Energy Conservation

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28 May 2014

- Key Message
- System Status
- Eskom's roll in Energy Savings as well as Achievements in Energy Savings
- Energy Savings Opportunities

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Key messages

- The Electricity Supply system will remain tight, Summer and Winter, until a substantial part of the build programme delivers capacity
- It remains important for all customers to maintain or achieve 10% electricity savings especially in the commercial, industrial and residential sectors.

Key Message

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Energy Savings Opportunities

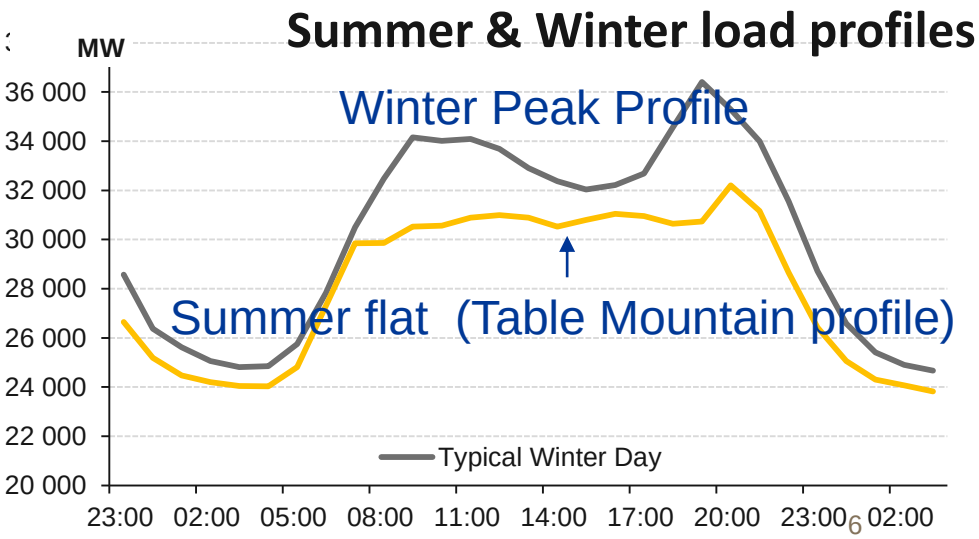
As a reminder - electricity usage in Summer and Winter…

Sept-March – Spring/Summer
'Live Lightly'

- Table Mountain profile
- Constrained all day incl. from 5 - 9pm
- Air-conditioning, geysers & pool pumps primarily impact demand
- Commercial, agricultural & residential customers can make the biggest difference

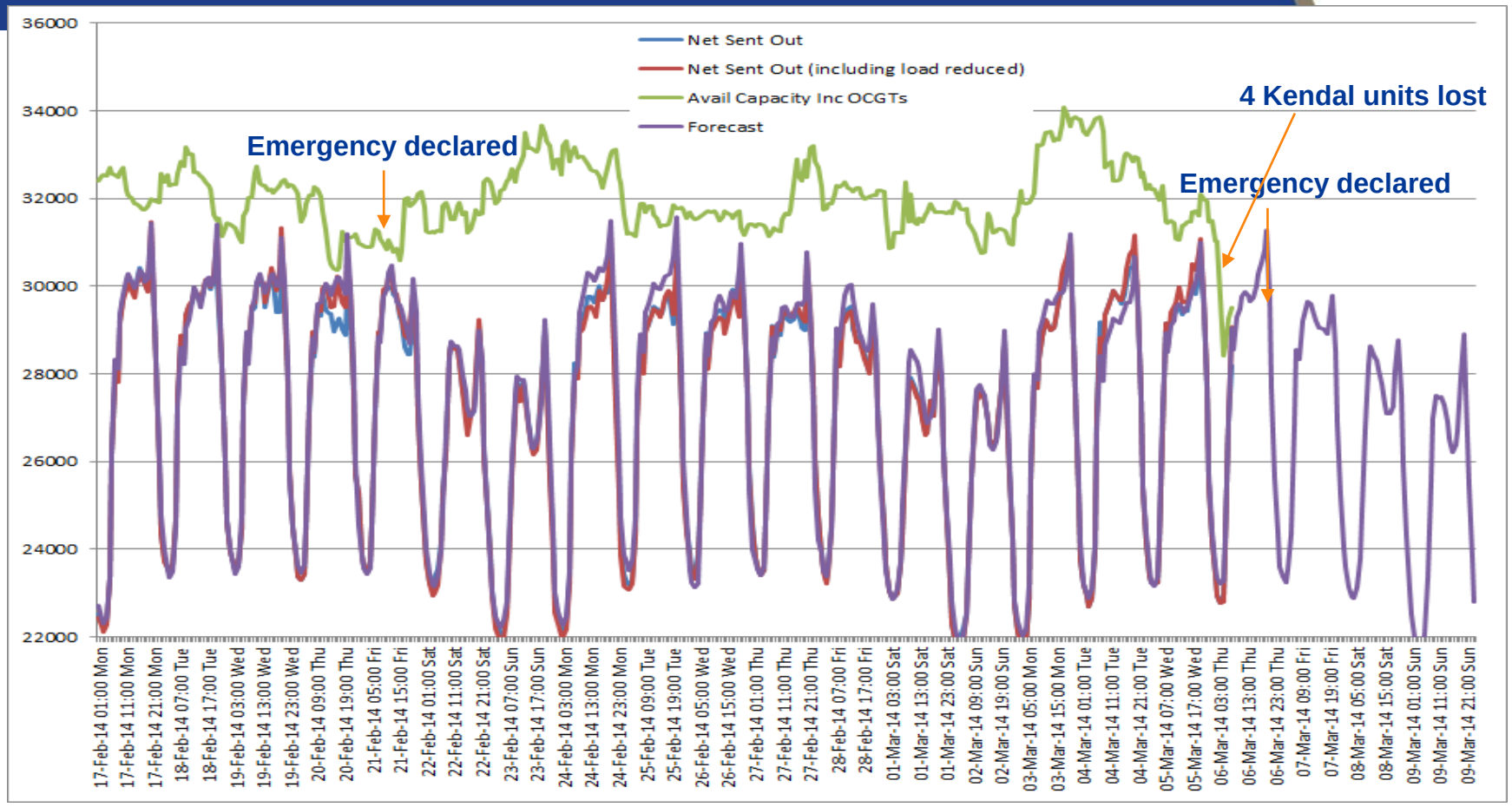
April-Aug – Autumn/Winter
'Beat the Peak'

- Peak profile
- Constrained from 5pm – 9pm
- Electrical heating, geysers, & pool pumps primarily impact demand
- Residential customers can make the biggest difference as demand increases in the evenings



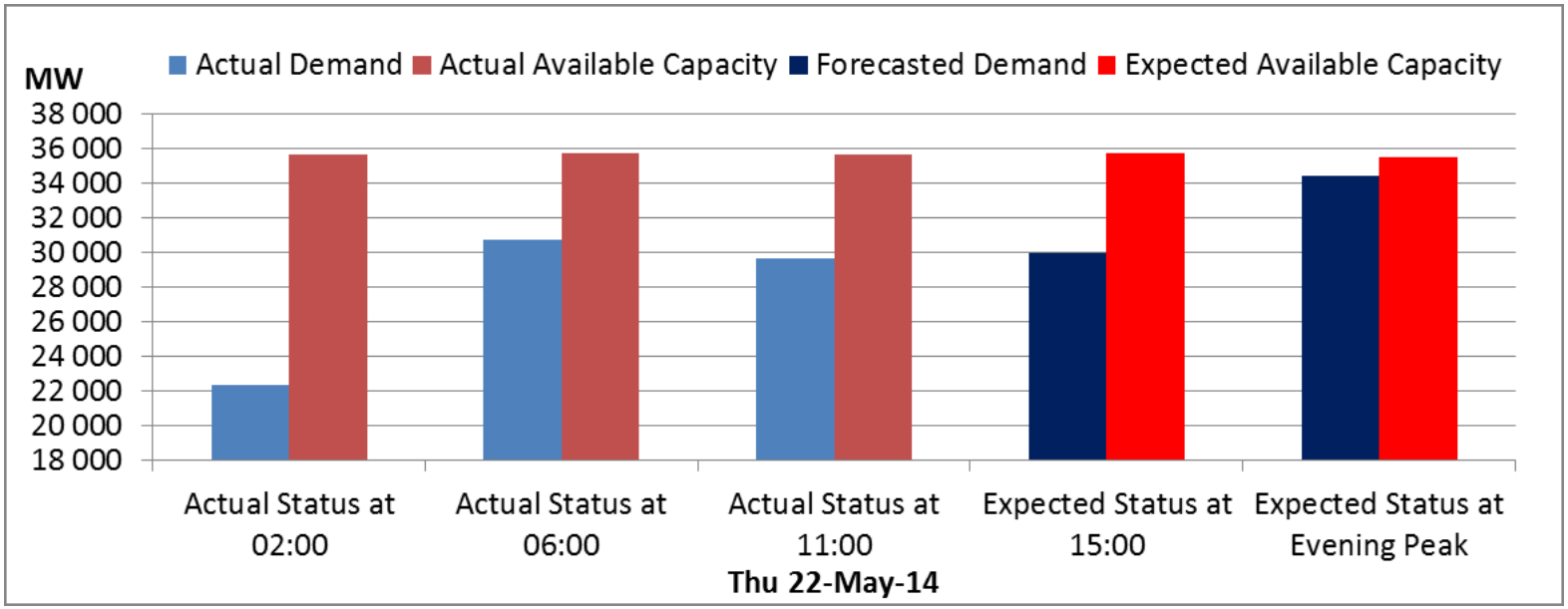
- Most planned maintenance done in summer
  - Lower demand
  - Max capacity for winter
- Colder than expected winter
  - 1°C – add 600 – 700 MW
- Warmer summer increased load due to air conditioning – 400MW

Available capacity to meet demand



- The emergency of 20 and 21 February 2014 was particularly tight from the Thursday afternoon and into the Friday afternoon.
- A substantial change can be seen on the emergency of the 6th March when the available capacity was much lower than the entire day's demand

Supply and Demand Trends



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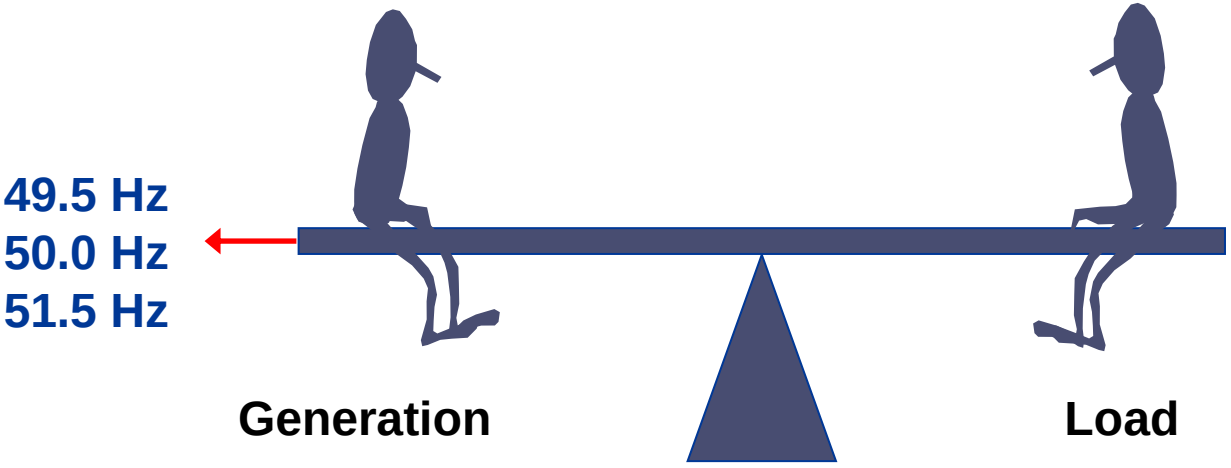
Energy Savings Opportunities

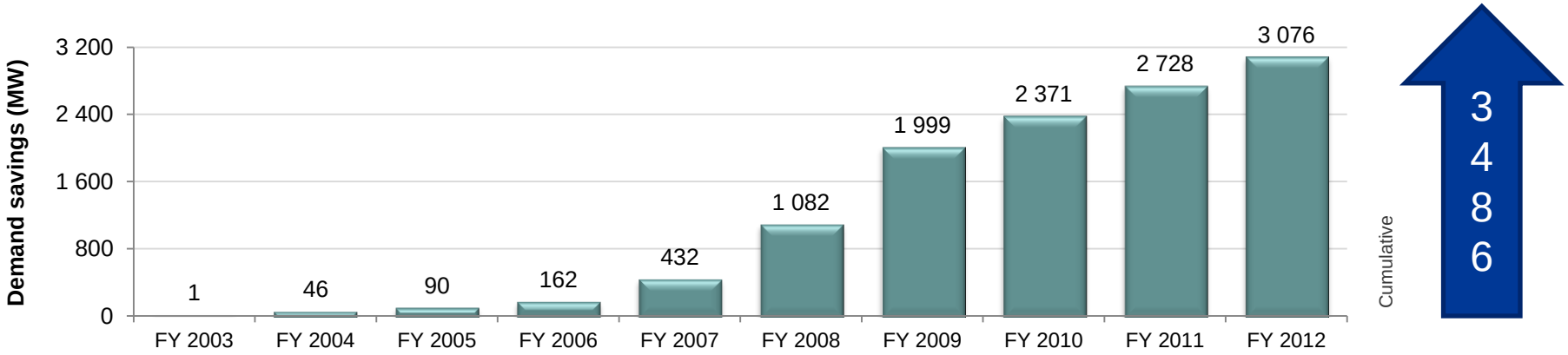
Balancing supply & demand

- Electricity demand must be matched in real time.
- Any mismatch in supply and demand is reflected in the system frequency.
- Strict frequency control is required in order to ensure system security.
- This requires 24/7/365 management of the integrated power system.
- This is a primary role of the System Operator (National Control)



Eskom's IDM programme has delivered significant demand savings since its inception

Since inception of Eskom's Integrated Demand Management[1] programme in 2003, a total (cumulative) demand savings of **3,076 MW** have been realised through IDM initiatives.



This equates to saving almost a complete, average sized power station (6 × 600 MW units = 3,600 MW)

1. All Energy Efficiency and Demand Side Management related activities were consolidated under a single division during 2010 and 2011.

Source: IDM Project Database

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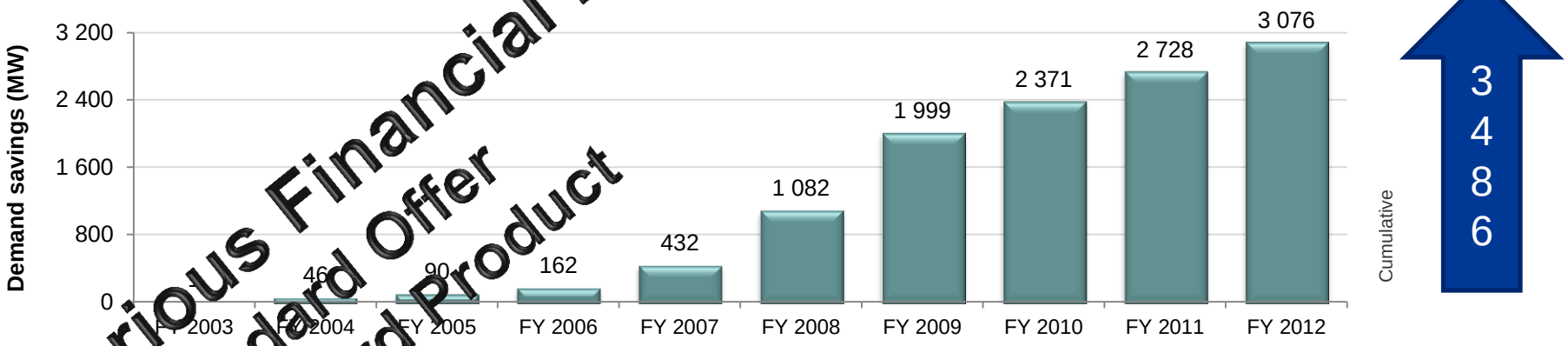

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Power alert TV messages

Green indicates limited strain on the electricity supply – asks you to switch off lights in all unoccupied rooms.

Orange means that the system is under moderate strain and that you need to switch off non-essential lights, the geyser and the pool pump.

Red means the electricity system is under increasing strain. Now is the time to switch off the geyser, pool pump and non-essential lights and appliances.

Black means that power interruptions are already happening in certain areas. Switch off everything except one light and the TV.

Supply-side: Renewable IPPs gain momentum

- The Department of Energy introduced three bid windows for the Renewable Independent Power Purchase Programme
- Of the 19 Renewable IPPs connected to the grid, 3 projects (99 MW) have achieved their contractual Commercial Operation Date (COD) and 8 projects are generating Early Operating Energy. Expect the last project of Bid Window 1 by no later than the first half of 2015

Bid	Date	MW	Power Purchase Agreements	Type of Technology	Status (As at 21 February 2014)
1	5 Nov. 2012	1416	28	Wind, Solar PV, Solar CSP	- 19 of 28 connected - 3 projects achieved COD; 8 projects in Early Operating - Last plant commercial expected by Feb 2015
2	9 May 2013	1044	19	Wind, Solar PV, Solar CSP, Landfill & Biomass	- Progressing well
3	- Bid Window 3 still to be concluded	17 bidders for 1456 MW - Wind, Solar PV, Solar CSP, Landfill and Biomass technology			

Supply-side: Cross-border IPPs

- Only until recently was Eskom allowed to conclude power purchase agreements with regional independent power producers
- While Eskom is committed to use IPPs, most contracts could not be concluded due to high price expectation

Project	Type	Potential	Eskom off-take	Status
Kudu	Natural gas	800 MW	600 MW	Eskom spent substantial time negotiating. PPA could not be concluded due to price
Mmamabula	Coal	1 200 MW	900 MW	• IG MOU signed • Due to high price expectation could not be signed • Explicit linkage to coal price which was higher than the Eskom coal cost • **New regulations implemented in RSA making the DoE the procurer**
Zesco	Coal and Hydro	200 MW	200 MW	Could not be concluded due to high price expectation
Kariba South	Hydro	120 MW	50 MW	Could not be concluded due to high price expectation

Continued progress with New Build …

- Eskom is **committed to completing the new build programme** and has put the necessary resources in place to do so
- Work has resumed at Ingula pumped-storage scheme after the safety incident
- Medupi and Kusile continue to demonstrate world-class safety performance (0.1 lost time incident rate). Medupi's first unit is still expected to be synchronised in the second half of 2014 and Kusile's first unit following a year thereafter.
- The technical C&I issues at both Kusile and Medupi are being addressed with the on-boarding of Siemens.

Continued Progress with New Build

- Seven of the 46 wind-turbines at Sere PS are complete and the station's 100MW is expected to be commissioned by 2014/2015

- Transmission power line construction is progressing well, major sections of the power grid (Western Cape, Limpopo and Gauteng) have been strengthened, although challenges still remain in terms of servitude acquisition.

Key Message

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Energy Savings Opportunities

Opportunities for greater efficiency are considered at three levels in the business

Behaviour change | awareness, entrenched from leadership throughout the organisation | education, skills development | training | practical knowledge / understanding of electricity usage, systems optimisation and operation to monitoring.

Operational measures and interventions related to installed equipment and technologies | management plans | practices and procedures | design specifications | procurement specifications | maintenance.

Systems and technologies

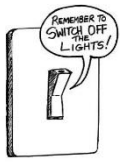
Efficient devices and installations | **efficiency upgrades and retrofits** | efficient technologies |

Minimise workplace energy use and spend with these 7 super savings tips

It is as easy as 1, 2,… 7 to be energy efficient at the office with easy, behaviour changes that are cost free:

1. 

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

2. 

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

3. 

   Only fill kettles with as much water as you need

4. 

   Set air-conditioners' average temperature in summer at 23°C and 18°C in winter

5. 

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

6. 

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

7. 

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

Operational measures and processes related to installed equipment, technologies and services

Operations and maintenance staff are important contributors to reducing energy consumption and can assist by introducing efficient practices:

- Adjust operating schedules,
- Calibrate building controls for optimum efficiency and where possible, automate controls and introduce occupancy sensors/controls,
- Care for existing equipment, regularly inspecting, maintaining and repairing when possible to optimal functionality (e.g. clean filters or heat exchanger tubes in condensers, evaporators and boilers; check filters, dampers, coils and balance of HVAC system),
- Select efficient options/alternatives for the replacement of failed equipment,
- Make use of natural light (daylight savings or daylight harvesting)

The **Procurement division** can introduce energy efficiency principles into procurement procedures and specifications:

- Introduce minimum efficiency performance standards for equipment / appliances, replacement bulbs, etc.
- Structure maintenance service contracts with energy efficiency penalties/incentive

Introduce **training programmes** at all levels of the organisation

Conventional wisdom suggests that “you can only manage what you measure”

The value of energy efficiency in properly implemented construction standards is universally recognized as the easiest and most cost-effective way to help consumers save energy and money. Introduce processes for **Compliance** to **national and voluntary building, measurement and reporting standards**:

- Building codes SANS 204, 10400XA,
- M&V standards 50001 and 50010
- Energy management plan (anticipated to be introduced under the Regulations on the Mandatory provision of Energy Data)

Measurement and reporting ensures employees and shareholders have access to information needed to understand the energy efficiency of the building/business/premises, to identify opportunities for improvement and see the benefits of the initiatives implemented.
Commit to voluntary disclosure of energy use and/or savings (and possibly associated carbon emission reductions) in annual reports. International studies suggested that companies that voluntarily reported on their energy use and carbon emissions outperformed companies that did not.

 | Source: http://www.triplepundit.com/2012/06/research-shows-stock-prices-when-companies-disclose-carbon-emissions/

Retrofit with efficient systems and technologies
an investment in efficient change

Automated control. Ensuring instituting energy management systems, such as automated control of HVAC systems and control of outdoor lighting.
Retrofit. Invest in an audit to accurately identify solutions aligned to the specific requirements, but indicative exchanges:

options

Water Heating | Electrical geyser, old, inefficient or incorrectly sized boilers	Heat pumps, solar water heating, combinations of these with
Lighting | mechanic control gear, inefficient bulbs	Suitable efficient alternates incl.: CFLs, LEDs, T-5 systems, electronic control gear, control systems, daylight harvesting
Motors | old, inefficient or inappropriately sized motors	VSDs, efficient motors (consider NEMA or IEC ratings)
HVAC | inefficient options	Evaporative AC, higher efficiency rated ACs, efficient compressors

We need to save 10% across all sectors

Eskom

Cut at least 10% off your energy costs by adopting a few simple energy efficient habits. Lowering your energy costs and saving electricity requires a combination of two simple decisions:

- **Switch off**: all appliances not in use, especially the geyser and pool pump between 5pm and 9pm.
- **Switch to**: new, energy efficient technologies throughout your home, such as energy saver lamps, solar water heater and heat pump.

How to save 10%

Geyser

Lower the thermostat to 60°, cover it with a geyser blanket and insulate the water pipes. Remember to switch off the geyser from 5pm to 9pm. Installing an approved solar water heater or water heating pump qualifies you for an Eskom rebate.

Air Conditioner

Dress appropriately and insulate your home. Your climate control – keep the room temperature in the "golden zone" between 18°C to 22°C.

TV and other appliances

Switch off your TV, computer and DVD player at the power button - don't leave them on standby mode, they still use up to 50% of their operating power. Once you are done charging your cellphone, unplug the cellphone charger.

Lights

Replace all your old-style incandescent bulbs with energy saving Compact Fluorescent Lamps (CFLs). Switch off lights in unoccupied rooms.

Space Heating

Keep warm by dressing appropriately, use blankets, hot water bottles and insulate your home. Only heat the rooms you are planning to spend time in. We recommend that you use heaters with a built-in thermostat and a short warm up time.

Shower

Make it hot and keep it short, it uses less hot water than bathing which means less work for your geyser. Switch to an energy and water saving shower head for more savings.

Microwave

Cook in the microwave whenever you can, it is the most energy efficient cooking appliance in the home

Pool Pump

Accounts for up to 11% of your monthly energy bill. Switch off your pool pump between 5pm and 9pm, and use a pool cover when it's too cold to swim in winter. With a pool cover, you can reduce the running time of your pool pump.

Fridge

Close the door quickly so it doesn't use extra power to get back to optimal coldness.

Conclusion

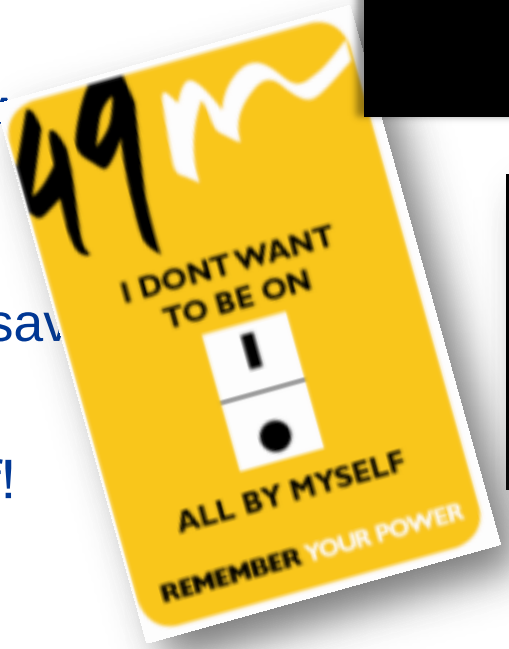
- The system remains tight and is vulnerable to any changes going into Winter**, and will remain so for the next few years until the build programme is completed**
- With the projected demand and current trends in plant performance, **extensive and expensive use of OCGTs** is anticipated, resulting in limited operating reserves to deal with volatility in demand or generation performance.
- We call on all customers, particularly the municipalities and the commercial sectors, **to manage and cut out all electricity wastage**. The industrial and commercial sector can make significant contributions particularly in large office blocks and shopping centres.
- If this is done, it will ensure a stable power system and reduced costs
- We thank all our customers who continue to assist by reducing consumption.

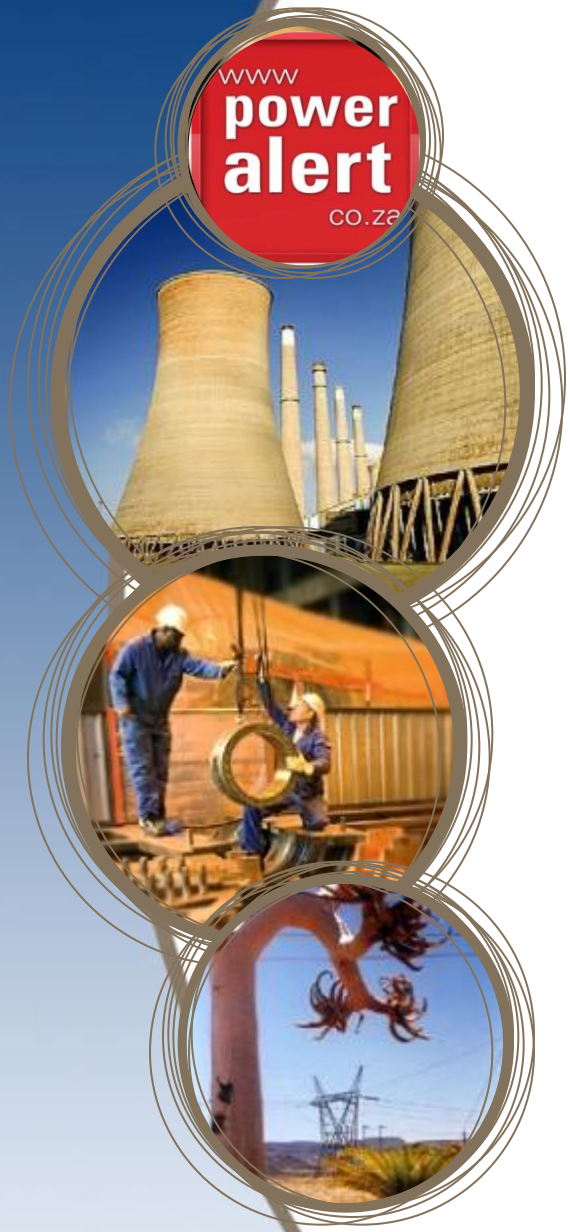
In support of

REMEMBER YOUR POWER 49

Please partner with us

- Embrace energy saving as a national culture, joining the global journey towards a sustainable future
- 49M campaign aims to create a culture of energy efficiency in SA
- Remember the three Ps: save **p**ower, save your **p**ocket and sav our **p**lanet .
  If you're not using it, switch it off!

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Thank you


49
I DONT WANT
TO BE ON
ALL BY MYSELF
REMEMBER YOUR POWER