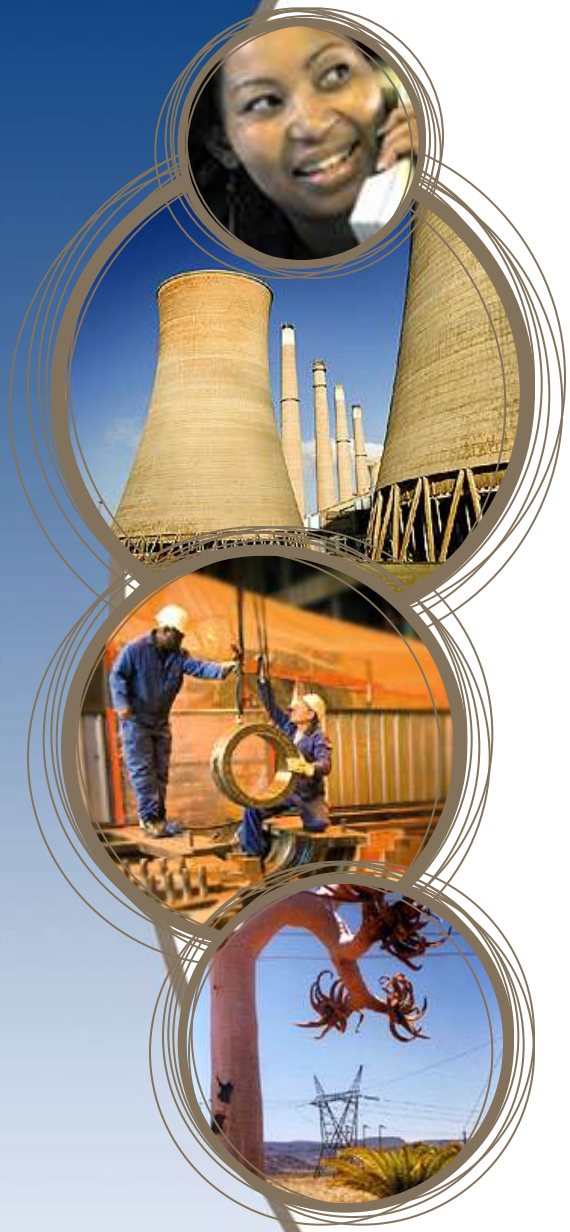
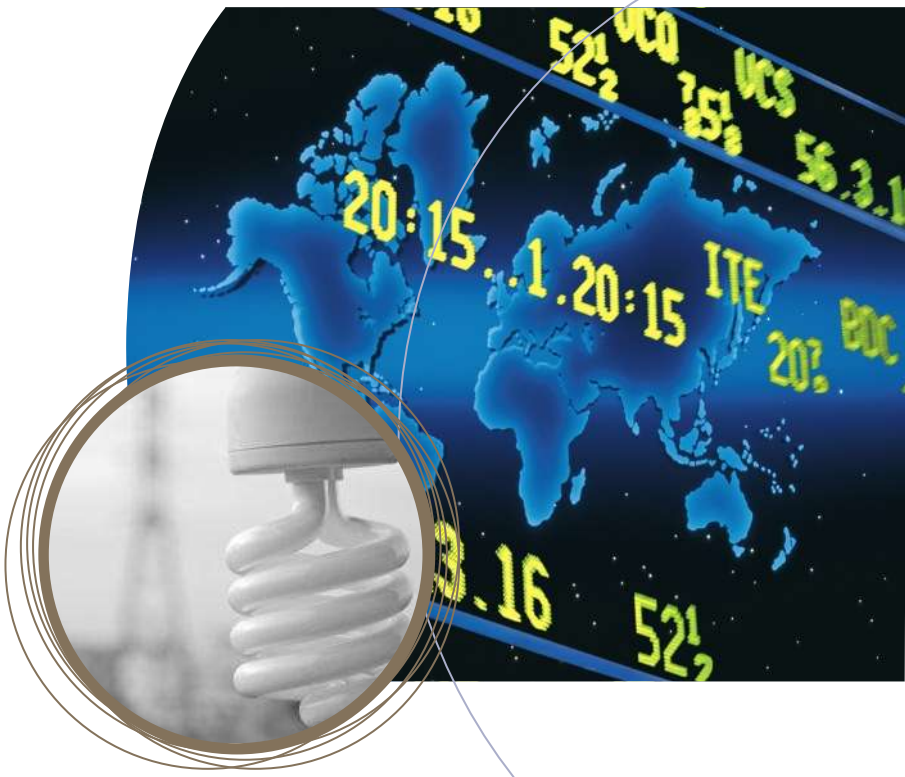


Integrated Demand Management

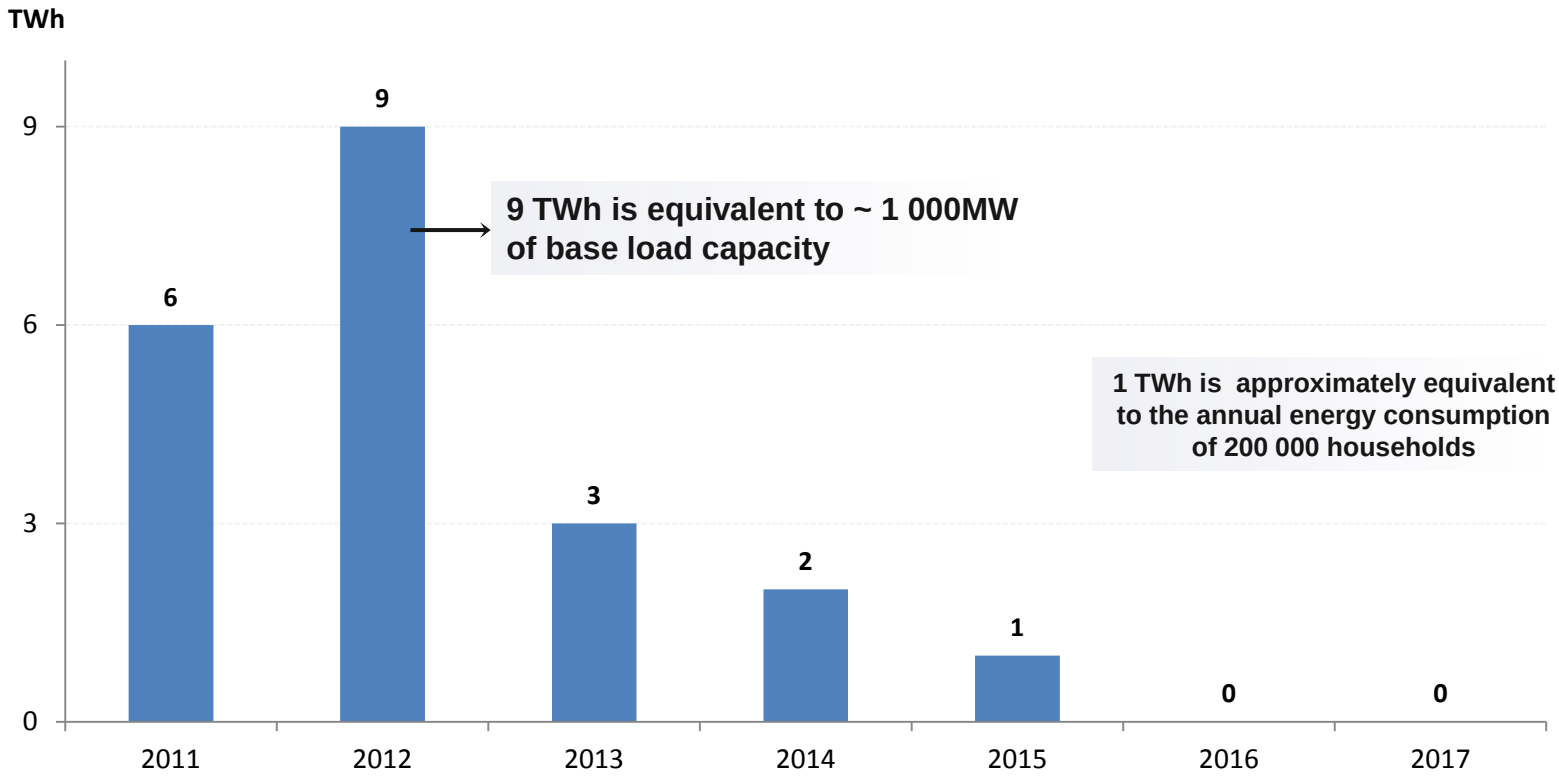
21 June 2012

Andrew Etzinger

STATE OF THE SYSTEM



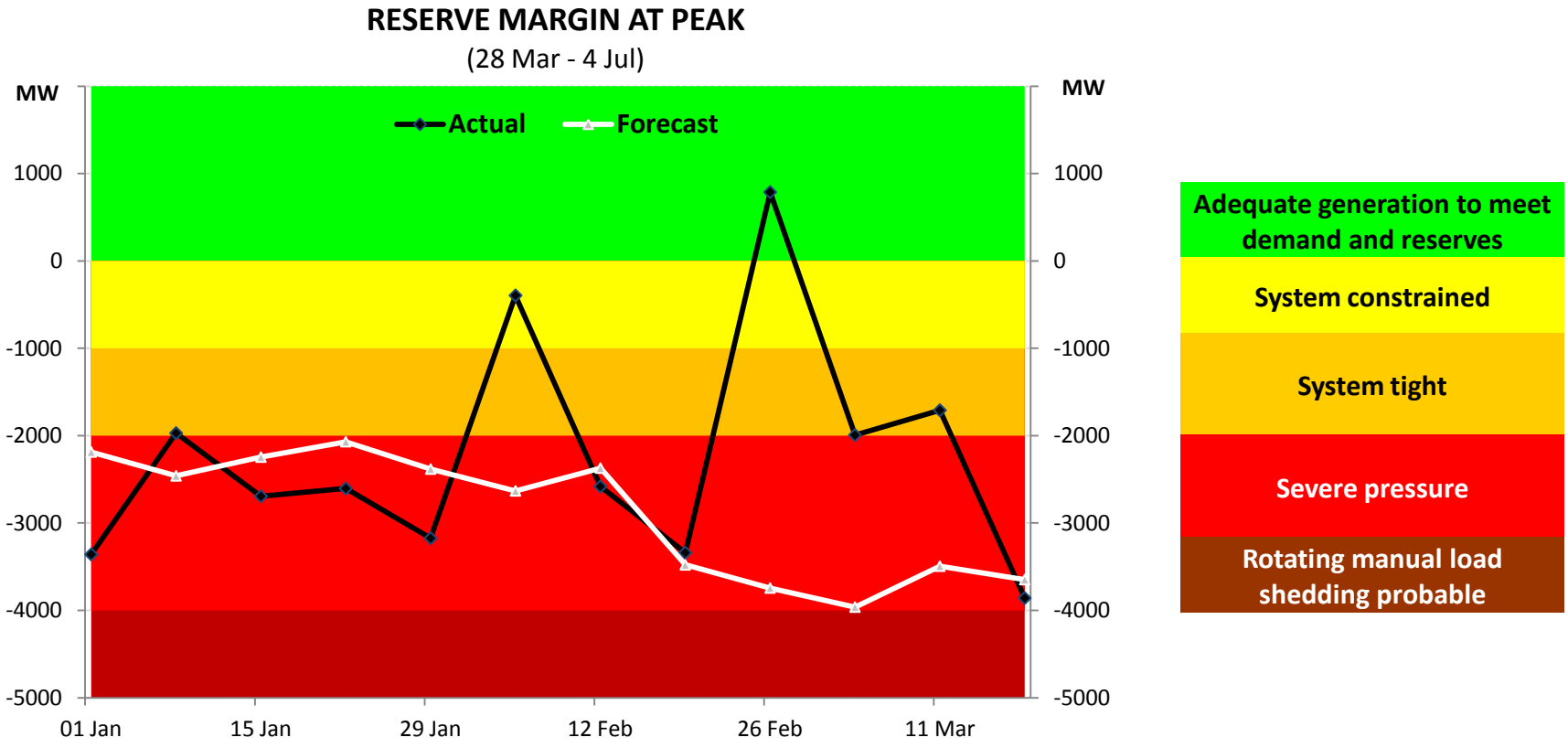
FORECAST OF ANNUAL ENERGY SUPPLY GAP



Source: Medium Term Risk Mitigation Plan (2009)

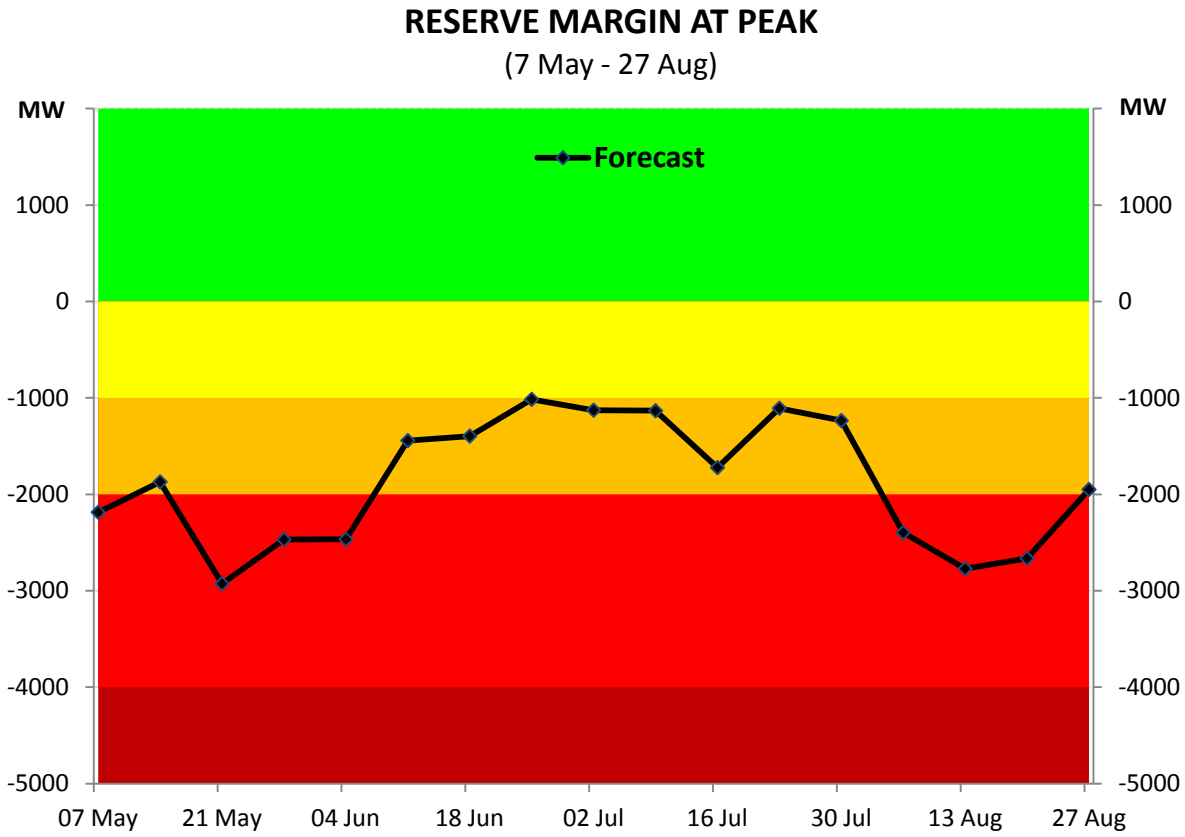
This forecast assumed that all planned supply and demand levers were put in place

REVIEW OF SYSTEM STATUS IN THE FIRST QUARTER (JAN – MAR 2012)



We have been making increased use of open cycle gas turbines but there is still a significant maintenance backlog. Additional demand and supply levers were secured in mid Feb which brought the system out of the red. **The system status has been in the deep red for a significant time in the last quarter.**

EXPECTED SYSTEM STATUS FOR THE NEXT FEW MONTHS



Adequate generation to meet demand and reserves

System constrained

System tight

Severe pressure

Rotating manual load shedding probable

The system is expected to be in the red for most of the proceeding 3 months. The OCGT's will need to be extensively used to meet the demand. Additional demand and supply levers need to be secured to prevent the system from being in the deep red for prolonged periods.

Energy Conservation Pledge with DPE

- In light of the critical electricity situation and in the interest of keeping the lights on, the DPE Mister Malusi Gigaba has called on his State Owned Companies to implement energy savings initiatives on all buildings under their management
- As responsible citizens of South Africa, the SOCs have recognised the need to use electricity efficiently to contribute to a reduction in demand to alleviate the load on the country's power supply.
- They have subsequently signed an Energy Conservation pledge to demonstrate their commitment and have appointed Energy Managers to drive the implementation
- An on-boarding session has recently been held with all the Energy Managers to kick off the process
- A memorandum of understanding is in the process of being finalised between DPE, Eskom and the SOC's

SOCs Energy Conservation pledge

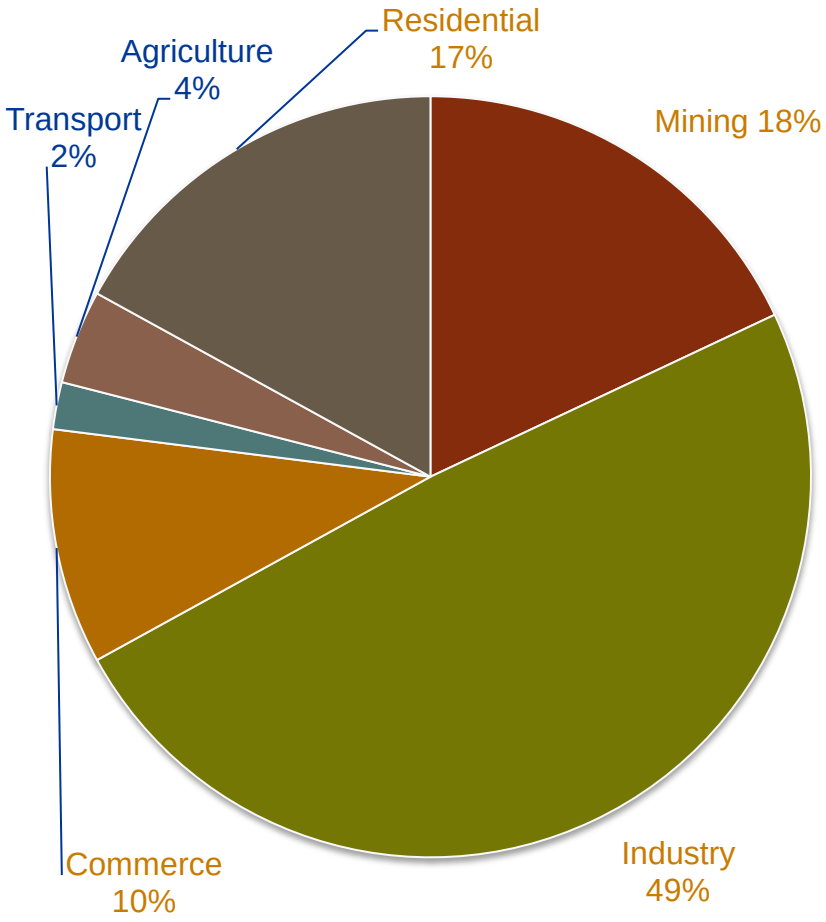
As part of the commitment to reduce electricity consumption, SOCs have pledged to:

- Perform basic energy audits and identify quick win opportunities to reduce consumption
- Analyse longer term energy savings opportunities and implement technology and process solutions
- Drive behaviour changes through staff awareness and education campaigns, including savings at home; and
- Appoint dedicated Energy Managers to increase visibility and be the advocates of energy efficiency;

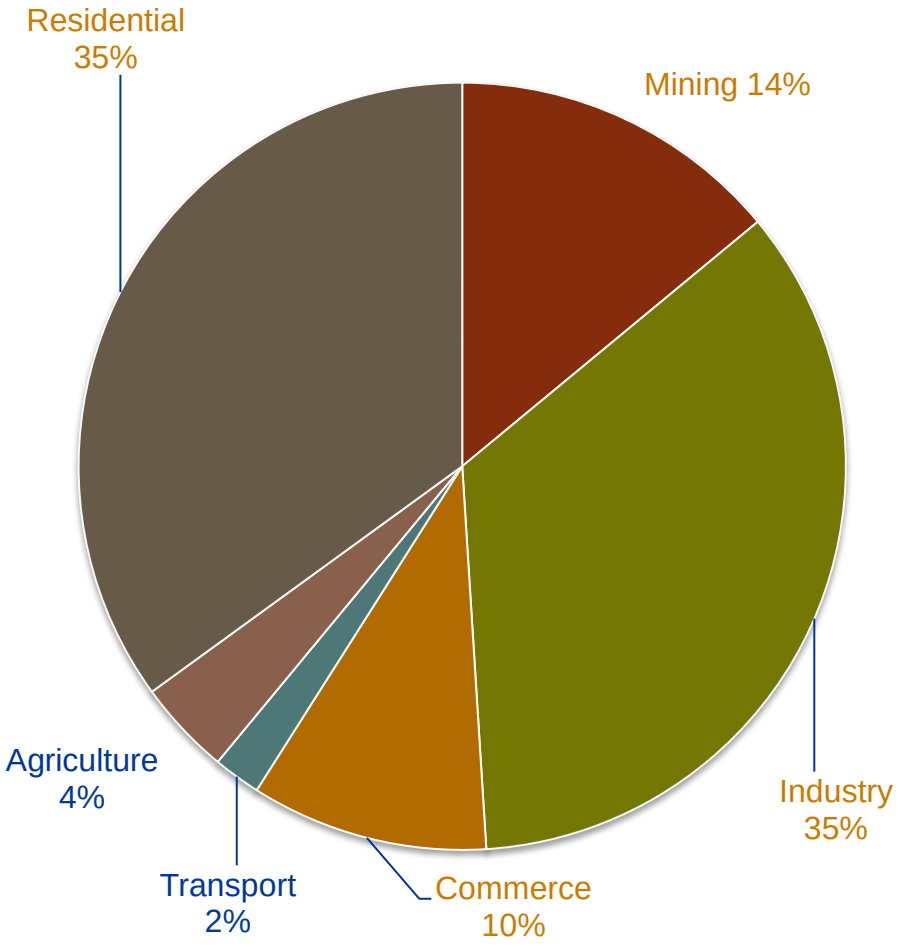
INTEGRATED DEMAND MANAGEMENT

Electricity consumption per sector

Energy Consumption



Demand



Source: as reported in the Eskom 2011 Integrated report)

IDM activities previously focused primarily on three areas

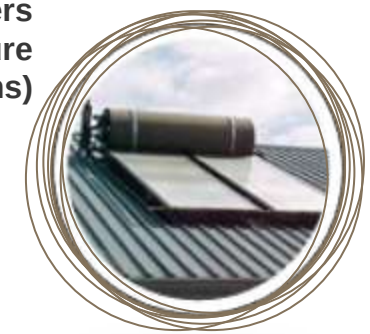
Industrial and mining process optimisation & efficiency upgrades

199	projects
596	megawatts
1,831	gigawatthours/annum

Mass rollouts (mainly of CFLs)

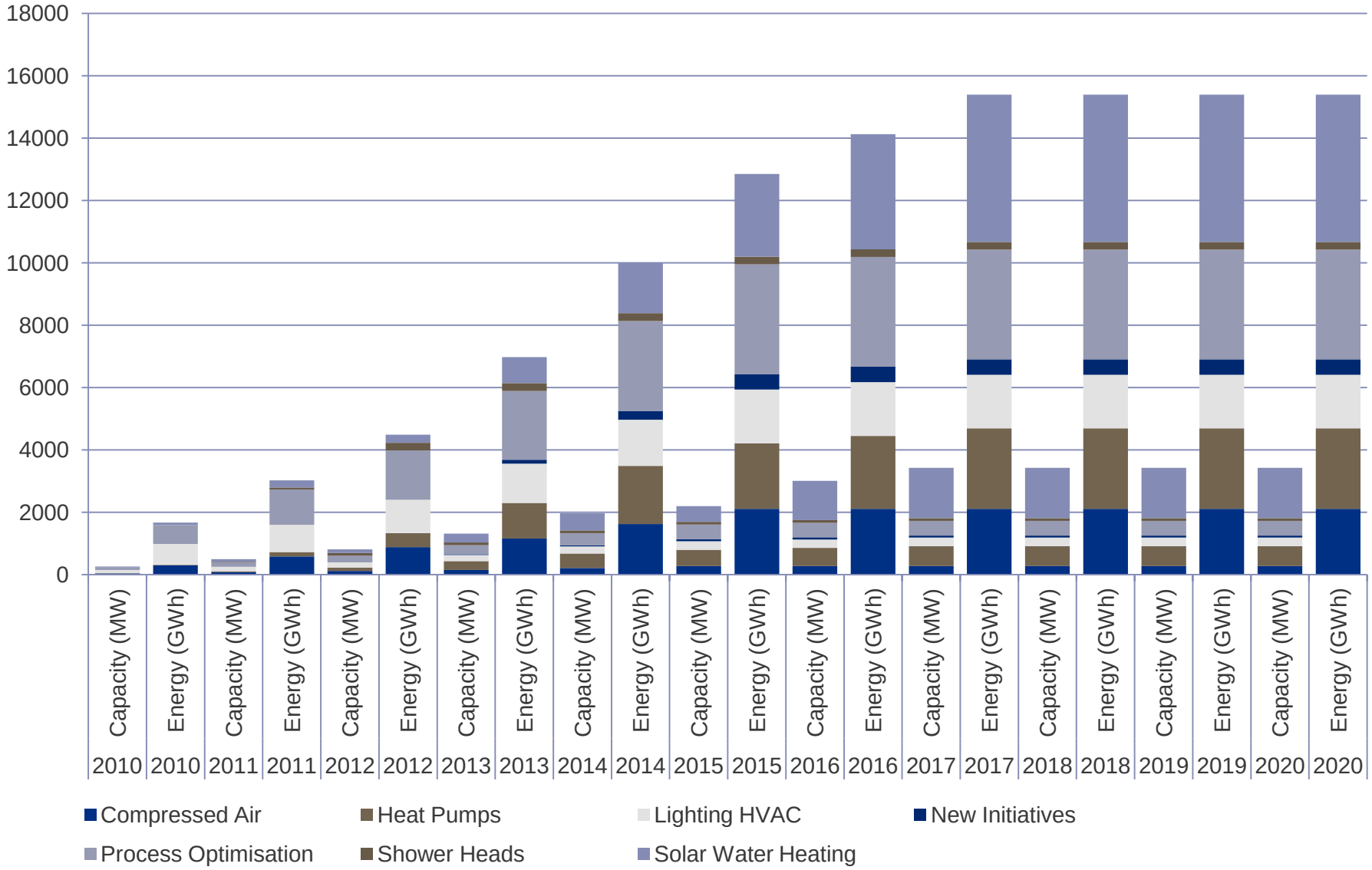
318	projects
2,128	megawatts
4,735	gigawatthours/annum``
52 m	CFLs rolled out 2004-2010

Solar Water Heaters (high and low pressure systems)



36,808	high pressure systems
151,028	low pressure systems
33	megawatts
219	gigawatthours/annum

The state of the electricity system is a driver for energy efficiency (as reflected in the IRP)

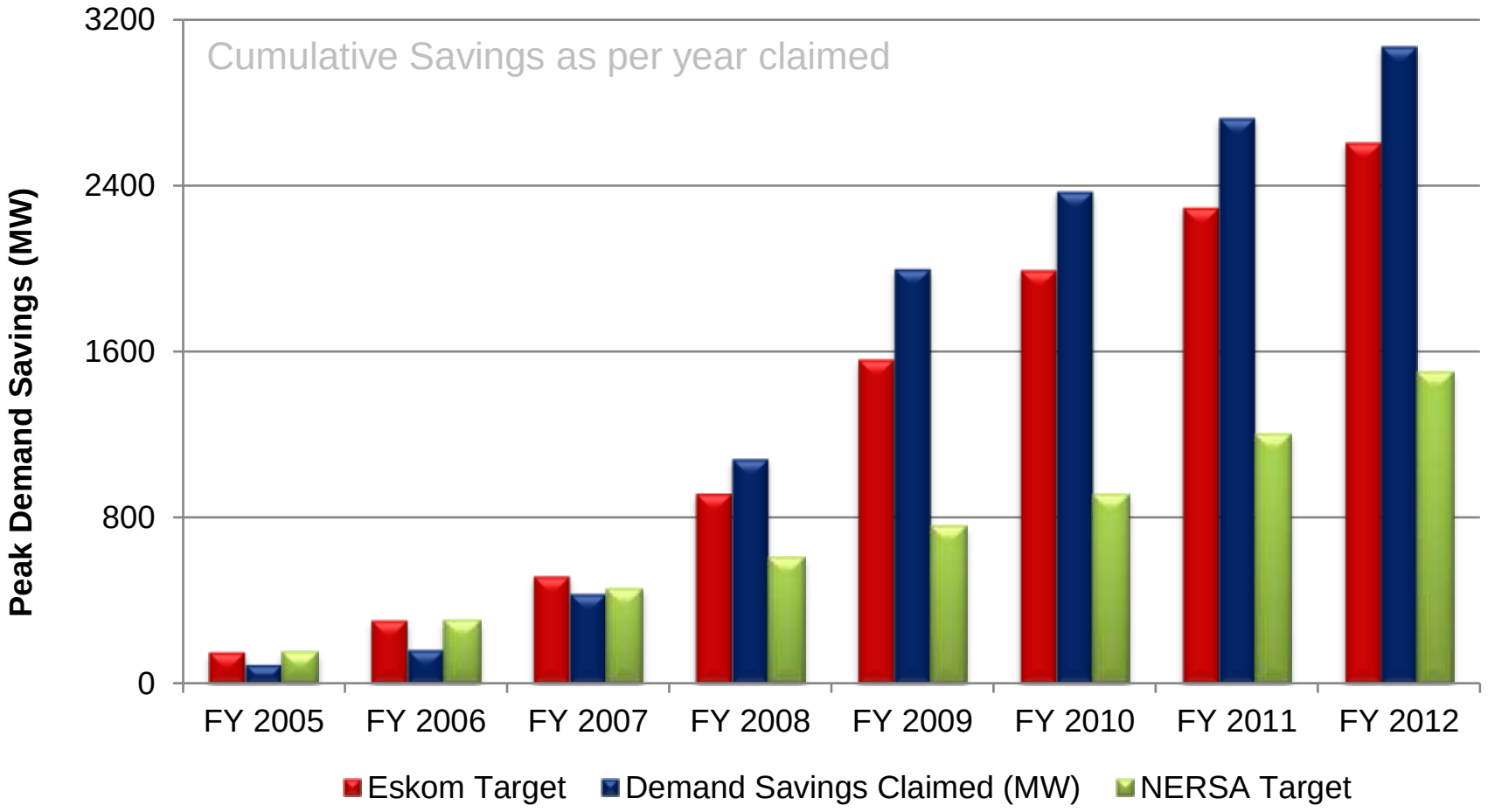


Verified MWs for financial year end 2012

IDM	EA FY 2012 Audit List (MW)	IDM Annualised Calc GWh on verified MW
Verified		
NERSA	338.29	1312.07
NERSA - SPP	3.37	22.17
NERSA Funded (including SPP)	**341.66**	**1334.24**
DoE Funded	5.23	15.70
NERSA & DoE	**346.89**	**1349.94**
Installed Not Verified To Claim	18.48	71.77
Total IDM Claim	**365.37**	**1421.71**

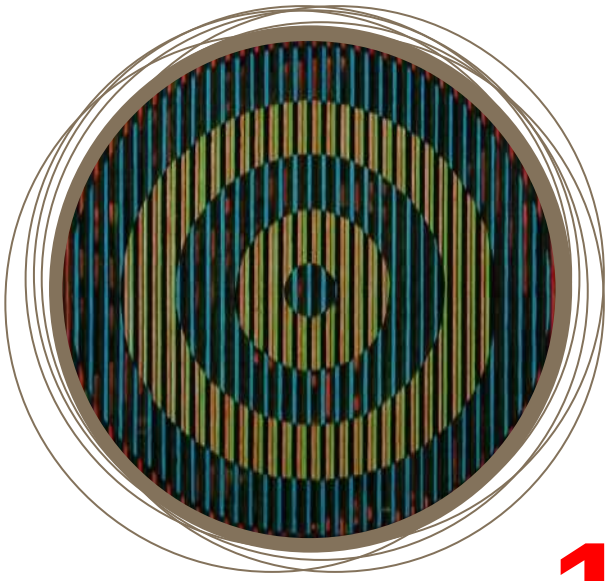
Cumulative Targets and Average Verified MWs

During **w**eekday **e**vening **p**eak **p**eriods (31 March 2012)



*** Includes DMP & Non Funded Projects**

Available Funding and Targets



MYPD2 Allocation for EE and DSM

5.4 billion ZAR, over

3 years, to deliver

1 037 MW demand savings and

4 055 GWh energy savings.

EEDSM FUNDING

Mechanisms and Programmes

Existing Funding Mechanisms and Programmes

ESCo Model

Performance Contracting

Standard Offer

Mass Rollouts

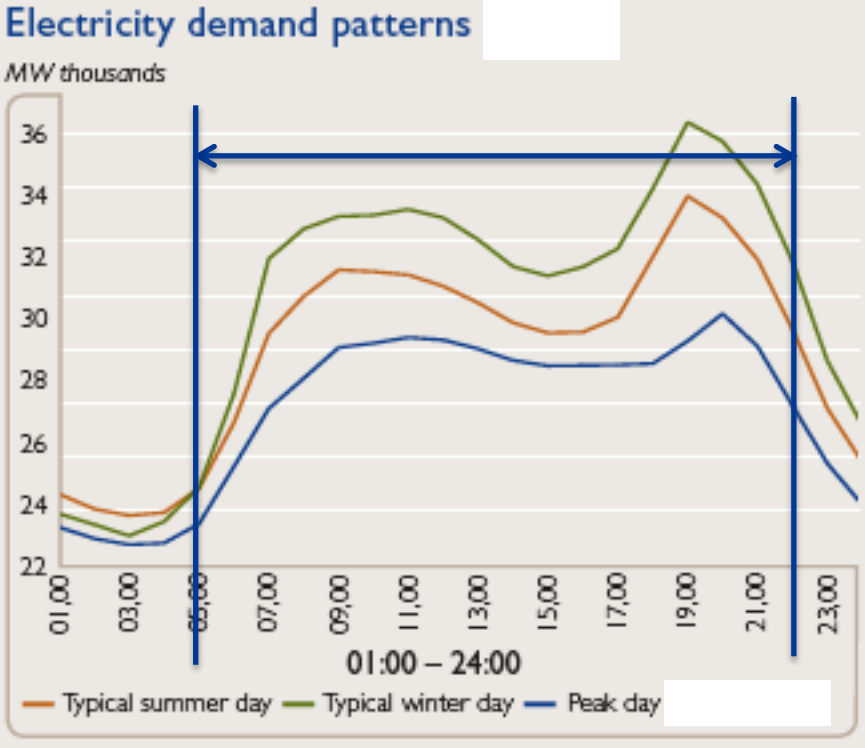
- Downlighters
- Residential Demand
- Shower heads

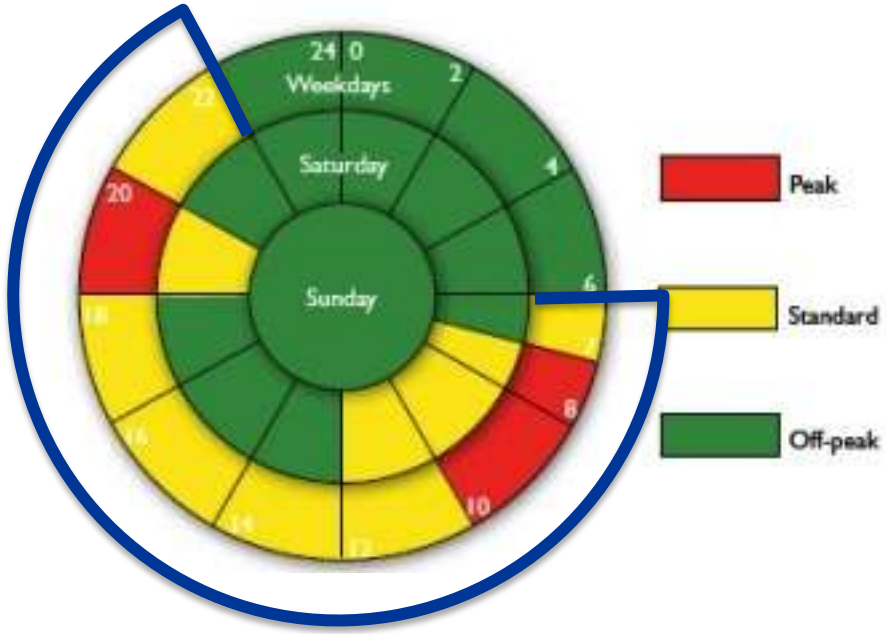
Standard Rebates

- Solar Water Heating & Heat Pumps

South African periods of peak consumption

priority target for energy efficiency interventions





ESCo Model

Process Optimisation, Lighting, Heat Pumps, HVAC, etc.

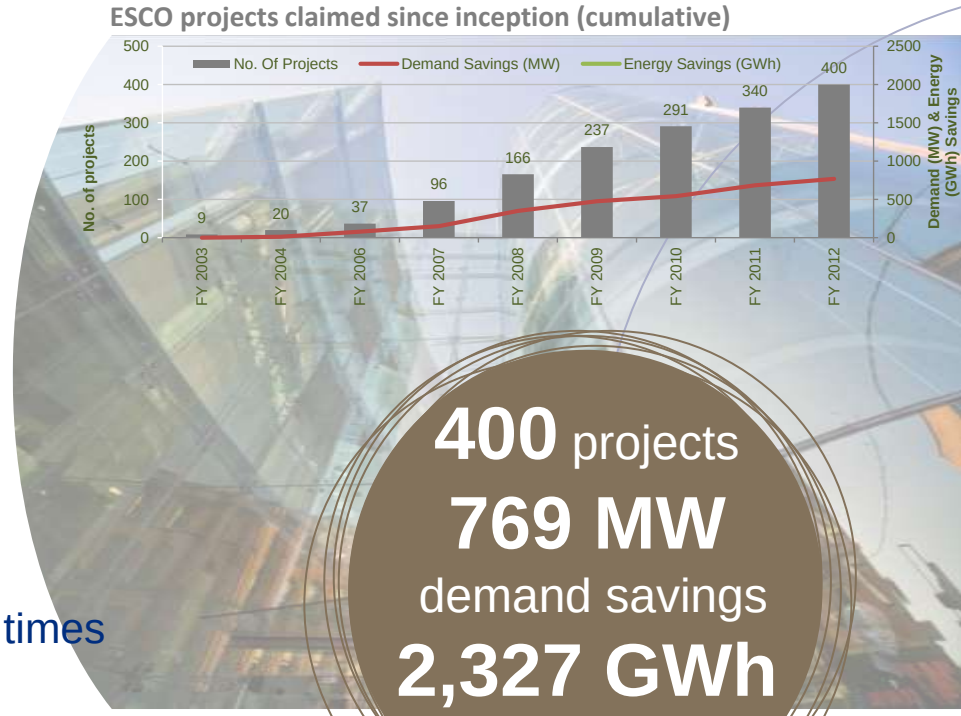
Individual Projects with unique requirements

Size: >1MW
Market focus: Industrial

Although demand-based, payment equates to
50-70c/kWh

Issues with ESCo model:

1) Individual project approvals and long lead times
2) Not applicable to “mass market”
3) Inconsistent evaluation criteria
4) Cumbersome governance processes
5) Complex and onerous contracts



400 projects
769 MW
demand savings
2,327 GWh
energy savings

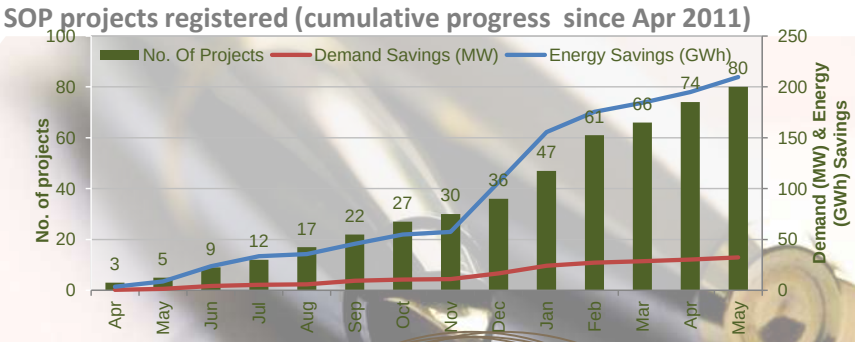
Standard Offer

Lighting, LEDs, Hot Water Systems, Solar, Industrial Process Optimisation

Replace inefficient technologies with a pre-approved suite of energy efficient products

Size: 50kW-5MW (Mon-Fri 6:00-22:00)
Market focus: Industrial / Commercial

Standard rate per kWh per technology
42 – 120 c/kWh (Peak Hours)



80 projects
32.3 MW
demand savings
209.6 GWh
energy savings

Performance Contracting

Compressed air, Ventilation, Lighting, Shower heads, Heat pumps, SWH, etc

Large, Capital Intensive Industrial projects.

Size: >30GWh for 3 years
Market focus: Industrial

Multiple fixed rates per kWh based on time of savings

Standard Product

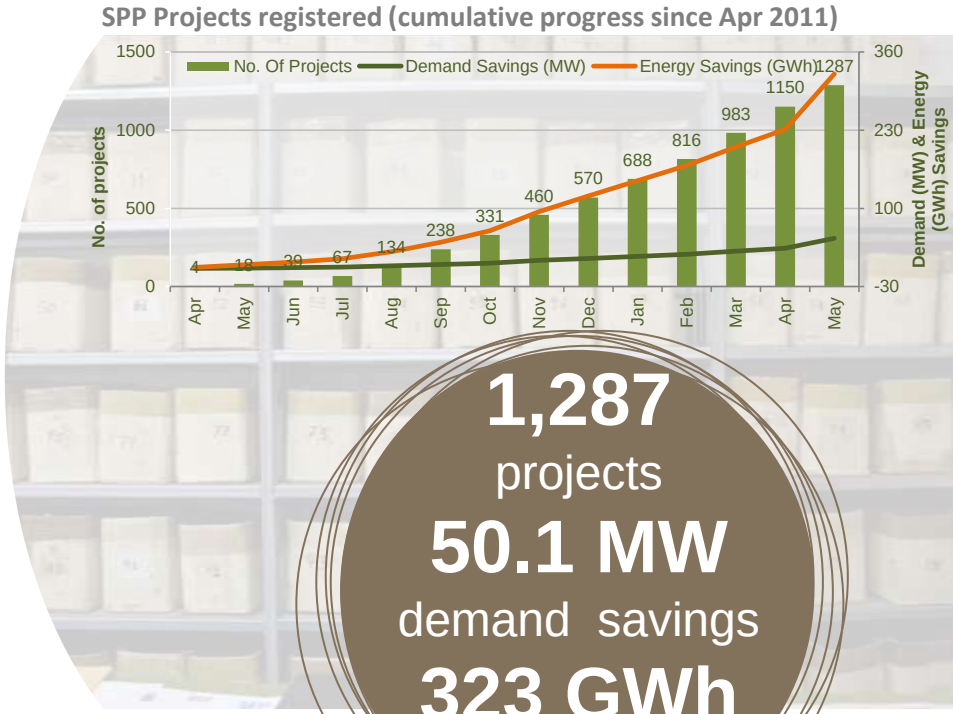
Pre-approved for deemed energy savings (24/7) achieved through specified technologies –

Lighting, Shower heads, Industrial heat pumps

projects

Size: <250kW savings
Market focus: Commercial

Standard value per rebated item, scaled to 85% of SOP
Rebate capped at R1,875,000



Residential Mass Rollout

Mixed basket of technologies including: CFLs, LEDs, Showerheads, Geyser Controllers, and Geyser blankets

Replace inefficient technologies with a pre-approved suite of energy efficient products

Size: 5MW-20MW
Market focus: Residential

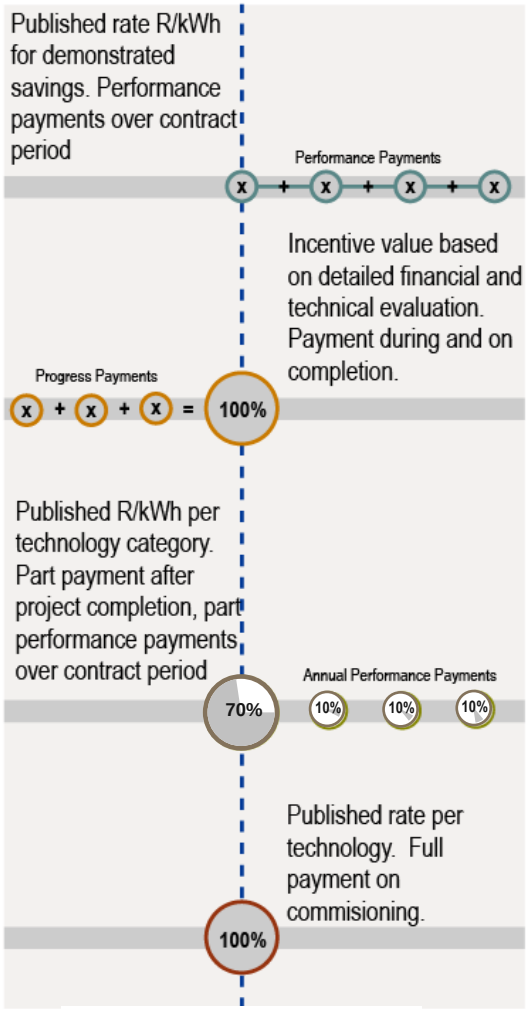
Fixed rate per technology
as published

How can Eskom help me implement an energy efficient solution?

Funding Models (Who is it for?)	How much power will Your project save?	Which technologies will you implement?	How long is the approval process?
Performance Contracting* (Industrial)	>30 GWh in 3 years	Custom or hybrid solution	3-4 Months
Aggregated Standard Product (Industrial & Commercial)	5 MW	Limited to specific products on a published list	2-4 weeks
Residential Mass Rollout (Residentail)	1 MW Batches; 1 MW Batches; 1 MW	Limited to specific products on a published list	2-4 weeks
ESCO Model (Industrial & Commercial)		Custom or hybrid solution	6-18 Months
Standard Offer (Industrial & Commercial)	250 kW	Limited to categories of technology on a published list	Less than 2 months
Standard Product (Commercial)	50 kW; 0	Limited to specific products on a published list	Less than 2 weeks

* Pending finalisation of offer

How and when are the rebates paid?



CFL and sustainability

Bulk purchase and issuing of free efficient lamps to households that are distributed door-to-door or at exchange points.

Replace inefficient, incandescent lamps with an equivalent, efficient compact fluorescent lamp.

Market focus: Residential

Complete project cost (including lamp procurement and project implementation activities) covered to enable free issue.

Carbon revenue used to assist with project financing.

Solar Water Heating

Pre-approved for
In support National Government's initiative to have 1,000,000 SWHs installed by 2014

Replace inefficient geyser with a pre-approved solar water heater.

Market focus: Residential

Standard value per approved geyser
Rebate values are capped within a size band

Rebate programme to be replaced by contracting approach

Demand Response as at 31 Jan 2012

Demand Market Participation (DMP) programme; Demand Response Aggregated Pilot (DRAPP) programme

DMP

Size: Customers with 20-80MW demand reduction potential

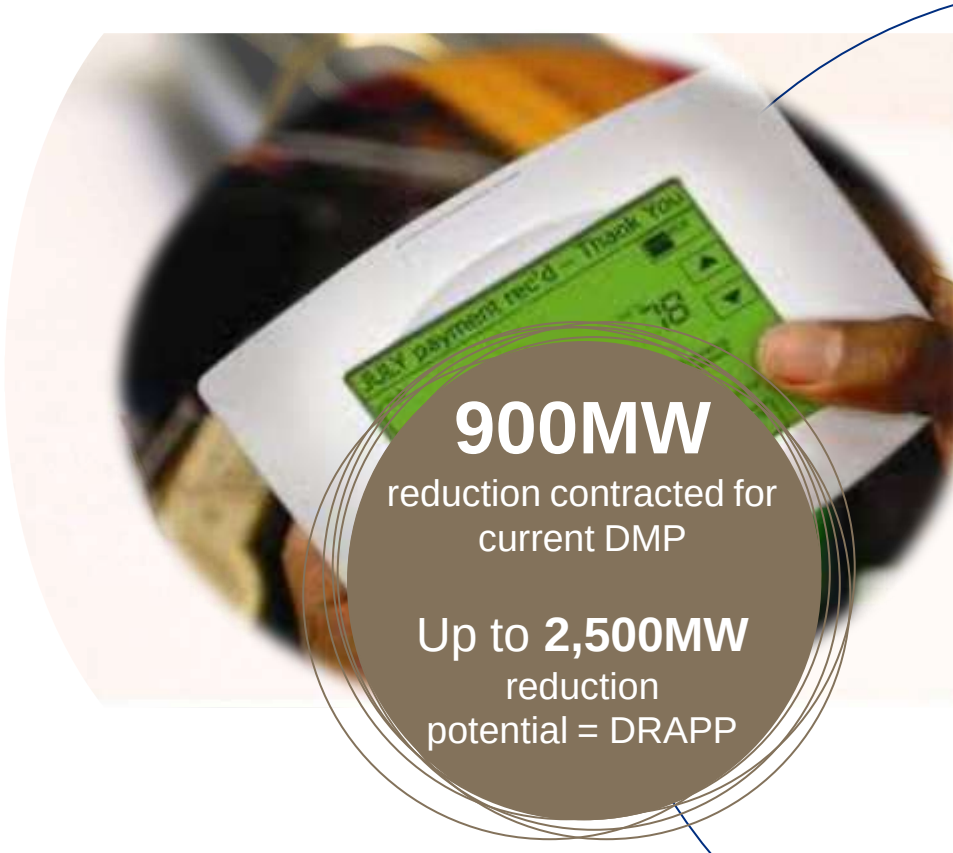
Market focus: Industrial

DRAPP

Size: Customers with <10MW demand reduction potential

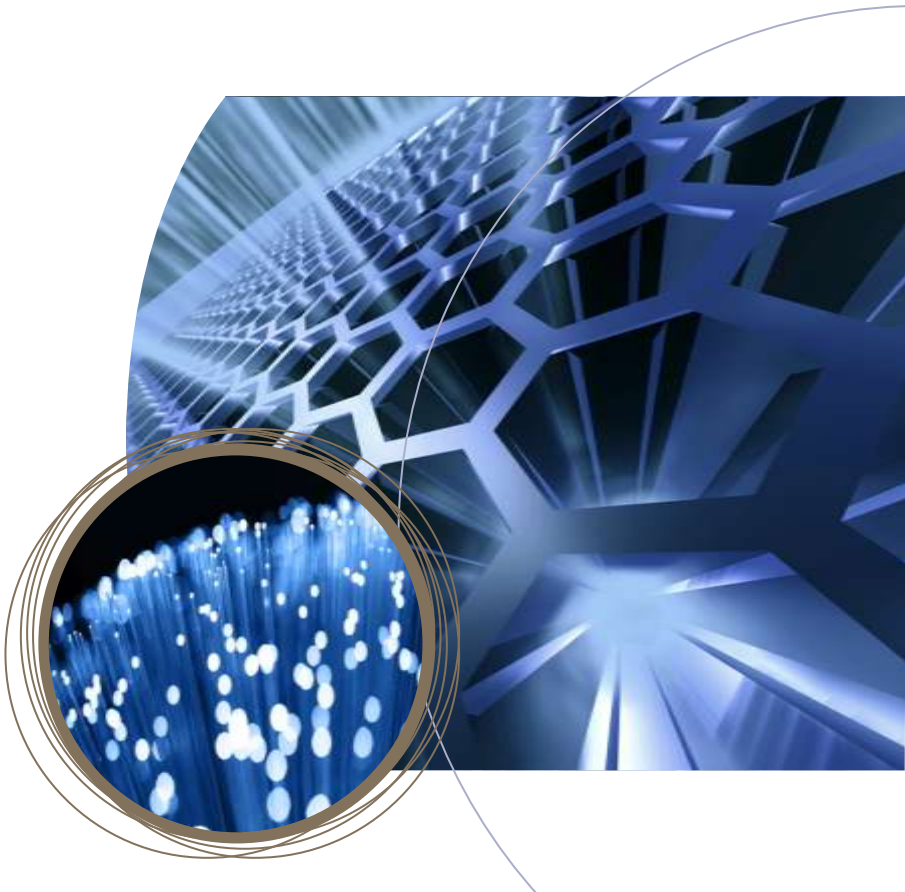
Market focus: Small industrial and commercial

Multiple fixed rate per MWh



FUTURE

Emerging and Future Focus



LED technology is making strides and offer the next tier of energy improvements in lighting

11 million downlighters installed

4.6 million in commercial/industrial market

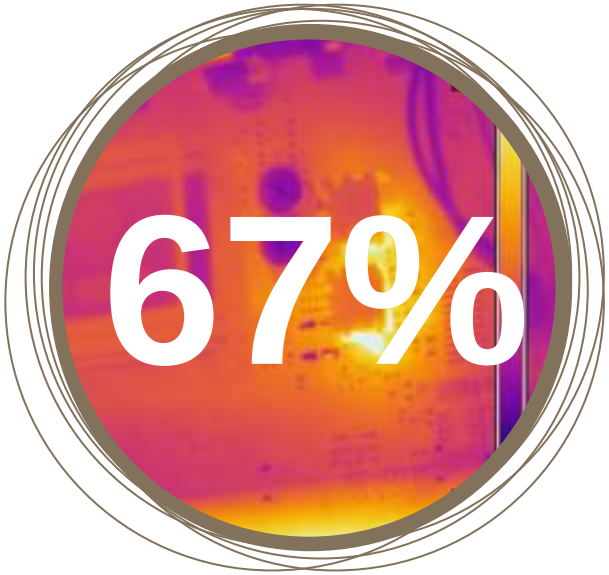
3 million LED retrofits targeted

60 MW peak demand savings potential

180 GWh per annum energy (per million)

Source: http://www.blowzone.co.uk/contemporary-led-chandeliers.php

Waste heat recovery enables economic and ecological efficiency improvements



percentage of E2PM* participants, who identified waste heat recovery as a key efficiency intervention (second most common intervention in the programme)

The **recovery of heat** and water in the production process and reintroducing these streams back into the originating process offers **significant improvement to the efficiency of the operation** and ultimately **makes business sense** as the operating costs are reduced.

4MW
plant currently being **piloted** under the **standard offer**.
5 more pilot plants applications under review ranging from
4 - 30MW

| **Sources:** Eco-efficiency opportunities fact sheet. Manufacturers and Processors: Waste Heat. Compiled by the Eco-Efficiency Centre, a non- profit, non-government educational and environmental management support centre for small- and medium-sized enterprises in Nova Scotia.
* Eco-Efficiency Program for Manufacturers (E2PM) that ran from 1998 t0 2009.

Energy efficiency and renewable energy are key components for optimal energy usage

Optimal energy usage requires a combination of energy efficiency and

interventions.

Accordingly several initiatives, including India's Ministry of Power and Canada's Clean Air Partnership, have broadened their **definitions of DSM** to incorporate **green/renewable energy.**

Eskom IDM, will be rolling out a small-scale renewable initiative as a in consultation with NERSA.

Way Forward

- We would like to engage with the Department of Public Works to follow a similar approach customised to their State owned Companies