. REHABILITATION & SHORT TERM PROJECTS FINANCING GAP [2008 – 2010]

No.	Country	Project Name	Capacity [MW]	Expected Date	Estimated Project Cost USD [M]	Funding
1	Mozambique	Mavuzi and Chicamba	34	2009	30	N
2	DRC	Mwadingusha	12	2010	30	N
3	DRC	Zongo	75	2010	20	N
4	DRC	Sanga	8	2010	6	N
5	DRC	Koni	42	2009	15	N
6	Malawi	Kaphichira Phase-2	64	2010	50	N
7	Zimbabwe	Gairezi Hydro Generation	35	2009	35	N
TOTAL			270		186	

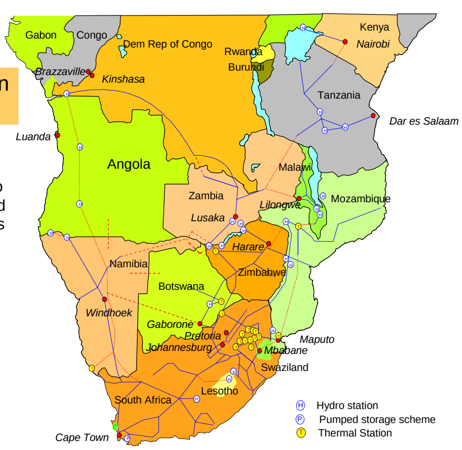
- 270 MW needed for USD 186 million for rehabilitation and short term projects

7. NEW PROJECTS & COSTS FINANCING GAP [2009 – 2015]

FINANCING GAP				
Year	New Capacity, MW	Cummulative Capacity, MW	Cost, USD m	Cummulative , USDm
2009	166	166	120	120
2010	169	335	101	221
2011	750	1085	370	591
2012	2917	4002	3139	3730
2013	5110	9112	10020	13750
2014	500	9612	192	13942
2015	11698	21310	14334	28276

Transmission Projects

Over USD 4.7 billion Would be required to develop the identified transmission projects



SOUTHERN AFRICAN GRID

G. SAPP Tariff Study

- The Final Draft Report and the Final Report are yet to be submitted by the Consultant.
- The Final Report would be completed by end of May 2008 and would be circulated to all stakeholders.

H. CONCLUSION

- ❖ Power sector crucial to dynamic economic growth
- ❖ Massive investments required in power sector
- ❖ Cost reflective tariffs an important element in all efforts
- ❖ Demand Side Management crucial to manage deficit
- ❖ The task is heavy but not insurmountable
- ❖ Need for all stakeholders to play their part

THANK YOU