

## Presentation to:

Portfolio Committee on Energy,  
Portfolio Committee on Public Enterprises and  
Select Committee on Economic and Business  
Development

29 July 2014



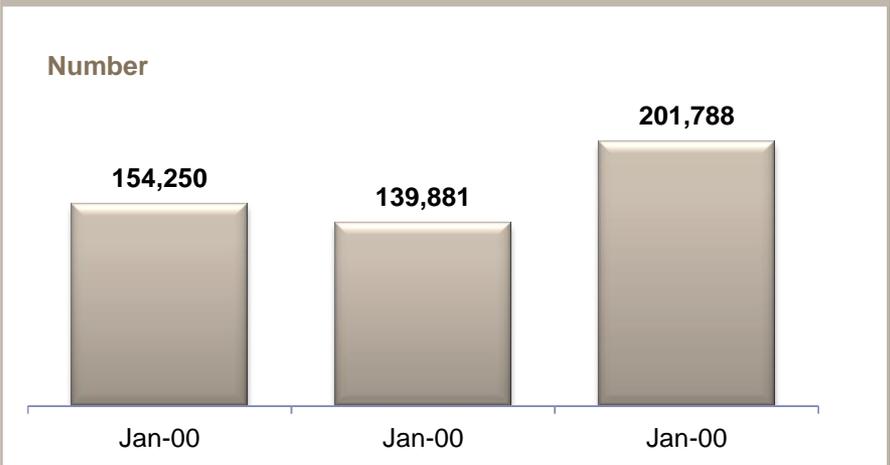
## Content

- 1. Eskom overview**
2. Sustainability of the Energy Sector and Eskom
3. Generation sustainability strategy
4. New build programme update
5. IPP programme
6. International agreements
7. Gas future
8. Municipal debt

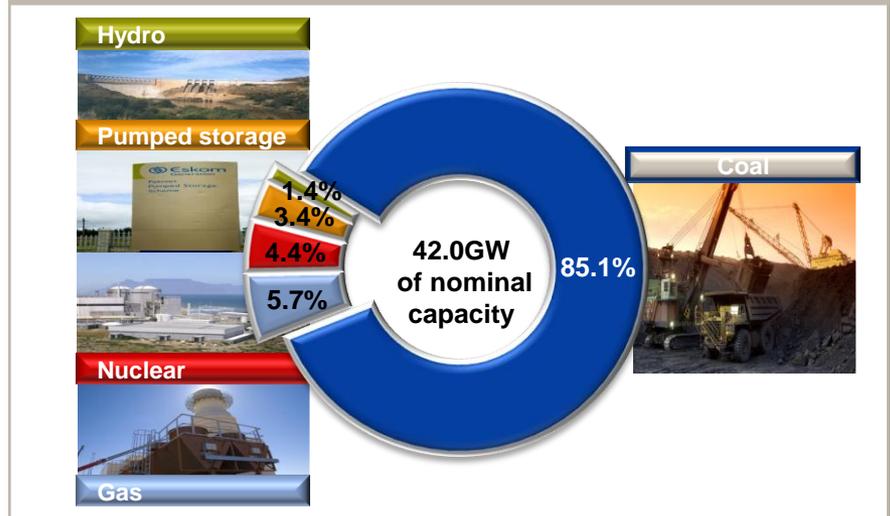


- Strategic **100% state-owned electricity utility**, strongly supported by the government
- **Supplies approximately 95%** of South Africa's electricity
- Performed **201 788 household electrification connections** during the year, the highest in a single year since 2002
- As at 31 March 2014:
  - **5.2 million customers** (2013: 5.0 million)
  - Net maximum **generating capacity of 42.0GW** (2013: 41.9GW)
  - **17.4GW of new generation capacity being built**, of which 6.1GW already commissioned
  - Approximately **359 337km of cables and power lines**
  - **46 919 employees**, inclusive of fixed-term contractors, in the group (2013: 47 295)
- Moody's and S&P stand-alone credit ratings: b1 and b- respectively with a negative outlook

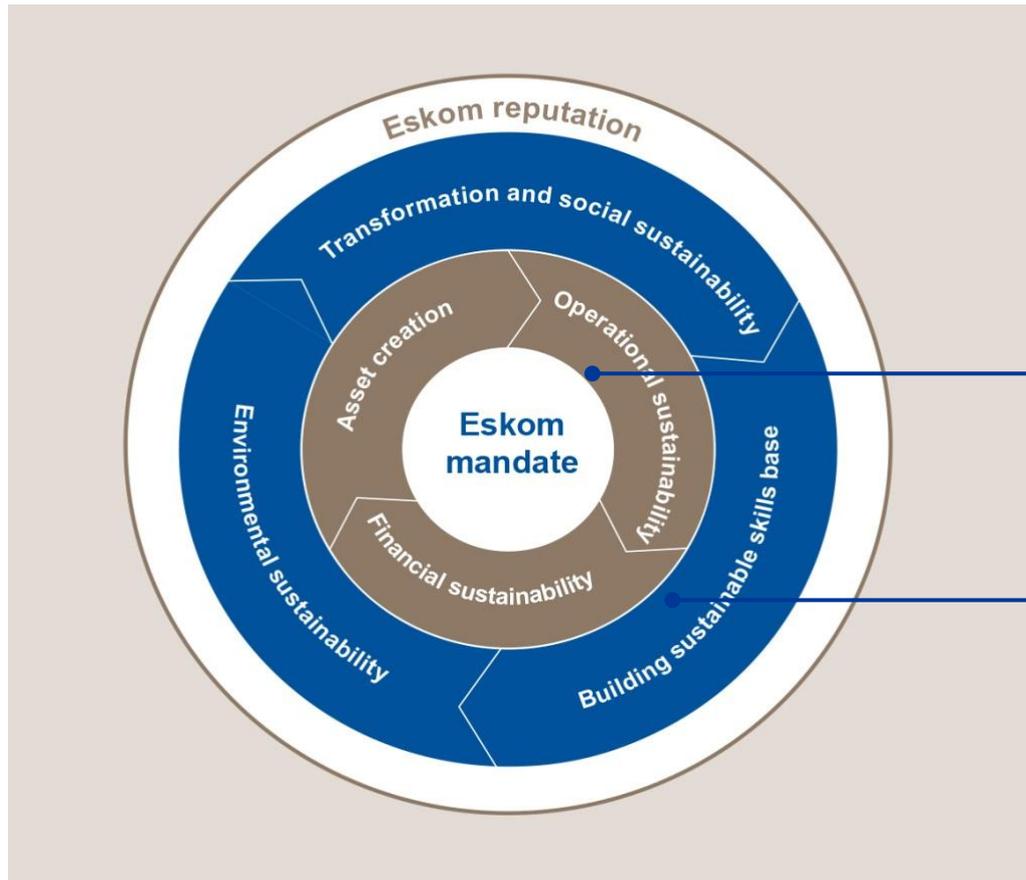
## Number of electrification connections



## Generation capacity – 31 March 2014



The changing environment requires a response that will ensure sustainability



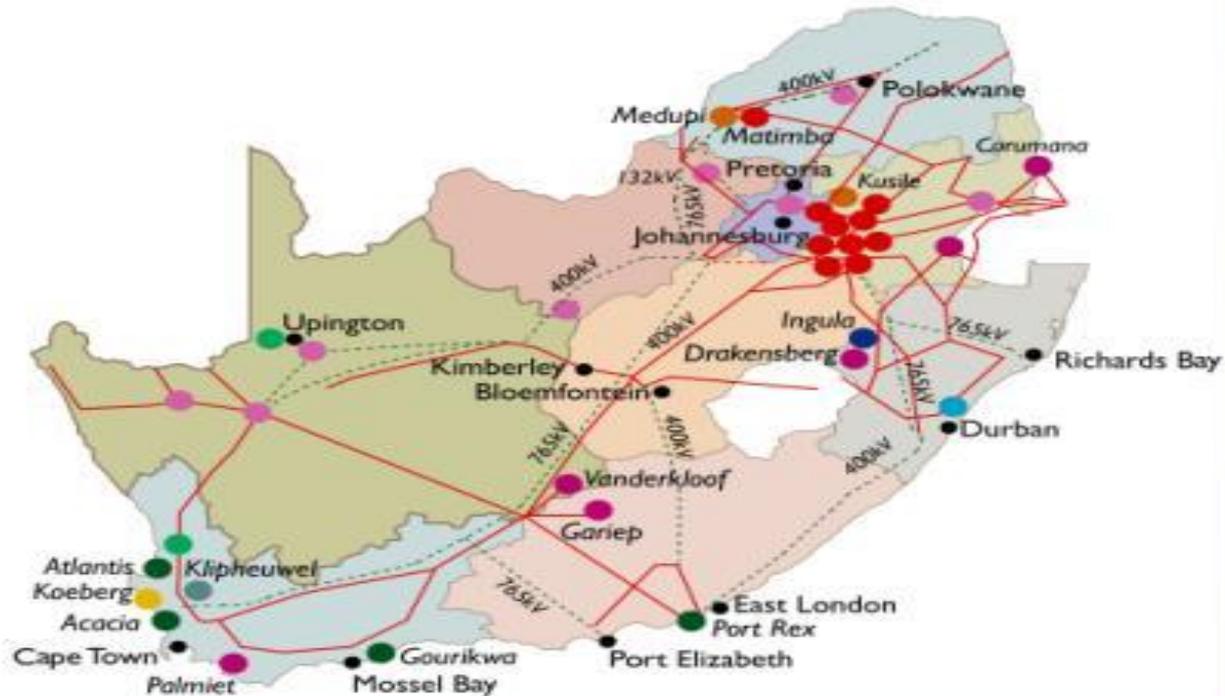
**Eskom's mandate is comprehensive**, focused on many dimensions of sustainability

- **Core areas** revolve around the tension of asset creation, operational sustainability, and financial sustainability
- Beyond that, **Eskom also needs to ensure a positive wider impact** on the environment, contribution to strategic transformation and social sustainability objectives as well as the contribution to a sustainable skills base

**Safety will continue to be the foundation for all our operations and is key to Eskom's performance and sustainability**

## South African grid map

The map indicates the South African power network



### Key

- Existing grid system
- - - Possible future grid system
- Future hydroelectric power station
- Future thermal power station
- Hydroelectric power station
- Interconnection substation
- Town
- Future renewables
- Renewables
- Thermal power station
- Future interconnection substation
- Nuclear power station
- Future gas station
- Gas power station

<u>Type</u>	<u>Number of stations</u>	<u>Nominal capacity (MW)</u>
Coal fired	13	35 650
Gas/liquid fuel turbine	4	2 409
Hydroelectric	6	600
Pumped storage	2	1 400
Nuclear	1	1 860
Wind energy	1	3
<b>TOTAL</b>	<b>27</b>	<b>41 919</b>

<u>Station</u>	<u>Location</u>	<u>Nominal capacity (MW)</u>
Arnot	Middelburg, Mpumalanga	2 232
Camden	Ermelo	1 480
Duvha	Witbank	3 450
Grootvlei	Balfour	1 090
Hendrina	Mpumalanga	1 865
Kendal	Witbank	3 840
Komati	Middelburg, Mpumalanga	791
Kriel	Bethal	2 850
Lethabo	Viljoensdrift	3 558
Majuba	Volksrust	3 843
Matimba	Lephalale	3 690
Matla	Bethal	3 450
Tutuka	Standerton	3 510

# Eskom's peaking power stations

	<u>Station</u>	<u>Location</u>	<u>Nominal capacity (MW)</u>
<b>Gas</b>	Acacia	Cape Town	171
	Ankerlig	Atlantis	1 327
	Gourikwa	Mossel Bay	740
	Port Rex	East London	171
<b>Hydroelectric</b>	Colley Wobbles	Mbashe River	42
	First Falls	Umtata River	6
	Gariep	Norvalspont	360
	Ncora	Ncora River	2
	Second Falls	Umtata River	11
	Vanderkloof	Petrusville	240
<b>Pumped storage</b>	Drakensberg	Bergville	1000
	Palmiet	Grabouw	400
<b>Wind</b>	Klipheuwel	Klipheuwel	3
<b>Nuclear</b>	Koeberg	Melkbosstrand	1860

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Eskom's Emergency Task Team was set up by Board at the April 2014 Breakaway.

The Eskom response plan is organised around four pillars:

- The first pillar is **Financial sustainability**, this includes development of opportunities to optimise the balance sheet and unlock cash as well as the Business Productivity Programme (BPP). BPP has already scoped value packages to address key areas of spend: Primary Energy, Maintenance Costs, Employee Costs, Capex, and External Spend. The Programme has also looked at Financial levers and Revenue Management.
- The second pillar is **Operational Sustainability**, encompassing the comprehensive programme to improve and sustain the generation plant.
- The third and final lever is the **Delivery of the Build Programme** focusing on delivery of Unit 6 and 5 of Medupi, and containing the Capex spend to R251bn and pursuing opportunities to add capacity and reduce system pressures by using alternative technologies, for example gas.
- The fourth pillar is the **implementation of a Gas Strategy** focusing on both local and regional gas sources for both greenfield and brownfield projects.

The initial emergency work, which focused on the 90 day plan, has now been concluded  
...an intense stakeholder engagement has now begun.

## (Today and going forward)

- **Cashflow forecast negative by June 2015**
- **Challenging to raise additional debt** to reverse the situation
- Forecasted **sales decline of R47 bn**

## Key objectives for today

- **Focus on short term imperatives**
- **Review critical decisions needed**
- **Frame long term issues and possible solutions**



## TIMELINE

### (1997-2008)

- No increase of generation capacity
- Maintenance deferred and use of OCGTs increased
- Extensive build program to add capacity launched in 2000's

### (2012-Today) - MYPD3

- R225 bn revenue gap
- Eskom Response programme established
- Operating reserves not adequate to meet peak demand

# We are looking at all available solution options

## Internally Eskom will drive the following

- Implementing a Business Productivity Programme (BPP) to reduce operating costs and limit capital spend
- Bring Medupi Unit 6 on line – first synchronisation by end of this year
- Accelerating the Generation Sustainability Programme with the aim of improving the availability and reliability of plant.
- Identifying new demand and supply-side levers to limit use of Open Cycle gas Turbines
- Pursuing gas options for both existing (brownfield) and new (greenfield) plants.
- Identifying regional projects and partnerships within the South African Power Pool.
- Identifying and finalising various funding options with the relevant Stakeholders.
- Clearly communicate and work with stakeholders on the new process to manage the system including revised load shedding schedules and communication to give certainty around the system reliability .

An appropriate sustainability Plan for Eskom looking at various options is being worked on by the relevant Stakeholders in line with the President's State of the National address.

## Content

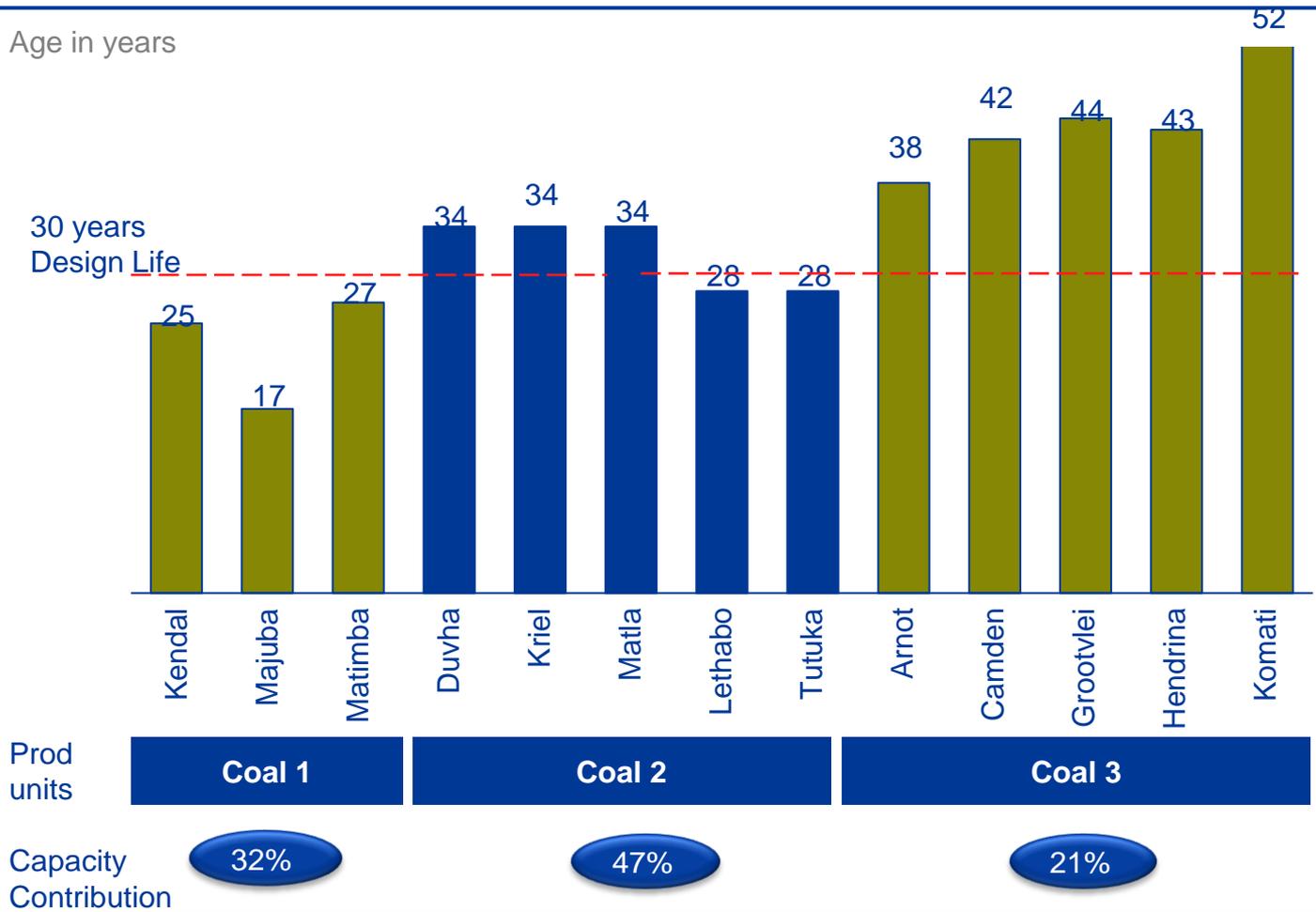
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# 60% of Eskom Power Stations are older than the recommended design life of 30 years<sup>1</sup>



## Coal Power Station ages



## Insight

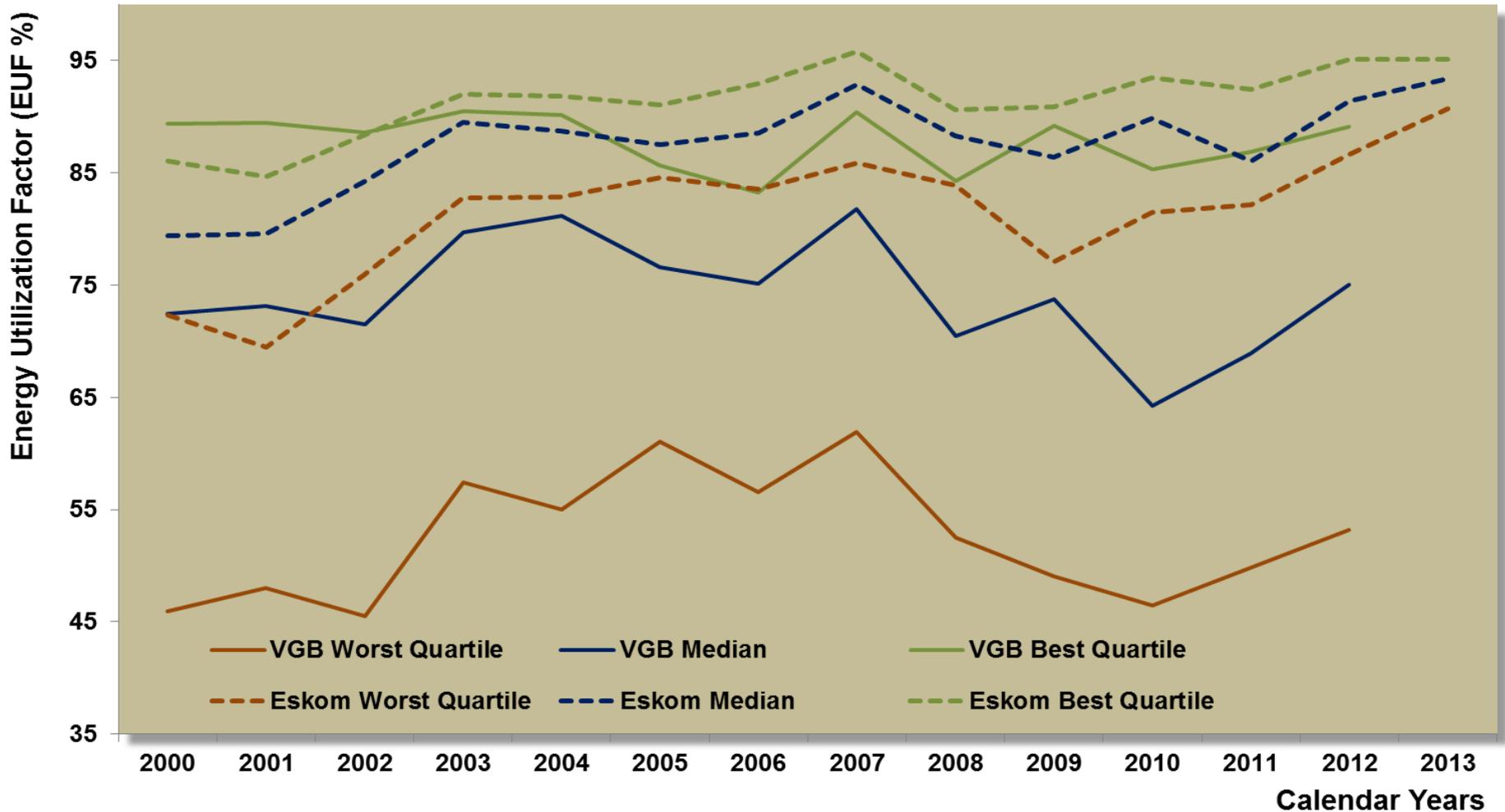
An aging Eskom fleet results in four major issues:

1. Increase in unplanned failures.
2. More mechanical maintenance failures
3. Increased duration required for outages puts pressure on the grid
4. Increased cost implications
5. Specialist engineering required

<sup>1</sup> – Interviews with Eskom Specialists, Medupi URS, Eskom Document GGP 1282 REV.2  
 SOURCE: GPSS, Team analysis

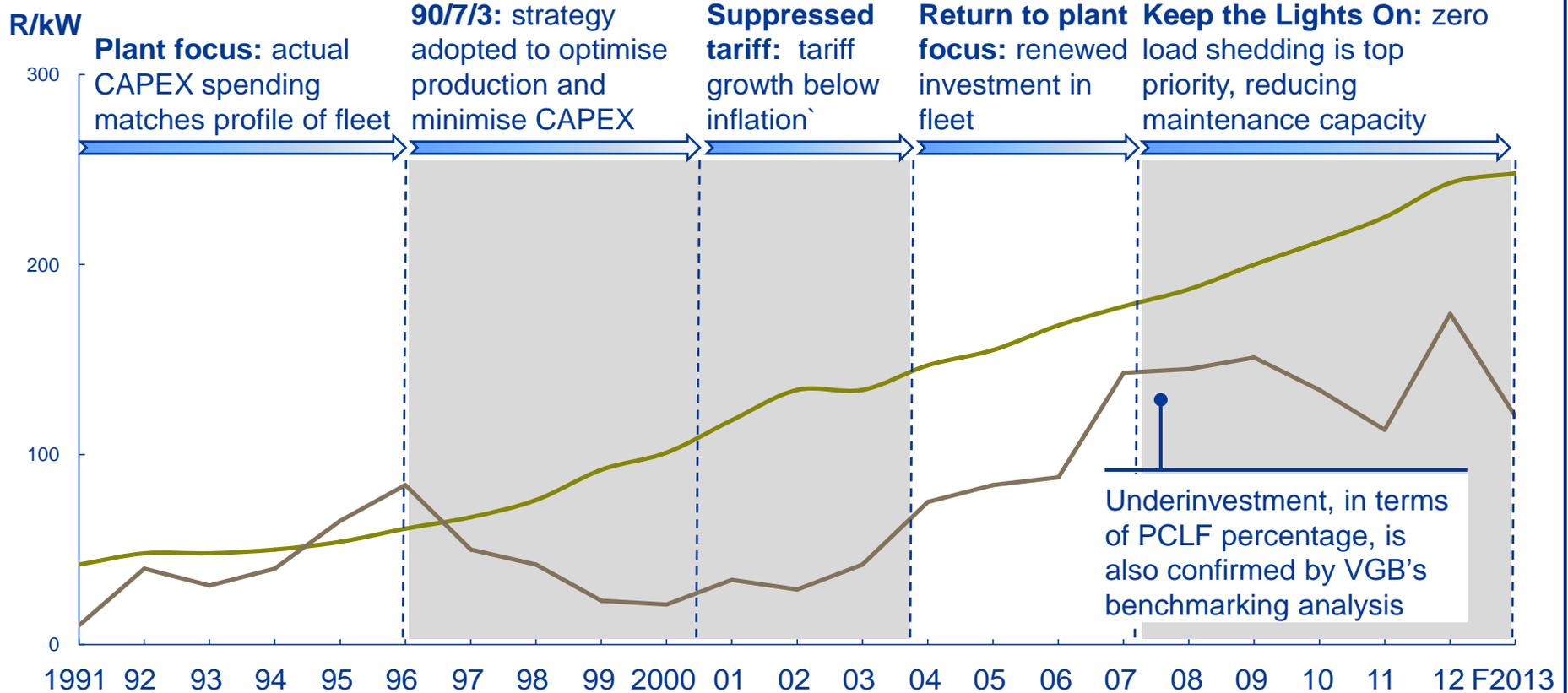
# Generation plant is being run harder than all other utilities

**Benchmarking EUF % All Coal Sizes 2000 - 2012**  
**123 VGB Units - Current Year (excl. Eskom Units)**



# Gx Plant have seen over 15 years of under expenditure in Capex on a fleet basis with periods of cost cutting, financial constraints and capacity constraints

## Capital expenditure – Generation (coal fired, etc.)

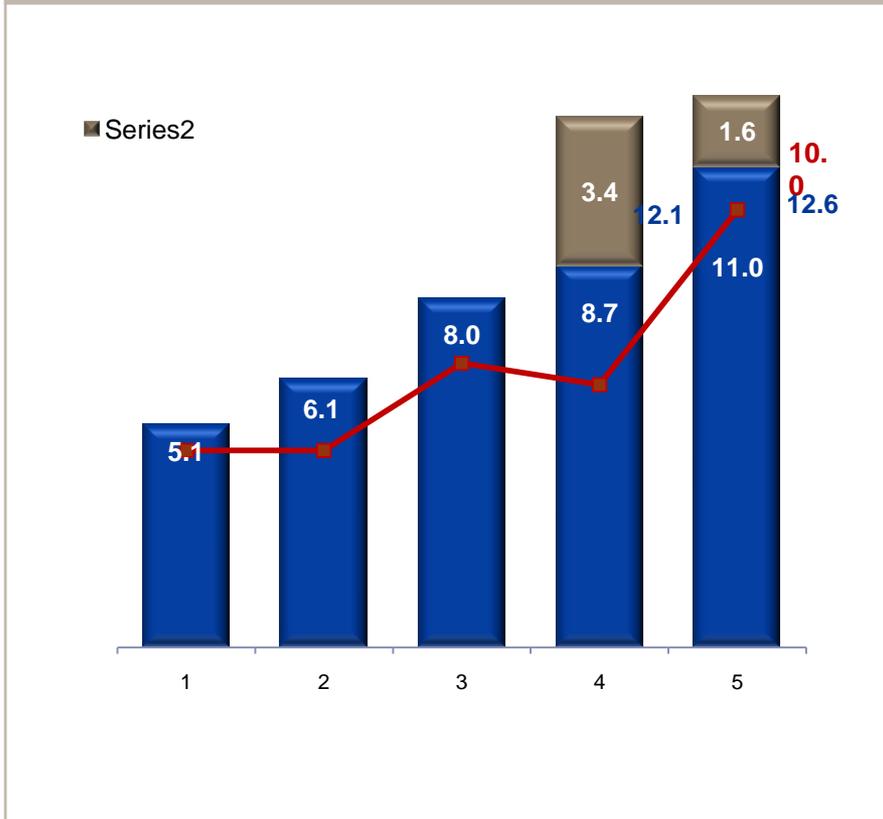


**Past decisions, while reflective of the need of South Africa and Eskom at the time, de-prioritised both time and capital allocated for maintenance**

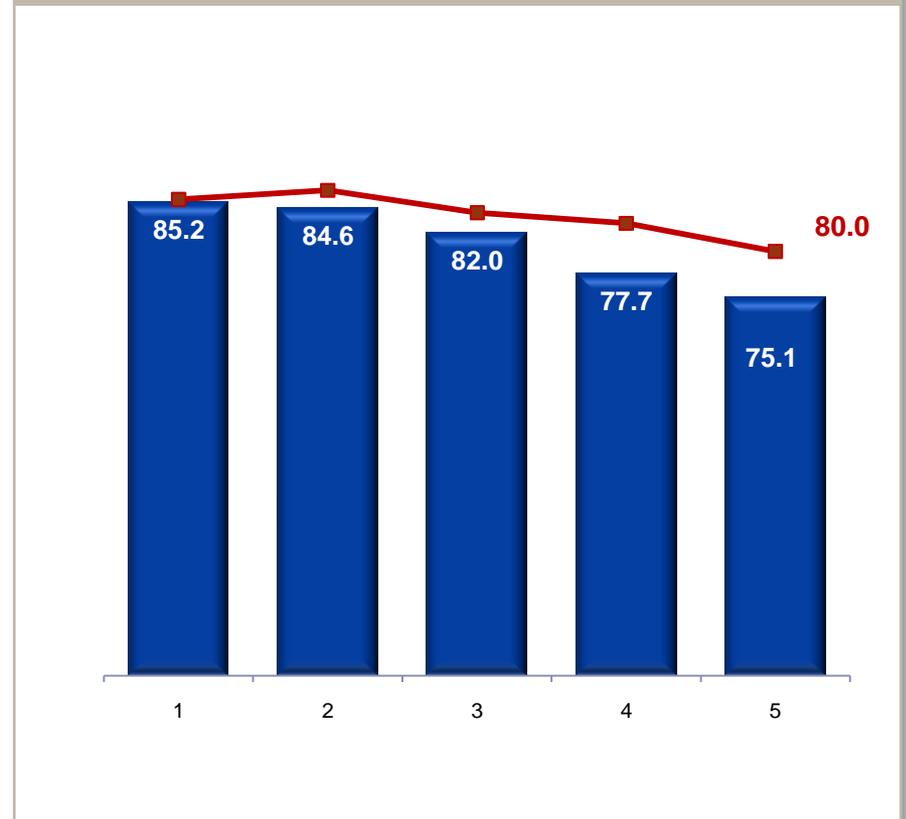
# UCLF and EAF trends from March 2010 to March 2014

■ Actual     
 ■ Annual year-end target

## Unplanned capability loss factor (UCLF<sup>1</sup>) %



## Energy availability factor (EAF<sup>2</sup>) %



1. UCLF measures the lost energy due to unplanned production interruptions resulting from equipment failures and other plant conditions
2. EAF measures plant availability, plus energy losses not under the control of plant management

# A 5 point recovery plan has been put into place in attempt to put generation on a sustainable path

## Initiative

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- 80 – 10 – 10 : Commit and deliver
- Recover good practice – adhere to SOP, housekeeping, outage quality and scope and on line maintenance
- Visible, aligned and felt leadership
- Hands on oversight, correction and mentorship
- Securing the space to manage increased volatility – Demand & Supply

# Generation performance recovery in 5 years

## Forecasted maintenance space required

MW, % PCLF

EAFF (%)

77.0

78.0

79.0

80.0

80.0

PCLF (%)

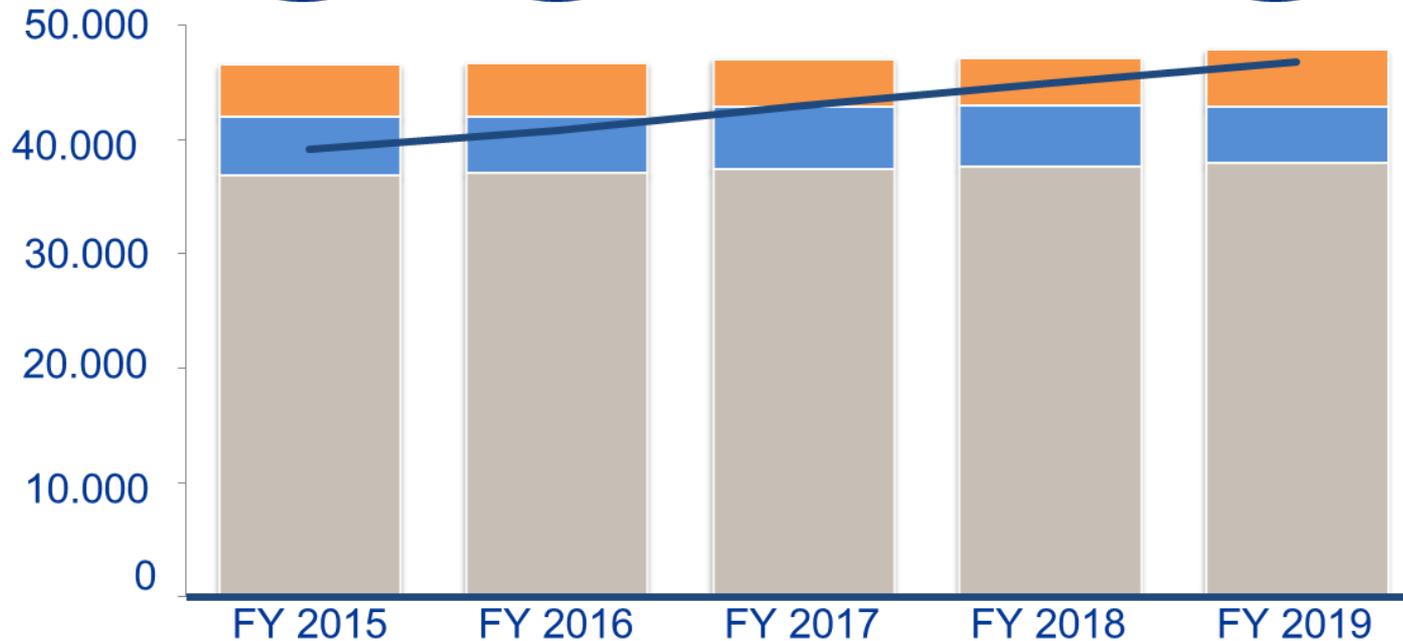
10.8

10.9

9.1

8.8

10.0



- PCLF
- UCLF
- Demand

### Implications

- Additional ~7,400 MW capacity required immediately to satisfy all maintenance requirements
- The requirement drops off in later years significantly

**Maintenance capacity shortfall<sup>1</sup>**

7,400

5,900

4,200

2,200

1100

MW

<sup>1</sup> Required to cover UCLF and PCLF  
Source: Maintenance Strategy team

— Supply (excl. operating reserve and current gas)

# There are a number of actions along three horizons to reach Sustainability over the next 5 years

-  People
-  Plant
-  Processes / systems

Improvement – 18 to 36 months



- Reinforce safety-first mindset – continue to innovate
- Retention drive to decrease turnover at key positions

Stability – up to 18 months



- Staff most critical vacancies
- Free up site & senior leadership time to spend more time in the physical plant
- Deploy Specialist to sites



- **Return to Design-based Maintenance**
- Ensure 100% stat/env compliance



- Drive UCLF down – targeted effort
- Improve Outage/Comm Effectiveness
- Exhaust supply and demand levers



- Streamline HR recruitment process
- Finalise condition monitoring implementation
- Improve site risk management processes



- Cease / postpone certain initiatives
- Roll out strategic and modular spares
- Use OEM capacity more effectively

Sustainability – up to 72 months



- Transform organisational mindset - sustainability
- Refocus training techniques in favour of hands-on, at-site technical experience



- Embed inflexible philosophy maintenance strategy
- Allocate sufficient budget for technical program
- Monitor & continuously Improve maintenance quality



- Implement tools for better technical data collection
- Manage suppliers contracts more rigorously



## Recent load shedding incidents...

## General power system context

- The power system has been **operated at its limit** in order undertake as much maintenance as possible.
- Whilst the intent has been to avoid forced demand reduction, the increased possibility of load shedding is a consequence
- Over the last six months, the variability in generation performance has been managed, however at current reserve levels, additional incidents affecting the balance of supply and demand may lead to a need for forced demand reduction.

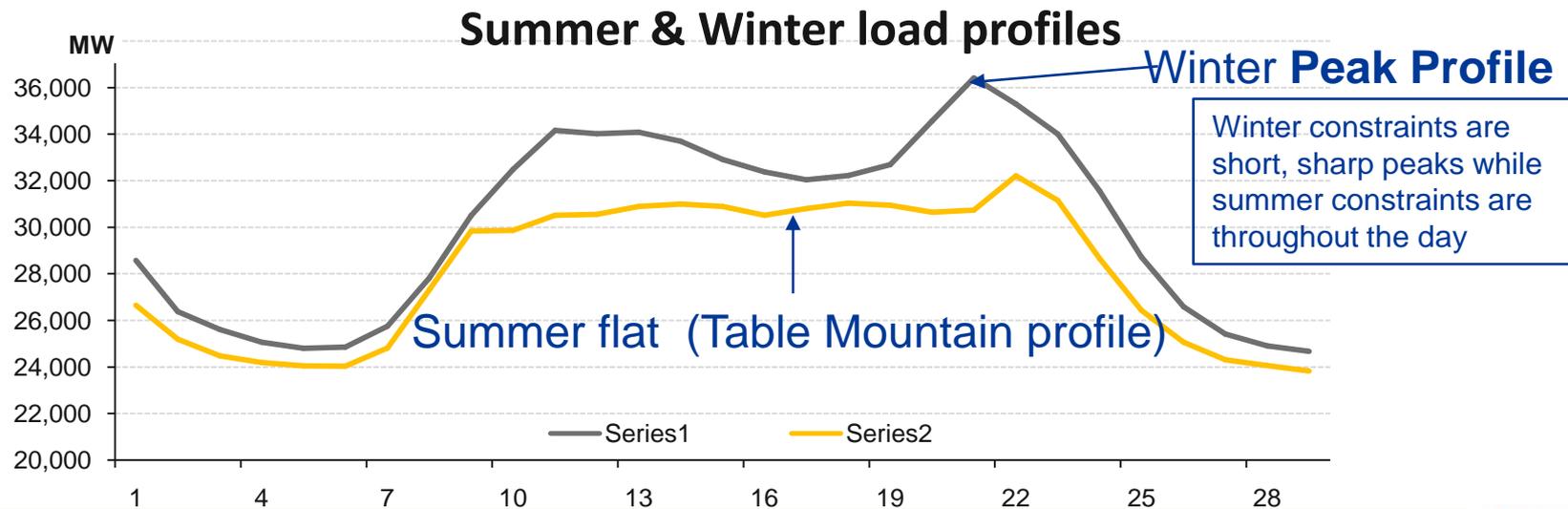
# Learning from system emergency incidents

	November 2013	February 2014	March 2014
<b>Cause (NB context of a constrained system)</b>	Disruption in the supply of OCGT fuel	HVDC line failure	Kendal coal and Duvha conveyer fire
<b>Emergencies declared</b>	19 Nov (17H00 - 29 Nov) Revised (21H00 21 Nov)	20 Feb (11H40-21H00) 21 Feb (15H50-21H00)	6 Mar (06H00-22H00)
<b>Voluntary demand reduction</b>	Large customers Metro's munics Small customers	Large customers Metro's munics Small customers	Large customers Metro's munics Small customers
<b>Forced demand reduction</b>	Curtailment – i.t.o. NRS048-9	Curtailment – i.t.o. NRS048-9	Curtailment & shedding – i.t.o. NRS048-9
<b>Stakeholders: large customers</b>	10% reduction	10% reduction	Initially 10% and then 20% reduction
<b>Stakeholders: Smaller customers</b>	No load shedding	No load shedding	Stage 3 shedding (20%) Stage 2 shedding (10%)
<b>Metro's and municipalities</b>	No load shedding	No load shedding	Implemented load shedding
<b>Schedules</b>	Eskom and several Metro/munic schedules published as a precaution	Schedules remained published	Several Metro/munic schedules not available until later in the day/week.

# Learning from system emergency incidents

	June 2014	June 2014	June 2014
<b>Cause (NB context of a constrained system)</b>	Kendal MUT causing depletion of reserves.	System demand	System demand
<b>Emergencies declared</b>	11 Jun (peak) 12 Jun (peak)	17 Jun (18H00-19H00)	18, 19 Jun (18H00-20H00)
<b>Voluntary demand reduction</b>	Large customers Metro's munics Small customers	Large customers Metro's munics Small customers	Large customers Metro's munics Small customers
<b>Forced demand reduction</b>	Shedding only (11 <sup>th</sup> ) Shed & curtail (12 <sup>th</sup> )	Shedding only – i.t.o NRS048-9	None
<b>Stakeholders: large customers</b>	10% reduction	10% reduction	N/A
<b>Stakeholders: Smaller customers</b>	Stage 1 shedding	Stage 1 shedding	N/A
<b>Metro's and municipalities</b>	Implemented load shedding	Implemented load shedding	N/A
<b>Schedules</b>	Schedules remained published – Eskom website available schedules	Schedules remained published – Eskom website available schedules	Schedules remained published – Eskom website available schedules

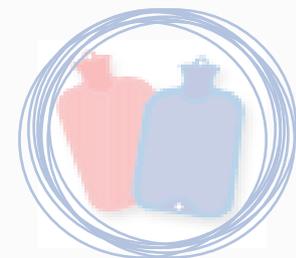
- Peak profile experienced from as early as **May up to end-August**
- Constrained from **5pm – 9pm** (with the highest demand and risk from 5:30pm to 6:30pm)
- Electrical heating, geysers and pool pumps primarily impact demand
- **Residential customers** can make the **biggest difference** as demand increases in the evenings



Help us Beat the Peak as it reduces high diesel usage

# All electricity users are urged to pull together and help to 'Beat the Peak' this winter

- Saving electricity not only reduces pressure on the grid but also reduces on your electricity bill and South Africa's carbon emissions.
- Evening peak is experienced between 5pm and 9pm. Switch off! Particularly from 5:30pm to 6:30pm, when the demand is at its highest.
- **To keep the system in balance please:**
  - **Switch off** geysers and pool pumps during peak times
  - **Reduce swimming pool pump** operating time and limit water circulation to once a day
  - **Dress for the weather**, to postpone switching on space heaters
  - **Install ceiling insulation** - an insulated room requires 51% less energy to heat up
  - Invest in a **thermostatically controlled heater** - a fan heater is ideal for quick heat situations, while an oil heater can be considered to keep a room warm for longer periods
  - Consider **gas heaters and hot water bottles** to keep warm
  - Respond to the **Power Alert messages** by switching off all appliances that are not being used



# It is possible to minimise workplace energy use and spend with these 7 super savings tips

1  Use the cold water tap rather than engaging the geyser every time

5  At the end of the day, don't leave your computer on stand-by; switch off the power button

2  When you leave the office, **remember** to switch off the lights

6  Be energy efficiency and change your light bulbs to energy efficient lights / CFLs

3  Only fill kettles with as much water as you need

7  Before you leave, turn off copiers, printers and fax machines at the switch. Avoid sleep mode.

4  Set air-conditioners' average temperature in summer at 23 C

- Eskom leadership and the Eskom Board are taking a **hands-on approach** to ensure operational sustainability.
- The system remains tight this Winter particularly during **peak from 5pm to 9pm, (with the highest risk between 5:30pm – 6:30pm)** and will remain so for the next few years until the build programme is completed.
- The tight system means that the **probability of load reduction and load shedding remains high in the event of significant incidents** on the power system.
- As a **precautionary measure**, residential customers should familiarise themselves and download winter load shedding schedules.  
<http://loadshedding.eskom.co.za/>.
- We thank all electricity users who continue to assist by reducing consumption.

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# New Generation Capacity and Transmission Lines

Leading and partnering to keep the lights on

## Return-to-service (RTS)



- None

## Base load



- Nuclear New Build Programme
- Next Coal (Coal 3)
- Biomass
- Majuba Underground Coal Gasification Demo Plant (UCG)
- Primary Energy projects (Road and Rail)

## Peaking and renewable



- Pilot Concentrated Solar Power (100 MW)
- Open Cycle Gas Turbine Conversion Project – conversion of Ankerlig and Gourikwa OCGT power plants to a Combined Cycle Gas Turbine (CCGT)
- Photovoltaic (own use)

## Mpumalanga refurbishment



- Refurbishment and air quality projects

## Transmission



- >60 Grid strengthening projects

In development

Under construction

- Komati (1 000 MW)
- Camden (1 520 MW)
- Grootvlei (1 180 MW)

- Medupi (4 764 MW)
- Kusile (4 800 MW)

- Ankerlig (1 338.3MW)
  - Gourikwa (746 MW)
  - Ingula (1 332 MW)
  - Sere (100 MW)
  - Acacia relocation
  - Solar PV installations: MWP, Lethabo, Kendal (1.62 MW)
- 3 517.92 MW**

- Arnot capacity increase (300 MW)
  - Matla refurbishment
  - Kriel refurbishment
  - Duvha refurbishment
  - Grootvlei Fabric Filter Plant (FFP)
  - Kriel Retrofit
- 300 MW**

- 765kV projects
  - Central projects
  - Northern projects
  - Cape projects
- 9 756 km**

**3 700 MW**

**9 564 MW**

Synchronisation of the first units are expected as follows:

- Medupi in the second half of 2014
- Kusile in the second half of 2015
- Ingula in the second half of 2015<sup>1</sup>

- ~ 17.4GW of new capacity (6 137MW installed and commissioned)
- ~ 9 756 km of new transmission network (5 524km installed)
- ~ 42 470 MVA of new transmission strengthening (27 565MVA installed)

**Medupi is the first coal-generating plant in Africa to use supercritical power generation technology**

1. Date moved out after the accident at Ingula end October 2013

## Summary



### Medupi

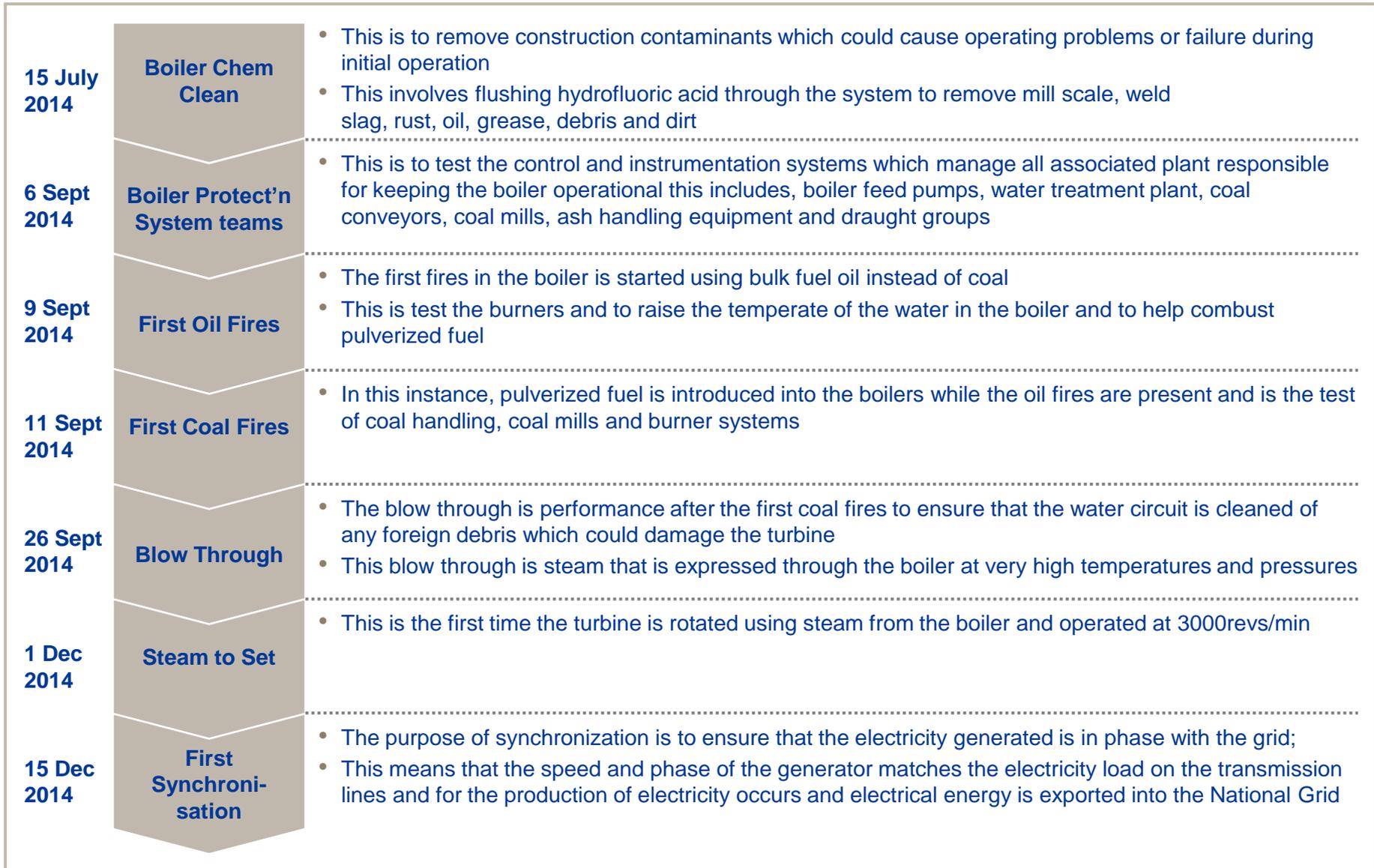
- 1<sup>st</sup> unit synchronization is on **schedule for December 2014**
- Construction progress in critical areas is still hindered due to industrial action that commenced on 01 July 2014, however, there has been a positive trend recently with resources returning to site
  - Both the **main contractors**, Alstom and Mitsubishi Hitachi Power Systems Africa (MHPSA), have **mobilised resources** to reduce the impact of the industrial action
  - In order to avoid slippage on the 1st unit synchronization date, the milestone of **Boiler Chemical Clean Start** is required to commence by **27 July 2014**
- The Control and Instrumentation (C&I) contractor's (Alstom) schedule indicates that it is on target for completion of **First Fires by 15 September 2014**, which is required to support the 1st unit synchronization date.
- First Coal was delivered to the Coal Stockyard and the running of conveyors, coaling to station and optimizing of the system continues.



### Kusile

- 1st unit synchronization by **December 2015**. Eskom continues to implement plans, track progress and drive strategies supported by contractors to complete these works within needed target dates and in parallel with the critical path work.
  - Boiler progress: MHPSA's **progress of 0.6%/week shows improvement** against the previous performance of 0.48%/week during March 2014 and it is making very good progress on Steam Piping. However, progress on the Boiler needs still needs to be improved to avoid slippages into 2016
  - Eskom continues to work with the C&I contractor to ensure support for the 2015 synchronization date, Eskom has also **implemented additional measures to mitigate schedule risk**
  - We have implemented a **Commercial Strategy** for the project which will help ensure that contractors perform with additional resources having been deployed to site by MHPSA

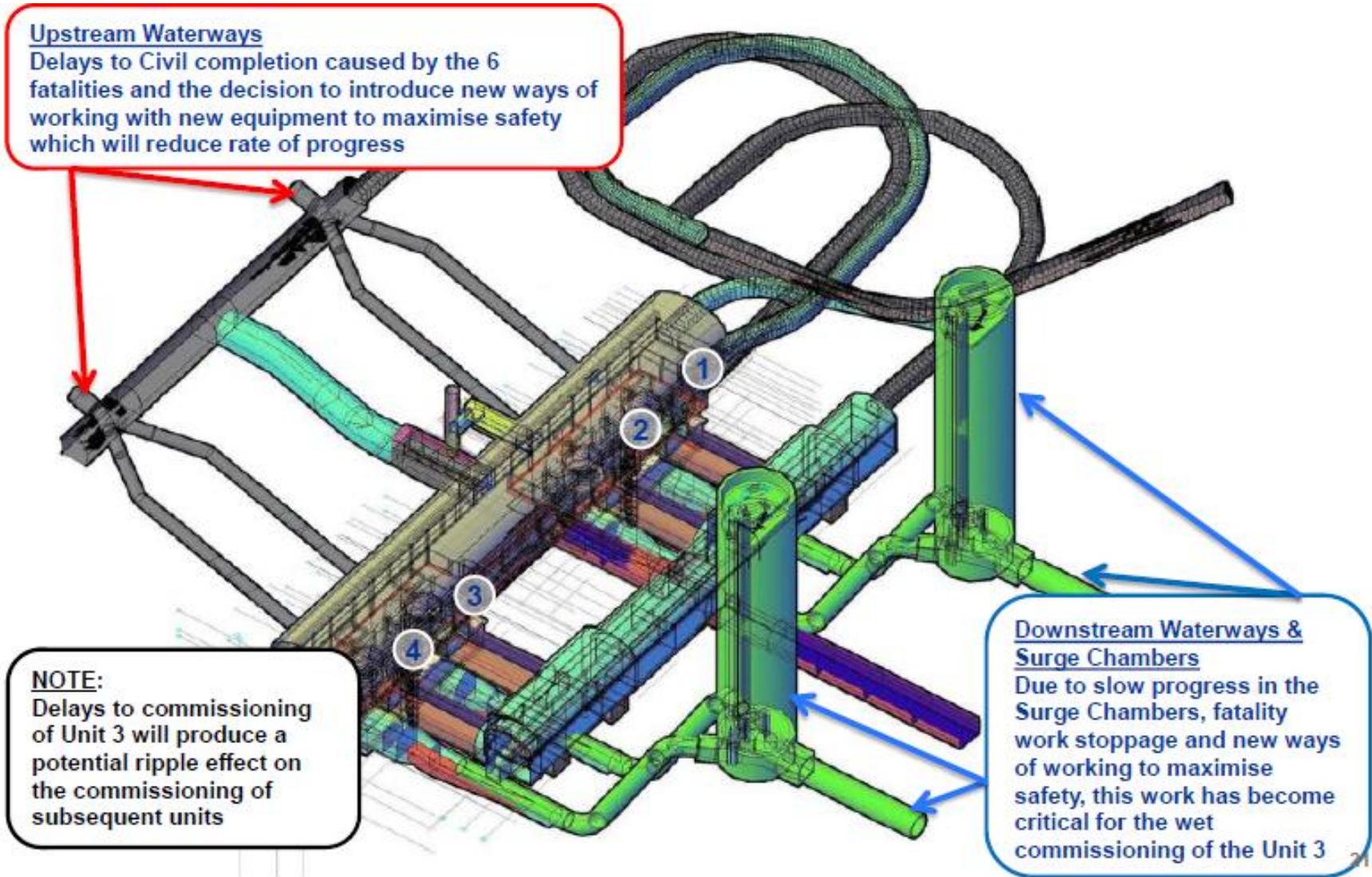
# Medupi Unit 6 – The next steps to 1st Synchronization in December 2014



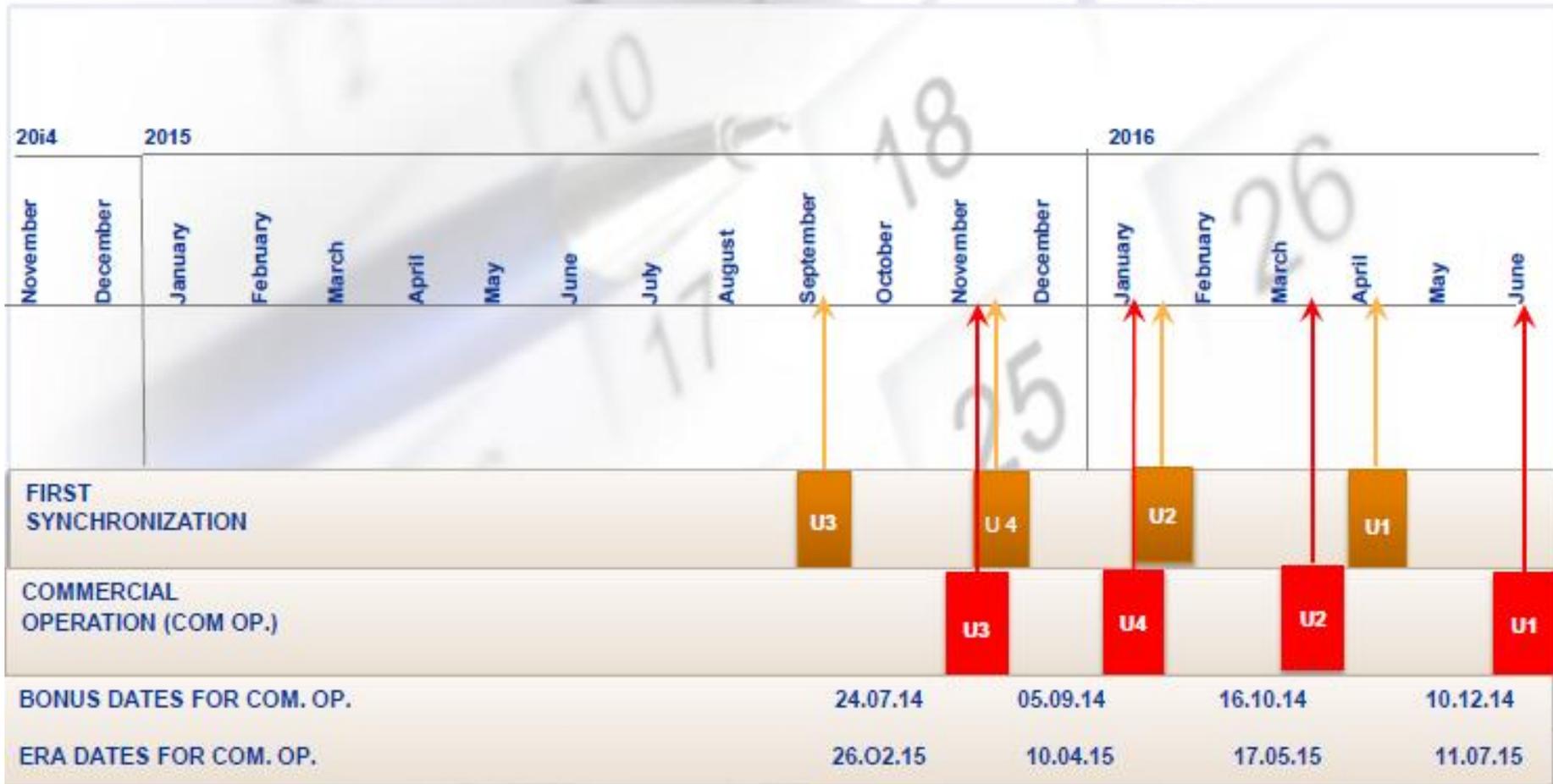
**Base load:** To mitigate the schedule risk relating to Control and Instrumentation (C&I), an Early Works Order (EWO) has been placed in parallel to the current C&I contractor work

	Milestone	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Criteria
Medupi	Alstom FATs	■							
	Siemens/Alstom U6 & 5 BPS	■	■						Determines whether hybrid BPS solution will work.
	SITs on DCS (first fire)			■					Successful SIT will enable full commissioning to proceed safely
	Plant information system (PIS) tests				■	■			Concession required to test PIS After SIT.
Kusile	DCS design and testing			■	■				Successful BPS can then be Implemented to Medupi 4-1.
	<ul style="list-style-type: none"> <li>• Design BPS</li> <li>• Concessions to TGC</li> <li>• FAT</li> </ul>			■	■			■	A successful integrated FAT determines Alstom's compliance.
Mitigation	Early work order for alternative supplier				■			■	RMS done in parallel to the above
	<ul style="list-style-type: none"> <li>• Basic design</li> <li>• Detailed design</li> </ul>				■			■	

# Peaking: Ingula's 1<sup>st</sup> Unit (Unit 3) synchronization of September 2015 could potentially be impacted in 2 main areas



# Peaking: Ingula's Unit synchronization and commercial operations forecast dates



**Forecasted first synchronisation September 2015**

# New build programme: Key issues on projects

Item	Description	Resolution
	<ul style="list-style-type: none"> <li>Inadequate and/or failed Weld Procedure Qualification Records (WPQRs) and Post Weld Heat Treatment (PWHT) on the boilers.</li> <li>Welds for which there was no evidence of PWHT.</li> <li>Misalignment of the Super-Heater that resulted in design changes.</li> </ul>	<ul style="list-style-type: none"> <li>Defective and sub-standard <b>welds needed to be re-treated or redone.</b></li> <li><b>Contractors had to revisit and correct their quality data books</b> to ensure compliant and adequate quality control.</li> <li>All <b>boiler repair work</b> has since been completed.</li> </ul>
	<ul style="list-style-type: none"> <li>The contractor was not able to meet some of its contractual requirements relating to C&amp;I. This posed a risk to both Projects Medupi and Kusile and could have delayed the projects further.</li> </ul>	<ul style="list-style-type: none"> <li><b>Eskom has worked- and continues to work with the contractor</b> to resolve identified issues within the required timelines. However, an alternative supplier was contracted on the Boiler Protection System (BPS) component for the 1<sup>st</sup> two units of Medupi and an Early Works Order (EWO) has been placed in parallel to the current C&amp;I work to further mitigate schedule delays.</li> </ul>
	<ul style="list-style-type: none"> <li>Poor safety performance on sites, particularly at Project Ingula with 6 fatalities occurring during the incident of October 2013.</li> </ul>	<ul style="list-style-type: none"> <li><b>Eskom and its contractors have implemented safety interventions</b>, appointed additional resources, removed non-performing resources and changed work methods. Safety performance and behaviour has improved significantly and Eskom and its contractors will continue with efforts to further improve performance.</li> </ul>

# Transmission projects: On target to meet the shareholder compact of lines built

KM LINE BUILT	Jun-14		YTD Plan	YTD Actual	YE Plan	YE Projection
	Plan	Actual				
<b>Northern Grid Projects:</b>	<b>36.4</b>	<b>33.7</b>	<b>100.1</b>	<b>113.5</b>	<b>208.8</b>	<b>204.9</b>
HPM: 132kV interconnecting line, 400kV line	8.0	0.0	8.0	7.7	57.2	58.3
Kusile: Vulcan bypass, loop 1 and 2	0.0	0.0	0.0	0.0	2.0	2.0
Anglo deviation	0.0	0.0	0.0	0.0	1.5	1.5
Medupi: Section E, F, G and Medupi Masa	28.4	33.7	92.1	105.8	148.1	143.1
<b>765kV Projects:</b>	<b>5.0</b>	<b>8.7</b>	<b>10.0</b>	<b>13.9</b>	<b>70.0</b>	<b>73.9</b>
Kappa Turn ins	5.0	8.7	10.0	13.9	10.0	13.9
Kappa Sterrekus	0.0	0.0	0.0	0.0	60.0	60.0
<b>Cape Grid Projects:</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>6.0</b>	<b>6.0</b>
Mercury Mookodi 400kV line	0.0	0.0	0.0	0.0	6.0	6.0
<b>Central Grid Projects</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>30.3</b>	<b>30.3</b>
Eros-Vuyani 400kV line Section A and B	0.0	0.0	0.0	0.0	25.9	25.9
Verwoerdburg Loop-in Loop-out	0.0	0.0	0.0	0.0	4.4	4.4
<b>Power Delivery Projects</b>	<b>41.4</b>	<b>42.4</b>	<b>110.1</b>	<b>127.4</b>	<b>315.1</b>	<b>315.1</b>

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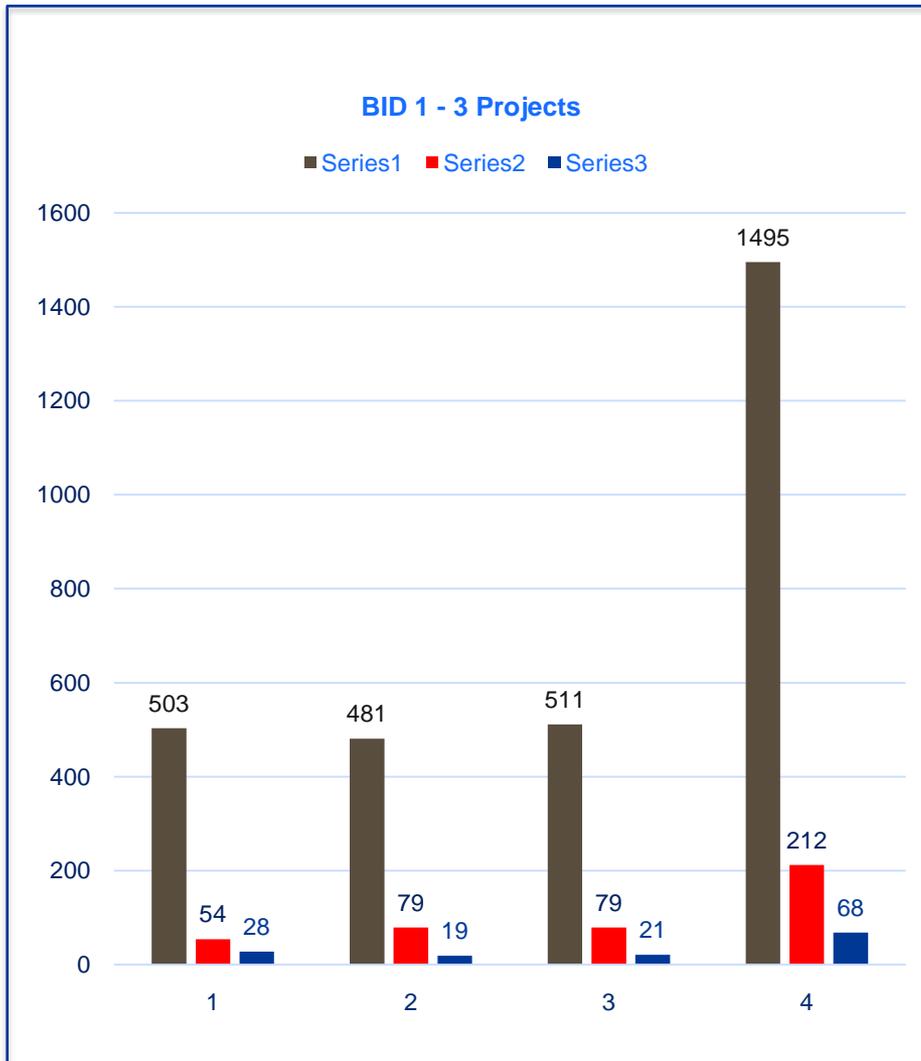


## Introduction

- The **Integrated Resource Plan (IRP 2010-30)** was **promulgated a few years ago** and remains the **official document of government plan** for directing the country on new generation. The IRP 2010 prescribes the preferred generation technology required to meet the expected demand growth up to 2030
- DoE has structured the IRP such that it **delivers on the government policy** of reducing carbon emissions ; introducing competition in the generation of electricity and facilitating economic growth of the country
- There has been some progress over the past three years since the promulgation of the IRP 2010 in executing the procurement programmes through Ministerial Determinations (in 2011 and 2012) which **identified 7135 MW of capacity to be procured from independent power producers (IPPs)**
- Through Small Project Procurement Program, over **200 MW is expected to be procured from the small scale IPPs**. Typically these projects would be between 1 MW and 5 MW. A further 1200 MW to be procured through Special Peakers' programme

## Progress to date

- Eskom Grid Access Unit (GAU) has **processed over 1400 Cost Estimate Letters** in support of the DoE's Renewable Energy Procurement Programme (REIPP)
- As of June 2014, **Eskom has connected 25 IPPs (23 in Bid window 1 and 2 in Bid window 2) as part of the RE IPP PP**. These 25 projects have cumulatively added **over 1300 MW of generation capacity** to the grid. A further 1200 MW is expected by the end of 2015 as the second bid window projects come to fruition
- GAU is currently **processing cost estimate letters for the 4<sup>th</sup> bid window (BW4)** with the bid submission date for this window scheduled for August 2014. In addition, **budget quotations for the 3<sup>rd</sup> bid window (BW3) are being processed** with financial close for these projects expected in August – September 2014



- IPP's that made applications to Eskom are (Bid 1: 503, Bid 2: 481, and Bid 3: 511) In total Eskom processed 1495 applications and issued cost estimates letters to the IPP's.
- Whilst Eskom processed these, only a few IPP's submitted applications for the Bids (Bid 1: 54, Bid 2: 79, and Bid 3: 97) Total: 230
- Successful Bids stand at 68
- Applications vs. successful bidders is less than 5% therefore requiring a different processes to manage the inefficiency

# Eskom has identified key issues and learnt lessons from the integration of IPPs

## Key issues and lessons

### Timelines

- Bid 1 and Bid 2 RE power plants to the grid appear to have taken the “low hanging fruits”. Bid 3 projects already taking longer to cost and quote
- IPP timelines are not consistent with Eskom delivery timeframes
- The slow pace of concluding the framework and activities for the Small and Micro Generation (SMG less than 1 MW) remains a risk to both Eskom and the municipalities

### Geographical locations

- The geographical distribution of renewable IPP projects generally follows the established patterns of wind and photovoltaic (PV) corridors
- Solar resources are largely in the desert areas of the Northern Cape with no infrastructure intended for connection of customers.

### Integration into existing plans

- Eskom Tx network development plan (strengthening and refurbishment) is necessary to create capacity to successfully connect the IPPs. Project does not seem to meet the immediate needs of the IPPs
- Dx and Tx integration for Planning and Design functions need to improve - in the past the improper functioning was not detected
- Eskom project processes and governance procedures may need improvement: 3 projects are likely to claim a total of R96 mil in deemed energy charges for Eskom delayed projects due to Procurement issues (R12mil); MYPD3 capital reprioritization (R19mil) and EIA related issues (R64mil)

### Funding issues

- Despite Eskom availing funding (R2.34 billion) for network upgrades, the long lead times will delay the grid connection dates thus impacting the commercial operation dates of some of the Bid 3 projects
- Although IPP costs are a pass through, negative cashflow for Eskom due to misalignment in timing of cashflows
- Inadequate funding allocated in MYPD3 for strengthening of the network to connect IPPs to the grid

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# Eskom currently has a number of cross-border Sales and Purchase agreements

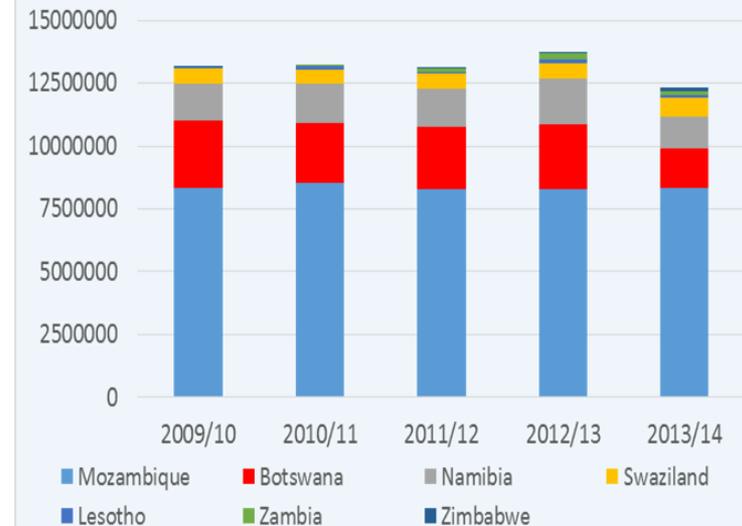
## Sales Agreements

Country	Account	Capacity	Firm?	Expiry
Mozambique	EDM	0MW	Non-firm	-
	Motraco	950MW	Firm	Dec 2025
Zambia	ZESCO	0MW	Non-firm	-
Zimbabwe	ZESA	0MW	Non-firm	-
Lesotho	LEC	90MW	Firm	indefinite
Swaziland	SEC	250MW	Firm	Aug 2025
Namibia	NamPower	300MW	Firm	Mar 2017
	Skorpion	100MW	Firm	Jan 2018
	Orange River	40MW	Firm	
Botswana	BPC	100MW	Firm	Dec 2015

## Purchase Agreements

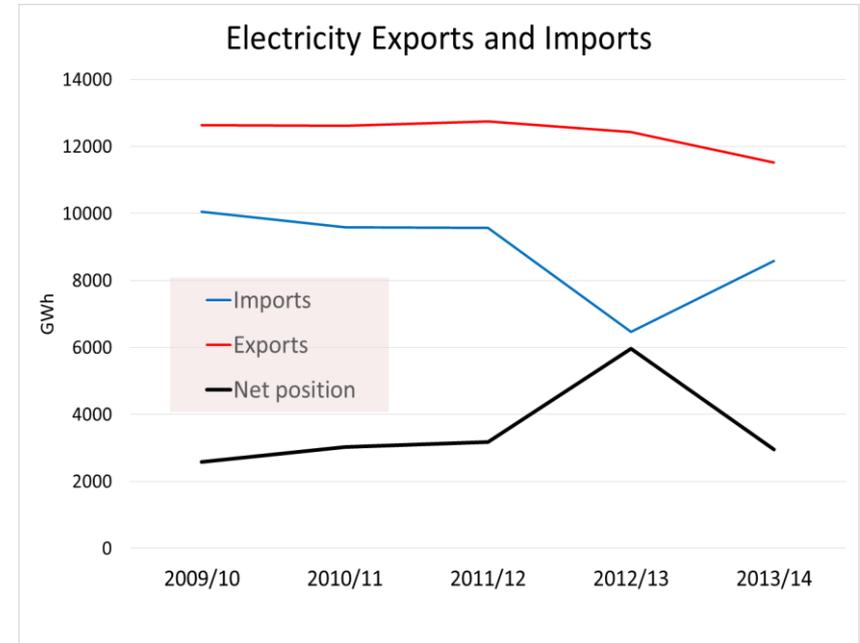
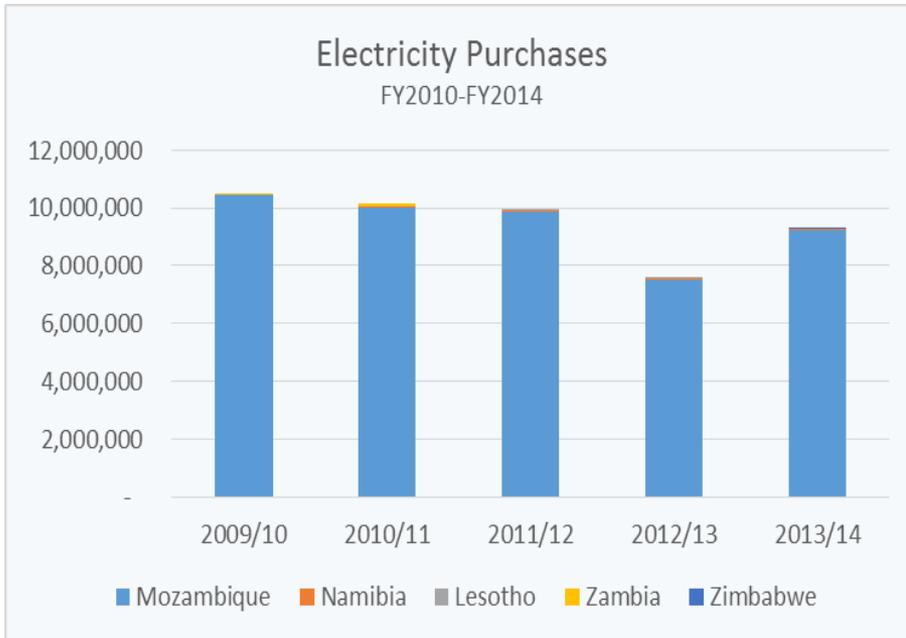
Country	Account	Capacity	Firm?	Expiry
Mozambique	Cahora Bassa	1 500MW	Firm	Mar 2030
	Aggreko	108-148MW	Firm	Aug 2015
Lesotho	LEC	0MW	Non-firm	

Electricity Export Sales  
FY2010 to FY2014



- Mozambique, Botswana and Namibia make up >90% of export sales
- Approx. 65% of sales made to Motraco (Mozal smelter)
- Sales to Botswana reduced due to new Morupule power station in Botswana
- Sales reduced to Namibia due to its agreements with Zimbabwe and Aggreko temporary power station

# Regional imports are currently limited



- Cahora Bassa is the main regional source of supply, tied to supplying the Mozal aluminum smelter in Mozambique
- Poor technical performance of the Cahora Bassa HVDC scheme resulted in reduced imports of 6.43TWh in FY2013, but improved to 8.58TWh in FY2014

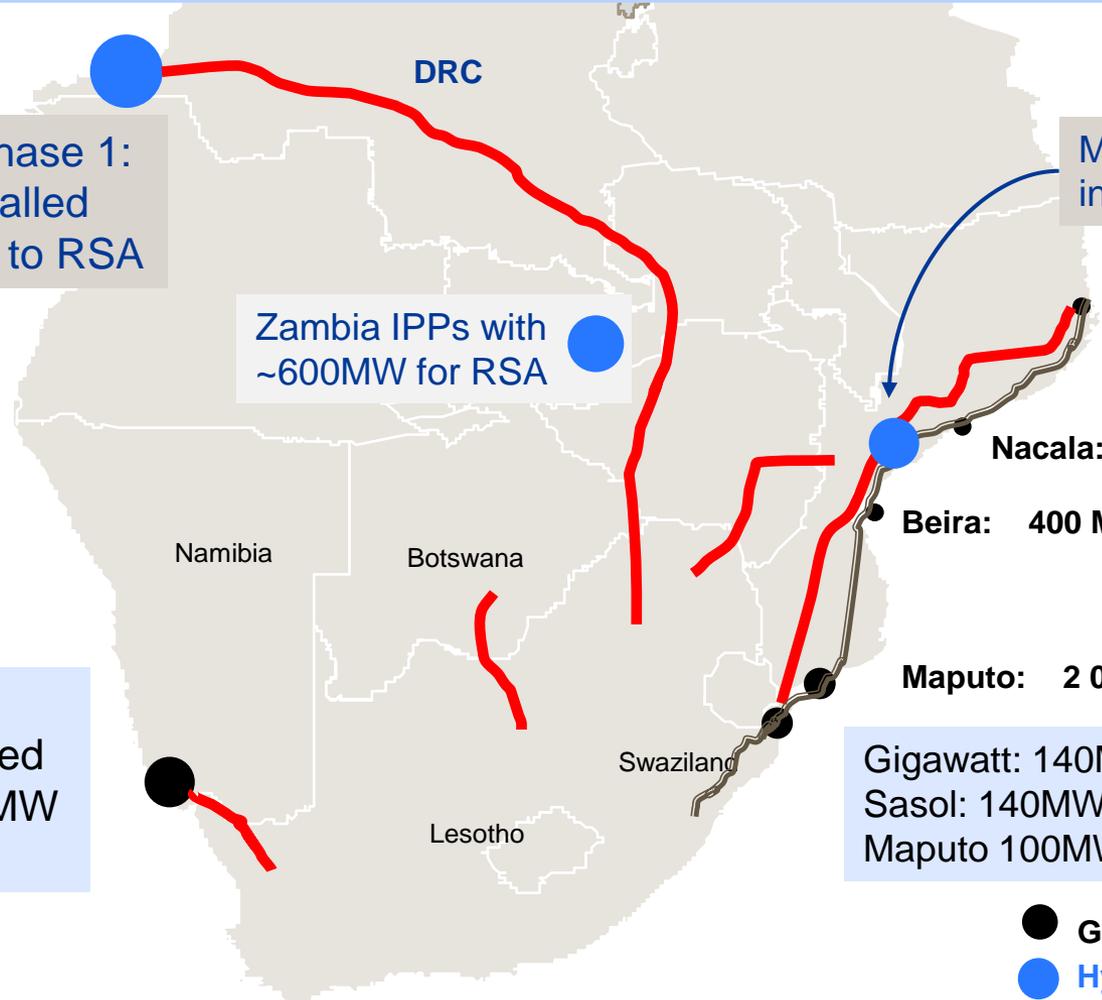
- In summary, electricity exports show a slow but steady decline, while imports improved in FY2014
- The overall result is that Eskom remains in a net export position of 2.95TWh in FY2014, which is an improvement from 5.97TWh in FY2013

# Applicable principles to Utilities receiving energy from Eskom during emergencies

- During Eskom system emergencies the following applies to exports:
  - Trading Partners are required to utilize all their own generation capacity to the maximum
  - All non-firm energy supplies are reduced to zero
  - All firm energy supplies are reduced by 10%
  - Trading Partners are required to enforce the 10% reduction on their customer base
  - If there is load shedding in South Africa then all sales to Namibia and Botswana are withdrawn, and Swaziland and Lesotho are required to do proportional load shedding
  - Energy which may inadvertently be drawn out of the Eskom system is charged at punitive emergency generation rates
  - The interruptibility of the Mozal and Skorpion Zinc agreements are activated by National Control as the Tx system requires for system stability

# Eskom is collaborating with various countries to develop new regional capacity

## Priority future generation and transmission opportunities to facilitate imports



**Grand Inga Phase 1:**  
4800 MW installed  
with 2500MW to RSA

**Zambia IPPs with**  
~600MW for RSA

**Mphanda Nkuwa:** 1 500 MW  
installed with 1 200MW to RSA

**Rovuma:** 200 MW  
**Nacala:** 300 MW  
**Beira:** 400 MW  
**Maputo:** 2 000 MW

Gas from Rovuma Basin. Assume RSA purchases 80% and EDM 20%

**Kudu:** 800 MW installed  
with <300MW to RSA

**Gigawatt:** 140MW  
**Sasol:** 140MW  
**Maputo:** 100MW

Gas from current Pande-Temane field. All power sold to EDM who wish to sell a portion to third parties

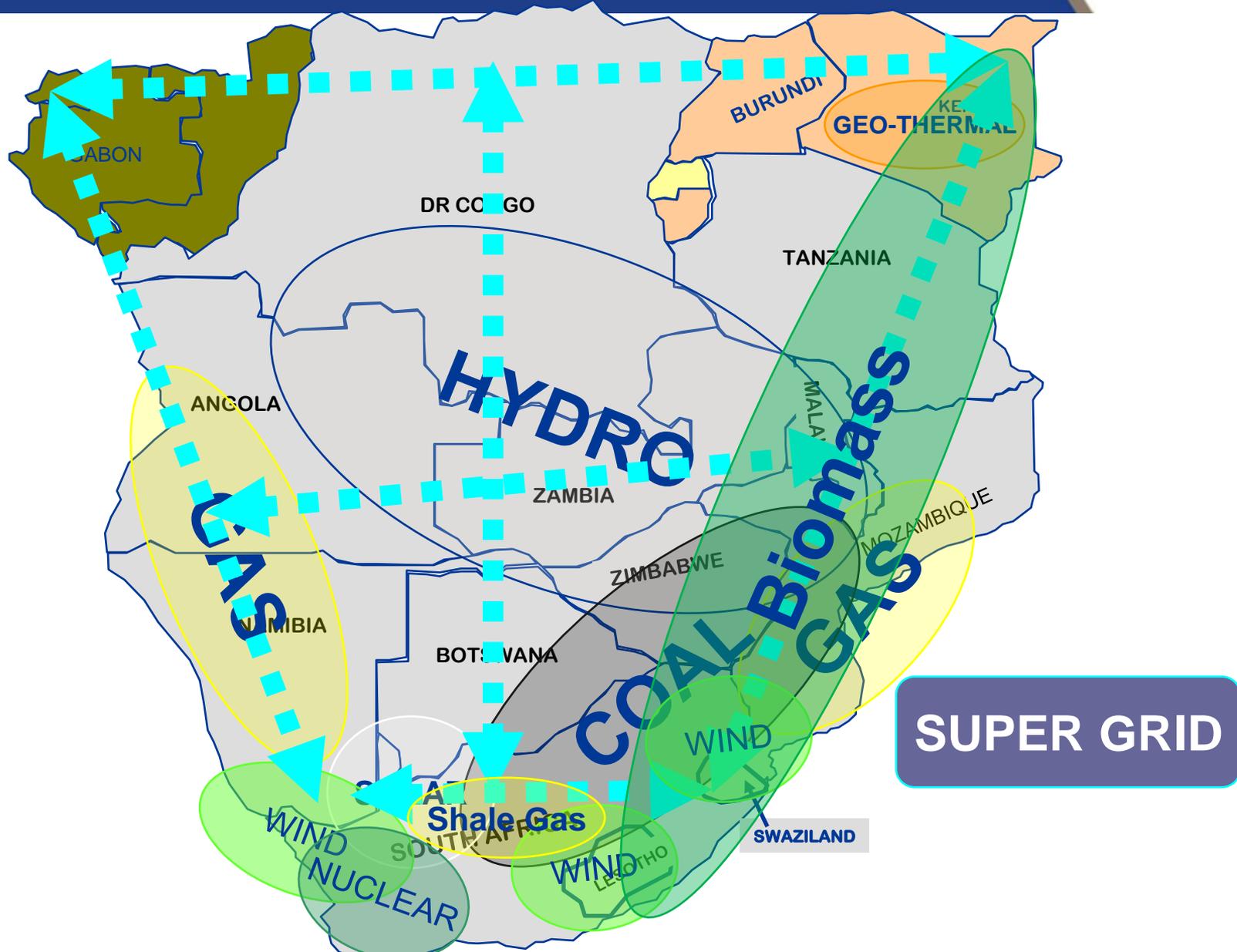
- Gas
- Hydro
- Transmission
- Gas pipeline

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We have an intention to pursue all technology options to ensure regional integration and energy security



# Among the supply options we are pursuing, gas is seen as one of the best for replacing end-of-life stations

Plants approaching end of life



- Camden

- **Arnot - 740 MW**
- **Camden – 1140 MW**
- **Grootvlei – 180 MW**
- **Hendrina – 1330 MW**
- **Komati – 300 MW**
- Matimba – 60 MW
- Tutuka – 60 MW

- Acacia – 180MW<sup>1</sup>
- **Arnot – 1480MW**
- **Duhva – 1160MW**
- Grootvlei – 900MW
- **Hendrina – 560MW**
- Kendal – 60MW
- **Komati – 600MW**
- **Kriel – 2880MW**
- Matla – 1740MW
- Port Rex – 180MW

- Ankerlig - 1350MW
- **Duhva – 2320MW**
- Gourikwa – 750MW
- Kendal – 3780MW<sup>1</sup>
- Koeberg – 1860MW
- Lethabo – 3540MW
- Majuba – 3170MW
- Matimba – 3600MW
- Matla – 1740MW
- Tutuka – 3480MW

- Given the long lead times to commission new plants, Eskom must decide soon on how this capacity will be replaced
- Life extensions and environmental retrofits will require R50-R260bn in capex spend which could be spent on gas instead



<sup>1</sup> Stations still required for grid stability

# The 600MW unit in Maputo is the most feasible short-term gas option; shale gas is the most attractive long-term source

		Capex		Gas cost \$/mmbtu	Generating cost R/MWh	Comple- tion	Remaining life Years	Feasibility <sup>2</sup>
		Total required Rbn	Eskom portion Rbn					
Phase I: Reduce system pressure	1 600MW (ex Buzi)	13	4	5-6	450-550	2016	5 <sup>1</sup>	
	2 LNG for coastal peaking stations	4	4	13-16	1600-2000	2018	>100	
Phase II: Replace ageing coal fleet	3 5000MW (ex Rovuma)	120	4	6-8	550-700	2023	>100	
	4 Ibhubesi gas	190	3	12-15	900 - 1100	2019	~10	
Phase III – Gas-enabled industrial- isation	5 Shale gas	730	4	4-5	400-450	2030s	>75 <sup>3</sup>	
	6 Waterberg CBM	14	0.4	7-8	500-600	2030	>30	

Difficult    Moderate    Easy  
 Positive    Breakeven    Uneconomical

1 Gas price of \$5-6 offered to Eskom with the gas-field expected to last until 2032  
 2 Subjective assessment based on coordination required between various stakeholders and technical complexity of implementation  
 3 Reserve estimates are as high as 485 TCF. Shale gas scenarios require 1 TCF p.a. to generate 10,000 MW  
 SOURCE: McKinsey Exploration Practices Benchmarking participants 2013; Eskom; team analysis

# Gas development options can drive three waves of opportunity for South Africa

Opportunity to pursue immediately



## New capacity

## Objectives for the country

## Gas options to support objectives

- Add capacity that is:
  - **Quick** to build
  - **Flexible** to account for renewables
  - **Economical** to avoid subsidies or reduce costs
- Begin **replacement** of ageing coal fleet with **sustainable and economic generation capacity** that can support country growth
- Drive **industrialisation** with **improved competitiveness** of key industries (e.g., petrochemicals)
- Complete **replacement of coal fleet** with sustainable and economic capacity

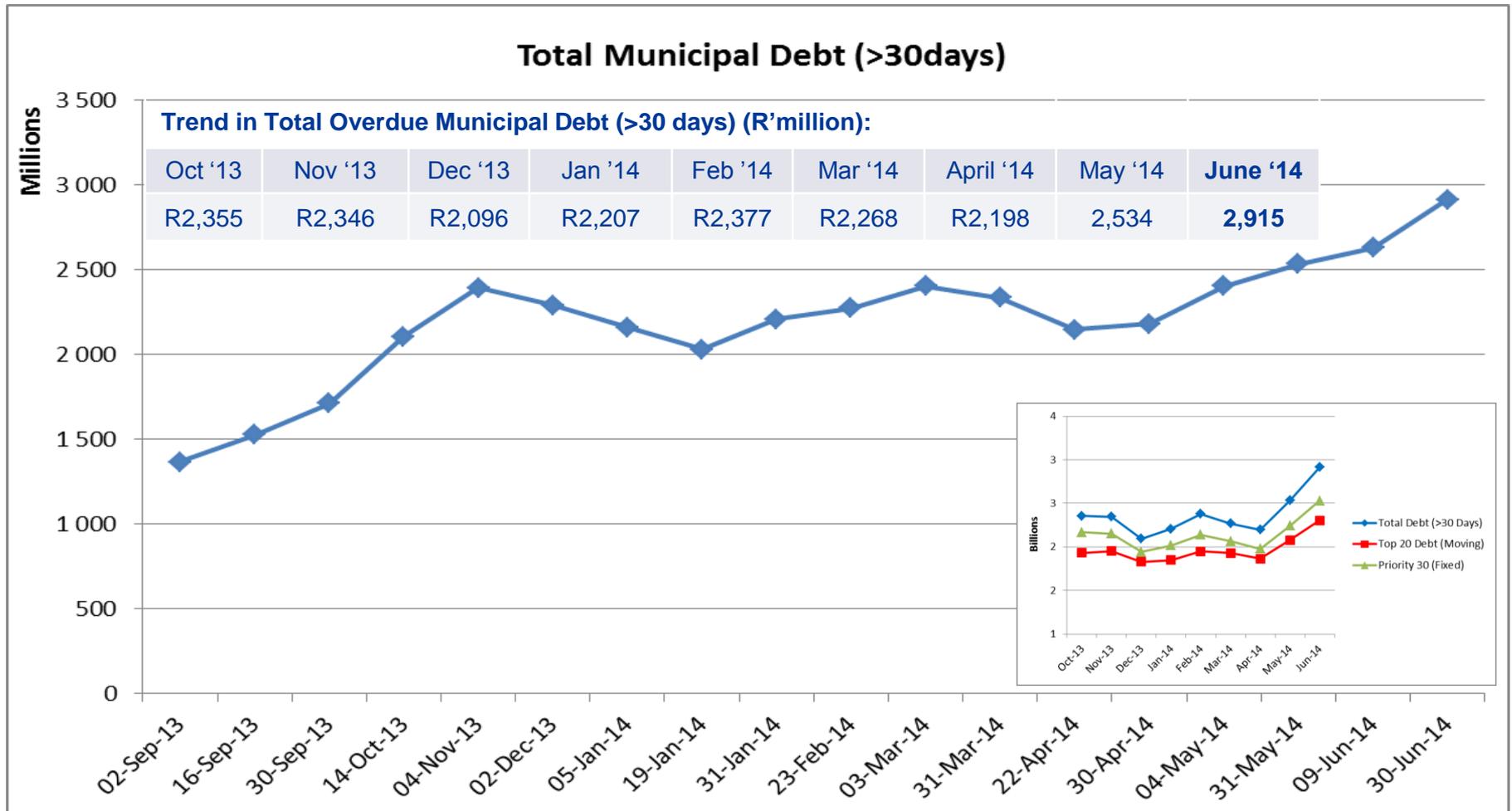
- 1 **600 MW** of power generated in **Mozambique**, potentially from Buzi block gas
- 2 **Floating LNG regas** to supply gas to OCGTs in the Western Cape - multifuel
- 3 5,000 MW capacity in Maputo, supplied by pipeline from **Rovuma** gas field
- 4 Potential supply from **Ibhubesi** gas field in the Western Cape
- 5 Develop **shale gas** for the balance of the gas mix in power generation and the rest for direct consumption
- 6 Build 400 MW capacity in Waterberg based off **CBM reserve**

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# Movement in overdue municipal debt

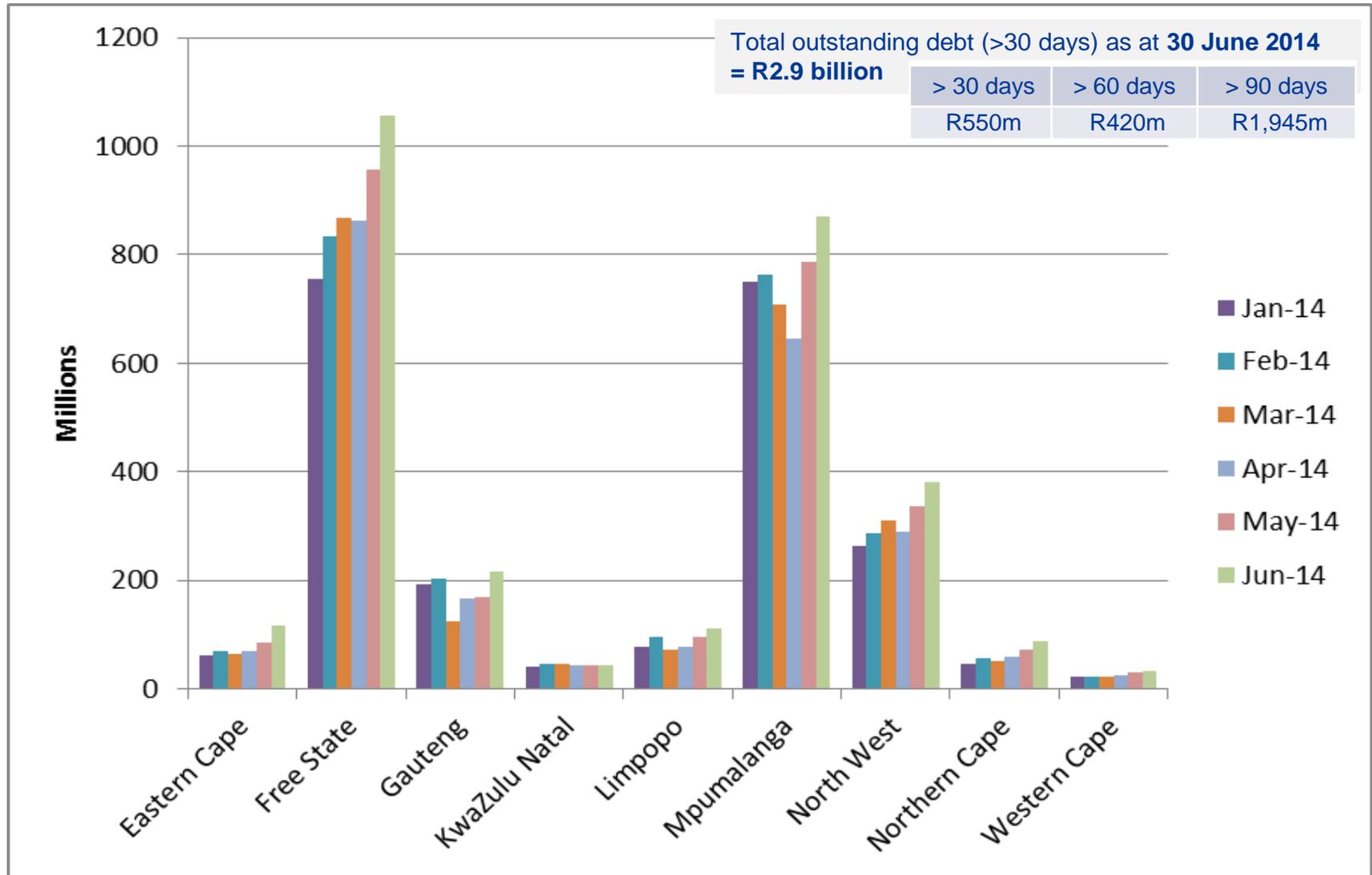


Source: Cashlab

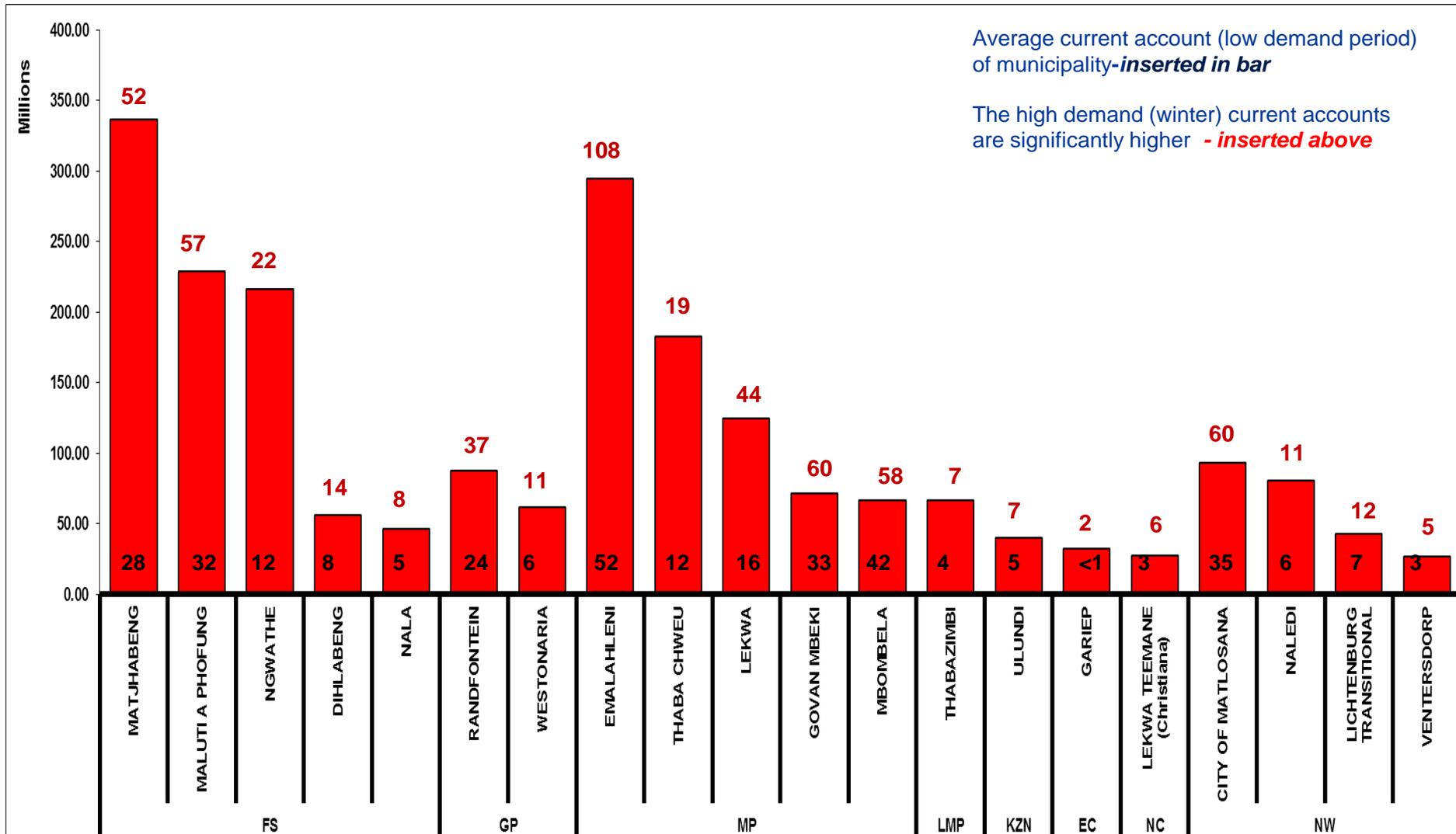
\*\* Eskom's payment terms is 15 days; however, the focus is on managing arrear debt >30 days as many municipalities have collection periods of 30 days.; also 'free basic electricity' accounts are payable in 30 days.



# Provincial breakdown of overdue debt, (>30 days)



# The top 20 defaulting municipalities



# Top 30 of defaulting municipalities as at 31 October 2013



Province	Priority 30 Municipality name	Average Current a/c (low demand) R'm	Total Overdue Debt (>30 Days)				Movement (from Oct 2013) R'm
			Oct 2013 R'm	April 2014 R'm	May 2014 R'm	June 2014 R'm	
Mpumalanga	EMALAHLENI LOCAL MUNICIPALITY	52	227.09	245.87	299.41	311.84	84.76
Free State	MATJHABENG MUNICIPALITY	28	184.19	283.74	310.55	338.65	154.45
Free State	MALUTI A PHOFUNG MUNICIPALITY	32	205.29	198.32	228.86	266.68	61.39
Free State	NGWATHE LOCAL MUNICIPALITY	12	192.31	204.19	216.47	229.16	36.85
Mpumalanga	THABA CHWEU LOCAL MUNICIPALITY	12	152.32	162.67	173.95	184.23	31.91
Mpumalanga	LEKWA LOCAL MUNICIPALITY	16	114.75	104.99	125.05	139.76	25.01
North West	CITY OF MATLOSANA LOCAL MUNICIPALITY	35	99.87	71.91	74.25	76.37	-23.50
Mpumalanga	MBOMBELA LOCAL MUNICIPALITY	42	62.20	34.49	33.39	68.76	6.56
Gauteng	RANDFONTEIN LOCAL MUNICIPALITY	24	96.66	81.83	66.17	87.61	-9.04
Mpumalanga	GOVAN MBEKI MUNICIPALITY	33	85.35	31.70	72.39	57.73	-27.63
North West	NALEDI LOCAL MUNICIPALITY	6	70.95	80.69	83.62	90.47	19.53
Gauteng	WESTONARIA LOCAL MUNICIPALITY	6	71.03	55.77	56.19	55.11	-15.93
Free State	DIHLABENG MUNICIPALITY	8	63.14	49.52	58.38	67.40	4.26
Gauteng	MOGALE CITY LOCAL MUNICIPALITY	38	59.98	23.99	29.51	58.09	-1.89
North West	LICHTENBURG MUNICIPALITY,-	7	43.50	43.85	36.34	42.95	-0.55
Limpopo	THABAZIMBI LOCAL MUNICIPALITY	4	43.46	58.88	62.79	66.49	23.03
Mpumalanga	MSUKALIGWA LOCAL MUNICIPALITY	12	43.47	13.86	23.18	34.17	-9.30
KwaZulu Natal	ULUNDI LOCAL MUNICIPALITY	5	41.86	0.05	0.11	40.06	-1.81
Free State	MAFUBE MUNICIPALITY	2	38.75	38.84	39.41	39.98	1.23
Free State	NALA LOCAL MUNICIPALITY	5	33.78	36.89	43.41	44.24	10.46
Limpopo	MAKHADO LOCAL MUNICIPALITY	15	25.16	0.00	10.64	18.52	-6.64
Free State	MOQHAKA MUNICIPALITY	14	37.21	0.00	0.00	0.19	-37.03
North West	LEKWA - TEEMANE	3	33.08	10.22	36.17	38.69	5.61
Eastern Cape	GARIEP LOCAL MUNICIPALITY	<1	25.04	31.36	32.14	33.99	8.95
North West	VENTERSDORP LOCAL MUNICIPALITY	3	23.88	21.49	24.21	26.97	3.09
Mpumalanga	MKHONDO LOCAL MUNICIPALITY	6	23.09	20.65	23.92	24.63	1.54
Northern Cape	NAMA KHOI LOCAL MUNICIPALITY	2	19.09	24.81	25.60	28.62	9.54
Eastern Cape	MALETSWAI MUNICIPALITY	<1	17.30	14.86	19.51	20.57	3.26
Western Cape	KANNALAND LOCAL MUNICIPALITY	<1	18.01	19.64	21.45	20.25	2.24
North West	MAQUASSI HILLS LOCAL MUNICIPALITY	3	17.09	14.98	16.84	18.84	1.75
	<b>Total</b>		<b>2168.92</b>	<b>1980.04</b>	<b>2243.89</b>	<b>2531.01</b>	<b>362.10</b>

# Progress with Provincial Structures

Eskom has experienced different levels of success in dealing with defaulting municipalities in the MP, FS, NW & GP

## Province

Mpumalanga  
(7 munics<sup>1</sup>)

## Progress with defaulting Municipalities

- Agreed with the MEC CoGTA (Oct 2013) that all municipal current bills will be honoured and outstanding debt to be settled by end Oct 2014.
- Payment agreements finalised with all except Lekwa and Emalahleni.

North West  
(6 munics<sup>1</sup>)

- Agreed with the MEC CoGTA (March 2014) that all defaulting munics will honour current accounts and debt to be settled by end March 2015. Discussions progressing well to finalise agreements with defaulting munics.

Free State  
(7 munics<sup>1</sup>)

- The FS MEC Finance is to set up a steering committee to initiate a detailed and in-depth process to deal with the arrear debt.
- Final demand (letter of disconnection) sent to Ngwathe, Maluti-a-Phofung and Dihlabeng municipalities – to disconnect 04 August 2014.
- Matjhabeng court date is 31 July 2014.

Gauteng  
(3 munics<sup>1</sup>)

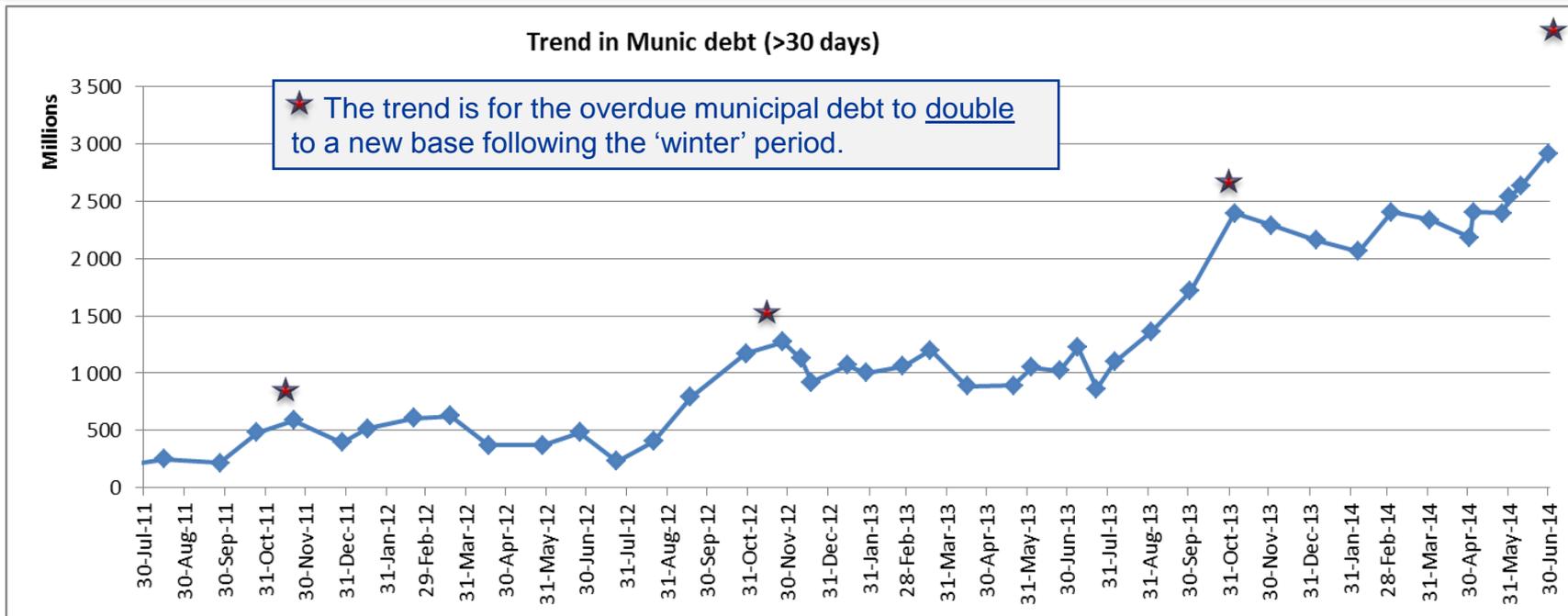
- Provincial Treasury and the MEC CogTA are involved in discussions with the defaulting munics and to oversee the process.
- Payment plan agreements in place with all except Westonaria.

- TC has no option but to be more assertive in protecting Eskom's revenue risk going forward and **notice of disconnection** will be issued as required.
- TC regularly meets with **National Treasury** who is placing pressure on provincial teams to address the debt (meeting on 22 July '14)
- TC is **informing the Premiers** of the outstanding municipal debt situation in their respective provinces.
- Eskom is in the process of **finalising signed** debt acknowledgment and outstanding **debt repayment plans** with defaulting munics.



# The increasing trend of overdue municipal debt over the last few years

We are in the process of determining a trend and year end projection by taking consideration of the 'aggregate' of the signed payment plans, higher 'winter' tariffs and some probability & risk factor. (interim projection = R4billion)



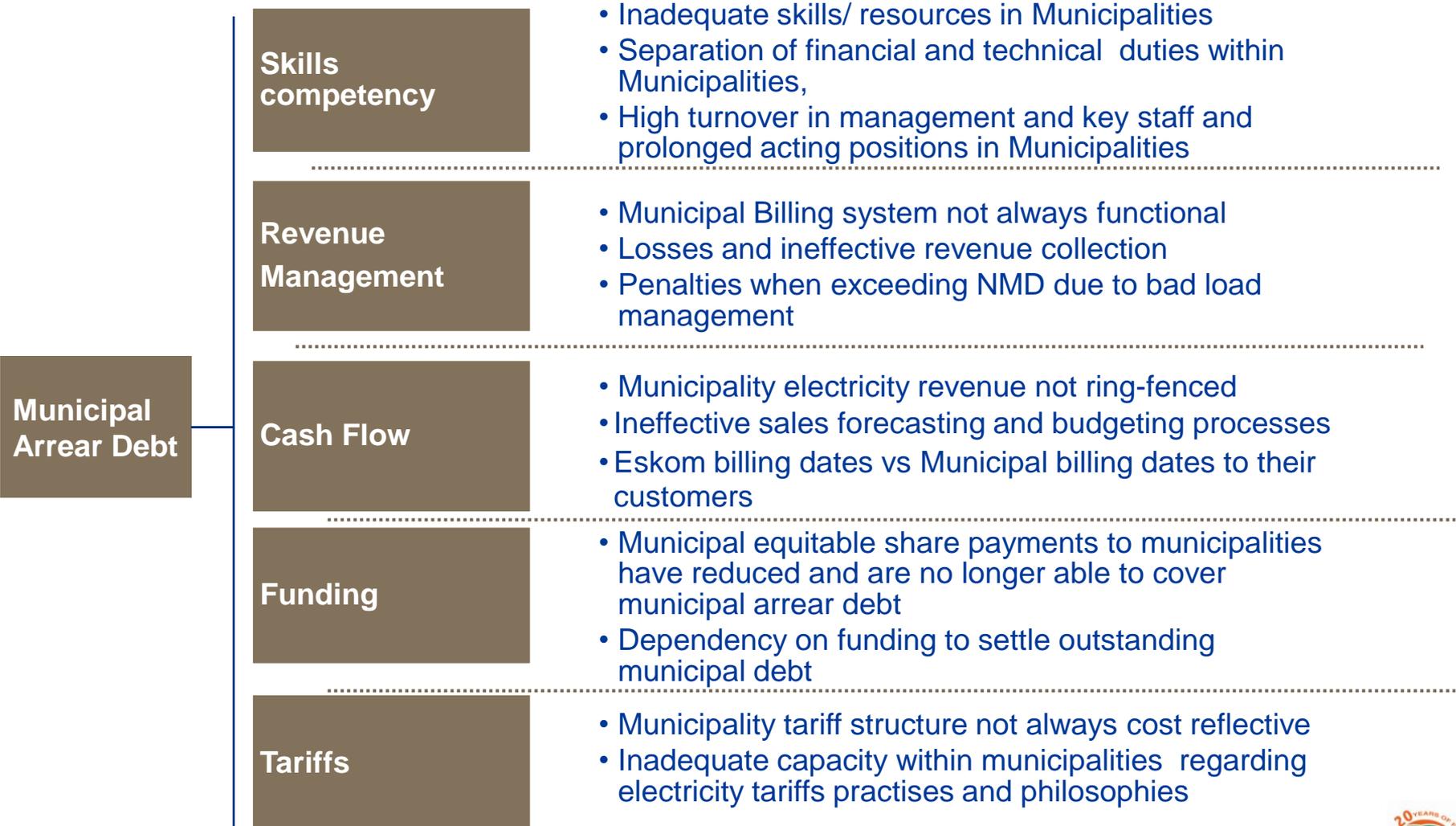
## What has changed over time:

- Eskom tariffs increasing
- Economic downturn
- Increasing inadequacy of equitable share funding – historically was sufficient to settle outstanding electricity debt
- Instability of key positions in municipalities
- Poor revenue collection and increasing number of creditors in municipalities

# Factors underlying the municipal debt situation

Various drivers are understood but out of Eskom's direct control

## Main issues/ drivers *(from an Eskom perspective)*



• Root causes cannot be tackled directly by Eskom and will embrace indirect ways of reducing municipal debt

A graphic on the left side of the slide. It consists of two overlapping circles. The larger, outer circle contains a silhouette of a tree against a sunset sky. The smaller, inner circle contains a close-up of two hands shaking in a firm grip. The circles are outlined with multiple concentric lines.

**Thank you**