

A decorative graphic on the left side of the slide, consisting of three overlapping circles. The top circle shows a worker in a red bucket on a lift. The middle circle shows a wind farm with several turbines. The bottom circle shows a large industrial building with a curved roof and tall chimneys, with zebras in the foreground. The circles are framed by concentric, hand-drawn-style lines.

State of the Power System Update

Brian Dames
Chief Executive

23 April 2012

Overview

Review of the quarter

Outlook for winter

Creating a sustainable Generation fleet

Conclusion

- This winter will be different in that generation maintenance will be done and not deferred. Eskom is committed to maintaining at least 9 generation units between April and August to ensure the long term sustainability of the plant.
- There is sufficient capacity to meet the demand most of the day. The concern is the peak demand between 5pm and 9pm. If that can be reduced by as much as 2000MW, the security of electricity supply will be adequate.
- Residential customers, particularly those that use geysers, space heating and pool pumps can make the biggest difference by switching off this equipment for 4 hours and will yield more than 2000MW savings.
- Eskom has completed a 5 year review of its maintenance requirements to create a sustainable generation fleet. It is committed to doing the maintenance that will ensure a sustainable generation fleet to meet the long term supply requirements for country.
- In the short to medium term, this will introduce risks to balancing supply and demand. In order to manage these risks, the country must continue to focus on additional supply options, energy efficiency and some form of mandatory energy conservation schemes.
- Eskom is committed to completing the new build programme and is putting the necessary resources in place to do so.

- We kept the lights on during summer, as we have done for the past five years
- Going into winter, we face new challenges: Eskom cannot do it alone
- Our power stations are ageing and are being run hard. Sustained high levels of planned maintenance are needed to ensure reliable performance
- The power system has been particularly tight and planned maintenance was impacted during 2013 due to:
 - The failure of a transmission line from Mozambique due to flooding, which reduced imports from Cahora Bassa – 850 MW
 - The unplanned outage of Koeberg Unit 1 – 900MW
 - The need to manage the impact of the strike at Exarro's coal mines – 1000MW
 - Volatile power station performance
- We kept the lights on in summer using Open Cycle Gas Turbines and demand side measures, but planned maintenance had to be reduced
- Eskom usually reduces maintenance to the minimum in winter so that we can meet higher demand. But this winter is different – planned maintenance cannot be deferred
- Demand during winter evening peaks can jump by up to 3000 MW in 1 hour, as households switch on lights, heaters and cookers
- Please help us **Beat the Peak** : switch off non-essential appliances from 5-9pm

- We have reached a point where we cannot continue to defer planned Generation maintenance any longer because this could have severe consequences.
- The performance of Eskom's own Generation fleet is volatile and that of the Cahora Bassa scheme has become unpredictable.
- The Multi-Year Price Determination 3 (MYPD3) determination adds to the challenge of managing a tight power system by reducing Eskom's ability to procure additional demand and supply side levers.
- We will implement a Generation maintenance strategy which is based on an 80% Availability; 10% Planned maintenance and 10% Unplanned outages over 5 years to maintain the current fleet, meet environmental requirements and achieve predictable performance from our existing assets.
- Much of the planned maintenance will be fixed, providing certainty for planning, while outages will be done to ensure we can comply with Environmental legislation
- Additional supply and demand side options must be explored to meet medium term electricity demand.

Overview

Review of the quarter

Outlook for winter

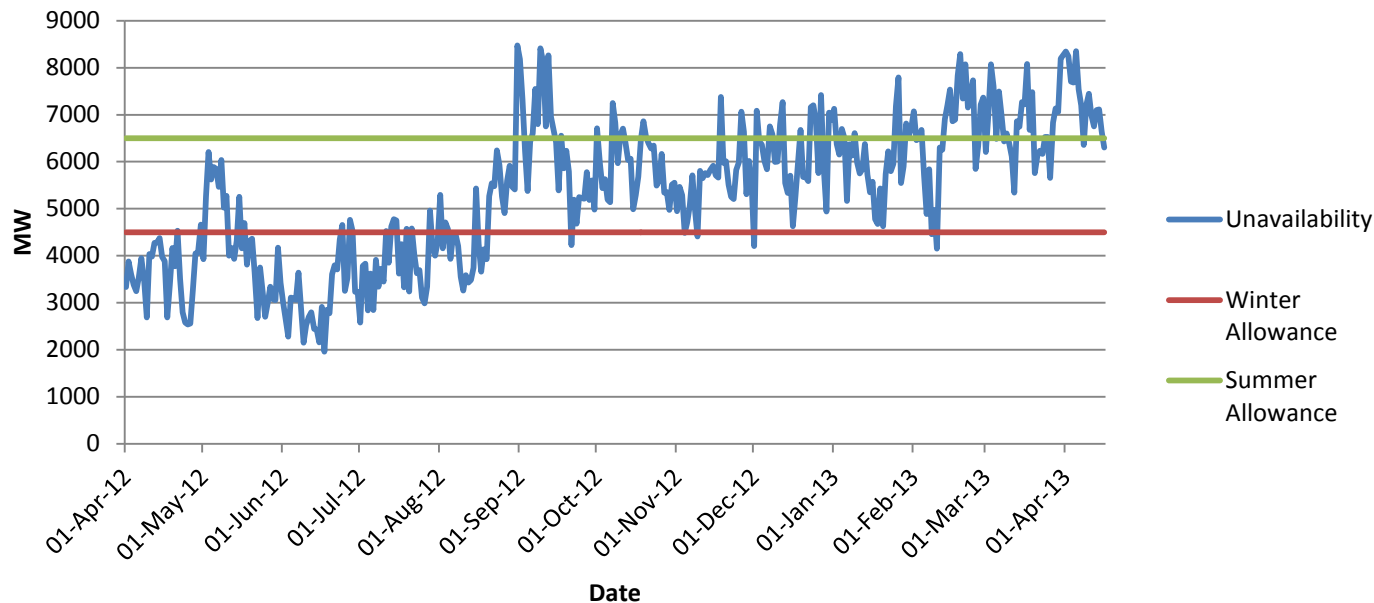
Creating a sustainable Generation fleet

Conclusion

Planned maintenance and unplanned outages

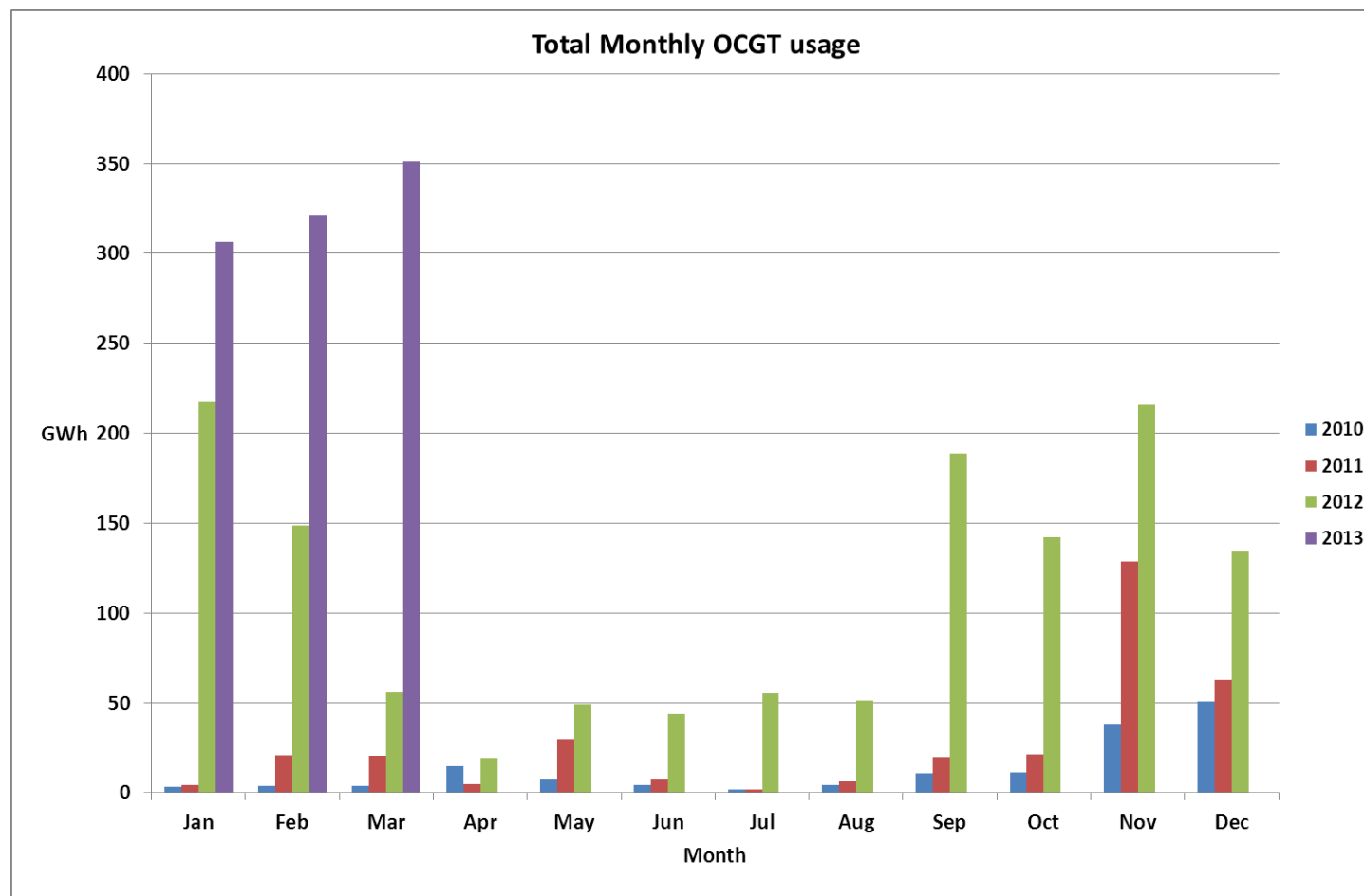
Planned %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2013	13.07	9.7	9.1									
2012	12.57	13.1	13.51	13.81	10.5	7.41	5.45	5.44	5.27	8.74	9.63	13.06
2011	9.96	7.62	8.42	8.66	6.3	4.5	2.9	5.97	8.8	9.56	7.64	15.58
2010	11.91	10.53	10.71	11.57	7.0	2.6	1.72	6.36	10.66	8.54	9.06	12.31

Unplanned Plant Unavailability at Peak

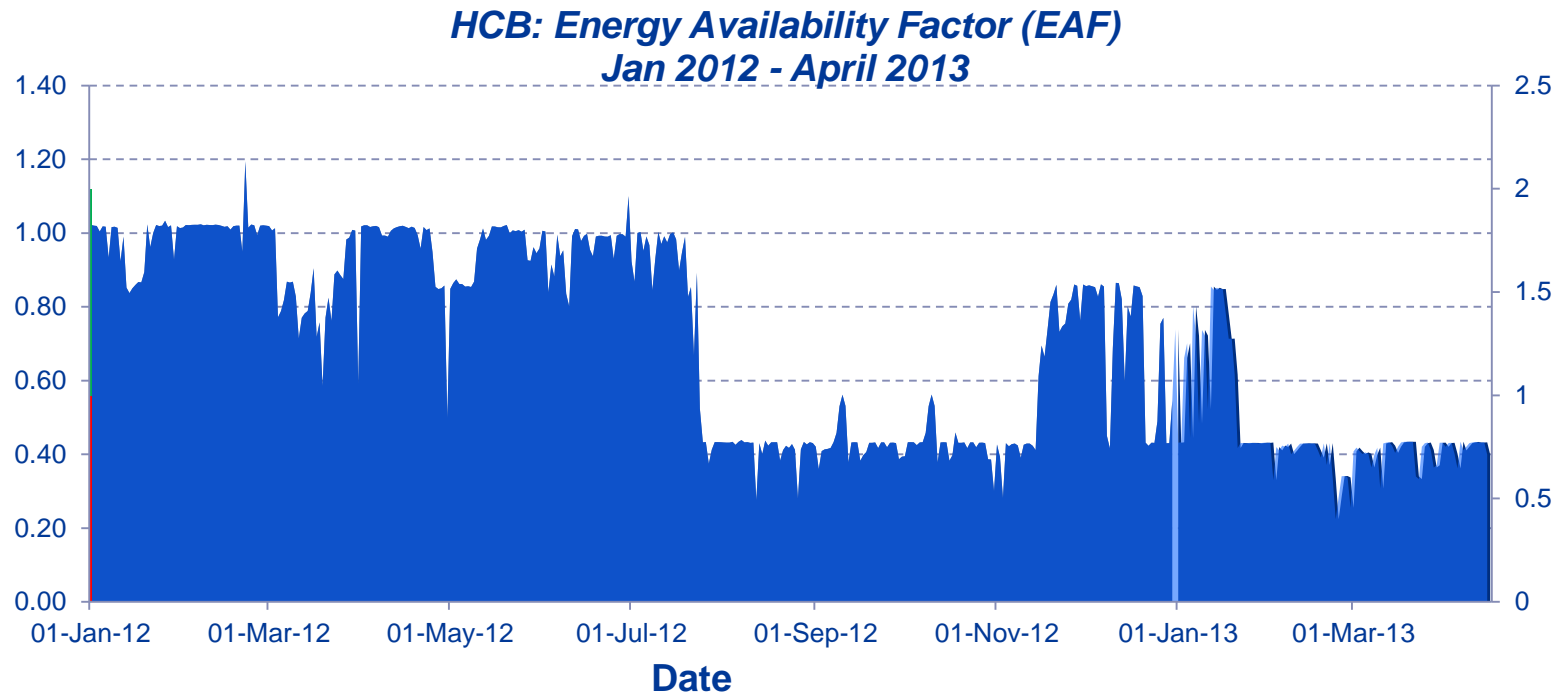


- Reduced Cahora Bassa imports, the Koeberg 1 outage, and high unplanned outages meant less space to do planned maintenance
- Power station performance tends to be more volatile in summer
- More maintenance needed to improve reliability
- Reduction of unplanned outages to 4500 MW by winter

We increased use of open cycle gas turbines to keep the lights on



The OCGTs were run harder in January, February and March 2013 than in any month in the last 4 years. Average load factors were close to 20%.

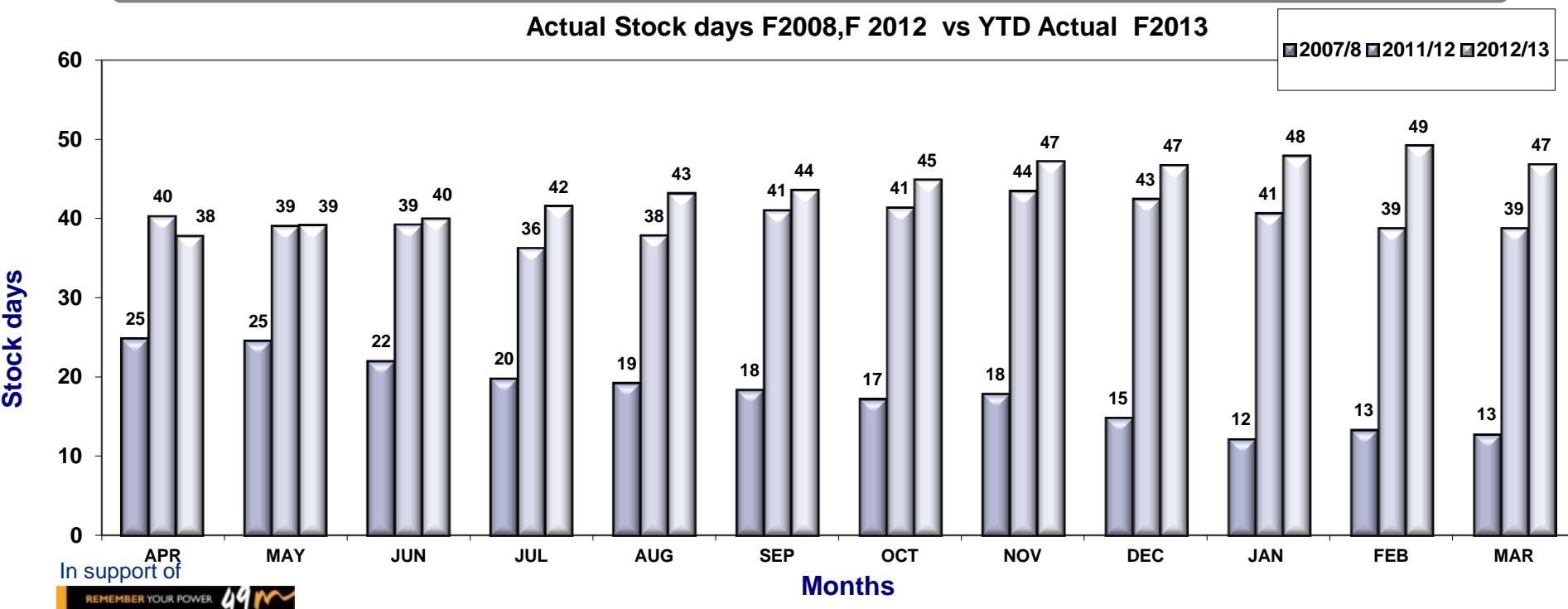


- The graph depicts the performance of the HVDC system in terms of its availability
- The availability since July 2012 has been poor
- This is due to the loss of a smoothing reactor (returned to service 15 November 2012) followed by the loss of one of the lines due to flooding. The line is anticipated to return to service by the end of April 2013.

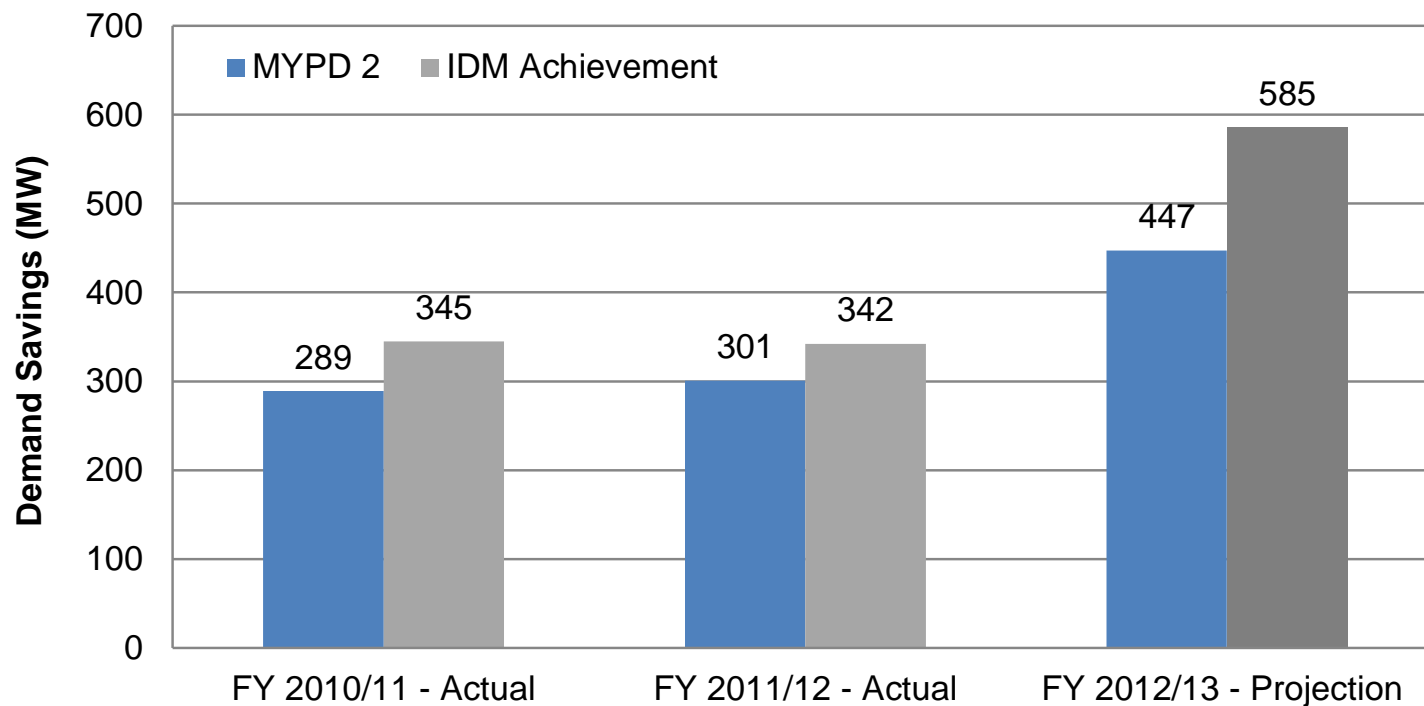
Coal stocks at high levels despite labour unrest

- Coal stock days are currently at 47 days (26 March).
- Stock days peaked at 49 days at the end of February (the highest ever), but were reduced by the three-week Exxaro strike which impacted Matla, Arnot and Matimba Power stations
- The impact of the strike was well-managed – but capacity from affected power stations was reduced by as much as 1000 MW during the day to conserve stockpiles, reducing space for planned maintenance on Eskom's generation fleet
- In support of road safety, trucking operations were halted during the Easter weekend

Actual Stock days F2008, F2012 vs YTD Actual F2013



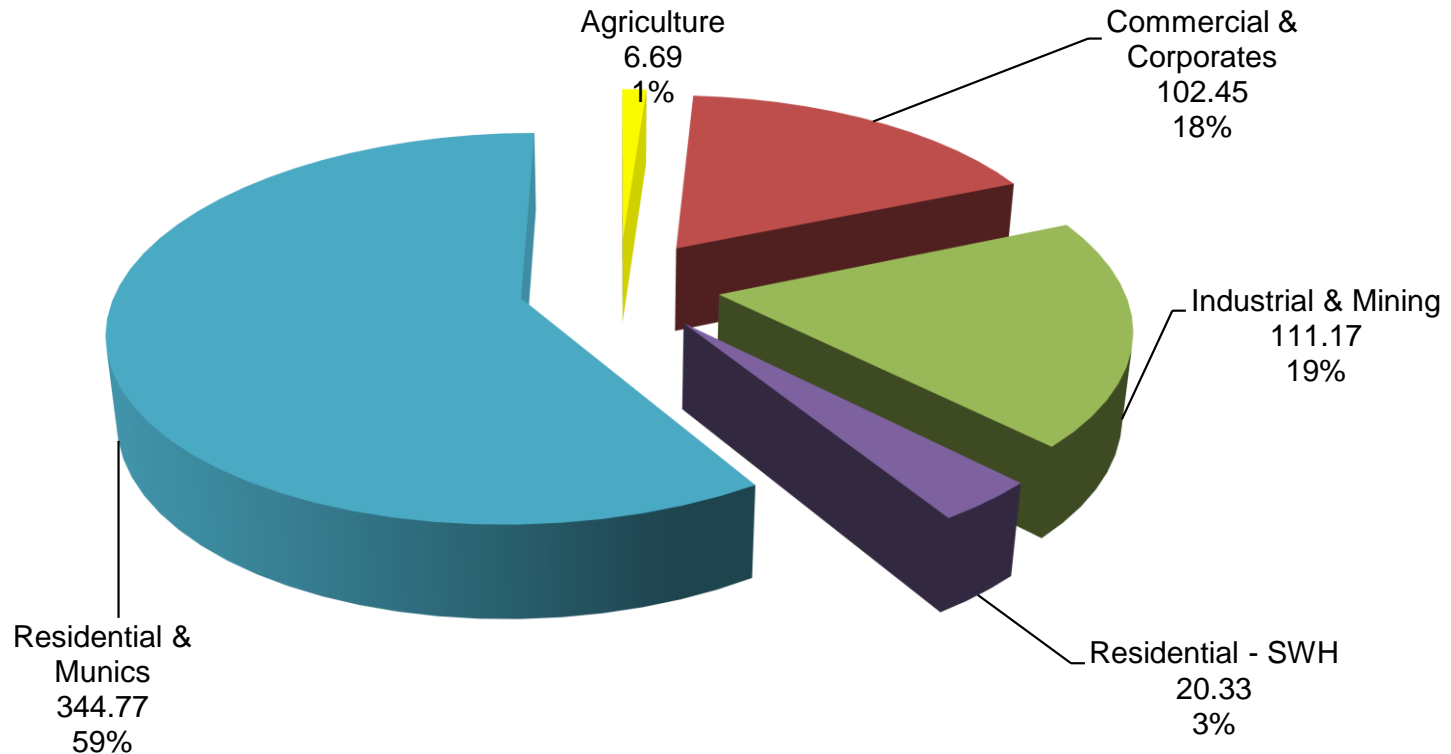
Integrated Demand Management Programme Savings (MW) - Achievement Against MYPD 2 Targets



MYPD 2 Cumulative Demand Savings target = 1037MW

IDM Achievement (subject to final audit) = 1272MW (123% of MYDP2 target)

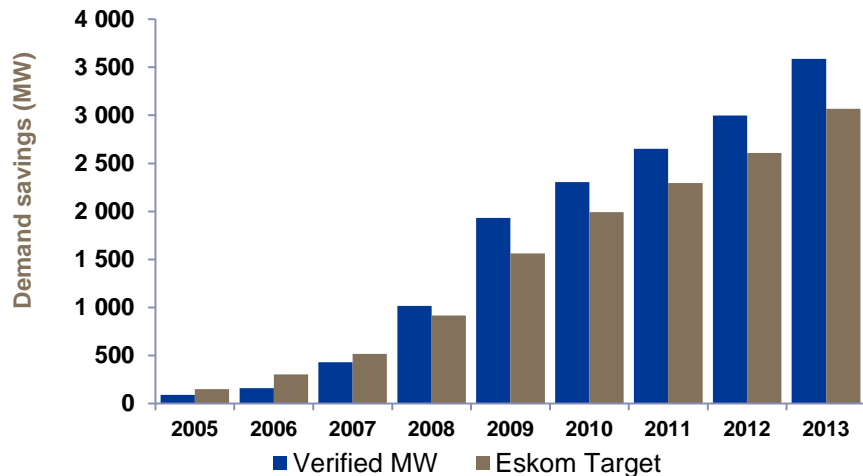
2013 Financial Year – Demand Savings Projection Split by Sector



IDM Projection FY 2013 = 585MW

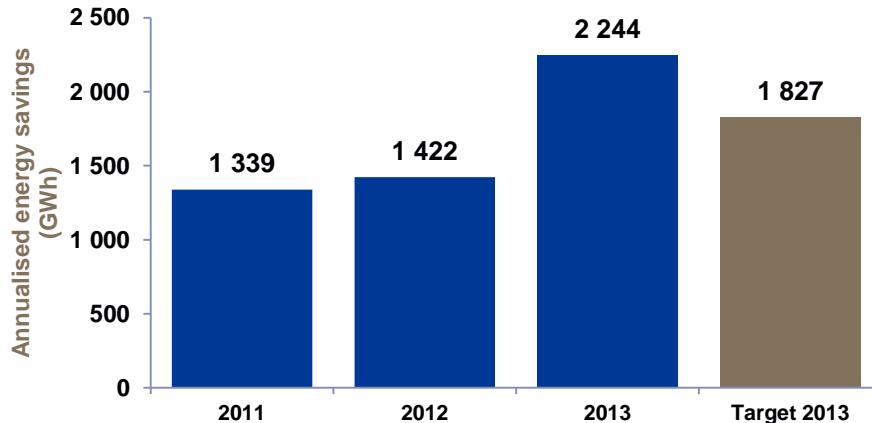
The demand side management programme run by Eskom has resulted in over 3 500MW of savings since its inception

Cumulative verified demand savings (MW)



- The accumulated verified demand savings for the combined financial years 2005 to 2013, is 3 586MW

Energy Savings (GWh)



- This is almost equivalent to the output of a typical power station



- **Power Alert** system consistently achieved a residential evening peak demand reduction of over 320MW, during summer, on worst system constrained days. (>17,7million lights or 107 thousand geysers)
- **Residential mass rollout** programme, phase 1 is complete and achieved a total savings of 218MW. More than 800,000 lower to middle income households were visited (227 direct jobs and 3,018 indirect jobs created)
- **Residential mass rollout** programme, phase 2 was launched in September 2012. The savings target is 80MW and should be completed in early 2014 financial year. The plan is to reach between 150,000 and 180,000 middle income households who will benefit from the retrofit of geyser and pool timers, efficient shower heads and lighting. This phase is expected to generate in excess 800 indirect jobs.
- **Water heat pump rebate programme** continues to grow. A total of 6807 units have been installed to date of which 3962 were installed in the 2013 financial year.



Overview

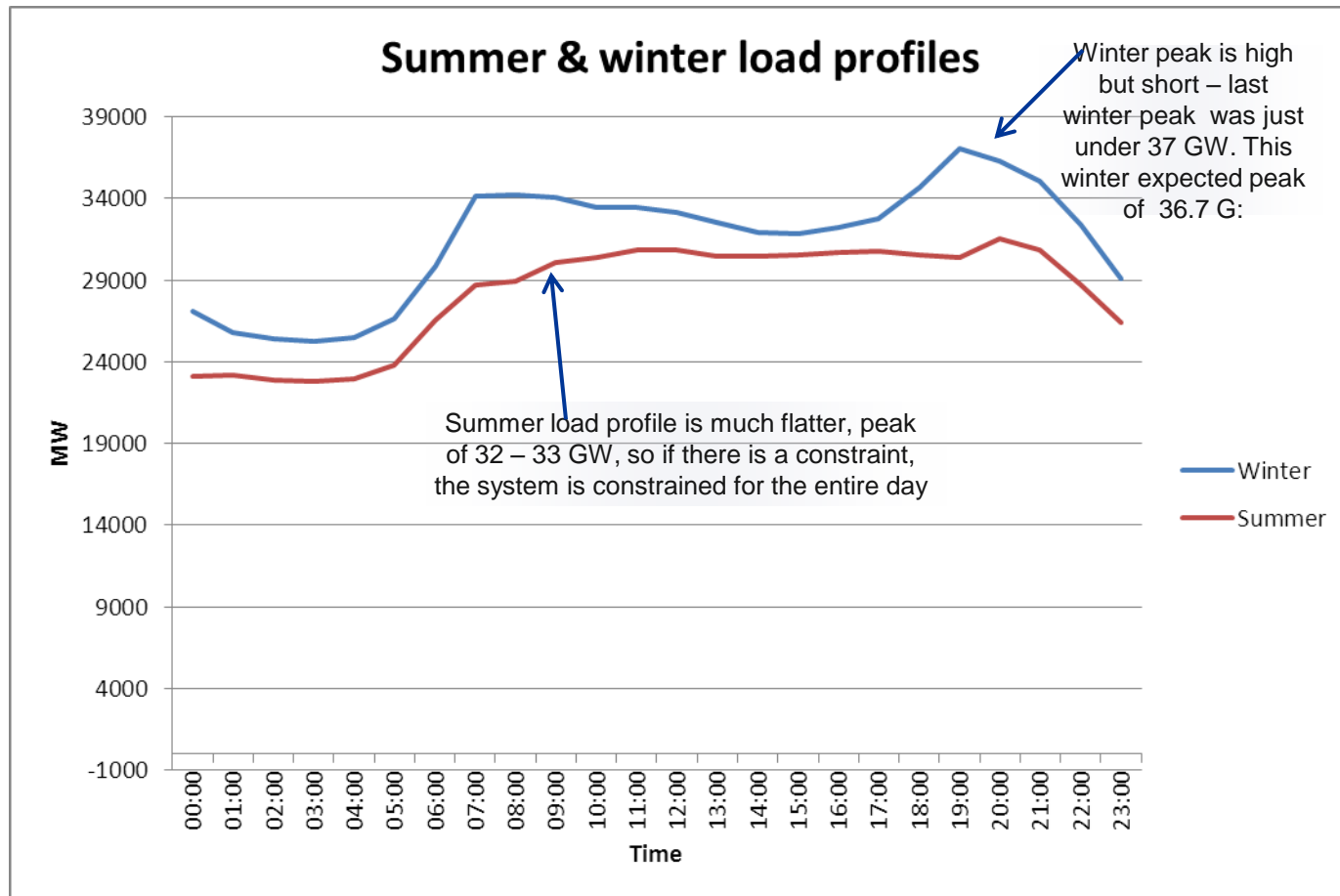
Review of the quarter

Outlook for winter

Creating a sustainable Generation fleet

Conclusion

Winter 2013 – Typical Demand Profile



Going into winter, demand can spike by more than 3000 MW during evening peak – equivalent to five units of a large power station

- Cahora Bassa is expected to increase its output to 1300 MW by the last week of April 2013 and the final 200 MW is expected to be restored by the third quarter of 2013.
- Koeberg Unit 1 is expected to be back in service in mid-April
- Planned maintenance outages over the peak winter period (June-July) are approximately 2000 MW. This is maintenance work that cannot be deferred
- There is an intense focus on reducing the level of unplanned outages to below 4500 MW
- Peak demand this winter is forecast at 36.8 GW, slightly lower than in 2012, but this is the average for an hour – the “peak within the peak” can go as high as 37 GW – 38 GW
- We have supply and demand side initiatives in place – but we are concerned about the impact which the NERSA tariff decision could have on our ability to finance the demand side measures needed to manage a tight system
- Approximately 2100 MW of Interruptible demand, for up to two hours a week, is available from the BHP Billiton aluminium smelters to help manage the frequency of the power system

Levers secured to date – some expire before winter and others by December 2013

	Short term initiatives (Nov 2011 – Jun 2012)	Target capacity (MW)	Secured capacity (MW)	Operational capacity (MW)	Status
Supply Side	Municipal Base Load Power	515	515	180	Contract until 31 December 2012. Evaluating contract extensions.
	IPPs and short term base load	230	196	196	Awaiting NERSA licensing for 35 MW
	Non-Eskom peaking generation	120	40	40	80 MW falls outside pricing mandate.
	Cross border	93	93	93	Stable Operation
	Power buyback	1000	1010	1010	Contracts conclude 31 May 2013. Evaluating contract extensions.
Demand Side	Demand response rewards programme	500	158	158	Programme to be terminated
	Mandatory ECS	-	-	-	Long term initiative
	Stand-by customer generation	100	11	7	Commercial challenges and pricing
	Residential Demand Management	1000	300	300	Approval for implementation of 158 MW by end 2013/14 financial year.
	Supplemental DMP	500	196	196	DMP reduced due to power buybacks

- Eskom and large customers, mainly in the ferrochrome and ferroalloy industries entered into a mutually beneficial arrangement in terms of power buybacks..
- Up to 1000MW of power was bought back with a commitment from the customers involved to not compromise contractual commitments with their customers nor incur job losses.
- Eskom used this space to continue with its planned maintenance programme.
- The current power buyback programme began in November 2012 and comes to an end on 31 May 2013.
- Winter tariffs for Eskom's large industrial and mining customers are implemented in the months of June, July and August and these result in reduced demand.

This represent one hour with highest peak demand in a week

				6500/4500 MW Unplanned Plant Unavailability
Date	UCLF	Planned	Forecast	Shortfall Including Operating Reserves and Gas
22-Apr-13 Mon	6500	3944	31862	
29-Apr-13 Mon	6500	5302	32026	
06-May-13 Mon	6500	4810	32714	
13-May-13 Mon	6500	4560	33020	
20-May-13 Mon	6500	3738	33495	
27-May-13 Mon	6500	3738	33698	
03-Jun-13 Mon	4500	2450	34867	
10-Jun-13 Mon	4500	2450	35216	
17-Jun-13 Mon	4500	2564	35167	
24-Jun-13 Mon	4500	2084	35344	
01-Jul-13 Mon	4500	2579	35989	
08-Jul-13 Mon	4500	2579	36510	
15-Jul-13 Mon	4500	1986	36885	
22-Jul-13 Mon	4500	1411	36574	
29-Jul-13 Mon	4500	1240	36583	

- April 2013 to 31 July 2013, the system will be extremely tight
- This winter will be different to previous winters as Eskom will have to perform long duration planned maintenance during the coldest months
- There will be an intense focus on managing the unplanned outage level (UCLF) to below 4500MW in April and May
- There is some flexibility to defer maintenance but this would increase the maintenance backlog.
- An Energy Conservation Scheme is needed to protect the system

“Beat the Peak” - Four Hours, Four Steps



- Saving electricity reduces pressure on the grid and cuts your electricity bill and South Africa’s carbon emissions

- Evening peak is between 5 pm and 9 pm – **four steps to beat the peak**

1. Switch off all geysers and pool pumps during peak

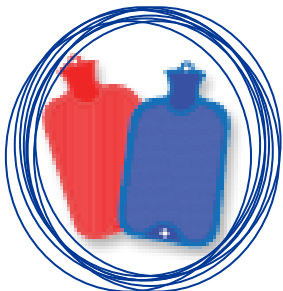
2. Switch off all non-essential lighting

3. Find alternative to electrical heaters

- Dress warmly, and use space heaters less
- Insulate ceilings to keep the heat in
- Invest in thermostatically controlled heaters (fan heaters are ideal for quick heat; oil heaters for longer periods)
- Consider gas heaters and hot water bottles

4. Respond to the Power Alert messages by switching off all appliances that are not being used

- **Switch to** energy efficient technologies: take advantage of solar water and water heating pump rebates and the residential mass rollout programme, which provides a range of free products



Overview

Review of the quarter

Outlook for winter

Creating a sustainable Generation fleet

Conclusion

- Our power stations are ageing and needs focus to maintain and improve performance.
- Planned maintenance has often had to be shifted or deferred to ensure we have the capacity available to meet demand and keep the lights on.
- This approach is not sustainable – it is essential that planned maintenance be done to enable predictable and sustainable performance from Eskom's power stations.
- Eskom has put in place a five year strategy for Generation sustainability which includes a firm commitment not to postpone critical maintenance.
- We will implement a programme which will allow for better resource planning and more effective use of contractor capacity as well as improved internal skills and processes.

64% of Eskom's current installed base load capacity plants are past their midlife



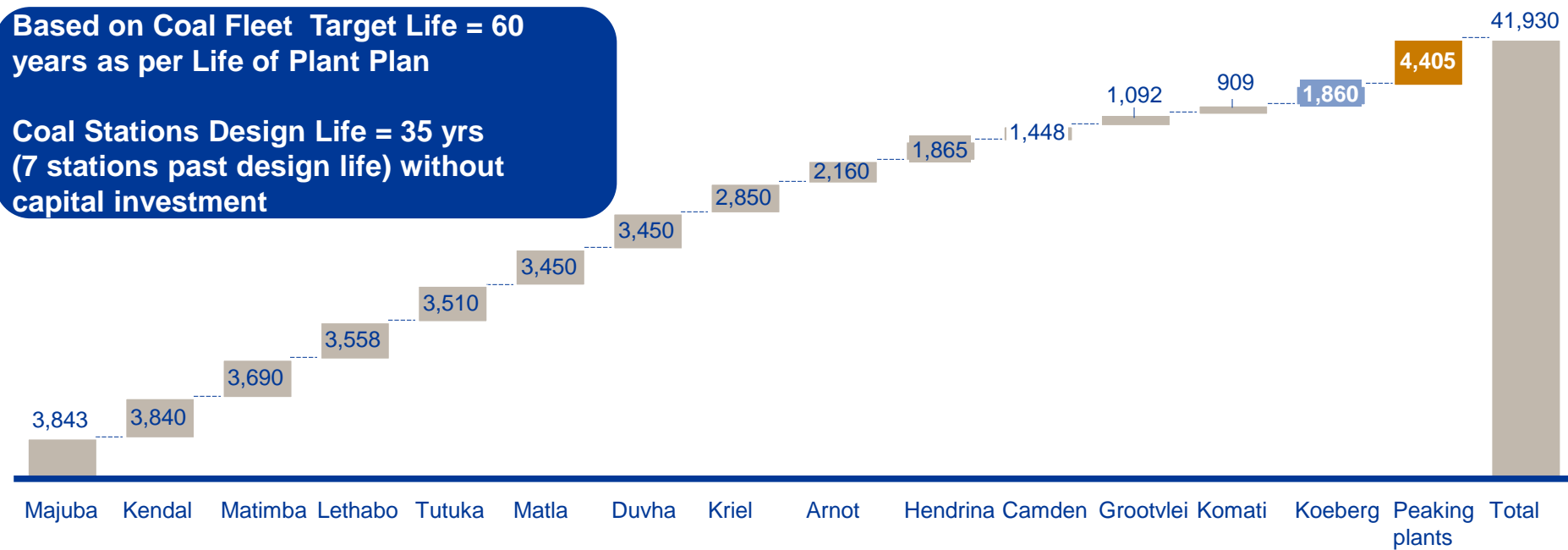
Coal Nuclear Peaking

Sent out capacity by station

MW

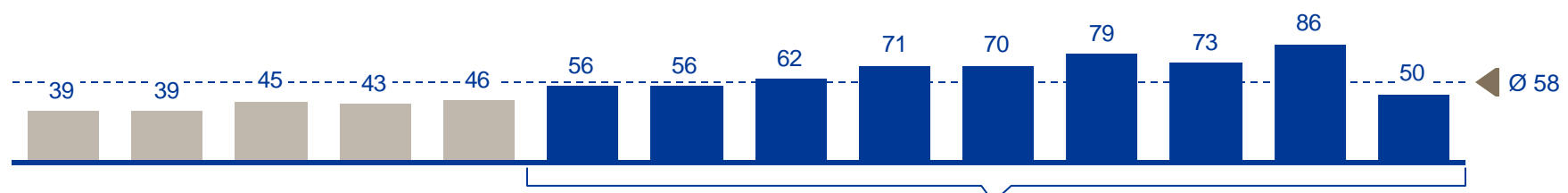
Based on Coal Fleet Target Life = 60 years as per Life of Plant Plan

Coal Stations Design Life = 35 yrs (7 stations past design life) without capital investment



Useful life completed

Percent



Stations more than half way through their operating lifecycle

Achieving a Sustainable Generation Business requires us to accommodate all major types of maintenance

Major projects

- Sustainability projects refurbish plant condition back to useful life
- Enhancement projects improve station performance (e.g. LifeEx)

Environmental

- Upgrades to plant to reduce the environmental impact of operating the plant, e.g., reduce emissions or water usage

Design-based Maintenance

- Preventive maintenance intended to keep the plant in working order. The maintenance is carried out at regular, predetermined intervals (e.g. inspection every 18 months)

Statutory and Safety

- Statutory maintenance is required by law
- Safety maintenance ensures a safe operating environment

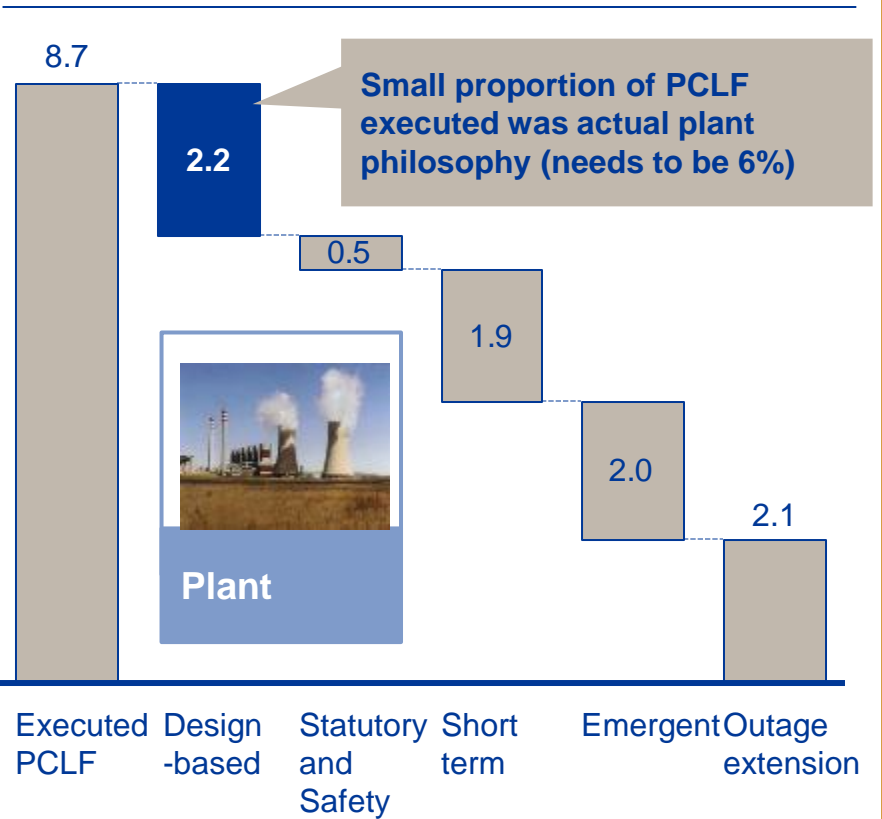
Short-term/ Emergent Work

- Short-term is work done on weekends and other short duration maintenance opportunities
- Emergent maintenance is reactive to addresses arising signs of existing or imminent failure

Essential Design-based maintenance has been backlogged with Statutory/Environ. given preference

Breakdown of FY2012 PCLF

Percent



With constrained capacity (maintenance space and ability to execute), four primary technical levers exist in defining the pathway to sustainability



1. **Flexibility of the supply – demand relationship** (e.g. how many demand reducing levers to pull, Residential Mass Roll-out, demand response options, accelerated new capacity options and energy conservation scheme)
2. **Delaying the clearance of the growing maintenance backlog** (smooth over 5 years – currently total 10% backlog)
3. **Prioritising some maintenance types over others** (e.g. philosophy over Life extension or other major projects)
4. **Targeting the overall health of the entire fleet and/or a set of prioritised stations** (e.g. All maintenance at some stations while only some maintenance activity at others: Plant prioritisation done on Remnant Life, Cost of Production and Recent Plant Performance)

- We have chosen a maintenance strategy for the next five years which will ensure that Eskom's Generation fleet is sustainable for the long term
- This is based on an **80:10:10 principle** – that is, on average, an Energy Availability Factor of 80%, planned maintenance of 10% and a projected unplanned outage ratio of 10%
- About 8% of the planned maintenance will be made up of maintenance which will be fixed in terms of its schedule. The other 2% will be short term maintenance. This will allow for certainty in planning and executing the maintenance outages. Outages to achieve compliance to Environmental legislation, where no exemptions have been obtained, will be done.
- Any improvement in unplanned outages will be used to create space for planned maintenance
- A minimum of 9 units will undergo planned maintenance this winter, because they have reached technical or statutory limits. This cannot be rescheduled.

Overview

Review of the quarter

Outlook for winter

Creating a sustainable Generation fleet

Conclusion

- Medupi is the first new coal-fired power station Eskom has built for 20 years and will add 4800 MW (more than 12%) to the national grid by the time it is complete in 2016
- Eskom's new build projects (Medupi, Kusile, Ingula) are critical to lift the constraint on electricity supply and support South Africa's growth and development
- We have shown we can deliver: we have commissioned 46 units, more than 5300 MW of new capacity, since the new build programme began in 2006
- Medupi is on a tight schedule to deliver first power to the grid from its first unit (Unit 6) by the end of 2013
- Meeting the deadline will be a huge challenge due to quality issues on the Hitachi boiler contract and Alstom control and instrumentation contract, as well as labour unrest
- Hitachi and Alstom have given written assurances that they will not delay the deadline
- Eskom has put plans in place to mitigate risks and is managing contractors assertively.
- A new partnership agreement is being negotiated by Eskom, labour and contractors
- We are doing everything in our power to meet the December 2013 target date

- The power system has been very tight during summer because of reduced imports and high levels of unplanned outages, including Koeberg Unit 1, and this has meant less space to do the maintenance work we had planned
- Going into winter, Eskom will for the first time plan to do extensive maintenance work, even during the coldest months, to improve reliability
- Our teams are preparing contingency plans to manage the impact of any severe weather events – as they did last winter
- We urge all customers to reduce demand, particularly over evening peak from 5pm-9pm
- We have done a comprehensive review of the five year maintenance plan required to ensure our power stations can deliver more sustainable performance
- We have put initiatives in place on the supply and demand side – but are concerned about the impact of the tariff decision on these
- An Energy Conservation Scheme or similar measures is needed as a safety net
- We are determined to keep the lights on for South Africa – but Eskom cannot do it alone

A decorative graphic on the left side of the slide. It consists of two overlapping circles. The larger, upper circle contains a photograph of an industrial power plant with a large cooling tower and various pipes and structures. The smaller, lower circle contains a photograph of two people, a man and a woman, sitting at a table and engaged in a discussion. The background of the slide is white with a blue curved shape on the left side.

Thank you